STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Solid Waste Management
Davy Crockett Tower, 7th floor
500 James Robertson Parkway
Nashville, Tennessee 37243

June 30, 2025

Stephen B. Neal
President
Excel TSD of Tennessee, LLC
550 Rivergate Road
Memphis, Tennessee 38109

CERTIFIED MAIL
 # 9589 0710 5270 2282 4762 59
RETURN RECEIPT REQUESTED

RE: FINAL PERMIT

Facility:	**Excel TSD of Tennessee, LLC**
Permittee:	**Excel TSD of Tennessee, LLC**
Owner/Operator:	**Excel TSD of Tennessee, LLC**
Location:	**550 Rivergate Road Memphis Tennessee 38109**
Permit Type:	**Storage and Treatment in Containers and Tanks**
Unit Locations:	**Outside Hazardous Waste Container Management Area (OHWCMA), HWM Building A and HWM Building B**
EPA ID Number:	**TND980847024**
Permit Number:	**TNHW-197**

Dear Mr. Neal:

Attached is a copy of the final permit, which authorizes Excel TSD of Tennessee, LLC, to continue to perform hazardous waste storage and treatment activities at the above-referenced facility. Issuance of this permit is in accordance with Rule 0400-12-01-.07(7)(i), and it is effective as of the signature date: June 30, 2025. This permit is valid for 10 years.

The Response to Comments to the Draft Permit is included with the final permit. Please note that Rule 0400-12-01-.07(7)(k) outlines the process for appeals to a final permit decision.

If you have any questions or comments, you may contact me at Brett Harris by telephone at 615-393-9221 or by email at Brett.Harris@tn.gov.

Sincerely,

Beverly Philpot
Hazardous Waste Program Manager

cc: Jennifer Vogel, EPA, Region 4
Carlos Merizalde, EPA, Region 4
Alan Newman, EPA, Region 4
Lisa A. Hughey, Director, DSWM
Craig Almanza, Deputy Director of Central Operations, DSWM
Brett Harris, Hazardous Waste Permitting Manager, DSWM
Jim Holt, Memphis Environmental Field Office Manager, DSWM
Jordan Boster, Environmental Consultant, DSWM
Records.SWM@tn.gov
SWMHWP-TND000645770-EXCEL TSD-PERM-TNHW197 FINAL-20250630-%-CENTRAL-2203

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June 30, 2025

Stephen B. Neal
President
Excel TSD of Tennessee, LLC .
550 Rivergate Road
Memphis, Tennessee 38109

CERTIFIED MAIL
 # 9589 0710 5270 2282 4762 66
RETURN RECEIPT REQUESTED

RE: RESPONSE TO COMMENTS

Facility:	**Excel TSD of Tennessee, LLC**
Permittee:	**Excel TSD of Tennessee, LLC**
Owner/Operator:	**Excel TSD of Tennessee, LLC**
Location:	**550 Rivergate Road Memphis Tennessee 38109**
Permit Type:	**Storage and Treatment in Containers and Tanks**
Unit Locations:	**Outside Hazardous Waste Container Management Area (OHWCMA), HWM Building A and HWM Building B**
EPA ID Number:	**TND980847024**
Permit Number:	**TNHW-197**

Dear Mr. Neal:

Enclosed is a copy of the Response to Comments to the draft Excel TSD of Tennessee, LLC permit for the facility located at 550 Rivergate Road, Memphis, Tennessee 38109.

If you have any questions or comments concerning the Response to Comments or the final permit, please contact Brett Harris by telephone at 615-393-9221 or by email at Brett.Harris@tn.gov .

Sincerely,

Lisa A. Hughey, CHMM
Director

Enclosure – Response to Comments
Enclosure 2 – Response to Comment C.196 – Attachment 5 Text

cc: Jennifer Vogel, EPA, Region 4
Carlos Merizalde, EPA, Region 4
Alan Newman, EPA, Region 4
Lisa A. Hughey, Director, DSWM
Craig Almanza, Deputy Director of Central Operations, DSWM
Beverly Philpot, Hazardous Waste Program Manager, DSWM
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SWMHWP-TND000645770-EXCEL TSD-PERM-TNHW 197 RESP TO COMM-20250630-%-CENTRAL-2203

RESPONSE TO COMMENTS

Excel TSD of Tennessee, LLC Renewal Permit

This document has been prepared in accordance with Tennessee Rule 0400-12-01-.07(7)(j). It has resulted from the Tennessee Department of Environmental and Conservation (TDEC) Division of Solid Waste Management's (DSWM) issuance of a draft hazardous waste management permit for Excel TSD of Tennessee, LLC. (ETSD). The facility is located at 550 Rivergate Road, Memphis Tennessee 38109, EPA ID Number TND980847024. The conditions of the renewal permit allow the facility to continue to store and treat hazardous waste in Tanks F1 and F2, Hazardous Waste Management (HWM) Building A, HWM Building B, and the Outside Hazardous Waste Container Management Area. The draft renewal permit was issued as part of the process to replace TNHW-138, the existing ETSD permit.

Section A of this document describes the efforts made by DSWM to obtain public input. Section B summarizes and responds to all significant comments received from the public. Section C summarizes and responds to all significant comments received from the facility. Section D lists DSWM editorial changes.

A. Public Involvement Opportunities

ETSD held the pre-application meeting for the renewal application on April 10, 2018, as public noticed on March 9, 2018, in the Memphis Commercial Appeal and on March 14, 2018, on Memphis radio station FM 100. No oral or written comments were received from the public in response to these 2018 notices.

DSWM published the "Notice of Intent to Reissue Hazardous Waste Management Permit" to ETSD in the March 20, 2025, edition of Memphis' Commercial Appeal and sent a copy of the notice to all persons on the applicable DSWM Facility Mailing Lists. Thirty-second announcements of the action, referencing the notice published in the newspaper, were provided over local radio stations: WHBQ-AM and WHBQ-FM. The notice advised the public that copies of the permit application, fact sheet, and draft permit were available for review at the Memphis Public Library – South Branch Library located at 1929 S 3rd Street, Memphis, TN 38109 (901-415-2780). These documents were posted online at tn.gov/environment/notices/excel-tsd and available at the Nashville Central Office, Davy Crockett Tower, 7th Floor, 500 James Robertson Parkway, Nashville, TN 37243 (615-532-0780) and the TDEC Memphis Environmental Field Office, 8383 Wolf Lake Drive, Bartlett, TN 38133 (901-371-3000).

The public notice established a 45-day comment period that began on March 20, 2025, and ended on May 5, 2025. This public notice also described how interested persons could comment on the proposed action.

B. Public Comment/Response Summary

DSWM received a public comment during the established 45-day comment period. The following comment received from the public and the DSWM response are addressed below.

1. **Comment:** While the draft permit outlines various safety protocols, history has shown that regulatory oversight often falls short. The complexity of managing such hazardous materials increases the risk of non-compliance, whether intentional or accidental. Ensuring continuous, effective oversight will require substantial resources and commitment from both Excel TSD and the Tennessee Department of Environment and Conservation. I need to be sure that you will honor your commitments, as outlined in your Fact Sheet under Section II, B: *"Excel TSD must maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment."*
Given the significant risks associated with processing hazardous waste at the Excel TSD facility, I urge you and the Department to reconsider the issuance of this permit. Protecting the health and safety of my neighborhood and our city of Memphis must remain our top priority. I recommend a thorough reassessment of the facility's potential impacts, an additional public comment period to increase community engagement, and further exploration of alternative waste management solutions that pose fewer risks to our environment and public health.

   Response: DSWM has reviewed your comment and appreciates your commitment to ensure protection of the health and safety of the community and the City of Memphis. The air emissions are monitored as per Tennessee Rule 0400-12-01-.06(31), and .06(32) Air Emissions Standards for Tanks, Surface Impoundments, and Containers which is the equivalent of the Federal Resource Conservation and Recovery Act (RCRA) regulations 40 CFR Part 264 and 265 Subpart BB and CC. The permit requires daily inspection to the ancillary equipment to mitigate any air emissions. To further mitigate risks from onsite releases, the permit includes the Concrete Repair and Rehabilitation Plan for the Contained Area as Attachment 8.6 which includes a timeline for adequate repairs to be completed at the site. In addition to concrete being repaired, any releases identified will require the use of the Soil Sample Plan found in Attachment 12 to further identify areas that need remediation.

C. Facility Comments/Response Summary

Excel TSD of Tennessee, LLC submitted comments during the 45-day comment period. The comments and responses are addressed below. [1]

1. **Comment:** ETSD is taking this opportunity to notify TDSWM that ETSD has exercised its former lease-purchase arrangement with Best Wade Petroleum, Inc. ("BWP"), to acquire the adjacent BWP property that ETSD had previously been leasing from BWP. This property transaction has been completed and ETSD now owns this former BWP property that has officially been part of the ETSD facility

[1] Unless otherwise noted, comments from the permit applicant are reproduced in their original form.

since February 2017. Within the last few years, BWP has terminated its active petroleum operations at their former property and is now working with the Tennessee Division of Underground Storage Tanks (TDUST) to permanently close its former petroleum underground storage tank farm and associated pumping station on the property. As a result of this property transaction, TDSWM must remove from the Statement, Conditions, and Attachments that comprise the Draft Permit all references to BWP as an owner of the facility.

Response: The DSWM has reviewed the application and submittals from ETSD. The mention of Best Wade Petroleum no longer being co-owners has not been found in any of the Permit Renewal Applications submitted by ETSD. Tennessee Hazardous Waste Rule 0400-12-01-.08(9)(b)3 states the requirements for changes in the ownership of the facility and ETSD shall submit a permit modification once the permit is issued. No changes were made.

2. **Comment:** In Part B.5 of Section II (General Description of Facility and Operations) and associated Figures II.A-4, II.A-5, and II.A-6 of its Permit Renewal Application, ETSD described some Future Physical Modifications that were authorized by Modification #2 to Permit No. TNHW-138 but have not yet been implemented by ETSD. As described, these modifications will not materially impact any of the permitted units but will improve overall Facility operations. Part II.B.5 also describes the conditions that must be met – including certain Class 1 Permit modifications – when ETSD does implement these modifications. Inasmuch as these Future Physical Modifications have previously been authorized by TDSWM and will not materially impact any of the permitted units, ETSD sees no reason why they should not be similarly included in the Renewal Permit – and had included Part II.B.5 in its Permit Renewal Application with that intent. However, it appears that this portion of ETSD's Permit Renewal Application was overlooked in TDSWM's development of the Draft Permit. ETSD therefore insists that these Future Physical Modifications along with the conditions for their implementation be also incorporated into the Renewal Permit. Because these modifications are not being made to comply with any regulatory requirement, there is no need to incorporate into the Renewal Permit any schedule for their implementation.

Response: Activities that have yet to take place cannot be included in the permit. At the time the activities are implemented, ETSD will need to submit a permit modification. No changes were made.

3. **Comment:** In Sections II, III, and IV of the Draft Permit Conditions, TDSWM has included numerous requirements that are different from or additional to the requirements of the regulations on which the Permit Conditions are based. In some cases, applicable regulatory language has actually been removed. ETSD strongly objects to this practice which in effect hides such modified/additional requirements in what appears to be "boilerplate" language from the regulations. See Comments 10.b and 10.c below as examples. ETSD does not challenge TDSWM's authority to impose additional terms and conditions beyond those required by the regulations

if deemed necessary to protect human health and/or the environment. However, ETSD strongly believes that such authority should be exercised very carefully and not simply at the discretion of the TDSWM permit writer. If TDSWM wants to impose requirements different from or additional to those included in the regulations, then those requirements should either be openly negotiated with the Permit Applicant in the development of the implementing Attachment documents (the preferable option) or at the least identified in a separate "Special Conditions" portion of the Draft Permit along with statements for each such Special Condition describing TDSWM's justification for it. ETSD strongly believes that the fundamental conditions in Sections I, II, III, and IV of the Draft Permit should address just the applicable requirements from Rule 0400-12-01-.06, include references to the applicable rule, and closely replicate the applicable regulatory language. As described in the individual comments on portions of Permit Conditions Sections II, III, and IV, ETSD believes that most if not all such modified/additional requirements that have been included are unnecessary or inappropriate.

Response: The DSWM drafted Sections I, II, III, and IV based upon Tennessee Rule 0400-12-01. No changes were made.

4. **Comment:** ETSD also strongly objects to TDSWM's practice of retyping and modifying into Permit Attachments portions of ETSD's Permit Renewal Application such as the Waste Analysis Plan, Closure Plan, etc. ETSD has no problem with incorporating such documentation in the Permit *by reference* but believes it completely inappropriate and unnecessary for TDSWM to produce modified versions of these documents as Permit Attachments. This is simply a massively wasteful effort that provides virtually unlimited opportunities to screw things up! The permitting process described in Rule 0400-12-01-.07 requires the Permit Applicant to develop and submit this documentation and for TDSWM to determine if it completely addresses all applicable provisions of Rules 0400-12-01-.06 and -.07 and adequately demonstrates that the Applicant will comply with the applicable standards of Rule 0400-12-01-.06. TDSWM is required to issue Notices of Deficiency if the submitted Application is incomplete and/or inadequate, and the Applicant is then required to respond to such NODs with additional or revised documentation that attempts to correct the identified deficiencies. This procedure is supposed to continue until either (1) a complete and adequate Application is submitted and TDSWM proceeds to the Draft Permit step, or (2) the Applicant determines he cannot or does not want to correct the deficiencies and gives up, or (3) TDSWM determines that the Application is complete but not quite adequate and incorporates into the Draft Permit certain additional requirements undesired by the Applicant but which TDSWM believes must be imposed to protect human health and/or the environment. There should thus be no need for TDSWM to re-type and produce new Attachments from the Permit Application documentation. Instead, the TDSWM should approve the Final Complete Permit Application and incorporate it in the Permit by reference and then reference the appropriate portions of the Approved Application by reference in its Permit Conditions. If TDSWM

finds it necessary to impose occasional additional or alternative requirements, or to provide clarification of a procedure or step described in a referenced Permit Application document, TDSWM can include such using "except that" or "in addition to" clauses to its reference to the Application document in the Permit Condition. Other State Hazardous Waste Programs successfully issue permits in this manner.

ETSD understands its obligation to submit a complete and adequate Application and has worked with TDSWM since 2018 to produce such through four official NODs and Responses and other unofficial information exchanges. ETSD has remained ready to continue these efforts since our December 2021 Response to TDSWM's last Notice of Deficiency. However, until receiving TDSWM's February 20, 2025, letter advising that TDSWM had determined ETSD's Permit Renewal Application to be complete, ETSD had received no correspondence from TDSWM concerning the completeness or adequacy of its Application.In particular, ETSD has received no further Notices identifying unresolved deficiencies in its Permit Renewal Application. ETSD therefore had no reason to believe significant deficiencies existed and was justifiably surprised and unhappy to see that several of the Attachments to this Draft Permit had been significantly modified from the versions we submitted. TDSWM made changes to apparently fix alleged deficiencies that had never been communicated to ETSD, while other changes actually remove language that had been inserted to address deficiencies identified in previous NODs. The TDSWM permit writer(s) also went far overboard in cavalierly making changes that had nothing to do with Application completeness or technical adequacy. A great many of TDSWM's changes are unnecessary, inappropriate, and confusing, and some are just wrong. ETSD has addressed most of these unwelcome changes in its Comments on individual Attachments below

Response: The DSWM addresses the individual comments mentioned in this comment below.

5. **Comment:** Title page 1, Par. 1, sent. 1 – To remove redundancy within the paragraph, ETSD suggests that the words "*management facility*" be substituted for the words "*storage and treatment in containers and tanks*" in this sentence.

Response: The words indicated in the comment cannot be changed because it is describing the name of the permit type which is Storage and Treatment in Containers and Tanks. No changes were made.

6. **Comment:** Title page 1, Par. 2 – This paragraph seems unnecessary and inappropriate in that it addresses only a specific few and not necessarily the most important requirements of the Permit. Why is it included?

Response: The DSWM has reviewed the paragraph and determined the inclusion of T.C.A. §68-212-108 is vital to the understanding of the passage. No changes were made.

7. **Comment:** Title page 1, Par. 2, sent. 1 – This seems to be only a partial sentence or the incorrectly punctuated lead-in to the second sentence and requires correction.

Response: The DSWM has reviewed the first sentence. The period after T.C.A. §68-212-108 will be replaced with a comma for grammatical correctness.

8. **Comment:** Title page 1, Par. 2, sent. 2 – To properly define and limit the scope of the Permit, insert the words "*in Rule Chapter 0400-12-01 that are*" between the word "*standards*" and the word "*applicable*". There are certainly air emission standards, and possibly land disposal restrictions, that are applicable to the facility under authorities and programs for which this Permit has no authority to require compliance.

Response: The DSWM has reviewed this sentence. The addition of "*in Rule Chapter 0400-12-01 that are*" is not required for this statement to be accurate. No changes were made. (NOTE: This sentence is located on Title Page 1, Par. 3, sent. 2)

9. **Comment:** Title Page 1, Par. 3, sent. 2 – To be more clear and accurate, this sentence should be rewritten to read as follows: "*This permit consists of the conditions specified herein, the various documents included as attachments (the provisions of which shall also be considered terms and conditions), and the applicable regulations of Rule Chapter 0400-12-01 that are included or referenced in the conditions and attachments.*"

Response: The proposed sentence does not add clarity. No changes were made.

10. **Comment:** Title Page 1, Par. 3, sent. 3 – The purpose of and need for this sentence is unclear in that it defines the term "*applicable requirement*" which is not used elsewhere in the paragraph. The sentence should be deleted or the paragraph re-written to clarify its purpose and point.

Response: The proposed change does not add clarity. No changes were made.

11. **Comment:** Title Page 1, Par. 3, last sentence – ETSD strenuously objects to the apparent intent of this sentence to require ETSD to comply with all subsequent modifications to the Rule Chapter 0400-12-01 regulations included or referenced in the permit terms and conditions and attachments as such modifications become effective. This sentence is inconsistent with the language of the second paragraph of Standard Condition I.A (Effect of Permit) which correctly states the relationship between Permit terms and conditions and modified or new regulations promulgated after Permit issuance. This sentence and paragraph must be modified to be consistent with Standard Condition I.A.

Response: All rules associated with Tennessee Rule 0400-12-01 are applicable to ETSD. No changes were made.

12. **Comment:** Title Page 2, The first two one-sentence paragraphs on this page should be combined into one paragraph.

Response: The DSWM combined the two one-sentence paragraphs to make one paragraph.

13. **Comment:** Title Page 2, In the second sentence of the third paragraph, the unnecessary and inappropriate comma that follows the word "*application*" should be deleted for clarity.

Response: The DSWM has reviewed the sentence and determined the comma is used correctly. No changes were made.

14. **Comment:** Table of Contents page 1 - Item II.P in the Table of Contents must either (1) be deleted, or (2) have the title replaced with the parenthesis "(RESERVED)", or (3) have the parenthesis "(RESERVED)" added after the title in the same manner as it is done for item IV.B. It is unnecessary and misleading to include provisions for Process Vents in the Permit when there are none at the ETSD Facility. To add such process vents, ETSD would have to first modify the Permit and Standard Condition II.P could properly be added at that time.

Response: "(RESERVED)" was added after II.P title as a place holder in case future regulations require additional information.

15. **Comment:** Table of Contents, page 4 - Delete the heading "*APPENDICES*" because there appear to be none.

Response: The DSWM reviewed the comment and removed "APPENDICES" as there are no Appendices attached to the permit.

16. **Comment:** It seems unnecessary and inappropriate to list the Figures and Tables in the main Table of Contents. They are already included in the Tables of Content for the individual Attachments in which they appear and the text of those Attachments provide the appropriate meaning for the figure or table and the appropriate context for their use (which might be lost if someone just finds the figure or table from the main Table of Contents).

Response: The DSWM reviewed the comment and determined removing the tables and figures from the Table of Contents does not add clarity. The tables and figures will remain in the main Table of Contents to acknowledge what tables and figures are found within the permit.

17. **Comment:** Section I – Standard Conditions, I.A, par. 1 – For added clarity and specificity, add the words "*pursuant to Rule 0400-12-01-.07*" at the end of the last sentence in this paragraph.

Response: The DSWM has reviewed this comment. The addition of "*pursuant to Rule 0400-12-01-.07*" to the specified sentence does not add clarity. No changes were made.

18. **Comment:** Section I – Standard Conditions, I.C – It is not clear to ETSD why TDSWM believes it necessary to fill up the Standard Conditions with the same definitions of terms that are included in HWM Rule 0400-12-01-.01(2)(a) when the introductory language of Section I.C already clearly includes such definitions by reference. It is also not clear why TDSWM chose to include some definitions from Rule 0400-12-01-.01(2)(a) and not include others that seem equally worthy of inclusion. For example, it would seem like the Rule 0400-12-01-.01(2)(a) definition of "in operation" would be included in the I.C definitions because that term is integral to the already included definition of "at reasonable times" and is included in several regulatory requirements. Another example is the inclusion in I.C of the definitions of "inactive portion" and "closed portion" but the omission of the definition of "active portion". If TDSWM is going to include in I.C any Rule 0400-12-01-.01(2)(a) definitions, then it would seem appropriate to include in I.C all of the definitions from Rule 0400-12-01-.01(2)(a) that are relevant to the permitted facility.

Response: The DSWM has reviewed this comment. The DSWM determined which definitions to include based upon the type of permit and facility. The definition section was not changed.

19. **Comment:** Section I – Standard Conditions, I.C, "Designated Facility" definition – There was a formatting error in typing this definition from Rule -.01(2)(a). The last sentence of part (b) should be included as separate part (c).

Response: The DSWM has reviewed this comment. To match the rule definition found in Tennessee Rule 0400-12-01-.01, the definition of "Designated Facility" has been updated to itemize the specified sentence ("If a waste is destined to a facility in an authorized State which has not yet obtained authorization to regulate that particular waste as hazardous, then the designated facility must be a facility allowed by the receiving State to accept such waste") as part (c).

20. **Comment:** Section I – Standard Conditions, I.C, "Dry Weight Equivalent" definition – This definition must be deleted. It is not included in the regulations and is not otherwise used in the Permit Conditions, ETSD is not aware of it being used anywhere in the Attachments, and this definition bears no resemblance to the normal use of the term where it is a measure of weight not volume.

Response: The DSWM has reviewed the comment and has removed the definition of "Dry Weight Equivalent" due to "Dry Weight Equivalent" not being mentioned within the rest of the permit.

21. **Comment:** Section I – Standard Conditions, I.C, "Schedule of compliance" definition – To correct a typographical error, change the word "*or*" to the word "*of*".

Response: This typographical error was corrected from "a schedule, or remedial…" to "schedule of remedial…" to match the regulations.

22. **Comment:** Section I – Standard Conditions, I.D.2 – For clarity and completeness, ETSD suggests adding the following to the end of the last sentence: "*as well as those of Rule 0400-12-01-.07(2) and Rule 0400-12-01-.07(7)*".

Response: The DSWM has reviewed this comment. The addition of "*as well as those of Rule 0400-12-01-.07(2) and Rule 0400-12-01-.07(7)*" to the specified sentence does not add clarity. No changes were made.

23. **Comment:** Section I – Standard Conditions, I.D.10.(a) – The references to EPA Region 4 technical documents should be updated to be current.

Response: The DSWM has reviewed I.D.10(a) and has updated the technical documents to the following applicable documents: "the EPA Region 4 Laboratory Services Branch's Quality System and Technical Procedures for LSASD Field Branch (most recent version)", " from EPA Region 4 Laboratory Services Branch's Laboratory Operations and Quality Assurance Manual (most recent version)", and "from EPA Region 4 Laboratory Services Branch's Sample and Evidence Management (most recent version)."

24. **Comment:** Section I – Standard Conditions, I.J – This description of the "Permit Structure" should be presented as a free-standing separate entry moved to immediately following the Table of Contents because (1) it simply is not a Section I Standard Condition with which the permittee must comply, and (2) it makes no sense to include it *after* the Section I Standard Conditions have already been presented.

Response: The DSWM has reviewed this comment. Moving Section I.J does not add clarity. No changes were made.

25. **Comment:** Section II – General Facility Conditions, ETSD does not understand or agree with how TDSWM presents these permit conditions.

Response: The DSWM has reviewed this comment and addresses these concerns in later comments.

26. **Comment:** Section II – General Facility Conditions, Why do the Permit Conditions in this Section II as well as Sections III and IV not include citations to the provisions of Rule 0400-12-01-.06 from which they are derived? ETSD believes that each Subsection must include a citation to the specific portion(s) of Rule 0400-12-01-

.06 on which the Subsection condition(s) is(are) based and authorized. By citing their source regulations, the Permit Conditions would then clearly carry with them the definitions of terms, interpretative notes, and historical understandings associated with the source regulations. Do such carry with the Condition statements if the source rules are not cited? Further, it makes no sense to eliminate references to these "source" regulations in Rule 0400-12-01-.06 from these permit conditions while including in these same conditions cross-references to other portions of Rule 0400-12-01-.06 and/or Rule Chapter 0400-12-01.

Response: The DSWM has reviewed this comment. Adding all the specific citations does not add clarity. No changes were made.

27. **Comment:** Section II – General Facility Conditions, How does TDSWM select which of the standards from the source regulations to spell out in the Permit Conditions? ETSD can discern no rhyme or reason to which regulatory standards are addressed in the Conditions. ETSD strongly believes that regulatory requirements that are not applicable to the Permittee or his facility should be excluded from the Permit Conditions so as to both (1) accurately describe what is required of the Permittee and (2) avoid misleading a person reviewing the Permit. However, whether such inapplicable requirements are included in the Permit Conditions seems to vary from Subsection to Subsection.

Response: The DSWM has reviewed Section II and found the conditions included to be adequate for the ETSD permit. No changes were made.

28. **Comment:** Section II – General Facility Conditions, ETSD also believes it useful and expedient to refer to the Attachment documents rather than the applicable regulations themselves where such documents describe both what is required by the regulation and how the Permittee will comply or has complied with it. The Attachments – which the Permit also identify as permit conditions – typically describe much more completely and specifically what the Permittee must do to comply. Citing an Attachment along with the source regulation also clarifies and simplifies the statement of the condition. For example, it seems that the applicable requirements under Subsection II.D – Security could be simply and completely presented – and compliance defined – by the following two-sentence paragraph:

> *Rule 0400-12-01-.06(2)(e) sets forth requirements with which the permittee must comply to prevent the unknowing entry, and minimize the possibility for unauthorized entry, of persons or livestock onto the active portion of the facility. Attachment 3 describes how the permittee will comply with the applicable portions of this rule.*

Of course, there are applicable requirements from some regulations that may not be adequately addressed in a Permit Attachment, and these will have to be cited or perhaps spelled out in the Permit Condition.

Response: The DSWM has reviewed this comment. Adding all the specific citations and attachments does not add clarity. No changes were made.

29. **Comment:** Section II – General Facility Conditions, . ETSD suggests that the Draft Permit be revised, to the extent possible, to present all or portions of Subsections C, D, E, F, G, H, I, L, Q, and R of this Section II as well as Sections III and IV and the whole of Sections III and IV, in the simple manner described in Comment 5.d above for Subsection D.

Response: The DSWM has reviewed this comment. Adding all the specific citations and attachments does not add clarity. No changes were made.

30. **Comment:** Section II – General Facility Conditions, II.C – This Subsection must be revised. For some unknown reason, TDSWM has tried to incorporate everything involving sampling, analysis, and monitoring under one heading when these are different things that are also (and better) addressed in different portions of these Permit Conditions. The title of this Subsection must be changed to simply "WASTE ANALYSIS" because (1) that would appropriately track the TN Rule 0400-12-01-.06 regulations; (2) it is unnecessary and inappropriate to try to address in this Subsection the testing of liquids that accumulate in secondary containment structures as described in Comment 6.e below; and (3) the proposed Paragraph 5 on "Sampling and Monitoring" is also unnecessary and inappropriate as described in Comment 6.f below. See also the Section II General Comments above.

Response: The DSWM has reviewed this comment. Separating sampling, analysis, and monitoring does not add clarity. No changes were made.

31. **Comment:** Section II – General Facility Conditions, II.C.2.(a) – Delete the second, third, and fourth sentences. See proposed new C.2(d) in Comment that follows for a more complete and accurate description of how forms are to be modified.

Response: The DSWM has reviewed this comment. Removing the second, third, and fourth sentence does not add clarity to the permit. No changes were made.

32. **Comment:** Section II – General Facility Conditions, II.C.2 – Attachment 2.1 includes several forms that are used by ETSD in Implementation of its Waste Analysis Plan. These forms are used to collect and record the information needed for ETSD to accept and properly manage hazardous wastes in compliance with the requirements of TN Rule Chapter 0400-12-01. Changes to these forms may be needed in the future to collect additional information required as a result of modifications or additions to this Rule Chapter. It is also important to note that these forms may also be used to collect or record information that ETSD needs to obtain or generate to comply with other Federal, State, or local regulatory requirements, to help ensure compliance with the requirements of "down-stream" vendor/customers, or for other business reasons. Thus, ETSD must have the ability to readily modify and utilize these forms – without having to actually modify the Permit – as long as the required hazardous waste management information is not lost. To that end, ETSD strongly suggests that the new language below be added as new subpart (d) of Paragraph II.C.2.:

(d) Attachment 2.1 includes several forms that are to be used by the permittee in its implementation of the Waste Analysis Plan. These forms may only be modified to delete existing information elements, or to add language that changes the intent of an existing information element, via a modification to this Permit in accordance with Rule 0400-12-01-.07(9). However, the permittee is not required to obtain a modification to this permit to change the format or style of the forms, reorganize the presentation of the existing information elements, or add new information elements.

Response: The DSWM has reviewed this comment and determined that adding the suggested language would not follow the regulations set forth in Tennessee Rule 0400-12-01. No changes were made.

33. **Comment:** Section II – General Facility Conditions, II. C.4.(a) – This subparagraph should be deleted as unnecessary, duplicative, and thus confusing. Subparagraph C.2.(c) already requires that the requirements of this subparagraph (a) be included in the Waste Analysis Plan and Subparagraph C.2.(a) requires the Plan in Attachment 2 be implemented. Subparagraph C.4.(a) adds nothing but duplication.

Response: The DSWM has reviewed this comment. Removing the specified subparagraph does not add clarity. No changes were made.

34. **Comment:** Section II – General Facility Conditions, II.C.4.(b) – ETSD insists that this paragraph be deleted as unnecessary, duplicative, and inappropriate. The characterization and management of liquids found in the secondary containment systems for container storage units is already (and appropriately) addressed by Permit Conditions III.G.2(e) and III.G.5 and Attachment 8. Similarly, the characterization and management of liquids found in the tank farm secondary containment system is already (and appropriately) addressed by Permit Condition IV.C.7 and Attachment 9. It is completely unnecessary and confusing to include competing language in this Subparagraph C.4.(b).

Response: The DSWM has reviewed this comment. Removing this paragraph does not add clarity. No changes were made.

35. **Comment:** Section II – General Facility Conditions, II.C.5 – ETSD also insists that this paragraph be deleted as unnecessary, duplicative, and inappropriate. It is simply duplicative of Permit Condition I.D.10.(a), including the reference to outdated USEPA Region 4 technical documents. Further, the only monitoring that ETSD must perform pursuant to this Permit is the Subpart AA and Subpart BB organic air emission monitoring performed using a direct-reading instrument, and the procedures and recordkeeping for that are referenced in Permit Condition IV.J and detailed in Attachment 9.

Response: The DSWM has reviewed this comment. Removing this paragraph does not add clarity. However, the references to the EPA's technical documents found

in the paragraph were updated as follows: "USEPA Region 4, Science and Ecosystem Support Division's (SESD) Field Branches Quality System and Technical Procedures" was changed to "the EPA Region 4 Laboratory Services Branch's Quality System and Technical Procedures for LSASD Field Branch (most recent version)", "the Field Branches Quality System and Technical Procedures" was changed to "the EPA Region 4 Laboratory Services Branch's Quality System and Technical Procedures for LSASD Field Branch (most recent version)", and "Test Methods for Evaluating Solid Waste Physical/Chemical Methods" was changed to "Hazardous Waste Test Methods / SW-846."

36. **Comment:** Section II – General Facility Conditions, II.C.2.(b) and (c) – These two paragraphs should be deleted as unnecessary because the Waste Analysis Plan is already completed and included in Attachment 2.

Response: The DSWM has reviewed this comment. Removing these paragraphs does not add clarity. No changes were made.

37. **Comment:** Section II – General Facility Conditions, II D.2 – This paragraph is a good example of the concerns addressed in Comment 5.c above. It makes no sense that this signage requirement – which is the least important of the Security requirements of Rule 0400-12-01-.06(2)(e) – is the only one of those requirements presented as a separate paragraph in this Subsection. Unless Subsection II.D is presented as described in Comment 5.c above, all or none of the applicable requirements should be spelled out with a citation to the appropriate portion of Rule 0400-12-01-.06(2)(e) on which it is based.

Response: The DSWM has reviewed this comment. Changing Section II.D.2 does not add clarity. No changes were made.

38. **Comment:** Section II – General Facility Conditions, II E.1 – To clarify the second sentence, ETSD suggests adding the word "*and*" between the word "*schedule*" and the word "*on*" and replacing "*form(s)*" with "*forms*".

Response: The DSWM has reviewed this comment. The suggested changes do not add clarity. No changes were made.

39. **Comment:** Section II – General Facility Conditions, II.E.3 – References to the inspection forms should be to Attachment 4.1 rather than Attachment 4.

Response: This typographical error was corrected from "Attachment 4" to "Attachment 4.1."

40. **Comment:** Section II – General Facility Conditions, II.E.3 – For clarity, ETSD suggests inserting the word "*permit*" between the word "a" and the word "*modification*" in the last sentence.

Response: The DSWM has reviewed this comment and added "*permit*" between the word "a" and the word "*modification*" to add clarity.

41. **Comment:** Section II – General Facility Conditions, II.E.3 – ETSD suggests moving the last 3 sentences in this Paragraph to a new Paragraph E.4 titled "Modification of Forms". Retention of records and modifications of forms are separate matters.

Response: The DSWM has reviewed this comment. The paragraph II.E.3 is adequate as written. No changes were made.

42. **Comment:** Section II – General Facility Conditions, II.E.4 – ETSD suggests that this existing Paragraph be deleted because the requirement is already – and more appropriately – included in Subsection III.I and there is no reason to duplicate it here.

Response: The DSWM has reviewed this comment and determined there is no II.E.4 so this comment cannot be addressed.

43. **Comment:** Section II – General Facility Conditions, References to Attachments 5 and 5.1 are missing in this Subsection and must be appropriately added.

Response: The DSWM has reviewed this comment and found that Attachment 5 is referenced. No changes were made.

44. **Comment:** Section II – General Facility Conditions, II.H.1 – Insert the word "*and*" between the word "*maintain*" and the word "*operate*" in the first sentence.

Response: This typographical error has been resolved so that the word "and" is between "maintain" and "operate."

45. **Comment:** Section II – General Facility Conditions, II. H.5 – For some unknown reason TDSWM has in this paragraph made two inexplicable changes to the regulatory language at Rule 0400-12-01-.06(3) and 40 CFR §264.35 on which the paragraph is based. In the first sentence, TDSWM deleted from the first sentence the ending clause in the rule which reads "*unless it can be demonstrated to the Commissioner that aisle space is not needed for any of these purposes*". This clause clearly indicates the intent for flexibility in implementing the standard. TDSWM has then added a second sentence not included in the rule that reads as follows: "*Aisle space shall also be provided between the containers and the limits (e.g., walls and containment curbs) of the container storage areas*." It is unknown why TDSWM feels the need to change the aisle space requirements from the flexible, general, function-based standard (i.e., to allow unobstructed movement of personnel and emergency response equipment to any area of the facility) included in the U.S. EPA and Tennessee rules to this much more specific and restrictive language. This language is also inconsistent with the aisle space description in

Attachment 8. ETSD strongly objects to these peremptory changes and insists that the language of Paragraph H.5 be revised to mimic the language of the regulation on which it was based. It seems likely that TDSWM's changes were well-meaning but very doubtful that they are based on any particular expertise and experience in the storage of containers of hazardous materials. There are many ways to configure the storage of hazardous waste containers which allow containers to be placed against walls that will still meet the function-based standard described above. ETSD believes that the aisle space provisions for storage of hazardous waste containers that are set forth in Section XI of its Permit Renewal Application describe such a configuration.

Response: The DSWM has reviewed Section II.H.5 and has found the regulation was not quoted in its entirety. To include subparagraph (3)(f) of Tennessee Rule 0400-12-01-.06, the following language has been updated in the permit to read as :

5. Required Aisle Space: The permittee must maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency, unless it can be demonstrated to the Commissioner that aisle space is not needed for any of these purposes.

46. **Comment:** Section II – General Facility Conditions, II.H.7 – This paragraph must be deleted as inappropriate and unnecessary. First, these requirements are inappropriate because they seem to be made up by TDSWM personnel rather than statements of the requirements of Rule 0400-12-01-.06(3) or other regulation. Subparagraph 7.(a) is also inappropriate because it is neither safe nor practicable for ETSD personnel to try to perform the specified activities within the dark confines of a truck crowded with containers. Subparagraph 7.(b) is completely unnecessary because proper maintenance of such equipment is already required by Permit Conditions I.D.5 and II.B. Subparagraph 7.(c) is also completely unnecessary because (1) maintaining proper aisle space is already required by Subsection H.5, (2) proper management of containers is already required by Section III.D, and (3) there is not and should not be a standard for the very subjective matter of "cleanliness".

Response: The DSWM has reviewed this comment. Removing II.H.7 would not add clarity as the intent for II.H.7 is to maintain safety while unloading and loading trucks. No changes were made.

47. **Comment:** Section II – General Facility Conditions, II.I, See General Comment 5.c above and Comment #1 on Attachment 7 below.

Response: The DSWM has reviewed this comment. Adding all the specific citations and attachments will not add clarity. No changes were made.

48. **Comment:** Section II – General Facility Conditions, II.J.1.(b)(5)(v) – It now seems unnecessary and inappropriate to include the clause "*Beginning June 30, 2021,*" at the beginning of this part, and ETSD suggests that it be deleted.

Response: The DSWM has reviewed this comment. Removing II.J.1.(b)(5)(v) will not add clarity. No changes were made.

49. **Comment:** Section II – General Facility Conditions, II.J.2 – ETSD suggests that this Paragraph be deleted as inapplicable to the current ETSD facility which currently lacks any ability to receive shipments from rail or water transporters. The facility and Permit will have to be modified before such shipments could be received, and this Paragraph should appropriately be added during such modification.

Response: The DSWM has reviewed this comment. Removing II.J.2 will not add clarity. No changes were made.

50. **Comment:** ETSD suggests that TDSWM give strong consideration to including in this Subsection any modifications (that would be applicable ETSD) to 40 CFR §§264.71 and 264.72 that U.S. EPA has made but which have not yet been incorporated into Rule 0400-12-01-.06(5)(b).

Response: The Environmental Protection Agency has authorized the State of Tennessee to assume primary responsibility for implementing the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Program in the state. As such, the State of Tennessee has a rule system in place governing hazardous waste treatment, storage, and disposal. No changes were made to this Section.

51. **Comment:** Section II – General Facility Conditions, II.K.1.(b) – ETSD suggests deleting the second sentence of this subparagraph because it applies to disposal facilities which the ETSD facility is not and will never be.

Response: The DSWM has reviewed this comment. Removing II.K.1(b) will not add clarity. No changes were made.

52. **Comment:** Section II – General Facility Conditions, II.K.1.(c) and (f) – ETSD suggests deleting the references to Subsection II.P in these subparagraphs because they apply to process vents and none are present at the ETSD facility. Further, the facility and this Permit would have to be modified to add any process vents, and Subsection II.P and such references to it could appropriately added during such modification.

Response: The DSWM acknowledges that ETSD does not currently have any process vents and has removed II.P from II.K.1(c) and (f). If in the future, the permittee decides to modify the permit and the facility to include process vents, the permittee shall add these as part of a permit modification.

53. **Comment:** Section II – General Facility Conditions, II.K.1.(h) – ETSD suggests deleting the clause regarding post-closure costs for disposal facilities from this subparagraph because it applies to disposal facilities which the ETSD facility is not and will never be.

Response: The DSWM has reviewed this comment. Removing II.K.1(h) does not add clarity. No changes were made.

54. **Comment:** Section II – General Facility Conditions - Why do this Subsection II.K and Paragraph I.D.12 duplicate certain requirements? ETSD suggests that such duplication be eliminated.

Response: The DSWM has reviewed the comment. Removing Subsection II.K and Paragraph I.D.12 does not add clarity. No changes were made.

55. **Comment:** Section II – General Facility Conditions, II.L.1 – This paragraph should simply be titled "*Closure Plan*" and include only the sentence "*The permittee must close the facility in accordance with the Closure Plan in Attachment 11.*" that is currently presented as Subparagraph L.1.(b). Current subparagraph L.1.(a) should be deleted because the closure performance standard – without all the references to closure requirements for units/operations that do not exist at the ETSD facility – is already stated in Attachment 11.

Response: The DSWM has reviewed this comment. Modifying II.L.1 as described in this comment, including removal of II.L.1(a) will not add clarity. No changes were made.

56. **Comment:** Section II – General Facility Conditions, II.L.2 – Change the word "*to*" in the title of this Paragraph to the word "*of*" to match the regulation.

Response: The DSWM reviewed this comment and changed the word "*to*" in the title of this Paragraph to "*of*" to match the regulation.

57. **Comment:** Section II – General Facility Conditions, II.M– Financial Requirements, The single sentence that immediately follows the title of this Subsection is unnecessary and should be deleted.

Response: The DSWM has reviewed this comment. Removing the single sentence that immediately follows the title of this Subsection will not add clarity. No changes were made.

58. **Comment:** Section II – General Facility Conditions, II.M.5.(c) – This subparagraph should be deleted because it only applies to new facilities and the ETSD facility is certainly not a new facility

Response: The DSWM has reviewed this comment. Removing the Subparagraph will not add clarity. No changes were made.

59. **Comment:** Section II – General Facility Conditions, II.O.1.(c) and (d) – The word "*applicable*" must be inserted between the word "*the*" and the word "*requirements*" in both Subparagraphs.

Response: The DSWM has reviewed this comment. Due to Section II.O.1 being titled "Applicability", the suggested use of the term "applicable" is redundant and not needed. No changes were made.

60. **Comment:** Section II – General Facility Conditions, II.P – Air Emission Standards for Process Vents - ETSD objects to the inclusion of this subsection in the Draft Permit because the ETSD facility currently has no such process vents and no plans to add any. ETSD thus believes the inclusion of the subsection to be false and misleading. Further, ETSD could add process vents at the facility in the future only after first modifying the Permit, and these requirements should and could readily be added as part of such modification. ETSD insists that TDSWM either (1) delete this entire subsection from the Draft Permit (the preferred option), or (2) delete Paragraphs P.1 and P.2 and replace the title with the word "RESERVED", or (3) delete Paragraphs P.1 and P.2 and add a hyphen and the word "Reserved" immediately after the word "Vents" in the title of the Subsection (the least desired option).

Response: The DSWM has reviewed this comment and added "(RESERVED)" after II.P title as a place holder in the event that future regulation requires additional information.

61. **Comment:** Section II – General Facility Conditions, II.Q.3 – Subparagraph Q.3.(a) incorrectly states that the equipment identification list and unit locations are included in Attachment 4 of the Draft Permit. However, this information is actually located in Attachment 9.4. To correct this error, ETSD suggests that the following language be more appropriately added as a third paragraph in Paragraph Q.1 to clarify how Rule 0400-12-01-.06(31) applies to the ETSD facility:
The only equipment at the facility that is subject to the standards of Rule 0400-12-01-.06(31) is identified in Attachment 9.4 to this Permit. That attachment includes a "RCRA Subpart BB Summary Table" that identifies each piece of equipment by its type and unique identification number, describes its method of compliance or exclusion, and describes and numbers its monitoring points.
Attachment 9.4 also includes "Subpart BB Diagrams" for both Tank System F1 and Tank System F2 that schematically show the locations of this equipment and their monitoring points. This equipment, how it is used, and how Rule 0400-12-01-.06(31) applies to it is also described in Subsection 9.G of Attachment 9. All of this equipment is used in fuel blending operations and is in light liquid service. The only types of equipment identified are valves, open-ended valves/lines, and flanges,

elbows and other connectors, and none of this equipment is designated for no detectable emissions.

Response: The DSWM has reviewed this comment and found that equipment and its location can be found in Attachment 4.1 - Inspection Schedule Table and Attachment 4.2 – Inspection Checklists. However, since Attachment 9.4 also includes this information, the sentence has been changed to "Attachment 4 and Attachment 9.4 of this Permit include the equipment identification list and unit locations as provided in the Permit."

62. **Comment:** Section II – General Facility Conditions, II.Q.3.(a) – This Subparagraph must be deleted – the addition of the new paragraph described in Comment 17.a above covers and corrects the information this Subparagraph provided.

Response: The DSWM has reviewed this comment and due to not adding the suggested new paragraph, the current Subparagraph is still needed. No changes were made.

63. **Comment:** Section II – General Facility Conditions, II.Q.3 – The following sentence should be included either at the end of each of the three remaining Subparagraphs in this Paragraph or (preferably) as a separate fourth Subparagraph: "*Permittee's compliance with these requirements is described in Subsection 9.G of Attachment 9 and Attachment 9.4.*"

Response: The DSWM has reviewed this comment and does not see the benefit of adding the suggested sentence. No changes were made.

64. **Comment:** Section II – General Facility Conditions, II.Q.4.(b) – The following sentence should be added to this Subparagraph: "*As described in Subsection 9.G of Attachment 9 and Attachment 9.4, the permittee utilizes multiple pumps which qualify for this exclusion.*"

Response: The DSWM has reviewed this comment and does not see the benefit of adding the suggested sentence. No changes were made.

65. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks – II.Q.5(a)- ETSD insists that this Subparagraph be deleted as inapplicable.

Response: The DSWM has reviewed this comment and does not see the benefit of removing the suggested Subparagraphs. No changes were made.

66. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks – II.Q.5(b)(iii) - ETSD insists that this Part be deleted as inapplicable.

Response: The DSWM has reviewed this comment and does not see the benefit of removing the suggested Subparagraphs. No changes were made.

67. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks – II.Q.5(c)(iv) – ETSD insists that this Part be deleted as inapplicable.

Response: The DSWM has reviewed this comment and does not see the benefit of removing the suggested Subparagraphs. No changes were made.

68. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks – II.Q.5(e)(iii) - ETSD insists that this Part be deleted as inapplicable.:

Response: The DSWM has reviewed this comment and does not see the benefit of removing the suggested Subparagraphs. No changes were made.

69. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks – II.Q.5(f) - ETSD insists that this Subparagraph be deleted as inapplicable because the ETSD facility has no closed-vent systems or control devices. Again, the Facility and the Permit would have to be modified to add such and this conditions could also be appropriately added as part of that modification.

Response: The DSWM has reviewed this comment and does not see the benefit of removing the suggested Subparagraphs. No changes were made.

70. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks – II.Q.5 - ETSD notes that there is no Subparagraph (g).

Response: The typographical errors noted in this comment were corrected as follows: the previous subparagraph II.Q.5(h) was changed to II.Q.5(g) and the previous subparagraph II.Q.5(i) was changed to II.Q.5(h).

71. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks – II.Q.5(h) - ETSD insists that this Subparagraph be deleted as inapplicable.

Response: The DSWM has reviewed this comment and does not see the benefit of removing the suggested Subparagraphs. No changes were made.

72. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks – II.Q.5(i) - ETSD insists that this Subparagraph be deleted as inapplicable.

Response: The DSWM has reviewed this comment and does not see the benefit of removing the suggested Subparagraphs. No changes were made.

73. **Comment:** Section II – General Facility Conditions, II.Q – Air Emission Standards for Equipment Leaks. ETSD notes that there is no Paragraph Q.6.

Response: The typographical errors noted in this comment were corrected as follows: the previous paragraph II.Q.7 was changed to II.Q.6, the previous paragraph II.Q.8 was changed to II.Q.7, and the previous paragraph II.Q.9 was changed to II.Q.8.

74. **Comment:** Section II – General Facility Conditions, II.Q.8 – ETSD suggests adding the following sentence to this Paragraph to appropriately reference the pertinent information in Attachment 9: "*The permittee must monitor and repair equipment as described in Subsection 9.G of Attachment 9, document such efforts on the "Subpart BB Leak Detection Monitoring Log" and "Subpart BB Equipment Repair Log " forms included in Attachment 9.5, and retain the completed Logs as part of the Facility's Operating Record for a period of at least three years.*"

Response: The DSWM has reviewed this comment. Adding the suggested sentence provides more detail regarding efforts ETSD must perform. The following sentence was added as Subparagraph (d) to II.Q.8 "The permittee must monitor and repair equipment as described in Subsection 9.G of Attachment 9, document such efforts on the "Subpart BB Leak Detection Monitoring Log" and "Subpart BB Equipment Repair Log" forms included in Attachment 9.5, and retain the completed Logs as part of the Facility's Operating Record for a period of at least three years."

75. **Comment:** Section II – General Facility Conditions, II.R.1 – For the sake of clarity, ETSD strongly suggests that confusing Subparagraphs (a) and (b) be deleted and that Paragraph 1 be rewritten as follows:
"*Rule 0400-12-01-.06(32) imposes certain air emissions standards for tanks and containers holding hazardous wastes which have an average VO concentration (at the point of origination) of 500 ppmw or more, as determined using the procedures set forth in part (d)2 of that rule. Except for tanks and containers that are excluded pursuant to part (a)2 of that rule, the permittee must manage such tanks and containers at his facility in compliance with the applicable requirements of those air emission standards.*"
This language is simple, clear, and accurate, and more consistent with the approach taken in Subsection Q for the Subpart BB standards.

Response: The DSWM has reviewed this comment. The subparagraphs are adequate as written. No changes were made.

76. **Comment:** Section II – General Facility Conditions, II.R.3 – ETSD suggests that this Paragraph be deleted because most of its Subparagraphs are inapplicable and its provisions are effectively covered by the revised Paragraph Q.1 language in Comment 18.a above.

Response: The DSWM has reviewed this comment. Paragraph II.R.3 is adequate as written. No changes were made.

77. **Comment:** Section II – General Facility Conditions, II.R.4 – ETSD insists that this Subparagraph be deleted because it makes no sense. As described in Attachment 9, ETSD operates two hazardous waste tank systems at the facility and these are identified as "F1" and "F2". ETSD does not know why TDSWM is referencing a "Mix Tank" in this Paragraph.

Response: The DSWM has reviewed II.R.4. The phrase "a mix tank that is" has been replaced with "two hazardous waste tank systems identified as F1 and F2 that are" in II.R.4(a).

78. **Comment:** Section II – General Facility Conditions, II R.5 – ETSD insists that this Subparagraph be deleted as unnecessary and confusing. To make sense, relevant waste determination procedures must be addressed in Paragraph R.6 (Standards: Tanks) and R.7 (Standards: Containers).

Response: The DSWM has reviewed this comment. Paragraph II.R.5 is adequate as written. No changes were made.

79. **Comments:** Section II – General Facility Conditions, II.R.6 – This Paragraph must be completely rewritten. For some unfathomable reason, TDSWM is in this Paragraph requiring ETSD to manage its hazardous waste tank systems F1 and F2 in accordance with Level 2 tank standards. This is completely inconsistent with Subsection 9.G of Attachment 9 which clearly explains that Tanks F1 and F2 are subject to Level 1 tank standards. ETSD suggests that the Paragraph be revised to read as follows:

6. Standards for Tanks

The permittee is authorized to utilize the two 6,000-gallon tanks identified as Tank F1 and Tanks F2 for the storage and treatment of hazardous wastes utilized in ETSD's fuel blending operations and to operate them in accordance with the requirements set forth in the subparagraphs below.

(a) The tanks must not be heated by the permittee.

(b) The tanks must not be used for any waste stabilization process as defined in Rule 0400-12-01-.05(29)(b).

(c) Prior to first placing a hazardous waste in either tank, the permittee must determine that the hazardous waste has a maximum organic vapor pressure less than 76.6 kPa (11.1 psi) as described in Rule 0400-12-01-.06(32)(d)3 and Attachment 9. Thereafter, the permittee must perform a new determination whenever changes to the hazardous waste managed in the tank could potentially cause the maximum organic vapor pressure to equal or exceed 76.6 kPa (11.1 psi). As described in Rule 0400-12-01-.06(32)(j)2.(ii)(I) and Attachment 9, the permittee must maintain documentation of these determination in the facility's operating records for at least three years."

(d) As described in Attachment 9, tanks F1 and F2 are designed and constructed with an integral fixed roof and closure devices that meet the requirements set forth in Rule 0400-12-01-.06(32)(e)3.(ii)(I), (II), (III)I., and (IV). The permittee

shall control air emissions from these tanks by implementing the following Tank Level 1 controls:

(i) Whenever hazardous waste is in the tank, the permittee must ensure that each closure device is secured in the closed position except as described in Rule 0400-12-01-.06(32)(e)3.(iii)(I) and Attachment 9.

(ii) At least annually, the permittee must inspect the fixed roof and its closure devices for defects that could result in air pollutant emissions. Such inspections shall be performed in accordance with the provisions of Rule 0400-12-01-.06(32)(e)3.(iv)(I) and Attachment 9. If a defect is detected, the permittee must repair the defect in accordance with the requirements of Rule 0400-12-01-.06(32)(e)11 and Attachment 9. The permittee must make and maintain a record of such inspections and repair efforts for at least three years in accordance with Rule 0400-12-01-.06(32)(j)2.(i) and Attachment 9. Attachment 9.5 includes a "Tank Roof Subpart CC Inspection/Repair Log" that is to be used to document the inspection and repair efforts and to be the maintained record.

Response: The DSWM has reviewed the comment. Section II.R.6 was revised to require compliance with Level 1 Tank Standards. The following was added:

"6. Standards: Tanks

The permittee is permitted to store and treat hazardous wastes in Tank F1 and F2. The tanks must comply with Level 1 tank standards of Rule 0400-12-01-.06(32)(e)3.

(a) The maximum organic vapor pressure, as determined by Rule 0400-12-01-.06(32)(d)3(ii), must be less than 76.6 kPa (11.1 psi) for each tank mentioned above.

(b) The hazardous waste in the tank cannot be heated to a temperature that is greater than the temperature at which the maximum organic vapor pressure is determined under Rule 0400-12-01-.06(32)(d).

(c) The hazardous waste in the tanks must not be treated by the permittee using a waste stabilization process, as defined in Rule 0400-12-01-.05(29)(b).

(d) Whenever a hazardous waste is in a tank, the fixed roof must be installed with each closure device (e.g., manholes, instruments connections, pipe nozzles) secured in the closed position except for routine inspections, maintenance, and other activities needed for normal operations.

(e) The permittee must inspect the tanks, and all covers and closure devices, at least once per year, or retest the tanks to ascertain that the air emissions from the tank systems comply with the design and with the requirements specified in Rule 0400-12-01-.06(32)(e)3(iv). All inspection and monitoring activities must be conducted at times when the unit is in operation, and by qualified persons with the appropriate training.

(f) The permittee shall transfer hazardous waste to a tank subject to Rule 0400-12-01-.06(32)(e) in accordance with the requirements of Rule 0400-12-01-.06(32)(e)10, including the use of continuous hard piping.

(g) The permittee shall repair each defect detected during inspection performed in accordance with Rule 0400-12-01-.06(32)(e)11 and 0400-12-01-.06(32)(e)3(iv)

(h) In the event that the Permittee has designated a cover as unsafe to inspect or monitor, the conditions of Rule 0400-12-01-.06(32)(e)12 must be met. Only covers subject to the Rule 0400-12-01-.06(32)requirements can be designated as unsafe to monitor. No other components subject Rule 0400-12-01-.06(32) regulations can be designated unsafe to monitor. "Unsafe to inspect and monitor covers" include covers under extreme pressure or heat or other circumstances where monitoring personnel would be exposed to an immediate danger. "

80. **Comment:** Section II – General Facility Conditions, II.R.7 – The first sentence of the introductory language to this Paragraph should be removed because it is irrelevant to Rule 0400-12-01-.06(32)(g). The second sentence must be removed because Rule 0400-12-01-.06(32)(g) has absolutely nothing to do with "the permitted capacity of the container storage areas".

Response: The DSWM has reviewed this comment. Removing the two sentences would not add clarity. No changes were made.

81. **Comment:** Section II – General Facility Conditions, II.R.7 – For clarity and brevity, and to attempt to customize the permit conditions to ETSD's facility, ETSD suggests that this Paragraph be rewritten as follows:

7. Standards for Containers

The permittee is authorized to store and treat hazardous wastes in containers but must comply as described in Subparagraphs (b) through (__) below with the applicable standards of Rule 0400-12-01-.06(32)(g)3 or 4 unless exempted as described in Subparagraph (a) below. However, the permittee is not authorized to use containers for any waste stabilization process as defined in Rule 0400-12-01-.05(29)(b). As described in Paragraph 8.E.11 of Attachment 8 and Subsection 9.H of Attachment 9, no containers requiring compliance with Container Level 3 standards are utilized and no closed-vent systems or control devices are involved.

(a) The permittee is exempt from the requirements of Subparagraphs (b) through (e) if the conditions specified in Parts (i), (ii), (iii), or (iv) of this Subparagraph are met. The permittee must keep records demonstrating that such exemptions apply as described in Part (v) of this Subparagraph.

(i) The container has a design capacity less than or equal to 0.1 m3 (26 gallons); or

(ii) The permittee has determined, using the procedures specified in Rule 0400-12-01-.06(32)(d)1, that all hazardous wastes placed in a container had an average VO concentration at the point of waste origination of less than 500 parts per million by weight (ppmw); or

(iii) The organic content of all hazardous waste in the container has been reduced by an organic destruction or removal process that achieves any of the conditions identified in Rule 0400-12-01-.06(32)(c)3.(ii); or

(iv) All hazardous waste placed in the container meet the Land Disposal Restriction conditions set forth in Rule 0400-12-01-.06(32)(c)3.(iv).

(v) The permittee shall maintain records as required by Rule 0400-12-01-.06(32)(j)1 and 6 demonstrating that any exemptions claimed under Parts (ii), (iii), and (iv) of this Subparagraph apply.

(b) Except as exempted pursuant to Subparagraph (a) above and as otherwise described in Subparagraph (c) below, the permittee shall store and treat hazardous wastes only in containers that meet the applicable U.S. Department of Transportation (USDOT) regulations on packaging hazardous materials for transportation as specified in Rule 0400-12-01-.06(g)6. For such containers having a design capacity greater than 0.1 m3 (26 gallons) and less than or equal to 0.46 m3 (119 gallons), the permittee shall control air pollutant emissions from the containers in accordance with the applicable Container Level 1 standards specified in Rule 0400-12-01-.06(32)(g)3 and Subparagraph (d) of this Paragraph. For such containers having a design capacity greater than 0.46 m3 (119 gallons) that are not "in light material service" (as that term is defined at Rule 0400-12-01-.05(29)(b)), the permittee will similarly comply with the Container Level 1 standards. For such containers having a design capacity greater than 0.46 m3 (119 gallons) that are "in light material service", the permittee shall control air pollutant emissions from the containers in accordance with the applicable Container Level 2 standards specified in Rule 0400-12-01-.06(32)(g)4 and Subparagraph (e) of this Paragraph.

(c) As described in Subsection 9.H of Attachment 9, the permittee uses several bulk containers (having a design capacity greater than 119 gallons) as "process vessels" in fuel blending operations. These include several plastic or steel "totes" and a vacuum truck. Each of these containers was designed and manufactured to meet applicable U.S. DOT Hazardous Materials Transportation specifications, and are equipped with covers and closure devices which meet the requirements of Rule 0400-12-01-.06(32)(g)3.(i)(II) and (ii). However, the tote containers are now dedicated to long-term (> 1 year) on-site use and no longer meet the USDOT packaging requirements because they are repeatedly used without reconditioning as is required for such containers in transport. The totes are utilized to mix and blend wastes into waste-derived fuels and are also used to store both fuel candidate wastes prior to fuel blending and the blended fuels themselves. When it is available on-site, the vacuum truck will be used to commingle fuel-candidate wastes from smaller containers (e.g., drums) and to transfer both fuel-candidate wastes and blended fuels between the tanks, totes,

and tanker trucks. in conjunction with the Disperser Unit as described in Subsection II.D.2 of this Permit Renewal Application The permittee considers these process vessels and the vacuum truck to be "in light material service" and thus shall control air pollutant emissions from the containers in accordance with the applicable Container Level 2 standards specified in Rule 0400-12-01-.06(32)(g)4 and Subparagraph (e) of this Paragraph. Except for the vacuum truck, which is actually managed by an entity affiliated with the permittee, these containers are not equipped with pressure relief or other safety devices but are marked or labeled with a uniquely identifying container number.

(d) Applicable Container Level 1 Standards

(i) Whenever hazardous waste is in a container using Container Level 1 controls, the permittee shall install all covers and closure devices for the container, as applicable to the container, and secure and maintain each closure device in the closed position except as provided in Rule 0400-12-01-.06(32)(g)3.(iii).

(ii) The permittee shall inspect and repair hazardous waste containers subject to Container Level 1 controls and their covers and closure devices as specified in Rule 0400-12-01-.06(32)(g)3.(iv).

(e) Applicable Container Level 2 Standards

(i) Whenever hazardous waste is in a container using Container Level 2 controls, the permittee shall install all covers and closure devices for the container, as applicable to the container, and secure and maintain each closure device in the closed position except as provided in Rule 0400-12-01-.06(32)(g)4.(iii).

(ii) The permittee shall inspect and repair hazardous waste containers subject to Container Level 2 controls and their covers and closure devices as specified in Rule 0400-12-01-.06(32)(g)4.(iv). The container inspection and repair required by Rule 0400-12-01-.06(32)(g)4.(iv)(I) is performed as described in Subsection 2.D of Attachment 2 and Paragraph 8.E.3 of Attachment 8. The container inspection and repair required by Rule 0400-12-01-.06(32)(g)4.(iv)(II) is performed and documented as described in Subsection 9.H of Attachment 9, which also describes how records of these efforts will be kept.

(iii) Transfer of hazardous waste in or out of a container using Container Level 2 controls shall be conducted in such a manner as to minimize exposure of the hazardous waste to the atmosphere, to the extent practical, considering the physical properties of the hazardous waste and good engineering and safety practices for handling flammable, ignitable, explosive, reactive, or other hazardous materials. For such transfers in or out of the containers described in Subparagraph (c), the permittee shall conduct such transfers as described in Subsection 9.C and Paragraph 9.H.2 in Attachment 9. The permittee shall conduct such transfers from other

containers subject to Container Level 2 controls as described in Subparagraph 8.E.11.(b) of Attachment 8.

(iv) Pursuant to Rule 0400-12-01-.06(32)(g)4.(i), the permittee shall ensure that the "process vessels" described in Subparagraph (c) operate with "no detectable organic emissions" (as that term is defined at Rule 0400-12-01-.05(29)(b)) by testing each such container at least every 12 months in accordance with the procedure specified in Rule 0400-12-01-.06(32)(g)7 and Paragraph 9.H.3 of Attachment 9. If this testing shows that a process vessel, including its cover or closure devices, does not operate with "no detectable organic emissions", then the container will be considered defective and must be repaired or removed from service as described in Rule 0400-12-01-.06(32)(g)4.(iv)(III) and Paragraph 9.H.3 of Attachment 9. These testing and repair efforts will be documented, and records kept, as described as described in Subsection 9.H of Attachment 9.

Response: The DSWM has reviewed this comment. The current paragraph II.R.7 language is adequate as written. No changes were made.

82. **Comment:** Section II – General Facility Conditions, II.R – Air Emission Standards for Tanks and Containers, ETSD notes that there is no Paragraph R.8.

Response: This typographical error was corrected as follows: the previous paragraph II.R.9 was changed to II.R.8, the previous paragraph II.R.10 was changed to II.R.9, the previous II.R.11 was changed to II.R.10, the previous II.R.12 was changed to II.R.11.

83. **Comment:** Section II – General Facility Conditions, II.R.9 – ETSD insists that this Subparagraph be deleted as inapplicable.

Response: The DSWM has reviewed this comment and has determined that the addition of the following sentence to Subparagraph II.R.8 was needed to provide clarity: "The permittee does not currently operate closed-vent systems or control devices."

84. **Comment:** Section II – General Facility Conditions, II.R.10 – ETSD suggest that this Paragraph and its incorrect reference to Attachment 4 be deleted. It is unnecessary because the applicable requirements for tanks are already included in revised Paragraph R.6 in Comment 18.e above, and the applicable requirements for containers are already included in revised Paragraph R.7 in Comment 18.g above.

Response: (NOTE: Par. II.R.10 renumbered to II.R.9 based on comment 82). The DSWM has reviewed paragraph II.R.9. The paragraph is adequate as written. The II.R.9 reference to Attachment 4 is correct since both are referring to inspections. No changes were made.

85. **Comment:** Section II – General Facility Conditions, II.R.11 – ETSD insists that this Paragraph be deleted because its applicable provisions are already incorporated into revised Paragraphs Q.1 (see Comment 17.a), Q.8 (see Comment 17.o), R.6 (see Comment 18.e), and R.7 (see Comment 18.g).

Response: The DSWM has reviewed this comment. Removing paragraph II.R.11 (renumbered to II.R.10 based on comment 82) would not add clarity. The DSWM has determined paragraph II.R.10 is adequate as written. No changes were made.

86. **Comment:** Section II – General Facility Conditions, II.R.12 – ETSD insists that this Paragraph be deleted as inapplicable.

Response: The DSWM has reviewed II.R.12 (which is now II.R.11 due to previous change from above comment C.82) and has determined that portions of paragraph II.R.12 are applicable to ETSD. The DSWM has determined that II.R.11(b) and (c) are not applicable and have changed II.R.11(b) to read as "The permittee does not currently operate a control device under this permit," and removed II.R.11(c) that was not applicable to ETSD. The current II.R.12(d) was renumbered to read II.R.11(c).

87. **Comment:** Section II – General Facility Conditions, II.T – Prohibition of the Placement of Transfer Facility Hazardous Waste in Permitted Storage Units: For clarity and completeness, ETSD suggests revising this text to read as follows: "*Hazardous waste containers with destination facilities other than this Facility listed on the manifest cannot be accepted by the permittee or be placed or stored in any of the permitted storage units authorized in this permit. However, such hazardous waste containers may be stored for 10 days or less at another portion of the Facility that has been designated as a Transfer Facility pursuant to Rule 0400-12-01-.04(1)(c), and which is operated – with ETSD's permission – by a hazardous waste transporter in accordance with the requirements of that Rule.*

Response: The DSWM has reviewed II.T. and determined that it is in agreement with TN Rule 0400-12-01-.04. No change was made.

88. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.A, par. 1 – In the first sentence, ETSD suggests substituting the words "*is authorized to*" in place of the word "*may*". The names of the three permitted container storage units should also be spelled out in place of the word "*unit(s)*". Further, the words "*commercial facility per Rule 0400-12-02*" must be deleted as unnecessary and confusing. It is irrelevant for purposes of Rule Chapter 0400-12-01 and this Permit that the ETSD Facility is considered a "commercial facility" under Rule Chapter 0400-12-02, and the ETSD Facility is excluded as an existing facility from the requirements of Rule Chapter 0400-12-02. ETSD also suggests that the reference to Attachment 9 should for clarity also identify the Subsection and Paragraph(s) where containers are addressed.

Response: In the first sentence of the first paragraph under Section III.A, the DSWM changed "may" to "is authorized to." The DSWM has added ETSD's container storage unit names "Outside Hazardous Waste Container Management Area, Hazardous Waste Management (HWM) Building A, and HWM Building B," to replace of "unit(s)."

89. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.A, par. 2 – This paragraph and Table III-1 have nothing to do with "Waste Identification" and should not be hidden under that heading. They should instead either be included under a separate Subsection heading (such as Container Storage Area Operating Capacity Limits" or as a Paragraph under Subsection D – Management of Containers.

Response: The DSWM has reviewed Section III.A and determined the only change needed in second paragraph of Subsection III.A was to remove "52,635 gallons" and replace it with "61,720 gallons."

90. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.A, par. 2 and 3 – ETSD demands that the second sentence of the second paragraph and the first sentence of the third paragraph along with all other references to this illogical method of measuring operating storage capacity be deleted for the reasons detailed in Comment #13 on Draft Permit Attachment 8.

Response: The DSWM has reviewed this comment and determined Section III.A is adequate as written. No changes were made.

91. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.A, par. 3 – The third sentence in this paragraph must also be deleted as wrong and inappropriate. First, the concept that the volume of a RCRA-empty container might be counted toward a container storage area's hazardous waste operating capacity limit is simply ludicrous. Second, the clause that says "*if the container is a RCRA empty container and does not have any hazardous waste stored in it*" is wrong and confusing because a RCRA-empty container is allowed to have a small amount of hazardous waste still in it. Third, the language "*as long as the container is properly labeled and identified as RCRA empty*" that is presented as a qualifier for a RCRA-empty container to be excluded is also just wrong. Federal and Tennessee regulations include no labeling or marking requirements for RCRA-empty requirements. They are typically identifiable because the prior identifying labels have been removed or painted over, by the marking or label "MT", or simply by where and how they are stored.

Response: The DSWM has reviewed this comment and determined Section III.A is adequate as written. No changes were made.

92. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers – In the Section III title, correct the spelling of "TREATMANT".

Response: This typographical error was corrected from "TREATMANT" to "TREATMENT."

93. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.D.1 – ETSD again suggests that the reference to Attachment 9 should for clarity also identify the Subsection and Paragraph(s) where containers are addressed.

Response: The DSWM has reviewed this comment. Identifying the Subsection and Paragraph(s) where containers are addressed in Attachment 9 is redundant, because Attachment 9 has a Table of Contents to find this information. No changes were made.

94. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.D.4 – ETSD insists that this Paragraph be deleted as duplicative and thus unnecessary. As the Paragraph acknowledges, aisle space is already addressed in Permit Condition II.H.5 and Attachment 8. This is a needless cross-reference that simply adds to confusion and the potential for conflict between Permit Conditions.

Response: The DSWM has reviewed this comment. Section III.D.4 is adequate as written. No changes were made.

95. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.D.5 – ETSD insists that this Paragraph be deleted as completely unnecessary, confusing, and inconsistent with Attachment 8. ETSD's Permit Renewal Application makes it clear that the floors/bases of all container storage areas are sloped to drain to collection trenches or sumps.

Response: The DSWM has reviewed this comment. Section III.D.5 is adequate as written. No changes were made.

96. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.D.6 – ETSD insists that this Paragraph be deleted as unnecessary and actually or potentially inconsistent with Attachment 8 with which compliance is already required pursuant to Paragraph III.D.1.

Response: The DSWM has reviewed this comment. Section III.D.6 is adequate as written. No changes were made.

97. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.D.7 – ETSD believes this Paragraph to be too vague and strongly suggests clarifying this Paragraph by revising it to read as follows: "*When containers holding ignitable or reactive wastes are being opened or closed, and when work is being performed in close proximity to such containers that are leaking or are not securely closed, only non-sparking tools and equipment shall be used.*"

Response: The DSWM has reviewed III.D.7. The DSWM has replaced paragraph III.D.7 language in the draft permit with the suggested language in this comment to enhance clarification. The DSWM has revised the paragraph from "When ignitable or reactive hazardous wastes are stored, non-sparking tools and equipment shall be used. (See Subsection II.G for additional requirements.)" to "When containers holding ignitable or reactive wastes are being opened or closed, and when work is being performed in close proximity to such containers that are leaking or are not securely closed, only non-sparking tools and equipment shall be used. (See Subsection II.G for additional requirements)."

98. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.D.8 – ETSD finds this Paragraph to be confusing and seemingly unnecessary, and insists that it be deleted or clarified. It does not impose any requirements that are not already imposed. If it is intended to address accepted shrink-wrapped pallets of small containers that are not themselves properly labeled, then it needs to be clarified.

Response: The DSWM has reviewed III.D.8 and has removed the following clause "however, if the containers have compatible waste, they may be placed into a larger container and the larger container re-labeled to reflect the contents" to enhance clarification.

99. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.E – ETSD insists that this Subsection be deleted as duplicative and unnecessary. Aisle space requirements are already addressed in Permit Condition II.H.5 and Attachment 8. This is a needless cross-reference that simply adds to confusion and the potential for conflict between Permit Conditions.

Response: The DSWM has reviewed this comment. Section III.E is adequate as written. No changes were made.

100. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.F.2 – ETSD insists that this Paragraph be deleted as unnecessary because it only requires what is already included in Attachment 4. Rule 0400-12-01-.06(9)(e) requires only weekly inspections, and ETSD only agreed to include the inspection of container storage area containment systems because it was convenient to implement in conjunction with the required daily inspection of Tanks F1 and F2. There is no reason to establish another Permit Condition here for what Attachment 4 already requires.

Response: The DSWM has reviewed this comment. Section III.F.2 is adequate as written. No changes were made.

101. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.G – Because the secondary containment systems for the container storage areas are already designed and installed, ETSD strongly suggests that

Paragraphs 2, 3, and 4 of this Subsection be deleted as completely unnecessary and that Paragraph G.1 be revised to read as follows:

"*The permittee shall operate and maintain the secondary containment systems for the Outside Hazardous Waste Container Management Area (OHWCMA) and Hazardous Waste Management Building Areas A and B and shall repair and rehabilitate the OHWCMA secondary containment system as described in Attachment 8 to collect any leaks and spills of hazardous waste and precipitation captured by such systems and prevent their release into the environment.*"

Response: The DSWM has reviewed this comment. Section III.G is adequate as written. No changes were made.

102. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.G.5 – There is absolutely no reason to include both this Paragraph as written and Subparagraph 2.G.(e) in the Draft Permit! ETSD also does not understand TDSWM's purpose/rationale for the "within 24 hours of discovery" time limit included in this Paragraph and whether this applies to just wash water or also to accumulated waste and precipitation. The U.S. EPA did not see any reason for a 24-hour time limit so why does TDSWM? Unless the secondary containment system might overflow, what is the point of rushing to mobilize personnel and equipment to try to remove collected liquids from the OHWCMA secondary containment during a two- or three-day rainy period? ETSD strongly suggests simply deleting the introductory text of Paragraph G.5.

Response: The DSWM has reviewed this comment. The inclusion of "or in as timely a manner as is possible to prevent harm to human health and the environment if the permittee can demonstrate that removal of the released waste and/or accumulated waters could not be accomplished within 24" makes Section III.G adequate. No changes were made.

103. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.G.5.(a) – This Subparagraph addresses a good and useful point, but its language should either be added to the text of Subparagraph 2.G.(e) or (perhaps more appropriately) to Subsection H – Preparedness and Prevention.

Response: The DSWM has reviewed this comment. Section III.G.5(a) is adequate as written and is in the correct location within the permit. No changes were made.

104. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.G.5.(b) – This Subparagraph must be deleted. It is neither appropriate or necessary for TDSWM to address the permittee's responsibilities as a generator in the Permit except possibly as a parenthetical Comment as is done in Subparagraph G.2(e).

Response: The DSWM has reviewed this comment. Section III.G.5(b) is adequate as written. No changes were made.

105. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.H.3 – The references to subparagraphs (14)(o), (15)(b), and (30)(e) of Rule 0400-12-01-.06, and the reference to Rule 0400-12-01-.10(1)(d)1, should be deleted as inapplicable to the permittee.

Response: The DSWM acknowledges that ETSD does not currently have any landfills, incinerators, or process vents, and has removed (14)(o), (15)(b), and (30)(e) from III.H.3. If in the future, should the permittee decide to modify the permit and facility to include landfills, incinerators, or process vents, the permittee will need to submit a permit modification to add the units to the permit.

106. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.I – Special Requirements for Ignitable or Reactive Wastes. This sentence is already included as Paragraph 4 of Permit Condition II.G. However, it seems to make more practical sense to include it here in Section III of the Permit Conditions and that is where it is found in Rule 0400-12-01-.06. But it does not need to be in both places. ETSD therefore suggests that Paragraph 4 of Permit Condition II.G be deleted.

Response: The DSWM has reviewed this comment. Paragraph II.G.4 and Section III.I are adequate as written and should remain in both areas of the permit. No changes were made.

107. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.J.1 – References to "*Section II.G.2*" in both Paragraphs 1 and 2 must be revised to "*Paragraph II.G.2*" instead. This correction should be made everywhere that references to compliance with "Section II.G.2" appears in the Permit Conditions.

Response: The DSWM has reviewed this comment. The DSWM revised "Section II.G.2" to "Paragraph II.G.2" in III.J.1 and III.J.2.

108. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.J.3 – The words "*containers, piles, open tanks, or surface impoundments*" should be changed to "*containers or open tanks*" because piles and surface impoundments do not currently exist, and are very unlikely to ever exist, at the ETSD Facility.

Response: The DSWM has reviewed Paragraph III.J.3 and determined that the Paragraph was meant to match Tennessee Rule 0400-12-01-.06(9)(h)3. Paragraph III.J.3 was updated to match the following:

3. *A storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks,*

or surface impoundments must be separated from the other materials or protected from them by means of a dike, berm, wall, or other device.
(Comment: The purpose of this part is to prevent fires, explosions, gaseous emission, leaching, or other discharge of hazardous waste or hazardous waste constituents which could result from the mixing of incompatible wastes or materials if containers break or leak.)

109. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.K.1 – ETSD suggests changing the last sentence to more appropriately read: "*The permittee will implement closure in accordance with the Closure Plan in Attachment 10 and applicable requirements of Subsection II.G of these Permit Conditions.*"

Response: The DSWM has reviewed this comment. The DSWM has determined that Paragraph III.K.1 had a typographical error in the last sentence which says "Closure shall be accomplished in accordance with Attachment 10, Closure Plan. The DSWM has revised that sentence to read "Closure shall be accomplished in accordance with Attachment 11, Closure Plan. With the typographical error corrected, the Paragraph is adequate as written without the inclusion to Subsection II.G as Subsection II.G does not relate to Closure.

110. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.K.2 – It is neither appropriate nor necessary for TDSWM to address the permittee's responsibilities as a generator in the Permit. This Paragraph must be either deleted or presented as a parenthetical "Comment" as it is in Rule 0400-12-01-.06(9)(i) from whence it came.

Response: The DSWM has reviewed this comment. Paragraph III.K.2 is adequate as written. No changes were made.

111. **Comment:** Section III – Specific Conditions for Storage and Treatment in Containers, III.L – Air Emission Standards, TDSWM saw fit to address the RCRA Subpart CC requirements for containers in Subsection II.R of these Permit Conditions rather than Section III. This Subsection III.L must therefore be deleted as duplicative and unnecessary.

Response: The DSWM has reviewed this comment. Both subsections II.R and III.L are adequate as written and should remain in both areas of the permit. No changes were made.

112. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.A – To simplify this Subsection, ETSD recommends deleting Paragraphs 1, 2, and 3 (which is a needless duplication of Paragraph 2) and Table IV-1 and modifying the introductory text to read as follows:
"*The permittee may store and treat hazardous wastes in the two 6,000-gallon above-ground storage tanks identified as F1 and F2 in Attachment 9. The*

permittee is prohibited from storing or treating in these tanks any hazardous waste that is not identified in Attachment 1."

A tank's maximum volume is fixed so it can hold no more than it can hold.

Response: The DSWM has reviewed this comment. Subsection IV.A is adequate as written. No changes were made.

112. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.C – Because the secondary containment system is already designed and installed, ETSD insists that Paragraphs 2, 3, 4, and 5 be deleted as completely unnecessary and that the first sentence of Paragraph C.1 be revised to read as follows:

"*The permittee shall ensure that the secondary containment system for tank systems F1 and F2 is operated and maintained as described in Attachment 9 to prevent any migration of wastes or accumulated liquid out of the system to the soil, groundwater, or surface waste at any time during the use of the tank systems.*"

Response: The DSWM has reviewed this comment. Subsection IV.C adequately describes what is necessary. No changes were made.

113. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.C.7 – ETSD insists that the following language that is included in Rule 0400-12-01-.06(10)(d)3.(iv) also be added to the end of this Paragraph: *", or in as timely a manner as is possible to prevent harm to human health and the environment, if the permittee can demonstrate to the Commissioner that removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours*". TDSWM's removal of this language is completely unjustified because even TDSWM must acknowledge that circumstances could occur that would prevent ETSD from meeting this 24-hour deadline.

Response: DSMW has added the applicable rule language to the permit in its entirety.

Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health and the environment, if the owner or operator can demonstrate to the Commissioner that removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours. (Note: If the collected material is a hazardous waste under Rule 0400-1201-.02, it is subject to management as a hazardous waste in accordance with all applicable requirements of Rules 0400-12-01-.03 through .06. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of sections 301, 304, and 402 of the Clean Water Act, as amended. If discharged to a Publicly Owned Treatment Works (POTW), it is subject to the

requirements of section 307 of the Clean Water Act, as amended. If the collected material is released to the environment, it may be subject to the reporting requirements of 40 CFR part 302.)

115. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.C.7.(b) – Again, it is neither appropriate nor necessary for TDSWM to address the permittee's responsibilities as a generator in the Permit. This Paragraph must be either deleted or presented as a parenthetical "Comment" or "Note" as it is in Rule 0400-12-01-.06(10)(d)3.(iv) from whence this Paragraph came.

Response: The DSWM has reviewed this comment. Subparagraph IV.C.7(b) is adequate as written. No changes were made.

116. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.D.1 – ETSD suggests that the words "*must not be*" be replaced with the word "*are*" for proper sentence structure.

Response: The DSWM has reviewed ParagraphIV.D.1 and found that this wording matches Tennessee Rule 0400-12-01-.06(10)(e)1. No changes were made.

117. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.D.2 – ETSD insists that subparagraphs (a), (b), and (c) be deleted and that Paragraph 2 be revised to read as set forth below because the appropriate controls and practices are already spelled out in Attachment 9:
"*The permittee shall use appropriate controls and practices as described in Attachment 9 to prevent spills and overflows from Tanks F1 and F2 or their containment system.*"

Response: The DSWM has reviewed Paragraph IV.D.2 and found that this wording matches Tennessee Rule 0400-12-01-.06(10)(e)2 . No changes were made.

118. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV. D.4 – ETSD insists that this paragraph be deleted as completely unnecessary because such controls and practices are already established and included in Attachment 9.

Response: The DSWM has reviewed this comment. Paragraph IV.D.4 is adequate as written. No changes were made.

119. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.E.1 – ETSD insists that this paragraph be revised to read as follows because the schedule and procedure are already described in Attachment 4: "*The permittee shall inspect overfill controls as described in Attachment 4.*".

Response: The DSWM has reviewed this comment. Paragraph IV.E.1 is adequate as written and in accordance with Tennessee Rule 0400-12-01-.06. No changes were made.

120. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.E.2 – ETSD insists that this entire paragraph be deleted as inappropriate and unnecessary because as described in Attachment 8 tank systems F1 and F2 do not have any monitoring or leak detection equipment.

Response: The DSWM has reviewed this comment. Paragraph IV.E.2 is adequate as written and in accordance with Tennessee Rule 0400-12-01-.06. No changes were made.

121. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.E.3 – The introductory clause "*Except as noted in IV.F.4*" must be deleted because it is simply inappropriate and wrong. ETSD insists that this bad clause be replaced with the much more appropriate "*As described in Attachment 4*".

Response: The DSWM has reviewed this comment. Paragraph IV.E.3 had a typographical error which was corrected to "Except as noted in IV.E.4", but otherwise the paragraph is adequate as written and in accordance with Tennessee Rule 0400-12-01-.06.

122. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.E.4 and 5 – ETSD insists that these Paragraphs be deleted as inapplicable.

Response: The DSWM has reviewed this comment. Paragraphs IV.E.4 and IV.E.5 are adequate as written and are in accordance with Tennessee Rule 0400-12-01-.06. No changes were made.

123. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.E.6 – ETSD strongly objects to the inclusion of the language "and as set forth in Paragraphs IV.F.1 and 2" in this Paragraph and insists that it be removed. This language is not required by Rule 0400-12-01-.06(10)(g)7 and for good reason. The major efforts described in Rule 0400-12-01-.06(10)(g), Subsection IV.F of these Permit Conditions, and Attachment 8 require their own notifications and documentation. ETSD suggests that this Paragraph be rewritten to read as follows:

> "*The permittee shall inspect the tank systems and their containment system in accordance with the Inspection Schedule and Daily Inspection Checklist included in Attachment 4 and shall retain the completed checklists in the Facility's operating records for a period of at least three years.*"

Response: The DSWM has reviewed this comment. Paragraph IV.E.6 had a typographical error which was corrected to "and as set forth in Paragraphs IV.E.1 and 2." Otherwise, the paragraph is adequate as written and in accordance with Tennessee Rule 0400-12-01-.06.

124. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.F – ETSD strenuously objects to TDSWM's inclusion of the language *", in addition to implementing the Contingency Plan found in Attachment 7"* in the second sentence of this Subsection's introductory text and insists that it be removed as inappropriate and unnecessary. This language is not included in Rule 0400-12-01-.06(10)(g) because the discovery of some leaked or spilled hazardous waste in the containment system does not necessarily constitute an emergency requiring implementation of the Contingency Plan. That plan describes when it needs to be implemented.

Response: The DSWM has reviewed this comment and agrees to remove "in addition to implementing the Contingency Plan found in Attachment 7" in order to match the language found in Tennessee Rule 0400-12-01-.06(10)(g).

125. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.F.2 – ETSD suggests adding the words "*from the tank system*" between the word "*waste*" and the word "*as*" to provide additional clarity.

Response: The DSWM has reviewed this comment. ParagraphIV.F.2 is adequate as written and in accordance with Tennessee Rule 0400-12-01-.06. No changes were made.

126. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.F.4 – ETSD insists that the introductory language of this Paragraph be revised to read as follows: "*The permittee must immediately conduct a visual inspection of the release and based upon that inspection:*" The inspection must be done first to detect a release to the environment.

Response: The DSWM has reviewed this comment. Paragraph IV.F.4 is adequate as written and in accordance with Tennessee Rule 0400-12-01-.06. No changes were made.

127. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV F.6 – The words "one or more" must be removed from the introductory text of this Paragraph because all actions must be taken as applicable. For consistency and completeness, ETSD also suggests adding the words "*requirements of Subsection F.I and the*" between the word "*the*" and the word "*Closure*" in the introductory text.

Response: The DSWM has reviewed Paragraph IV.F.6 and has found the Tennessee Rule 0400-12-01-.06(10)(g)5(i) was not referenced correctly. The rule reads:

(i) Unless the owner/operator satisfies the requirements of subparts (ii) through (iv) of this part, the tank system must be closed in accordance with subparagraph (h) of this paragraph.

The DSWM has revised Paragraph IV.F.6 to read as follows to reflect Tennessee Rule 0400-12-01-.06(10)(g)5(i): "Unless the permittee satisfies the requirements of Subparagraphs IV.F.6(a), (b), and (c), the tank system must be closed in accordance with Tennessee Rule 0400-12-01-.06(10)(h) and the Closure Plan in Attachment 11."

128. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV F.6(c) and 7 – ETSD insists that this Subparagraph and Paragraph be deleted as inapplicable because all components of tank systems F1 and F2 are within the containment system.

Response: The DSWM has reviewed this comment. Subparagraph IV.F.6(c) and Paragraph IV.F.7 are adequate as written and in accordance with Tennessee Rule 0400-12-01-.06. No changes were made.

129. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.H.1 – ETSD insists that the word "*same*" be inserted between the word "*the*" and the word "*tank*" for clarity and consistency with the applicable regulation.

Response: The DSWM has reviewed Paragraph IV.H.1 and has found that Tennessee Rule 0400-12-01-.06(10)(j)1 was not referenced correctly. The rule reads:

"Incompatible wastes, or incompatible wastes and materials, must not be placed in the same tank system, unless part (2)(h)2 of this rule is complied with."

The DSWM has revised Paragraph IV.H.1 to read as follows to reflect Tennessee Rule 0400-12-01-.06(10)(j)1: "Incompatible wastes, or incompatible wastes and materials, must not be placed in the same tank system, unless paragraph II.G.2 is complied with; and".

130. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.I.1 – ETSD suggests inserting the clause "*As described in the Closure Plan in Attachment 11,*" at the beginning of this sentence to provide appropriate reference to that document. ETSD further suggests adding the words "*of a tank system*" after the word "*closure*" and before the following comma for clarity and consistency with the applicable regulation.

Response: The DSWM has reviewed this comment. Paragraph IV.I.1 is adequate as written. No changes were made.

131. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.I.2 – ETSD insists that the entry "*IV.J.1*" be replaced with the words "*1 of this Subsection*" to correct the reference.

Response: This typographical error was corrected to read "IV.I.1."

132. **Comment:** Section IV – Specific Conditions for Storage and Treatment in Tanks, IV.J – TDSWM saw fit to address the RCRA Subpart CC requirements for tanks in Subsection II.R of these Permit Conditions rather than Section IV. This Subsection IV.J must therefore be deleted as duplicative and unnecessary.

Response: The DSWM has reviewed this comment. Both Subsection II.R and IV.J are adequate as written and should remain in both areas of the permit. No changes were made.

133. **Comment:** Section V – Schedule of Compliance, V.1, V.2, V.3, V.4, and V.5 – In each of these Paragraphs, it seems that for consistency ETSD should be referred to as the "*permittee*" as in other Permit Conditions.

Response: "ETSD" was updated to be "the permittee" to be consistent with the permit.

134. **Comment:** Section V – Schedule of Compliance, V.1 – In the first sentence, "*Fischer and Arnold*" must be changed to "*Fisher Arnold*" to correct the company name.

Response: V.1 was replaced in its entirety based on comment 135.

135. **Comment:** Section V – Schedule of Compliance, V.1 – For clarity and purpose, ETSD insists that the last sentence of this Paragraph be deleted and replaced with the following language:

> *The permittee must submit within 90 days of permit issuance a report from a qualified professional engineer describing his inspection and assessment of the concrete secondary containment surfaces of the Outside Hazardous Waste Container Management Area and rendering his opinions as to where those surfaces meet the standard set forth at Rule 0400-12-01-.06(9)(f)2.(i) and where they do not. Upon receipt of such report, DSWM shall promptly release from the liquid hazardous waste storage restrictions of Commissioner's Order HWM23-0034 those areas where the professional engineer has found that the regulatory standard is met, providing the permittee can demonstrate that liquids that might leak or be spilled from containers stored in such areas will not drain into or over areas where the engineer has found that the regulatory standards are not met.*

The "Concrete Repair and Rehabilitation Plan (CRR Plan) in Attachment 8.6 calls for the concrete containment surfaces of the entire Contained Area to be replaced or repaired and rehabilitated within two years, and it has already been determined that implementation of the CRR Plan is the only way to provide a long-term fix to the aging concrete surfaces. There thus seems no reason to task the professional engineer with assessing containment surface integrity over the entire Contained Area. However, ETSD believes that such an assessment would be useful for

defining those areas of the OHWCMA where containers of liquid hazardous waste could be safely stored.

Response: The DSWM has reviewed the comment and determined that the following will replace V.1: "*The permittee must submit within 90 days of permit issuance a report from a qualified professional engineer describing his or her inspection and assessment of the concrete secondary containment surfaces of the Outside Hazardous Waste Container Management Area and rendering his or her opinions as to whether those surfaces meet the standard set forth at Rule 0400-12-01-.06(9)(f)2.(i) and.*" The DSWM cannot grant a release of Order HWM23-0034 as part of this RCRA permit. The language requesting this was removed from the proposed sentence.

136. **Comment:** Section V – Schedule of Compliance, V.2 – It makes no sense to refer in this Paragraph to just the Phase 1 deadline. ETSD insists that this Paragraph be revised to read as follows:

> "*The Concrete Repair and Rehabilitation Plan set forth in Attachment 8.6 will be implemented in accordance with the Implementation Schedule included therein except as may otherwise be approved by the Division Director.*"

As described in Comment #5 on Attachment 8.6, ETSD finds the implementation schedule included in Attachment to be completely unreasonable and unacceptable.

Response: The DSWM has reviewed the suggested language and updated the permit to read as follows "The Concrete Repair and Rehabilitation Plan set forth in Attachment 8.6 will be implemented in accordance with the Implementation Schedule included therein except as may otherwise be approved by the Division Director." to enhance clarity.

137. **Comment:** Section V – Schedule of Compliance, V.4 – It is ridiculous and unbelievable that TDSWM would try to impose both a extremely tight schedule for completing the concrete repair work and the requirement in this Paragraph of a 5-business-day pre-notification to TDSWM before work can be performed. ETSD insists that this Paragraph be deleted.

Response: The requirement of five-day pre-notification is to provide the DSWM with time to have a representative on site to witness and review the activity associated with the Concrete Repair and Rehabilitation Plan. No changes were made.

138. **Comment:** Section V – Schedule of Compliance, V.5 – This Paragraph must also be deleted. ETSD could find no language in Attachment 9.1 stating that Tanks F1 and F2 would be reinspected in 2023. The reports from the contractor that performed the visual and ultrasonic inspections of these tanks in 2018 did say that such inspections should be repeated every five years – presumably to comply with Steel Tank Institute Standard SP001 – but Rule 0400-12-01-.06(10) includes no such requirement and the Professional Engineer's certification imposes no such

requirement. However, ETSD did have a contractor perform ultrasonic testing on both tanks in 2024 and will within the next few weeks have a qualified professional engineer review that data, inspect both tanks, and render an opinion as to whether the 2018 professional engineer certification remains valid. ETSD will share the engineer's report with TDSWM promptly upon receipt.

Response: The DSWM has reviewed this comment and Attachment 9.1 ("P.E. Structural Integrity Assessment of Tank Systems F1 and F2," page 3. It is apparent from ETSD's comments that the inspection recommended did not take place until 2024. ETSD may provide the response from testing completed in 2024. No changes were made.

139. **Comment:** Attachment 2 – Waste Analysis Plan, 2.B, par 1 – Re-add the words "*Typically, the*" to the beginning of the third sentence to acknowledge that generators might ship smaller containers to ETSD other than in larger containers (e.g., on shrink-wrapped pallets).

Response: The DSWM has reviewed this comment. The third sentence has been changed to read "Smaller containers may be packaged in larger containers such as 55-gallon drums, one-yard cubic boxes or may be shipped shrink-wrapped on pallets to meet transportation requirements."

140. **Comment:** Attachment 2 – Waste Analysis Plan, 2.B, par. 1 – TDSWM added the last sentence to this paragraph apparently without understanding that ETSD requires all shipments of hazardous waste (even shipments originating from VSQGs) to be accompanied by a manifest. This sentence must be deleted.

Response: The DSWM has changed the next to last sentence to say, "All containers of waste shall arrive in individual shipments accompanied by a hazardous waste manifest which describes the shipment." The DSWM has removed the last sentence of the paragraph as requested by ETSD to provide clarity.

141. **Comment:** Attachment 2 – Waste Analysis Plan, 2.B, par. 3 – Add the word "*Typically*" back to the beginning of the fifth sentence to appropriately acknowledge both the usual action stated in the fifth sentence and the alternative action described in the sixth sentence. The two sentences otherwise conflict and make less sense.

Response: The DSWM has reviewed this comment. The fifth and sixth sentence have been changed to "However, such rejected containers may be held at the Facility for a few days while ETSD personnel work with the generator/shipper to successfully complete the pre-approval process for the new waste stream and then

the containers are accepted and managed by ETSD." to allow cohesion with the rest of the paragraph. .

142. **Comment:** Attachment 2 – Waste Analysis Plan, 2. B, par. 3 – In both the fifth and sixth sentences, TDSWM has inexplicably imposed on ETSD the inappropriate time limit of "*less than seven calendar days*" to take the described actions regarding rejected shipments. There is no justification for this impracticably short time limit because Rule 0400-12-01-.06(5)(c)4.(i) clearly allows 60 days for such actions to be taken. Further, this 60-day limit is even acknowledged in the third paragraph of Section E.2 of this document. ETSD therefore insists that the words "*less than seven calendar days*" be removed from both sentences. In the third sentence, this removed language should be replaced by ETSD's original language "*a few days*" to describe the typical situation. In the fourth sentence, the word "container" should be changed to "containers" and the removed language should be replaced with the words "*several days*". ETSD also suggests that the following new sentence be added as the fifth sentence of the paragraph to provide clarity: "*As described in Subsection E.2, ETSD must complete either option within 60 days.*"

Response: The DSWM has reviewed this comment and updated the fifth through eighth sentences in Subsection B of Attachment 2 to the following language in the permit: "However, such rejected containers may be held at the Facility for a few days while ETSD personnel work with the generator/shipper to successfully complete the pre-approval process for the new waste stream and then the containers are accepted and managed by ETSD." Alternatively, the container will be held for 60 calendar days while arrangements are being made to either (1) return it to the generator/shipper, or (2) ship it from ETSD to another facility designated by the generator/shipper. As described in Paragraph 2.E.2, ETSD must complete either option within 60 calendar days."

143. **Comment:** Attachment 2 – Waste Analysis Plan, 2.B, par. 3 – The paragraph's current fifth sentence states that rejected containers "*are held in the western portion of the Outside Hazardous Waste Container Management Area during this time*". While this has historically been the typical case, where containers of rejected wastes may be held can depend on the type and characteristics of the waste as well as on the number, size, and type of containers involved. ETSD therefore insists that this unnecessary and restrictive sentence be deleted. [Note: Where such wastes may be temporarily held will also depend upon the status of TDEC's 2024 Commissioner's Order restricting where containers holding liquids may be stored at the facility. ETSD strongly believes that this Order should be terminated once the Renewal Permit is issued, thus triggering the implementation of both the "Concrete Repair and Rehabilitation Plan" in Attachment 8.6 and the "Secondary Containment Surfaces Inspection and Maintenance Plan" in Attachment 4.3. ETSD believes that implementation of these plans eliminates any need for the overly restrictive prohibitions on storage of containers holding liquid hazardous wastes that are contained in this Order.]

Response: The DSWM has reviewed this comment. The following sentence has been removed, "Such containers are held in the western portion of the Outside Hazardous Waste Container Management Area during this time." The removal of the sentence does not mean ETSD does not have to account for the type and characteristic of the waste and the number, size, and the type of containers used. Please note that the 2024 Commissioner's Order cannot be terminated within this RCRA hazardous waste permit.

144. **Comment:** Attachment 2 – Waste Analysis Plan, 2.B, par. 4 (parenthetical note) – The last sentence of this paragraph again includes the inappropriate time limit "*less than seven calendar days*". To resolve this occurrence, ETSD strongly suggests that this sentence simply be deleted because it is completely unnecessary to the point of the Note and duplicative of the preceding paragraph.

Response: The DSWM has reviewed this comment and determined that the "less than seven calendar days" was corrected to "60 calendar days" to reflect Tennessee Rule 0400-12-01-.06.

145. **Comment:** Attachment 2 – Waste Analysis Plan, 2.C, par. 6 – In the last sentence, change *"(sequentially)*" to "*(typically sequentially).*" While sequential numbering is typically done, it should not be a violation if a non-sequential number is accidentally or purposely used.

Response: The DSWM has reviewed the comment and Attachment 2 (Waste Analysis Plan, Section C). The DSWM removed "(sequentially)" from the third sentence and added a new fourth sentence that reads "In most cases, the number assigned is sequentially."

146. **Comment:** Attachment 2 – Waste Analysis Plan, 2.C, par. 7 – In the last sentence of this paragraph, ETSD suggests that the word "*either*" be inserted between the word "*must*" and the word "*be*" to acknowledge the two alternatives presented.

Response: The DSWM has reviewed this comment and has added "either" between "must" and "be."

147. **Comment:** Attachment 2 – Waste Analysis Plan, 2.C, par. 8 – In the third bullet, ETSD insists that the word "*annually*" be replaced with the words "*every two years*" that were included in ETSD's Permit Renewal Application. TDSWM made this change with no apparent justification. Rule 0400-12-01-.06(2)(d)2.(iv) requires only that the Waste Analysis Plan must specify the frequency with which the initial analysis of the waste will be reviewed or repeated to ensure that the analysis is accurate and up to date – it does not require that such be done annually. ETSD believes that a biennial schedule for repeating the pre-approval process is adequate.

Response: The DSWM reviewed this comment and made the suggested change from "At least annually" to "At least every two years."

148. **Comment:** Attachment 2 – Waste Analysis Plan, 2.D.1, par. 4 – ETSD suggests that the last sentence of this paragraph be revised to read as follows: "*For multi-container loads, this step is routinely performed after off-loading for reasons of safety and convenience*." It is unsafe and impractical to attempt these efforts within the dark confines of a truck packed with containers.

Response: The DSWM has reviewed this comment. Attachment 2.D.1 is adequate as written, due to the statement being written as "before or during off-loading." No changes were made.

149. **Comment:** Attachment 2 – Waste Analysis Plan, 2.D.1, par. 6 – As also described in Comment 5 above, ETSD insists that the words "*at the west end of the Outside Hazardous Waste Container Management Area*" be deleted as overly restrictive and impractical. While this location has historically been where containers of received wastes have been typically held while awaiting acceptance or rejection, their actual "staging" location can depend on the type and characteristics of the waste as well as on the number, size, and type of containers involved. [Note: Where such wastes may be temporarily held will also depend upon the status of TDEC's 2024 Commissioner's Order restricting where containers holding liquids may be stored at the facility. ETSD strongly believes that this Order should be terminated once the Renewal Permit is issued, thus triggering the implementation of both the "Concrete Repair and Rehabilitation Plan" in Attachment 8.6 and the "Secondary Containment Surfaces Inspection and Maintenance Plan" in Attachment 4.3. ETSD believes that implementation of these plans eliminates any need for the overly restrictive prohibitions on storage of containers holding liquid hazardous wastes that are contained in this Order.]

Response: The DSWM has reviewed this comment and revised the sentence to read "Unless a waste container is immediately rejected (such as a container that indicates a radiation hazard) and left on or placed back on the delivering truck, the waste containers that are delivered to the Facility are off-loaded and held as received containers in a permitted storage area while they go through the shipment screening and certain recordkeeping procedures."

150. **Comment:** Attachment 2 – Waste Analysis Plan, 2.D.1, par. 7 – ETSD insists that the fifth and sixth sentences in the paragraph be deleted because they are inaccurate. ROR Numbers are assigned only after receipt of shipments. [Note: The fifth and sixth sentences were improperly included in ETSD's Permit Renewal Application, so ETSD owns this error.]

Response: The DSWM has reviewed this comment and removed the following sentences from paragraph 7 of Attachment 2.D.1: "In those situations where ETSD personnel assist the generator/shipper by preparing the Manifest and associated documents, the ROR Number is assigned as part of that effort and "Date Issued" will be earlier than the date the shipment was received. However, in those situations

where the generator/shipper prepares the Manifest and associated documents, the "Date Issued" and the "Date Received" entries will be the same."

151. **Comment:** Attachment 2 – Waste Analysis Plan, 2.D.1, par. 7 – ETSD also insists that the sixth and seventh sentences of this paragraph be deleted and replaced with the following clarifying language: "*As indicated on the R.O.R. Master Listing Sheet, ROR Numbers may sometimes be voided. This can occasionally occur because the ROR Number is assigned to waste shipments early in the receiving process using only information from the manifest(s) received from the transporter. Occasionally a manifest will describe a shipment that is subsequently discovered to not be present in the load. Such a discovery requires voiding the ROR Number assigned to that shipment, and the date that occurs is entered on the R.O.R. Master Listing Sheet.*"

Response: The DSWM reviewed the comment. The following was removed "As indicated on the R.O.R. Master Listing sheet, ROR Numbers are also sometimes voided – such as when the generator/shipper fails to use the ETSD-prepared manifest. In such case, the "Void Date" is entered on the R.O.R. Master Listing sheet along with description of event" and replaced with "As indicated on the R.O.R. Master Listing Sheet, ROR Numbers may sometimes be voided. This can occasionally occur because the ROR Number is assigned to waste shipments early in the receiving process using only information from the manifest(s) received from the transporter. Occasionally a manifest will describe a shipment that is subsequently discovered to not be present in the load. Such a discovery requires voiding the ROR Number assigned to that shipment, and the date that occurs is entered on the R.O.R. Master Listing Sheet."

152. **Comment:** Attachment 2 – Waste Analysis Plan, 2.E.2, par. 2 – TDSWM has added in the second sentence a requirement that received containers of unaccepted non-conforming waste be "*clearly marked*" and held in a permitted unit while ETSD works with the generator-shipper to determine how it should be managed. It is not clear what TDSWM means by "*clearly marked*" or why such containers should require special marking. There is no regulatory requirement for such additional marking, and the containers will be readily identifiable by the markings they have and do not have (e.g., date of acceptance) and by the areas where they are being held. ETSD believes that the words "*clearly marked and*" should be deleted from the second sentence as vague and unnecessary.

Response: The DSWM has reviewed this comment and revised the sentence to say "Received containers of nonconforming wastes will be marked in a way that non-conforming waste is identifiable when stored in proximity with conforming waste and…"

153. **Comment:** Attachment 2 – Waste Analysis Plan, 2.E.2, par. 2 – TDSWM also added the third sentence to this paragraph which states that "*Such waste will be counted toward the permitted capacity of the unit where stored.*" This sentence is

completely inappropriate in the Waste Analysis Plan and must be deleted. It may be appropriate to include a version of such sentence in Section D.2 of Attachment 8, but only if the sentence is modified to apply only to received-but-unaccepted containers of waste marked by the generator-shipper as Hazardous Waste. Any such language added to Section D.2 of Attachment 8 should also clarify that such waste would not be so counted when and if it is determined to be nonhazardous.

Response: The DSWM has reviewed this comment. Attachment 2.E.2 is adequate as written. No changes were made.

154. **Comment:** Attachment 2 – Waste Analysis Plan, 2.E.2, par. 3 – In the next-to-last sentence, TDSWM added the words "*as rejected along*", apparently to reflect the marking requirement for rejected waste discussed in Comment 16above. As explained in Comment 16, ETSD believes that this additional marking requirement should be removed as vague and unnecessary, and thus the added words "*as rejected along*" in this sentence should also be deleted.

Response: The DSWM has reviewed this comment. Attachment 2.E.2 is adequate as written. No changes were made.

155. **Comment:** Attachment 2 – Waste Analysis Plan, 2.F.1, par. 2 – In its Permit Renewal Application, ETSD utilized the rationale presented earlier in this paragraph to explain why the last sentence was written as follows: "*Therefore, while these fingerprint analyses will be performed in substantial accordance with the referenced analytical methods, strict compliance with all method details is typically not necessary.*" ETSD had previously understood that this sentence and paragraph were acceptable to TDSWM. In this Attachment 2, however, TDSWM has for some unexplained reason ignored the rationale of the preceding sentences and changed the last sentence to read as follows: "*These fingerprint analyses will be performed in accordance with the referenced analytical methods.*" ETSD believes TDSWM's changes to the last sentence to be unnecessary and unacceptable and insists that the sentence be revised to read as presented in ETSD's Permit Renewal Application.

Response: The DSWM has reviewed this comment. Attachment 2.F.1 is adequate as written. No changes were made.

156. **Comment:** Attachment 2 – Waste Analysis Plan, 2.F.3.(b) – In the bullet entry for Chlorine content, the spelling of the words "Choride" and "verision" should be corrected.

Response: The DSWM has corrected "Choride" to"Chloride" and "verision" to "version."

157. **Comment:** Attachment 2 – Waste Analysis Plan, 2.F.3.(b) – In the bullet entry for Ignitability, ETSD requests that the period at the end of the entry be replaced with

a comma followed by the language "*or a Setaflash closed cup flash point tester in accordance with the instructions provided by the equipment manufacturer and ASTM D3278-78.*" This added language will clearly allow ETSD to replace its Pensky-Martens device with the also acceptable Setaflash device without first having to possibly modify the Permit.

Response: The DSWM has reviewed this comment and agrees to add the suggested language. The following was added "or a Setaflash closed cup flash point tester in accordance with the instructions provided by the equipment manufacturer and ASTM D3278-78" after "ASTM D93-80."

158. **Comment:** Attachment 2 – Waste Analysis Plan, 2.F.3.(b) – In the third sentence of the bullet entry for Total Halides, the equipment name "*Chlor-D-Tect*" should be corrected to read "*Chlor-D-Tech*".

Response: The typographical errors has been corrected "Chlor-D-Tect" to "Chlor-D-Tech."

159. **Comment:** Attachment 2 – Waste Analysis Plan, 2.G – In the bullet entry for Facility-generated Waste, insert the word "*which*" between the first comma and the word "*must*", and insert the word "*it*" between the word "*generating*" and the second comma. These changes will provide needed clarification.

Response: The DSWM has reviewed this comment and added "that" before "must be."

160. **Comment:** Attachment 2 – Waste Analysis Plan, 2.J – This is a new section prepared wholly by TDSWM that for some unknown reason addresses the testing and management of ETSD-generated wastes. It is completely unnecessary and inappropriate for inclusion in the Waste Analysis Plan, and thus must be deleted. The characterization and management of hazardous wastes generated by ETSD's on-site activities is subject to the applicable requirements of TN Rule 0400-12-01-.03 rather than the terms of this Permit. Any needed clarifications as to how ETSD-generated wastes are to be co-managed within the permitted units at the ETSD facility should be (and already are) addressed elsewhere in the Permit – notably in Attachment 8.

Response: The DSWM has reviewed Attachment 2.J and has determined that it is adequate. No changes were made.

161. **Comment:** Attachment 2.1 – Forms Utilized In Waste Analysis Plan Implementation – The various forms that TDSWM has included in Attachment 2.1 appear to be intended to be faithful reproductions of the documents submitted as Appendix III.A in ETSD's 2024 Permit Renewal Application. However, the reproduction quality is poor. This attachment must be updated to include clear copies of current versions of these forms which ETSD will provide.

Response: The DSWM has updated the forms in Attachment 2.1 to provide clear copies.

162. **Comment:** Attachment 2.2 – Waste Testing Support For Process Determinations – The table and associated notes included as Attachment 2.2 appears to be identical to that submitted as Appendix III.B in ETSD's 2024 Permit Renewal Application except for inconsistencies in the left margins of the Notes text which should be corrected.

Response: This formatting issue was corrected.

163. **Comment:** Attachment 2.3 – ETSD Procedure For Determining Waste Volume In A Container – The text document "ETSD Procedure for Determining Waste Volume in a Container" appears to be essentially identical to that submitted as Appendix III.C in ETSD's 2024 Permit Renewal Application except for the last sentence added by TDSWM that reads as follows: "*Daily inventories are based off size of container for compliance purposes*." This sentence is wholly unnecessary and inappropriate for inclusion in this internal procedural document and must be deleted.

Response: The DSWM has reviewed this comment. The sentence mentioned in the comment, "Daily inventories are based off size of container for compliance purposes" is adequate as written. No changes were made.

164. **Comment:** Attachment 2 – Waste Analysis Plan, 2.C, par. 2 – The last sentence of this paragraph states that "*the generator/shipper is also asked to provide Safety Data Sheets and/or any pertinent, available laboratory analysis reports from previous testing of the waste stream.*" This statement is a faithful reproduction of the language from ETSD's Permit Renewal Application, but during this review ETSD has realized that it is not completely accurate and needs to be changed. The phrase "*is also asked*" must be changed to "*may also be asked*" to reflect the fact that this information is not always requested because it is unnecessary and/or inappropriate for some waste streams (especially for some "pass-through" waste streams that will not be processed by ETSD). For examples, it would not be appropriate to request Safety Data Sheets for a K061 emission control dust waste stream, nor would it be necessary to request analytical data for a commercial chemical product that is discarded because its shelf life has expired.

Response: The DSWM determined the sentence with the "and/or" as written is understood that a Safety Data Sheet or analytical data will be used as appropriate. No changes were made.

165. **Comment:** Attachment 3 – Facility Security – The text of TDSWM Draft Permit Attachment 3 seems to be essentially unchanged from the equivalent text in Section IV of ETSD's 2024 Permit Renewal Application. The only significant text changes needed are those described in Comments 3, 4, and 5 below to acknowledge ETSD's

recent acquisition of that portion of the facility formerly leased from Best Wade Petroleum, Inc. ("BWP"). See General Comment 1.

Response: The DSWM has reviewed the application and submittals from ETSD. The mention of Best Wade Petroleum no longer being co-owners has not been found in any of the Permit Renewal Applications submitted by ETSD. Tennessee Hazardous Waste Rule 0400-12-01-.08(9)(b)3 states the requirements for changes in the ownership of the facility and ETSD shall submit a permit modification once the permit is issued. No changes were made.

166. **Comment:** Attachment 3 – Facility Security, 3.A, par. 1 – In the second sentence, the figure number "*IV-1*" must be changed to "*3-1*".

Response: The typographical error was corrected from "IV-1" to "3-1."

167. **Comment:** Attachment 3 – Facility Security, 3 A, par. 1 – In the second sentence, the language "*and the immediately adjacent property that ETSD leases from Best Wade Petroleum, Inc. ("BWP")*" must be deleted.

Response: The DSWM has reviewed the application and submittals from ETSD. The mention of Best Wade Petroleum no longer being co-owners has not been found in any of the Permit Renewal Applications submitted by ETSD. Tennessee Hazardous Waste Rule 0400-12-01-.08(9)(b)3 states the requirements for changes in the ownership of the facility and ETSD shall submit a permit modification once the permit is issued. No changes were made.

168. **Comment:** Attachment 3 – Facility Security, 3 A, par. 2 – This entire paragraph must be deleted.

Response: The DSWM has reviewed the application and submittals from ETSD. The mention of Best Wade Petroleum no longer being co-owners has not been found in any of the Permit Renewal Applications submitted by ETSD. Tennessee Hazardous Waste Rule 0400-12-01-.08(9)(b)3 states the requirements for changes in the ownership of the facility and ETSD shall submit a permit modification once the permit is issued. No changes were made.

169. **Comment:** Attachment 3 – Facility Security, 3 C, par. 1 – The last sentence in this paragraph must be deleted.

Response: The DSWM has reviewed the application and submittals from ETSD. The mention of Best Wade Petroleum no longer being co-owners has not been found in any of the Permit Renewal Applications submitted by ETSD. Tennessee Hazardous Waste Rule 0400-12-01-.08(9)(b)3 states the requirements for changes in the ownership of the facility and ETSD shall submit a permit modification once the permit is issued. No changes were made.

170. **Comment:** Attachment 3 – Facility Security, 3.C, par. 3 – For clarity, the parenthesis *"(Attachment 2)"* that ends the first sentence should be deleted and replaced by the language "*that is Attachment 2 to this Permit*".
Response: The DSWM has reviewed this comment. Attachment 3.C is adequate as written. No changes were made.

171. **Comment:** Attachment 3 – Facility Security – Because they are referenced in Attachment 3, TDSWM has properly added as Attachment 3.1 (Figures) the figures "One-Mile Radius Map", "Aerial Photo", and "Flood Insurance Rate Map" that were submitted as Appendices I.E, I.G, and I.H in ETSD's 2024 Permit Renewal Application. The attached figures already included the "Active Facility Showing Truck Traffic Flow Patterns" drawing that was included Section IV of ETSD's 2024 Permit Renewal Application.

Response: The DSWM has reviewed this comment and no changes were made.

172. **Comment:** Attachment 3 – Facility Security – Figure 3.1 needs to be updated to reflect BWP's permanent closure of the former petroleum underground storage tank farm and associated pumping station.

Response:
The DSWM has reviewed the application and submittals from ETSD. The mention of Best Wade Petroleum no longer being co-owners has not been found in any of the Permit Renewal Applications submitted by ETSD. Tennessee Hazardous Waste Rule 0400-12-01-.08(9)(b)3 states the requirements for changes in the ownership of the facility and ETSD shall submit a permit modification once the permit is issued. No changes were made.

173. **Comment:** Attachment 4 – Facility Inspection Program, 4.A, par. 1 – In the first sentence, change the word "*Section*" to "*document*". (Note: The word "*Section*" is an inappropriate carryover from the Permit Application document.)

Response: The word "Section" was changed to "Attachment" in the first sentences of both the first and second paragraphs. .

174. **Comment:** Attachment 4 – Facility Inspection Program, 4.B.5, par. 3 – TDSWM has added this new paragraph and it doesn't seem to make sense as written. It appears to be targeted toward the management of incompatible wastes and materials but there is obviously language missing. ETSD suggests that the paragraph be revised to read as follows:

The Container Storage Areas are inspected weekly to verify that containers holding hazardous wastes that are incompatible with any waste or other materials stored in nearby containers are sufficiently separated (by distance or barriers like berms or walls) from the other materials to prevent mixing of their incompatible contents in the event the containers break or leak. This is especially important if the hazardous waste and/or other materials are liquids,

which may require placement in separate secondarily contained areas or the use of portable containment units.

Response: The DSWM has reviewed paragraph 3 in Attachment 4.B.5 and added the following "The Container Storage Areas are inspected weekly to verify that containers holding hazardous wastes that are incompatible with any waste or other materials stored in nearby containers are sufficiently separated (by distance or barriers like berms or walls) from the other materials to prevent mixing of their incompatible contents in the event the containers break or leak. This is especially important if the hazardous waste and/or other materials are liquids, which may require placement in separate secondarily contained areas or the use of portable containment units."

175. **Comment:** Attachment 4 – Facility Inspection Program, 4.B.5, par. 4 – TDSWM has added the following new language to the end of this paragraph: "*Additionally, ETSD will conduct thorough inspections of the secondary containment surfaces of the Contained Area including certification by a professional engineer of its integrity on a minimum of a two-year basis for the duration of the permit. Records of this inspection including engineering certification will be submitted to the DSWM within 90 days of completion.*" Presumably this language is intended to require both the biennial inspection and the certification to be performed by a qualified professional engineer. This new language must be removed for the following reasons:

i. It is completely inappropriate to include such a requirement in the description of ETSD's self-inspection program. If such a provision is deemed necessary, it should instead be included in Attachment 4.3 ("Secondary Containment Surfaces Inspection and Maintenance Program") and it should be carefully crafted to identify the integrity standard to be utilized and to require the professional engineer to be qualified to make such judgments.

ii. ETSD has submitted numerous certifications by qualified professional engineers over the years attesting that the secondary surfaces of the Contained Area meet the applicable regulatory requirements at Rule 0400-12-01-.06(9)(f)2.(i) only to have TDSWM shortly thereafter find ETSD to be in violation of that very standard.

iii. ETSD does not believe such a provision is necessary because the "Secondary Containment Surfaces Inspection and Maintenance Plan" defines when a qualified professional engineer must get involved in maintenance of the secondary containment surfaces.

iv. The language of any such requirement needs to be carefully crafted to establish when such inspections are to begin and what the professional engineer is to do and certify. With the issuance of the Renewal Permit, ETSD will be required to initiate implementation of the "Concrete Repair and Rehabilitation Plan for the Contained Area" that is included as Attachment 8.6. Certainly no such inspections should until this effort is completed.

Response: The DSWM has reviewed this comment and Attachment 4.B.5 and determined that Attachment 4.B.5 is adequate as written in order to protect human health and the environment. No changes were made.

176. **Comment:** Attachment 4 – Facility Inspection Program, 4.B.6, par. 1 – In the first sentence of this paragraph TDSWM has added the text *"(e.g., tank roof, tank bottom, closure devices"*. This added text is inappropriate and must be removed. However, it was likely added to be consistent with a similar and also inappropriate provision in ETSD's Daily Inspection Checklist. During ETSD's development of the revised Inspection Checklists that were submitted in its January 2019 response to TDSWM's first Notice of Deficiency, the old Inspection Checklist for the annual inspection of tank roofs and closure devices required by TN Rule 0400-12-01-.06(32)(e)3.(iv)(II) inadvertently got included in the Daily Inspection Checklist. This error is only now being discovered. The regulatory requirement for an at-least-annual inspection of the roofs and closure devices of the hazardous waste tanks is separately and more appropriately addressed in Section F.2 of Attachment 9 and the form used to document such is included in Attachment 9.5. See also Comments 8 and 9 below.

Response: The DSWM has reviewed the comment. The DSWM has removed "(e.g., tank roof, tank bottom, closure devices)" from the daily tanks F1 and F2 inspection items.

177. **Comment:** Attachment 4.1 – Inspection Schedule Table – On page 4.1-2, correct the spelling of the words "*horns and sirens*" in the middle column entry for Emergency Alarms.

Response: This typographical error was corrected.

178. **Comment:** Attachment 4.1 – Inspection Schedule Table – On page 4.1-4, correct the spelling of "*Roll-off boxes*" in the third bullet.

Response: This typographical error was corrected from "Roll-of boxes" to "Roll-off boxes."

179. **Comment:** Attachment 4.1 – Inspection Schedule Table – On page 4.1-4, TDSWM has added a new entry for weekly inspection of "Building B Ignitable & Reactive Waste Storage Boundary". The middle column entry should be modified to read "*No ignitable or reactive waste beyond boundary line, line adequately marked & visible*" to also address the main objective of the inspection.

Response: The DSWM has reviewed this comment and has added the following to the table: "No ignitable or reactive waste beyond boundary line, line adequately marked & visible" next to "Building B Ignitable & Reactive Waste Storage Boundary."

180. **Comment:** Attachment 4.1 – Inspection Schedule Table – On page 4.1-5, TDSWM has added a new entry for daily inspection of "Tank Roof & Closure Devices. As described in Comment 4 above, this new entry must be deleted.

Response: The DSWM has reviewed the comment. The DSWM has removed the "Tank Roof & Closure Devices" row from the daily tanks F1 and F2 inspection schedule.

181. **Comment:** Attachment 4.2 –Inspection Checklists – Page 4.2.3 includes an entry for daily inspection of "Tank Roof & Closure Devices. As described in Comment 4 above, this entry was made in error and must be deleted.

Response: The DSWM has reviewed the comment. The DSWM has removed the "Tank Roof & Closure Devices" row from the daily tanks F1 and F2 inspection checklist.

182. **Comment:** Attachment 4.2 –Inspection Checklists – To be consistent with the new Inspection Schedule Table entry described in Comment 7 above, a new entry should be added to page 4.2.5 for weekly inspection of "Building B Ignitable & Reactive Waste Storage Boundary" that reads similarly.

Response: The DSWM has reviewed this comment and determined that the revision noted in the comment will need to be handled as a permit modification after the permit is issued. The following was added to the checklist: under "Item" "Building B Ignitable & Reactive Waste Storage Boundary" and under "Area(s) of Concern" added "*No ignitable or reactive waste beyond boundary line, line adequately marked & visible*"

183. **Comment:** Attachment 4.2 –Inspection Checklists – On page 4.2.9, the entry for monthly inspection of "Building B Ignitable & Reactive Waste Storage Boundary" must be deleted. As described in Comments 7 and 10 above, this item will be addressed in the weekly inspections.

Response: The DSWM has reviewed this comment and has removed "Building B Ignitable & Reactive Waste Storage Boundary" row from the monthly inspection form.

184. **Comment:** Attachment 4.1 – Inspection Schedule Table and Attachment 4.2 – Inspection Checklists – Within a few weeks following submittal of these Comments, ETSD will submit to TDSWM revised versions of the Inspection Schedule Table and the Inspection Checklists which incorporate the corrections identified in Comments 4 through 11 above. Format changes are also planned for the Inspection Checklists.

Response: The DSWM has reviewed the comment and agrees . The DSWM has revised the Inspection Schedule Table and the Inspection Checklist as described in above comments.

185. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan, 4.3-A, par. 1 – The next-to-last sentence was needlessly added by TDSWM and must be deleted from the introductory language. In addition to being inappropriate for the introductory language, it is also too simplistic and inaccurate. The I&M Plan identifies several repair alternatives, temporary and permanent, and describes for which ones a certification by a professional engineer is required.

Response: The DSWM has reviewed this comment. Attachment 4.3.A is adequate as written. No changes were made.

186. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan, 4.3-B.3.(2) – In both the underlined title and first sentence of this subsection, TDSWM has for some unknown reason deleted the word "*significant*" between the words "*and*" and "*random*". It appears that this deletion was done by someone not at all familiar with the "Concrete Repair and Rehabilitation Plan for the Contained Area" ("CRR Plan") in Draft Permit Attachment 8.6 that this text is describing. Whether a random crack is considered "*significant*" or not is a very important distinction in the CRRP and dictates the remedial measures to be taken. The word "*significant*" must be restored to the section title and the first sentence so as to correct this summary of CRR Plan provisions.

Response: The DSWM has reviewed the comment and the Tennessee Rule 0400-12-01-.06(9)(f)2(i) which states: "A base must underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed." No changes were made.

187. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan, 4.3-B, last Par. – The second sentence in this paragraph must be deleted. The schedule by which the *CRR Plan* will be implemented is already contained in the Plan itself. ETSD suggests replacing the current second sentence with the following one: "*The CRR Plan includes a schedule for implementing these phases.*"

Response: The DSWM has reviewed this comment. The DSWM added "The CRR Plan includes a schedule for implementing these phases." to replace "It is anticipated that the CRR Plan will be implemented pursuant to compliance schedule established in ETSD's Renewal Permit."

188. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan, 4.3-C – To provide badly needed clarity to ETSD personnel, TDSWM inspectors, and others, ETSD insists that the following new paragraph be added to this Subsection:

It is also important to note that a crack or a gap that has been effectively sealed using a temporary or permanent repair technique described in Subsection G.1 is no longer considered a crack or gap for the purposes of this document even if the surface outline of the former crack or gap is still visible.

Response: The DSWM has reviewed Attachment 4.3.C and the Tennessee Rule 0400-12-01-.06(9)(f)2(i) which states: "A base must underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed." No changes were made.

189. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan. Similar to the changes addressed in Comment 2, TDSWM in its Draft Attachment 4.3 has for some unknown reason removed critical language distinguishing between Major and Minor concrete cracks that was included in the "Secondary Containment Surface Inspection and Maintenance Plan" ("SCS I&M Plan") that ETSD submitted as Appendix VIII.C in its Permit Renewal Application. The removal of this language is unacceptable and it must be restored. The deleted and to be restored language includes the following:

(1) The following language must be restored at the end of the sixth paragraph of subsection E of Attachment 4.3: *If an unsealed random crack in concrete is identified, the ETSD inspector must also indicate whether it is a "major" or "minor" crack. [Note: As also noted in Subsection G.1 below, a random crack in concrete is major if it shows any indication of vertical displacement or is wider than 1/16-inch (0.0625 in.); otherwise, the random crack is considered minor.]*

(2) In subsection F.2.i, the beginning word "*Cracks*" must be replaced with the words "*Major random cracks*".

(3) In subsection F.2.ii, the beginning word "*Cracks*" must be replaced with the words "*Minor random cracks*".

(4) In subsection F.2.v, the beginning word "*Cracks*" must be replaced with the words "*Major random cracks*".

(5) In the first sentence of subsection F.3, the words "*major random*" must be inserted before the fourth word "*cracks*".

(6) In the second sentence, the word "*minor*" must be inserted between the words "*any*" and "*deficiencies*".

(7) In subsection G.1, the following language must be restored at the end of the first paragraph: "*How it will be sealed will depend upon whether the crack/gap is deemed "major" or "minor". A visible gap at a joint or at a previously sealed random crack is considered major. A random crack in concrete is major if it shows any indication of vertical displacement or is*

wider than 1/16–inch (0.0625 in.); otherwise, the random crack is considered minor."

(8) In the first sentence of subsection G.1.i, the word "*major*" must be inserted between the words "*All*" and "*cracks/gaps*".

(9) In the first sentence of subsection G.1.ii, the word "*major*" must be inserted between the words "*A*" and "*cracks/gap*".

(10) In the first sentence of subsection G.1.iii, the word "*minor*" must be inserted between the words "*A*" and "*cracks/gap*" and the word "*may*" must be replaced with the word "*will*".

ETSD cannot comprehend why TDSWM deleted the language identified in items (1) – (10) above during its conversion of ETSD's submitted SCS I&M Plan into Draft Permit Attachment 4.3. ETSD crafted the SCS I&M Plan to distinguish between Major and Minor random concrete cracks in virtually the same way that Significant and Non-Significant random concrete cracks are distinguished between in the CRR Plan included as Draft Permit Attachment 8.6. The distinction allowed the ETSD-submitted SCS I&M Plan to prescribe different responses and repair techniques to Major and Minor random concrete cracks in the same way that the approved CRR Plan in Draft Permit Attachment 8.6 prescribes different repair methods for random concrete cracks that are considered Significant and those that are not. Further, the ETSD-submitted SCS I&M Plan prescribed the same "permanent" repair methods that were specified in the CRR Plan. It is unclear why essentially the same distinction between the severity of random concrete cracks was approved in Draft Permit Attachment 8.6 but not in Attachment 4.3. As currently written, Attachment 4.3 requires even hairline cracks less than 1/16-inch wide to be repaired using the more disruptive, time-consuming, and expensive method of installing a DOWSIL 890SL silicone seal as described in Attachment 8.6 rather than using the surface-applied penetrating concrete sealer that Attachment 8.6 specifies is effective repair for such non-Significant random concrete cracks. This makes no sense and must be corrected by the restoration of the language identified in items (1) – (10) above.

Response: The DSWM has reviewed Attachment 4.3 and the Tennessee Rule 0400-12-01-.06(9)(f)2(i) which states: "A base must underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed." No changes were made.

190. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan, 4.3.E, par. 1 – In the fourth sentence, TDSWM has needlessly added the words "*and kept in the operating record*" after the word "*weekly*". These added words are irrelevant to the sentence and paragraph and should be deleted. If not deleted, the added words should also be needlessly added to the end of the third sentence for consistency.

Response: The DSWM has reviewed this comment and "and kept in the operating record" was added to the third sentence for consistency.

191. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan, 4.3.F, par. 2 – The second sentence of this paragraph must be deleted as unnecessary. There is no reason to document the simple action by a manager to confirm the findings of the ETSD inspector. Subsection F.2 more specifically describes how the confirmed identification of a secondary containment surface deficiency will be documented using the Secondary Containment Surface Deficiency Response Log.

Response: The DSWM has reviewed this comment. Attachment 4.3.F is adequate as written. No changes were made.

192. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan, 4.3 Table of Contents – The table of contents for Attachment 4.3 identifies 5 attachments containing technical information on products to be used in secondary containment surface repair efforts. However, two of the referenced attachments are actually located in Draft Permit Attachment 8.6. ETSD believes that duplicates of these two attachments should be renumbered and physically included in Attachment 4.3 for the sake of completeness and consistency. The text references to these two attachments should also be revised to their new "4.3.X" numbers, except that the references to such technical information in subsection B.3 should include both the "4.3.X" and "8.6.X numbers for clarity.

Response: The DSWM has reviewed this comment and has determined that in order to avoid having duplicates within the permit, the decision to have two documents named different things was declined. No changes were made.

193. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan – TDSWM added the Contained Area Layout drawing to Draft Permit Attachment 4.3 as new "Figure 4.1". This is a good addition except that the figure should actually be identified as "Figure 4.1.3" instead of "Figure 4.1".

Response: The DSWM has reviewed this comment and has corrected the title of the figure to "Figure 4.3-1."

194. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan – ETSD has determined that it would be useful to include on the Secondary Containment Surface Deficiency Response Log form boxes to check to indicate if the identified crack or gap is "Major" or "Minor". This revised form will be included with other documentation in a properly certified submitted to TDSWM within a few weeks .

Response: The DSWM has reviewed this comment and determined that the revised form will need to be submitted as a permit modification after the permit is issued. No changes were made.

195. **Comment:** Attachment 4.3 – Secondary Containment Surfaces Inspection and Maintenance Plan – In the finalization of Attachment 4.3, TDSWM should consider any modifications to the Permit Conditions and be careful to reference the appropriate ones in the first paragraph of subsection F.

Response: The DSWM has reviewed this comment. Attachment 4.3.F is adequate as written. No changes were made.

196. **Comment:** Attachment 5 – ETSD Training Program Outline – Section VII (Personnel Training and Responsibilities) of ETSD's Permit Renewal Application included 4 pages of text and two Appendices. Appendix VII.A provided the Training Program Outline and Appendix VII.B provided Job Descriptions. In Attachment 5 of the Draft Permit TDSWM has ignored the 4 pages of text, included the Training Program Outline as Attachment 5.0, and included the Job Descriptions as Attachment 5.1. There seem to be no significant revisions from what ETSD submitted in Attachment 5.0, and Attachment 5.1 seems to be just a copy of ETSD's submitted Job Descriptions. Although it is not clear why TDSWM deviated from their typical practice and deleted the text of our Section VII, no comments seem warranted.

Response: The DSWM inadvertently left out the four pages of text. They have been added to the permit and Attachment 5.1 and 5.2 have been modified to match the original submission. The added four pages of text can be found in Enclosure 2 below.

197. **Comment:** Attachment 6 – Preparedness and Prevention – 6.A, par. 2 – In the second sentence, add the word "*that*" between the words "*unit*" and "*minimize*" for clarity.

Response: The DSWM has reviewed this comment and determined this grammar suggestion is not necessary. No changes were made.

198. **Comment:** Attachment 6 – Preparedness and Prevention – 6.A – To improve their clarity, the references to other portions of the Permit in this Section, they should be written to read from the more specific to the more general. For example, in the second sentence of paragraph 2 the reference to "*Attachment 8, Sections 8.B and 8.C of this Permit.*" should instead be revised to read "*Subsections 8.B and 8.C of Attachment 8 of this Permit.*"

Response: The DSWM reviewed the comment and has made the necessary change to the reference to read "Attachment 8, Subsections 8.B and 8.C of this Permit."

199. **Comment:** Attachment 6 – Preparedness and Prevention – 6.A, par. 2 – As per Comment 3 above, in the fourth sentence revise the reference to "*Attachment 8, Section 8.E (especially subsections 8.E.7 and 8.E.11) and in Attachments 2, 4, and*

7." to instead read "*Subsection 8.E (especially Paragraphs 8.E.7 and 8.E.11) of Attachment 8 and in Attachments 2, 4, and 7.*"

Response: The DSWM reviewed the comment and has revised "Attachment 8, Section 8.E (especially subsections 8.E.7 and 8.E.11) and in Attachments 2, 4, and 7." to update the references to "Subsection 8.E (especially Paragraphs 8.E.7 and 8.E.11) of Attachment 8 and in Attachments 2, 4, and 7."

200. **Comment:** Attachment 6 – Preparedness and Prevention – 6.A, par. 3 – In the second sentence, delete the inappropriate comma after the word "*water*" and apply Comment 3 above to the reference.

Response: The DSWM reviewed the comment and has removed the comma after water and revised the reference from "Section 9.B to "Subsection 9.B"

201. **Comment:** Attachment 6 – Preparedness and Prevention – 6.A, par. 3 – In the third sentence, remove the inappropriate comma after the word "*procedures*" and insert it instead after the word "*equipment*" where it is needed, then apply Comment 3 above to the reference.

Response: The DSWM has reviewed this comment and determined the placement of the comma is adequate as written. The DSWM has corrected the reference from "Attachment 9, Sections 9.B, 9.C, 9.D, and 9.E" to "Attachment 9, Subsections 9.B, 9.C, 9.D, and 9.E."

202. **Comment:** Attachment 6 – Preparedness and Prevention – 6.A, par. 3 – In the fourth, fifth, and sixth sentences, apply Comment 3 above to the references.

Response: The DSWM reviewed the comment and has made the necessary changes to the references found in Subsection 6.A paragraph 3.

(a) "Sections 9.F, 9.G, and 9.H" in the fourth sentence was changed to "Subsections 9.F, 9.G, and 9.H."
(b) "(Section 9.D and Section 9.G)" in the fifth sentence was changed to "(Subsection 9.D and Subsection 9.G)."
(c) "Sections 9.F, 9.G, and 9.H" in the sixth sentence was changed to "Subsections 9.F, 9.G, and 9.H."

203. **Comment:** Attachment 6 – Preparedness and Prevention – 6.F, Par. 2 – In the first sentence, add the word "*a*" between the words "*or*" and "*modification*".

Response: The typographical error was corrected to add "a" between "or" and "modification" to read "or a modification."

204. **Comment:** Attachment 7 – Contingency Plan. – ETSD found that Attachment 7 was missing some key language and information that had been included in the

version of the Contingency Plan that was included in the Permit Renewal Application. ETSD will in a few weeks submit a revised Contingency Plan that appropriately includes the prior text along with some revised forms and perhaps other revised Permit Renewal Application documentation. This will be included with a proper certification by the ETSD president.

Response: The DSWM has reviewed this comment. The Contingency Plan included in the draft permit is the same as the Class 1 permit modification acknowledged on October 22, 2024. No changes were made.

205. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, Table of Contents – What happened to ETSD Appendix XI.F – Agency Inspector Coordination Procedure, which was included in the Permit Renewal Application? See also Comment 15.

Response: The DSWM acknowledges that XI F "Agency Inspector Coordination Procedure" was included in the Permit Renewal Application but does not find it relevant to be included in the permit. No changes were made.

206. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.B.1, par. 1 – In its Permit Renewal Application, ETSD had included a sentence after the fourth sentence of this paragraph that read "*These boundaries are depicted on Figure II.A-3 (Contained Area Layout) in Section II of this Application*." ETSD strongly believes that this Contained Area Layout drawing provides a visual depiction of the OHWCMA that greatly supplements and clarifies the prose description of the OHWCMA provided in the first four sentences. Given the format of the Draft Permit, ETSD believes that a copy of the Contained Area Layout drawing should be included in Attachment 8.1 and a reference to it should be included after the fourth sentence of this paragraph.

Response: The DSWM has reviewed the comment and added the figure of the Contained Area Layout to Attachment 8.1 as Figure 8.1-3. The sentence mentioned in the comment was added as follows: "These boundaries are depicted on Figure 8.1-3 found in Attachment 8.1." DSWM has added this on the request of the permittee, but notes that that the previous drawing in the section was similar to the newly added figure.

207. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.B.2, par. 1 – At the end of the fourth sentence, add the missing word "*Attachment*" between the word "*in*" and the number "*8.1*".

Response: This typographical error was corrected to add "Attachment" between "in" and "8.1" to read as "in Attachment 8.1."

208. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.B.2, par. 3 – Restore the word "*were*" in place of the word "*was*" in the third sentence to appropriately address the plural word "*pads*" earlier in the sentence.

Response: This grammatical error was corrected to changed "was" to "were."

209. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.B.2, par. 4 – To properly complete the reference to the outside document in the third sentence, add the words "*of this Permit*" between the number "*4.3*" and the following comma.

Response: The DSWM has reviewed this comment and determined that "of this Permit" is inferred to the reader. No changes were made.

210. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.B.2, par. 5 – In the first sentence, add a closing parenthesis mark ")" after the number "*4.3*".

Response: This typographical error was corrected added a ")" after "4.3" in the first sentence.

211. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.C.1, par. 2 – To make the first sentence make sense, move the language "*in Attachment 8.1*" from the end of the sentence to immediately after the number "*8.1-2*". In the last sentence, change the word "*at*" to the word "*as*".

Response: These grammatical errors were corrected. The last sentence of the first paragraph revised "at "Building B" (or "Area B")" to "as "Building B" (or "Area B")." The first sentence of the second paragraph was revised from "Figure 8.1-2 is a scale drawing showing how the HWM Building (referred to on the drawing as the "RCRA Container Storage Building") was designed and constructed in Attachment 8.1." to "In Attachment 8.1, Figure 8.1-2 is a scale drawing showing how the HWM Building (referred to on the drawing as the "RCRA Container Storage Building") was designed and constructed."

212. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.C.2, par. 1 – In the first sentence, again add the words "*of this Permit*" between the number "*4.3*" and the following comma.

Response: The DSWM has reviewed this comment and determined that "of this Permit" is inferred to the reader. No changes were made.

213. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.C.2, par. 1 – In the last sentence, change the word "*to*" to the word "*with*" so that the sentence makes sense.

Response: This grammatical error was corrected from "to" to "with."

214. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.D.1, par. 1 – To clarify the "Section III" reference and eliminate the needless and confusing reference to the sum total of the operating capacities of the three container management units, ETSD strongly suggests that the first sentence be revised to read as follows: "*As specified in Permit Condition III.A, ETSD has established both maximum operating capacity limits (in gallons of hazardous waste allowed at any one time) for each of the three permitted container storage units and a separate "facility-wide" maximum operating capacity limit that applies to the combined amount allowed in all three units at any one time.*"

Response: The DSWM has reviewed this comment and added "As specified in Permit Condition III.A, ETSD has established both maximum operating capacity limits (in gallons of hazardous waste allowed at any one time) for each of the three permitted container storage units and a separate "facility-wide" maximum operating capacity limit (61,720 gallons) that applies to the combined amount allowed in all three units at any one time" in place of the first sentence.

215. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.D.1, par. 3 – The first sentence in ETSD's version of this paragraph in Section XI.D.1 of its Permit Renewal Application read as follows: "*Facility-generated" (a.k.a. "site-generated" hazardous waste are excluded from the above operating capacity limits principally because such wastes do not, by regulation, have to be managed within the three permitted container management units (although ETSD prefers and fully intends to hold containers of such facility-generated wastes within the secondarily-contained units during their allowed accumulation period).*" TDSWM has modified this sentence to read as follows: "*"Facility-generated" (a.k.a. "site-generated") hazardous waste are not excluded from the above operating capacity limits principally if there is off-site hazardous waste stored in the unit.*" ETSD finds this sentence thoroughly confusing." First, we assume that "not excluded" means "included". But is the sentence saying that Facility-generated hazardous waste is excluded from the operating capacity limits only if there is no off-site hazardous waste stored in the unit? There is also the residual parenthetical statement from ETSD's original sentence that is left floating in the middle of the paragraph.

TDSWM also deleted from the paragraph the last sentence from ETSD's version which read as follows: "*It should be noted that while not counted toward the operating capacity limitations, facility-generated hazardous wastes are included in the closure cost estimates set forth in Section X of this Application.*" This sentence makes the very important point that ETSD's position that Facility-generated hazardous wastes accumulated in the three permitted storage units do not count toward the operating capacity limits is also reflected in ETSD's closure cost estimates where the costs of properly managing Facility-generated hazardous wastes is added to the cost of properly managing the operating capacity of the three units. This is most clearly seen in Section C of Attachment 11 (Closure Plan) where

the Maximum Hazardous Waste Inventory in containers is calculated to include 9,085 gallons of Facility-generated hazardous waste plus the facility-wide container operating capacity limit of 52,635 gallons. When TDSWM modified Sections D.1 and D.2 of Attachment 8 to require that containers of Facility-generated waste count toward the operating capacity limits, it failed to make the corresponding changes to delete the 9,085 gallons of Facility-generated hazardous waste from the Maximum Hazardous Waste Inventory in Section C of Attachment 11.
In summary, if TDSWM is taking the position that Facility-generated hazardous wastes accumulated in the three permitted container storage areas count toward the operating capacity limits, then the third paragraph of Section D.1 of Attachment 8 must be re-written to more clearly say such and Section C of Attachment 11 must also be re-written to incorporate the 9,085 gallons of Facility-generated hazardous waste into the 52,635 gallons of container operating capacity instead of additional to it.

Response: The DSWM has revised the paragraph to read as: "Facility-generated" (a.k.a. "site-generated') hazardous wastes are included in the above operating capacity limits. ETSD prefers and fully intends to hold containers of such facility-generated wastes within the secondarily contained units during their allowed accumulation period. The vast majority of such facility-generated wastes will be generated and accumulated in bulk containers in the OHWCMA." The DSWM reviewed Attachment 8.D.1 and determined the facility-wide total will be updated to 61,720 gallons.

216. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.D.2, par. 2 – The last two sentences of this subsection read: "*ETSD will ensure that containers of facility-generated hazardous wastes and any non-hazardous waste containers in the permitted areas are clearly marked or labeled as such. These containers will be counted toward capacity limits.*" Both of these sentences must be deleted as unnecessary, inappropriate, and confusing. Containers of facility-generated hazardous waste are already required by the generator standards of TN Rule -.03 to have a "Hazardous Waste" label identifying ETSD as the generator. The marking/labeling of containers of non-hazardous waste is already addressed in Section E.1 (Co-management of Other Materials). Finally, the second sentence indicates that containers of non-hazardous wastes will be counted toward the hazardous waste operating capacity limits which is clearly inappropriate and unjustified.

Response: The DSWM has reviewed this comment, and the volume of the drums has to be taken into account for secondary containment which must include the non-hazardous waste volumes within the area to account for displacement. This section will remain as written.

217. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.D.2 – In this subsection, TDSWM has modified the language presented in ETSD's Permit Renewal Application to require that compliance with operating capacity

limitations be determined based on the capacity of the hazardous waste containers present rather than the amount of hazardous waste present in such containers. This is an old issue between TDSWM and ETSD, and one ETSD thought had been resolved with the Settlement Agreement TDSWM issued on August 24, 2018, to finally address ETSD's appeal of similar requirements TDSWM had included in the Permit Modification issued on September 17, 2017. In that Settlement Agreement, TDSWM deleted the language in Permit Condition III and in Permit Attachment 7.1 that required the use of container capacities rather than hazardous waste volume in determining compliance with operating capacity limits. Thus, the expired-but-still-effective Permit under which ETSD currently operates continues to require that compliance with operating capacity limits be determined by the volume of hazardous waste in the containers present.

ETSD is very disappointed that TDSWM is once again trying to require that compliance with operating capacity limits – which have always been expressed in gallons of hazardous waste – be determined using the size of the containers present rather than the volume of hazardous waste actually contained in such containers. ETSD understands that TDSWM's only argument for such requirement is that it makes it faster and easier for TDSWM personnel to evaluate compliance with operating capacity limits during their very infrequent inspections of the ETSD facility. Partly in sympathy with this TDSWM concern and partly to ease its own burden in implementing the Daily Container Inventory provisions described in subsection D.3 of the Draft Permit, ETSD in Section XI.D.2 of its 2024 Permit Renewal Application presented a hybrid approach for determining compliance with operating capacity limits as follows:

- *For each container having a volume of 55-gallons or less, counting the volume of the container itself;*
- *For an "over-pack" container, counting the volume of the largest container it could hold (maximum of 55 gallons); and*
- *For the very much smaller number of larger containers, counting the actual volume of hazardous waste in the container determined by visual inspection or ETSD operating records. (Note: This effort may not be performed if the container volume can be counted without exceeding an operating capacity limit.)*

Because the vast majority of the containers that are present at any given time at the ETSD facility will be those having a volume of 55-gallons or less and overpack containers, ETSD believed (and still believes) that these provisions will greatly reduce the level of effort required of TDSWM inspectors in determining operating capacity limit compliance. At the same time, counting only the actual volume of hazardous waste in the much smaller number of larger containers will keep ETSD from effectively losing the use of potentially thousands of gallons of operating capacity. TDSWM must realize that the current language of subsection D.2 would result in the ridiculous determination that a 20-cy rolloff box containing as little as one gallon of hazardous waste would count for 4,040 gallons of operating capacity! Where does TDSWM get the authority to treat the air in a partially filled container as a hazardous waste – especially solely for the convenience of TDSWM inspectors?

ETSD is also outraged that TDSWM has suddenly inserted into Attachment 8 the requirement that the capacity of even hazardous waste containers larger than 55-gallon size be used instead of the actual volume of hazardous waste present in such containers without even discussing the issue with ETSD. Although it did not include the later-added clarifying provision concerning overpack containers, Section XI of ETSD's initial Permit Renewal Application submitted in April 2018 included the hybrid operating capacity determination approach described above of assuming all hazardous waste containers of 55-gallon size or smaller are full while requiring an actual determination of the amount of hazardous waste in larger containers. This language has never been considered deficient or even challenged in any of the Notices of Deficiency TDSWM has issued on ETSD's Permit Renewal Application and has been included in each submittal of Section XI of the Application since. ETSD believes this action to suddenly insert the language in the Draft Permit to be peremptory and unacceptable.
For the above reasons, ETSD finds to be unacceptable the existing description in the first paragraph (including the three bullet items) of subsection D.2 of Draft Permit Attachment 8 of how compliance with operating capacity determinations will be made, and insists that the original language from Section XI.D.2 be restored.

Response: The DSWM has reviewed this comment and has determined the counting of capacity limits based on the size of the container is a standard unit of measurement that is used to determine the capacity. Measurement of all containers individually to obtain the volume would involve calibration of measuring equipment as well as specific training and records pertaining to every container stored within permitted storage areas. If ETSD can produce suitable documentation that all measurement will be ready for review and equipment requirements can be met, then a modification for this section of the permit can be submitted to the DSWM. No changes were made.

218. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, D.2, par. 1 – Unless they require something different, it makes no sense to have separate bullets for containers having of volume of 55 gallons or less and containers larger than 55 gallons.

Response: The DSWM has reviewed the comment, and determined no changes were necessary.

219. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.D.2 – In the original version of this text that was included as Section XI.D.2 of ETSD's 2024 Permit Renewal Application, there was a third paragraph that read as follows:

When the Facility's hazardous waste container management areas are being inspected by TDSWM and/or U. S. Environmental Protection Agency ("USEPA") personnel for purposes of determining compliance with the operating capacity limitations established in Subsection D.1 above, the Agency Inspector Coordination Procedure included as Appendix XI.F will be implemented to facilitate accurate volume determinations.

This paragraph, which was obviously deleted by TDSWM, referenced an "Agency Inspector Coordination Procedure" that was included as Appendix XI.F in ETSD's Permit Renewal Application but also deleted by TDSWM from Attachment 8. The referenced "procedure" described certain actions that ETSD personnel would take to facilitate the efforts of TDSWM inspectors to make an accurate determination as to whether any of the operating capacity limits were exceeded. Versions of this reference paragraph in D.2 and the "Agency Inspector Coordination Procedure" in Appendix XI.F were included in ETSD's initial Permit Renewal Application submitted in April 2018, and in every modification of Section XI of ETSD's Permit Renewal Application that has been submitted to TDSWM since. Although ETSD has tweaked the language in both a little over time, ETSD does not believe that TDSWM has ever identified either the paragraph of the Appendix as being deficient. Nor does ETSD recall having any informal discussions with TDSWM personnel regarding issues with the paragraph or appendix. So why were the paragraph and appendix removed in preparation of the Draft Permit?
Perhaps TDSWM believes that the deleted paragraph and appendix were unnecessary with the proposed change in D.2 to utilize solely container size in making operational capacity limit compliance determinations. Regardless of the reason, ETSD deserves an explanation. And the deleted paragraph and appendix may need to be re-inserted when Comment 13 is properly addressed.

Response: As described above, the DSWM did not find XI F "Agency Inspector Coordination Procedure" relevant to the permit and determined it would not be added. No changes were made.

220. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.D.3, par. 1 – This short paragraph contains several errors. First, in the first sentence, the reference to "*Subsection 8.*" must be corrected to refer instead to "*Subsection 8.D.1*".

Response: This typographical error was corrected to read as "Paragraph 8.D.1." There was also a line formatting error that was corrected here.

221. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.D.3, par. 1 – In the second and third sentences, the references to "*Attachment 4.3*" must be corrected to refer instead to "*Attachment 8.3*".

Response: The DSWM has reviewed this comment and has corrected the typographical error so that "Attachment 4.3" in both the second and third sentences was revised to "Attachment 8.3."

222. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.D.3, par. 1 – In the second and third sentences, the word "*three*" must be corrected to "*six*" as it read in Section XI.D.3 of ETSD's Permit Renewal Application. Whoever changed "*six*" to "*three*" in the Draft Permit was apparently unfamiliar with both the Daily Container Inventory form and associated figure in Attachment

8.3, both of which identify six operating areas for Daily Container Inventory purposes.

Response: The DSWM has reviewed this comment and section 8.D.3. The DSWM has determined that in total there are three operating areas, OHWCMA, HWM Building Area A, and HWM Building Area B. ETSD has separated OHWCMA into four different areas for internal use. No changes were made.

223. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.1, par. 1 – Again for some unknown reason, TDSWM removed from the end of the second sentence the following punctuation and wording that ETSD had included in Section XI.E.1 of its Permit Renewal Application: *"; however, non-hazardous waste containers are not necessarily subject to the requirements set forth in this Subsection"*. ETSD insists that this omitted language be restored, or a similar statement added to the paragraph, to emphasize this very important point. The omitted language exists in ETSD's expired-but-still-effective current permit, was included in ETSD's original Permit Renewal Application submitted in April 2018, has been included in every revised version of Attachment XI submitted to TDSWM, and has never been identified as problematic by TDSWM in any formal Notice of Deficiency or in any informal communication. Before such language is omitted from the Permit, TDSWM should explain to TDSWM why it is being removed.

Response: The DSWM has reviewed the comment and determined it is adequate as written. No changes were made.

224. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.2, par. 1 – In the second sentence, add the verb "*are*" between the words "*perimeter*" and "*all*" so that the sentence makes sense.

Response: This typographical error was corrected to add "are" between "perimeter" and "all."

225. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.2, par. 3 – In this paragraph, TDSWM for some unknown reason removed the following sentence that ETSD had included as the last sentence of this paragraph in Section XI.E.1 of its Permit Renewal Application: "*Wastes that require macro-encapsulation prior to landfill disposal may be placed in special "Macro" containers which are then shipped to a land disposal facility for the actual macro-encapsulation procedure and subsequent disposal – no macro-encapsulation is performed at the ETSD Facility.*" ETSD had added this sentence to the paragraph to address a comment in TDSWM's October 8, 2021, Notice of Deficiency. ETSD thus believes that this omitted sentence should be restored to the paragraph to clarify any references to "microencapsulation" or "macro" in Attachment 8 (including on the Process Batch Sheet form in Attachment 8.2).

Response: The DSWM has reviewed the comment. ETSD is not permitted to perform macroencasulation on site. No changes were made.

226. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.3.(b) – Again for some unknown reason, TDSWM removed from the lead paragraph of this subsection an explanatory note that ETSD had included after the first sentence in Section XI.E.3.(b) of its Permit Renewal Application. That note read as follows: "[*Note: A container with dents may still be in good condition. Dented containers are allowed as long as the damage does not threaten the integrity of the container, cause the container not to close properly, interfere with the application or reading of labels, or cause the container to be unstable on a flat surface.]*". Again, the omitted language exists in ETSD's expired-but-still-effective current permit, was included in ETSD's original Permit Renewal Application submitted in April 2018 and has been included in every revised version of Attachment XI submitted to TDSWM since, and has never been identified as problematic by TDSWM in any formal Notice of Deficiency or in any informal communication. ETSD believes that this note acknowledges the real-world existence of at least minor dents in a significant percentage of containers involved in transportation, and provides true and useful information to ETSD personnel, TDSWM inspectors, and other persons reviewing ETSD's Permit or operations. ETSD therefore insists that the two sentences of this note be restored in this paragraph.

Response: The DSWM has reviewed Subparagraph 8.E.3(b) and Tennessee Rule 0400-12-01-.06(9)(b). The DSWM has determined that Paragraph 8.E.3(b) is adequate as written. No changes were made.

227. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.4.(d) – Again for some unknown reason, TDSWM removed from the end of the fourth sentence the following language and punctuation that ETSD had included in Section XI.E.4.(d) of its Permit Renewal Application: *", but otherwise only individual containers may be placed against such walls or berms"*. This subsection of ETSD's Permit Renewal Application was revised to its current wording (including this TDSWM-omitted language) and included in ETSD's January 4, 2019, Response to TDSWM's October 15, 2018, Notice of Deficiency to address a comment. Since then, it has been included in every revised version of Attachment XI submitted to TDSWM, and has never been identified as problematic by TDSWM in any subsequent formal Notice of Deficiency or in any informal communication. ETSD believes that the above language omitted by TDSWM from the Draft Permit provides valuable clarification regarding the storage of containers near walls. ETSD therefore insists that the removed language be restored.

Response: The DSWM has reviewed and revised Attachment 8.E.4(d) from "Such rows may extend perpendicular from perimeter walls and berms without providing aisle space between the containers and the wall or berm." to "Such rows may extend perpendicular from perimeter walls and berms without providing aisle space

between the containers and the wall or berm, but otherwise only individual containers may be placed against such walls or berms" to enhance clarity.

228. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.7.(c) and E.7.(d), (e) – Line spacing errors need correction.

Response: This typographical error was corrected. In Subparagraph, 8.E.7(c) removed the spacing after "CFR" and before "§177.848(d)." After Subparagraph 8.E.7.(d) deleted the second "(d)."

229. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.7.(f) – In the first sentence of this subsection, change the verb "*are*" to "*is*" – the verb applies to "*a storage containe*r" rather than multiple containers.

Response: This grammatical error was correct from 'are" to "is."

230. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.8.(b) – Again for some unknown reason, TDSWM has stunningly inserted the word "immediately" in this subsection in place of the following language that was included in Section XI.E.8.(b) of ETSD's Permit Renewal Application: "*in a timely manner (i.e., as soon as practicable to prevent overflow of the collection system and to minimize any container exposure to standing liquids)*". This change makes no sense because the priority is to find and fix the source of the liquids. This change is also inconsistent with Tennessee Rule -.06(9)(f)2.(v), Permit Conditions III.G.2. and 5, and other portions of Attachment 8. The word "immediately" must be deleted and the omitted language above must be restored in this subsection.

Response: The DSWM has reviewed this comment and determined that the word "Immediately" was added to make sure the liquid did not remain for any length of time in the collection trenches. No changes were made.

231. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.11.(a) – In the last sentence of this subsection, the text "*Section 9.H*" should be revised to read "*Subsection 9.H of Attachment 9 to this Permit*" to ensure that the reader understands that the reference is to another attachment in the Draft Permit. ETSD recommends that TDSWM make sure that all references to portions of another Attachment are written in this way.

Response: The DSWM has reviewed this comment and has revised the text to read as "Subsection 9.H." The DSWM determined that the "to this Permit" is inferred to the reader so it was not added.

232. **Comment:** Attachment 8.1 – Figures, page 8.1-2, The title sheet for Figure 8.1-1 – Correct "*OCONTAINMENT*" to "*CONTAINMENT*".

Response: This typographical error was corrected from "OCONTAINMENT" to "CONTAINMENT."

233. **Comment:** Attachment 8.1 – Figures, page 8.1-4, Attachment 8.1, Title sheet for Figure 8.1.2 – Correct "*ORCRA*" to "*RCRA*".

Response: This typographical error was corrected from "ORCRA" to "RCRA."

234. **Comment:** Attachment 8.3 – Operating Forms – This Attachment includes two forms titled "DAILY CONTAINER INVENTORY FOR _____" (where the date is to be added in the blank line in the title). Unfortunately, both forms are copies of page 2 of the 2-page form – page 1 of the form is missing. This error goes back to ETSD's Permit Renewal Application, which also inadvertently included two copies of page 2 but no copy of page 1. Within a few weeks following submission of these comments, ETSD will submit a copy of page 1 of the form which will need to be inserted into Attachment 8.2 in place of the first copy of page 2 of the form.

Response: The DSWM has reviewed the comment and determined that ETSD will need to submit a Class 1 permit modification to revise the forms after the permit has been issued. This requirement has been added as number 6 in Section V: Schedule of Compliance and states "The permittee will submit a Class 1 permit modification to revise the "DAILY CONTAINER INVENTORY FOR _____" forms within 60 calendar days of permit issuance.

235. **Comment:** Attachment 8 – Management Of Hazardous Waste In Containers, 8.E.3.(b)(iv) – Again for some unknown reason, TDSWM significantly revised the last sentence in this Subparagraph in Attachment 8 from what ETSD had included in its Permit Renewal Application without TDSWM ever identifying ETSD's language as deficient in any Notice of Deficiency or in any informal communication. ETSD had included in Section XI.E.3.(b)(iv) of its Permit Renewal Application a last sentence which read as follows: "*Any corrective action requiring additional time must be documented in the facility operating record providing adequate reason why it could not be completed in a timely manner.*". TDSWM has in this Subparagraph unreasonably changed the sentence to read as follows: "*Any corrective action must be documented in the facility operating record.*" ETSD strongly objects to this modification and insists that the wording of this sentence be restored to ETSD's original wording. The corrective actions referred to in Subparagraph (b) are routine operations necessary to ensure that hazardous wastes are managed in containers that are in good condition and are actions that are almost always taken immediately. There is no reason for, or benefit to be gained by, requiring that ETSD somehow document performance of such routine operations in the Facility's operating record as long as such are performed as soon as possible. ETSD's language appropriately requires documentation of such routine efforts only if additional time is for some reason needed to perform the corrective action.

Response: The DSWM has reviewed the comment and Attachment 8.E.3(b)(iv). The DSWM has revised the last sentence from "Any corrective action must be documented in the facility operating record." to "Any corrective action requiring additional time must be documented in the facility operating record providing adequate reason why it could not be completed in a timely manner." to enhance clarity.

236. **Comment:** Attachment 8.6 – Concrete Repair And Rehabilitation Plan For The Contained Area, 8.6.II, par. 2 – For some unknown reason, TDSWM in the third sentence changed the word "*plan*" to "*plain*". At least with regard to engineering drawings, the term "plan view" refers to how an area or structure looks when viewed from directly above. TDSWM must restore the original word "*plan*".

Response: This typographical error was corrected in the third sentence from "plain" to "plan."

237. **Comment:** Attachment 8.6 – Concrete Repair And Rehabilitation Plan For The Contained Area, 8.6.III.A, par. 2 – To improve clarity of the reference to another Permit attachment in the fourth sentence, ETSD suggests adding the words "*to this Permit*" between the closing parentheses ")" and the following comma.

Response: The DSWM has reviewed this comment and determined that "to this Permit" is inferred to the reader. No changes were made.

238. **Comment:** Attachment 8.6 – Concrete Repair And Rehabilitation Plan For The Contained Area, 8.6.III.A, par. 3 – For some unknown reason, TDSWM added the fourth sentence to this paragraph that reads: "*Replacement activities will include replacement of the Visqueen or similar synthetic barrier under the concrete.*" This sentence is unnecessary and inappropriate and should be deleted. It is unnecessary because both Figures 8.6.1-3 and 8.6.5 include notes that require any membrane between the concrete slab and its stone base to remain and to be replaced by the contractor if it is damaged. It is inappropriate because it focuses on a relatively minor detail of the planned repair in a paragraph and subsection that is simply presenting a summary overview of the planned work. It is also inappropriate because the word "Visqueen" is the name of a brand of polyethylene plastic sheeting.

Response: The DSWM has reviewed the comment. The sentence has been revised to read "Replacement activities will include replacement of the synthetic barrier under the concrete." The replacement of the damaged synthetic barrier is of vital importance to the concrete repair plan.

239. **Comment:** Attachment 8.6 – Concrete Repair And Rehabilitation Plan For The Contained Area, 8.6.III.A, par. 4 – Again for some unknown reason, TDSWM omitted from the beginning of this paragraph the following sentence which was included in Section III.A of Appendix XI.G of ETSD's Permit Renewal

Application: "*These concrete panel replacement efforts will be performed in phases as described in Section IV of this Plan.*" This omitted sentence is certainly true and seems a useful reference in this subsection's summary overview of the planned work at least as important as the sentence that TDSWM left in the paragraph. It makes no sense to remove this sentence, particularly since very similar sentences in subsections B, C. D. and E of Section III were not omitted. The omitted sentence has also been included in the CRR Plan since the written plan text was initially submitted in ETSD's October 23, 2019 submittal in response to TDSWM's June 28, 2019, Notice of Deficiency. Further, TDSWM has never indicated that this sentence was deficient, or made the CRR Plan deficient, in any Notice of Deficiency or informal communication issued to ETSD since then. ETSD insists that this omitted sentence be restored to this paragraph.

Response: The DSWM has reviewed the comment and updated the Section to read "Section IV of this Plan."

240. **Comment:** Attachment 8.6 – Concrete Repair And Rehabilitation Plan For The Contained Area, 8.6.IV.A.1, 2, 3, 4, 5, 6 – Again for some unknown reasons, TDSWM has in these subsections of IV.A dramatically shortened the Target Completion Dates of the six planned phases of work from the time frames presented in Appendix XI.G of Section XI of ETSD's Permit Renewal Application. These changes are as follows, with all dates based on number of calendar days since issuance of the Renewal Permit:

Phase 1 – Reduced from 180 days to 30 days
Phase 2 – Reduced from 270 days to 90 days
Phase 3 – Reduced from 360 days to 150 days
Phase 4 – Reduced from 450 days to 210 days
Phase 5 – Reduced from 540 days to 270 days
Phase 6 – Reduced from 630 days to 330 days

These suggested new target deadlines are unnecessarily and unreasonably short, detached from real-world considerations, and incompatible with continuing operation of ETSD's facility. These deadlines were apparently established by someone unfamiliar with the details of this Plan and the issues associated with construction at an operating facility. **These shorter deadlines are absolutely unacceptable to ETSD.**

It is amazing to ETSD that TDSWM would try to impose such an unreasonable concrete repair schedule on ETSD in the Renewal Permit when TDSWM knew in June 2019 that the needed concrete repair work could be accomplished only through issuance of the Renewal Permit and yet essentially stopped work on ETSD's Permit Renewal Application for over two years following ETSD's December 15, 2021, response to TDSWM's October 15, 2021, Notice of Deficiency. In fact, the first official correspondence ETSD received from TDSWM on the completeness or adequacy of the Permit Renewal Application since that October 2021 NOD was the Completeness Determination letter issued by TDSWM on February 20, 2025!

It is also interesting to note that ETSD has included the same schedule in every previous submittal to TDSWM of the Appendix XI.G test (09-20-19, 10-23-19, 02-

03-20, and 06-24-20) and the schedule has never before been identified as deficient or problematic. That is probably because the previous TDSWM reviewers who worked with ETSD on the development of the CRR Plan were more familiar with not only the detailed technical requirements set forth on the drawings and in Section III of the Plan text but also the details of the implementation issues addressed in Sections IV.B, V.A, V.B, and V.C of the Plan text.

Response: The DSWM appreciates ETSD's comments on the timeline. The DSWM believes that ETSD has had more than adequate time to prepare for the work needed to begin this plan as stated in the timeline within your comment. The DSWM made no changes to this section.

241. **Comment:** Attachment 8.6 – Concrete Repair And Rehabilitation Plan For The Contained Area, 8.6. IV.C – While dramatically shortening the implementation time frames as described in Comment 5 above, TDSWM in this Subsection of Attachment 8.6 is indefinitely extending how long the planned concrete repair work will actually take!

In Section IV.C and Attachment E of Appendix XI.G of Section XI of ETSD's Permit Renewal Application, ETSD had voluntarily included a relatively simple plan to quickly screen for potential contamination of the newly exposed soil surface underlying concrete panels that have been removed, to then quickly collect shallow soil samples for testing from those areas deemed from the screening results to be most likely to be contaminated, and to then possibly remove the soil by over-excavation. As made clear in that simple plan, these efforts were not planned because ETSD had reason to believe that the soil underlying any portion of the concrete secondary containment surfaces of the Contained Area is contaminated. Neither ETSD nor TDSWM are aware of any evidence of such contamination. ETSD's idea was to simply utilize the opportunity provided by the removal of the overlying concrete to try to identify and remove any pockets of contaminated soil before the new concrete panel was poured. While a desirable objective, ETSD also understood that these efforts could not be allowed to unduly slow down the concrete repair efforts.

TDSWM has substantially modified the language of Subsection IV.C from that ETSD had included in its Permit Renewal Application to expand the scope and complicate the details of the soil investigation/removal effort. In Attachment 8.6.5, TDSWM has also substantially modified the language from that ETSD had included in Attachment E to similarly expand the scope and complicate the details of the soil investigation/removal effort. Further, TDSWM has included a brand new 40-page Soil Sampling Plan as Attachment 12 to the Permit with additional complicating and time-consuming details.

It is now abundantly clear to ETSD – although apparently not to TDSWM – that there is no way that the CERCLA-style soil investigation/removal efforts required by TDSWM's changes can be implemented contemporaneously with the concrete repair efforts. The objectives and methodologies of the two very different efforts are simply incompatible. Considering that there is a long and clearly identified need for the concrete repair efforts and no identified need for the soil

investigation/removal efforts, **ETSD hereby formally withdraws** the soil investigation/removal plans it volunteered in Section IV.C and Attachment E of Appendix XI.G of Section XI of ETSD's Permit Renewal Application along with any references to such plans elsewhere in Appendix XI.G or other portions of its Permit Renewal Application.
ETSD also reminds TDSWM that (1) there is no identified reason or currently applicable regulatory requirement for the soil investigation/removal plan requirements that TDSWM has established in Draft Permit Attachments 8.6, 8.6.5, and 12, and (2) the Permit Conditions at Section VI (Specific Conditions for Corrective Action) already describes how releases that are subsequently discovered at the permitted facility are to be investigated and (if necessary) remediated. **ETSD therefore insists that TDSWM remove from the Draft Permit the following: Subsection IV.C of Attachment 8.6, Attachment 8.6.5, and Attachment 12, and all references to these documents and the soil investigation/removal effort (including but not limited to the last sentence of the introductory text of Section IV of Attachment 8.6).** See also Comment #1 on Attachment 12.

Response: The DSWM has reviewed this comment . To ensure protection of human health and environment, the DSWM denies ETSD's request to withdrawal Section IV.C and Attachment E of Appendix XI.G of Section XI of ETSD's Permit Renewal Application. No changes were made.

242. **Comment:** Attachment 8.6 – Concrete Repair And Rehabilitation Plan For The Contained Area, 8.6.VI.A.2, par. 1 – Again for unknown reasons, TDSWM removed the following sentence that was included in ETSD's Permit Renewal Application as the tenth sentence of this paragraph: "*While concrete is considered at least somewhat porous to the inward migration of liquids including VOCs, that means it is even more porous to the outward migration of VOCs in vapor form.*" ETSD deliberately included this sentence in the paragraph to acknowledge the long-time concerns expressed by TDSWM and USEPA about the porosity of concrete and to also emphasize that such porosity works in both directions for VOCs. This sentence is certainly true and ETSD believes it necessary and appropriate for the paragraph. This sentence was included in ETSD's August 23, 2019, submittal of the first complete Plan text and has been included in each subsequent submittal of the CRR Plan to TDSWM since. It has never been identified as problematic in any Notice of Deficiency issued by TDSWM nor does ETSD recall it being identified as problematic in any informal communication from TDSWM. ETSD insists that this omitted sentence be restored to the paragraph.

Response: The DSWM has reviewed this comment and determined that Attachment 8.6.VI.A.2 is adequate as written. No changes were made.

243. **Comment:** Attachment 8.6 – Concrete Repair And Rehabilitation Plan For The Contained Area, 8.6.VI.A.2, par. 1 – Again for unknown reasons, TDSWM changed the last sentence of this paragraph in a way that seems to void rather than summarize the point being made by the preceding sentences that there is no reason

to test the removed concrete for VOCs. ETSD's original sentence summarized the point by reading as follows: "*There is thus no reason to think that the concrete will contain any significant amounts of VOCs except possibly in reacted and therefore changed form.*" TDSWM revised this sentence to read as follows: "*There is a possibility that the concrete will contain trace amount of VOCs (and potentially SVOCs.*" While certainly true, TDSWM's sentence adds nothing but confusion to the paragraph. ETSD insists that TDSWM's sentence be deleted and replaced by ETSD's original sentence.

Response: As mentioned in ETSD's response as written, the information is a true statement. The DSWM has determined that the sentence will remain as written. No changes were made.

244. **Comment:** Attachment 8.6.5 – Procedure For Investing Subsurface Conditions During Concrete Panel Replacement – For the reasons described in Comment C.6 above, ETSD insists that this Attachment be removed from the Draft Permit.

Response: The DSWM has reviewed this comment and determined that Attachment 8.6 is necessary to protect human health and the environment. No changes were made.

245. **Comment:** Attachment 9 – Management Of Tank Systems And Equipment And Containers Used In Fuel Blending, 9.B.1 – Correct the last sentence by (1) changing the verb "*is*" to "*are*" to properly reflect more than one referenced object, and (2) move the language "and F2" from its current location after the word "system" to its proper location at the end of the sentence.

Response: The typographical and grammatical errors were corrected from "Included in Attachment 9.3 is (1) a Plan-view Diagram of the Tank Farm secondary containment system and F2, and (2) a Piping and Instrumentation Diagram for Tank Systems F1." to "Included in Attachment 9.3 are (1) a Plan-view Diagram of the Tank Farm secondary containment system, and (2) a Piping and Instrumentation Diagram for Tank Systems F1 and F2."

246. **Comment:** Attachment 9 – Management Of Tank Systems And Equipment And Containers Used In Fuel Blending, 9.C.(d), second bullet – TDSWM has added the words "*to a permitted storage unit*" to the end of this sentence, apparently misunderstanding that the verb "*moved*" refers to the bucket rather than the hose. Considering that the material transfer is already occurring in a "permitted storage unit, this added language is somewhat confusing. Regardless, it appears that the disposition of the capped transfer hoses and the contents (if any) of the 5-gallon buckets is of TDSWM concern and should be addressed.

To address the capped hoses, ETSD suggests replacing the words "*to a permitted storage unit*" in the second bullet with the words

To address the contents of the 5-gallon buckets, ETSD suggests adding a new bullet item between the second and third bullet items that reads as follows: "*Any*

liquid that collects in the 5-gallon buckets under the hose couplings will be transferred into the receiving container (for tank discharges) or into a fuel blending process vessel in the Fuel Blending Area."

Response: The DSWM has reviewed Attachment 9.C(d). The DSWM removed "to a permitted storage area" and added "to their proper storage location within the Tank Farm or the Fuel Blending Area or on the truck from which they came." to the end of the second bullet. A new bullet was added between the second and third bullet that states "Any liquid that collects in the 5-gallon buckets under the hose couplings will be transferred into the receiving container (for tank discharges) or into a fuel blending process vessel in the Fuel Blending Area." to enhance clarity."

247. **Comment:** Attachment 9 – Management Of Tank Systems And Equipment And Containers Used In Fuel Blending, 9.D.3 – TDSWM has unnecessarily and inappropriately inserted the language "*under Multi-Sector permit (TMSP) TNR050717*" into the last line, and this language must be removed. While this added language may or may not properly identify the permit that currently authorizes such discharges, Tennessee Rule Chapter 0400-12-1 provides no authority over discharges to a POTW (including its collection sewer system). It is thus unnecessary and inappropriate to cite this TSMP in this hazardous waste management facility permit, and it could be problematic to do so. For example, a change in the number of the TMSP permit could potentially require a modification of the hazardous waste management facility Permit.

Response: The DWM has reviewed Attachment 9.D.3. The DSWM determined the Multi-Sector permit number should not be included in case the number changes. The DSWM has revised the sentence to read as follows: "Following testing, the stored storm water is discharged in compliance with the permitted POTW discharge limits."

248. **Comment:** Attachment 9 – Management Of Tank Systems And Equipment And Containers Used In Fuel Blending, 9.F, par 1 – TDSWM has added the following sentence before the last sentence of this paragraph: "*This determination is documented and kept within the operating record by ETSD.*" To avoid confusion, ETSD insists that this added sentence be replaced with the following more detailed and accurate one: "*ETSD maintains in its operating records documentation demonstrating that the materials it inputs into Tanks F1 and F2 have a Maximum Organic Vapor Pressure less than 11.1 psi (76.6kPa).*"

Response: The DSWM has reviewed paragraph 1 in Attachment 9.F and revised "This determination is documented and kept within the operating record by ETSD" to "ETSD maintains in its operating records documentation demonstrating that the materials it inputs into Tanks F1 and F2 have a Maximum Organic Vapor Pressure less than 11.1 psi (76.6kPa)." to enhance clarity.

249. **Comment:** Attachment 9 – Management Of Tank Systems And Equipment And Containers Used In Fuel Blending, 9.G.4, par. 1 – TDSWM has added the third sentence in this paragraph which reads as follows: "*This calibration will be included in the operating records.*". ETSD believes this sentence must be deleted from this first paragraph as unnecessary and potentially confusing. Recordkeeping of leak detection monitoring efforts including instrument calibration is addressed in detail in the second paragraph of Paragraph G.4.

Response: The DSWM has reviewed this comment and has determined Attachment 9.G.4 is adequate as written. No changes were made.

250. **Comment:** Attachment 10 – Solid Waste Management Units And Areas Of Concern, page 10.1-1, It appears that TDSWM has inadvertently omitted from Table 10.1-1 the line entry for SWMU #7. This SWMU is the curbed concrete slab known as the Contained Area that has long been identified as a SWMU – and is identified as such and included in Table 10.1-1 in ETSD's current Permit. It is also clearly included in Table 10.1-7 and referenced several times in the Unit Descriptions of several other SWMUs/AOCs in Table 10.1-1.
This Table 10.1-1 is used to identify those SWMUs/AOCs for which No Further Action is required at this time, and SWMU #7 has been included on it for many years. This surely must be a simple inadvertent error because SWMU #7 is also not identified on Tables 10.1-2 through 10.1-6 which are used to identify SWMUs/AOCs for which some Corrective Action is required, and SWMUs and AOCs once identified never just go away. ETSD is aware of no legitimate reason why the line entry for SWMU #7 should not be restored to Table 10.1-1 and insists that TDSWM do so.

Response: The DSWM has moved SWMU #7 to Table 10.1-7 due to its inclusion as a unit that is regulated by a Hazardous Waste Permit. SWMU #7 was removed from Table 10.1-1 to prevent confusion of being located in two tables. No changes were made.

251. **Comment:** Attachment 11 – Closure Plan, 11.B, par. 1 – At the end of the first sentence, TDSWM has for unknown reasons inserted the words "*any contaminated media*" in place of the word "*soils*" that ETSD included in its Permit Renewal Application. Whoever made this shocking change must not be familiar with the closure regulations. With regard to contaminated media, TN Rule 0400-12-01-.06(7) requires only that contaminated soils be decontaminated or removed. As stated in the second paragraph of this subsection, if such "clean" closure cannot be achieved then the portions of the ETSD facility where hazardous wastes or hazardous waste constituents remain in place will be closed as a landfill, thereby triggering the associated corrective action requirements if needed. The words "*any contaminated media*" in the first sentence must be corrected to the word "*soils*".

Response: The DSWM reviewed the comment and revised 11.B to change "any contaminated environmental media" to "soils" in order to match the regulations.

252. **Comment:** Attachment 11 – Closure Plan, 11.C, par. 2 – The first sentence of this paragraph includes the language "*Section III 'Specific Conditions for Storage and Treatment in Containers'*", and the third sentence includes the language "*Section III*'. These two references are not further defined and are somewhat confusing. For clarity and accuracy, the above language in these sentences should both be changed to simply "*Permit Condition III.A*".

Response: The DSWM has reviewed this comment and has determined Attachment 11.C is adequate as written. No changes were made.

253. **Comment:** Attachment 11 – Closure Plan, 11.D.2.(a)(i) – TDSWM changed the word "*macroencapsulation*" that ETSD had included in its Permit Renewal Application to the word "*encapsulation*" for some unknown reason. ETSD used the term "macroencapsulation" because it is a specific technology-based standard identified in Table 1 at TN Rule 0400-12-01-.10(3)(c) used for the treatment of certain hazardous wastes to meet Land Disposal Restriction requirements. The word "encapsulation" is not so defined and used in the regulations. Therefore, the word "*encapsulation*" in this subsection must be changed back to the word "*macroencapsulation*".

Response: The DSWM has reviewed the comment and revised 11.D.2(a)(i) to include "macroencapsulation" in place of "encapsulation."

254. **Comment:** Attachment 11 – Closure Plan, 11.D.2.(b)(ii)(B) – TDSWM inserted the words "*and latest*" between the word "*specified*" and the acronym "*USEPA*" in this sentence. Presumably TDSWM is wanting to require that the most recent version of the specified methods be used rather than some unknown "latest" USEPA analytical method. For clarity and specificity, ETSD therefore recommends that the clause between the commas in this sentence be revised to read as follows: "*by the most recent version of the specified USEPA analytical methods*".

Response: The DSWM has reviewed the comment. The DSWM determined that ETSD's suggested language provides clarification of the sentence's intent and updated the sentence to ""Clean" Rinsate Criteria, by the most recent version of the specified USEPA analytical methods, shows concentrations less than or equal to the specified criteria."

255. **Comment:** Attachment 11 – Closure Plan, 11.D.2.(b)(ii)(B) – ETSD suggests that the following sentence be added following the first sentence: "*The final rinse from which such representative samples are to be collected must be performed using only clean potable water (i.e., unamended with detergents or other cleaning agents).*" This sentence, which also was not (but should have been) included in ETSD's Permit Renewal Application, is needed because Decon Method B as described in subsection D.3.(b) clearly allows the water used in pressure washing to be amended with detergents and other cleaning agents that could potentially contain one or more of the chemical parameters identified in Table 11-2. Testing of

such an amended rinsewater could thus result in an elevated "BGD" value and a false determination regarding compliance with the "Alternate Criterion" values.

Response: The DSWM has reviewed this comment. The n following sentence was added to Attachment 11.D.2(b)(ii)(B) "The final rinse from which such representative samples are to be collected must be performed using only clean potable water (i.e., unamended with detergents or other cleaning agents)." to ensure clarity.

256. **Comment:** Attachment 11 – Closure Plan, 11.E.10, par. 1 – In ETSD's Comment C.235, ETSD insists that Subsection IV.C of Attachment 8.6, its associated Attachment 8.6.5, and Attachment 12 be removed from the Draft Permit. Consistent with those removals, the following language must be removed from the first sentence of this paragraph: "*and the results from the subsurface investigations performed as part of the implementation of concrete panel replacement efforts described in Attachment 8.6*". ETSD suggests that this removed language be replaced with the following more general language: "*and the results from any investigations that have been performed to evaluate subsurface conditions at the ETSD facility*". This alternate language seems more appropriate for a closure activity that will happen at an as-yet-unknown future time.

Response: The DSWM reviewed this comment and believes that the addition of Attachment 8.6 (Concrete Repair and Rehabilitation Plan for the Contained Area) and Attachment 12 (Soil Sampling Plan) are essential for the protection of human health and the environment and to limit the risk to the community. No changes were made.

257. **Comment:** Attachment 11 – Closure Plan, 11.E.10, par. 1 – In the last sentence of this paragraph, the number "11" needs to be replaced with the number "11.1" to correct the cross-reference.

Response: This typographical error was corrected "Attachment 11" to "Attachment 11.1."

258. **Comment:** Attachment 11 – Closure Plan, 11.F – In the Day 155 entry, add the word "*sampling*" after the word "*soil*" to correct the incomplete entry which goes back to ETSD's Permit Renewal Application.

Response: The DSWM has reviewed the comment. The "Day 155" entry was revised to "Completed inspection of secondary containment surfaces for potential release points and initial soil sampling" to provide clarity on expectations.

259. **Comment:** Attachment 11 – Closure Plan, 11.F – In the Day 180 entry, add the parenthesis "*(if necessary)*" between the word "*Complete*" and the word "*removal*". Obviously, removal of soils will only be performed if soils are found to

be unacceptably contaminated. This omission also goes back to ETSD's Permit Renewal Application.

Response: The DSWM has reviewed the comment. The "Day 180" entry was revised to "Complete (if necessary) removal of contaminated soils and confirmation sampling and analysis." to provide clarity in the event that removal is not necessary.

260. **Comment:** Attachment 11.1 – Closure Plan, Attachment 11.1, Section II. – TDSWM added the following words to the next-to-last sentence of this Section: "*be provided in the work plan for prior approval by DSWM before sampling takes place*". The person who added this language apparently does not understand that the nature of the closure process does not allow for such a TDSWM approval step in the background soil sampling process. Implementation of the procedure in Attachment 11.1 is a part of the efforts described in Paragraph E.10 of Attachment 11 to investigate underlying/adjacent soils at potential release points. Like the efforts described in Paragraph E.9 of Attachment 11 to identify potential release points and the efforts described in Paragraph E.11 of Attachment 11 to remove contaminated soils and perform confirmation soil sampling and analysis, these Paragraph E.10 and Attachment 11.1 efforts are components of the Closure Plan which ETSD must at least attempt to completely implement within the 180-day closure time period set forth in the regulations. Further, these efforts cannot effectively be implemented until the waste removal and decontamination components have principally been completed. This means there is no time for seeking TDSWM approvals of such mid-process decisions that must be made. The only "plans" for these efforts that TDSWM will have the opportunity to approve are those already set forth in Attachment 11. The yet-to-be-determined provisions like locations and number of sampling locations will be made by ETSD and the professionals hired by ETSD as described in Attachments 11 and 11.1. Thus, Paragraphs E.9, E.10, and E.11 do not require further TDSWM approvals prior to implementation of their specified actions. For these reasons, TDSWM must delete from Section II of Attachment 11.1 the added wording "*be provided in the work plan for prior approval by DSWM before sampling takes place*". [Note: As described in Paragraph E.12 of Attachment 11, ETSD and the Professional Engineer overseeing Closure Plan implementation are required to submit a Closure Report and certifications for TDSWM's review.]

Response: The DSWM reviewed the comment and disagrees with ETSD proposal for lack of DSWM oversight. The DSWM has identified this section as being protective of the human health and environment and will remain as such. No changes were made.

261. **Comment:** Attachment 12 – SOIL SAMPLING PLAN This Soil Sampling Plan (SSP) seems to be an elegant and very comprehensive plan that the TDSWM has crafted for ETSD to implement to investigate the soils under the concrete secondary containment surfaces of the Contained Area of the ETSD facility. The SSP calls for a massive soil investigation involving at least 3 phases of work. Phase 2 involves

collecting soil samples on a 3-foot by 3-foot square grid pattern, with thus at least one soil sample collected for every 9 square feet (sf) of surface and then analyzed for the 8 RCRA Metals, VOCs, and SVOCs. Over just the 5,600 sf of concrete panels currently identified for replacement in the Concrete Repair and Rehabilitation Plan in Attachment 8.6, this means that 622 samples will be collected and analyzed. The entire Contained Area covers 26,358 sf. Even if the 5,261 sf occupied by the HWM Building, Maintenance Building, and Tank Farm are eliminated, that still leaves 21,097 sf to be investigated and 21,097sf / 9sf = 2,344 samples to be collected and analyzed. These are ridiculous numbers of samples for such a limited area, and this represents just Phase 2 of the SSP!

TDSWM devised this SSP and added language requiring its implementation when converting Appendix XI.G and its Attachment E of Section XI of ETSD's Permit Renewal Application into Attachment 8.6 and Attachment 8.6.5 of the Draft Permit. TDSWM did this without issuing any Notice of Deficiency or otherwise advising ETSD of such action. TDSWM's action converts the "quick-and-dirty" investigation – not required by any regulation – that ETSD had voluntarily included in its Permit Renewal Application to take advantage of the concrete panel replacement efforts to gather some limited data on sub-slab soil contamination into a massive investigation that cannot feasibly be implemented during the implementation of the Concrete Repair and Rehabilitation Plan. Further, TDSWM has provided no justification for these massive new requirements, agreeing with ETSD that there is no known evidence or information indicating that releases to the sub-slab soils have occurred. The only rationale presented by TDSWM for such soil investigation efforts that ETSD has found in the Draft Permit is the following statement from Section II of the SSP:

The potential exists for the hazardous wastes stored in containers to have been spilled or to have leaked from containers onto the ground surface and infiltrate the concrete secondary containment below through cracks or other preferential pathways and means to contaminate the underlying soils and/or groundwater.

While potentially true (except for the unfortunate inclusion of the word "ground"), such a vague statement would apply to any place that containers of hazardous wastes or other hazardous materials are stored on concrete surfaces and provides no adequate justification for implementation of this SSP. If evidence or indications of releases did exist, presumably TDSWM would have included the Contained Area (SWMU #7) on Table 10.1.2 and require Confirmatory Sampling. See also Comment 1 on Attachment 10.

As described in Comment #6 on Attachment 8.6 above, ETSD is withdrawing from Section IV.C and Attachment E of Appendix XI.G of Section XI of its Permit Renewal Application its voluntary plan for investigating sub-slab soils during the concrete replacement effort and insisting that TDSWM remove from the Draft Permit Subsection IV.C of Attachment 8.6, Attachment 8.6.5, and Attachment 12. ETSD believes that TDSWM's expansion of ETSD's voluntary effort represents an unjustified corruption of the RCRA permitting process that appropriately relies on the Specific Conditions for Corrective Action in Section VI of the Permit Conditions and Attachment 10 and the Closure requirements in Subsection II.L of the Permit Conditions and Attachment 11 to achieve TDSWM's apparent goals.

Response: The DSWM has reviewed this comment in its entirety. If ETSD believes the amount of contamination to be found under the concrete will require as many samples as this comment alludes to, the DSWM feels that Attachment 12 (Soil Sampling Plan) is justified in the requirements listed in the sampling plan. In the event ETSD does not find contamination under the concrete during the repair plan then ETSD will follow the guidance for non-impacted soils found in Attachment 12, which would not be subject to additional sampling. No changes were made.

D. DSWM Editorial Changes to Final Permit

DSWM made the following editorial edits to the final permit.

1. Subpart I.12(f)(i)(III) – page I-19 – Revised "Section" to "Part" to remain consistent with the Permit Structure.

2. Subsection III.C – page III-2 – Table III-1: Container Storage Capacity Limitations – The "Maximum Facility Storage Capacity was revised from "52,635" to "61,720" to stay consistent with the rest of the permit.

3. Subsection III.L – page III-6 – Revised "Section" to "Subsection" to remain consistent with the Permit Structure.

4. Subparagraph IV.C.2(d) – page IV-2 – Added ", or in as timely a manner as is possible to prevent harm to human health and the environment, if the permittee can demonstrate to the Commissioner that removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours" after "24 hours" to incorporate Tennessee Rule 0400-12-01-.06(10)(d)3(iv) in its entirety.

5. Paragraph IV.C.3 – page IV-3 – The line spacing was corrected after IV.C.3 and before IV.C.4

6. Attachment 2.C – page 2-4 – In the first sentence of the seventh paragraph, "Section G" was revised to "Subsection 2.G" and "Subsection C.2.F" was revised to "Paragraph 2.F.2"to remain consistent with Permit Structure.

7. Attachment 2.D.1– page 2-5 – In the first sentence of the second paragraph, "Section C" was revised to "Subsection 2.C" to remain consistent with Permit Structure. In the last sentence of the second paragraph, "Subsection E.2" was revised to "Paragraph 2.E.2" to remain consistent with Permit Structure.

8. Attachment 2.D.1– page 2-7 – In the first sentence of the eighth paragraph, "Section E" was revised to "Subsection 8.E" to remain consistent with Permit Structure. In the second sentence of the eighth paragraph, "Subsection 8.E.3" was revised to "Paragraph 8.E.3" to remain consistent with Permit Structure.

9. Attachment 2.D.1– page 2-7 – In the penultimate sentence of the ninth paragraph, "Subsection 8.E.7" was revised to "Paragraph 8.E.7" to remain consistent with Permit Structure.

10. Attachment 2.D.1– page 2-8 – In the second sentence of the tenth paragraph, "Section G" was revised to "Subsection 2.G" to remain consistent with Permit Structure.

11. Attachment 2.D.1– page 2-8 – In the last paragraph, "Section E" was revised to "Subsection 2.E" to remain consistent with Permit Structure.

12. Attachment 2.D.2– page 2-8 – In the first sentence of the paragraph, "Section G" was revised to "Subsection 2.G" and "Subsection F.2" was revised to "Paragraph 2.F.2" to remain consistent with Permit Structure.

13. Attachment 2.D.1– page 2-9 – In the last sentence of the paragraph, "Section E" was revised to "Subsection 2.E" to remain consistent with Permit Structure.

14. Attachment 2.E.1– page 2-9 – In the first sentence of the first paragraph, "Subsection D.1" was revised to "Paragraph 2.D.1" and "Subsection D.3" was revised to "Paragraph 2.D.3" to remain consistent with Permit Structure.

15. Attachment 2.F.1– page 2-11 – In the first sentence of the first paragraph, "Subsection G.2" was revised to "Paragraph 2.G.2" to remain consistent with Permit Structure.

16. Attachment 2.G – page 2-16 – In the first sentence of the first paragraph, "Section D" was revised to "Subsection 2.D" to remain consistent with Permit Structure.

17. Attachment 2.G – page 2-16 – In the first sentence of the third paragraph, "Section D" was revised to "Subsection 2.D" to remain consistent with Permit Structure.

18. Attachment 2.G – page 2-18 – In the first sentence of the last bullet point of the third paragraph, "Section E" was revised to "Subsection 2.E" to remain consistent with Permit Structure.

19. Attachment 2.H – page 2-18 – In the first sentence of the paragraph, "Subsections C and F.1" was revised to "Subsection 2.C and Paragraph 2.F.1" to remain consistent with Permit Structure. In the last sentence in the paragraph, "Section F" was revised to "Subsection 2.F" to remain consistent with Permit Structure.

20. Attachment 4.C – page 4-6 – In the first sentence of the paragraph, "Sections B.1 through B.6" was revised to "Subsections 4.B.1 through 4.B.6" to remain consistent with Permit Structure.

21. Attachment 4.3.D – page 4.3-7 – In the last sentence of the first paragraph, "Subsection B.2" was revised to "Paragraph 4.3.B.2" to remain consistent with Permit Structure.

22. Attachment 4.3.D – page 4.3-7 – In the first sentence of the last paragraph, "Section C" was revised to "Subsection 4.3.C" to remain consistent with Permit Structure.

23. Attachment 4.3.E – page 4.3-7 – In the first sentence of the first paragraph, "Section B" was revised to "Subsection 4.3.B" to remain consistent with Permit Structure

24. Attachment 4.3.F.2 – page 4.3-10 – In the first sentence, "Subsection F.4" was revised to "Paragraph 4.3.F.4" to remain consistent with Permit Structure.

25. Attachment 4.3.F.3.i – page 4.3-10 – "Subsection G.1.ii" was revised to "Subparagraph 4.3.G.1.ii" to remain consistent with Permit Structure.

26. Attachment 4.3.F.3.ii – page 4.3-10 – "Subsection G.1.iii" was revised to "Subparagraph 4.3.G.1.iii" to remain consistent with Permit Structure.

27. Attachment 4.3.F.3.iv – page 4.3-10 – "Subsections F.3.i or F.3.ii" was revised to "Subparagraphs 4.3.F.3.i and 4.3.F.3.ii" and "Subsection F.3.iii" was revised to "Subparagraph 4.3.F.3.iii" to remain consistent with Permit Structure.

28. Attachment 4.3.F.3.v – page 4.3-10 – In the last sentence of the first paragraph, "Subsection G.1.i" was revised to "Subparagraph 4.3.G.1.i" and "Subsection F.3.i" was revised to "Subparagraph 4.3.F.3.i" to remain consistent with Permit Structure.

29. Attachment 4.3.F.4 – page 4.3-10 – "Subsection G.1.ii" was revised to "Subparagraph 4.3.G.1.ii" to remain consistent with Permit Structure.

30. Attachment 4.3.F.5.i – page 4.3-11 – "Subsection G.2" was revised to "Paragraph 4.3.G.2" to remain consistent with Permit Structure.

31. Attachment 4.3.F.5.ii – page 4.3-11 – "Subsection G.3" was revised to "Paragraph 4.3.G.3" and "Subsection G.4" was revised to "Paragraph 4.3.G.4" to remain consistent with Permit Structure.

32. Attachment 4.3.F.7 – page 4.3-11 – In the first paragraph, "Sections G and H" was revised to "Subsections 4.3.G and 4.3.H" to remain consistent with Permit Structure. In the first sentence of the second paragraph, "Subsections G.1.ii and iii and G.2" was revised to "Subparagraphs 4.3.G.1.ii and 4.3.G.1.iii and Paragraph 4.3.G.2" to remain consistent with Permit Structure. In the second sentence of the second paragraph, "Subsection F.6" was revised to "Paragraph 4.3.F.6" to remain consistent with Permit Structure.

33. Attachment 4.3.G – page 4.3-12 – In the first sentence, "Section C" was revised to "Subsection 4.3.C" to remain consistent with Permit Structure. In the second sentence, "Subsection G.2" was revised to "Paragraph 4.3.G.2" to remain consistent with Permit Structure.

34. Attachment 4.3.G.1.iii – page 4.3-13 – "Subsection G.1.ii" was revised to "Subparagraph 4.3.G.1.ii" to remain consistent with Permit Structure.

35. Attachment 4.3.G.3 – page 4.3-14 – In the first sentence of the first paragraph "Subsection G.4" was revised to "Paragraph 4.3.G.4" to remain consistent with Permit Structure. In the last sentence of the first paragraph, "Subsection G.2" was revised to "Paragraph 4.3.G.2" to remain consistent with Permit Structure.

36. Attachment 4.3.G.3 – page 4.3-14 – In the last sentence of the second paragraph, "Subsection G.1.ii" was revised to "Subparagraph 4.3.G.1.ii" to remain consistent with Permit Structure.

37. Attachment 4.3.G.4 – page 4.3-14 – In both sentence of the first paragraph, "Subsections G.1, G.2, and G.3" were revised to "Paragraphs 4.3.G.1, 4.3.G.2, and 4.3.G.3" to remain consistent with Permit Structure.

38. Attachment 4.3.G.4 – page 4.3-14 – In the last sentence of the second paragraph, "Subsection G.1.i" was revised to "Subparagraph 4.3.G.1.i" to remain consistent with Permit Structure.

39. Attachment 4.3.H – page 4.3-15 – In the first sentence of the first paragraph, "Subsection B.2" was revised to "Paragraph 4.3.B.2" to remain consistent with Permit Structure. In the last sentence of the first paragraph, "Section E" was revised to "Subsection 4.3.E" to remain consistent with Permit Structure.

40. Attachment 6.B.2 – page 6-3 – In the third sentence of the paragraph, "Section C" was revised to "Subsection 6.C" to remain consistent with Permit Structure.

41. Attachment 6.D – page 6-7 – In the first sentence of the first paragraph, "Subsection 6.B.1" was revised to "Paragraph 6.B.1" to remain consistent with Permit Structure.

42. Attachment 6.E– page 6-7 – In the last sentence of the paragraph, "subsection 8.E.4(d)" was revised to "Subparagraph 8.E.4(d)" to remain consistent with Permit Structure.

43. Attachment 6.G.1 – page 6-8 – In the first sentence of the paragraph, "Subsection 6.B.3" was revised to "Paragraph 6.B.3" to remain consistent with Permit Structure.

44. Attachment 6.G.1 – page 6-9 – In the penultimate sentence of the paragraph, "Section 6.C" was revised to "Subsection 6.C" to remain consistent with Permit Structure.

45. Attachment 6.G.2 – page 6-9 – In the first sentence of the paragraph, "Section 9.C" was revised to "Subsection 9.C" to remain consistent with Permit Structure.

46. Attachment 8.B.2 – page 8-3 – In the first sentence of the paragraph, "Subsection 8.B.1" was revised to "Paragraph 8.B.1" to remain consistent with Permit Structure.

47. Attachment 8.B.2 – page 8-5 – In the last sentence of the fifth paragraph, "Subsection 8.B.3" was revised to "Paragraph 8.B.3" to remain consistent with Permit Structure.

48. Attachment 8.B.2 – page 8-6 – In the last sentence of the sixth paragraph, "Subsection 8.B.3" was revised to "Paragraph 8.B.3" to remain consistent with Permit Structure.

49. Attachment 8.C.2 – page 8-10 – In the first sentence of the third paragraph, "Section 8.E" was revised to "Subsection 8.E" to remain consistent with Permit Structure. There was also a line formatting error that was corrected here.

50. Attachment 8.C.2 – page 8-10 – In the second sentence of the third paragraph, "Section E" was revised to "Subsection 8.E" to remain consistent with Permit Structure.

51. Attachment 8.C.2 – page 8-10 – In the third sentence of the third paragraph, "Section E" was revised to "Subsection 8.E" to remain consistent with Permit Structure.

52. Attachment 8.D.1 – page 8-11 – In the last sentence of the second paragraph, "Subsections 8.B.2 and 8.C.2" was revised to "Paragraphs 8.B.2 and 8.C.2" to remain consistent with Permit Structure.

53. Attachment 8.D.3 – page 8-12 – In the first sentence of the first paragraph, "Subsection 8.D.2" was revised to "Paragraph 8.D.2" to remain consistent with Permit Structure.

54. Attachment 8.E.3(a) – page 8-16 – In the first sentence of the first paragraph, "Subsection 8.E.3(c)" was revised to "Subparagraph 8.E.3(c)" to remain consistent with Permit Structure.

55. Attachment 8.E.3(a)(i) – page 8-16 – In the first sentence of the first paragraph, "Subsection 8.E.3(c)" was revised to "Subparagraph 8.E.3(c)" to remain consistent with Permit Structure.

56. Attachment 8.E.3(a)(ii) – page 8-17 – In the last sentence of the paragraph, "Subsection 8.E.3(b)" was revised to "Subparagraph 8.E.3(b)" and "Subsection 8.E.3(c)" was revised to "Subparagraph 8.E.3(c)" to remain consistent with Permit Structure.

57. Attachment 8.E.3(c) – page 8-18 – In the last sentence of the paragraph, "Section 9.H" was revised to "Subsection 9.H" to remain consistent with Permit Structure. There was also a line space formatting error that was corrected here.

58. Attachment 8.E.11 – page 8-28 – In the last sentence of the paragraph, "Section 8.E" was revised to "Subsection 8.E" to remain consistent with Permit Structure.

59. Attachment 8.E.11(a) – page 8-29 – In the last sentence of the paragraph, "Subsections (b) and (c)" was revised to "Subparagraph 8.E.11(b) and 8.E.11(c)" and "subsections of this Section 8.E" was revised to "paragraphs of this Subsection 8.E" to remain consistent with Permit Structure.

60. Attachment 8.6 III.A – page 8.6-4 – In the last sentence of the second paragraph, "subsection B.2 of Attachment 8" was revised to "Paragraph 8.B.2 of Attachment 8" to remain consistent with Permit Structure.

61. Attachment 8.6 III.D – page 8.6-6 – In the last sentence of the first paragraph, "Section III.B" was revised to "Subsection III.B" to remain consistent with Permit Structure.

62. Attachment 8.6 IV.A.1(i) – page 8.6-8 – In both sentences of the paragraph, "Section III.B" was revised to "Subsection III.B" to remain consistent with Permit Structure.

63. Attachment 8.6 IV.A.1(ii) – page 8.6-8 – "Section III.C" was revised to "Subsection III.C" to remain consistent with Permit Structure.

64. Attachment 8.6 IV.A.1(iii) – page 8.6-8 – "Section III.D" was revised to "Subsection III.D" to remain consistent with Permit Structure.

65. Attachment 8.6 IV.A.1(iv) – page 8.6-8 – "Section III.E" was revised to "Subsection III.E" to remain consistent with Permit Structure.

66. Attachment 8.6 IV.A.2(i) – page 8.6-8 – "Section III.A" was revised to "Subsection III.A" to remain consistent with Permit Structure.

67. Attachment 8.6 IV.A.2(ii) – page 8.6-8 – Both "Section III.B" were revised to "Subsection III.B" to remain consistent with Permit Structure.

68. Attachment 8.6 IV.A.2(iii) – page 8.6-8 – "Section III.D" was revised to "Subsection III.D" to remain consistent with Permit Structure.

69. Attachment 8.6 IV.A.2(iv) – page 8.6-8 – "Section III.E" was revised to "Subsection III.E" to remain consistent with Permit Structure.

70. Attachment 8.6 IV.A.3(i) – page 8.6-8 – "Section III.A" was revised to "Subsection III.A" to remain consistent with Permit Structure.

71. Attachment 8.6 IV.A.3(ii) – page 8.6-8 – Both "Section III.B" were revised to "Subsection III.B" to remain consistent with Permit Structure.

72. Attachment 8.6 IV.A.3(iii) – page 8.6-8 – "Section III.D" was revised to "Subsection III.D" to remain consistent with Permit Structure.

73. Attachment 8.6 IV.A.3(iv) – page 8.6-8 – "Section III.E" was revised to "Subsection III.E" to remain consistent with Permit Structure.

74. Attachment 8.6 IV.A.4(i) – page 8.6-9 – "Section III.A" was revised to "Subsection III.A" to remain consistent with Permit Structure.

75. Attachment 8.6 IV.A.4(ii) – page 8.6-9 – Both "Section III.B" were revised to "Subsection III.B" to remain consistent with Permit Structure.

76. Attachment 8.6 IV.A.4(iii) – page 8.6-9 – "Section III.D" was revised to "Subsection III.D" to remain consistent with Permit Structure.

77. Attachment 8.6 IV.A.4(iv) – page 8.6-9 – "Section III.E" was revised to "Subsection III.E" to remain consistent with Permit Structure.

78. Attachment 8.6 IV.A.5(i) – page 8.6-9 – "Section III.A" was revised to "Subsection III.A" to remain consistent with Permit Structure.

79. Attachment 8.6 IV.A.5(ii) – page 8.6-9 – Both "Section III.B" were revised to "Subsection III.B" to remain consistent with Permit Structure.

80. Attachment 8.6 IV.A.5(iii) – page 8.6-9 – "Section III.D" was revised to "Subsection III.D" to remain consistent with Permit Structure.

81. Attachment 8.6 IV.A.5(iv) – page 8.6-9 – "Section III.E" was revised to "Subsection III.E" to remain consistent with Permit Structure.

82. Attachment 8.6 IV.A.6(i) – page 8.6-9 – "Section III.A" was revised to "Subsection III.A" to remain consistent with Permit Structure.

83. Attachment 8.6 IV.A.6(ii) – page 8.6-9 – Both "Section III.B" were revised to "Subsection III.B" to remain consistent with Permit Structure.

84. Attachment 8.6 IV.A.6(iii) – page 8.6-9 – "Section III.D" was revised to "Subsection III.D" to remain consistent with Permit Structure.

85. Attachment 8.6 IV.A.6(iv) – page 8.6-9 – "Section III.E" was revised to "Subsection III.E" to remain consistent with Permit Structure.

86. Attachment 8.6 IV.B – page 8.6-10 – In the second sentence and the last sentence of the paragraph "Subsection V" was revised to "Section V" to remain consistent with Permit Structure.

87. Attachment 8.6 V – page 8.6-11 – In the first sentence of the paragraph, "Subsection" was revised to "Section" to remain consistent with Permit Structure.

88. Attachment 8.6 V – page 8.6-11 – In the last sentence of the paragraph, "Subsection B.2 of Attachment 8" was revised to "Paragraph 8.B.2 of Attachment 8" to remain consistent with Permit Structure.

89. Attachment 8.6 V.A.2 – page 8.6-12 – "Subsection IV.B.2" was revised to "Paragraph IV.B.2" to remain consistent with Permit Structure.

90. Attachment 8.6 V.B.1(i) – page 8.6-12 – "Subsection IV.B.2(3)" was revised to "Subparagraph IV.B.2" to remain consistent with Permit Structure.

91. Attachment 8.6 V.B.3 – page 8.6-13 – "Subsection IV.C.1" was revised to "Paragraph IV.C.1" and "Subsection IV.C.3" was revised to "Paragraph IV.C.3" to remain consistent with Permit Structure.

92. Attachment 8.6 VI.A.1 – page 8.6-14 – In the last sentence of the first paragraph "Subsection VI.A.3" was revised to "Paragraph VI.A.3" to remain consistent with Permit Structure.

93. Attachment 8.6 VI.A.1 – page 8.6-14 – In the last sentence of the third paragraph "Subsection VI.A.2" was revised to "Paragraph VI.A.2" to remain consistent with Permit Structure.

94. Attachment 8.6 VI.A.2 – page 8.6-16 – In the third sentence of the third paragraph "Subsection IV.A.1" was revised to "Paragraph IV.A.1" to remain consistent with Permit Structure.

95. Attachment 8.6 VI.B.2 – page 8.6-16 – In the first sentence of the first paragraph "Subsection VI.A.2" was revised to "Paragraph VI.A.2" to remain consistent with Permit Structure. In the first sentence of the second paragraph "Subsection VI.A.2" was revised to "Paragraph VI.A.2" to remain consistent with Permit Structure

96. Attachment 8.6 VI.C.2 – page 8.6-17 – In the first sentence of the second paragraph "Subsection VI.A.2" was revised to "Paragraph VI.A.2" to remain consistent with Permit Structure.

97. Attachment 9.A – page 9-1 – In the first sentence, "section" was revised to "Attachment" to remain consistent with Permit Structure. In the third sentence, "Section 9.B" was revised to "Subsection 9.B" to remain consistent with Permit Structure. In the fourth sentence, "Section 9.C through 9.E" was revised to "Subsection 9.C through 9.E" to remain consistent with Permit Structure. In the fifth sentence, "Section 9.F" was revised to "Subsection 9.F" to remain consistent with Permit Structure. In the sixth sentence, "Section 9.G" was revised to "Subsection 9.G" to remain consistent with Permit Structure. In the seventh sentence, "Section 9.H" was revised to "Subsection 9.H" to remain consistent with Permit Structure.

98. Attachment 9.F – page 9-8 – In the third paragraph, "Subsections F.1 and F.2" was revised to "Paragraphs 9.F.1 and 9.F.2" to remain consistent with Permit Structure.

99. Attachment 9.G.1 – page 9-9 – In the second paragraph, "Section 9.C" was revised to "Subsection 9.C" to remain consistent with Permit Structure.

100. Attachment 9.G.2 – page 9-9 – In the first sentence of the first paragraph, "Subsection 9.D.2" was revised to "Paragraph 9.D.2" and "Subsection 9.G.4" was revised to "Paragraph 9.G.4" to remain consistent with Permit Structure.

101. Attachment 9.G.2 – page 9-10 – In the last sentence of the third paragraph, "Subsection 9.G.7" was revised to "Paragraph 9.G.7" to remain consistent with Permit Structure. In the first sentence of the fourth paragraph, "Subsection 9.G.4" was revised to "Paragraph 9.G.4" to remain consistent with Permit Structure.

102. Attachment 9.G.3 – page 9-11 – In the first sentence of the first paragraph, "Subsection 9.G.4" was revised to "Paragraph 9.G.4" to remain consistent with Permit Structure. In the last sentence of the second paragraph, "Subsection 9.G.7" was revised to "Paragraph 9.G.7" to remain consistent with Permit Structure. In the first sentence of the fourth paragraph, "Subsection 9.G.4" was revised to "Paragraph 9.G.4" to remain consistent with Permit Structure.

103. Attachment 9.G.4 – page 9-12 – In the first and last sentences of the first paragraph, "Subsections 9.G.2 and 9.G.3" was revised to "Paragraphs 9.G.2 and 9.G.3" to remain consistent with Permit Structure. In the last sentence of the second paragraph, "Subsection 9.G.7" was revised to "Paragraph 9.G.7" to remain consistent with Permit Structure.

104. Attachment 9.H.1 – page 9-14 – In the first sentence, "Section 9.G" was revised to "Subsection 9.G" to remain consistent with Permit Structure.

105. Attachment 9.H.2 – page 9-14 – In the first sentence, "Subsection 8.E.5" was revised to "Paragraph 8.E.5" to remain consistent with Permit Structure.

106. Attachment 9.H.3 – page 9-15 – In the last sentence of the first paragraph, "Subsection 9.H.5" was revised to "Paragraph 9.H.5" to remain consistent with Permit Structure. In the second sentence of the second paragraph, "Subsection 9.H.4" was revised to "Paragraph 9.H.4" to remain consistent with Permit Structure.

107. Attachment 9.H.3 – page 9-16 – In the penultimate sentence of the last paragraph, "Subsection 9.H.4" was revised to "Paragraph 9.H.4" to remain consistent with Permit Structure.

108. Attachment 9.H.4 – page 9-16 – In the first sentence of the first paragraph, "Subsection 9.H.3" was revised to "Paragraph 9.H.3" to remain consistent with Permit Structure.

109. Attachment 9.H.4 – page 9-17 – In the last sentence of the second paragraph, "Subsection 9.H.5" was revised to "Paragraph 9.H.5" to remain consistent with Permit Structure

110. Attachment 9.3 – page 9.3-2 – Figure 9.3 – 1's title was corrected from "OPLAN VIEW DIAGRAM OF TANK FARM SECONDARY CONTAINMENT SYSTEMS" to "PLAN VIEW DIAGRAM OF TANK FARM SECONDARY CONTAINMENT SYSTEMS."

111. Attachment 10.3.VII.A – page 10.3-5 – "Section IV.G" was revised to "Subsection VI.G in Section VI: Specific Conditions for Corrective Action" to remain consistent with Permit Structure and to correct the reference to the right Subsection in the permit.

112. Attachment 10.3.VII.B – page 10.3-5 – "Section IV.G.3" was revised to "Paragraph VI.G.3 in Section VI: Specific Conditions for Corrective Action" to remain consistent with Permit Structure and to correct the reference to the right Subsection in the permit.

113. Attachment 11.C – page 11-2 – In the first sentence of the second paragraph, "52,635 gallons" was revised to "61,720" in order to be consistent throughout the permit.

114. Attachment 11.D.5 – page 11-10 – In the last sentence of the paragraph, "Subsection D.4" was revised to "Paragraph 11.D.4" in order to be consistent with Permit Structure.

115. Attachment 11.E.8 – page 11-15 – In the both the first and last sentence of the paragraph, "Subsection D.4" was revised to "Paragraph 11.D.4" in order to be consistent with Permit Structure.

116. Attachment 11.E.10 – page 11-16 – In the second sentence of the paragraph, "Subsections (a) through (d)" was revised to "Subparagraphs (a) through (d)" in order to be consistent with Permit Structure.

117. Attachment 11.E.10(a) – page 11-17 – In the last sentence of the last paragraph, "Subsection (a)(i)" was revised to "Part 11.E.10(a)(i)" in order to be consistent with Permit Structure.

118. Attachment 11.E.10(b) – page 11-18 – In the last sentence of the paragraph, "Subsection (a)(i)" was revised to "Part 11.E.10(a)(i)" in order to be consistent with Permit Structure.

119. Attachment 11.E.11 – page 11-19 – In the second sentence of the second paragraph, "Subsection 10(a)" was revised to "Subparagraph11.E.10(a)" in order to be consistent with Permit Structure.

120. Attachment 11.E.11 – page 11-20 – In the last sentence of the second paragraph, "Subsection 10(d)" was revised to "Subparagraph11.E.10(d)" in order to be consistent with Permit Structure.

ENCLOSURE 2

ATTACHMENT 5

PERSONNEL RESPONSIBILITIES AND TRAINING

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Attachment 5.2 .....ETSD Job Description 5.2-1

A. INTRODUCTION

Excel TSD of Tennessee, L.L.C. ("ETSD" or the "Facility") operates a hazardous waste storage and treatment facility and receives a wide variety of both hazardous and non- hazardous wastes. Many of the materials handled by the Facility pose a significant threat to human health and/or the environment if they are improperly managed. ETSD's operations are subject to stringent regulatory requirements by both Federal and State agencies under the hazardous waste management programs, occupational safety and health programs, hazardous materials transportation programs, etc. Therefore, it is imperative that facility operators and personnel receive training that teaches them to perform their job safely and satisfactorily, effectively performing their duties while minimizing potential for release of hazardous materials into the environment and any exposure to themselves and others by proper use of personal protective equipment and engineering controls.

B. PERSONNEL TRAINING – GENERAL

Facility personnel must complete a program of classroom instruction or on-the-job training ("0JT") that teaches them to perform their duties in a way that ensures ETSD's compliance with the requirements of Tennessee Rule 0400-12-01-.06(2)(g) [equivalent to 40 CFR §264.16]. Additionally, facility personnel must receive Hazardous Waste Operations and Emergency Response ("HAZWOPER") training as required by 29 CFR§1910.120. All new ETSD personnel must successfully complete this training within six months of initial employment or assignment to a new position. The contents of the training program(s) are described in Attachment 5.1.

The level of training required of ETSD is summarized in the following table:

Level of Training Required

↓Topic \ Personnel →	OP	SS	STP	LS
Hazardous Waste Management Regulations	Summary	Detail	Detail	Summary
Hazardous Waste Handling and Operations	Detail	Detail	Detail	Detail
Reports and Record-Keeping	Summary	Detail	Detail	Detail
Personnel Safety	Detail	Detail	Detail	Detail
Spill Prevention and Emergency Response	Detail	Detail	Detail	Summary
Inspections	Summary	Detail	Detail	Summary
Equipment	Detail	Detail	Summary	Summary
Train-the-Trainer	N/A	Detail	Detail	N/A

OP = Operations Personnel: Process and Assistant Process Operators

SS = Supervisory Staff: Laboratory Manager, Operations Manager, and Compliance Manager.

STP = Safety and Training Personnel: Safety Director and Facility Manager.

LS = Laboratory Staff: Laboratory Technicians, Chemists.

To augment classroom instruction, ETSD provides OJT performed under the direction of a trained supervisor. OJT is structured to provide specific standards for job performance. Acceptable employee performance is based on his/her ability to apply classroom knowledge to the actual job situation. The ETSD training program uses a variety of teaching aids to facilitate the employees learning to include introductory and specialized courses, exams, handouts, laboratory observation, visual aids, films, etc. Completion of training programs are documented and retained in each employee's file. Personnel who serve as on-site emergency responders will receive HAZWOPER training as required by 29 CFR §1910.120. Personnel will not be required or allowed to respond to spills or emergencies until they have completed this training. ETSD training records identify the personnel who have completed this training.

In addition to the detailed introductory training, ETSD also implements a program of continuing training of all personnel involved in the management of hazardous wastes. This also is comprised of both classroom instruction and OJT. Such persons will undergo an annual refresher classroom training course. A more detailed description of ETSD's personnel training program is included as Attachment 5.1.

C. QUALIFICATIONS/RESPONSIBILITIES OF TRAINING DIRECTOR

ETSD combines the responsibilities of Training Director and Safety Director and refers to that person as Safety Director. It is the responsibility of the Safety Director ("SD") to identify the specific training needs for each employee and oversee the training programs. The SD must be proficient in hazardous waste management procedures, facility operations, have extensive knowledge of all emergency response procedures, and be aware of all applicable health and safety requirements.

The responsibilities of the Safety Director include:

- Assessment of training requirements.
- Development of training plans and forecasts.
- Approval of courses developed and presented to contractors.
- Preparation and approval of all announcements and schedules of courses to be presented.
- Approval of rosters of employees to attend training courses.
- Maintenance of records of training activities.

D. Maintenance of Training Records

The training records are kept in the individual employee's file and are maintained by the Office Manager or his/her designee. Documentation that the required training has been completed for each employee includes:

- Written description of the type and amount of training;
- Completion dates
- Job title and written job description
- Trainee's signature

The SD or Operations Manager is responsible for reviewing personnel training records to determine which individuals have not completed training or which are approaching their annual refresher training date. The SD or Operations Manager notifies the individual's supervisor and provides the dates of the next available required training course. The following is a listing of information used to identify the type of training required for the specific job function.

- Job title and name of employee filling job.
- Written job description.
- Required qualifications (e.g., skill, education, etc.).

At a minimum, training records on personnel are maintained until either completion of Facility closure or three years from the date of their termination of employment with ETSD, whichever comes first.

State of Tennessee
Program
Department of Environment
and Conservation
Division of Solid Waste Management

Hazardous Waste Management

Davy Crocket Tower, 7th Floor
500 James Robertson Parkway
Nashville, Tennessee 37243

HAZARDOUS WASTE MANAGEMENT PERMIT

Permittee:	Excel TSD of Tennessee, LLC
Facility:	Excel TSD of Tennessee, LLC
Co-Owners:	Excel TSD of Tennessee, LLC and Best Wade Petroleum Inc.
Operator:	Excel TSD of Tennessee, LLC
Location:	550 Rivergate Road Memphis, Tennessee 38109
Permit Type:	Storage and Treatment in Containers and Tanks
Unit Locations:	Outside Hazardous Waste Container Management Area (OHWCMA), HWM Building A and HWM Building B
EPA ID Number:	TND980847024
Permit Number:	TNHW-**197**

Pursuant to the Tennessee Hazardous Waste Management Act (Act), as amended [Tennessee Code Annotated (T.C.A.) §68-212-101 et seq.] and Regulations [Tennessee Rule Chapter (Chapter) 0400-12-01] promulgated thereunder by the Underground Storage Tanks and Solid Waste Disposal Control Board, a hazardous waste storage and treatment in containers and tanks permit is issued to Excel TSD of Tennessee, LLC (hereinafter called the permittee) for the facility located in Memphis, Shelby County, Tennessee at latitude 35.074469 North and longitude 90.082543 West. The permittee shall be allowed to store and treat hazardous waste in containers and tanks.

Pursuant to the authority of T.C.A. §68-212-108, the permittee shall be required to investigate any releases of hazardous waste or hazardous constituents pursuant to this permit at the facility regardless of the time at which waste was placed in a unit and to take appropriate corrective action for any such releases. In addition, this permit requires the permittee to comply with all land disposal restrictions and air emission standards applicable to this facility and to notify of imminent hazards.

The permittee must comply with all terms and conditions of this permit. This permit consists of the conditions contained herein (including those in any attachments) and the applicable regulations contained in Rule 0400-12-01, as specified in the permit. An applicable requirement is a requirement of a Tennessee statute or rule which takes effect prior to the final administrative disposition of this permit. For all other rules in Rule 0400-12-01, applicable regulations are those in effect on the date of the issuance of this permit and any subsequent modifications to those rules as they become effective.

Continuation, Transfer, Modification, Revocation and Reissuance, and Termination of this permit shall comply with and conform to Rule 0400-12-01-.07(9).

This permit is based on the premise that the information and reports submitted by the permittee prior to issuance of this permit or prior to any subsequent modification to this permit are accurate. Any inaccuracies found in this information or information submitted as required by this permit may be grounds for termination or modification of this permit and enforcement action.

The Commissioner may modify this permit if information is received which was not available at the time of permit issuance and which would have justified the application of different permit conditions at the time of issuance. The permittee must notify the Commissioner of any deviation from or changes in the information in the application, which would affect the permittee's ability to comply with the applicable regulations or permit conditions.

This permit is effective as of **June 30, 2025**, and shall remain in effect until **June 30, 2035**, unless revoked and reissued, or terminated, or continued.

Lisa A. Hughey, CHMM
Director

June 30, 2025
Date

Facility: Excel TSD of Tennessee, LLC
EPA Identification Number: TND980847024
Permit Number: TNHW-197

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Permittee:	Excel TSD of Tennessee, LLC
Facility:	Excel TSD of Tennessee, LLC
Co-Owners:	Excel TSD of Tennessee, LLC and Best Wade Petroleum Inc.
Operator:	Excel TSD of Tennessee, LLC
Location:	Memphis, Tennessee
Type:	Storage and Treatment in Containers and Tanks
Unit Locations:	Outside HW Container Management Area, HWM Building Areas A and B, and Tanks T1 and T2
EPA ID Number:	TND980847024
Permit Number:	TNHW-197

I. STANDARD CONDITIONS

A. EFFECT OF PERMIT

The permittee is authorized to store and treat hazardous waste in containers and tanks in accordance with the conditions of this permit. The permittee is also required to conduct corrective action for any release of hazardous waste or hazardous constituents in accordance with the conditions of this permit. Any receipt or handling of hazardous waste not authorized in this permit is prohibited, unless such management is not subject to a permit as set forth at Rule 0400-12-01-.07(1)(b), is operating under interim status as set forth in Rule 0400-12-01-.07(3)(a) or is subject to a separate hazardous waste management permit issued by the Tennessee Department of Environment and Conservation (TDEC or Department).

Pursuant to Rule 0400-12-01-.07(8)(g), compliance with this permit during its term constitutes compliance, for the purposes of enforcement, with the Tennessee Hazardous Waste Management Act of 1977, as amended, as it applies to the permitted activities, except for those requirements not included in the permit which: (1) become effective by statute, (2) are promulgated under Rule 0400-12-01-.10 restricting the placement of hazardous waste in or on the land, or (3) are promulgated under Rules 0400-12-01.05(27), (28), or (29) limiting air emissions. However, this permit may be modified, revoked and reissued, or terminated during its term for cause as set forth in this permit and Rule 0400-12-01-.07(9).

Issuance of this permit does not authorize any injury to persons or property or invasion of other private rights, or any infringement of other State or local laws or regulations. This permit does not convey any property rights of any sort, or any exclusive privilege.

Compliance with the terms of this permit does not constitute a defense to any order issued or any action brought under Section 3013 or Section 7003 of the Resource Conservation and Recovery Act of 1976 as amended (42 U.S.C.A. 6901 et seq., commonly referred to as RCRA), Sections 104, 106(a), and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C.A. 9601 et seq., commonly known as CERCLA), Sections 68-212-206(a), 207, and 215(c) of the Tennessee Hazardous Waste Management Act of 1983, as amended, or any other law providing for protection of public health or the environment.

B. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

C. DEFINITIONS

For the purpose of this permit, terms used herein shall have the same meaning as those in Rules 0400-12-01-.01, 0400-12-01-.02, 0400-12-01-.03, 0400-12-01-.06, 0400-12-01-.07, and 0400-12-01-.10, and T.C.A § 68-212-101 et. seq., unless this permit or any attachment to this permit specifically provides otherwise. Where terms are not defined in the regulations or the permit, the meaning associated with such terms shall be as defined by applicable U.S. Environmental Protection Agency (EPA) and TDEC guidelines or publications. Otherwise, the generally accepted scientific or industrial meaning of the term or the standard dictionary reference shall apply.

1. "Above ground tank" means a device meeting the definition of "tank" in Rule 0400-12-01-.01 and that is situated in such a way that the entire surface area of the tank is completely above the plane of the adjacent surrounding surface and the entire surface area of the tank (including the tank bottom) is able to be visually inspected.

2. "Act" means the Tennessee Hazardous Waste Management Act, as amended, Tennessee Code Annotated (T.C.A.) §§ 68-212-101 et seq.

3. "Ancillary equipment" means any device including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps, that is used to distribute, meter, or control the flow of hazardous waste from its point of generation to a storage or treatment tank(s), between hazardous waste storage and treatment tanks to a point of disposal onsite, or to a point of shipment for disposal off-site.

4. "Annual" means a period not to exceed 365 days.

5. "Aquifer" means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs.

6. "Area of concern" or "AOC" means any area having a probable release of a hazardous waste or hazardous constituent that is not from a solid waste management unit and is determined by the Commissioner to pose a current or potential threat to human health or the environment. Such areas of concern may require investigations and remedial action as required by this permit and Rule 0400-12-01-.07(8)(b)2(ii), in order to ensure adequate protection of human health and the environment.

7. "Area of contamination" is a discrete contiguous area of generally dispersed contamination that can be considered a solid waste management unit. Because an

area of contamination is equated to a solid waste management unit, consolidation and/or *in situ* treatment of hazardous wastes within that area do not create a new point of hazardous waste generation. An area of contamination allows wastes to be consolidated or treated *in situ* within the area of contamination without triggering land disposal restrictions (LDRs) or minimum technology requirements.

8. "At reasonable times" shall mean, for the purpose of this permit, at least but not limited to, any time the facility is in operation.

9. "Authorized representative" means the person responsible for the overall operation of a facility or an operational unit (i.e., part of a facility), e.g., the plant manager, superintendent or person of equivalent responsibility.

10. "Battery" means a device consisting of one or more electrically connected electrochemical cells which is designed to receive, store, and deliver electric energy. An electrochemical cell is a system consisting of an anode, cathode, and an electrolyte, plus such connections (electrical and mechanical) as may be needed to allow the cell to deliver or receive electrical energy. The term battery also includes an intact, unbroken battery from which the electrolyte has been removed.

11. "Board" means the Underground Storage Tanks and Solid Waste Disposal Control Board established by T.C.A. § 68-211-111.

12. "Central accumulation area" means any on-site hazardous waste accumulation area with hazardous waste accumulating in units subject to either Rule 0400-12-01-.03(1)(g) (for small quantity generators) or Rule 0400-12-01-.03(1)(h) (for large quantity generators). A central accumulation area at an eligible academic entity that choses to operate under Rule 0400-12-01-.03(10) is also subject to Rule 0400-12-01-.03(10)(I) when accumulating unwanted material and/or hazardous waste.

13. "Certification" means a statement of professional opinion based upon knowledge and belief.

14. "CFR" means the Code of Federal Regulations

15. "Closed portion" means that portion of a facility which an owner or operator has closed in accordance with the approved facility closure plan and all applicable closure requirements.

16. "Commissioner" means the Commissioner of the Tennessee Department of Environment and Conservation (formerly the Tennessee Department of Health and Environment) or his authorized representative.

17. "Component" means any constituent part of a unit or any group of constituent parts of a unit assembled to perform a specific function (e.g., a pump seal, pump, kiln liner, kiln thermocouple) when used in Rule 0400-12-01-.07 and, when used

otherwise in these rules, means either the tank or ancillary equipment of a tank system.

18. "Confined aquifer" means an aquifer bounded above and below by impermeable beds or by beds of distinctly lower permeability than that of the aquifer itself; an aquifer containing confined ground water.

19. "Contained" means held in a unit (including a land-based unit as defined in this subparagraph) that meets the following criteria: (1) the unit is in good condition, with no leaks or other continuing or intermittent unpermitted releases of the hazardous secondary materials to the environment, and is designed, as appropriate for the hazardous secondary materials, to prevent releases of hazardous secondary materials to the environment. Unpermitted releases are releases that are not covered by a permit (such as a permit to discharge to water or air) and may include, but are not limited to, releases through surface transport by precipitation runoff, releases to soil and groundwater, wind-blown dust, fugitive air emissions, and catastrophic unit failures; (2) the unit is properly labeled or otherwise has a system (such as a log) to immediately identify the hazardous secondary materials in the unit; and (3) the unit holds hazardous secondary materials that are compatible with other hazardous secondary materials placed in the unit and is compatible with the materials used to construct the unit and addresses any potential risks of fires or explosions. [Note: As used in this definition, "compatible" means that the commingling with other hazardous secondary materials will not produce heat or pressure, fire or explosion, violent reaction, toxic dusts, mists, fumes, or gases, or flammable fumes or gases; or that the placement in a particular unit will not cause detectable corrosion or decay of containment materials (e.g., container inner liners or tank walls.)] (4) hazardous secondary materials in units that meet the applicable requirements of Rule 0400-12-01-.05 or Rule 0400-12-01-.06 are presumptively contained.

20. "Container" means any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled

21. "Containment building" means a hazardous waste management unit that is used to store or treat hazardous waste under provisions of Rule 0400-12-01-.06(33) and Rule 0400-12-01-.05(30).

22. "Contamination" refers to the presence of any hazardous constituent in a concentration which exceeds the naturally occurring concentration of that constituent in the immediate vicinity of the unit (i.e., having higher concentrations of a constituent as compared to nearby areas that have not been affected by the unit).

23. "Contingency plan" means a document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten public health or the environment.

24. "Corrective action" shall be defined as all activities, including activities conducted beyond the facility boundary, that are proposed or implemented to facilitate assessment, monitoring, and active or passive remediation of releases of hazardous waste or hazardous constituents to soil, groundwater, surface water, or the atmosphere associated with solid waste management units and/or areas of concern and/or areas of contamination located at the facility or off-site, as required by Rule 0400-12-01-.06(6)(k) and (l), or as otherwise required and specified by this permit.

25. A "corrective action management unit" or "CAMU" means an area within a facility that is used only for managing remediation wastes for implementing corrective action or cleanup at the facility.

26. "Corrective measures" means all corrective action necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any solid waste management unit at the facility, regardless of the time at which the waste was placed in the unit, as required under Rule 0400-12-01-.06(6)(l). Corrective measures may address releases to air, soil, sediment, surface water, or groundwater.

27. "Corrosion expert" means a person who, by reason of his knowledge of the physical sciences and the principles of engineering and mathematics, acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and metal tanks. Such a person must be certified as being qualified by the National Association of Corrosion Engineers (NACE) or be a registered professional engineer who has certification or licensing that includes education and experience in corrosion control on buried or submerged metal piping systems and metal tanks.

28. "Daily" means once each calendar day. Not to exceed 24 hours.

29. "Department" means the Tennessee Department of Environment and Conservation (formerly Tennessee Department of Health and Environment).

30. "Designated facility" means:

    (a) A hazardous waste treatment, storage, or disposal facility which:

        (i) Has received a permit (or interim status) in accordance with the requirements of Rule 0400-12-01-.07; or

        (ii) Has received a permit (or interim status) from a State authorized in accordance with 40 CFR 271; or

        (iii) Is regulated under Rule 0400-12-01-.02(1)(f)3(ii) or Rule 0400-12-01-.09(6); and

(iv) Has been designated on the manifest by the generator pursuant to Rule 0400-12-01-.03(3)(a).

(b) Designated facility also means a generator site designated on the manifest to receive its waste as a return shipment from a facility that has rejected the waste in accordance with Rule 0400-12-01-.05(5)(c)6 or Rule 0400-12-01-.06.

(c) If a waste is destined to a facility in an authorized State which has not yet obtained authorization to regulate that particular waste as hazardous, then the designated facility must be a facility allowed by the receiving State to accept such waste.

31. "Destination facility" means a facility that treats, disposes of, or recycles a particular category of universal waste, except those management activities described in Rule 0400-12-01-.12(2)(d)1 and Rule 0400-12-01-.12(2)(d)3 and Rule 0400-12-01-.12(3)(d)1 and Rule 0400-12-01-.12(3)(d)3.

32. "Dioxins and furans" (D/F) means tetra-, penta-, hexa-, hepta-, and octa-chlorinated dibenzo dioxins and furans.

33. "Discharge" or "hazardous waste discharge" means the accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into or on any land or water.

34. "Disposal" means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any hazardous waste into or on any land, water, or air so that such hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

35. "Disposal facility" means a facility or part of a facility at which hazardous waste is intentionally placed into or on any land or water, and at which waste will remain after closure. The term disposal facility does not include a corrective action management unit into which remediation wastes are placed.

36. "Division Director" or "Director" means the Director of the Division of Solid Waste Management of the Department, or his designee. This person also serves as the Technical Secretary to the Board, and functions as the chief of staff to both the Commissioner and the Board in matters relating to these rules and their implementation.

37. "Electronic Manifest" or "e-Manifest" means the electronic format of the hazardous waste manifest that is obtained from EPA's national e-Manifest system and transmitted electronically to the system, and that is the legal equivalent of EPA Forms 8700-22 (Manifest) and 8700-22A (Continuation Sheet).

38. "Electronic Manifest System" or "e-Manifest system" means EPA's national information technology system through which the electronic manifest may be obtained, completed, transmitted, and distributed to users of the electronic manifest and to regulatory agencies.

39. "Elementary neutralization unit" means a device which: (1) is used for neutralizing wastes that are hazardous only because they exhibit the corrosivity characteristic defined in Rule 0400-12-01-.02(3)(c), or they are listed in Rule 0400-12-01-.02(4) only for this reason; and (2) meets the definition of tank, tank system, container, transport vehicle, or vessel in this subparagraph.

40. "Equivalent method" means any testing or analytical method approved by the Commissioner under Rule 0400-12-01-.01(3).

41. "Existing tank system" or "existing component" means a tank or component that is used for the storage or treatment of hazardous waste and that is in operation, or for which installation has commenced on or prior to July 14, 1986. Installation will be considered to have commenced if the owner or operator has obtained all Federal, State, and local approvals or permits necessary to begin physical construction of the site or installation of the tank system and if either (1) a continuous on-site physical construction or installation program has begun, or (2) the owner or operator has entered into contractual obligations – which cannot be canceled or modified without substantial loss – for physical construction of the site or installation of the tank system to be completed within a reasonable time.

42. "Extent of contamination" is defined as the horizontal and vertical area in which the concentrations of hazardous constituents in the environmental media being investigated are above detection limits or background concentrations indicative of the region, whichever is appropriate as determined by the Commissioner.

43. "Facility" means:

(a) All contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste, or for managing hazardous secondary materials prior to reclamation. A facility may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, or combinations of them).

(b) For the purpose of implementing corrective action under Rule 0400-12-01-.06(6)(l), all contiguous property under the control of the owner or operator seeking a permit under the Tennessee Hazardous Waste Management Act, T.C.A. §§ 68-212-101 et seq. This definition also applies to facilities implementing corrective action under T.C.A. §§ 68-212-111.

(c) Notwithstanding part (b) of this definition, a remediation waste management site is not a facility that is subject to Rule 0400-12-01-.06(6)(l)

but is subject to corrective action requirements if the site is located within such a facility.

44. "Final closure" means the closure of all hazardous waste management units at the facility in accordance with all applicable closure requirements so that hazardous waste management activities under Rules 0400-12-01-.05 and 0400-12-01-.06 are no longer conducted at the facility unless subject to the provisions in Rule 0400-12-01-.03(4)(e).

45. "Freeboard" means the vertical distance between the top of a tank or surface impoundment dike, and the surface of the waste contained therein.

46. "Free liquids" means liquids which readily separate from the solid portion of a waste under ambient temperature and pressure.

47. "Functionally equivalent component" means a component which performs the same function or measurement, and which meets or exceeds the performance specifications of another component.

48. "Generation" means the act or process of producing hazardous wastes.

49. "Generator" means any person, by site, whose act or process produces hazardous waste identified or listed in Rule 0400-12-01-.02 or whose act first causes a hazardous waste to become subject to regulation.

50. "Ground water" means water below the land surface in a zone of saturation.

51. "Hazardous secondary material" means a secondary material (e.g., spent material, by-product, or sludge) that, when discarded, would be identified as hazardous waste under Rule 0400-12-01-.02.

52. "Hazardous secondary material generator" means any person whose act or process produces hazardous secondary materials at the generating facility. For purposes of this definition, "generating facility" means all contiguous property owned, leases, or otherwise controlled by the hazardous secondary material generator. For the purposes of Rule 0400-12-01-.02(1)(d)1(xxiii), a facility that collects hazardous secondary materials from other persons is not the hazardous secondary material generator.

53. "Hazardous waste" means a hazardous waste as defined in Rule 0400-12-01-.02(1)(c).

54. "Hazardous waste code", or "hazardous waste number", or "EPA hazardous waste number" means the code assigned by the Department or EPA to each hazardous waste listed in Rule 0400-12-01-.02(4) and to each characteristic identified in Rule 0400-12-01-.02(3), and any derivation of such codes or number which may be assigned by the Department or EPA to an individual waste or class of waste.

55. "Hazardous waste constituent" means a constituent that caused the Board to list the hazardous waste in Rule 0400-12-01-.02(4), or a constituent listed in Table 1 of Rule 0400-12-01-.02(3)(e).

56. "Hazardous waste management unit" (HWMU) is a contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system, and a container storage area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed.

57. "HWM facility" means Hazardous Waste Management facility.

58. "Inactive portion" means that portion of a facility which is not operated after the date one or more of the hazardous wastes handled by the facility first became subject to regulation under rules promulgated under the Act. (See also "active portion" and "closed portion").

59. "Incompatible waste" means a hazardous waste which is unsuitable for:

    (a) Placement in a particular device or facility because it may cause corrosion or decay of containment materials (e.g., container inner liners or tank walls); or

    (b) Commingling with another waste or material under uncontrolled conditions because the commingling might produce heat or pressure, fire or explosion, violent reaction, toxic dusts, mists, fumes, or gases, or flammable fumes or gases.

60. "In-ground tank" means a device meeting the definition of "tank" in this subparagraph whereby a portion of the tank wall is situated to any degree within the ground, thereby preventing visual inspection of that external surface area of the tank that is in the ground.

61. "Inner liner" means a continuous layer of material placed inside a tank or container which protects the construction materials of the tank or container from the contained waste or reagents used to treat the waste.

62. "Institutional controls" or "ICs" are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the corrective measures.

63. "Interim measures" (IM) are actions necessary to minimize or prevent the further migration of contaminants and limit actual or potential human and environmental

exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented.

64. "Land disposal" when used in respect to a specified hazardous waste, shall be deemed to include, but not limited to any placement of such hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave.

65. "Landfill" includes any disposal facility or part of a facility where hazardous waste is placed in or on a land and which is not a pile, a land treatment facility, a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground mine, a cave, or a corrective action management unit.

66. "Leachate" means any liquid, including any suspended components in the liquid, that has percolated through or drained from hazardous waste.

67. "Leak Detection and Repair Program" or "LDAR Program" means the processes and procedures set forth in Subsections II.P, II.Q, II.R and Rules 0400-12-01-.06(30), (31), and (32).

68. "Leak detection system" means a system capable of detecting the failure of either the primary or secondary containment structure or the presence of a release of hazardous waste or accumulated liquid in the secondary containment structure. Such a system must employ operational controls (e.g., daily visual inspections for releases into the secondary containment system of aboveground tanks) or consist of an interstitial monitoring device designed to detect continuously and automatically the failure of the primary or secondary containment structure or the presence of a release of hazardous waste into the secondary containment structure.

69. "Management" or "waste management" or "hazardous waste management" means the orderly control of storage, transportation, treatment, and disposal of hazardous waste.

70. "Manifest" means the shipping document EPA Form 8700-22 (including, if necessary, EPA Form 8700-22A), or the electronic manifest originated and signed in accordance with the applicable requirements of Rules 0400-12-01-.03 through 0400-12-01-.06.

71. "Manifest tracking number" means the alphanumeric identification number (i.e., a unique three letter suffix preceded by nine numerical digits), which is pre-printed in Item 4 of the Manifest by a registered source.

72. "Monthly" means recurring by the end of the same day of the following month, but no later than the last day of the following month. [If the action required to be conducted monthly is taken (1) on the 3rd of a month, then the action must be taken again by midnight ending the 3rd of the following month, or (2) on the last day of

the month (for example the 31st one month), then the action must be taken again by midnight on the last day of the following month whether it is a 28th through the 31st.]

73. "New tank system" or "new tank component" means a tank system or component that will be used for the storage or treatment of hazardous waste and for which installation has commenced after July 14, 1986; except, however, for purposes of Rules 0400-12-01-.05(10)(d)7(ii) and 0400-12-01-.06(10)(d)7(ii), a new tank system is one for which construction commences after July 14, 1986. (See also "existing tank system.")

74. "Off-site" means any site which is not on-site.

75. "On-site" means the same or geographically contiguous property which may be divided by public or private right-of-way provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing as opposed to going along the right-of-way. Non-contiguous properties owned by the same person but connected by a right-of-way which he controls and to which the public does not have access, are also considered on-site property.

76. "Operating Day" means any 24-hour period during which at least a partial shift is worked by employees who process, treat, or place into storage hazardous waste at a facility.

77. "Point of compliance" or "POC" refers to the vertical surface located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated unit.

78. "Point of exposure" or "POE" refers to a point in place and time that an organism can come in contact (ingestion, inhalation, or dermal contact) with a hazardous constituent. Facilities are usually evaluated for human health and environmental concerns. Environmental is synonymous with the term ecological, which includes all plants and animals, except humans.

79. "Quarterly" means a period not to exceed 90 days.

80. "Registered engineer", "registered professional engineer", or "qualified professional engineer" shall mean a person authorized to perform engineering in Tennessee pursuant to Tennessee Code Annotated, Title 62, Chapter 2.

81. "Release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of any hazardous waste or hazardous constituents.

82. "Remediation waste" means all solid and hazardous wastes, and all media (including groundwater, surface water, soils, and sediments) and debris, that are managed for implementing cleanup.

83. "Schedule of compliance" means a schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (for example, actions, operations, or milestone events) leading to compliance with the Act and regulations.

84. "Screening levels" are health-based concentrations of hazardous constituents determined to be indicators for the protection of human health and/or the environment.

85. "Semi-annual" means a minimum of two times per calendar year such that at least five months and no more than seven months have elapsed since the last semi-annual event.

86. "Solid waste" means a waste as defined in Rule 0400-12-01-.02(1)(b).

87. A "solid waste management unit" or "SWMU" means any unit that has been used for the treatment, storage, or disposal of solid waste at any time, irrespective of whether the unit is or ever was intended for the management of solid waste. Permitted or interim status hazardous waste management units are also solid waste management units. Solid waste management units include areas that have been contaminated by routine and systematic releases of hazardous waste or hazardous constituents, excluding one-time accidental spills that are immediately remediated and cannot be linked to solid waste management activities, e.g., product or process spills.

88. "Storage" means the containment of hazardous waste in such a manner as not to constitute disposal of such hazardous waste.

89. "Sump" means any pit or reservoir that meets the definition of tank and those troughs/trenches connected to it that serve to collect hazardous waste for transport to hazardous waste storage, treatment, or disposal facilities; except that as used in the landfill, surface impoundment, and waste pile rules, "sump" means any lined pit or reservoir that serves to collect liquids drained from a leachate collection and removal system or leak detection system for subsequent removal from the system.

90. "Surface impoundment" or "impoundment" means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials) which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling and aeration pits, ponds, and lagoons.

91. "Tank" means a stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support.

92. "Tank System" means any hazardous waste storage or treatment tank and its associated ancillary equipment and containment system.

93. A "temporary unit" or "TU" means any temporary tanks and/or container storage areas used solely for the treatment or storage of hazardous remediation wastes during specific remediation activities. Designated by the Commissioner, such units must conform to specific standards and may only be in operation for the period of time as specified in this permit.

94. "Transfer facility" means any transportation related facility, including loading docks, parking areas, storage areas and other similar areas where shipments of hazardous waste or hazardous secondary materials are held during the normal course of transportation.

95. "Transportation" means the movement of hazardous waste by air, rail, highway, or water.

96. "Transporter" means any person engaged in the transportation of hazardous waste.

97. "Transport vehicle" means a motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, railroad freight car, etc.) is a separate transport vehicle.

98. "Treatment" means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.

99. "24-hour, 25-year storm" means a storm of 24-hour duration with a probable recurrence interval of once in 25 years.

100. "Unfit-for-use tank system" means a tank system that has been determined through an integrity assessment or other inspection to be no longer capable of storing or treating hazardous waste without posing a threat of release of hazardous waste to the environment.

101. A "unit" includes, but is not limited to, any landfill, surface impoundment, waste pile, land treatment unit, incinerator, injection well, tank, container storage area, septic tank, drain field, wastewater treatment unit, elementary neutralization unit, transfer station or recycling unit.

102. "User of the electronic manifest system" means a hazardous waste generator, a hazardous waste transporter, an owner or operator of a hazardous waste treatment, storage, recycling, or disposal facility, or any other person that:

(a) Is required to use a manifest to comply with:

(i) Any federal or state requirement to track the shipment, transportation, and receipt of hazardous waste or other waste material that is shipped from the site of generation to an off-site designated facility for treatment, storage, recycling, or disposal; or

(ii) Any federal or state requirement to track the shipment, transportation, and receipt of rejected wastes or regulated container residues that are shipped from a designated facility to an alternative facility, or returned to the generator; and

(b) Elects to use the system to obtain, complete and transmit an electronic manifest format supplied by the EPA electronic manifest system, or

(c) Elects to use the paper manifest form and submits to the system for data processing purposes a paper copy of the manifest (or data from such a paper copy), in accordance with Rule 0400-12-01-.05(5)(b)1(ii)(V) or Rule 0400-12-01-.06(5)(b)1(ii)(V). These paper copies are submitted for data exchange purposes only and are not the official copies of record for legal purposes.

103. "Waste" means a solid waste as defined in Rule 0400-12-01-.02(1)(b).

104. "Weekly" means recurring by the end of the same day of the following week (e.g., if an action required to be conducted weekly is taken on a Monday, then the action must be taken again by midnight ending the following Monday.)

D. GENERAL DUTIES AND REQUIREMENTS

1. Duty to Comply: The permittee must comply with all conditions of this permit, except that the permittee need not comply with the conditions of the permit to the extent and for the duration such noncompliance is authorized in an emergency permit [see Rule 0400-12-01-.07(1)(d)]. Any permit noncompliance, except under the terms of an emergency permit, constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

2. Duty to Reapply: If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The permittee must submit a new application at least 180 days before the expiration date of the effective permit unless permission for a later date has been granted by the Commissioner. The Commissioner shall not grant permission for applications to be submitted later than the expiration date of the existing permit. The permittee must follow the procedural requirements of Rule 0400-12-01-.07(1)(m).

3. Need to Halt or Reduce Activity Not a Defense: It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce

the permitted activity in order to maintain compliance with the conditions of this permit.

4. Duty to Mitigate: In the event of noncompliance with the permit, the permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment.

5. Proper Operation and Maintenance: The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance include effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

6. Permit Actions: This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any existing permit condition.

7. Property Rights: This permit does not convey any property rights of any sort, or any exclusive privilege.

8. Duty to Provide Information: The permittee shall furnish to the Commissioner, within a reasonable time, any relevant information which the Commissioner may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Commissioner, upon request, copies of records required to be kept by this permit.

9. Inspection and Entry: The permittee shall allow the Commissioner, or an authorized representative, upon presentation of credentials and other documents as may be required by law, to:

   (a) Enter at reasonable times upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;

   (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

   (c) Inspect at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit;

(d) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location; and

(e) Make photographs for the purpose of documenting items of compliance or noncompliance at waste management units, or where appropriate to protect legitimate proprietary interests, make such photographs for him or her. If the permittee makes a claim of proprietary information, then the permittee shall make the photographs and submit them to the inspector pursuant to Rule 0400-12-01-.01(7) within 15 days.

10. Monitoring and Records

(a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The permittee shall perform all monitoring in accordance with the methods described in this permit, including the attachments, or as follows. If not specified elsewhere in this permit, the methods used to obtain, pack, mark, label, and ship a representative waste or media sample to be analyzed must be the appropriate methods from Appendix I of Rule 0400-12-01-.02(30) and the EPA Region 4 Laboratory Services Branch's *Quality System and Technical Procedures for LSASD Field Branch* (most recent version), or an equivalent method approved by the Commissioner. Media include soil, sediment, water, wastewater, and tissue. If not specified elsewhere in this permit, the type and size of containers for each constituent/parameter, the methods of preservation, holding times, and other sample preparation requirements used to prepare and preserve representative samples to be analyzed, must be the appropriate methods from EPA Region 4 Laboratory Services Branch's *Laboratory Operations and Quality Assurance Manual* (most recent version). If not specified elsewhere in this permit, the methods used to handle and manage samples and other types of evidence after their collection and during delivery to the laboratory must be the appropriate methods from EPA Region 4 Laboratory Services Branch's *Sample and Evidence Management* (most recent version), or an equivalent method approved by the Commissioner. Methods for the collection and handling of air, gas, or vapor samples must receive prior approval by the Commissioner. If not specified elsewhere in this permit, laboratory methods must be those specified in the most recent edition of *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846, or an equivalent method approved by the Commissioner.

(b) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, the certification required by Rule 0400-12-01-.06(5)(d)2(ix), and

records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report, certification, or application, or until corrective action is completed, whichever date is later. The permittee shall maintain records from all groundwater monitoring wells and associated groundwater surface elevations, for the active life of the facility, and, for disposal facilities, for the post-closure care period as well. These periods may be extended by request of the Commissioner at any time.

(c) Records of monitoring information shall include:

(i) The date, exact place, and time of sampling or measurements;

(ii) The individual(s) who performed the sampling or measurements;

(iii) The date(s) analyses were performed;

(iv) The individual(s) who performed the analyses;

(v) The analytical techniques or methods used; and

(vi) The results of such analyses.

11. Signatory Requirement: All applications, reports, or information submitted to the Commissioner shall be signed and certified. [See Rule 0400-12-01-.07(2)(a).]

12. Reporting Requirements

(a) Planned changes: The permittee shall give notice to the Commissioner as soon as possible of any planned physical alterations or additions to the permitted facility. The notice shall include at a minimum, a summary of the planned change, the reason for the planned change, and a proposed time frame for the change to occur. If a SWMU or AOC is impacted, the notice shall include a discussion of the impact(s) the planned change will have on the ability to investigate contamination at or from the SWMU or AOC, and a discussion of the impact(s) the planned change will have on the known or suspected on-site and off-site contamination.

(b) Anticipated noncompliance: The permittee shall give advance notice to the Commissioner as soon as possible of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. For a new facility, the permittee may not commence treatment, storage, or disposal of hazardous waste; and for a facility being modified, the permittee may not treat, store, or dispose of hazardous waste in the modified portion of the facility except as provided in Rule 0400-12-01-.07(9)(c)5, until:

(i) The permittee has submitted to the Commissioner by certified mail or hand delivery a letter signed by the permittee and a registered professional engineer stating that the facility has been constructed or modified in compliance with the permit; and

(ii) The Commissioner has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the permit; or

(iii) Within 15 days of the date of submission of the letter in Rule 0400-12-01-.07(8)(a)12(ii)(I), the permittee has not received notice from the Commissioner of his or her intent to inspect, prior inspection is waived, and the permittee may commence treatment, storage, or disposal of hazardous waste.

(c) Transfers: This permit is not transferable to any person except after notice to the Commissioner. The Commissioner may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act. (See Rule 0400-12-01-.07(9)(b); in some cases, modification or revocation and reissuance is mandatory.)

(d) Monitoring reports: Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(e) Compliance schedules: Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

(f) Twenty-four-hour reporting

(i) The permittee shall orally report any noncompliance or imminent or existing hazards from a release of hazardous waste or hazardous constituent which may endanger health or the environment within 24 hours from the time the permittee becomes aware of the circumstances, including:

(I) Information concerning release of any hazardous waste that may cause an endangerment to public drinking water supplies.

(II) Any information of a release or discharge of hazardous waste or of a fire or explosion from the hazardous waste management facility, which could threaten the environment or human health outside the facility.

(III) The requirements shown in Part I.D.12(f)(iii) apply to all events including events reported initially under I.D.12(f)(i)

(ii) The description of the occurrence and the cause shall include:

(I) Name, address, and telephone number of the owner or operator;

(II) Name, address, and telephone number of the facility;

(III) Date, time, and type of incident;

(IV) Name and quantity of material(s) involved;

(V) The extent of injuries, if any;

(VI) An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and

(VII) Estimated quantity and disposition of recovered material that resulted from the incident.

(iii) A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The Commissioner may waive the five-day written notice requirement in favor of a written report within 15 days.

(g) Manifest discrepancy report: If a significant discrepancy in a manifest is discovered, the permittee must attempt to reconcile the discrepancy. If not resolved within 15 days, the permittee must submit a letter report, including a copy of the manifest, to the Commissioner as outlined in Subparagraph II.J.13(c).

(h) Unmanifested waste report: Such report must be submitted to the Commissioner within 15 days of receipt of unmanifested waste as outlined in Paragraph II.K.4.

(i) Annual report: An annual report must be submitted covering facility activities during the previous calendar year as outlined in Paragraph II.K.3.

(j) Other noncompliance: The permittee shall report all instances of noncompliance not reported under Subparagraph I.D.12(d), (e), and (f), at the time monitoring reports are submitted. The reports shall contain the information listed in Rule 0400-12-01.07(8)(a)12(vi).

(k) Other information: Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Commissioner, it shall promptly submit such facts or information.

13. Information Repository: The Commissioner may require the permittee to establish and maintain an information repository at any time, based on the factors set forth in Rule 0400-12-01-.07(7)(e)4(v)(II). The information repository will be governed by the provisions in Rule 0400-12-01-.07(7)(e)4(v)(III) through (VI).

14. Continuation of Expiring Permit: When the permittee has made timely and sufficient application for a new permit, the existing permit does not expire until the Commissioner has made a final determination on issuance or denial, and, in case the application is denied, or the terms of the new permit limited, until the last day for seeking review of the Commissioner's order or a later date fixed by order of the reviewing court.

15. Obligation for Corrective Action: Pursuant to the requirements of Section VI, Specific Conditions for Corrective Action, the permittee is required to select and implement corrective actions as necessary to protect human health and the environment from all releases of hazardous waste or constituents from any solid waste management unit at the facility, regardless of the time at which waste was placed in such unit. The permittee is required to continue this permit for any period necessary to comply with the corrective action requirements of this permit. If corrective action is expected to continue beyond the expiration date of this permit, the permittee shall be required to comply with the reapplication requirement in Paragraph I.D.2.

E. PROPRIETARY INFORMATION

In accordance with Rules 0400-12-01-.01(7) and.07(1)(h), the permittee may assert a claim of confidentiality when submitting any proprietary information required by this permit.

F. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The permittee shall maintain at the facility, until closure is completed and certified by a qualified Professional Engineer, the following documents and amendments, revisions, and modifications to these documents:

1. A copy of this permit;

2. Personnel training documents and records required by this permit;

3. Contingency Plan required by this permit;

4. Operating and other applicable administrative records as required by this permit and Chapter 0400-12-01; and

5. Inspection schedules required by this permit.

G. ANNUAL MAINTENANCE FEES

The permittee shall submit to the Commissioner annual maintenance fees as required by Rule 0400-12-01-.08.

H. REQUIRED NOTICES

1. A permittee that is arranging or has arranged to receive hazardous waste subject to 0400-12-01-.03(9) from a foreign source must submit the following required notices:

   (a) As per Rule 0400-12-01-.03(9)(e)2, for imports where the competent authority of the country of export does not require the foreign exporter to submit to it a notification proposing export and obtain consent from EPA and the competent authorities for the countries of transit, the permittee, if acting as the importer, must provide notification of the proposed transboundary movement in English to EPA using the allowable methods listed in Rule 0400-12-01-.03(9)(e)2(i) at least 60 days before the first shipment is expected to depart the country of export. The notification may cover up to one year of shipments of wastes having similar physical and chemical characteristics, the same United Nations classification, the same RCRA waste codes and OECD waste codes, and being sent from the same foreign exporter.

   (b) As per Rule 0400-12-01-.03(9)(e)4(ii)(XV), a copy of the movement document bearing all required signatures within three working days of receipt of the shipment to the foreign exporter; to the competent authorities of the countries of export and transit that control the shipment as an export and transit shipment of hazardous waste respectively; and on or after the electronic import-export reporting compliance date, to EPA electronically using EPA's Waste Import Export Tracking System (WIETS), or its successor system. The original of the signed movement document must be maintained at the facility for at least three years. The permittee may satisfy this recordkeeping requirement by retaining electronically submitted documents in the facility's account on EPA's Waste Import Export Tracking System (WIETS), or its successor system, provided that copies are readily available for viewing and production if requested by any EPA or authorized state inspector. No permittee may be held liable for the inability to produce the documents for inspection under this subpart if the permittee can demonstrate that the inability to produce the document is due exclusively to

technical difficulty with EPA's Waste Import Export Tracking System (WIETS), or its successor system for which the permittee bears no responsibility.

(c) As per Rule 0400-12-01-.03(9)(e)6(iv), if the facility has physical control of the waste and it must be sent to an alternate facility or returned to the country of export, such permittee must inform EPA, using the allowable methods listed in Rule 0400-12-01-.03(9)(e)2(i) of the need to return or arrange alternate management of the shipment.

(d) As per Rule 0400-12-01-.03(9)(e)7, such permittee shall:

(i) Send copies of the signed and dated confirmation of recovery or disposal, as soon as possible, but no later than 30 days after completing recovery or disposal on the waste in the shipment and no later than one calendar year following receipt of the waste, to the foreign exporter, to the competent authority of the country of export that controls the shipment as an export of hazardous waste, and for shipments recycled or disposed of on or after the electronic import-export reporting compliance date, to EPA electronically using EPA's Waste Import Export Tracking System (WIETS), or its successor system.

(ii) If the facility performed any of recovery operations R12, R13, or RC16, or disposal operations D13 through D15, or DC17, promptly send copies of the confirmation of recovery or disposal that it receives from the final recovery or disposal facility within one year of shipment delivery to the final recovery or disposal facility that performed one of recovery operations R1 through R11, or RC16, or one of disposal operations D1 through D12, or DC15 to DC16, to the competent authority of the country of export that controls the shipment as an export of hazardous waste, and on or after the electronic import-export reporting compliance date, to EPA electronically using EPA's Waste Import Export Tracking System (WIETS), or its successor system. The recovery and disposal operations in this item are defined in Rule 0400-12-01-.03(9)(b).

2. If the permittee receives hazardous waste from an off-site source (except where the permittee is also the generator), he must inform the generator in writing that he has the appropriate permit(s) for, and will accept, the waste the generator is shipping. The permittee must keep a copy of this written notice as part of the operating record.

3. Before transferring ownership or operation of a facility during its operating life, or of a disposal facility during the post-closure care period, the permittee must notify the new owner or operator in writing of the requirements of this permit and Rules 0400-12-01-.07 and .08.

(Comment: The permittee's failure to notify the new owner/operator of the requirements of this permit condition in no way relieves the new owner or operator of his obligation to comply with all applicable requirements.)

I. ORDER OF PRECEDENCE

In the event of any inconsistency between the permit conditions and the material contained in any attachment to this permit, the permit conditions shall take precedence.

J. PERMIT STRUCTURE

This permit is organized, numbered, and referenced according to the following outline form:

I. Section

A. Subsection

1. Paragraph

(a) Subparagraph

(i) Part

(I) Subpart

(A) Item

II. GENERAL FACILITY CONDITIONS

A. HAZARDOUS WASTES TO BE MANAGED

The hazardous wastes to be managed in the unit(s) authorized by this permit are identified in Attachment 1. The permittee shall not manage any other hazardous wastes identified by Rule 0400-12-01-.02 in the unit(s) authorized by this permit, until this permit has been appropriately modified.

B. OPERATION AND MAINTENANCE OF THE FACILITY

The permittee must maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.

C. SAMPLING, ANALYSIS, AND MONITORING

1. General Waste Analysis:

   Before the permittee treats, stores, or disposes of any hazardous wastes he must obtain a detailed chemical and physical analysis of a representative sample of the wastes. At a minimum, the analysis must contain all the information which must be known to treat, store, or dispose of the waste in accordance with this permit, and Rule 0400-12-01-.10.

2. Waste Analysis Plan

   (a) The permittee shall follow the procedures described in the Waste Analysis Plan found in Attachment 2. The Permittee may change the format or style of the forms in Attachment 2. Additions may be made to the forms if deemed necessary to provide the information needed to properly manage the facility in the event that those additions do not change the intent of the required content. Deletions shall be submitted to the Division as a modification to this permit. The permittee must keep this plan at the facility.

   (b) The permittee shall ensure that the Waste Analysis Plan, required by Subparagraph II.C.2(a), at a minimum, specifies:

      (i) The parameters for which each hazardous waste, will be analyzed and the rationale for the selection of these parameters

      (ii) The test methods which will be used to test for these parameters.

(iii) The sampling method which will be used to obtain a representative sample of the waste to be analyzed

(iv) The frequency with which the initial analysis of the waste will be reviewed or repeated to ensure that the analysis is accurate and up to date.

(v) For off-site facilities, the waste analysis the hazardous waste generators have agreed to supply.

(vi) Where applicable, the methods that will be used to meet the additional waste analysis requirements for specific waste management methods as specified in Subsections II.G, II.O, II.P, II.Q, and II.R,

(c) For off-site facilities, the permittee shall also ensure that the Waste Analysis Plan, required by Subparagraph II.C.2(a), at a minimum, must also specify the procedures to be used to inspect and analyze each movement of hazardous waste received at the facility to ensure that it matches the identity of the waste designated on the accompanying manifest or shipping paper. At a minimum, the plan shall describe:

(i) The procedures which will be used to determine the identity of each movement of waste managed at the facility; and

(ii) The sampling method which will be used to obtain a representative sample of the waste to be identified, if the identification method includes sampling.

3. Frequency of Analysis: The analysis must be repeated as necessary to ensure that it is accurate and up to date. At a minimum, the analysis must be repeated no less frequently than the frequency specified in Attachment 2 and shall be repeated:

(a) When the permittee is notified, or has reason to believe, that the process or operation generating the hazardous waste has changed; and

(b) For off-site facilities, when the results of the inspection required in Subparagraph II.C.4(a) indicate that the hazardous waste received at the facility does not match the waste designated on the accompanying manifest or shipping paper.

4. Additional Analysis

(a) The permittee must inspect and analyze each hazardous waste shipment received from off-site at the facility to determine whether it matches the identity of the waste specified on the accompanying manifest or shipping

paper. The procedure which shall be followed is described in the Waste Analysis Plan (Attachment 2).

(b) The permittee shall inspect and analyze all standing liquid in the secondary containment system(s) prior to its release from the facility. Sampling and analysis shall be performed to determine whether the liquid is a hazardous waste and how to properly manage it.

5. Sampling and Monitoring: Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The permittee shall perform all monitoring in accordance with the methods described in this permit, including the attachments. If not specified in this permit, the method used to obtain a representative waste sample to be analyzed must be the appropriate method from Appendix I of Rule 0400-12-01-.02(30), the most recent version of the EPA Region 4 Laboratory Services Branch's *Quality System and Technical Procedures for LSASD Field Branch* (most recent version)",, or an equivalent method approved by the Commissioner. If not specified in this permit, procedures for sampling media must be those identified in the latest edition of the EPA Region 4 Laboratory Services Branch's *Quality System and Technical Procedures for LSASD Field Branch* (most recent version)",or an equivalent method approved by the Commissioner. Laboratory methods must be those specified in the most recent edition of *Hazardous Waste Test Methods / SW-846.*

D. SECURITY

1. The permittee must prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active portion of the facility. The permittee must maintain security for the facility as described in Attachment 3, Facility Security.

2. The permittee must post a sign with the legend, "Danger - Unauthorized Personnel Keep Out," or language to that effect, at each entrance to the active portion of the facility, and at other locations, in sufficient numbers to be seen from any approach to the active portion. The legend must be written in English and in any other language predominant in the area surrounding the facility and must be legible from a distance of at least 25 feet.

E. GENERAL INSPECTION REQUIREMENTS

1. Inspections: The permittee shall inspect the facility for malfunctions and deterioration, operator errors, and discharges which may be causing or may lead to (1) a release of hazardous waste or hazardous constituents to the environment or (2) a threat to human health. Areas subject to spills, such as loading and unloading areas, must be inspected daily when in use. The permittee shall inspect each listed item per the inspection schedule on the inspection form(s) in Attachment 4, Facility

Inspection Program. The inspection type and frequency shall be in accordance with Attachment 4.

2. Remedies: The permittee shall remedy any deterioration or malfunction of equipment or structures which the inspection reveals on a schedule that ensures the problem will not lead to an environmental or human health hazard. When a hazard is imminent or has already occurred, remedial action shall be taken immediately.

3. Inspection Records: The Permittee must keep the written inspection schedule and records at the facility. The permittee shall record inspections in an inspection log or summary. The permittee shall keep these records for at least three years from the date of inspection. At a minimum, these records shall include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions. The Permittee may change the format or style of the forms in Attachment 4.1. Additions may be made to the forms if deemed necessary to provide the information needed to properly manage the facility if those additions do not change the intent of the required content. Deletions must be submitted to the Division as a permit modification request.

F. PERSONNEL TRAINING

The permittee must ensure that facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the permittee's compliance with this permit and the Tennessee Hazardous Waste Management Regulations. The permittee must ensure that the training program is directed by a person trained in hazardous waste management procedures and must include instruction which teaches facility personnel hazardous waste management procedures (including contingency plan implementation) relevant to the positions in which they are employed.

1. Training Program: The training program shall at least conform to the personnel training included in this subsection and Attachment 5, Personnel Responsibilities and Training. The permittee must ensure that the training program is, at a minimum, designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including where applicable:

   (a) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;

   (b) Key parameters for automatic waste feed cut-off systems;

   (c) Communications or alarm systems;

   (d) Response to fires or explosions;

(e) Response to groundwater contamination incidents; and

(f) Shutdown of operations.

2. Timing: Facility personnel must successfully complete the program within six months after the date of their employment or assignment to the facility, or to a new position at the facility, whichever is later. Untrained personnel shall not work in unsupervised positions until they have completed the training requirements of this permit.

3. Annual Review: Facility personnel must take part in an annual review of the initial training required by this permit.

4. Training Documents and Records: The permittee must maintain the following documents and records at the facility:

(a) The job title for each position at the facility related to hazardous waste management, and the name of the employee filling each job;

(b) A written job description for each position listed in Subparagraph II.F.4(a). This description may be consistent in its degree of specificity with descriptions for other similar positions in the same company location or bargaining unit, but must include the requisite skill, education, or other qualifications, and duties of employees assigned to each position;

(c) A written description of the type and amount of both introductory and continuing training that will be given to each person filling a position listed under Subparagraph II.F.4(a); and

(d) Records that document that the training or job experience required under Paragraphs II.F.1, 2, and 3 has been given to, and completed by, facility personnel.

5. Retention of Training Records: Training records on current personnel must be kept at the facility until closure of the facility; training records on former employees must be kept for at least three years from the date the employee last worked at the facility. Personnel training records may accompany personnel transferred within the same company.

G. GENERAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

1. The permittee must take precautions to prevent accidental ignition or reaction of ignitable or reactive waste. This waste must be separated and protected from sources of ignition or reaction including but not limited to open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or

mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. While ignitable or reactive waste is handled, the permittee must confine smoking and open flames to specially designated locations. "No Smoking" signs must be conspicuously placed wherever there is a hazard from ignitable or reactive waste.

2. Where specifically required by this permit, the permittee that treats, stores or disposes of ignitable or reactive waste, or mixes incompatible waste or incompatible wastes and other materials, must take precautions to prevent reactions which:

   (a) Generate extreme heat or pressure, fire or explosions, or violent reactions;

   (b) Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;

   (c) Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;

   (d) Damage the structural integrity of the device or facility; and

   (e) Through other like means threaten human health or the environment.

3. When required to comply with Paragraph II.G.1 or 2, the permittee must document that compliance. This documentation may be based on references to published scientific or engineering literature, data from trial tests (e.g., bench scale or pilot scale tests), waste analyses (as specified in Rule 0400-12-01-.06(2)(d)), or the results of the treatment of similar wastes by similar treatment processes and under similar operating conditions.

4. Containers holding ignitable or reactive waste must be located at least 15 meters (50 feet) from the facility's property line.

H. PREPAREDNESS AND PREVENTION

1. Design, Operation, and Maintenance of the Facility: The permittee must maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.

2. Required Equipment: At a minimum, the permittee must equip the facility with the equipment listed in Attachment 7, Contingency Plan, and with the following:

   (a) An internal communications or alarm system capable of providing immediate emergency instruction (voice or signal) to facility personnel;

(b) A device, such as a telephone (immediately available at the scene of operations) or a hand-held two-way radio, capable of summoning emergency assistance from local police departments, fire departments, or State or local emergency response teams;

(c) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment; and

(d) Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems.

3. Testing and Maintenance of Equipment: The permittee must test and maintain all facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment as necessary to assure its proper operation in time of emergency.

4. Access to Communications or Alarm Systems: The permittee must ensure that:

(a) Whenever hazardous waste is being poured, mixed, spread, or otherwise handled, all personnel involved in the operation must have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another employee.

(b) If there is ever just one employee on the premises while the facility is operating, he must have immediate access to a device, such as a telephone (immediately available at the scene of operation) or a hand-held two-way radio, capable of summoning external emergency assistance.

5. Required Aisle Space: The permittee must maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency, unless it can be demonstrated to the Commissioner that aisle space is not needed for any of these purposes.

6. Arrangements with Local Authorities

(a) The permittee must attempt to make and document the following arrangements, as appropriate for the type of waste authorized to be managed by this permit and the potential need for the services of these organizations:

(i) Arrangements to familiarize police, fire departments, and emergency response teams with the layout of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working,

entrances to and roads inside the facility, and possible evacuation routes;

(ii) Where more than one police and fire department might respond to an emergency, agreements designating primary emergency authority to specific police and specific fire department, and agreements with any others to provide support to the primary emergency authority;

(iii) Arrangements with State emergency response teams, emergency response contractors, and equipment suppliers;

(iv) Arrangements to familiarize local hospitals with the properties of hazardous wastes handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or releases at the facility; and

(v) The permittee shall provide written information regarding waste quantities, types, and locations, to state and local authorities [including State Emergency Response Commissions (SERCs) and Local Emergency Response Commissions (LERCs)] and first responders for the purpose of emergency preparedness and prevention and shall place a copy of this information in the facility's operating record, as well as to update such information as necessary, and shall provide the updates to state and local authorities and first responders. This information shall contain the following:

(I) Waste types (ignitable, reactive etc.)/names;

(II) Approximate quantities of each waste type;

(III) General locations of waste at the facility;

(IV) The layout of the facility;

(V) General locations within the facility where personnel normally work; and

(VI) Entrances and roads inside the facility and possible evacuation routes.

The facility must submit the emergency and contingency information using paper and electronic format and also have such information readily accessible during an emergency.

(b) Where State or local authorities decline to enter into such arrangements, the permittee must document this refusal in the operating record.

7. Loading and Unloading Operations

Prevention of hazards at the container loading (storage) area shall be accomplished by several means.

(a) Containers of hazardous waste shall be checked for proper closure, labeling, and proper placement prior to unloading.

(b) Operational equipment (fork-lift trucks, straps, etc.) shall be properly maintained to prevent the occurrence of a spill or release of hazardous waste due to equipment malfunctions.

(c) The loading and unloading area shall be checked prior to use for potential hazards due to aisle space obstructions, for improper container management practices, and for cleanliness.

I. CONTINGENCY PLAN AND EMERGENCY PROCEDURES

The permittee must have a Contingency Plan for the facility.

1. Purpose of the Contingency Plan: The Contingency Plan, contained in this permit as Attachment 7, must be designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water.

2. Implementation of Plan(s): The permittee must immediately carry out the provisions of the Contingency Plan, whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which threatens or could threaten human health or the environment.

3. Content of the Contingency Plan

(a) The Contingency Plan, Attachment 7, must describe the actions facility personnel must take to comply with Paragraphs II.I.1 through II.I.7 in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.

(b) The Contingency Plan, Attachment 7, must describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services, pursuant to Paragraph II.H.6.

(c) The Contingency Plan, Attachment 7, must list names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator (see Paragraph II.I.6), and this list must be kept up to date. Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in order which they will assume responsibility as alternate.

(d) The Contingency Plan, Attachment 7, must include a list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the Contingency Plan, Attachment 7, must include the location and a physical description of each item on the list, and a brief outline of its capabilities.

(e) The Contingency Plan, Attachment 7, must include an evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This evacuation plan must describe signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires).

4. Copies of Contingency Plan:
The permittee must maintain at the facility a copy of the Contingency Plan, Attachment 7, and its subsequent revisions. In addition, the Contingency Plan and all revisions to the plan must be submitted to all local police departments, fire departments, hospitals, and State and local emergency response teams that may be called upon to provide emergency services.

5. Amendment to Contingency Plan: The permittee must review, and immediately amend, the Contingency Plan whenever one or more of the following occur:

(a) This permit is revised;

(b) The Contingency Plan fails in an emergency;

(c) The facility changes - in its design, construction, operation, maintenance, or other circumstances - in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous constituents, or changes the response necessary in an emergency;

(d) The list of emergency coordinators changes; or

(e) The list of emergency equipment changes.

6. Emergency Coordinator: There must be, at all times, at least one employee either on the facility premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures. This emergency coordinator must be thoroughly familiar with all aspects of the facility's Contingency Plan, all operations and activities at the facility, the location and characteristics of waste handled, the location of all records within the facility, and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the Contingency Plan.

7. Emergency Procedures

(a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must immediately:

(i) Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel; and

(ii) Notify appropriate State and local agencies with designated response roles if their help is needed.

(b) Whenever there is a release, fire, or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and areal extent of any released materials. He may do this by observation or review of facility records or manifests, and, if necessary, by chemical analysis.

(c) Concurrently, the emergency coordinator must assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment must consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions).

(d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows:

(i) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and

(ii) He must immediately notify the Tennessee Emergency Management Agency (using their 24-hour toll free number 800-262-3300) and/or

the National Response Center (using their 24-hour toll free number 800-424-8802). The report must include:

(I) Name and telephone number of reporter;
(II) Name and address of facility;

(III) Time and type of incident (e.g., release, fire);

(IV) Name and quantity of material(s) involved, to the extent known;

(V) The extent of injuries, if any; and

(VI) The possible hazards to human health, or the environment, outside the facility.

(e) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing released waste, and removing or isolating containers.

(f) If the facility stops operations in response to a fire, explosion, or release, the emergency coordinator must monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate.

(g) Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility.

[Comment: Unless the permittee can demonstrate, in accordance with Rule 0400-12-01-.02(1)(c)3 or 4, that the recovered material is not a hazardous waste, the permittee becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of Rules 0400-12-01-.03, .04 and .06.]

(h) The emergency coordinator must ensure that, in the affected area(s) of the facility:

(i) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and

(ii) All emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use before operations are resumed.

(i) The permittee must note in the operating record the time, date, and details of any incident that requires implementing the Contingency Plan. Within 15 days after the incident, he must submit a written report on the incident to the Commissioner. The report must include:

(i) Name, address, and telephone number of the permittee;

(ii) Name, address, and telephone number of the facility;

(iii) Date, time, and type of incident (e.g., fire, explosion);

(iv) Name and quantity of material(s) involved;

(v) The extent of injuries, if any;

(vi) An assessment of actual or potential hazards to human health or the environment, where this is applicable; and

(vii) Estimated quantity and disposition of recovered material that resulted from the incident.

J. MANIFEST SYSTEM

1. Use of the Manifest System

(a) If the facility receives hazardous waste accompanied by manifest or e-manifest the permittee or his/her agent must sign and date the manifest as indicated in Subparagraph II.J.1(b) to certify that the hazardous waste covered by the manifest was received, that the hazardous waste was received except as noted in the Discrepancy space of the manifest, or that the hazardous waste was rejected as noted in the manifest Discrepancy space.

(b) If the facility receives a hazardous waste shipment accompanied by a manifest, the permittee or his agent must:

(i) Sign and date each copy of the manifest;

(ii) Note any discrepancies (as defined in Subparagraph II.J.13(a)) on each copy of the manifest;

(iii) Immediately give the transporter at least one copy of the manifest;

(iv) Within 30 days of delivery, send a copy (Page 2) of the manifest to the generator;

(v) Beginning June 30, 2021, the requirement to submit the top copy (Page 1) of the paper manifest and any paper continuation sheet to the e-manifest system for purposes of data entry and processing may be met by the permittee only by transmitting to the EPA system an image file of Page 1 of the manifest and any continuation sheet, or by transmitting to the EPA system both a data file and the image file corresponding to Page 1 of the manifest and any continuation sheet, within 30 days of the date of delivery. Submissions of copies to the e-manifest system shall be made to the electronic mail/submission address specified at the e-Manifest program website's directory of services; and

(vi) Retain at the facility a copy of each manifest for at least three years from the date of delivery.

(c) If the permittee receives hazardous waste subject to Rule 0400-12-01-.03(9) from a foreign source , he must:

(i) Additionally list the relevant consent number from consent documentation supplied by EPA to the facility for each waste listed on the manifest, matched to the relevant list number for the waste from block 9b. If additional space is needed, the permittee should use a Continuation Sheet(s) (EPA Form 8700-22A); and

(ii) Send a copy of the manifest within 30 days of delivery to EPA using the addresses listed in Rule 0400-12-01-.03(9)(c)5 until the facility can submit such a copy to the e-Manifest system per Part II.J.1(b)(v).

2. Bulk Shipments: If the facility receives, from a rail or water (bulk shipment) transporter, hazardous waste which is accompanied by a shipping paper containing all the information required on the manifest (excluding the Installation Identification Numbers, generator's certification, and signatures), the permittee, or his agent, must:

(a) Sign and date each copy of the manifest or shipping paper (if the manifest has not been received) to certify that the hazardous waste covered by the manifest or shipping paper was received;

(b) Note any significant discrepancies [as defined in Subparagraph II.J.13(a)] on each copy of the manifest or shipping paper;

[Comment: The Department does not intend that the permittee whose procedures under Subparagraph II.C.2(c) include waste analysis must perform that analysis before signing the shipping paper and giving it to the transporter. Subparagraph II.J.13(b), however, requires reporting an unreconciled discrepancy discovered during later analysis.]

(c) Immediately give the rail or water (bulk shipment) transporter at least one copy of the manifest or shipping paper (if the manifest has not been received);

(d) Within 30 days after the delivery, send a copy of the signed and dated manifest or a signed and dated copy of the shipping paper (if the manifest has not been received within 30 days after delivery) to the generator; and

[Comment: Rule 0400-12-01-.03(3)(d)3 requires the generator to send three copies of the manifest to the facility when hazardous waste is sent by rail or water (bulk shipment).]

(e) Retain at the facility a copy of the manifest and shipping paper (if signed in lieu of the manifest at the time of delivery) for at least three years from the date of delivery.

3. Initiating a Shipment: Whenever a shipment of hazardous waste is initiated from the facility, the permittee must comply with the manifesting requirements of Rule 0400-12-01-.03. The provisions of Rule 0400-12-01-.03(1)(f), (1)(g), and (1)(h) are applicable to the onsite accumulation of hazardous wastes by generators. Therefore, the provisions of Rule 0400-12-01-.03(1)(f), (1)(g), and (1)(h) only apply to owners or operators who are shipping hazardous waste which they generated at that facility or operating as a large quantity generator consolidating hazardous waste from very small quantity generators under Rule 0400-12-01-.03(1)(h)6.

4. As per Rule 0400-12-01-.03(9)(e)4(ii)(XV), within three working days of the receipt of a shipment subject to Rule 0400-12-01-.03(9), the permittee must provide a copy of the movement document bearing all required signatures to the foreign exporter, to competent authorities of all other countries of export and transit that control the shipment as an export and transit of hazardous waste respectively; and on or after the electronic import-export reporting compliance date, to EPA electronically using EPA's Waste Import Export Tracking System (WIETS), or its successor system. The original copy of the movement document must be maintained at the facility for at least three years from the date of signature. The permittee may satisfy this recordkeeping requirement by retaining electronically submitted documents in the facility's account on EPA's Waste Import Export Tracking System (WIETS), or its successor system, provided that copies are readily available for viewing and production if requested by any EPA or authorized state inspector. The permittee may not be held liable for the inability to produce the documents for inspection under this part if the permittee can demonstrate that the

inability to produce the document is due exclusively to technical difficulty with EPA's Waste Import Export Tracking System (WIETS), or its successor system, for which the permittee bears no responsibility.

5. A facility must determine whether the consignment state for a shipment regulates any additional wastes (beyond those regulated federally) as hazardous wastes under its state hazardous waste program. The permittee must also determine whether the consignment state or generator state requires the facility to submit any copies of the manifest to these states.

6. Legal equivalence to paper manifests: Electronic manifests that are obtained, completed, and transmitted in accordance with Rule 0400-12-01-.03(3)(a)1(iii), and used in accordance with this part in lieu of the paper manifest form are the legal equivalent of paper manifest forms bearing handwritten signatures, and satisfy for all purposes any requirement in this permit to obtain, complete, sign, provide, use, or retain a manifest.

   (a) Any requirement in this permit for the permittee to sign a manifest or manifest certification by hand, or to obtain a handwritten signature, is satisfied by signing with or obtaining a valid and enforceable electronic signature within the meaning of Rule 0400-12-01-.03(3)(f).

   (b) Any requirement in this permit to give, provide, send, forward, or to return to another person a copy of the manifest is satisfied when a copy of an electronic manifest is transmitted to the other person.

   (c) Any requirement in this permit for a manifest to accompany a hazardous waste shipment is satisfied when a copy of an electronic manifest is accessible during transportation and forwarded to the person or persons who are scheduled to receive delivery of the hazardous waste shipment.

   (d) Any requirement in this permit for the permittee to keep or retain a copy of each manifest is satisfied by the retention of the facility's electronic manifest copies in its account on the e-Manifest system, provided that such copies are readily available for viewing and production if requested by any EPA or authorized state inspector.

   (e) The permittee shall not be held liable for the inability to produce an electronic manifest for inspection under this permit if the permittee can demonstrate that the inability to produce the electronic manifest is due exclusively to a technical difficulty with the electronic manifest system for which the permittee bears no responsibility.

7. The permittee may participate in the electronic manifest system either by accessing the electronic manifest system from the permittee's electronic equipment, or by accessing the electronic manifest system from portable equipment brought to the permittee's site by the transporter who delivers the waste shipment to the facility.

8. Special procedures applicable to replacement manifests: If a facility receives hazardous waste that is accompanied by a paper replacement manifest for a manifest that was originated electronically, the following procedures apply to the delivery of the hazardous waste by the final transporter:

   (a) Upon delivery of the hazardous waste to the designated facility, the permittee must sign and date each copy of the paper replacement manifest by hand in Item 20 (Designated Facility Certification of Receipt) and note any discrepancies in Item 18 (Discrepancy Indication Space) of the replacement manifest,

   (b) The permittee must give back to the final transporter one copy of the paper replacement manifest,

   (c) Within 30 days of delivery of the hazardous waste to the designated facility, the permittee must send one signed and dated copy of the paper replacement manifest to the generator, and send an additional signed and dated copy of the paper replacement manifest to the EPA e-Manifest system, and

   (d) The permittee must retain at the facility one copy of the paper replacement manifest for at least three years from the date of delivery.

9. Special procedures applicable to electronic signature methods undergoing tests: If the permittee, using an electronic manifest, signs this manifest electronically using an electronic signature method which is undergoing pilot or demonstration tests aimed at demonstrating the practicality or legal dependability of the signature method, then the permittee shall also sign with an ink signature the facility's certification of receipt or discrepancies on the printed copy of the manifest provided by the transporter. Upon executing its ink signature on this printed copy, the permittee shall retain this original copy among its records for at least three years from the date of delivery of the waste.

10. Imposition of user fee for electronic manifest use

   (a) As prescribed in 40 CFR § 264.1311, and determined in 40 CFR § 264.1312, the permittee who is a user of the electronic manifest system shall be assessed a user fee by EPA for the submission and processing of each electronic and paper manifest. EPA shall update the schedule of user fees and publish them to the user community, as provided in 40 CFR § 264.1313.

   (b) The permittee subject to user fees shall make user fee payments in accordance with the requirements of 40 CFR § 264.1314, subject to the informal fee dispute resolution process of 40 CFR § 264.1316, and subject to the sanctions for delinquent payments under 40 CFR § 264.1315.

11. Electronic manifest signatures: Electronic manifest signatures shall meet the criteria described in Rule 0400-12-01-.03(3)(f).

12. Post-receipt manifest data corrections: After facilities have certified to the receipt of hazardous wastes by signing Item 20 of the manifest, any post-receipt data corrections may be submitted at any time by any interested person (e.g., waste handler) shown on the manifest.

(a) Interested persons must make all corrections to manifest data by electronic submission, either by directly entering corrected data to the web-based service provided in e-Manifest for such corrections, or by an upload of a data file containing data corrections relating to one or more previously submitted manifests.

(b) Each correction submission must include the following information:

(i) The Manifest Tracking Number and date of receipt by the facility of the original manifest(s) for which data are being corrected;

(ii) The item number(s) of the original manifest that is the subject of the submitted correction(s); and

(iii) For each item number with corrected data, the data previously entered, and the corresponding data as corrected by the correction submission.

(c) Each correction submission shall include a statement that the person submitting the corrections certifies that to the best of his or her knowledge or belief, the corrections that are included in the submission will cause the information reported about the previously received hazardous wastes to be true, accurate, and complete:

(i) The certification statement must be executed with a valid electronic signature; and

(ii) A batch upload of data corrections may be submitted under one certification statement.

(d) Upon receipt by the system of any correction submission, other interested persons shown on the manifest will be provided electronic notice of the submitter's corrections.

(e) Other interested persons shown on the manifest may respond to the submitter's corrections with comments to the submitter, or by submitting another correction to the system, certified by the respondent as specified in

subparagraph II.J.12(c), and with notice of the corrections to other interested persons shown on the manifest.

13. Manifest Discrepancies

(a) Manifest discrepancies are:

(i) Significant differences [as defined by Subparagraph II.J.13(b)] between the quantity or type of hazardous waste designated on the manifest or shipping paper, and the quantity and type of hazardous waste that the facility actually receives;

(ii) Rejected wastes, which may be a full or partial shipment of hazardous waste that the TSDF cannot accept; or

(iii) Container residues, which are residues that exceed the quantity limits for "empty" containers set forth in Rule 0400-12-01-.02(1)(g)2.

(b) Significant differences in quantity are: For bulk waste, variations greater than 10 percent in weight; and for batch waste, any variation in piece count, such as a discrepancy of one drum in a truckload. Significant differences in type are obvious differences which can be discovered by inspection or waste analysis, such as waste solvent substituted for waste acid or toxic constituents not reported on the manifest or shipping paper.

(c) Upon discovering a significant difference in quantity or type, the permittee must attempt to reconcile the discrepancy with the waste generator or transporter (e.g., with telephone conversations). If the discrepancy is not resolved within 15 days after receiving the waste, the permittee must immediately submit to the Commissioner a letter describing the discrepancy and attempts to reconcile it, and a copy of the manifest or shipping paper at issue.

(d) Upon rejecting waste or identifying a container residue that exceeds the quantity limits for "empty" containers set forth in Rule 0400-12-01-.02(1)(g)2, the permittee must consult with the generator prior to forwarding the waste to another facility that can manage the waste. If it is impossible to locate an alternative facility that can receive the waste, the permittee may return the rejected waste or residue to the generator. The permittee must send the waste to the alternative facility or to the generator within 60 days of the rejection of the container residue identification.

(i) While the permittee is making arrangements for forwarding rejected wastes or residues to another facility under this paragraph, the permittee must ensure that either the delivering transporter retains

custody of the waste, or the permittee must provide for secure, temporary custody of the waste, pending delivery of the waste to the first transporter designated on the manifest prepared under Paragraphs II.J.13(e) and II.J.13(f).

(e) Except as provided in Part II.J.13(e)(vii), for full or partial load rejections and residues that are to be sent off-site to an alternate facility, the facility is required to prepare a new manifest in accordance with Rule 0400-12-01-.03(3)(a) and the following instructions:

(i) Write the generator's Installation Identification Number in Item 1 of the new manifest. Write the generator's name and mailing address in Item 5 of the new manifest. If the mailing address is different from the generator's site address, then write the generator's site address in the designated space in Item 5.

(ii) Write the name of the alternate designated facility and the facility's Installation Identification Number in the designated facility block (Item 8) of the new manifest.

(iii) Copy the Manifest Tracking Number found in Item 4 of the old manifest to the Special Handling and Additional Information Block of the new manifest and indicate that the shipment is a residue or rejected waste from the previous shipment.

(iv) Copy the Manifest Tracking Number found in Item 4 of the new manifest to the manifest reference number line in the Discrepancy Block of the old manifest (Item 18a).

(v) Write the DOT description for the rejected load or the residue in Item 9 (U.S. DOT Description) of the new manifest and write the container types, quantity, and volume(s) of waste.

(vi) Sign the Generator's/Offeror's Certification to certify, as the offeror of the shipment, that the waste has been properly packaged, marked and labeled and is in proper condition for transportation and mail a signed copy of the manifest to the generator identified in Item 5 of the new manifest.

(vii) For full load rejections that are made while the transporter remains present at the facility, the facility may forward the rejected shipment to the alternate facility by completing Item 18b of the original manifest and supplying the information on the next destination facility in the Alternate Facility space. The facility must retain a copy of this manifest for its records, and then give the remaining copies of the manifest to the transporter to accompany the shipment.

If the original manifest is not used, then the facility must use a new manifest and comply with Parts II.J.13(e)(i), (ii), (iii), (iv), (v), and (vi).

(f) Except as provided Part II.J.13(f)(vii), for rejected wastes and residues that must be sent back to the generator, the facility is required to prepare a new manifest in accordance with Rule 0400-12-01-.03(3)(a) and the following instructions:

(i) Write the facility's Installation Identification Number in Item 1 of the new manifest. Write the facility's name and mailing address in Item 5 of the new manifest. If the mailing address is different from the facility's site address, then write the facility's site address in the designated space for Item 5 of the new manifest.

(ii) Write the name of the initial generator and the generator's Installation Identification Number in the designated facility block (Item 8) of the new manifest.

(iii) Copy the Manifest Tracking Number found in Item 4 of the old manifest to the Special Handling and Additional Information Block of the new manifest and indicate that the shipment is a residue or rejected waste from the previous shipment.

(iv) Copy the Manifest Tracking Number found in Item 4 of the new manifest to the manifest reference number line in the Discrepancy Block of the old manifest (Item 18a).

(v) Write the DOT description for the rejected load or the residue in Item 9 (U.S. DOT Description) of the new manifest and write the container types, quantity, and volume(s) of waste.

(vi) Sign the Generator's/Offeror's Certification to certify, as offeror of the shipment, that the waste has been properly packaged, marked and labeled and is in proper condition for transportation.

(vii) For full load rejections that are made while the transporter remains at the facility, the facility may return the shipment to the generator with the original manifest by completing Item 18a and 18b of the manifest and supplying the generator's information in the Alternate Facility space. The facility must retain a copy for its records and then give the remaining copies of the manifest to the transporter to accompany the shipment. If the original manifest is not used, then the facility must use a new manifest and comply with Parts II.J.13(f)(i), (ii), (iii), (iv), (v), (vi) and (viii).

(viii) For full or partial load rejections and container residues contained in non-empty containers that are returned to the generator, the facility must also comply with the exception reporting requirements in Rule 0400-12-01-.03(5)(c)1.

(g) If a facility rejects a waste or identifies a container residue that exceeds the quantity limits for "empty" containers set forth in Rule 0400-12-01-.02(1)(g)2 after it has signed, dated, and returned a copy of the manifest to the delivering transporter or to the generator, the facility must amend its copy of the manifest to indicate the rejected wastes or residues in the Discrepancy space of the amended manifest. The facility must also copy the Manifest Tracking Number from Item 4 of the new manifest to the Discrepancy space of the amended manifest and must re-sign and date the manifest to certify to the information as amended. The facility must retain the amended manifest for at least three years from the date of amendment, and must within 30 days, send a copy of the amended manifest to the transporter and generator that received copies prior to their being amended.

K. RECORDKEEPING AND REPORTING

The permittee must keep a written operating record at the facility.

1. Operating Record: The following information must be recorded by the permittee, as it becomes available, and maintained in the operating record at the facility for three years unless noted as follows:

(a) A description and the quantity of each hazardous waste received, and the method(s) and date(s) of its treatment, storage, or disposal at the facility as required by Rule 0400-12-01-.06(57), Appendix I. This information must be maintained in the operating record until closure of the facility;

(b) The location of each hazardous waste within the facility and the quantity at each location. For disposal facilities, the location and quantity of each hazardous waste must be recorded on a map or diagram that shows each cell or disposal area. For all facilities, this information must include cross-references to specific manifest document numbers, if the waste was accompanied by a manifest. This information must be maintained in the operating record until closure of the facility;

(c) Records and results of waste analysis and waste determinations performed as specified in Subsections II.C, II.G, II.O, II.Q, and II.R;

(d) Summary reports and details of all incidents that require implementing the Contingency Plan as required by Subparagraph II.I.7(i);

(e) Records and results of inspections as required by Paragraph II.E.3;

(f) Monitoring, testing or analytical data, and corrective action where required by Sections III, IV, V, and VI and Subsections II.Q, and II.R. This information must be maintained in the operating record for three years, except for records and results pertaining to groundwater monitoring and cleanup which must be maintained in the operating record until closure of the facility;

(g) For off-site facilities, notices to generators as required by Paragraph I.H.2;

(h) All closure cost estimates under Paragraph II.M.1 of this permit and Rule 0400-12-01-.06(8)(c), and, for disposal facilities, all post-closure cost estimates under Rule 0400-12-01-.06(8)(e). This information must be maintained in the operating record at the facility until closure of the facility;

(i) A certification by the permittee no less often than annually, that the permittee has a program in place to reduce the volume and toxicity of hazardous waste that he generates to the degree determined by the permittee to be economically practicable; and the proposed method of treatment, storage or disposal is that practicable method currently available to the permittee which minimizes the present and future threat to human health and the environment;

(j) For an off-site treatment facility, a copy of the notice, and the certification and demonstration, if applicable, required by the generator or the owner or operator under Rule 0400-12-01-.10(1)(g) or(h);

(k) For an on-site treatment facility, the information contained in the notice (except the manifest number), and the certification and demonstration if applicable, required by the generator or the owner or operator under Rule 0400-12-01-.10(1)(g) or (h);

(l) For an off-site storage facility, a copy of the notice, and the certification and demonstration if applicable, required by the generator or the owner or operator under Rule 0400-12-01-.10(1)(g) or(h);

(m) For an on-site storage facility, the information contained in the notice (except the manifest number), and the certification and demonstration if applicable, required by the generator or the owner or operator under Rule 0400-12-01-.10(1)(g) or(h).

(n) Any records required under Rule 0400-12-01-.06(1)(b)9(xiii); and

(o) Certifications as required by Rule 0400-12-01-.06(10)(g)6, must be maintained in the operating record until closure of the facility.

2. Availability, Retention, and Disposition of Records

(a) All records, including plans, required by this permit must be furnished upon request, and made available at all reasonable times for inspection, by any officer, employee, or representative of the Department who is duly designated by the Commissioner.

(b) The retention period for all records required under this permit is extended automatically during the course of any unresolved enforcement action regarding the facility or as requested by the Commissioner or Board.

3. Annual Report

(a) The permittee must prepare and submit a single copy of an annual report to the Commissioner by March 1 of each year.

(b) Annual reports must be submitted on forms provided by the Department and in accordance with the instructions accompanying the form.

(c) The annual report must cover facility activities during the previous calendar year and must include the following information:

(i) The installation identification number, name, and address of the facility;

(ii) The calendar year covered by the report;

(iii) For off-site facilities, the installation identification number of each hazardous waste generator from which the facility received a hazardous waste during the year; for imported shipments, the report must give the name and address of the foreign generator;

(iv) A description and the quantity of each hazardous waste the facility received during the year. For off-site facilities, this information must be listed by installation identification number of each generator;

(v) The method of treatment, storage, or disposal for each hazardous waste;

(vii) For generators who treat, store, or dispose of hazardous waste on-site, a description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated;

(viii) For generators who treat, store, or dispose of hazardous waste on-site, a description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to

the extent such information is available for the years prior to 1984; and

(ix) The certification signed by the permittee or his authorized representative.

4. Unmanifested Waste Report: If a facility accepts for treatment, storage, or disposal any hazardous waste from an off-site source without an accompanying manifest, or without an accompanying shipping paper as described in Rule 0400-12-01-.04(3)(a)5, and if the waste is not excluded from the manifest requirement by Rule 0400-12-01-.02(1)(e), then the permittee must prepare and submit a letter to the Commissioner within fifteen days after receiving the waste. The unmanifested waste report must be submitted on EPA Form 8700-13B. Such report must be designated "Unmanifested Waste Report" and include the following information:

(a) The Installation Identification Number, name, and address of the facility;

(b) The date the facility received the waste;

(c) The Installation Identification Number, name, and address of the generator and the transporter, if available;

(d) A description and the quantity of each unmanifested hazardous waste the facility received;

(e) The method of treatment, storage, or disposal for each hazardous waste;

(f) The certification signed by the permittee or his authorized representative; and

(g) A brief explanation of why the waste was unmanifested, if known.

5. Additional Reports: In addition to submitting annual report and unmanifested waste reports required by Paragraphs II.K.3 and 4, the permittee must also report to the Commissioner:

(a) Releases, fires, and explosions as specified by Subparagraph II.I.7(i) and in Attachment 7, Contingency Plan;

(b) Certifications of closures as required by Paragraph II.L.7; and

(c) As otherwise required by this Section and Sections I, III and IV.

L. CLOSURE

1. Performance Standard:

   (a) The permittee must close the facility in a manner that:

      (i) Minimizes the need for further maintenance; and

      (ii) Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

      (iii) Complies with the closure requirements of Rule 0400-12-01-.06(7) and, as applicable, the requirements of Rules 0400-12-01-.06(9)(i), 0400-12-01-.06(10)(h), 0400-12-01-.06(11)(i), 0400-12-01-.06(12)(i), 0400-12-01-.06(13)(k), 0400-12-01-.06(14)(k), 0400-12-01-.06(15)(l), 0400-12-01-.06(16), 0400-12-01-.06(17), 0400-12-01-.06(27)(b) through 0400-12-01-.06(27)(d), and 0400-12-01-.06(33)(c).

   (b) The permittee must close the facility in accordance with the Closure Plan, in Attachment 11,

2. Amendment of Closure Plan: The permittee must submit a written notification of or request for a permit modification to authorize a change in operating plans, facility design, or the approved Closure Plan in accordance with the procedures in Rule 0400-12-01-.07(9). The written notification or request shall include four (4) paper copies and one electronic copy of the amended Closure Plan for review or approval by the Commissioner.

   (a) The permittee may submit a written notification or request to the Commissioner for a permit modification to amend the Closure Plan at any time prior to the notification of partial or final closure of the facility.

   (b) The permittee must submit a written notification of or request for a permit modification to authorize a change in the approved Closure Plan whenever:

      (i) Changes in operating plans or facility design affect the Closure Plan.

      (ii) There is a change in the expected year of closure, if applicable.

      (iii) In conducting partial or final closure activities, unexpected events require a modification of the approved Closure Plan.

(iv) The permittee requests the Commissioner to apply alternative requirements to a regulated unit under Rule 0400-12-01-.06(6)(a)6, (7)(a)3, and/or (8)(a)4.

(c) The permittee must submit a written request for a permit modification including at least four (4) copies of the amended Closure Plan for approval at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred which has affected the Closure Plan. If an unexpected event occurs during the partial or final closure period, the permittee must request a permit modification no later than 30 days after the unexpected event. The Commissioner will approve, disapprove, or modify this amended plan in accordance with the procedures in Rule 0400-12-01-.07. In accordance with Rule 0400-12-01-.07(8)(b), the approved Closure Plan will become a condition of any permit issued.

(d) The Commissioner may request modification to the plan under the conditions described in Subparagraph II.L.2(b). The permittee must submit the modified plan within 60 calendar days of the Commissioner's request, or within 30 calendar days if the change in facility conditions occurs during partial or final closure. Any modifications requested by the Commissioner will be approved in accordance with the procedures in Rule 0400-12-01-.07.

3. Notification of Partial and Final Closure

(a) The permittee must notify the Commissioner in writing at least 45 calendar days prior to the date on which he expects to begin final closure of the facility;

(b) The date when the permittee "expects to begin closure" must be no later than 30 calendar days after the date on which any hazardous waste management unit receives the known final volume of hazardous waste, or if there is a reasonable possibility that the hazardous waste management unit will receive additional hazardous waste, no later than one year after the date on which the unit received the most recent volume of hazardous wastes. If the permittee can demonstrate to the Commissioner that the hazardous waste management unit or facility has the capacity to receive additional hazardous wastes and he has taken all steps to prevent threats to human health and the environment, including compliance with all applicable permit requirements, the Commissioner may approve an extension to this one-year limit; or

(c) If the facility's permit is terminated, or if the facility is otherwise ordered, by judicial decree or final order under the Act, to cease receiving hazardous wastes or to close, then the requirements of this part do not apply. However,

the permittee must close the facility in accordance with the deadlines established in Paragraph II.L.5.

4. Removal of Wastes and Decontamination or Dismantling of Equipment: Nothing in this Subsection (II.L) shall preclude the permittee from removing hazardous wastes and decontaminating or dismantling equipment in accordance with the approved partial or final Closure Plan at any time before or after notification of partial or final closure.

5. Time Allowed for Closure

(a) Within 90 calendar days after receiving the final volume of hazardous wastes at a hazardous waste management unit or facility, the permittee must treat or remove from the unit or facility all hazardous waste in accordance with the approved Closure Plan. The Commissioner may approve a longer period if the permittee complies with all applicable requirements for requesting a modification to the permit and demonstrates that:

(i) The activities required to comply with Subparagraph II.L.5(a) will, of necessity, take longer than 90 calendar days to complete; or

(I) The hazardous waste management unit or facility has the capacity to receive additional hazardous wastes; and

(II) There is a reasonable likelihood that the permittee or another person will recommence operation of the hazardous waste management unit or the facility within one year; and

(III) Closure of the hazardous waste management unit or facility would be incompatible with continued operation of the site; and

(ii) The permittee has taken and will continue to take all steps to prevent threats to human health and the environment, including compliance with all applicable permit requirements.

(b) The permittee must complete partial and final closure activities in accordance with the approved Closure Plan, Attachment 11, and within 180 calendar days after receiving the final volume of hazardous wastes at the hazardous waste management unit or facility. The Commissioner may approve an extension to the closure period if the permittee complies with all applicable requirements for requesting a modification to the permit and demonstrates that:

(i) The partial or final closure activities will, of necessity, take longer than 180 calendar days to complete; or

(I) The hazardous waste management unit or facility has the capacity to receive additional hazardous wastes; and

(II) There is a reasonable likelihood that the permittee or another person will recommence operation of the hazardous waste management unit or the facility within one year; and

(III) Closure of the hazardous waste management unit or facility would be incompatible with continued operation of the site; and

(ii) The permittee has taken and will continue to take all steps to prevent threats to human health and the environment from the unclosed but not operating hazardous waste management unit or facility, including compliance with all applicable permit requirements.

(c) The demonstrations referred to in Parts II.L.5(a)(i) and (b)(i) must be made as follows:

(i) The demonstration in Part II.L.5(a)(i) must be made at least 30 calendar days prior to the expiration of the 90-day period in Subparagraph II.L.5(a); and

(ii) The demonstration in Part II.L.5(b)(i) must be made at least 30 calendar days prior to the expiration of the 180-day period in Subparagraph II.L.5(b).

6. Disposal or Decontamination of Equipment, Structures, and Soils: During the partial and final closure periods, all contaminated equipment, structures, and soils must be properly disposed of or decontaminated unless otherwise specified in the approved Closure Plan. By removing any hazardous waste or hazardous constituents during partial or final closure, the permittee may become a generator of hazardous waste and must handle that hazardous waste in accordance with all applicable requirements of Rule 0400-12-01-.03.

7. Certification of Closure: Within 60 calendar days of completion of closure of each hazardous waste management unit and within 60 calendar days of the completion of final closure, the permittee must submit to the Commissioner, by registered mail, four (4) copies of the certification that the hazardous waste management unit or facility, as applicable, has been closed in accordance with the specifications in the approved Closure Plan. The certification must be signed by the permittee and by a qualified Registered Professional Engineer as defined in Rule 0400-12-01-.01(2)(a). Documentation supporting the qualified Registered Professional Engineer's certification must be furnished to the Commissioner upon request until he releases the permittee from the financial assurance requirements for closure under Subsection II.M..

M. FINANCIAL REQUIREMENTS

The requirements of this subsection apply to owners and operators of this facility.

1. Cost Estimate for Closure: The permittee must have a detailed written estimate, in current dollars, of the cost of closing the facility, in accordance with the requirements of Subsection II.L and Rule 0400-12-01-.06(8).

   (a) The closure cost estimate must equal the cost of final closure at the point in the facility's active life when the extent and manner of its operation would make closure the most expensive, as indicated in the Closure Plan, Attachment 11; and

   (b) The closure cost estimate must be based on the costs to the permittee of hiring a third party to close the facility. A third party is a party who is neither a parent nor a subsidiary of the permittee;

   (c) The closure cost estimate may not incorporate any salvage value that may be realized with the sale of hazardous waste, facility structures or equipment, land, or other assets associated with the facility at the time of partial or final closure.

   (d) The permittee may not incorporate a zero cost for hazardous wastes that might have economic value.

2. Closure Cost Adjustments:

   (a) During the active life of the facility, the permittee must adjust the closure cost estimate for inflation within 60 calendar days prior to the anniversary date of the establishment of the financial instrument(s) used to comply with Paragraph II.M.5. If the permittee is using the financial test or corporate guarantee, the closure cost estimate must be updated for inflation within 30 calendar days after the close of the firm's fiscal year and before submission of updated information to the Division Director, as specified in Rule 0400-12-01-.06(8)(g)8(v). The adjustment may be made by recalculating the maximum costs of closure in current dollars, or by using an inflation factor derived from the most recent Implicit Price Deflator for Gross National Product published by the U.S. Department of Commerce in its Survey of Current Business, as specified in Parts II.M.2(a)(i) and (ii). The inflation factor is the result of dividing the latest published annual Deflator by the Deflator for the previous year.

      (i) The first adjustment is made by multiplying the closure cost estimate by the inflation factor. The result is the adjusted closure cost estimate.

(ii) Subsequent adjustments are made by multiplying the latest adjusted closure cost estimate by the latest inflation factor.

(b) During the active life of the facility, the permittee must revise the closure cost estimate no later than 30 calendar days after the Commissioner has approved the request to modify the Closure Plan if the change in the Closure Plan increases the cost of closure. The revised closure cost estimate must be adjusted for inflation as specified in Subparagraph II.M.2(a).

3. Maintenance of the Closure Cost Estimate: The permittee must keep the following at the facility during the operating life of the facility: The latest closure cost estimate prepared in accordance with Paragraph II.M.1 and Subparagraph II.M.2(b) and, when this estimate has been adjusted in accordance with Subparagraph II.M.2(a), the latest adjusted closure cost estimate. Such cost estimates must be itemized and address all closure activities.

4. Submission of the Revised Closure Cost Estimate: Within 30 calendar days of the date the closure cost estimate is revised, the permittee must submit the latest closure cost estimate to the Commissioner.

5. Financial Assurance for Closure: The permittee must file and maintain with the Division Director financial assurance for closure of the facility in accordance with the requirements of Rule 0400-12-01-.06(8)(d).

(a) The permittee must choose from the financial assurance mechanisms as specified in Rule 0400-12-01-.06(8)(g).

(b) The permittee must file and maintain financial assurance in an amount at least equal to the current closure cost estimate.

(i) Whenever the closure cost estimate increases to an amount greater than the amount of financial assurance currently filed with the Division Director, the permittee must, within 60 calendar days after the increase, file additional financial assurance at least equal to this increase.

(ii) Whenever the current closure cost estimate decreases, and upon the written request of the permittee, the Division Director shall, provided he or she validates the decrease, reduce the amount of financial assurance required for the facility to the amount of the current closure cost estimate. Upon such occurrence, the Division Director shall, as appropriate considering the financial assurance mechanism(s) on file, either cause to be released to the permittee cash or collateral equal to this reduction or allow the permittee to substitute for the mechanism(s) on file a new mechanism(s) in the reduced amount.

(c) For new facilities, financial assurance must be filed with the Commissioner and must be effective before the date on which hazardous waste is first received for treatment, storage, or disposal.

(d) The financial assurance must be maintained until the Commissioner or Board releases the permittee from the requirements of this Paragraph (II.M.5), as specified in Subparagraph II.M.5(d), or until the Commissioner or Board orders forfeiture of the financial assurance, as provided in Subparagraph II.M.5(e) below.

(i) Within 60 calendar days after receiving certifications from the permittee and a qualified Professional Engineer that final closure has been accomplished in accordance with the approved closure plan, Attachment 11, the Division Director will notify the permittee in writing that he is no longer required by Paragraph II.M.5 to maintain financial assurance for final closure of the particular facility, unless the Commissioner or Board has reason to believe that final closure has not been in accordance with the approved closure plan, Attachment 11. The Commissioner shall provide the permittee a detailed written statement of any such reason to believe that closure has not been in accordance with the approved closure plan.

(ii) Financial assurance will normally be released in the form(s) it was submitted. However, where such release involves an amount equal to only a portion of the funds assured by a financial assurance mechanism [see Rule 0400-12-01-.06(8)(i) and (j)], the Commissioner shall, as appropriate considering the type of mechanism involved, either cause to be released to the permittee cash or collateral equal to that amount or allow the permittee to substitute for the mechanism on file a new mechanism(s) reduced by that amount.

(e) The Commissioner or Board may order that any financial assurance filed by the permittee pursuant to this Paragraph (II.M.5) be forfeited to the State if the Commissioner or Board determines that the permittee has failed to perform final closure in accordance with the approved closure plan-Attachment 10 when required to do so. Any such forfeiture action shall follow the procedures provided in Paragraph II.M.7 below .

6. Alternate Financial Assurance: The permittee may substitute alternate financial assurance meeting the requirements of Paragraph II.M.5 above for the financial assurance already filed with the Division Director. However, the existing financial assurance shall not be released by the Commissioner until the substitute financial assurance has been received and approved by him or her.

7. Procedures for Forfeiture of Financial Assurance:

(a) Upon his or her determination that the permittee has failed to perform final closure in accordance with the approved Closure Plan-when require to do so, the Division Director shall cause a notice of non-compliance to be served upon the permittee. Such notice shall be hand delivered or forwarded by certified mail. The notice of noncompliance shall specify in what respects the permittee has failed to perform as required and shall establish a schedule of compliance leading to compliance with the plan and other permit requirements as soon as possible.

(b) If the Division Director determines that the permittee has failed to perform as specified in the notice of non-compliance or as specified in any subsequent compliance agreement which may have been reached by the permittee and the Division Director, the Division Director shall cause a notice of show cause meeting to be served upon the permittee. Such notice shall be signed by the Division Director and either hand-delivered or forwarded by certified mail to the permittee. The notice of show cause meeting shall establish the date, time, and location of a meeting scheduled to provide the permittee with the opportunity to show cause why the Division Director should not pursue forfeiture of the financial assurance filed to guarantee such performance.

(c) If no mutual compliance agreement is reached at the show cause meeting, or upon the Division Director's determination that the permittee has failed to perform as specified in such agreement that was reached, the Division Director shall request the Commissioner to order forfeiture of the financial assurance filed to guarantee such performance.

(d) The Commissioner shall order forfeiture of the financial assurance upon his or her validation of the Division Director's determinations and upon his or her determination that the procedures of Subparagraphs II.M.7(a), (b), and (c) above have been followed. The Commissioner may however, at his or her discretion, provide opportunity for the permittee to be heard before issuing such order. Upon issuance, a copy of the order shall be hand delivered or forwarded by certified mail to the permittee. Any such order issued by the Commissioner shall become effective 30 calendar days after receipt by the permittee, unless it is appealed to the Board as provided in T.C.A. § 68-212-113.

(e) If necessary, upon the effective date of the order of forfeiture, the Commissioner shall give notice to the State Attorney General, who shall collect the forfeiture.

(f) All forfeited funds shall be deposited in a special account within the Tennessee Environmental Protection Fund for use by the Commissioner as set forth in T.C.A. § 68-212-108(c)(6) and T.C.A. §68-203-101 et seq.

8. Liability Requirements: The permittee must demonstrate financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility or group of facilities, in accordance with the requirements of Rule 0400-12-01-.06(8)(n).

9. Incapacity of the Permittee, Guarantors, or Financial Institutions

(a) The permittee must notify the Division Director by certified mail of the commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code, naming the permittee (owner or operator) as debtor, within 10 calendar days after commencement of the proceeding. A guarantor of a corporate guarantee as specified in Rule 0400-12-01-.06(8)(g)8 must make such a notification if he is named as debtor, as required under the terms of the corporate guarantee (Rule 0400-12-01-.06(8)(p)8).

(b) The permittee who fulfills the requirements of Paragraph II.M.5 or 8 by obtaining a trust fund, surety bond, letter of credit, or insurance policy will be deemed to be without the required financial assurance or liability coverage in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution to act as trustee or of the institution issuing the surety bond, letter of credit, or insurance policy to issue such instruments. The permittee must establish other financial assurance or liability coverage within 60 calendar days after such an event.

N. CO-MANAGEMENT OF OTHER MATERIALS

The permittee must not treat, store, or dispose of other wastes or other materials along with hazardous waste in any hazardous waste management unit subject to the requirements of this permit unless:

1. The other waste or other material is labeled, marked, or otherwise clearly identifiable as to what it is;

2. The permittee is able to demonstrate that the other waste or other material is not a hazardous waste; and

3. The other waste or other material is managed in a manner that does not adversely impact compliance with the conditions of this permit.

O. LAND DISPOSAL RESTRICTIONS

1. Applicability

   (a) Land Disposal Restrictions (LDR): Rule 0400-12-01-.10 identifies hazardous wastes that are prohibited from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be land disposed. The permittee shall comply with all applicable requirements of Rule 0400-12-01-.10. Where the permittee has applied for an extension, exemption, waiver or variance under Rule 0400-12-01-.10, the permittee shall comply with all applicable restrictions of Rule 0400-12-01-.10, pending final approval of such application.

   (b) Dilution as a Substitute for treatment: Except as provided in Rule 0400-12-01-.10(1)(c)2, the Permittee shall not in any way dilute a restricted waste or the residual from the treatment of a restricted waste as a substitute for adequate treatment to achieve compliance with Rule 0400-12-01-.10(3), to circumvent the effective date of a prohibition in Rule 0400-12-01-.10(2), to otherwise avoid a prohibition in Rule 0400-12-01-.10(2), or to circumvent a land disposal prohibition imposed by T.C.A. § 68-212-107(d)9.

   (c) LDR testing, tracking, and recordkeeping: The Permittee shall comply with the requirements of Rule 0400-12-01-.10(1)(g).

   (d) Special Rules Regarding Wastes That Exhibit a Characteristic: The Permittee shall comply with the requirements of Rule 0400-12-01-.10(1)(i).

2. Treatment Standards: A restricted waste identified in Rule 0400-12-01-.10(2) may not be placed in a land disposal unit without further treatment unless the requirements of Rule 0400-12-01-.10(2) and/or Rule 0400-12-01-.10(3) are met.

3. Prohibitions: The storage of hazardous waste restricted from land disposal under Rule 0400-12-01-.10 is prohibited unless the requirements of Rule 0400-12-01-.10(4) are met.

P. AIR EMISSION STANDARDS FOR PROCESS VENTS (RESERVED)

1. Applicability

   (a) Rule 0400-12-01-.06(30) contains emission standards for process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, and air or steam stripping operations that manage hazardous wastes with organic concentrations of at least ten (10) parts per million by weight (ppmw). Rule 0400-12-01-.06(30) also contains standards for closed-vent systems and control devices.

2. Notification of Modifications, Additions, or New Units

(a) The Permittee does not currently operate and is not currently authorized under this Permit to operate any process vents, closed-vent systems, or control devices at the Facility that are subject to Rule 0400-12-01-.06(30).

(b) Prior to installing or operating any process vents, closed-vent systems, or control devices subject to Rule 0400-12-01-.06(30), or modifying any existing equipment, procedure, or process such that the process vents, closed-vent systems, or control devices will become subject to Rule 0400-12-01-.06(30), the Permittee shall apply for a permit modification under Rule 0400-12-01-.07(9)(c), provide specific Part B permit application information required under Rule 0400-12-01-.07(5), as applicable, with the modification request, and shall obtain a permit modification in accordance with Rule 0400-12-01-.07(9)(c).

Q. AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

1. Applicability

The permittee shall comply with the air emission standards for equipment leaks as set forth in Rule 0400-12-01-.06(31) for all equipment that contains or contacts hazardous wastes with organic concentrations of at least ten (10) percent by weight that are managed in units that are subject to this permit or in any on-site hazardous waste recycling unit.

The Permittee operates hazardous waste management units that manage hazardous organic waste in equipment that contains or contacts hazardous waste with organic concentrations of approximately 10 percent by weight, for greater than 300 hours per calendar year. Therefore, this equipment is subject to Rule 0400-12-01-.06(31) and the conditions that follow.

2. Notification of Modifications, Additions, or New Units

Prior to installing or operating any new unit or equipment subject to Rule 0400-12-01-.06(31), or modifying any existing unit, equipment, procedure, or process such that the unit(s) or equipment will become subject to Rule 0400-12-01-.06(31), the Permittee shall apply for a permit modification under Rule 0400-12-01-.07(9)(c), provide specific Part B application information required under Rule 0400-12-01-.07(5), as applicable, with the modification request, and shall obtain a permit modification in accordance with Rule 0400-12-01-.07(9)(c).

3. Marking and Tagging

(a) The Permittee shall maintain the most current equipment locations and identification list in the facility's operating record. Attachment 4 and

Attachment 9.4 of this Permit include the equipment identification list and unit locations as provided in the Permit.

(b) The Permittee shall ensure that all subject equipment is uniquely marked and tagged for the specific purposes of tracking, monitoring, inspecting, and repairing each piece of equipment in accordance with Rule 0400-12-001-.06(31)(a)4. The marking must be of a permanent nature, weatherproof, and regularly maintained to ensure it is clearly visible at all times of operation.

(c) The unique marking of the equipment shall correspond to, and be identified on, the current equipment locations and identification list maintained at the Facility and used to conduct all inspections and monitoring.

(d) Tags used to identify leaks and potential leaks must comply with all the applicable requirements of Rule 0400-12-01-.06(31)(o)3, including, but not limited to the following requirements: (a) the tags must include the equipment identification number; and (b) the tags must be red or some other readily visible bright color; and (c) the tags must be made of or coated in a material that is not degraded by the hazardous waste stream, or weather, including UV light.

4. Excluded Equipment

(a) Equipment that is in vacuum service is excluded from the requirements of Rule 0400-12-01-.06(31)(c) through (31)(k) and corresponding conditions of this Permit if it is identified as required by Rule 0400-12-01-.06(31)(o)7(v).

(b) Equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for less than 300 hours per calendar year is excluded from the requirements of Rule 0400-12-01-.06(31)(c) through (31)(k) and the corresponding conditions of this Permit if it is identified as required by Rule 0400-12-01-.06(31)(o)7(vi).

5. Equipment Standards

The permittee shall comply with the appropriate equipment standards of Rule 0400-12-01-.06(31), the conditions of this Permit, and the requirements of the LDAR Program.

(a) Standards: Pumps in Light Liquid Service

(i) Each pump in light liquid service shall be monitored monthly to detect leaks by the methods specified in Rule 0400-12-01-.06(31)(n)2, except any pump that is: (1) equipped with dual mechanical seal system satisfying the requirements of Rule 0400-

12-01-.06(31)(c)4, (2) designated, as described in Rule 0400-12-01-.06(31)(o)7(ii), for no detectable emissions, as indicated by an instrument reading of less than 500 parts per million (ppm) above background, and meeting the requirements of Rule 0400-12-01-.06(31)(c)5, or (3) equipped with a closed vent system complying with the requirements of Rule 0400-12-01-.06(31)(c)6.

(ii) Each pump in light service shall be checked by visual inspection each calendar week for indication of liquid dripping from pump seals.

(iii) A leak is detected if: (1) an instrument reading of 10,000 ppm or greater is measured, or (2) there is an indication of liquid dripping from the pump seal.

(iv) When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in Rule 0400-12-01-.06(31)(j). The first attempt at repair must be made no later than 5 calendar days after each leak is detected.

(b) Standards: Open-ended Valves or Lines

(i) Each open-ended valve or line shall be equipped with a cap, blind flange, plug, or second valve, which shall seal the open end at all times except during operations requiring hazardous waste stream flow through the open-ended valve or line.

(ii) Each open-ended valve or line equipped with a second valve shall be operated in a manner such that the valve on the hazardous waste stream end is closed before the second valve is closed.

(iii) When a double block and bleed system is used, the bleed valve or line may remain open during operations that require venting the line between the block valves but shall seal the open end at all other times.

(c) Standards: Valves in Gas/Vapor Service or in Light Liquid Service

(i) Each valve in gas/vapor or light liquid service shall be monitored monthly to detect leaks in accordance with Rules 0400-12-01-.06(31)(h)1 and 3, except as provided in Rules 0400-12-01-.06(31)(l) and 0400-12-01-.06(31)(m).

(ii) If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

(iii) When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after the leak is detected, except as provided in Rule 0400-12-01-.06(31)(j). The first attempt at repair must be made no later than 5 calendar days after each leak is detected and must include the best practices specified in Rule 0400-12-01-.06(31)(h)5.

(iv) Only valves in light liquid service can be designated difficult or unsafe to monitor pursuant to Rule 0400-12-01-.06(31)(h)7 or 8. The permittee shall not designate any other components subject to the Rule 0400-12-01-.06(31) regulations as difficult or unsafe to monitor.

(d) Standards: Pumps and Valves in Heavy Liquid Service, Pressure Relief Devices in Light Liquid or Heavy Liquid Service, and Flanges and Other Connectors

(i) Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, and flanges and other connectors must be monitored within five days by the method specified in Rule 0400-12-01-.06(31)(n)2 if evidence of a potential leak is found by visual, audible, olfactory, or any other detection method.

(ii) If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

(iii) When a leak is detected, the permittee must repair the leak as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in 0400-12-01-.06(31)(j). The first attempt at repair shall be made no later than five calendar days after each leak is detected.

(iv) First attempts at repair include, but are not limited to, the best practices described under Rule 0400-12-01-.06(31)(h)5.

e) Standards: Delay of Repair

Delays of repair shall be in accordance with the requirements of Rule 0400-12-01-.06(31)(j). A written description of the circumstances associated with the delay of repair addressing the requirements of Rule 0400-12-01-.06(31)(j) shall be maintained in the Facility's operating record.

(i) Delay of repair of equipment for which leaks have been detected will be allowed if: (1) the repair is technically infeasible without a hazardous waste management unit shutdown (in such case, repair of

this equipment shall occur before the end of the next hazardous waste management unit shutdown); or (2) the equipment is isolated from the hazardous waste management unit and does not continue to contain or contact hazardous waste with organic concentrations at least 10% by weight.

(ii) Delay of repair for valves will be allowed if: (1) emissions of purged material resulting from immediate repair are greater than the emissions likely to result from delay of repair; and (2) when repair procedures are affected, the purged material is collected and destroyed or recovered in a control device complying with Rule 0400-12-01-.06(31)(k).

(iii) Delay of repair for pumps will be allowed if: (1) repair requires the use of a dual mechanical seal system that includes a barrier fluid system; and (2) repair is completed as soon as practicable, but not later than six months after the leak was detected.

(iv) Delay of repair beyond a hazardous waste management unit shutdown will be allowed for a valve only if it meets the provisions of Rule 0400-12-01-.06(31)(j)5.

(f) Standards: Closed-Vent Systems and Control Devices

Closed-vent systems and control devices that are subject to the provisions of Rule 0400-12-01-.06(31) shall comply with the provisions of Rule 0400-12-01-.06(30)(d) and (31)(k).

(i) A control device involving vapor recover (e.g., a condenser or adsorber) shall be designed and operated to recover the organic vapors vented to it with an efficiency of 95 weight percent or greater.

(ii) The permittee shall ensure proper operation and maintenance of the control device by installing, calibrating, maintaining, and operating according to the manufacturer's specification a flow indicator that provides a record of vent stream flow from each affected process vent to the control device at least once every hour. The flow indicator sensor shall be installed in the vent stream at the nearest feasible point to the control device inlet but before the point at which the vent streams are combined.

(iii) The permittee shall inspect the readings from each monitoring device at least once each operating day to check control device operation and, if necessary, immediately implement the corrective measures necessary to ensure the control device operates in compliance with the requirements of Rule 0400-12-01-.06(30)(d).

(iv) The permittee using a carbon adsorption system that does not regenerate the carbon bed directly onsite in the control device shall replace the existing carbon in the control device with fresh carbon on a regular basis by monitoring the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system on a regular schedule, and replace the existing carbon with fresh carbon immediately when carbon break through is indicated. The monitoring frequency shall be daily or at an interval no greater than 20 percent of the time required to consume the total carbon working capacity established as a requirement of Rule 0400-12-01-.06(30)(f)2(iv)(III)VII, whichever is longer.

(v) A closed-vent system shall be designed to operate with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background as determined by the procedure in Rule 0400-12-01-.06(30)(e)2, and by visual inspections.

(vi) The permittee shall monitor and inspect each closed-vent system required to comply with Rule 0400-12-01-.06(30)(d) to ensure proper operation and maintenance of the closed-vent system by implementing the following requirements:

(I) The permittee shall monitor the closed-vent system components and connections using the procedures in Rule 0400-12-01-.06(30)(e)2 to demonstrate that the closed-vent system operates with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background.

(II) After initial leak detection monitoring required in Rule 0400-12-01-.06(30)(d)12(i)(I), the permittee shall inspect and monitor the closed-vent system yearly to check for defects in closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed that could result in air pollutant emissions. The permittee shall monitor a component or connection using the procedures specified in Rule 0400-12-01-.06(30)(e)2 to demonstrate that it operates with no detectable emissions following any time the component is repaired, or replaced, or the connection is unsealed.

(III) The permittee shall maintain a record of the inspection and monitoring in accordance with the requirements of Rule 0400-12-01-.06(30)(f).

(vii) In the event that a defect or leak is detected, the permittee shall repair the defect or leak in accordance with Rule 0400-12-01-.06(30)(d)12(iii);

(ix) Closed-vent systems and control devices used to comply with provisions of Rule 0400-12-01-.06(30) shall be operated at all times when emissions may be vented to them.

(x) The permittee shall document that all carbon removed from the control device that is hazardous waste is managed, regardless of the average volatile organic concentration of the carbon, in a manner pursuant to Rule 0400-12-01-.06(30)(d)14.

(g) Alternative Standards for Valves in Gas/Vapor Service or in Light Liquid Service: Percentage of Valves Allowed to Leak

(i) The permittee subject to Rule 0400-12-01-.06(31)(h) within a hazardous waste management unit comply with an alternative standard that allows no greater than two percent of the valves to leak. If the permittee elects to comply with this alternative standard, he must comply with the provisions of Rule 0400-12-01-.06(31)(l)2 and 3. If the permittee decides to discontinue the election of the alternative standards, he must comply with the work practice standards in Rule 0400-12-01-.06(31)(h) and must notify the Director in writing that he will comply with the standards described in Rule 0400-12-01-.06(31)(h)1 through 5.

(h) Alternative Standards for Valves in Gas/Vapor Service or in Light Liquid Service: Skip Period Leak Detection and Repair

The permittee may elect for all valves subject to the requirements of Rule 0400-12-01-.06(31)(h) within a hazardous waste management unit to comply with one of the alternative work practices specified below.

(i) After two consecutive quarterly leak detection periods with the percentage of valves leaking equal to or less than two percent, the permittee may begin to skip one of the quarterly leak detection periods for the valves subject to the requirements in Rule 0400-12-01-.06(31)(h).

(ii) After five consecutive quarterly leak detection periods with the percentage of valves leaking equal to or less than two percent, the permittee may begin to skip three of the quarterly leak detection periods for the valves subject to the requirements of in Rule 0400-12-01-.06(31)(h).

(iii) If the percentage of valves leaking is greater than two percent, the permittee shall monitor monthly in compliance with the requirements in Rule 0400-12-01-.06(31)(h) but may again elect to use Rule 0400-12-01-.06(31)(m) after meeting the requirements of Rule 0400-12-01-.06(31)(h)3(i).

6. Test Methods and Procedures

(a) The Permittee shall comply with the leak detection test methods and procedures of Rule 0400-12-01-.06(31)(n) for all equipment subject to Rule 0400-12-01-.06(31).

(b) All testing, monitoring and confirmatory sampling must be conducted during times of operation by persons trained in the proper implementation of the test methods and procedures required by Rule 0400-12-01-.06(31)(n), including, but not limited to, Method 21.

7. Recordkeeping and Reporting Requirements

The permittee must comply with the recordkeeping and reporting requirements of Rule 0400-12-01-.06(31)(o) and(p).

8. Equipment Maintenance and Installation of Temporary Equipment

(a) Temporary equipment installed during maintenance or repair activities, including preventative maintenance activities, shall be noted in the daily inspection log in the facility's operating record. The notation shall include the date the maintenance or repair began, the date the maintenance or repair is expected to be completed, the equipment identification numbers replaced during the maintenance or repair activity, and a brief statement describing the installation and use of the temporary equipment.

(b) All temporary equipment shall be designed and equipped to: ensure it will fulfill its intended functions without failure or release; perform equivalently to the equipment it is temporarily replacing, to prevent performance upsets, releases of hazardous waste, fire or explosion; not jeopardize the safety of personnel, surrounding equipment, or the environment; be compatible with the waste; and withstand environmental conditions at the facility.

(c) Temporary equipment shall be utilized on a temporary basis and shall not be used as a permanent part of the hazardous waste management unit or system and shall not be considered a completed repair. Temporary equipment shall not remain in use longer than the timeframe allowed in the leak repair standard for the original equipment type unless the standards Rule 0400-12-01-.06(31)(j) have been met.

(d) The permittee must monitor and repair equipment as described in Subsection 9.G of Attachment 9, document such efforts on the "Subpart BB Leak Detection Monitoring Log" and "Subpart BB Equipment Repair

Log " forms included in Attachment 9.5, and retain the completed Logs as part of the Facility's Operating Record for a period of at least three years."

R. AIR EMISSION STANDARDS FOR TANKS AND CONTAINERS

1. The Permittee shall comply with the air emissions standards of Rule 0400-12-01-.06(32) for hazardous waste tanks and containers that contact hazardous waste containing an average volatile organic concentration greater than 500 ppmw at the point of waste origination, as determined by the procedures outlined in Rule 0400-12-01-.06(32)(d), except as excluded by Rule 0400-12-01.06(32)(a)2 or specifically exempted by Rule 0400-12-01-.06(32)(d)3.

   (a) The Permittee currently operates and is authorized under this Permit to operate tanks and containers that are subject to Rule 0400-12-01-.06(32).

   (b) The Permittee operates hazardous waste management units which contact hazardous waste containing an average volatile organic concentration greater than 500 ppmw and are therefore subject to Rule 0400-12-01-.06(32). The requirements of Rule 0400-12-01-.06(32) apply to the hazardous waste management units, as well as their covers, closure devices, and control devices.

2. Notification of New Modifications, Additions, or New Units

   Prior to installing or operating a tank, container, surface impoundment, miscellaneous unit, closed vent system, or control device subject to Rule 0400-12-01-.06(32), or modifying any existing unit, procedure, or process such that the unit(s) will become subject to Rule 0400-12-01-.06(32), the Permittee shall apply for a permit modification under Rule 0400-12-01-.07(9)(c), provide specific Part B application information required under Rule 0400-12-01-.07(5), as applicable, with the modification request, and shall obtain a permit modification in accordance with Rule 0400-12-01-.07(9)(c).

3. Excluded Units

   The requirements of Rule 0400-12-01-.06(32) do not apply to the following waste management units at the facility:

   (a) Pursuant to Rule 0400-12-01-.06(32)(a)2(ii), containers with a design capacity of less than or equal to 0.1 m^3 are excluded from the requirements of Rule 0400-12-01-.06(32).

   (b) Pursuant to Rule 0400-12-01-.06(32)(a)2(iii) and (iv), tanks and surface, impoundments, respectively, in which the Permittee has stopped adding hazardous waste and has begun implementing an approved closure plan are excluded from the requirements of Rule 0400-12-01-.06(32).

(c) Pursuant to Rule 0400-12-01-.06(32)(a)2(v), waste management units that are used solely for the on-site treatment or storage of hazardous waste that is placed in the unit as a result of implementing remedial activities required under the corrective action authorities of T.C.A §§ 68-212-108(I), 68-212-111 or 68-212-201 et seq RCRA Section 3004(u) or (v), or CERLCA authorities, or similar State or Federal corrective action authorities., are excluded from the requirements of Rule 0400-12-01-.06(32).

(d) Pursuant to Rule 0400-12-01-.06(32)(a)2(vi), waste management units that are used solely for the management of radioactive mixed waste in accordance with the applicable regulations under the Atomic Energy Act and the Nuclear Waste Policy Act are excluded from the requirements of Rule 0400-12-01-.06(32).

(e) Pursuant to Rule 0400-12-01-.06(32)(a)2(vii), the Permittee must have installed organic air emissions controls which adequately control organic air emissions at all times that the hazardous waste management unit is in operation. Hazardous waste management units that the Permittee has certified are equipped with operating air emission controls in accordance with the requirements of an applicable Clean Air Act (CAA) regulation under 40 C.F.R Parts 60, 61 or 63, are excluded from the requirements of Rule 0400-12-01-.06(32). For the purpose of complying with this subparagraph, a tank for which the air emission control includes an enclosure, as opposed to a cover, must be in compliance with the enclosure and control device requirements of Rule 0400-12-01-.06(32)(e)9, except as provided in Rule 0400-12-01-.06(32)(c)3(v).

(f) Pursuant to Rule 0400-12-01-.06(32)(a)2(viii), tanks with a process vent, as defined in Rule 0400-12-01-.06(30)(b), are excluded from the requirements of Rule 0400-12-01-.06(32).

(g) The Permittee currently does not have any hazardous waste management units which are excluded from the Rule 0400-12-01-.06(32) standards.

4. Air Pollutant Exemption from Tank

(a) The Permittee currently operates two hazardous waste tank systems identified as F1 and F2 that are exempted from the Rule 0400-12-01-.06(32)(e) through (h) standards by Rule 0400-12-01-.06(32)(c)3.

(b) Pursuant to Rule 0400-12-01-.06(32)(c)3, hazardous wastes treated in the Mix Tank shall have an average volatile organic concentration at the point of waste origination of less than 500 ppm by weight. The determination will be reviewed and updated, as necessary, at least once every 12 months following the date of the initial determination for the hazardous waste streams entering the unit.

5. Waste Determination Procedures

(a) The Permittee must follow the waste determination procedures of Rule 0400-12-01-.06(32)(d) and Attachment 2, Waste Analysis Plan, of the Permit.

(b) The Permittee must conduct an annual re-characterization of the hazardous waste managed at the Facility at least once every 12 months pursuant to Attachment 2, Waste Analysis Plan, of the Permit.

6. Standards: Tanks

The permittee is permitted to store and treat hazardous wastes in Tank F1 and F2. The tanks must comply with Level 1 tank standards of Rule 0400-12-01-.06(32)(e)3.

(a) The maximum organic vapor pressure, as determined by Rule 0400-12-01-.06(32)(d)3(ii), must be less than 76.6 kPa (11.1 psi) for each tank mentioned above.

(b) The hazardous waste in the tank cannot be heated to a temperature that is greater than the temperature at which the maximum organic vapor pressure is determined under Rule 0400-12-01-.06(32)(d).

(c) The hazardous waste in the tanks must not be treated by the permittee using a waste stabilization process, as defined in Rule 0400-12-01-.05(29)(b).

(d) Whenever a hazardous waste is in a tank, the fixed roof must be installed with each closure device (e.g., manholes, instruments connections, pipe nozzles) secured in the closed position except for routine inspections, maintenance, and other activities needed for normal operations.

(e) The permittee must inspect the tanks, and all covers and closure devices, at least once per year, or retest the tanks to ascertain that the air emissions from the tank systems comply with the design and with the requirements specified in Rule 0400-12-01-.06(32)(e)3(iv). All inspection and monitoring activities must be conducted at times when the unit is in operation, and by qualified persons with the appropriate training.

(f) The permittee shall transfer hazardous waste to a tank subject to Rule 0400-12-01-.06(32)(e) in accordance with the requirements of Rule 0400-12-01-.06(32)(e)10, including the use of continuous hard piping.

(g) The permittee shall repair each defect detected during inspection performed in accordance with Rule 0400-12-01-.06(32)(e)11 and 0400-12-01-.06(32)(e)3(iv)

(h) In the event that the Permittee has designated a cover as unsafe to inspect or monitor, the conditions of Rule 0400-12-01-.06(32)(e)12 must be met. Only covers subject to the Rule 0400-12-01-.06(32)requirements can be designated as unsafe to monitor. No other components subject Rule 0400-12-01-.06(32) regulations can be designated unsafe to monitor. "Unsafe to inspect and monitor covers" include covers under extreme pressure or heat or other circumstances where monitoring personnel would be exposed to an immediate danger. "

7. Standards: Containers

The permittee is permitted to operate three container storage areas: the Outside Hazardous Waste Container Management Area (OHWCMA) and Areas A and B inside the Hazardous Waste Management (HWM) Building. The permitted capacity of the container storage areas must comply with the standards set forth in Rule 0400-12-01-.06(32)(g).

(a) Container Level 1 Standards

The permittee must manage the containers with a design capacity greater than 0.1 m^3 (26 gallons) and less than or equal to 0.46 m^3 (119 gallons), and the containers with a design capacity greater than 0.46 m^3 (119 gallons) that are not in light material service, as defined in Rule 0400-12-01-.06(32)(g)3. When storing hazardous waste in Level 1 containers, the permittee must comply with the following requirements:

(i) A Level 1 container must satisfy one of the following requirements:

(I) A container that meets the applicable U.S. Department of Transportation (DOT) regulations on packaging hazardous materials for transportation as specified in Rule 0400-12-01-.06(g)6.

(II) A container equipped with a cover and closure devices that form a continuous barrier over the container opening such that when the cover and closure devices are secured in the closed position there are no visible holes, gaps, or other open spaces into the interior of the container. The cover may be a separate cover installed on the container (e.g., a lid on a drum or a suitably secured tarp on a rol-off box) or may be an integral part of the container structural design (e.g., a "portable tank" or bulk cargo container equipped with a

screw-type cap) in accordance with Rule 0400-12-01-.06(32)(g)3(i)(II).

(III) An open–top container in which an organic-vapor suppressing barrier is placed on or over the hazardous waste in the container such that no hazardous waste is exposed to the atmosphere as specified in Rule 0400-12-01-.06(32)(g)3(i)(III).

(ii) Containers, which do not meet DOT regulation specified in Rule 0400-12-01-.06(32)(g)6, shall be equipped with covers and closure devices, as applicable to the container, that are composed of suitable materials to minimize exposure of the hazardous waste to the atmosphere and to maintain the equipment integrity, for as long as the container is in service. Factors to be considered in selecting the materials of construction and designing the cover and closure devices shall include: organic vapor permeability, the effects of any contact with the hazardous waste or its vapor managed in the container; the effects of outdoor exposure of the closure device or cover material to wind, moisture, and sunlight; and the operating practices for which the container is intended to be used.

(iii) Whenever a hazardous waste is in a container using Container Level 1 controls, the permittee shall install all covers and closure devices for the container, as applicable to the container, and secure and maintain each closure device in the closed position except if it meets the purpose of and operates as defined in Rule 0400-12-01-.06(32)(g)3(iii)(I) through (V).

(iv) The permittee using Container Level 1 controls shall inspect the containers and their covers and closure devices in accordance with Rule 0400-12-01-.06(32)(g)3(iv)(I) and (II) and repair defects in accordance with Rule 0400-12-01-.06(32)(g)3(iv)(III).

(v) The permittee shall maintain at the facility a copy of the procedure used to determine that containers with capacity of 0.46 m^3 or greater, which do not meet applicable DOT regulations as specified in Rule 0400-12-01-.06(32)(g)3(v), are not managing hazardous waste in light material service.

(b) Container Level 2 standards

The permittee must manage the containers with a design capacity greater than 0.46 m^3 (119 gallons) that are in light material service, as defined in Rule 0400-12-01-.06(32)(b), with Container Level 2 standards as described

at Rule 0400-12-01-.06(32)(g)4. When storing hazardous waste in Level 2 containers, the permittee must comply with the following requirements:

(i) The permittee shall receive and handle a container complying with one of the following requirements as specified in Rule 0400-12-01-.06(32)(g)4(i):

(I) A container that meets the applicable DOT regulations on packaging hazardous materials for transportation as specified in Rule 0400-12-01-.06(32)(g)6.

(II) A container that operates with no detectable organic emissions as defined in Rule 0400-12-01-.06(32)(b) and determined in accordance with the procedure specified in Rule 0400-12-01-.06(32)(g)7.

(III) A container that has been demonstrated within the preceding 12 months to be vapor-tight by using 40 CFR Part 60, appendix A, Method 27 in accordance with the procedure specified in Rule 0400-12-01-.06(32)(g)8.

(ii) The permittee shall transfer hazardous waste in or out of a container using Container Level 2 controls shall be conducted in such a manner as to minimize exposure of the hazardous waste to the atmosphere, to the extent practical, as specified in Rule 0400-12-01-.06(32)(g)4(ii). When transferring hazardous waste in or out of a container, the permittee shall conduct such transferring activity by opening only the bung portion of the container. The permittee shall not open the entire top portion of the container to transfer hazardous waste into or out of a container at any time.

(iii) For the treatment activities in containers other than the prohibited waste stabilization process, the permittee shall comply with the requirements specified in the Section III, Container Management, and Attachment 8 of the permit.

(iv) Whenever a hazardous waste is in a container using Container Level 2 controls, the permittee shall install covers and closure devices for the container, and secure and maintain each closure device in the closed position except during filling and removal operations as specified in Rule 01400-12-01-.06(32)(g)4(iii).

(v) The permittee of containers using Container Level 2 controls shall inspect the containers and their covers and closure devices in accordance with Rule 0400-12-01-.06(32)(g)4(iv)(I) and (II). When a defect is detected for the container, cover, or closure devices, he

shall repair the defect in accordance with Rule 0400-12-01-.06(32)(g)4(iv)(III).

(c) Container Level 3 standards.

When a container with a design capacity greater than 0.1 m^3 (26 gallons) is used for treatment of a hazardous waste by a waste stabilization process, the permittee shall control air pollutant emissions from the container in accordance with the Container Level 3 standards as specified in Rule 0400-12-01-.06(32)(g)5 at those times during the waste stabilization process when the hazardous waste in the container is exposed to the atmosphere. When storing hazardous waste in Level 2 containers, the permittee must comply with the following requirements:

(i) A container using Container Level 3 controls is one of the following:

(I) A container that is vented directly through a closed-vent system to a control device in accordance with the requirements of Rule 0400-12-01-.06(32)(g)5(ii)(II).

(II) A container that is vented inside an enclosure which is exhausted through a closed-vent system to a control device in accordance with the requirements of Rule 0400-12-01-.06(32)(g)5(ii)(I) and 0400-12-01-.06(32)(g)5(ii)(II).

(ii) The permittee shall meet the following requirements, as applicable to the type of air emission control equipment selected by the owner or operator:

(I) The container enclosure shall be designed and operated in accordance with the criteria for a permanent total enclosure as specified in "Procedure T--Criteria for and Verification of a Permanent or Temporary Total Enclosure" under 40 CFR 52.741, appendix B. The enclosure may have permanent or temporary openings to allow worker access; passage of containers through the enclosure by conveyor or other mechanical means; entry of permanent mechanical or electrical equipment; or direct airflow into the enclosure. The permittee shall perform the verification procedure for the enclosure as specified in Section 5.0 to "Procedure T--Criteria for and Verification of a Permanent or Temporary Total Enclosure" initially when the enclosure is first installed and, thereafter, annually.

(II) The closed-vent system and control device shall be designed and operated in accordance with the requirements of Rule 0400-12-01-.06(32)(h).

(iii) Safety devices, as defined in Rule 0400-12-01-.05(29)(b), may be installed and operated as necessary on any container, enclosure, closed-vent system, or control devices used to comply with the requirements of Rule 0400-12-01-.06(32)(g)5(i).

(iv) The permittee using Container Level 3 controls in accordance with the provisions of Rule 0400-12-01-.06(32)(g)5 shall inspect and monitor the closed-vent systems and control devices as specified in Rule 0400-12-01-.06(32)(h).

(v) The permittee using Container Level 3 controls in accordance with the provisions of Rule 0400-12-01-.06(32)(g)5 shall prepare and maintain the records specified in Rule 0400-12-01-.06(32)(j)4.

(vi) Transfer of hazardous waste in or out of a container using Container Level 3 controls shall be conducted in such a manner as to minimize exposure of the hazardous waste to the atmosphere, to the extent practical, considering the physical properties of the hazardous waste and good engineering and safety practices for handling flammable, ignitable, explosive, reactive, or other hazardous materials. Examples of container loading procedures that the Department considers to meet the requirements of Rule 0400-12-01-.06(32)(g)5 include using any one of the following: A submerged-fill pipe or other submerged-fill method to load liquids into the container; a vapor-balancing system or a vapor-recovery system to collect and control the vapors displaced from the container during filling operation; or a fitted opening in the top of a container through which the hazardous waste is filled and subsequently purging the transfer line before removing it from the container opening.

8. Standards: Closed-Vent Systems and Control Devices

The emissions shall be controlled through complying with Rule 0400-12-01-.06(32)(h). The emission control shall consist of a closed-vent system and a carbon adsorption system functioning as the control device. The closed-vent system and carbon adsorption shall comply with the following requirements. The permittee does not currently operate closed-vent systems or control devices.

(a) The closed-vent system shall route the gases, vapors, and fumes emitted from the hazardous waste in the waste management unit to a control device that meets the requirements specified in Rule 0400-12-01-.06(32)(h).

(b) The closed-vent system and carbon adsorption system (used as a control device) shall comply with the requirements specified in Rule 0400-12-01-.06(32)(h). The closed-vent system shall comply with the requirements or Rule 0400-12-01-.06(30)(d)3.

(c) A control device designed and operated to reduce the total organic content of the inlet vapor stream vented to the control device by at least 95 percent by weight in accordance with Rule 0400-12-01-.06(32)(h)3(i)(I). The permittee shall demonstrate that a control device achieves the performance requirements of Rule 0400-12-01-.06(32)(h)3(i) as specified in Rule 400-12-01-.06(32)(h)3(v) and 3(vi).

(d) The permittee who elects to use a closed-vent system and control device to comply with the requirements of Rule 0400-12-01-.06(32)(h) shall comply with the following requirements:

(i) Periods of planned routine maintenance of the control device, during which the control device does not meet the specifications of Rule 0400-12-01-.06(32)(h)3(i)(I), 0400-12-01-.06(32)(h)3(i)(II), or 0400-12-01-.06(32)(h)3(i)(III) , as applicable, shall not exceed 240 hours. The permittee shall demonstrate compliance with the requirements by recording the information specified in Rule 0400-2-01-.06(32)(j)5(i)(V).

(ii) The specifications and requirements in Rule 0400-12-01-.06(32)(h)3(i)(I), 0400-12-01-.06(32)(h)3(i)(II), or 0400-12-01-.06(32)(h)3(i)(III) for control devices do not apply during periods of planned routine maintenance or during a control device system malfunction.

(iii) The permittee shall demonstrate compliance with the requirements of part (d)(i) above by recording the information specified in Rule 0400-12-01-.06(32)(j)5(i)(V).

(iv) The permittee shall correct control device system malfunctions as soon as practicable after their occurrence in order to minimize excess emissions of air pollutants.

(v) The permittee shall operate the closed-vent system such that gases, vapors, or fumes are not actively vented to the control device during periods of planned maintenance or control device system malfunction except in cases when it is necessary to vent the gases, vapors, and/or fumes to avoid an unsafe condition or to implement malfunction corrective actions or planned maintenance actions.

(e) The permittee shall operate and maintain the control device (carbon adsorption system) so that all carbon that is a hazardous waste and that is removed from the control device shall be managed in accordance with Rule 0400-12-01-.06(30)(d)14, regardless of the average volatile organic concentration of the carbon.

(f) The permittee shall demonstrate that the control device achieves the performance requirements of Rule 0400-12-01-.06(32)(h)3(i) by using either a performance test as specified in Rule 0400-12-01-.06(32)(h)3(v)(III), or a design analysis as specified in Rule 0400-12-01-.06(32)(h)3(v)(IV). For a performance test conducted to meet the requirements, the permittee shall use the test methods and procedures specified in Rule 0400-12-01-.06(30)(e)3(i) through 0400-12-01-.06(30)(e)3(iv). For a design analysis conducted to meet the requirements, the design analysis shall meet the requirements of Rule 0400-12-01-.06(30)(f)2(iv)(III).

(g) The permittee shall demonstrate that the carbon adsorption system achieves the performance requirements based on the total quantity of organics vented to the atmosphere from all carbon adsorption system equipment that is used for organic adsorption, organic desorption or carbon regeneration, organic recovery, and carbon disposal.

(h) The closed-vent system and control device shall be inspected and monitored by the permittee in accordance with the procedures specified in Rules 0400-12-01-.06(30)(d)6(ii) and 0400-12-01-.06(30)(d)23. The readings from each monitoring device required by Rule 0400-12-01-.06(30)(d)6(ii) shall be inspected at least once each operating day to check control device operation. Any necessary corrective measures shall be immediately implemented to ensure the control device is operated in compliance with the requirements of this permit.

9. Inspection and Monitoring Requirements

(a) The Permittee shall comply with the inspection and monitoring requirements of Rule 0400-12-01-.06(32)(i), this Permit, and Attachment 4 of the Permit;

(b) The permittee shall inspect and monitor air emission control equipment used to comply with Rule 0400-12-01-.06(32) in accordance with the applicable requirements specified in Rule 0400-12-01-.06(32)(e) through 0400-12-01-.06(32)(h). The permittee shall inspect and monitor air emission control equipment at least annually to ensure that there are no detectable emissions exceeding the permit and regulatory limits. Any covers designated as unsafe to inspect or monitor shall meet the requirements of Rule 0400-12-01-.06(32)(e)12 and/or Rule 0400-12-01-.06(32)(f)7;

(c) The permittee shall develop and implement a written plan and schedule to perform the inspections and monitoring required. The permittee shall incorporate this plan and schedule into the facility inspection plan required in Rule 0400-12-01-.06(2)(f). All inspections and monitoring must be conducted at times when the hazardous waste management unit or equipment is in operation, and by qualified persons with the appropriate training.

10. Recordkeeping Requirements

(a) Records demonstrating compliance with Rule 0400-12-01-.06(32), including any third party's records, shall be maintained in an accessible manner at the Facility or other appropriate location approved by the Regional Administrator, for a period of not less than three years. All records necessary for demonstrating compliance shall include, at a minimum, the required recordkeeping information in Rule 0400-12-01-.06(32)(j) and this Permit.

(b) These records shall include but are not limited to the (1) current list of regulated hazardous waste management units and their unique identification number, covers, closure and control devices and their physical location at the Facility as illustrated on a P&ID and/or Facility Map; (2) all associated operating information, specifications, and standards for each hazardous waste management unit; (3) annual waste determinations; (4) all maintenance, inspection, leak detection and repair records associated with each hazardous waste management unit; and (5) training documentation for persons conducting inspections or monitoring.

(c) The permittee designating a cover as "unsafe to inspect or monitor" pursuant to Rule 0400-12-01-.06(32)(e)12 or0400-12-01-.06(32)(f)7 shall record in a log that is kept in the facility operating record the following information: The identification numbers for waste management units with covers that are designated as "unsafe to inspect and monitor," the explanation for each cover stating why the cover is unsafe to inspect and monitor, and the plan and schedule for inspecting and monitoring each cover. be kept at the Facility or other appropriate location approved by the Commissioner, be available for inspection at reasonable times, and demonstrate compliance with the requirements of Rule 0400-12-01-.06(j)(32)7.

11. Reporting Requirements

(a) In accordance with Rule 0400-12-01-.06(32)(k)1 and 0400-12-01-.06(32)(k)2, the Permittee shall prepare and submit a written report within 15 calendar days of the time that the permittee becomes aware of the

occurrence to the Commissioner documenting each occurrence of noncompliance, if such noncompliance occurs.

(b) The permittee does not currently operate a control device under this permit.

(c) The permittee does not currently operate a flare under this permit.

S. RESTRICTION OF OWNERSHIP OF THE FACILITY

No person who has been convicted of any felony or has been convicted of a misdemeanor for the unlawful storage, treatment, or disposal of hazardous waste may, at any time, be the legal or beneficial owner of ten percent (10%) or more of the stock of the facility.

T. PROHIBITION OF THE PLACEMENT OF TRANSFER FACILITY HAZARDOUS WASTE IN PERMITTED STORAGE UNITS

Hazardous waste containers with destination facilities other than this Facility listed on the manifest must be stored under Rule 0400-12-01-.04 for ten days or less and cannot be placed, accepted, or stored in any of the permitted storage units authorized in this permit and must be managed in a separate designated transfer facility area.

III. SPECIFIC CONDITIONS FOR STORAGE AND TREATMENT IN CONTAINERS

A. WASTE IDENTIFICATION

The permittee is authorized to store and treat hazardous waste in containers in the Outside Hazardous Waste Container Storage Management Area (OHWCSM), Hazardous Waste Management (HWM) Building A, and HWM Building B as a commercial facility per Rule 0400-12-02, as described in Attachment 8 and 9, and subject to the terms of this permit and Rule 0400-12-01-.06(9). The Permittee is prohibited from storing and treating any hazardous waste that is not identified in Attachment 1.

The permittee is authorized to store a maximum capacity of 61,720 gallons of hazardous waste at any given time in the permitted container storage areas. The maximum storage limit for each container storage area is listed in Table 1. The capacity of each unit/area shall not be exceeded. Compliance with the storage limit for each unit/area is based on the capacity of the containers stored in the unit/area and not on the actual or estimated volume of hazardous waste in the containers.

For purposes of compliance with the capacity limitations of this permit, each container will be considered as storing an amount of hazardous waste equal to its maximum size capacity (i.e., 55-gallon drum, 15-gallon bucket, etc.) and not based on actual or estimated volume of hazardous waste in container. However, if the container is a RCRA empty container and does not have any hazardous waste stored in it, the container will not be considered part of the capacity limitation for compliance as long as the container is properly labeled and identified as RCRA empty. Containers within the management areas may range from 1-gallon buckets to bulk containers.

B. CONDITION OF CONTAINERS

If a container holding hazardous waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the permittee shall transfer the hazardous waste from that container to a container that is in good condition or otherwise manage the waste in some other way that complies with the conditions of this permit.

C. COMPATIBILITY OF WASTE WITH CONTAINERS

The permittee shall use a container made of or lined with materials which will not react with, and are otherwise compatible with, the hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired.

Table III-1: Container Storage Capacity Limitations

CS Unit	Container Management Unit Name	Maximum Storage Capacity (gallons)	Maximum Number and Typical Type of Containers	
OHWCMA	Outside HW Container Management Area	42,000	763	55-gallon drums
HWM Building A	Hazardous Waste Management Building A	16,720	304	55-gallon drums
HWM Building B	Hazardous Waste Management Building B	11,000	200	55-gallon drums
Maximum Facility Storage Capacity		**61,720 gallons**		

D. MANAGEMENT OF CONTAINERS

1. Containers of hazardous waste shall be managed, and the units operated as described in Attachments 8 and 9.

2. The permittee shall assure that containers holding hazardous waste are always closed during storage, except when necessary to add or remove waste.

3. The permittee shall assure that a container holding hazardous waste shall not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.

4. The permittee shall maintain aisle space within the container management units in a manner consistent with the requirements of Paragraph II.H.5 and as required by Attachment 8 regarding the dimensions of the aisles.

5. If a container storage unit is storing any quantity of hazardous waste which contains free liquids, the permittee shall place all containers on pallets or similar devices which elevate the containers above the floor or place the containers on a sloped floor to drain and remove liquids.

6. Where applicable, the permittee shall arrange palletized waste in rows to facilitate inspections of the containers and the base underlying the containers.

7. When containers holding ignitable or reactive wastes are being opened or closed, and when work is being performed in close proximity to such containers that are leaking or are not securely closed, only non-sparking tools and equipment shall be used. (See Subsection II.G for additional requirements.)

8. De-palletized containers must be properly re-packaged and/or relabeled as appropriate before placing in storage units.

E. AISLE SPACING

The permittee shall maintain aisle space within the container management units in a manner consistent with Attachment 8 regarding the dimensions of the primary and secondary aisles. Rows of containers shall be separated by a minimum aisle space of 2.5-feet, at all times in OHWCMA, HWM Building A, and HWM Building B.

F. INSPECTION OF THE CONTAINER MANAGEMENT UNIT(S)

1. At least weekly or as required in Attachment 4, the permittee shall inspect areas where containers are stored. The permittee must look for leaking containers and for deterioration of containers and the containment system caused by corrosion or other factors. See Rule 0400-12-01-.06(2)(f)3 and Condition III.B for remedial action required if deterioration or leaks are detected.

2. The permittee shall inspect the containment system in each container storage unit/area and the unloading area(s) daily when in use for the presence of any release of hazardous waste or accumulated precipitation, as described in the inspection checklist for each unit in Attachment 4. For the purpose of this permit condition, "each operating day" (or "daily during use") is equivalent to "daily when in use" and means when wastes are being stored, moved, loaded/unloaded and therefore, subject to spills.

G. CONTAINMENT, DETECTION, AND MANAGEMENT OF LEAKS OR SPILLS

1. The permittee shall ensure that the container storage areas have a containment system that is designed, operated, and maintained in accordance with Paragraph III.G.2, and is constructed and maintained as specified in the plans and specifications found in Attachments 8 and 9. When normal maintenance or replacement of equipment or minor piping rearrangements are necessary to properly operate the facility, the permittee shall use parts or items which meet or exceed the performance standards of those set forth in the attachments. If parts or items are to be used which do not meet or exceed the standards set forth in the attachments, prior approval from the Commissioner shall be required.

2. The containment system shall be designed, operated, and maintained as follows:

   (a) A base shall underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed;

   (b) The base shall be sloped, or the containment system shall be otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids;

(c) The containment system shall have sufficient capacity to contain 10% of the volume of containers or the volume of the largest container, whichever is greater. Containers that do not contain free liquids need not be considered in this determination;

(d) Run-on into the containment system shall be prevented unless the collection system has sufficient excess capacity in addition to that required in Subparagraph III.G.2(c) to contain any run-on which might enter the system; and

(e) Spilled or leaked waste and accumulated precipitation shall be removed from the sump or collection area in as timely a manner as is necessary to prevent overflow of the collection system.

(Comment: If the collected material is a hazardous waste under Rule 0400-12-01-.02, it must be managed as a hazardous waste in accordance with all applicable requirements of Rules 0400-12-01-.03 through .07 and .09. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of section 402 of the Clean Water Act, as amended.)

3. Storage areas that store containers holding only wastes that do not contain free liquids need not have a containment system defined by Paragraph III.G.2, except as provided by Paragraph III.G.4 or provided that:

(a) The storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation; or

(b) The containers are elevated or are otherwise protected from contact with accumulated liquid.

4. Storage areas that store containers holding the wastes listed below that do not contain free liquids must have a containment system defined by Paragraph II.G.2:

(a) F020, F021, F022, F023, F026, and F027.

(b) (Reserved)

5. In addition to the requirements of Subparagraph III.G.2(e), spilled or leaked waste and accumulated precipitation must be removed in as timely a manner as possible as is necessary to prevent overflow of the collection system, and wash waters must be removed from the containment system within 24 hours of discovery, or in as timely a manner as is possible to prevent harm to human health and the environment if the permittee can demonstrate that removal of the released waste and/or accumulated waters could not be accomplished within 24 hours.

(a) The permittee shall have available at all times at least one portable pump (dedicated to the hazardous waste management units) and necessary appurtenances (e.g., hoses) for use in removing liquids from the containment systems. For hazardous waste container management units where ignitable wastes are stored, these pumps shall be of a type that will not generate heat or sparks that might result in ignitable vapors and shall be maintained in proper working order.

(b) The permittee shall determine if the collected materials are hazardous wastes in accordance with Rule 0400-12-01-.03(1)(b). Unless the permittee can demonstrate in accordance with Rule 0400-12-01-.02(1)(c)4 that the collected material removed from the containment system is not a hazardous waste, the permittee becomes a generator of hazardous waste and shall manage it in accordance with applicable requirements of Rules 0400-12-01-.03 through 0400-12-01-.10.

H. RECORDKEEPING

1. The permittee shall provide in the operating record a description and the quantity of each hazardous waste received, and the method(s) and date(s) of its treatment and storage at the facility as required by Appendix I in paragraph (57) of Rule 0400-12-01-.06;

2. The location of each hazardous waste within the facility and the quantity at each location. This information must include cross-references to specific manifest document numbers, if the waste was accompanied by a manifest;

3. Records and results of waste analyses and waste determinations performed as specified in subparagraphs (2)(d), (2)(h), (31)(n), and (32)(d) of Rule 0400-12-01-.06, and part (1)(d)1 and subparagraph (1)(g) of Rule 0400-12-01-.10; and

4. Records and results of inspections as required by Rule 0400-12-01-.06(2)(f)4.

I. SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES

The permittee shall not locate containers holding ignitable or reactive waste within 15 meters (50 feet) of the facility's property line.

J. SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES

The permittee must ensure that:

1. Incompatible wastes, or incompatible wastes and materials, are not placed into the same container unless Paragraph II.G.2 is complied with.

2. Hazardous wastes are not placed in an unwashed container that previously held an incompatible waste or material unless Paragraph II.G.2 is complied with.

[Comment: As required by Rule 0400-12-01-.06(2)(d) the waste analysis plan requires wastes analyses, trial tests or other documentation to assure compliance with Subsection II.G. As required by Paragraph II.K.1, the permittee must place the results of each waste analysis and trial test, and any documented information, in the operating record of the facility.]

3. A storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other materials or protected from them by means of a dike, berm, wall, or other device.

(Comment: The purpose of this part is to prevent fires, explosions, gaseous emission, leaching, or other discharge of hazardous waste or hazardous waste constituents which could result from the mixing of incompatible wastes or materials if containers break or leak.)

K. CLOSURE OF THE CONTAINER MANAGEMENT UNIT(S)

1. At closure, the permittee shall remove all hazardous waste and hazardous waste residues from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues shall be decontaminated or removed. Closure shall be accomplished in accordance with Attachment 11, Closure Plan.

2. At closure, as throughout the operating period, unless the permittee can demonstrate, in accordance with Rule 0400-12-01-.02(1)(c)4, that the wastes removed from the containment system is not a hazardous waste, the permittee becomes a generator of hazardous waste and shall manage it in accordance with all applicable requirements of Rule Chapter 0400-12-01.03 through .07 and .09.

L. AIR EMISSION STANDARDS

The permittee shall manage all hazardous waste placed in containers in accordance with the applicable requirements of Subsection II.R. of this permit and Rules 0400-12-01-.06(30), (31), and (32).

IV. SPECIFIC CONDITIONS FOR STORAGE AND TREATMENT IN TANKS

A. WASTE IDENTIFICATION

The permittee may store and treat hazardous wastes in two above ground tanks described in Attachment 9, subject to the terms of this permit and Rule 0400-12-01-.06(10).

1. The permittee is prohibited from storing or treating hazardous waste that is not identified in Attachment 1.

2. A maximum quantity of 12,000 gallons of hazardous waste may be stored in tank units apportioned in Table 1.

3. A maximum quantity of 12,000 gallons/day of hazardous waste may be treated in the tank units as apportioned in Table 1.

Table IV-1: Summary of Storage and Treatment in Tanks

Tank ID #	Secondary Containment	Description	Maximum Storage Capacity (gallons)	Maximum Treatment Throughput (gallons/day)
F1	Yes – In Place	Fuel Blending Tank	6,000	6,000
F2	Yes – In Place	Fuel Blending Tank	6,000	6,000

B. INSTALLATION OF NEW TANK SYSTEMS (RESERVED)

C. CONTAINMENT, DETECTION, AND MANAGEMENT OF RELEASES TO THE SECONDARY CONTAINMENT SYSTEMS

1. The permittee shall ensure that secondary containment systems as described in Attachment 9 are designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during the use of the tank system; and capable of detecting and collecting releases and accumulated liquids until the collected material is removed.

2. The secondary containment system shall meet the following conditions, at a minimum.

   (a) Be constructed of or lined with materials that are compatible with the wastes(s) to be placed in the tank system and must have sufficient strength and thickness to prevent failure owing to pressure gradients (including static

head and external hydrological forces), physical contact with the waste to which it is exposed, climatic conditions, and the stress of daily operation (including stresses from nearby vehicular traffic);

(b) Be placed on a foundation or base capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift;

(c) Be provided with a leak-detection system that is designed and operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours; and

(d) Be sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health and the environment, if the permittee can demonstrate to the Commissioner that removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours.

[Note: If the collected material is a hazardous waste under Rule 0400-12-01-.02, it is subject to management as a hazardous waste in accordance with all applicable requirements of Rules 0400-12-01-.03 through .06. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of sections 301, 304, and 402 of the Clean Water Act, as amended. If discharged to a Publicly Owned Treatment Works (POTW), it is subject to the requirements of section 307 of the Clean Water Act, as amended. If the collected material is released to the environment, it may be subject to the reporting requirements of 40 CFR Part 302.]

3. Secondary containment for tanks must include one or more of the following devices:

(a) A liner (external to the tank);

(b) A vault;

(c) A double-walled tank; or

(d) An equivalent device as approved by the Commissioner.

The facility currently uses a concrete containment basin (Tank Farm floor), collection/removal sump, and walls which can hold the entire volume of Tanks F1

and F2 as well as the incipient rainfall from a 25-year, 24-hour rainfall event (See Attachment 9: Management of Tank Systems and Equipment and Containers Used in Fuel Blending.)

4. In addition to the requirements of Paragraphs C.2 and C.3, secondary containment systems must satisfy the following requirements:

(a) External liner systems must be:

(i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;

(ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event;

(iii) Free of cracks or gaps; and

(iv) Designed and installed to surround the tank completely and to cover all surrounding earth likely to come into contact with the waste if the waste is released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste).

(b) Double-walled tanks must be:

(i) Designed as an integral structure (i.e., an inner tank completely enveloped within an outer shell) so that any release from the inner tank is contained by the outer shell;

(ii) Protected, if constructed of metal, from both corrosion of the primary tank interior and of the external surface of the outer shell; and

(iii) Provided with a built-in continuous leak detection system capable of detecting a release within 24 hours, or at the earliest practicable time, if the owner or operator can demonstrate to the Commissioner, and the Commissioner concludes, that the existing detection technology or site conditions would not allow detection of a release within 24 hours.

[Note: The provisions outlined in the Steel Tank Institute's (STI) "Standard for Dual Wall Underground Steel Storage Tanks" may be used as guidelines for aspects of the design of underground steel double-walled tanks.]

5. Ancillary equipment must be provided with secondary containment (e.g., trench, jacketing, double-walled piping) that meets the requirements of Paragraphs C.2 and C.3 except for:

   (a) Aboveground piping (exclusive of flanges, joints, valves, and other connections) that are visually inspected for leaks on a daily basis;

   (b) Welded flanges, welded joints, and welded connections that are visually inspected for leaks on a daily basis;

   (c) Sealless or magnetic coupling pumps and sealless valves, that are visually inspected for leaks on a daily basis; and

   (d) Pressurized aboveground piping systems with automatic shut-off devices (e.g., excess flow check valves, flow metering shutdown devices, loss of pressure actuated shut-off devices) that are visually inspected for leaks on a daily basis.

6. The permittee shall inspect the secondary containment systems each operating day for the presence of any release of hazardous waste or accumulated liquid, as described in Attachments 4 and 9. For the purpose of this permit Section, an "operating day" is any calendar day during which one or more of the tanks, including the secondary containment systems, are used to contain wastes.

7. Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health and the environment, if the owner or operator can demonstrate to the Commissioner that removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours. [Note: If the collected material is a hazardous waste under Rule 0400-1201-.02, it is subject to management as a hazardous waste in accordance with all applicable requirements of Rules 0400-12-01-.03 through .06. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of sections 301, 304, and 402 of the Clean Water Act, as amended. If discharged to a Publicly Owned Treatment Works (POTW), it is subject to the requirements of section 307 of the Clean Water Act, as amended. If the collected material is released to the environment, it may be subject to the reporting requirements of 40 CFR part 302.]

   (a) The permittee shall have available at all times at least one portable pump dedicated to hazardous waste areas and necessary appurtenances (e.g., hoses) for use in removing liquids from the secondary containment systems. These pumps shall be of a type that will not generate heat or sparks that might result in ignition of vapors and shall be maintained in proper working order.

(b) Prior to or after removal from the containment systems, the permittee must determine if the collected materials are a hazardous waste in accordance with Rule 0400-12-01-.03(1)(b). Unless the permittee can demonstrate, in accordance with Rule 0400-12-01-.02(1)(c)4, that the collected material removed from the containment system is not a hazardous waste, the permittee becomes a generator or hazardous waste and shall manage it in accordance with applicable requirements or Rules 0400-12-01-.03 through 0400-12-01-.10.

D. GENERAL OPERATING REQUIREMENTS

1. The permittee shall ensure that hazardous wastes or treatment reagents must not be placed in a tank system if they could cause the tank, its ancillary equipment, or the containment system to rupture, leak, corrode, or otherwise fail.

2. The permittee shall use appropriate controls and practices to prevent spills and overflows from tank or containment systems. These include at a minimum:

   (a) Spill prevention controls (e.g., check valves, dry disconnect couplings);

   (b) Overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed cutoff, or bypass to a standby tank); and

   (c) Maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation.

3. The permittee shall comply with the requirements of Subsection IV.F if a leak or spill occurs in the tank system.

4. Prior to the placement of any tank system into operation, the permittee shall submit to the Division Director, and obtain the Division Director's approval of, a detailed description of controls and practices that will be utilized to prevent spills and overflows. Upon approval by the Division Director, those controls and practices shall become conditions of this permit through a modification request of the permit.

E. INSPECTION OF THE TANK SYSTEMS

1. The permittee shall develop and follow a schedule and procedure for inspecting overfill controls (See Attachment 4: Facility Inspection Program).

2. The permittee shall inspect at least once each operating day, data gathered from monitoring and leak detection equipment (e.g., pressure or temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design.

(Note: Paragraph F.3 requires the permittee to remedy any deterioration or malfunction he finds. Subsection F requires the permittee to notify the Commissioner within 24 hours of confirming a leak. Also, Federal 40 CFR Part 302 may require the permittee to notify the National Response Center of a release and Section 304 of Title III of the Superfund Amendments and Reauthorization Act of 1986 may require notification of the Tennessee emergency Management Agency.)

3. Except as noted in IV.E.4, the permittee must inspect at least once each operating day the following:

   (a) Aboveground portions of the tank system, if any, to detect corrosion or releases of waste;

   (b) The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation).

   [Note: "Each operating day" has been defined as "every day the tank is in operation (i.e., storing or treating hazardous waste) and not necessarily just on days the facility is open for business."]

4. The permittee of tank systems that either use leak detection systems to alert facility personnel to leaks or implement established workplace practices to ensure leaks are promptly identified, shall inspect at least weekly those areas described in subparagraphs E.3(a) and (b). This documentation must include a description of the established workplace practices at the facility.

5. Ancillary equipment that is not provided with secondary containment must be inspected at least once each operating day.

6. The permittee shall inspect the tank system(s) in accordance with the schedule in Attachment 4 and document in the operating record of the facility an inspection of those items in Attachment 4 and as set forth in Paragraphs IV.E.1 and 2.

F. RESPONSE TO LEAKS OR SPILLS

The permittee shall immediately remove from service any tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use. Further, if such a release occurs, the permittee shall satisfy the following requirements.

1. The permittee must immediately stop the flow of hazardous waste into the tank system or secondary containment system and inspect the system to determine the cause of the release.

2. If the release was from a tank system, the permittee shall, within 24 hours after detection of the leak or, if the permittee demonstrates that it is not possible, at the earliest practicable time, remove as much of the waste as is necessary to prevent further release of hazardous waste to the environment and to allow inspection and repair of the tank system to be performed.

3. The permittee shall remove and manage all material released to a secondary containment system, as set forth in Paragraph IV.C.3.

4. If releases to the environment have occurred, the permittee shall immediately conduct a visual inspection of the release, and based on that inspection, take necessary actions to:

   (a) Prevent further migration of the leak or spill to soils or surface water; and

   (b) Remove and properly dispose of any visible contamination of the soil or surface water.

5. Unless it consists of less than or equal to a quantity of one pound of hazardous waste and is immediately contained and cleaned up, the permittee shall:

   (a) Within 24 hours of detection, report any release of hazardous waste to the environment to the Division Director.

   (b) Within 30 days of detection of a release to the environment, submit to the Division Director a report containing the following information:

      (i) Likely route of migration of the release;

      (ii) Characteristics of the surrounding soil (soil composition, geology, hydrogeology, and climate);

      (iii) Results of any monitoring or sampling conducted in connection with the release (if available). If sampling or monitoring data relating to the release are not available within 30 days, this data must be submitted to the Division Director within 45 days of receipt of analytical results.

      (iv) Proximity to downgradient drinking water, surface water, and populated areas; and

      (v) Description of response actions taken or planned.

6. Unless the permittee satisfies the requirements of Subparagraphs IV.F.6(a), (b), and (c), the tank system must be closed in accordance with Tennessee Rule 0400-12-01-.06(10)(h) and the Closure Plan in Attachment 11.

(a) If the cause of the release was a spill that has not damaged the integrity of the system, the permittee may return the system to service as soon as the released waste is removed and repairs, if necessary, are made.

(b) If the cause of the release was a leak from the primary tank system into the secondary containment system, the system must be repaired prior to returning the tank system to service.

(c) If the source of the release was a leak to the environment from a component of a tank system without secondary containment, the permittee must provide the component of the system from which the leak occurred with secondary containment that satisfies the requirements of Rule 0400-12-01-.06(10)(d) before it can be returned to service, unless the source of the leak is an aboveground portion of a tank system that can be inspected visually. If the source is an aboveground component that can be inspected visually, the component must be repaired and may be returned to service without secondary containment as long as the requirements of Paragraph IV.D.7 are satisfied. If a component is replaced to comply with the requirements of this Paragraph, that component must satisfy the requirements for new tank systems or components in accordance with Rules 0400-12-01.06(10)(c) and (d). Additionally, if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection (e.g., the bottom of an in-ground or on-ground tank), the entire component must be provided with secondary containment in accordance with Rule 0400-12-01-.06(10)(d) prior to being returned to use.

7. If the permittee has repaired a tank system in accordance with Paragraph IV.D.6, and the repair has been extensive (e.g., installation of an internal liner, repair of a ruptured primary containment or secondary containment vessel), the tank system must not be returned to service unless the permittee has obtained a certification by qualified Professional Engineer, in accordance with Rule 0400-12-01-.07(2)(a)10, that the repaired system is capable of handling hazardous wastes without release for the intended life of the system. This certification must be submitted to the Division Director within seven days after returning the tank system to use.

G. SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTES

1. The permittee shall ensure that no ignitable or reactive waste is placed in tank systems, unless:

(a) The waste is treated, rendered, or mixed before or immediately after placement in the tank system so that:

(i) The resulting waste, mixture, or dissolved material no longer meets the definition of ignitable or reactive waste under Rule 0400-12-01-.02(3)(b) or (d); and

(ii) Paragraph II.D.2 of this permit is complied with; or

(b) The waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to ignite or react; or

(c) The tank system is used solely for emergencies.

2. The permittee shall ensure, through modification of the facility (and/or operations) and this permit, that the facility maintains compliance with the requirements for the maintenance of protective distances between the waste management area and any public ways, streets, alleys, or an adjoining property line that can be built upon, as required in Tables 2-1 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Code" (1977 or 1981). The permittee shall notify the Division Director, as soon as possible, of any anticipated change in property lines or public rights-of-way that might impact such compliance.

H. SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES

The permittee shall ensure that unless Paragraph II.G.2 of this permit is complied with:

1. Incompatible wastes, or incompatible wastes and materials, must not be placed in the same tank system, unless paragraph II.G.2 is complied with; and

2. Hazardous wastes are not placed in a tank system that has not been decontaminated and that previously held an incompatible waste or material.

I. CLOSURE OF THE TANK SYSTEMS

1. The permittee shall remove or decontaminate, at closure, all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste unless Rule 0400-1-11-.02(1)(c)4 applies.

2. If the permittee demonstrates that not all contaminated soils can be practicably removed or decontaminated as required in Paragraph IV.I.1, then the permittee shall close the tank system and perform post-closure care in accordance with the closure and post-closure requirements that apply to landfills. In addition, for the purposes of closure, post-closure, and financial responsibility, such a tank system is then considered to be a landfill, and the permittee must meet all of the requirements for landfills.

J. AIR EMISSION STANDARDS

The owner or operator shall manage all hazardous waste placed in a tank in accordance with the applicable requirements of Subsection II.R.

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V. SCHEDULE OF COMPLIANCE

1. The permittee must submit within 90 days of permit issuance a report from a qualified professional engineer describing his or her inspection and assessment of the concrete secondary containment surfaces of the Outside Hazardous Waste Container Management Area and rendering his or her opinions as to whether those surfaces meet the standard set forth at Rule 0400-12-01-.06(9)(f)2.(i).

2. The Concrete Repair and Rehabilitation Plan set forth in Attachment 8.6 will be implemented in accordance with the Implementation Schedule included therein except as may otherwise be approved by the Division Director.

3. The permittee will send monthly status reports of the concrete repair and rehabilitation plan activities to DSWM until project completion.

4. The permittee will notify DSWM electronically, by emailing hazardouswaste.permitting@tn.gov, a minimum of 5 business days prior to any sampling, concrete testing, concrete removal, or rehabilitation work.

5. The tank certifications listed in Attachment 9.1 included language stating the tanks would be reinspected in 2023. Provide DSWM copies of these results within 30 days of permit issuance.

6. The permittee will submit a Class 1 permit modification to revise the "DAILY CONTAINER INVENTORY FOR _____" forms within 60 calendar days of permit issuance.

VI. SPECIFIC CONDITIONS FOR CORRECTIVE ACTION

A. APPLICABILITY

The conditions of this section apply to:

1. The solid waste management units (SWMUs) and areas of concern (AOCs) identified in Attachment 10.1, Table 10.1-1, which require No Further Action under the corrective action conditions of this permit at this time;

2. The SWMUs and AOCs identified in Attachment 10.1, Table 10.1-2, which require Confirmatory Sampling;

3. The SWMUs and AOCs identified in Attachment 10.1, Table 10.1-3, which require a RCRA Facility Investigation;

4. The SWMUs and AOCs identified in Attachment 10.1, Table 10.1-4, which require Interim Measures;

5. The SWMUs and AOCs identified in Attachment 10.1, Table 10.1-5, which require a Corrective Measures Study;

6. The SWMUs and AOCs identified in Attachment 10.1, Table 10.1-6, which require a Corrective Action Remedy;

7. The SWMUs and AOCs identified in Attachment 10.1, Table 10.1-7, which are regulated by a Hazardous Waste Permit;

8. Any additional SWMUs or AOCs discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means. As used in this section of the permit, the terms "discover," "discovery," or "discovered" refer to the date on which the permittee either (1) visually observes evidence of a new SWMU or AOC, (2) visually observes evidence of a previously unidentified release of hazardous constituents to the environment, or (3) receives information which suggests the presence of a new release of hazardous waste or hazardous constituents to the environment; and

9. Contamination that has migrated or is migrating beyond the facility boundary. The permittee shall implement corrective actions beyond the facility boundary where necessary to protect human health and the environment, unless the permittee demonstrates to the satisfaction of the Commissioner that, despite the permittee's best efforts, the permittee was unable to obtain the necessary permission to under-take such actions. The permittee is not relieved of all responsibility to clean up a release

that has migrated beyond the facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis. Assurances of financial responsibility for completion of such off-site corrective action will be required.

B. NEWLY IDENTIFIED SWMUs AND AOCs

1. The permittee must notify the Commissioner in writing, within 15 calendar days of discovery of any suspected new AOC as discovered under Paragraph VI.A.8. The notification shall include, at a minimum, the location of the AOC and all available information pertaining to the nature of the release (e.g., media affected, hazardous constituents released, magnitude of release, etc.). The Commissioner may conduct, or require the permittee to conduct, further assessment (i.e., confirmatory sampling) in order to determine the status of the suspected AOC. The Commissioner will notify the permittee in writing of the final determination as to the status of the suspected AOC. If the Commissioner determines that further investigation or other corrective action of an AOC is required, the permittee shall modify the permit in accordance with Rule 0400-12-01-.07(9).

2. The permittee must notify the Commissioner in writing, within 15 calendar days of discovery of any additional SWMU as discovered under Paragraph VI.A.8.

3. The permittee must prepare and submit to the Commissioner, within 90 calendar days of notification, a SWMU Assessment Report (SAR) for each SWMU identified under Paragraph VI.B.2. At a minimum, the SAR will provide the following information:

   (a) Location of unit(s) on a topographic map of appropriate scale such as required under Rule 0400-12-01-.07(5)(a)1(xix);

   (b) Designation of type and function of unit(s);

   (c) General dimensions, capacities and structural description of unit(s) (supply any available plans/drawings);

   (d) Dates that the unit(s) was operated;

   (e) Specification of all wastes that have been managed at/in the unit(s) to the extent available. Include any available data on hazardous constituents in the wastes; and

   (f) All available information pertaining to any release of hazardous waste or hazardous constituents from such unit(s), including any available information and analytical results for air, soil, sediment, surface water, and groundwater.

4. Based on the results of the SAR, the Commissioner will determine the need for further investigations at the SWMUs covered in the SAR. If the Commissioner

determines that such investigations are needed, the permittee will be required to prepare a plan for such investigations as outlined in Subparagraph VI.E.1(a) or Paragraph VI.D.1.

C. NEWLY DISCOVERED RELEASES FROM SWMUs OR AOCs

1. The permittee must notify the Commissioner, in writing, of any newly discovered release(s) of hazardous waste or hazardous constituents discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means, within 15 calendar days of discovery. Such newly discovered releases may be from SWMUs and/or AOCs identified in Paragraph VI.A.1, or SWMUs and/or AOCs identified in Paragraph VI.A.8 for which further investigation under Paragraph VI.B.4 was not required.

2. If the Commissioner determines that further investigation of the SWMUs or AOCs is needed, the permittee will be required to prepare a plan for such investigations as outlined in Subparagraph VI.E.1(a).

D. CONFIRMATORY SAMPLING (CS)

1. Upon notification by the Commissioner, the permittee will prepare and submit a Confirmatory Sampling Work Plan (CS Work Plan) for suspected AOCs per Paragraph VI.B.1 or newly identified SWMUs per Paragraph VI.B.4. The work plan must be submitted within 45 calendar days of notification by the Commissioner that a CS Work Plan is required. The CS Work Plan must include schedules of implementation and completion of specific actions necessary to determine whether a release has occurred. It must also address applicable requirements and affected media. In order to partly or wholly satisfy the CS requirement, previously existing data may be submitted with the work plan for the Commissioner's consideration.

2. The CS Work Plan must be approved by the Commissioner, in writing, prior to implementation. The Commissioner will specify the start date of the CS Work Plan schedule in the letter approving the CS Work Plan. If the Commissioner disapproves the CS Work Plan, the Commissioner will (1) notify the permittee in writing of the CS Work Plan's deficiencies and specify a due date for submission of a revised CS Work Plan, (2) revise the CS Work Plan and notify the permittee of the revisions, or (3) conditionally approve the CS Work Plan and notify the permittee of the conditions.

3. The permittee will implement the confirmatory sampling in accordance with the approved CS Work Plan.

4. The permittee will prepare and submit to the Commissioner in accordance with the schedule in the approved CS Work Plan, a Confirmatory Sampling Report (CS Report) identifying all SWMUs or AOCs that have released hazardous waste or hazardous constituents into the environment. The CS Report must include all data,

including raw data, and a summary and analysis of the data, which supports the above determination. If submission of the CS Report coincides with submission of the RFI (RCRA Facility Investigation) Report, then the CS Report and the RFI Report may be combined into one submission.

5. Based on the results of the CS Report, the Commissioner will determine the need for further investigations at the SWMUs or AOCs covered in the CS Report. If the Commissioner determines that such investigations are needed, the permittee will be required to prepare a plan for such investigations as outlined in Subparagraph VI.E.1(a). The Commissioner will notify the permittee of any no further action decision.

E. RCRA FACILITY INVESTIGATION (RFI)

1. RFI Work Plan(s)

(a) The permittee must prepare and submit to the Commissioner, within 90 calendar days of notification by the Commissioner, an RFI Work Plan for those units identified under Paragraph VI.B.4, Paragraph VI.C.2, or Paragraph VI.D.5. The RFI Work Plan(s) must be developed to meet the requirements of Subparagraph VI.E.1(b).

(b) The RFI Work Plan(s) must meet the requirements specified in Attachment 10.2, unless otherwise directed by the Commissioner. The RFI Work Plan(s) will include schedules of implementation and completion of specific actions necessary to determine the nature and extent of contamination and the potential pathways of contaminant releases to the air, soil, surface water, and groundwater. The permittee must provide sufficient justification and associated documentation that a release is not probable or has already been characterized if a unit or a media/pathway associated with a unit (groundwater, surface water, soil, subsurface gas, or air) is not included in the RFI Work Plan(s). Such deletions of a unit, media or pathway from the RFI(s) are subject to the approval of the Commissioner. The permittee must provide sufficient written justification for any omissions or deviations from the minimum requirements of Attachment 10.2. Such omissions or deviations are subject to the approval of the Commissioner. In addition, the scope of the RFI Work Plan(s) will include all investigations necessary to ensure compliance with Rule 0400-12-01-.06(6)(l)3.

(c) The RFI Work Plan(s) must be approved by the Commissioner, in writing, prior to implementation. The Commissioner will specify the start date of the RFI Work Plan schedule in the letter approving the RFI Work Plan(s). If the Commissioner disapproves the RFI Work Plan(s), the Commissioner will either (1) notify the permittee in writing of the RFI Work Plan's deficiencies and specify a due date for submission of a revised RFI Work Plan, (2) revise the RFI Work Plan and notify the permittee of the revisions and the start date

of the schedule within the approved RFI Work Plan, or (3) conditionally approve the RFI Work Plan and notify the permittee of the conditions.

2. RFI Implementation

The permittee must implement the RFI(s), as outlined in Attachment 10.2, in accordance with the approved RFI Work Plan(s). The permittee must notify the Commissioner at least 20 calendar days prior to any sampling activity.

3. RFI Reports

(a) The permittee must prepare and submit to the Commissioner Draft and Final RCRA Facility Investigation Report(s) for the investigations conducted pursuant to the RFI Work Plan(s) submitted under Paragraph VI.E.1. The Draft RFI Report(s) must be submitted to the Commissioner for review in accordance with the schedule in the approved RFI Work Plan(s). The Final RFI Report(s) must be submitted to the Commissioner within 30 calendar days of receipt of the Commissioner's final comments on the Draft RFI Report. The RFI Report(s) will include an analysis and summary of all required investigations of SWMUs and AOCs and their results. The summary will describe the type and extent of contamination at the facility, including sources and migration pathways, identify all hazardous constituents present in all media, and describe actual or potential receptors. The RFI Report(s) will also describe the nature and extent of contamination (qualitative/quantitative) in relation to background levels indicative of the area. If the RFI Report is a summary of only the initial phase investigatory work or based on current investigations and further investigation is necessary, then an Interim RFI Report summarizing the initial phase investigation must be submitted incorporating a work plan for the final phase investigatory actions required based on the initial findings. The report must include a work plan for the final phase investigatory actions required based on the initial findings. Approval of the final phase work plan will be carried out in accordance with Subparagraph VI.E.1(c). The objective of this task will be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and the environment, and to support a Corrective Measures Study, if necessary.

(b) The permittee must submit to the Commissioner, along with the Interim and Final RFI Report(s), Screening Levels based on the latest EPA guidance or as otherwise directed by the Commissioner for each of the Hazardous Constituents reported in Condition VI.E.3(a).

(c) The Commissioner will review the RFI Report(s), including the screening levels described in Subparagraph VI.E.3(b). The Commissioner will notify the permittee of the need for further investigative action if necessary and, if

appropriate at this moment of the investigation, inform the permittee, if not already notified, of the need for a Corrective Measures Study to meet the requirements of Subparagraph VI.G and Rule 0400-12-01-.06(6)(l). The Commissioner will notify the permittee of any no further action decision. Any further investigative action required by the Commissioner must be prepared and submitted in accordance with a schedule specified by the Commissioner and approved in accordance with Subparagraph VI.E.1(c).

(d) If the time required to conduct the RFI(s) is greater than 180 calendar days, the permittee must provide the Commissioner with quarterly RFI Progress Reports (90 calendar day intervals) beginning 90 calendar days from the start date specified by the Commissioner in the RFI Work Plan approval letter. The Quarterly RFI Progress Reports must contain the following information at a minimum:

(i) A description of the portion of the RFI completed;

(ii) Summaries of findings;

(iii) Summaries of any deviations from the approved RFI Work Plan during the reporting period;

(iv) Summaries of any significant contacts with local community public interest groups or State government;

(v) Summaries of any problems or potential problems encountered during the reporting period;

(vi) Actions taken to rectify problems;

(vii) Changes in relevant personnel;

(viii) Projected work for the next reporting period; and

(ix) Copies of daily reports, inspection reports, data, etc.

F. INTERIM MEASURES (IM)

The Commissioner may require Interim Measures (IM) if they are necessary to protect human health and the environment (considering specific site conditions and Tennessee Regulations).

1. IM Work Plan

(a) Upon notification by the Commissioner, the permittee must prepare and submit an IM Work Plan for any SWMU or AOC for which the

Commissioner determines IM are necessary. IM are necessary in order to minimize or prevent the further migration of contaminants and to limit actual or potential human and environmental exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented. The IM Work Plan must be submitted within 30 calendar days of such notification and must include the elements listed in Subparagraph VI.F.1(c). Such interim measures may be conducted concurrently with investigations required under the terms of this permit. Units having an approved IM Work Plan will comply with Paragraph VI.F.2 and beyond to govern implementation of the IM requirements for the unit(s).

(b) The permittee may initiate IM at a SWMU or AOC by submitting the appropriate notification pursuant to Subparagraph I.D.11(a). The Commissioner will process permittee-initiated IM by either conditionally approving the IM or imposing an IM Work Plan per Subparagraph VI.F.1(a). Permittee-initiated IM shall be considered conditionally approved unless the Commissioner specifically imposes an IM Work Plan within 30 calendar days of receipt of notification of the permittee-initiated IM. The scope and success of permittee-initiated IM, conditionally approved per Subparagraph VI.F.1(b), will be subject to subsequent in-depth review by the Commissioner. The Commissioner will either comment on or approve the permittee-initiated IM. Permittee-initiated IM must follow the progress and final reporting requirements in Paragraph VI.F.3.

(c) The IM Work Plan shall ensure that the interim measures are designed to mitigate any current or potential threat(s) to human health or the environment and are consistent with and integrated into any long-term solution at the facility. The IM Work Plan must include the interim measures objectives and procedures for implementation (including any designs, plans, or specifications) including schedules for implementation.

(d) The IM Work Plan imposed under Subparagraph VI.F.1(a) must be approved by the Commissioner, in writing, prior to implementation. The Commissioner will specify the start date of the IM Work Plan schedule in the letter approving the IM Work Plan. If the Commissioner disapproves the IM Work Plan, the Commissioner will either (1) notify the permittee in writing of the IM Work Plan's deficiencies and specify a due date for submission of a revised IM Work Plan, (2) revise the IM Work Plan and notify the permittee of the revisions and the start date of the schedule within the approved IM Work Plan, or (3) conditionally approve the IM Work Plan and notify the permittee of the conditions.

2. IM Implementation

(a) The permittee must implement interim measures imposed under Subparagraph VI.F.1(a) in accordance with the approved IM Work Plan.

(b) The permittee must give notice to the Commissioner as soon as possible of any planned changes, reductions or additions to the IM Work Plan imposed under Subparagraph VI.F.1(a) or initiated by the permittee under Subparagraph VI.F.1(b).

(c) Final approval of corrective action required under Rule 0400-12-01-.06(6)(l), which is achieved through IMs, will be in accordance with Rule 0400-12-01-.07(9)(c)5(iii) and Subsection VI.H as a permit modification.

3. IM Reports

(a) If the time required for completion of interim measures imposed under Subparagraph VI.F.1(a) or implemented under Subparagraph VI.F.1(b) is greater than one year (365 calendar days), the permittee must provide the Commissioner with progress reports at intervals specified in the approved Work Plan or semi-annually for permittee-initiated interim measures. The Interim Measures (IM) Progress Reports must contain the following information at a minimum:

(i) A description of the portion of the interim measures completed;

(ii) Summaries of findings;

(iii) Summaries of any deviations from the IM Work Plan during the reporting period;

(iv) Summaries of any problems or potential problems encountered during the reporting period; and

(v) Projected work for the next reporting period.

(b) The permittee must prepare and submit an Interim Measures (IM) Report to the Commissioner, within 90 calendar days of completion of interim measures conducted under Subsection VI.F. The IM Report must contain the following information at a minimum:

(i) A description of interim measures implemented;

(ii) Summaries of results;

(iii) Summaries of all problems encountered;

(iv) Summaries of accomplishments or effectiveness of interim measures; and

(v) Copies of all relevant laboratory/monitoring data, etc. in accordance with Paragraph I.D.9.

G. CORRECTIVE MEASURES STUDY (CMS)

1. The permittee must prepare and submit to the Commissioner a CMS for those SWMUs and AOCs where hazardous constituents have come to be located at concentrations exceeding those appropriate for the protection of human health and the environment. The CMS will be developed to meet the requirements of Paragraph VI.G.2. The permittee may seek approval from the Commissioner for concurrent RFI/CMS. The CMS may be performed concurrent with the RFI process if the Commissioner determines that sufficient investigative details are available to allow concurrent action.

2. The CMS must meet the requirements of Attachment 10.3 of this permit at a minimum. The CMS must include schedules of implementation and completion of specific actions necessary to complete a CMS. The permittee must provide sufficient justification or documentation for any unit deleted from the CMS. Such deletion of a unit is subject to the approval of the Commissioner. The scope of the CMS must include all investigations necessary to ensure compliance with the Act and Rules 0400-12-01-.06(6)(l), .06(22)(c), and .07(8)(b)2(ii). The permittee must implement corrective actions beyond the facility boundary, as set forth in Paragraph VI.A.8.

3. The permittee must submit the draft CMS no later than 90 calendar days of notification by the Commissioner that a CMS is required.

4. The Commissioner will either approve or disapprove, in writing, the CMS. If the Commissioner disapproves the CMS, the Commissioner will (1) notify the permittee in writing of the CMS's deficiencies and specify a due date for submission of a revised CMS, or (2) revise the CMS and notify the permittee of the revisions, or (3) conditionally approve the CMS and notify the permittee of the conditions. This modified CMS becomes the approved CMS.

H. REMEDY APPROVAL AND PERMIT MODIFICATION

1. A remedy decision (CA400) will be selected from the remedial alternatives evaluated in the CMS. It will be based at a minimum on protection of human health and the environment, as per specific site conditions and existing regulations and reflected in a statement of basis. The selected remedy may include any IM implemented to date.

2. Pursuant to 0400-12-01-.07(9)(c), a permit modification will be initiated by the Commissioner after recommendation of a remedy under Paragraph VI.H.1. As part

of the public notification during the modification process, all supporting documentation for the proposed remedy, including the statement of basis, will be made available for public review and comment. The statement of basis will be prepared utilizing EPA's "Guidance on RCRA Corrective Action Decision Documents" (EPA/540/G-91/011) as a reference. This modification will serve to incorporate a final remedy, including a CAMU if necessary, and CMS remedy implementation schedules into this permit. The permit modification must include a schedule and date for remedy construction (CA550).

3. Following the public comment period, the Commissioner may approve the CMS and select a final corrective measure(s) or require the permittee to revise the CMS or perform an additional CMS.

4. The Commissioner will notify the permittee of the final corrective measure(s) selected by the Department in the Final Decision and Response to Comments. The notification will include the Commissioner's reasons for selecting the corrective measure(s).

5. Upon the effective date of the permit modification approving the selected remedy, the permittee must implement the approved remedy per the CMS remedy implementation schedule. The permittee must submit Corrective Measures Implementation and Effectiveness Reports to the Commissioner annually. The Commissioner will specify which information to include in the annual Corrective Measures Implementation and Effectiveness Reports upon the effective date of the permit modification.

I. REMEDY IMPLEMENTATION

1. The permittee must implement a corrective action remedy for the SWMUs and AOCs identified in Attachment 10.1, Table 10.1-6, in accordance with the requirements in Attachment 10.5, Corrective Action Remedies.

2. Within 60 calendar days of the effective date of this permit or permit modification for remedy approval in accordance with Subsection VI.H., the permittee must demonstrate financial assurance for completing the corrective action remedies as described in Attachment 10.5. The permittee will provide the assurance in accordance with Paragraph VI.J.

J. FINANCIAL ASSURANCE REQUIREMENTS FOR CORRECTIVE ACTION

If the permittee is required to implement a corrective action remedy in accordance with Paragraph VI.I.2, the permittee must demonstrate continuous compliance with Rules 0400-12-01-.06(6)(a)1(ii) and .06(6)(l) as follows.

1. Cost Estimate for Corrective Action: Pursuant to the corrective measures study report required by Condition G, the permittee must submit a cost estimate for

corrective action following the guidelines provided in Attachment 10.3, Paragraph V.E.5. The permittee must adjust the cost estimate as part of any modification request for changes to the approved remedy or as required by the Commissioner.

2. Financial Assurance for Corrective Action

(a) The permittee must file and maintain corrective action financial assurance with the Division Director in an amount at least equal to the current cost estimate for completion of the final remedy for the facility. As specified in Paragraph VI.I.2, the permittee must provide financial assurance after remedy selection and permit modification. However, the Commissioner may notify and require the permittee to provide financial assurance for corrective action at any time during the term of this permit.

(b) The mechanisms and procedures for complying with the corrective action financial assurance requirements will be in a manner consistent with Rules 0400-12-01-.06(8)(g) through (p). References to regulatory requirements for "closure and/or post-closure care" will be replaced with the phrase "closure, post-closure care, and/or corrective action" or other language as approved by the Commissioner.

(c) Unless the Director approves an alternative amount that is based on a revised cost estimate, financial assurance must be maintained as an annually inflation-adjusted, twenty-year balance.

(d) The requirements in Paragraph II.L.10, which details the procedures to follow concerning the financial incapacity of the permittee, guarantors, or financial institutions, will also apply to the corrective action financial assurance.

3. Procedures for Forfeiture of Financial Assurance: Upon his or her determination that the permittee has failed to perform corrective action in accordance with Attachment 10.5, the approved Corrective Action Remedies, when required to do so, the Division Director will initiate the procedures for forfeiture of financial assurance in accordance with Paragraph II.L.8.

K. INSTITUTIONAL CONTROLS (ICs)

1. The permittee must consider institutional or other appropriate non-engineering controls for protection of human health and the environment from contamination left in place at any SWMU or AOC. Among the institutional controls (ICs) to be considered is a "Notice of Land Use Restriction" pursuant to T.C.A. §68-212-225.

2. ICs may be used to protect the corrective measures implemented at the facility if this permit is terminated at the completion of corrective action. ICs must be implemented prior to termination of this permit.

3. ICs that are approved as part of the final remedy must survive the termination of this permit.

4. ICs may be placed upon the facility or on any specifically identified area of a SWMU or AOC. ICs may restrict the use of the property covered by such ICs to commercial or industrial land use, as those terms are currently defined, or may be defined in the future, by zoning ordinance(s) of the city, county, or any other local governmental entity with jurisdiction and authority to regulate the land use at the property.

L. COMPLETION OF CORRECTIVE ACTION

1. The corrective action will be considered complete when the Commissioner determines that compliance with the media cleanup standards and the cleanup objectives has been achieved, and that all actions required to control the source(s) of contamination have been satisfied.

2. Corrective action will be considered complete with or without controls in place where the permittee has satisfied all obligations under Rules 0400-12-01-.06(6)(a)1(ii) and .06(6)(l).

3. Upon completion of the corrective action for the entire facility, or for a portion of the facility, or for any off-site contamination, the permittee must submit to the Commissioner, by registered mail, a request for termination of the corrective action schedule of compliance according to the procedures for Class 3 modifications in Rule 0400-12-01-.07(9)(c). The request must include a certification that the corrective measures have been completed in accordance with the requirements of this permit.

4. When, upon receipt of the certification, and in consideration of public comments and any other relevant information, the Commissioner determines that the corrective measures have been completed in accordance with the terms and conditions of this permit and the requirements for completion, the Commissioner will terminate this permit or modify the permit to terminate the Corrective Action Schedule of Compliance for SWMUs and AOCs that require no further action at this time. Upon termination of the permit or modification of the permit for completion of corrective action at the entire facility, the Commissioner will release the permittee from the financial assurance requirements of this permit.

M. MODIFICATION OF THE CORRECTIVE ACTION COMPLIANCE SCHEDULE

1. If at any time the Commissioner determines that modification of the Corrective Action Compliance Schedule is necessary, the Commissioner may initiate a modification to the Corrective Action Compliance Schedule in Attachment 10.4.

2. Modifications that are initiated and finalized by the Commissioner will be in accordance with the applicable provisions of Rule 0400-12-01-.07(9). The permittee

may also request a permit modification in accordance with Rule 0400-12-01-.07(9) to change the Corrective Action Compliance Schedule.

N. WORK PLAN AND REPORT REQUIREMENTS

1. All work plans and schedules will be subject to approval by the Commissioner prior to implementation to assure that such work plans and schedules are consistent with the requirements of this permit and with applicable regulations.

2. All work plans and reports will be submitted in accordance with the approved schedule. Extensions of the due date for submissions may be granted by the Commissioner based on the permittee's demonstration that sufficient justification for the extension exists.

3. The permittee must revise all submissions and schedules as specified by the Commissioner. Upon approval the permittee must implement all work plans and schedules as written.

4. If the permittee at any time determines that the SAR information required under Subsection VI.B, the CS Work Plan under Subsection VI.D, or the RFI Work Plan(s) required under Subparagraph VI.E no longer satisfy the requirements of Tennessee Hazardous Waste Management Regulations, Rule 0400-12-01-.06(6)(l) or this permit for prior or continuing releases of hazardous waste or hazardous constituents from solid waste management units or areas of concern, the permittee must submit an amended Work Plan(s) to the Commissioner within 90 calendar days of such determination.

5. A hard copy is to be mailed as well as one electronic copy submitted for all corrective action reports and plans required under this permit section and must be provided by the permittee to the Central Office. Submissions must be addressed in care of the Division Director, as follows:

Director
Division of Solid Waste Management
Attention Hazardous Waste Program
Davy Crockett Tower, 7th Floor
500 James Robertson Parkway
Nashville, TN 37243

The permittee must also submit (1) hard copy to the Environmental Field Office at the following address:

Environmental Field Office Manager
Division of Solid Waste Management
TDEC Memphis Environmental Field Office
8383 Wolf Creek Drive
Bartlett, TN 38133

O. APPROVAL/DISAPPROVAL OF SUBMISSIONS

The Commissioner will review the work plans, reports, schedules, and other documents (submissions) that require the Commissioner's approval in accordance with the conditions of this permit. The Commissioner will notify the permittee in writing of any submission that is disapproved and the basis, therefore. Subsection VI.P will apply only to submissions that have been disapproved and revised by the Commissioner, or that have been disapproved by the Commissioner, then revised and resubmitted by the permittee, and again disapproved by the Commissioner.

P. DISPUTE RESOLUTION

The Commissioner and the permittee must use their best effort to resolve any disputes concerning submissions hereunder and the proper application of statutory or regulatory provisions informally and in good faith. If a disagreement cannot be resolved informally, the parties jointly or individually may pursue the matter formally by requesting a Declaratory Order by the Tennessee Underground Storage Tanks and Solid Waste Disposal Control Board in a contested case hearing under T.C.A. §4-5-223.

ATTACHMENT 1

HAZARDOUS WASTES TO BE MANAGED

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
D001		Ignitability	Characteristic Waste
D002		Corrosivity	Characteristic Waste
D003		Reactivity	Characteristic Waste
D004	Arsenic	Toxicity	Characteristic Waste
D005	Barium	Toxicity	Characteristic Waste
D006	Cadmium	Toxicity	Characteristic Waste
D007	Chromium	Toxicity	Characteristic Waste
D008	Lead	Toxicity	Characteristic Waste
D009	Mercury	Toxicity	Characteristic Waste
D010	Selenium	Toxicity	Characteristic Waste
D011	Silver	Toxicity	Characteristic Waste
D012	Endrin	Toxicity	Characteristic Waste
D013	Lindane	Toxicity	Characteristic Waste
D014	Methoxychlor	Toxicity	Characteristic Waste
D015	Toxaphene	Toxicity	Characteristic Waste
D016	2,4-D	Toxicity	Characteristic Waste
D017	2,4,5-TP (Silvex)	Toxicity	Characteristic Waste
D018	Benzene	Toxicity	Characteristic Waste
D019	Carbon tetrachloride	Toxicity	Characteristic Waste
D020	Chlordane	Toxicity	Characteristic Waste
D021	Chlorobenzene	Toxicity	Characteristic Waste
D022	Chloroform	Toxicity	Characteristic Waste
D023	o-Cresol	Toxicity	Characteristic Waste
D024	m-Cresol	Toxicity	Characteristic Waste
D025	p-Cresol	Toxicity	Characteristic Waste
D026	Cresol	Toxicity	Characteristic Waste
D027	1,4-Dichlorobenzene	Toxicity	Characteristic Waste
D028	1,2-Dichloroethane	Toxicity	Characteristic Waste
D029	1,1-Dichloroethylene	Toxicity	Characteristic Waste
D030	2,4-Dinitrotoluene	Toxicity	Characteristic Waste
D031	Heptachlor (and its epoxide)	Toxicity	Characteristic Waste
D032	Hexachlorobenzene	Toxicity	Characteristic Waste
D033	Hexachlorobutadiene	Toxicity	Characteristic Waste
D034	Hexachloroethane	Toxicity	Characteristic Waste
D035	Methyl ethyl ketone	Toxicity	Characteristic Waste
D036	Nitrobenzene	Toxicity	Characteristic Waste
D037	Pentachlorophenol	Toxicity	Characteristic Waste
D038	Pyridine	Toxicity	Characteristic Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
D039	Tetrachloroethylene	Toxicity	Characteristic Waste
D040	Trichloroethylene	Toxicity	Characteristic Waste
D041	2,4,5-Trichlorophenol	Toxicity	Characteristic Waste
D042	2,4,6-Trichlorophenol	Toxicity	Characteristic Waste
D043	Vinyl chloride	Toxicity	Characteristic Waste
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	Toxic	Listed Waste
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	Toxic	Listed Waste
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	Ignitable	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	Toxic	Listed Waste
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	Ignitable, Toxic	Listed Waste
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	Toxic	Listed Waste
F007	Spent cyanide plating bath solutions from electroplating operations.	Reactive, Toxic	Listed Waste
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	Reactive, Toxic	Listed Waste
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	Reactive, Toxic	Listed Waste
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	Reactive, Toxic	Listed Waste
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	Reactive, Toxic	Listed Waste
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.	Toxic	Listed Waste
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	Acute Hazardous	Listed Waste
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.	Acute Hazardous	Listed Waste
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.	Acute Hazardous	Listed Waste
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	Acute Hazardous	Listed Waste
F024	Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in Tennessee Rule 1200-1-11-.02(4)(b) or (c).).	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
F025	Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	Toxic	Listed Waste
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.	Acute Hazardous	Listed Waste
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing Hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.).	Acute Hazardous	Listed Waste
	Acetic acid, (2,4,5-trichlorophenoxy)-	Toxic	
	Pentachlorophenol		
	Phenol, pentachloro-		
	Phenol, 2,3,4,6-tetrachloro-		
	Phenol, 2,4,5-trichloro-		
	Phenol, 2,4,6-trichloro-		
	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-		
	Silvex (2,4,5-TP)		
	2,4,5-T		
	2,3,4,6-Tetrachlorophenol		
	2,4,5-Trichlorophenol		
	2,4,6-Trichlorophenol		
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with Hazardous Waste Codes F020, F021, F022, F023, F026, and F027.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
F032	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with Tennessee Rule 1200-1-11-.02(4)(f) or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	Toxic	Listed Waste
F034	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	Toxic	Listed Waste
F035	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
F037	Petroleum refinery primary oil/water/solids separation sludge-Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in Tennessee Rule 1200-1-11-.02(4)(b)2(ii) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.	Toxic	Listed Waste
F038	Petroleum refinery secondary (emulsified) oil/water/solids separation sludge-Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in Tennessee Rule 1200-1-11-.02(4)(b)2(ii) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.	Toxic	Listed Waste
F039	Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under Tennessee Rule 1200-1-11-.02(4). (Leachate resulting from the disposal of one or more of the following Hazardous Wastes and no other Hazardous Wastes retains its Hazardous Waste Code(s): F020, F021, F022, F026, F027, and/or F028.).	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.	Toxic	Listed Waste
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments.	Toxic	Listed Waste
K003	Wastewater treatment sludge from the production of molybdate orange pigments.	Toxic	Listed Waste
K004	Wastewater treatment sludge from the production of zinc yellow pigments.	Toxic	Listed Waste
K005	Wastewater treatment sludge from the production of chrome green pigments.	Toxic	Listed Waste
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).	Toxic	Listed Waste
K007	Wastewater treatment sludge from the production of iron blue pigments.	Toxic	Listed Waste
K008	Oven residue from the production of chrome oxide green pigments.	Toxic	Listed Waste
K009	Distillation bottoms from the production of acetaldehyde from ethylene.	Toxic	Listed Waste
K010	Distillation side cuts from the production of acetaldehyde from ethylene.	Toxic	Listed Waste
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile.	Reactive, Toxic	Listed Waste
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile.	Reactive, Toxic	Listed Waste
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile.	Toxic	Listed Waste
K015	Still bottoms from the distillation of benzyl chloride.	Toxic	Listed Waste
K016	Heavy ends or distillation residues from the production of carbon tetrachloride.	Toxic	Listed Waste
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.	Toxic	Listed Waste
K018	Heavy ends from the fractionation column in ethyl chloride production.	Toxic	Listed Waste
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.	Toxic	Listed Waste
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.	Toxic	Listed Waste
K021	Aqueous spent antimony catalyst waste from fluoromethanes production.	Toxic	Listed Waste
K022	Distillation bottom tars from the production of phenol/acetone from cumene.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K023	Distillation light ends from the production of phthalic anhydride from naphthalene.	Toxic	Listed Waste
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene.	Toxic	Listed Waste
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene.	Toxic	Listed Waste
K026	Stripping still tails from the production of methyl ethyl pyridines.	Toxic	Listed Waste
K027	Centrifuge and distillation residues from toluene diisocyanate production.	Reactive, Toxic	Listed Waste
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.	Toxic	Listed Waste
K029	Waste from the product steam stripper in the production of 1,1,1-trichloroethane.	Toxic	Listed Waste
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.	Toxic	Listed Waste
K031	By-product salts generated in the production of MSMA and cacodylic acid.	Toxic	Listed Waste
K032	Wastewater treatment sludge from the production of chlordane.	Toxic	Listed Waste
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.	Toxic	Listed Waste
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.	Toxic	Listed Waste
K035	Wastewater treatment sludges generated in the production of creosote.	Toxic	Listed Waste
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton.	Toxic	Listed Waste
K037	Wastewater treatment sludges from the production of disulfoton.	Toxic	Listed Waste
K038	Wastewater from the washing and stripping of phorate production.	Toxic	Listed Waste
K039	Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.	Toxic	Listed Waste
K040	Wastewater treatment sludge from the production of phorate.	Toxic	Listed Waste
K041	Wastewater treatment sludge from the production of toxaphene.	Toxic	Listed Waste
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K043	2,6-Dichlorophenol waste from the production of 2,4-D.	Toxic	Listed Waste
K044	Wastewater treatment sludges from the manufacturing and processing of explosives.	Reactive	Listed Waste
K045	Spent carbon from the treatment of wastewater containing explosives.	Reactive	Listed Waste
K046	Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.	Toxic	Listed Waste
K047	Pink/red water from TNT operations.	Reactive	Listed Waste
K048	Dissolved air flotation (DAF) float from the petroleum refining industry.	Toxic	Listed Waste
K049	Slop oil emulsion solids from the petroleum refining industry.	Toxic	Listed Waste
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry.	Toxic	Listed Waste
K051	API separator sludge from the petroleum refining industry.	Toxic	Listed Waste
K052	Tank bottoms (leaded) from the petroleum refining industry.	Toxic	Listed Waste
K060	Ammonia still lime sludge from coking operations.	Toxic	Listed Waste
K061	Emission control dust/sludge from the primary production of steel in electric furnaces.	Toxic	Listed Waste
K062	Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332).	Corrosive, Toxic	Listed Waste
K069	Emission control dust/sludge from secondary lead smelting. (Note: This listing is stayed administratively for sludge generated from secondary acid scrubber systems. The stay will remain in effect until further administrative action is taken. If EPA takes further action effecting this stay, EPA will publish a notice of the action in the Federal Register).	Toxic	Listed Waste
K071	Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.	Toxic	Listed Waste
K073	Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.	Toxic	Listed Waste
K083	Distillation bottoms from aniline production.	Toxic	Listed Waste
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes.	Toxic	Listed Waste
K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.	Toxic	Listed Waste
K087	Decanter tank tar sludge from coking operations.	Toxic	Listed Waste
K088	Spent potliners from primary aluminum reduction.	Toxic	Listed Waste
K093	Distillation light ends from the production of phthalic anhydride from ortho-xylene.	Toxic	Listed Waste
K094	Distillation bottoms from the production of phthalic anhydride from ortho-xylene.	Toxic	Listed Waste
K095	Distillation bottoms from the production of 1,1,1-trichloroethane.	Toxic	Listed Waste
K096	Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.	Toxic	Listed Waste
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.	Toxic	Listed Waste
K098	Untreated process wastewater from the production of toxaphene.	Toxic	Listed Waste
K099	Untreated wastewater from the production of 2,4-D.	Toxic	Listed Waste
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.	Toxic	Listed Waste
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	Toxic	Listed Waste
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	Toxic	Listed Waste
K103	Process residues from aniline extraction from the production of aniline.	Toxic	Listed Waste
K104	Combined wastewater streams generated from nitrobenzene/aniline production.	Toxic	Listed Waste
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.	Toxic	Listed Waste
K106	Wastewater treatment sludge from the mercury cell process in chlorine production.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K107	Column bottoms from product separation from the production of 1,1-dimethyl-hydrazine (UDMH) from carboxylic acid hydrazines.	Corrosive, Toxic	Listed Waste
K108	Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	Ignitable, Toxic	Listed Waste
K109	Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	Toxic	Listed Waste
K110	Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	Toxic	Listed Waste
K111	Product washwaters from the production of dinitrotoluene via nitration of toluene.	Corrosive, Toxic	Listed Waste
K112	Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.	Toxic	Listed Waste
K113	Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	Toxic	Listed Waste
K114	Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	Toxic	Listed Waste
K115	Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	Toxic	Listed Waste
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.	Toxic	Listed Waste
K117	Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene.	Toxic	Listed Waste
K118	Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.	Toxic	Listed Waste
K123	Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salt.	Toxic	Listed Waste
K124	Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.	Corrosive, Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K125	Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.	Toxic	Listed Waste
K126	Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts.	Toxic	Listed Waste
K131	Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide.	Corrosive, Toxic	Listed Waste
K132	Spent absorbent and wastewater separator solids from the production of methyl bromide.	Toxic	Listed Waste
K136	Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.	Toxic	Listed Waste
K141	Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations).	Toxic	Listed Waste
K142	Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.	Toxic	Listed Waste
K143	Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal.	Toxic	Listed Waste
K144	Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.	Toxic	Listed Waste
K145	Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.	Toxic	Listed Waste
K147	Tar storage tank residues from coal tar refining.	Toxic	Listed Waste
K148	Residues from coal tar distillation, including but not limited to, still bottoms.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K149	Distillation bottoms from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. (This waste does not include still bottoms from the distillation of benzyl chloride.).	Toxic	Listed Waste
K150	Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.	Toxic	Listed Waste
K151	Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha-(or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.	Toxic	Listed Waste
K156	Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.).	Toxic	Listed Waste
K157	Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.).	Toxic	Listed Waste
K158	Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.).	Toxic	Listed Waste
K159	Organics from the treatment of thiocarbamate wastes.	Toxic	Listed Waste
K161	Purification solids (including filtration, evaporation, and centrifugation solids), bag house dust and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126.).	Reactive, Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K169	Crude oil storage tank sediment from petroleum refining operations.	Toxic	Listed Waste
K170	Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations.	Toxic	Listed Waste
K171	Spent Hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media).	Ignitable, Toxic	Listed Waste
K172	Spent Hydrorefining catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media).	Ignitable, Toxic	Listed Waste
K174	Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (including sludges that result from commingled ethylene dichloride or vinyl chloride monomer wastewater and other wastewater), unless the sludges meet the following conditions: (i) they are disposed of in Subtitle C or non-hazardous landfill licensed or permitted by the state of federal government; (ii) they are not otherwise placed on the land prior to final disposal; and (iii) the generator maintains documentation demonstrating that the waste was either disposed of in an on-site landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in an off-site landfill. Respondents in any action brought to enforce the requirements of Subtitle C must, upon a showing by the government that the respondent managed wastewater treatment sludges from the production of vinyl chloride monomer or ethylene dichloride, demonstrate that they meet the terms of the exclusion set forth above. In doing so, they must provide appropriate documentation (e.g., contracts between the generator and the landfill owner/operator, invoices documenting delivery of waste to landfill, etc.) that the terms of the exclusion were met.	Toxic	Listed Waste
K175	Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process.	Toxic	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
K176	Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide).	Toxic	Listed Waste
K177	Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of intermediates (e.g., antimony metal or crude antimony oxide).	Toxic	Listed Waste
K178	Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride-ilmenite process.	Toxic	Listed Waste
K181	Non-wastewaters from the production of dyes and/or pigments (including non-wastewaters commingled at the point of generation with non-wastewaters from other processes) that, at the point of generation, contain mass loadings of any of the constituents identified in part 3 of this subparagraph that are equal to or greater than the corresponding part 3 levels, as determined on a calendar year basis. These wastes will not be hazardous if the non-wastewaters are: (i) disposed in a Subtitle D landfill unit subject to the design criteria in 40 CFR 258.40, (ii) disposed in a Subtitle C landfill unit subject to either Rule 1200-1-11-.06(14)(b) or Rule 1200-1-11-.05(14)(b); (iii) disposed in other Subtitle D landfill units that meet the design criteria in 40 CFR 258.40, Rule 1200-1-11-.06(14)(b), or Rule 1200-1-11-.05(14)(b); or (iv) treated in a combustion unit that is permitted under Subtitle C, or an onsite combustion unit that is permitted under the Clean Air Act. For the purposes of this listing, dyes and/or pigments production is defined in subpart 2(i) of this subparagraph. Part 4 of this subparagraph describes the process for demonstrating that a facility's non-wastewaters are not K181. This listing does not apply to wastes that are otherwise identified as hazardous under subparagraphs (b)-(e) of paragraph (3) of this Rule and subparagraphs (b)-(d) of paragraph (4) of this Rule at the point of generation. Also, the listing does not apply to wastes generated before any annual mass loading limit is met.	Toxicity Characteristic Waste	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
P001	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%	Acute Toxicity	Listed Waste
	Warfarin, & salts, when present at concentrations greater than 0.3%		
P002	Acetamide, N-(aminothioxomethyl)-	Acute Toxicity	Listed Waste
	1-Acetyl-2-thiourea		
P003	Acrolein	Acute Toxicity	Listed Waste
	2-Propenal		
P004	Aldrin	Acute Toxicity	Listed Waste
	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-		
P005	Allyl alcohol	Acute Toxicity	Listed Waste
	2-Propen-1-ol		
P006	Aluminum phosphide	Reactivity, Toxicity	Listed Waste
P007	5-(Aminomethyl)-3-isoxazolol	Acute Toxicity	Listed Waste
	3(2H)-Isoxazolone, 5-(aminomethyl)-		
P008	4-Aminopyridine	Acute Toxicity	Listed Waste
	4-Pyridinamine		
P009	Ammonium picrate	Reactivity	Listed Waste
	Phenol, 2,4,6-trinitro-, ammonium salt		
P010	Arsenic acid H_3AsO_4	Acute Toxicity	Listed Waste
P011	Arsenic oxide As_2O_5	Acute Toxicity	Listed Waste
	Arsenic pentoxide		
P012	Arsenic oxide As_2O_3	Acute Toxicity	Listed Waste
	Arsenic trioxide		
P013	Barium cyanide	Acute Toxicity	Listed Waste
P014	Benzenethiol	Acute Toxicity	Listed Waste
	Thiophenol		
P015	Beryllium powder	Acute Toxicity	Listed Waste
P016	Dichloromethyl ether	Acute Toxicity	Listed Waste
	Methane, oxybis[chloro-		
P017	Bromoacetone	Acute Toxicity	Listed Waste
	2-Propanone, 1-bromo-		
P018	Brucine	Acute Toxicity	Listed Waste
	Strychnidin-10-one, 2,3-dimethoxy-		
P020	Dinoseb	Acute Toxicity	Listed Waste
	Phenol, 2-(1-methylpropyl)-4,6-dinitro-		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
P021	Calcium cyanide Calcium cyanide Ca(CN)2	Acute Toxicity	Listed Waste
P022	Carbon disulfide	Acute Toxicity	Listed Waste
P023	Acetaldehyde, chloro- Chloroacetaldehyde	Acute Toxicity	Listed Waste
P024	Benzenamine, 4-chloro- p-Chloroaniline	Acute Toxicity	Listed Waste
P026	1-(o-Chlorophenyl)thiourea Thiourea, (2-chlorophenyl)-	Acute Toxicity	Listed Waste
P027	3-Chloropropionitrile Propanenitrile, 3-chloro-	Acute Toxicity	Listed Waste
P028	Benzene, (chloromethyl)- Benzyl chloride	Acute Toxicity	Listed Waste
P029	Copper cyanide Copper cyanide Cu(CN)	Acute Toxicity	Listed Waste
P030	Cyanides (soluble cyanide salts), not otherwise specified	Acute Toxicity	Listed Waste
P031	Cyanogen Ethanedinitrile	Acute Toxicity	Listed Waste
P033	Cyanogen chloride Cyanogen chloride (CN)Cl	Acute Toxicity	Listed Waste
P034	2-Cyclohexyl-4,6-dinitrophenol Phenol, 2-cyclohexyl-4,6-dinitro-	Acute Toxicity	Listed Waste
P036	Arsonous dichloride, phenyl- Dichlorophenylarsine	Acute Toxicity	Listed Waste
P037	Dieldrin 2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta, 7aalpha)-	Acute Toxicity	Listed Waste
P038	Arsine, diethyl- Diethylarsine	Acute Toxicity	Listed Waste
P039	Disulfoton Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester	Acute Toxicity	Listed Waste
P040	O,O-Diethyl O-pyrazinyl phosphorothioate Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	Acute Toxicity	Listed Waste
P041	Diethyl-p-nitrophenyl phosphate Phosphoric acid, diethyl 4-nitrophenyl ester	Acute Toxicity	Listed Waste
P042	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)- Epinephrine	Acute Toxicity	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
P043	Diisopropylfluorophosphate (DFP)	Acute Toxicity	Listed Waste
	Phosphorofluoridic acid, bis(1-methylethyl) ester		
P044	Dimethoate	Acute Toxicity	Listed Waste
	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester		
P045	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[(methylamino)carbonyl] oxime	Acute Toxicity	Listed Waste
	Thiofanox		
P046	Benzeneethanamine, alpha,alpha-dimethyl-	Acute Toxicity	Listed Waste
	alpha,alpha-Dimethylphenethylamine		
P047	4,6-Dinitro-o-cresol, & salts	Acute Toxicity	Listed Waste
	Phenol, 2-methyl-4,6-dinitro-, & salts		
P048	2,4-Dinitrophenol	Acute Toxicity	Listed Waste
	Phenol, 2,4-dinitro-		
P049	Dithiobiuret	Acute Toxicity	Listed Waste
	Thioimidodicarbonic diamide $[(H_2N)C(S)]_2NH$		
P050	Endosulfan	Acute Toxicity	Listed Waste
	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10- hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide		
P051	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta, 7aalpha)-, & metabolites	Acute Toxicity	Listed Waste
	Endrin		
	Endrin, & metabolites		
P054	Aziridine	Acute Toxicity	Listed Waste
	Ethyleneimine		
P056	Fluorine	Acute Toxicity	Listed Waste
P057	Acetamide, 2-fluoro-	Acute Toxicity	Listed Waste
	Fluoroacetamide		
P058	Acetic acid, fluoro-, sodium salt	Acute Toxicity	Listed Waste
	Fluoroacetic acid, sodium salt		
P059	Heptachlor	Acute Toxicity	Listed Waste
	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-		
P060	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-	Acute Toxicity	Listed Waste
	Isodrin		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
P062	Hexaethyl tetraphosphate Tetraphosphoric acid, hexaethyl ester	Acute Toxicity	Listed Waste
P063	Hydrocyanic acid Hydrogen cyanide	Acute Toxicity	Listed Waste
P064	Methane, isocyanato- Methyl isocyanate	Acute Toxicity	Listed Waste
P065	Fulminic acid, mercury(2+) salt Mercury fulminate	Reactivity, Toxicity	Listed Waste
P066	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester Methomyl	Acute Toxicity	Listed Waste
P067	Aziridine, 2-methyl- 1,2-Propylenimine	Acute Toxicity	Listed Waste
P068	Hydrazine, methyl- Methyl hydrazine	Acute Toxicity	Listed Waste
P069	2-Methyllactonitrile Propanenitrile, 2-hydroxy-2-methyl-	Acute Toxicity	Listed Waste
P070	Aldicarb Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime	Acute Toxicity	Listed Waste
P071	Methyl parathion Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester	Acute Toxicity	Listed Waste
P072	alpha-Naphthylthiourea Thiourea, 1-naphthalenyl-	Acute Toxicity	Listed Waste
P073	Nickel carbonyl Nickel carbonyl $Ni(CO)_4$, (T-4)-	Acute Toxicity	Listed Waste
P074	Nickel cyanide Nickel cyanide Ni(CN)2	Acute Toxicity	Listed Waste
P075	Nicotine, & salts Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts	Acute Toxicity	Listed Waste
P076	Nitric oxide Nitrogen oxide NO	Acute Toxicity	Listed Waste
P077	Benzenamine, 4-nitro- p-Nitroaniline	Acute Toxicity	Listed Waste
P078	Nitrogen dioxide Nitrogen oxide NO_2	Acute Toxicity	Listed Waste
P081	Nitroglycerine 1,2,3-Propanetriol, trinitrate	Reactivity	Listed Waste
P082	Methanamine, N-methyl-N-nitroso- N-Nitrosodimethylamine	Acute Toxicity	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
P084	N-Nitrosomethylvinylamine Vinylamine, N-methyl-N-nitroso-	Acute Toxicity	Listed Waste
P085	Diphosphoramide, octamethyl- Octamethylpyrophosphoramide	Acute Toxicity	Listed Waste
P087	Osmium oxide OsO_4, (T-4)- Osmium tetroxide	Acute Toxicity	Listed Waste
P088	Endothall 7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	Acute Toxicity	Listed Waste
P089	Parathion Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	Acute Toxicity	Listed Waste
P092	Mercury, (acetato-O)phenyl- Phenylmercury acetate	Acute Toxicity	Listed Waste
P093	Phenylthiourea Thiourea, phenyl-	Acute Toxicity	Listed Waste
P094	Phorate Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	Acute Toxicity	Listed Waste
P095	Carbonic dichloride Phosgene	Acute Toxicity	Listed Waste
P096	Hydrogen phosphide Phosphine	Acute Toxicity	Listed Waste
P097	Famphur Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester	Acute Toxicity	Listed Waste
P098	Potassium cyanide Potassium cyanide K(CN)	Acute Toxicity	Listed Waste
P099	Argentate(1-), bis(cyano-C)-, potassium Potassium silver cyanide	Acute Toxicity	Listed Waste
P101	Ethyl cyanide Propanenitrile	Acute Toxicity	Listed Waste
P102	Propargyl alcohol 2-Propyn-1-ol	Acute Toxicity	Listed Waste
P103	Selenourea	Acute Toxicity	Listed Waste
P104	Silver cyanide Silver cyanide Ag(CN)	Acute Toxicity	Listed Waste
P105	Sodium azide	Acute Toxicity	Listed Waste
P106	Sodium cyanide Sodium cyanide Na(CN)	Acute Toxicity	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
P108	Strychnidin-10-one, & salts Strychnine, & salts	Acute Toxicity	Listed Waste
P109	Tetraethyldithiopyrophosphate Thiodiphosphoric acid, tetraethyl ester	Acute Toxicity	Listed Waste
P110	Plumbane, tetraethyl- Tetraethyl lead	Acute Toxicity	Listed Waste
P111	Diphosphoric acid, tetraethyl ester Tetraethyl pyrophosphate	Acute Toxicity	Listed Waste
P112	Methane, tetranitro- Tetranitromethane	Reactivity	Listed Waste
P113	Thallic oxide Thallium oxide Tl_2O_3	Acute Toxicity	Listed Waste
P114	Selenious acid, dithallium(1+) salt Thallium(I) selenite	Acute Toxicity	Listed Waste
P115	Sulfuric acid, dithallium(1+) salt Thallium(I) sulfate	Acute Toxicity	Listed Waste
P116	Hydrazinecarbothioamide Thiosemicarbazide	Acute Toxicity	Listed Waste
P118	Methanethiol, trichloro- Trichloromethanethiol	Acute Toxicity	Listed Waste
P119	Ammonium vanadate Vanadic acid, ammonium salt	Acute Toxicity	Listed Waste
P120	Vanadium oxide V_2O_5 Vanadium pentoxide	Acute Toxicity	Listed Waste
P121	Zinc cyanide Zinc cyanide Zn(CN)2	Acute Toxicity	Listed Waste
P122	Zinc phosphide Zn_3P_2, when present at concentrations greater than 10%	Reactivity, Toxicity	Listed Waste
P123	Toxaphene	Acute Toxicity	Listed Waste
P127	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate Carbofuran	Acute Toxicity	Listed Waste
P128	Mexacarbate Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester)	Acute Toxicity	Listed Waste
P185	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O-[(methylamino)-carbonyl]oxime Tirpate	Acute Toxicity	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
P188	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a, 8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1)	Acute Toxicity	Listed Waste
	Physostigmine salicylate		
P189	Carbamic acid, [(dibutylamino)- thio]methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester	Acute Toxicity	Listed Waste
	Carbosulfan		
P190	Carbamic acid, methyl-, 3-methylphenyl ester	Acute Toxicity	Listed Waste
	Metolcarb		
P191	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]- 5-methyl-1H-pyrazol-3-yl ester	Acute Toxicity	Listed Waste
	Dimetilan		
P192	Carbamic acid, dimethyl-, 3-methyl-1- (1-methylethyl)-1H- pyrazol-5-yl ester	Acute Toxicity	Listed Waste
	Isolan		
P194	Ethanimidothioc acid, 2-(dimethylamino)-N-[[(methylamino) carbonyl]oxy]-2-oxo-, methyl ester	Acute Toxicity	Listed Waste
	Oxamyl		
P196	Manganese, bis(dimethylcarbamodithioato-S,S')-	Acute Toxicity	Listed Waste
	Manganese dimethyldithiocarbamate		
P197	Formparanate	Acute Toxicity	Listed Waste
	Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[(methylamino)carbonyl]oxy]phenyl]-		
P198	Formetanate hydrochloride	Acute Toxicity	Listed Waste
	Methanimidamide, N,N-dimethyl-N'-[3-[[(methylamino)-carbonyl]oxy]phenyl]-, monohydrochloride		
P199	Methiocarb	Acute Toxicity	Listed Waste
	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate		
P201	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate	Acute Toxicity	Listed Waste
	Promecarb		
P202	m-Cumenyl methylcarbamate	Acute Toxicity	Listed Waste
	3-Isopropylphenyl N-methylcarbamate		
	Phenol, 3-(1-methylethyl)-, methyl carbamate		
P203	Aldicarb sulfone	Acute Toxicity	Listed Waste
	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime		
P204	Physostigmine	Acute Toxicity	Listed Waste
	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-		
P205	Zinc, bis(dimethylcarbamodithioato-S,S')-	Acute Toxicity	Listed Waste
	Ziram		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U001	Acetaldehyde	Ignitability	Listed Waste
	Ethanal		
U002	Acetone	Ignitability	Listed Waste
	2-Propanone		
U003	Acetonitrile	Ignitability, Toxicity	Listed Waste
U004	Acetophenone	Toxicity	Listed Waste
	Ethanone, 1-phenyl-		
U005	Acetamide, N-9H-fluoren-2-yl-	Toxicity	Listed Waste
	2-Acetylaminofluorene		
U006	Acetyl chloride	Corrosivity, Reactivity, Toxicity	Listed Waste
U007	Acrylamide	Toxicity	Listed Waste
	2-Propenamide		
U008	Acrylic acid	Ignitability	Listed Waste
	2-Propenoic acid		
U009	Acrylonitrile	Toxicity	Listed Waste
	2-Propenenitrile		
U010	Azirino[2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta,8aalpha,8balpha)]-	Toxicity	Listed Waste
	Mitomycin C		
U011	Amitrole	Toxicity	Listed Waste
	1H-1,2,4-Triazol-3-amine		
U012	Aniline	Ignitability, Toxicity	Listed Waste
	Benzenamine		
U014	Auramine	Toxicity	Listed Waste
	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-		
U015	Azaserine	Toxicity	Listed Waste
	L-Serine, diazoacetate (ester)		
U016	Benz[c]acridine	Toxicity	Listed Waste
U017	Benzal chloride	Toxicity	Listed Waste
	Benzene, (dichloromethyl)-		
U018	Benz[a]anthracene	Toxicity	Listed Waste
U019	Benzene	Ignitability, Toxicity	Listed Waste
U020	Benzenesulfonic acid chloride	Corrosivity, Reactivity	Listed Waste
	Benzenesulfonyl chloride		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U021	Benzidine	Toxicity	Listed Waste
	[1,1'-Biphenyl]-4,4'-diamine		
U022	Benzo[a]pyrene	Toxicity	Listed Waste
U023	Benzene, (trichloromethyl)-	Toxicity	Listed Waste
	Benzotrichloride	Corrosivity, Reactivity, Toxicity	
U024	Dichloromethoxy ethane	Toxicity	Listed Waste
	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-		
U025	Dichloroethyl ether	Toxicity	Listed Waste
	Ethane, 1,1'-oxybis[2-chloro-		
U026	Chlornaphazin	Toxicity	Listed Waste
	Naphthalenamine, N,N'-bis(2-chloroethyl)-		
U027	Dichloroisopropyl ether	Toxicity	Listed Waste
	Propane, 2,2'-oxybis[2-chloro-		
U028	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	Toxicity	Listed Waste
	Diethylhexyl phthalate		
U029	Methane, bromo-	Toxicity	Listed Waste
	Methyl bromide		
U030	Benzene, 1-bromo-4-phenoxy-	Toxicity	Listed Waste
	4-Bromophenyl phenyl ether		
U031	1-Butanol	Ignitability	Listed Waste
	n-Butyl alcohol		
U032	Calcium chromate	Toxicity	Listed Waste
	Chromic acid H_2CrO_4, calcium salt		
U033	Carbonic difluoride	Toxicity	Listed Waste
	Carbon oxyfluoride	Reactivity, Toxicity	
U034	Acetaldehyde, trichloro-	Toxicity	Listed Waste
	Chloral		
U035	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-	Toxicity	Listed Waste
	Chlorambucil		
U036	Chlordane, alpha & gamma isomers	Toxicity	Listed Waste
	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-		
U037	Benzene, chloro-	Toxicity	Listed Waste
	Chlorobenzene		
U038	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	Toxicity	Listed Waste
	Chlorobenzilate		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U039	p-Chloro-m-cresol Phenol, 4-chloro-3-methyl-	Toxicity	Listed Waste
U041	Epichlorohydrin Oxirane, (chloromethyl)-	Toxicity	Listed Waste
U042	2-Chloroethyl vinyl ether Ethene, (2-chloroethoxy)-	Toxicity	Listed Waste
U043	Ethene, chloro- Vinyl chloride	Toxicity	Listed Waste
U044	Chloroform Methane, trichloro-	Toxicity	Listed Waste
U045	Methane, chloro- Methyl chloride	Ignitability, Toxicity	Listed Waste
U046	Chloromethyl methyl ether Methane, chloromethoxy-	Toxicity	Listed Waste
U047	beta-Chloronaphthalene Naphthalene, 2-chloro-	Toxicity	Listed Waste
U048	o-Chlorophenol Phenol, 2-chloro-	Toxicity	Listed Waste
U049	Benzenamine, 4-chloro-2-methyl-, hydrochloride 4-Chloro-o-toluidine, hydrochloride	Toxicity	Listed Waste
U050	Chrysene	Toxicity	Listed Waste
U051	Creosote	Toxicity	Listed Waste
U052	Cresol (Cresylic acid) Phenol, methyl-	Toxicity	Listed Waste
U053	2-Butenal Crotonaldehyde	Toxicity	Listed Waste
U055	Benzene, (1-methylethyl)- Cumene	Ignitability	Listed Waste
U056	Benzene, hexahydro- Cyclohexane	Ignitability	Listed Waste
U057	Cyclohexanone	Ignitability	Listed Waste
U058	Cyclophosphamide 2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide	Toxicity	Listed Waste
U059	Daunomycin 5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopyranosyl) oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-	Toxicity	Listed Waste
U060	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro- DDD	Toxicity	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U061	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	Toxicity	Listed Waste
	DDT		
U062	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester	Toxicity	Listed Waste
	Diallate		
U063	Dibenz[a,h]anthracene	Toxicity	Listed Waste
U064	Benzo[rst]pentaphene	Toxicity	Listed Waste
	Dibenzo[a,i]pyrene		
U066	1,2-Dibromo-3-chloropropane	Toxicity	Listed Waste
	Propane, 1,2-dibromo-3-chloro-		
U067	Ethane, 1,2-dibromo-	Toxicity	Listed Waste
	Ethylene dibromide		
U068	Methane, dibromo-	Toxicity	Listed Waste
	Methylene bromide		
U069	1,2-Benzenedicarboxylic acid, dibutyl ester	Toxicity	Listed Waste
	Dibutyl phthalate		
U070	Benzene, 1,2-dichloro-	Toxicity	Listed Waste
	o-Dichlorobenzene		
U071	Benzene, 1,3-dichloro-	Toxicity	Listed Waste
	m-Dichlorobenzene		
U072	Benzene, 1,4-dichloro-	Toxicity	Listed Waste
	p-Dichlorobenzene		
U073	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	Toxicity	Listed Waste
	3,3'-Dichlorobenzidine		
U074	2-Butene, 1,4-dichloro-	Ignitability, Toxicity	Listed Waste
	1,4-Dichloro-2-butene		
U075	Dichlorodifluoromethane	Toxicity	Listed Waste
	Methane, dichlorodifluoro-		
U076	Ethane, 1,1-dichloro-	Toxicity	Listed Waste
	Ethylidene dichloride		
U077	Ethane, 1,2-dichloro-	Toxicity	Listed Waste
	Ethylene dichloride		
U078	1,1-Dichloroethylene	Toxicity	Listed Waste
	Ethene, 1,1-dichloro-		
U079	1,2-Dichloroethylene	Toxicity	Listed Waste
	Ethene, 1,2-dichloro-, (E)-		
U080	Methane, dichloro-	Toxicity	Listed Waste
	Methylene chloride		
U081	2,4-Dichlorophenol	Toxicity	Listed Waste
	Phenol, 2,4-dichloro-		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U082	2,6-Dichlorophenol	Toxicity	Listed Waste
	Phenol, 2,6-dichloro-		
U083	Propane, 1,2-dichloro-	Toxicity	Listed Waste
	Propylene dichloride		
U084	1,3-Dichloropropene	Toxicity	Listed Waste
	1-Propene, 1,3-dichloro-		
U085	2,2'-Bioxirane	Toxicity	Listed Waste
	1,2:3,4-Diepoxybutane	Ignitability, Toxicity	
U086	N,N'-Diethylhydrazine	Toxicity	Listed Waste
	Hydrazine, 1,2-diethyl-		
U087	O,O-Diethyl S-methyl dithiophosphate	Toxicity	Listed Waste
	Phosphorodithioic acid, O,O-diethyl S-methyl ester		
U088	1,2-Benzenedicarboxylic acid, diethyl ester	Toxicity	Listed Waste
	Diethyl phthalate		
U089	Diethylstilbesterol	Toxicity	Listed Waste
	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-		
U090	1,3-Benzodioxole, 5-propyl-	Toxicity	Listed Waste
	Dihydrosafrole		
U091	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-	Toxicity	Listed Waste
	3,3'-Dimethoxybenzidine		
U092	Dimethylamine	Ignitability	Listed Waste
	Methanamine, N-methyl-		
U093	Benzenamine, N,N-dimethyl-4-(phenylazo)-	Toxicity	Listed Waste
	p-Dimethylaminoazobenzene		
U094	Benz[a]anthracene, 7,12-dimethyl-	Toxicity	Listed Waste
	7,12-Dimethylbenz[a]anthracene		
U095	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	Toxicity	Listed Waste
	3,3'-Dimethylbenzidine		
U096	alpha,alpha-Dimethylbenzylhydroperoxide	Reactivity	Listed Waste
	Hydroperoxide, 1-methyl-1-phenylethyl-		
U097	Carbamic chloride, dimethyl-	Toxicity	Listed Waste
	Dimethylcarbamoyl chloride		
U098	1,1-Dimethylhydrazine	Toxicity	Listed Waste
	Hydrazine, 1,1-dimethyl-		
U099	1,2-Dimethylhydrazine	Toxicity	Listed Waste
	Hydrazine, 1,2-dimethyl-		
U101	2,4-Dimethylphenol	Toxicity	Listed Waste
	Phenol, 2,4-dimethyl-		
U102	1,2-Benzenedicarboxylic acid, dimethyl ester	Toxicity	Listed Waste
	Dimethyl phthalate		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U103	Dimethyl sulfate	Toxicity	Listed Waste
	Sulfuric acid, dimethyl ester		
U105	Benzene, 1-methyl-2,4-dinitro-	Toxicity	Listed Waste
	2,4-Dinitrotoluene		
U106	Benzene, 2-methyl-1,3-dinitro-	Toxicity	Listed Waste
	2,6-Dinitrotoluene		
U107	1,2-Benzenedicarboxylic acid, dioctyl ester	Toxicity	Listed Waste
	Di-n-octyl phthalate		
U108	1,4-Diethyleneoxide	Toxicity	Listed Waste
	1,4-Dioxane		
U109	1,2-Diphenylhydrazine	Toxicity	Listed Waste
	Hydrazine, 1,2-diphenyl-		
U110	Dipropylamine	Ignitability	Listed Waste
	1-Propanamine, N-propyl-		
U111	Di-n-propylnitrosamine	Toxicity	Listed Waste
	1-Propanamine, N-nitroso-N-propyl-		
U112	Acetic acid, ethyl ester	Ignitability	Listed Waste
	Ethyl acetate		
U113	Ethyl acrylate	Ignitability	Listed Waste
	2-Propenoic acid, ethyl ester		
U114	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters	Toxicity	Listed Waste
	Ethylenebisdithiocarbamic acid, salts & esters		
U115	Ethylene oxide	Ignitability, Toxicity	Listed Waste
	Oxirane		
U116	Ethylenethiourea	Toxicity	Listed Waste
	2-Imidazolidinethione		
U117	Ethane, 1,1'-oxybis-	Ignitability	Listed Waste
	Ethyl ether		
U118	Ethyl methacrylate	Toxicity	Listed Waste
	2-Propenoic acid, 2-methyl-, ethyl ester		
U119	Ethyl methanesulfonate	Toxicity	Listed Waste
	Methanesulfonic acid, ethyl ester		
U120	Fluoranthene	Toxicity	Listed Waste
U121	Methane, trichlorofluoro-	Toxicity	Listed Waste
	Trichloromonofluoromethane		
U122	Formaldehyde	Toxicity	Listed Waste
U123	Formic acid	Corrosivity, Toxicity	Listed Waste
U124	Furan	Ignitability	Listed Waste
	Furfuran		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U125	2-Furancarboxaldehyde	Ignitability	Listed Waste
	Furfural		
U126	Glycidylaldehyde	Toxicity	Listed Waste
	Oxiranecarboxyaldehyde		
U127	Benzene, hexachloro-	Toxicity	Listed Waste
	Hexachlorobenzene		
U128	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	Toxicity	Listed Waste
	Hexachlorobutadiene		
U129	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha,6beta)-	Toxicity	Listed Waste
	Lindane		
U130	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	Toxicity	Listed Waste
	Hexachlorocyclopentadiene		
U131	Ethane, hexachloro-	Toxicity	Listed Waste
	Hexachloroethane		
U132	Hexachlorophene	Toxicity	Listed Waste
	Phenol, 2,2'-methylenebis[3,4,6-trichloro-		
U133	Hydrazine	Reactivity, Toxicity	Listed Waste
U134	Hydrofluoric acid	Corrosivity, Toxicity	Listed Waste
	Hydrogen fluoride		
U135	Hydrogen sulfide	Toxicity	Listed Waste
	Hydrogen sulfide H_2S		
U136	Arsinic acid, dimethyl-	Toxicity	Listed Waste
	Cacodylic acid		
U137	Indeno[1,2,3-cd]pyrene	Toxicity	Listed Waste
U138	Methane, iodo-	Toxicity	Listed Waste
	Methyl iodide		
U140	Isobutyl alcohol	Ignitability, Toxicity	Listed Waste
	1-Propanol, 2-methyl-		
U141	1,3-Benzodioxole, 5-(1-propenyl)-	Toxicity	Listed Waste
	Isosafrole		
U142	Kepone	Toxicity	Listed Waste
	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-		
U143	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy- 2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*),7aalpha]]-	Toxicity	Listed Waste
	Lasiocarpine		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U144	Acetic acid, lead(2+) salt	Toxicity	Listed Waste
	Lead acetate		
U145	Lead phosphate	Toxicity	Listed Waste
	Phosphoric acid, lead(2+) salt (2:3)		
U146	Lead, bis(acetato-O)tetrahydroxytri-	Toxicity	Listed Waste
	Lead subacetate		
U147	2,5-Furandione	Toxicity	Listed Waste
	Maleic anhydride		
U148	Maleic hydrazide	Toxicity	Listed Waste
	3,6-Pyridazinedione, 1,2-dihydro-		
U149	Malononitrile	Toxicity	Listed Waste
	Propanedinitrile		
U150	Melphalan	Toxicity	Listed Waste
	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-		
U151	Mercury	Toxicity	Listed Waste
U152	Methacrylonitrile	Ignitability, Toxicity	Listed Waste
	2-Propenenitrile, 2-methyl-		
U153	Methanethiol	Ignitability, Toxicity	Listed Waste
	Thiomethanol		
U154	Methanol	Ignitability	Listed Waste
	Methyl alcohol		
U155	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	Toxicity	Listed Waste
	Methapyrilene		
U156	Carbonochloridic acid, methyl ester	Ignitability, Toxicity	Listed Waste
	Methyl chlorocarbonate		
U157	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	Toxicity	Listed Waste
	3-Methylcholanthrene		
U158	Benzenamine, 4,4'-methylenebis[2-chloro-	Toxicity	Listed Waste
	4,4'-Methylenebis(2-chloroaniline)		
U159	2-Butanone	Ignitability, Toxicity	Listed Waste
	Methyl ethyl ketone (MEK)		
U160	2-Butanone peroxide	Reactivity, Toxicity	Listed Waste
	Methyl ethyl ketone peroxide		
U161	Methyl isobutyl ketone	Ignitability	Listed Waste
	4-Methyl-2-pentanone		
	Pentanol, 4-methyl-	Toxicity	

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U162	Methyl methacrylate	Ignitability, Toxicity	Listed Waste
	2-Propenoic acid, 2-methyl-, methyl ester		
U163	Guanidine, N-methyl-N'-nitro-N-nitroso-	Toxicity	Listed Waste
	MNNG		
U164	Methylthiouracil	Toxicity	Listed Waste
	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-		
U165	Naphthalene	Toxicity	Listed Waste
U166	1,4-Naphthalenedione	Toxicity	Listed Waste
	1,4-Naphthoquinone		
U167	1-Naphthalenamine	Toxicity	Listed Waste
	alpha-Naphthylamine		
U168	2-Naphthalenamine	Toxicity	Listed Waste
	beta-Naphthylamine		
U169	Benzene, nitro-	Toxicity	Listed Waste
	Nitrobenzene	Ignitability, Toxicity	
U170	p-Nitrophenol	Toxicity	Listed Waste
	Phenol, 4-nitro-		
U171	2-Nitropropane	Ignitability, Toxicity	Listed Waste
	Propane, 2-nitro-		
U172	1-Butanamine, N-butyl-N-nitroso-	Toxicity	Listed Waste
	N-Nitrosodi-n-butylamine		
U173	Ethanol, 2,2'-(nitrosoimino)bis-	Toxicity	Listed Waste
	N-Nitrosodiethanolamine		
U174	Ethanamine, N-ethyl-N-nitroso-	Toxicity	Listed Waste
	N-Nitrosodiethylamine		
U176	N-Nitroso-N-ethylurea	Toxicity	Listed Waste
	Urea, N-ethyl-N-nitroso-		
U177	N-Nitroso-N-methylurea	Toxicity	Listed Waste
	Urea, N-methyl-N-nitroso-		
U178	Carbamic acid, methylnitroso-, ethyl ester	Toxicity	Listed Waste
	N-Nitroso-N-methylurethane		
U179	N-Nitrosopiperidine	Toxicity	Listed Waste
	Piperidine, 1-nitroso-		
U180	N-Nitrosopyrrolidine	Toxicity	Listed Waste
	Pyrrolidine, 1-nitroso-		
U181	Benzenamine, 2-methyl-5-nitro-	Toxicity	Listed Waste
	5-Nitro-o-toluidine		
U182	Paraldehyde	Toxicity	Listed Waste
	1,3,5-Trioxane, 2,4,6-trimethyl-		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U183	Benzene, pentachloro-	Toxicity	Listed Waste
	Pentachlorobenzene		
U184	Ethane, pentachloro-	Toxicity	Listed Waste
	Pentachloroethane		
U185	Benzene, pentachloronitro-	Toxicity	Listed Waste
	Pentachloronitrobenzene (PCNB)		
U186	1-Methylbutadiene	Ignitability	Listed Waste
	1,3-Pentadiene		
U187	Acetamide, N-(4-ethoxyphenyl)-	Toxicity	Listed Waste
	Phenacetin		
U188	Phenol	Toxicity	Listed Waste
U189	Phosphorus sulfide	Reactivity	Listed Waste
	Sulfur phosphide		
U190	1,3-Isobenzofurandione	Toxicity	Listed Waste
	Phthalic anhydride		
U191	2-Picoline	Toxicity	Listed Waste
	Pyridine, 2-methyl-		
U192	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	Toxicity	Listed Waste
	Pronamide		
U193	1,2-Oxathiolane, 2,2-dioxide	Toxicity	Listed Waste
	1,3-Propane sultone		
U194	1-Propanamine	Ignitability, Toxicity	Listed Waste
	n-Propylamine		
U196	Pyridine	Toxicity	Listed Waste
U197	p-Benzoquinone	Toxicity	Listed Waste
	2,5-Cyclohexadiene-1,4-dione		
U200	Reserpine	Toxicity	Listed Waste
	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester, (3beta,16beta,17alpha,18beta,20alpha)-		
U201	1,3-Benzenediol	Toxicity	Listed Waste
	Resorcinol		
U202	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts	Toxicity	Listed Waste
	Saccharin, & salts		
U203	1,3-Benzodioxole, 5-(2-propenyl)-	Toxicity	Listed Waste
	Safrole		
U204	Selenious acid	Toxicity	Listed Waste
	Selenium dioxide		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U205	Selenium sulfide	Toxicity	Listed Waste
	Selenium sulfide SeS_2	Reactivity, Toxicity	
U206	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-	Toxicity	Listed Waste
	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-		
	Streptozotocin		
U207	Benzene, 1,2,4,5-tetrachloro-	Toxicity	Listed Waste
	1,2,4,5-Tetrachlorobenzene		
U208	Ethane, 1,1,1,2-tetrachloro-	Toxicity	Listed Waste
	1,1,1,2-Tetrachloroethane		
U209	Ethane, 1,1,2,2-tetrachloro-	Toxicity	Listed Waste
	1,1,2,2-Tetrachloroethane		
U210	Ethene, tetrachloro-	Toxicity	Listed Waste
	Tetrachloroethylene		
U211	Carbon tetrachloride	Toxicity	Listed Waste
	Methane, tetrachloro-		
U213	Furan, tetrahydro-	Ignitability	Listed Waste
	Tetrahydrofuran		
U214	Acetic acid, thallium(1+) salt	Toxicity	Listed Waste
	Thallium(I) acetate		
U215	Carbonic acid, dithallium(1+) salt	Toxicity	Listed Waste
	Thallium(I) carbonate		
U216	Thallium(I) chloride	Toxicity	Listed Waste
	Thallium chloride TlCl		
U217	Nitric acid, thallium(1+) salt	Toxicity	Listed Waste
	Thallium(I) nitrate		
U218	Ethanethioamide	Toxicity	Listed Waste
	Thioacetamide		
U219	Thiourea	Toxicity	Listed Waste
U220	Benzene, methyl-	Toxicity	Listed Waste
	Toluene		
U221	Benzenediamine, ar-methyl-	Toxicity	Listed Waste
	Toluenediamine		
U222	Benzenamine, 2-methyl-, hydrochloride	Toxicity	Listed Waste
	o-Toluidine hydrochloride		
U223	Benzene, 1,3-diisocyanatomethyl-	Reactivity, Toxicity	Listed Waste
	Toluene diisocyanate		
U225	Bromoform	Toxicity	Listed Waste
	Methane, tribromo-		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U226	Ethane, 1,1,1-trichloro-	Toxicity	Listed Waste
	Methyl chloroform		
U227	Ethane, 1,1,2-trichloro-	Toxicity	Listed Waste
	1,1,2-Trichloroethane		
U228	Ethene, trichloro-	Toxicity	Listed Waste
	Trichloroethylene		
U234	Benzene, 1,3,5-trinitro-	Toxicity	Listed Waste
	1,3,5-Trinitrobenzene	Reactivity, Toxicity	
U235	1-Propanol, 2,3-dibromo-, phosphate (3:1)	Toxicity	Listed Waste
	Tris(2,3-dibromopropyl) phosphate		
U236	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt	Toxicity	Listed Waste
	Trypan blue		
U237	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-	Toxicity	Listed Waste
	Uracil mustard		
U238	Carbamic acid, ethyl ester	Toxicity	Listed Waste
	Ethyl carbamate (urethane)		
U239	Benzene, dimethyl-	Ignitability, Toxicity	Listed Waste
	Xylene	Ignitability	
U240	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters	Toxicity	Listed Waste
	2,4-D, salts & esters		
U243	Hexachloropropene	Toxicity	Listed Waste
	1-Propene, 1,1,2,3,3,3-hexachloro-		
U244	Thioperoxydicarbonic diamide $[(H_2N)C(S)]_2S_2$, tetramethyl-	Toxicity	Listed Waste
	Thiram		
U246	Cyanogen bromide (CN)Br	Toxicity	Listed Waste
U247	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-	Toxicity	Listed Waste
	Methoxychlor		
U248	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations of 0.3% or less	Toxicity	Listed Waste
	Warfarin, & salts, when present at concentrations of 0.3% or less		
U249	Zinc phosphide Zn_3P_2, when present at concentrations of 10% or less	Toxicity	Listed Waste

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U271	Benomyl	Toxicity	Listed Waste
	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2- yl]-, methyl ester		
U278	Bendiocarb	Toxicity	Listed Waste
	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate		
U279	Carbaryl	Toxicity	Listed Waste
	1-Naphthalenol, methylcarbamate		
U280	Barban	Toxicity	Listed Waste
	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester		
U328	Benzenamine, 2-methyl-	Toxicity	Listed Waste
	o-Toluidine		
U353	Benzenamine, 4-methyl-	Toxicity	Listed Waste
	p-Toluidine		
U359	Ethanol, 2-ethoxy-	Toxicity	Listed Waste
	Ethylene glycol monoethyl ether		
U364	Bendiocarb phenol	Toxicity	Listed Waste
	1,3-Benzodioxol-4-ol, 2,2-dimethyl-		
U367	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-	Toxicity	Listed Waste
	Carbofuran phenol		
U372	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester	Toxicity	Listed Waste
	Carbendazim		
U373	Carbamic acid, phenyl-, 1-methylethyl ester	Toxicity	Listed Waste
	Propham		
U387	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester	Toxicity	Listed Waste
	Prosulfocarb		
U389	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester	Toxicity	Listed Waste
	Triallate		
U394	A2213	Toxicity	Listed Waste
	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester		
U395	Diethylene glycol, dicarbamate	Toxicity	Listed Waste
	Ethanol, 2,2'-oxybis-, dicarbamate		
U404	Ethanamine, N,N-diethyl-	Toxicity	Listed Waste
	Triethylamine		
U409	Carbamic acid, [1,2-phenylenebis (iminocarbonothioyl)]bis-, dimethyl ester	Toxicity	Listed Waste
	Thiophanate-methyl		

HAZARDOUS WASTES TO BE MANAGED (CONTINUED)

EPA Hazardous Waste Code	Contaminant	Hazard	Basis
U410	Ethanimidothioic acid, N,N'-[thiobis[(methylimino)carbonyloxy]]bis-, dimethyl ester	Toxicity	Listed Waste
	Thiodicarb		
U411	Phenol, 2-(1-methylethoxy)-, methylcarbamate	Toxicity	Listed Waste
	Propoxur		

ATTACHMENT 2

WASTE ANALYSIS PLAN

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A. INTRODUCTION

This document describes the procedures that are performed by the Excel TSD of Tennessee, L.L.C. hazardous waste management facility ("ETSD" or "Facility") to obtain the detailed chemical and physical information necessary for the Facility to manage hazardous waste safely and effectively and in compliance with applicable requirements of Tennessee Rule 0400-12-01-.06 [equivalent to 40 CFR Part 264] and Tennessee Rule 0400-12-01-.10 [equivalent to 40 CFR Part 268]. Although a standard waste profile must be obtained for each waste stream received, the level of detail required relative to the chemical constituents and physical characteristics of a waste stream will to a degree depend upon how it will be managed at the Facility. If the waste is to remain in the container in which it was received and simply be stored until it is shipped off-site to another properly authorized waste management facility, then not as much information may be required as it would be for a waste stream that may be mixed with others as it is processed by ETSD.

B. SUMMARY DESCRIPTION OF WASTE ACCEPTANCE PROCEDURES

Hazardous wastes are received at the Facility in containers that arrive by truck. The containers range in size and shape from 6,000-gallon tanker trucks to consumer-sized containers of one-gallon size or smaller. Smaller containers may be packaged in larger containers such as 55-gallon drums, one cubic yard boxes, or may be shipped shrink wrapped on pallets. All containers of waste shall arrive in individual shipments accompanied by a hazardous waste manifest which describes the shipment.

Before a container of waste can be *accepted* by the Facility for processing, the following must occur:

- The waste stream (by generator/shipper) must be pre-approved by ETSD as described in Subsection 2.C below, and

- The waste shipment must successfully complete ETSD's shipment screening procedure described in Subsection 2.D below.

ETSD strives to ensure that the pre-approval process is completed before the waste stream is ever shipped to the Facility. However, occasionally a container holding a new waste stream is received at the Facility either by accidental shipment or by discovery that the waste as received does not conform to the pre-approved material profile. In such case, the unapproved waste containers are rejected and ETSD personnel will contact the generator/shipper and work with him/her to ensure that the rejected containers of wastes are properly managed. If the transporter has not yet left the Facility, the container may be re-loaded (if necessary) onto the truck for the transporter to return the container of waste to the generator/shipper. However, such rejected containers may be held at the Facility for a few calendar days while ETSD personnel work with the generator/shipper to successfully complete the pre-approval process for the new waste stream and then the containers are accepted and managed by ETSD. Alternatively, the container may be held for up to 60 calendar days while arrangements are being made to either (1) return it to the generator/shipper, or (2) ship it from ETSD to another facility designated by the generator/shipper. As described in Paragraph 2.E.2, ETSD must complete either option within 60 calendar days.

[Note: The above paragraph highlights the difference between waste containers that have been *received* at the Facility versus those that have been *accepted* by the Facility. As described, a container of waste may be *received* by the Facility – with signature of the manifest and departure of the transporter – but may subsequently not be *accepted.* This occurs as an undesirable but inevitable result of human errors and other factors in the transportation process. Such containers are then held at the Facility for 60 calendar days while arrangements are being made to either accept it into the Facility or to transport it back to the generator/shipper or to another facility identified by the generator/shipper.]

C. WASTE STREAM PRE-APPROVAL PROCEDURES

Before a waste stream is accepted into the Facility, it must first go through a pre-approval process that determines whether and how it can be managed, and the pricing associated with such management. The generator/shipper initiates the process by completing and submitting to ETSD a Waste Material Profile form ("MPF"). ETSD personnel may assist in the preparation of the MPF, but the form must be signed and certified as complete and accurate by a representative of the generator/shipper. The pre-approval process is based on the information provided on and/or with the MPF.

A copy of the current MPF utilized by ETSD is included in Attachment 2-1. It is a 4-page form that requires information about the generator of the candidate waste as well as substantial information about the candidate waste itself that is designed to enable ETSD personnel to determine if and how the waste can be safely and effectively managed at the ETSD facility. Among other things, the MPF requires basic information identifying the waste stream and the generator/shipper; detailed physical and chemical information characterizing the waste stream; the identification of all applicable USEPA hazardous waste codes; shipping information required under U.S. Department of Transportation Hazardous Materials Transportation regulations; information on the expected frequency of shipments and the waste volumes and container types involved; and supplemental information necessary to ensure compliance with the hazardous waste Land Disposal Restrictions requirements of Tennessee Rule 0400-12-01-.10 [equivalent to 40 CFR Part 268]. The generator/shipper's dated signature certifying the accuracy and completeness of the information provided is required at the bottom of page 2. Along with the completed MPF, the generator/shipper is also asked to provide Safety Data Sheets and/or any pertinent, available laboratory analysis reports from previous testing of the waste stream.

[Note: Because of the similar information requirements of other commercial hazardous waste management facilities, a similar profile form from such a facility may also be accepted as long as all information required in the MPF is provided, and it is signed and certified as accurate and complete.]

Upon receipt of a new MPF, ETSD personnel review the MPF and attached information for completeness and to determine how the material can be safely and effectively managed at the Facility (in compliance with applicable regulatory and permit requirements) and the pricing associated with such management. Occasionally, and especially if the waste stream is unusual, additional information may have to be obtained to complete the evaluation. This could include obtaining a representative sample of the waste stream for testing for compatibility, treatability, etc.

Pre-approval of a "lab pack" is a special case that requires more information. This is especially true in the typical case when the customer wishes for ETSD personnel to actually prepare the lab pack. Lab pack pre-approval is based on an inventory or packing list of items in the customer's inventory to be packed by compatibility group. ETSD personnel review the proposed inventory lists to confirm that the Facility can accept all of the items, to confirm that all proposed items in a compatibility group are indeed compatible, and to

determine planned management of the waste items at the Facility. A separate MPF with an inventory list is required each time a customer has a new group (lab pack) of wastes to be managed.

If ETSD personnel find that the waste stream is acceptable for management at the Facility, and if the customer agrees to the pricing, ETSD will notify the generator/shipper that the wastes may be shipped to the Facility (or, for wastes already received but not approved, that the waste will be accepted into the Facility). The waste stream is also issued an approved MPF number for use on manifests and containers to identify the waste contents. The MPF Number is a combination of the generator's/shipper's account number, and a number assigned to that particular approved waste stream. In most cases, the number is assigned sequentially.

For waste streams other than the Special Wastes identified in Subsection 2.G below, ETSD will also obtain a representative sample of the waste stream for Fingerprint Analysis as described in Paragraph 2.F.2 below. The fingerprint analysis is used to both confirm some of the key information from the MPF and to provide baseline information (i.e., a "fingerprint") against which future incoming shipments can be compared to verify that the incoming material conforms to the established waste stream profile. This fingerprint analysis must either be performed during the Pre-Approval Process or, more commonly, on samples obtained from the initial shipment received of a newly approved waste stream.

The pre-approval process will be repeated:

- When a generator/shipper notifies ETSD that the chemical composition of the waste stream, or the process generating it, has changed; or
- When the results from "fingerprint analysis" or a more detailed analysis of a received waste indicate that the waste received does not match the established description or fingerprint of the pre-approved waste stream; or
- At least every two years.

When the pre-approval of a waste stream is repeated, the generator/shipper will be required to submit an updated and re-certified MPF and ETSD personnel will re-evaluate the information as described above to again verify appropriate waste management procedures. A new sample may be required to assist in the re-evaluation.

D. INCOMING SHIPMENT SCREENING PROCEDURES

Each shipment of waste that arrives at the Facility is subjected to a multi-step screening process to verify that the shipment conforms to its description on the accompanying Hazardous Waste Manifest (or other appropriate shipping paper) and that each waste in the shipment conforms to its pre-approved description as presented on the approved Waste Material Profile form ("MPF") and other supporting information (including its Fingerprint Analysis profile). All such shipments are received at the Facility by truck.

It should be noted that ETSD personnel are aware beforehand of incoming waste shipments through coordination with the generators/shippers and/or the transporters. Although the transportation process involves certain uncertainties, ETSD tries to schedule and receive waste shipments in a planned and orderly manner to facilitate safe and effective operations. One objective is to promptly get incoming shipments (destined for ETSD) safely off-loaded from trucks into the secondarily contained Receiving Area.

For clarification, it is noted here that a "shipment" consists of one or more containers received from a single generator/shipper and is defined by the accompanying manifest (or other appropriate shipping paper). A single "shipment" thus may include multiple containers of several different wastes, as defined on separate lines on the Manifest. A truck "load" may consist of just one "shipment" with a single Manifest, such as a tanker truck load from a generator's tank. A truck "load" may also consist of several different "shipments" with multiple Manifests, such as occurs when a truck makes a "milk run" to several different generators to pick up a few containers at each stop.

1. Visual Inspection of Shipments

Before any off-loading occurs, ETSD personnel first obtain the Manifest(s) from the truck driver and verify that ETSD is designated as the receiving facility for at least part of the truck load. If so, then the truck is directed to either the Truck Loading Dock or the Tank Farm area (or elsewhere within the Contained Area) for off-loading and shipment verification by ETSD personnel. From the Manifests, ETSD Receiving personnel also identify the generators and waste streams involved, which enables them to retrieve the appropriate profile information for shipment verification purposes.

The first screening step is to verify that the wastes identified on the Manifest has been approved for acceptance at the Facility through the pre-approval procedures described in Subsection 2.C above. Each waste stream entry on the Manifest is checked for a current pre-acceptance approval. If no matching waste approval is found that portion of the shipment will be at least temporarily rejected (see Paragraph 2.E.2 below).

Lab packs are a special case in that the Packing List for each lab pack container will be checked for pre-approval of each item on the Packing List.

The second screening step is to verify that the shipment actually includes the containers described on the Manifest. ETSD Receiving personnel inspect the number, type, and labeling of containers against the Manifest description. For single container bulk loads (e.g., tanker trucks, roll-off boxes), this is performed prior to off-loading. For multi-container loads, this may be performed before or during off-loading, but for convenience and safety is performed after off-loading. Discrepancies in piece count and container type or labeling are noted and resolved, where possible, via queries of the driver and/or via telephone calls to the transporter

and/or generator/shipper. Significant discrepancies are noted on the Manifest (or other appropriate shipping paper) as required by Tennessee Rule 0400-12-01-.06(5)(c) [equivalent to 40 CFR §264.72] and/or its equivalent Permit condition.

Unless a waste container is immediately rejected (such as a container that indicates a radiation hazard) and left on or placed back on the delivering truck, the waste containers that are delivered to the Facility are off-loaded and held as received containers in a permitted storage area while they go through the shipment screening and certain recordkeeping procedures.

A unique Record of Receipt ("ROR") number is assigned to each waste shipment that is received at the ETSD Facility and is used to help identify each container of received waste as it is managed. The ROR number is a 5-digit number "XXXXX" that is simply assigned sequentially from a pre-printed R.O.R. Master Listing of such numbers. An example R.O.R. Master Listing sheet is included in Attachment 2.1-1. In assigning the ROR Number to a waste, ETSD personnel enter on the R.O.R. Master Listing sheet the Manifest Tracking Number of the hazardous waste manifest that accompanied the shipment, the number and name of the ETSD customer generating/shipping the waste, and the dates when the ROR Number was issued, and the shipment was received. As indicated on the R.O.R. Master Listing Sheet, ROR Numbers may sometimes be voided. This can occasionally occur because the ROR Number is assigned to waste shipments early in the receiving process using only information from the manifest(s) received from the transporter. Occasionally a manifest will describe a shipment that is subsequently discovered to not be present in the load. Such a discovery requires voiding the ROR Number assigned to that shipment, and the date that occurs is entered on the R.O.R. Master Listing Sheet. Once entries are made, each R.O.R. Master Listing sheet becomes a part of the Operating Record.

The next step in receiving a waste shipment is the initiation by ETSD Receiving personnel of a separate Drum Inspection Report form (see copy of form in Attachment 2.1-1) for each separate waste stream in the received shipment. The Drum Inspection Report form provides key information regarding the received waste stream and is used to document several observations and findings from the Receiving process. The ROR Number is entered on the Drum Inspection Report form along with the generator name, the waste stream's approved MPF number, the date the shipment was received, the number of containers of that waste stream in the shipment, and other information useful to ETSD. Each container in the shipment holding that waste stream is also assigned a sequential one- or two-digit container number "Y" or "YY" (starting with "1") which is also entered on the Drum Inspection Report. (For example, if there are 11 containers of that particular waste stream in the shipment, then those containers would be numbered "1" through "11".) The combination of the ROR number and the container number in the form "XXXXX-Y" or "XXXXX-YY" creates a unique identifying number for that container that is used to track it as it is managed at the facility. During the Receiving process, each received container is promptly, clearly, and durably

marked (using markers or grease pencils) or labeled (using adhesive labels) by ETSD personnel with the date the container was received and its unique ROR identifier. The approved MPF number for the waste stream is also written on each such container (if it has not already been entered on a label). The MPF Number and ROR Number thus provide readily identifiable information on each container that can easily be linked back to the MPF and manifest information in the Facility's files, while the combined ROR Number and container number provides a unique identifier for that container that is used in Facility records.

During this visual inspection, the containers are also inspected to verify that they are in good condition and properly closed, as described in Subsection 8.E of Attachment 8 (Management of Hazardous Waste in Containers). Leaking containers are promptly either overpacked into, or their contents are transferred into, a container that is in good condition and of appropriate USDOT-approved type as described in Paragraph 8.E.3 of Attachment 8. If a container is found not to be properly closed, it will be repaired or similarly replaced prior to acceptance of the waste. Any replacement container will then be appropriately labeled to identify its contents.

The visual inspection is also used to identify generator-applied labels that have been scraped off or been made illegible through container handling. Missing or illegible labels that are important to safe and proper management of the containers are replaced by ETSD personnel using information from the old labels, manifest, or MPF. These include labels that indicate whether the container contents are a hazardous waste or a non-hazardous waste, and labels that identify the applicable U.S. Department of Transportation hazard class(es) or division(s) and are used in making incompatibility determinations as described in Paragraph 8.E.7 of Attachment 8. Such replacement labels will be added within 48 hours of container receipt and before the container leaves the Receiving Area.

The third screening step is to visually inspect the container contents (i.e., the wastes themselves) to evaluate their conformance with pre-existing profile information and the results of previous Fingerprint Analyses. Except for certain Special Wastes (see Subsection 2.G below), all waste containers are opened by ETSD Receiving personnel for visual inspection of their contents and evaluation of the waste's appearance against both the previously noted descriptions for visual checks and the appearance of the wastes in any other containers supposedly holding the same waste stream. The volume of waste in a container is also determined as described in Attachment 2.3-1.

During these visual inspections, the following findings and observations are documented on the Drum Inspection Report form and/or on the Manifest (as appropriate) by ETSD Receiving personnel:

- If the shipment method (e.g., tanker truck, vacuum tank, drums, boxes, etc.) matches the manifest

- If the shipment labels match the manifest
- Any irregularities in the shipment, (e.g., leaks, etc.)
- Condition of the containers
- If the number and type of containers match the manifest
- If any restricted wastes are indicated (by labeling)
- If the waste appearance matches previously noted descriptions for visual checks

Verification of shipment weights as indicated on the Manifest is also performed by ETSD Receiving personnel utilizing either weight measurements from scales or weight calculations based on profile information or laboratory analysis results for specific gravity or bulk density.

When manifest or visual discrepancies are noted, the generator or the generator's agent is contacted to try to reconcile the discrepancies. If all discrepancies are resolved, such is noted in the discrepancy section of the manifest and/or on the Drum Inspection Report. If all discrepancies cannot be reconciled, the affected portions of the shipment (or the entire shipment) will be at least temporarily rejected (see Subsection E below).

2. Fingerprint Analysis

Except for Special Wastes (see Subsection 2.G below), at least ten percent (10%) of the containers from each waste stream in the shipment are sampled by ETSD Receiving personnel for Fingerprint Analysis in ETSD's on-site laboratory as described in Paragraph 2.F.2. The selection of containers for sampling is based on the visual similarity of the container contents. If the contents of each container identified as the same waste stream are visually similar, then any of the containers may be selected for sampling (based on the fact that the transportation process itself provides sufficient randomness in the selection process). If the contents of some of the containers are visually dissimilar, then containers will be selected for sampling to ensure that separate samples are collected of visually dissimilar contents. The individual container samples from each waste stream may be composited provided that they are similar in physical appearance. The collected samples are then submitted to ETSD Laboratory personnel along with a completed Verification of Analysis Request form (see Attachment 2.1-1). ETSD's chemists will then analyze the submitted samples for the Standard Analyses and any Additional Analyses either designated on the Verification of Analysis Request form or subsequently determined to be necessary to evaluate the conformity of the sampled waste stream with its pre-approved profile. The laboratory results are reported on an Analytical

Report form (see Attachment 2.1-1) along with the chemist's/Lab Director's determinations of conformity. If the Fingerprint Analysis results show that the waste in the containers represented by the sample do not conform with the pre-approved waste profile, then those waste containers will be at least temporarily rejected (see Subsection E below).

E. WASTE ACCEPTANCE / REJECTION

1. Waste Acceptance

If the visual screening described in Paragraph 2.D.1 above finds that (1) the manifest does accurately describe a pre-approved waste stream, (2) the container number, type, and labeling match the manifest description and the pre-approved waste stream profile, and (3) the visual appearance of the containerized waste matches its preapproved waste profile physical description; and if the fingerprint analysis described in Paragraph 2.D.3 finds that the waste does indeed match its "fingerprint", then the containers of waste so represented will be accepted into the Facility. Such containers will then be marked or labeled with the date it was accepted (in the same area of the container surface where the date received and MPF number were written). Accepted containers may also be marked with other numbers or letter codes for ETSD business reasons – such as a process identifier code that indicates how and/or where it is to be processed. Once a container has been accepted, it is moved promptly from the Receiving Area near the Truck Loading Dock to a storage or treatment area.

ETSD has not formally established any generally applicable ranges of deviation between the description provided on a waste stream's Waste Material Profile form ("MPF") provided by the customer and the descriptive information obtained from the waste shipment screening procedures. While some observed deviations indicate the receipt of a different waste than described on the MPF, a waste stream can also exhibit large variations within a single fingerprint parameter (e.g., color variations in a paint wastes stream, physical form, water content in a fuel-candidate waste stream). Most deviations will trigger a telephone call or e-mail exchange with the customer to try to reconcile the difference(s). ETSD believes that it best serves its customers (and public health and the environment) by contacting the customer and trying to work out a way to manage even the deviant waste shipments it might receive so that the waste containers do not have to be shipped back to the customer. For minor deviations, this may include getting the customer to modify the Waste Material Profile to establish a realistic range of deviation for that parameter for that waste stream. For major deviations, a new Waste Material Profile form may be required, and a different management scheme and pricing may be necessary. ETSD will document all deviations and path's forward in the operating record and keep this document available for review by DSWM.

2. Waste Rejection

Wastes may occasionally be delivered to the Facility that are instantly recognizable as unacceptable because of container type, labeling, manifest information, previous waste rejections, etc. In such case, the containers involved will not be unloaded from, or will be promptly re-loaded into, the delivering truck. Such wastes will not be received at the Facility and will remain the generator's/shipper's and transporter's responsibility. If the wastes were identified on the manifest as destined for ETSD, then ETSD Receiving personnel will note the rejection on the manifest and return the manifest to the driver.

If a shipment or part of a shipment is received at the Facility but later rejected by the initial incoming shipment screening process (i.e., rejected after the delivering truck has left the Facility), ETSD personnel will contact the generator/shipper (and the transporter as necessary) to work out the problems. Received containers of nonconforming wastes will be marked in a way that nonconforming waste is identifiable when stored in proximity with conforming waste and held at the Facility in a permitted unit – but not necessarily in the western "Receiving" portion of the Outside Hazardous Waste Container Management Area – while ETSD personnel work with the generator to either (1) reconcile the apparent nonconformity so that the wastes can be accepted and managed at the Facility under the original pre-approved waste profile, (2) process the nonconforming wastes through the waste stream pre-approval process as a new waste stream acceptable at the Facility, or (3) make arrangements to transport the rejected containers back to the generator or to another hazardous waste management facility. Such waste will be counted toward the permitted capacity of the unit where stored. Pursuant to Tennessee Rule 0400-12-01-.06(5)(c) [equivalent to 40 CFR § 264.72], ETSD will initiate a new manifest for any such re-shipment of rejected wastes or unmanifested waste mischaracterized by off-site generators and found to be hazardous.

This "holding time" for waste containers which have been received at the Facility but not accepted for processing is only a few days or perhaps a few weeks (e.g., if additional waste characterization testing must be performed by a commercial laboratory), but it cannot exceed 60 days from the date of container receipt in accordance with Tennessee Rule 0400-12-01-.06(5)(c)4(i) [equivalent to 40 CFR § 264.72(d)(1)]. Such containers can be readily identified because they will have been marked or labeled by ETSD personnel as rejected along with the date of receipt but will not have been marked with a date of acceptance. During this holding time, the containers will be subject to the full container management requirements of Attachment 8 (Management of Hazardous Wastes in Containers).

ETSD may sometimes receive, accept, and process containers of wastes which are discovered to contain residues – in excess of the quantity limits for "empty" containers set for the in Tennessee Rule 0400-12-01-.02(1)(g)2 [equivalent to 40 CFR § 261.7(b)] – which ETSD either cannot remove from the container or which does not conform to the approved waste profile. Containers holding such

"container residues" will be immediately marked or labeled with the date the residues were discovered and will be held at the Facility – in any portion of the Hazardous Waste Management Building or the Outside Hazardous Waste Container Management Area – while ETSD personnel work with the generator to either (1) process the nonconforming container residues through the waste stream pre-approval process as a new waste stream acceptable at the Facility, or (2) make arrangements to transport the container residues back to the generator or to another properly authorized hazardous waste management facility. Pursuant to Tennessee Rule 0400-12-01-.06(5)(c) [equivalent to 40 CFR § 264.72], ETSD will initiate a new manifest for any such re-shipment of container residues.

This "holding time" for unaccepted container residues is only a few days or perhaps a few weeks (e.g., if additional waste characterization testing must be performed by a commercial laboratory), but it cannot exceed 60 days from the date of container receipt in accordance with Tennessee Rule 0400-12-01-.06(5)(c)4(i) [equivalent to 40 CFR § 264.72(d)(1)]. Such containers can be readily identified because they will have been marked or labeled by ETSD personnel with the date the unapproved residues were discovered. During this holding time, the containers will be subject to the full container management requirements of Attachment 8.

F. FINGERPRINT ANALYSIS PROGRAM

1. Purpose and Use

For waste streams that are accepted into the Facility, other than the Special Wastes described in Paragraph 2.G.2, a "fingerprint analysis" of the waste stream will be established to both confirm some of the key information from the MPF and to provide "baseline" information against which future incoming shipments can be compared to verify that the incoming material conforms to the established waste stream profile. This is especially true of industrial liquids and sludges that will be blended into waste-derived fuels and of which further shipments are expected, but it may not be true of waste streams of which, or containers from which, representative samples are either difficult or dangerous to obtain. The former category would include some solids and debris, and the latter category would include most waste streams that are acutely hazardous and containers of compressed fluids. Because wastes that are acutely hazardous are seldom encountered and managed at the Facility except on a "container in / container out" basis, it is not necessary to establish a "fingerprint" for such waste streams. Similarly, it is not necessary to establish a fingerprint for compressed fluids because of the difficulty with containerization and the regulatory controls make it very unlikely that the containers would contain anything except what is described in the paperwork and on the containers.

The fingerprint analysis is performed in the Facility's on-site laboratory on representative samples of the waste stream. Such samples are either provided by

the generator/shipper during the pre-approval process, collected by ETSD personnel at the generator/shipper's facility during the pre-approval process, or – and most commonly – collected by ETSD personnel from the initial incoming shipment of a pre-approved waste stream. The fingerprint analysis is not intended to provide a detailed characterization of the waste stream, and indeed ETSD's on-site laboratory is not set up to perform such comprehensive analyses with detailed quality assurance / quality control procedures. Instead, the fingerprint analysis is intended to identify certain descriptive information that can be quickly and rather simply obtained, but which collectively provide adequate information to reasonably confirm that the waste is what the MPF says it is. It is not intended to identify minor deviations in a waste stream's constituency, but instead major deviations that would indicate a mistake was made in labeling a container or that materials were improperly mixed. These fingerprint analyses will be performed in accordance with the referenced analytical methods.

2. Sample Collection

Sampling devices are selected based on the size and type of containment unit and the specific material involved. ETSD's selection of an appropriate sampling device is influenced by the generator's original characterization (i.e., on the MPF) and the packaging used.

For flowable materials, the sampling device of choice is a Coliwasa, drum thief, or tubing to draw a full vertical section. For non-flowable wastes, samples are obtained using a trier, scoop, or tubing.

Large containers and tanks are sampled with a Coliwasa or tubing to obtain a vertical sample of all layers (as appropriate) or by weighted bottle or a bomb sampler to allow for sampling at various depths. However, some tanks do not allow for access through the top and may require sampling from side ports or pumps and valves at the tanks' inlet or outlet. These samples may be composited and if upon examination, the material is found to be stratified (layered), then each layer may be analyzed separately.

Solids, granules, and light powders are sampled by trier, scoop, shovel or by coring with an auger or heavy tubing.

3. Analytical Parameters and Rationale

The analyses performed in ETSD's on-site laboratory in establishing and testing for the fingerprint analysis of a waste stream are classified as either *Standard* or *Additional*. "Standard Analyses" are performed on pre-acceptance samples (which may be collected from the initial shipment received) and on incoming load samples in order to: (1) ensure that the waste received (in all containers) actually conforms to the information submitted by the generator/shipper on the MPF and otherwise, and (2) ensure that the planned waste management technique can be safely and

effectively utilized. "Additional Analyses" are performed at the direction of the Operations Manager or Facility Manager to: (1) augment existing information on the waste to help ensure safe and effective management, (2) further identify a waste to help ensure regulatory compliance, and/or (3) further ensure that the appropriate treatment or storage process is utilized.

(a) Standard Analyses include, but are not necessarily limited to, the following:

- *Odor* – Characteristic odors of waste samples are not specifically assessed because of the inherent health risk to ETSD personnel. However, if a characteristic odor is experienced during the handling of waste stream samples for other tests, this information is recorded.

- *Physical Description* – Visual appearance including color, physical state, and texture, as appropriate, are used to define the general physical properties of the waste. It is also used to verify the observable presence of free liquids. This facilitates subjective comparison of the sampled waste with prior waste descriptions or samples. If the appearance of the waste shipped is notably different from that pre-approved, it may indicate that the waste shipped is not the same waste that was pre-approved. However, such observations must be supported by other information indicating that a difference exists before the received waste is deemed non-conforming.

- *pH Screen* – Analyses for pH are performed on aqueous liquid waste streams to determine the corrosive nature of the waste. High or low pH indicates potential corrosivity and incompatibility issues. Testing for pH is generally done using commercially available paper strips (0 – 6.0 and 6.5 – 13.0) which indicate pH by a color change, with a precision of 0.5 pH units. If a more exact measurement is required or the results of the paper strip test are in question, a Pocket pH Tester and Electrode (or equivalent device) is utilized in accordance with the instructions provided by the equipment manufacturers and ASTM Method E70-07 or EPA SW-846 Method 9041A.

- *Heating Value* – The heating value or BTU content of a waste is measured to determine its value as a candidate for fuel blending. Testing for heating value is performed using a Parr 6200 Bomb Calorimeter (or equivalent device), a Parr 6510 Water Handling System (or equivalent device), and a laboratory balance scale in accordance with the instructions provided by the equipment manufacturers and ASTM Method E144.

- *Specific Gravity* – The results of the Specific Gravity analysis are recorded and used as another comparison criterion for determining

how well a received waste matches its profile information and baseline characterization. Testing for Specific Gravity is performed in accordance with ASTM Methods D5057 and D1298. A Hydrometer is used only for liquids that will not stain glass (Method I). For other liquids, a 3-mL graduated syringe (without needle) or a small graduated cylinder is used (Method II).

- *Water Content* – This test is used to verify whether a liquid waste stream or phase is aqueous or organic in nature and to determine the amount of free water that may be present (an important factor in determining candidacy and pricing for fuel blending). Testing for Water Content is performed using a Mettler Toledo EasyPlus Easy KFV Titrator (or equivalent device) in accordance with the instructions provided by the equipment manufacturer and EPA SW-846 Method 9000.

(b) Additional Analyses include, but are not necessarily limited to, the following:

- *Bulk Density* – The results of the Bulk Density test are recorded for physically solid wastes and used as another comparison criterion for determining how well a received waste matches its profile information and baseline characterization. Testing for Bulk Density is performed using a laboratory balance scale in accordance with ASTM Method D5057.

- *Chlorine Content (% Chloride)* – This is a critical criterion for fuel blending and is utilized in determining blending options and pricing. Testing for Chlorine Content is by the Argentometric Titration Method in accordance with the procedures set forth in the 17th edition of *Standard Methods for the Examination of Water and Wastewater*, ASTM Method D808, and EPA SW-846 Methods 5050 and 9253 or most recent version.

- *Ignitability (or Flammability Potential)* – Organic liquid wastes, and particularly the lightest (floating) layer, are tested for their Flash Point to confirm D001 waste code designations, to help make compatibility determinations for mixing, and to help determine the appropriate way to manage the waste. Testing for Flash Point is performed using a Pensky-Martens closed-cup flash point tester in accordance with the instructions provided by the equipment manufacturers and ASTM D93-80 or a Setaflash closed cup flash point tester in accordance with the instructions provided by the equipment manufacturer and ASTM D3278-78.

- *Paint Filter Test* – This test is used to determine if free liquids are present in a solid or semi-solid material. The test is performed in accordance with EPA SW-846 Method 9095B.

- *Liquid Waste Compatibility* – This analysis is performed to determine whether liquid wastes are compatible and can be combined or processed together. This test is performed by simply mixing small amounts of different liquid wastes in a glass container and observing any reactions.

- *Water Mix* – This test is used to determine whether the waste has a potential to react vigorously with water (bubbling, spattering, or fuming), to form gases, other products, or to generate extreme heat, and to determine its solubility in water. This test is unnecessary for wastes that are already in contact with excess water or wastes which are known to be water reactive. The test is performed by adding water, one drop at a time, to a small amount of the waste in a glass container and observing any reactions.

- *Total Halides* - This test checks for the presence of halides in addition to chlorides and is also utilized in determining fuel blending options and pricing. The test is also used to help verify whether a used oil is "on spec" as well as to detect mixing of PCBs in incoming waste streams. The testing is performed using either a Dexsil Chlor-D-Tech 1000 test kit or a Dexsil Chlor-N-Oil 50 test kit in accordance with the instructions of the kit manufacturer and ASTM Method D5384 and EPA SW-846 Method 9077 (for halogens) and EPA SW-846 Method 9079 (for PCBs).

Other parameters or analyses not listed above may be added to the Fingerprint Analyses performed on-site to comply with regulatory requirements or company policy. In addition, collected samples may be sent to off-site commercial analytical laboratories for analysis when more detailed or accurate analyses are required. The off-site testing most frequently required is that for RCRA Toxicity Characteristic testing (a.k.a. "TCLP Analyses") to determine if a waste meets the Toxicity Characteristic or contains constituents above applicable treatment standards.

G. SPECIAL WASTES

Note: The following is a designation of waste set forth by Excel TSD and is not the same or meant to be understood as Special Waste as defined by Tennessee Rule 0400-11-01.

Some wastes, known as "Special Wastes", are not subjected to the full Incoming Shipment Screening Procedures set forth in Subsection 2.D above because such procedure(s):

- Would present elevated health and safety hazards to ETSD Receiving personnel (e.g., lab packs, certain commercial chemical products); and/or

- Are impractical because of visual identification or sampling and analysis considerations (e.g., lab packs, debris, chemical-containing equipment); and/or

- Are unwarranted because the contents of the containers are known in sufficient and reliable chemical and physical detail (e.g., outdated commercial chemical products, contaminated media from environmental investigations or remediation efforts).

Following are the types of Special Wastes which ETSD Receiving personnel may exempt from certain of the screening procedures set forth in Subsection 2.D above, and the procedure to which they may not be subjected:

- *Chemical Lab Packs* – This applies to discarded smaller containers of chemicals, wastes, lab debris, etc., that are packed together with sorbent materials in larger containers according to Tennessee Rule 0400-12-01-.06(14)(q) [equivalent to 40 CFR §264.316]. For each chemical lab pack container (e.g., drum), the generator will supply an inventory or packing list specifying the type and quantities of chemicals contained therein. Such lab pack containers are opened for visual inspection but are not sampled.

- *Contaminated Personal Protective Equipment (PPE)* – This refers to gloves, booties, masks, aprons, and other clothing and equipment (disposable) used to provide protection to persons in hazardous chemical environments and which have become contaminated with hazardous chemicals through use or accident. Containers of contaminated PPE are opened for visual inspection but are not sampled.

- *Debris as defined in Tennessee Rule 0400-12-01-.10(1)(b) [equivalent to 40 CFR §268.2]* – This refers to discarded pieces of solid plant or animal matter, natural geologic material, or certain manufactured objects which exceed a 60 mm (approximately 2.36-inch) particle size, and which are or contain hazardous chemicals. Containers of debris are opened for visual inspection but are not sampled.

- *"RCRA-Empty" containers, as defined in Tennessee Rule 0400-12-01-.02(1)(g) [equivalent to 40 CFR §261.7]* – This refers to a container that held a hazardous waste or hazardous chemical product, but which has been emptied but still contains a small amount of chemical residuals as allowed by the rule. Because their lack of contents is usually readily identifiable from handling, such containers are not opened or sampled.

- *Household hazardous wastes* – This refers to the various hazardous wastes (post-consumer products) that are derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters,

campgrounds, picnic grounds, and day-use recreation areas) and exempt from hazardous waste regulation by Tennessee Rule 0400-12-01-.02(1)(d)2(i) [equivalent to 40 CFR §261.4(b)(1)]. Containers of household hazardous waste are opened for visual inspection but are not sampled.

- *Facility-generated waste* – This refers to wastes generated at the ETSD facility, that must be adequately characterized by knowledge of the process generating, analytical data, or source of the waste. Such containers are not opened for visual inspection or sampling.

- *Universal Wastes as described in Tennessee Rule 0400-12-01-.12(1)(a) [equivalent to 40 CFR §273.1] or other chemical-containing equipment removed from service* – Containers holding such materials may (e.g., drums) or may not (e.g., cardboard lamp boxes) be opened for visual inspection, but are not sampled.

- *Residue and debris from the cleanup of spills or releases of a single chemical substance, product, or waste* – Containers holding such materials are opened for visual inspection (unless the chemical involved poses an acute inhalation, fire, or explosion hazard) but are not sampled.

- *Off-specification, outdated, unused, or banned commercial chemical products in original containers* – Such containers are not opened for visual inspection or sampling.

- *Residue and debris from the demolition or dismantling of industrial process equipment or structures contaminated with chemicals from the process* – Containers holding such material are opened for visual inspection (unless the chemicals involved pose an acute inhalation, fire, or explosion hazard) but are not sampled.

- *Containers holding chemicals which pose an acute inhalation, fire, or explosion hazard* – Such containers are not opened for visual inspection or sampling.

- *Waste or contaminated media from an environmental investigation or remediation project for which the sampling and analysis plan was approved by a federal or state agency* – Containers holding such materials are not opened for visual inspection or sampling.

- *Wastes designated for simple container storage and subsequent trans-shipment off-site* – These are wastes that are managed on a "container-in, container-out" basis such that the container contents are not processed in any way but are simply held for a period of time before being shipped off-site to another properly authorized storage, recycling, treatment, or disposal facility for further management. (See Section E.) Containers of such wastes are not opened for visual inspection or sampling. If ETSD later decides to process a waste container that was originally designated for simple container storage, the waste container will at that time be

subjected to the visual inspection and fingerprint sampling steps to confirm the identity of the container contents for processing.

H. WASTE TESTING IN SUPPORT OF PROCESSING DETERMINATIONS

As noted in Subsection 2.C and Paragraph 2.F.1 above, the collection and analysis of samples of candidate waste streams during pre-approval evaluation or received waste shipments is performed in part to enable ETSD Operations Manager(s) determine if and how the waste can be safely and effectively processed at the Facility. It is also sometimes important to collect and analyze samples of wastes that have been processed or generated at the Facility (through separation or consolidation) so as to evaluate further processing needs or compliance with customer specifications or regulatory requirements. Included in Attachment 2.2-1 is a table that shows the testing that is performed in support of processing determinations. Sampling and analysis is performed as described in Subsection 2.F.

I. RECORDKEEPING

As required by Tennessee Rule 0400-12-01-.06(5)(d)2 [equivalent to 40 CFR §264.73(d), ETSD is required to maintain the following records relating to Waste Analysis Plan implementation as part of its Operating Record:

- Completed Waste Material Profile forms describing each hazardous waste accepted for management at the facility will be retained until closure of the Facility. Any other information (e.g., Safety Data Sheets, laboratory analysis reports) submitted or developed to support the information provided on the completed forms will be retained for at least three years.

- Completed R.O.R. Master Listing sheets will be retained until closure of the Facility.

- Completed Verification of Analysis Request and Analytical Report forms from ETSD-performed Fingerprint Analyses will be retained for at least three years. This includes such testing performed for purposes of waste stream approval, waste shipment acceptance, and to support Facility processing determinations.

- Completed Drum Inspection Report forms will be retained for at least three years.

- Copies of manifests for hazardous waste shipments received at the Facility will be retained for at least three years.

These records will be made available at all reasonable times for inspection by any authorized representative of the Tennessee Department of Environment and Conservation or the U.S. Environmental Protection Agency. The records may be maintained in paper or electronic form.

J. Onsite Generated Hazardous Waste, Non-Hazardous Waste, or Materials

Onsite generated hazardous waste, non-hazardous wastes or materials must have the following determinations completed prior to storing in one of the storage areas with off-site hazardous waste:

- Quantity.
- Compatibility with the off-site hazardous waste stored in the storage area.

The determinations above shall be evaluated before the onsite generated hazardous waste, non-hazardous wastes or materials are placed in one of the storage areas with off-site hazardous waste and ongoing when new off-site hazardous waste is added to the in one of the storage areas. The determination shall be part of the operating record as long as the onsite generated hazardous waste, non-hazardous wastes or materials are placed in one of the storage areas with off-site hazardous waste.

Attachment 2.1

FORMS UTILIZED IN WASTE ANALYSIS PLAN IMPLEMENTATION

EXCEL TSD
of Tennessee, LLC
Conserving Our Natural Resources
901-774-8146

☐ For Excel Office Use Only
Customer No. _____
Stream No. _____

Waste Material Profile Form

Generator Information

Generator Name:_____ EPA ID#: _____

Mailing Address:_____ Physical Address: _____

_____ _____

Contact:_____ Phone#:_____ Email:_____

If no EPA ID#, is generator a VSQG? ☐ Y ☐ N

Customer Name:_____ Contact:_____

Billing Address: _____ Phone#: _____

_____ Email: _____

Waste Stream Information

Material Name: _____

Process Generating Waste:_____

RCRA Hazardous Waste? ☐ Y ☐ N EPA Waste Codes:_____

Lab Pack? ☐ Y ☐ N Universal Waste? ☐ Y ☐ N Used Oil? ☐ Y ☐ N

State Codes:_____ Is waste exempt from regulations? ☐ Y ☐ N Explain:

_____

Material Composition

Constituent	%	Range
		+/-
		+/-
		+/-
		+/-

Constituent	%	Range
		+/-
		+/-
		+/-
		+/-

Material Characteristics

Physical State @70°F:_____%Liquid_____%Sludge_____%Solid_____%Debris_____Aerosol / Gas

Flash point (CC) (°F): ☐ <73° ☐ 73°-100° ☐ 101°-140° ☐ 141°-200° ☐ >200° ☐ N/A

pH: ☐ ≤2 ☐ 2.1-5 ☐ 5-9 ☐ 9-12.4 ☐ >12.5 # Layers: ☐ 1 ☐ 2 ☐ 3

Odor: ☐None ☐ Mild ☐ Strong Describe:_____Color: _____

Specify gravity: ☐ ≤0.8 (gasoline) ☐ 0.8-1 (ethanol) ☐ 1 (water) ☐ 1.0-1.2 (antifreeze) ☐ >1.2 Vapor

Pressure (psi): ☐ ≤11.1 ☐ >11.1 Halogens:_____% VOC's:_____%

PCB's (ppm): ☐ None ☐ <2 ☐ 2-49 ☐ >50 Reactivity: ☐ Y ☐ N

Viscosity (liquids): ☐ <100 (water) ☐ 101-500 (motor oil) ☐ 501-<10,000 (molasses) ☐ >10,000 ☐ N/A

BTU: ☐ <5,000 ☐ 5,000 - 7,999 ☐ 8,000-11,999 ☐ >12,000

These values are determined by: ☐ Process Knowledge ☐ Analysis (Provide copy) ☐ SDS (Provide copy)

Additional Waste Stream Information

Is this waste subject to NESHAP rules? ☐ Y ☐ N

Does this Waste Stream Contain Benzene (Hazardous Waste only)? ☐ Y ☐ N

1. Is this waste stream generated in a facility with a SIC code listed under NESHAP (SIC codes 2800-2899, 2911 or 3312), or a TSDF that treats NESHAP waste? ☐ Y ☐ N (SIC Code:_____)
2. Does this waste stream contain greater than 10% water? ☐ Y ☐ N
3. Is the Total Annual Benzene (TAB) for the generating facility greater than 2,200 lb./yr. (10Mg/yr.)? ☐ Y ☐ N
4. What is the total, not TCLP, benzene content of this waste stream?_____%wt. or_____PPM
5. What is the TAB for the generating facility considering all waste streams?_____LB./yr. or Mg/yr.

Do any of the following pertain to this waste stream? ☐ Y ☐ N If yes, check all that apply:

☐ Explosive ☐ Biohazardous ☐ Water Reactive ☐ Air Reactive ☐ Radioactive ☐ Shock Sensitive ☐ Dioxins

☐ Organic Peroxide ☐ Temp. Controlled ☐ Cyanides ☐ Sulfides ☐ Compressed Gas ☐ Oxidizer

DOT Shipping Information

DOT Hazardous Material? ☐ Y ☐ N Reportable Quantity (RQ)? ☐ Y ☐ N ERG #_____

Proper Shipping Name: _____

Hazard Class:_____ID # (UN/NA):_____Packing Group: ☐ I ☐ II ☐ III

Subsidiary Haz. Class: _____ Technical Name (if required): _____

Volumes

_____ Drums (Size) ☐ 85 ☐ 55 ☐ 30 ☐ 15 ☐ 5 ☐ Metal ☐ Plastic ☐ Fiberboard

_____ Totes (Size) ☐ 275 ☐ 330 ☐ Other _____Cubic Yard Boxes _____Pallet

_____ Bulk Liquids (Tanker)_____Gallons _____Bulk Solids (Rolloff)_____(Size)

_____ Cylinders (Size)_____Lecture_____Small_____Medium_____Large

Frequency: # of Units:_____per ☐ Month ☐ Quarter ☐ Year ☐ One Time

**** Please attach analytical reports and/or SDS ****

Certification: I certify that I am authorized to execute this document and I certify that all the information submitted in this and all attached documents is complete and accurate to the best of my knowledge and that all known or suspected hazards have been disclosed. I also certify that any samples obtained and submitted are representative of the waste in accordance with USEPA 40 CFR §261.20(c).

Signature: _____ Date: _____

Print Name: _____ Title: _____

UNIVERSAL TREATMENT STANDARDS (UTS) / UNDERLYING HAZARDOUS CONSTITUENTS (UHC) FORM

Place an X in the box next to the appropriate constituent(s) that are present in D001 (except for TOC ≥ 10%), D002, D003 (#) and D012-D043 waste streams in

Constituent	WW	NWW
Acenaphthene	0.059	3.4
Acenaphthylene	0.059	3.4
Acetone	0.28	160
Acetonitrile	5.6	38
Acetophenone	0.01	9.7
2-Acetylaminofluorene	0.059	140
Acrolein	0.29	N/A
Acrylamide	19	23
Acrylonitrile	0.24	84
Aldrin	0.021	0.066
4-Aminobiphenyl	0.13	N/A
o-Andisidine	0.010	0.66
Aniline	0.81	14
Anthracene	0.059	3.4
Aramite	0.36	N/A
Barban	0.056	1.4
Bendiocarb	0.056	1.4
Bendiocarb phenol	0.056	1.4
Benomyl	0.056	1.4
Benz (a) anthracene	0.059	3.4
Benzal Chloride	0.055	6
Benzene	0.14	10
Benzo (b) fluoranthene	0.11	6.8
Benzo (k) fluoranthene	0.11	6.8
Benzo (g,h,i) perylene	0.0055	1.8
Benzo (a) pyrene	0.061	3.4
alpha-BHC	0.00014	0.066
beta-BHC	0.00014	0.066
delta-BHC	0.023	0.066
gamma-BHC (Lindane)	0.0017	0.066
Bromodichloromethane	0.35	15
Bromomethane (Methyl Bromide)	0.11	15
4-Bromophenyl phenyl ether	0.055	15
n-Butyl Alcohol	5.6	2.6
Butyl benzyl phthalate	0.017	28
2-sec-Butyl 4,6-dinitrophenol (Dinseb)	0.066	2.5
Carbon disulfide	3.8	4.8*
Carbon tetrachloride	0.057	6
Chlordane (alpha & gamma)	0.0033	0.26
p-Chloroaniline	0.46	16
Chlorobenzene	0.057	6
Chlorobenzilate	0.1	N/A
2-Chloro-1,3-butadiene	0.057	0.28
Chlorodibromomethane	0.057	15
Chloroethane	0.27	6
bis-(2-Chloroethoxy)methane	0.036	7.2
bis-(2-Chloroethyl)ether	0.033	6
2-Chloroethyl vinyl ether	0.062	N/A
Chloroform	0.046	6
bs-(2-Chloroisopropyl)ether	0.055	7.2
p-Chloro-m-cresol	0.018	14
Chloromethane (Methyl chloride)	0.19	30
2-Chloronaphthalene	0.055	5.6
2-Chlorophenol	0.044	5.7
3-Chloropropylene	0.036	30
Chrysene	0.059	3.4
p-Cresidine	0.010	0.66
o-Cresol	0.11	5.6
m-Cresol	0.77	5.6
p-Cresol	0.77	5.6
Cyclohexanone	0.36	0.75*
o,p'-DDD	0.023	0.087
p,p'-DDD	0.023	0.087
o,p'-DDE	0.031	0.087
p,p'-DDE	0.031	0.087
o,p'-DDT	0.0039	0.087
p,p'-DDT	0.0039	0.087

Constituent	WW	NWW
Diben(a,h)anthracene	0.055	8.2
Dibenz(a,e)pyrene	0.061	N/A
1,2-Dibromo-3-Chloropropane	0.11	15
1,2-Dibromoethane/Ethylene Dibromide	0.028	15
Dibromomethane	0.11	15
m-Dichlorobenzene	0.036	6
o-Dichlorobenzene	0.088	6
p-Dichlorobenzene	0.09	6
Dichlorofluoromethane	0.23	7.2
1,1-Dichloroethane	0.059	6
1,2-Dichloroethane	0.21	6
1,1-Dichloroethylene	0.025	6
trans-1,2-Dichloroethylene	0.054	30
2,4-Dichlorophenol	0.044	14
2,6-Dichlorophenol	0.044	14
2,4-Dichlorophenoxyacetic acid (2,4-D)	0.72	10
1,2-Dichloropropane	0.85	18
cis-1,3-Dichloropropylene	0.036	18
trans-1,3-Dichloropropylene	0.036	18
Dieldrin	0.017	0.13
Diethyl phthalate	0.2	28
p-Dimethylaminoazobenzene	0.13	N/A
2,4-Dimethylaniline (2,4-xylidine)	0.010	0.66
2,4-Dimethyl phenol	0.036	14
Dimethyl phthalate	0.047	28
Di-n-butyl phthalate	0.057	28
1,4-Dinitrobenzene	0.32	2.3
4,6-Dinitro-o-cresol	0.28	160
2,4-Dinitrophenol	0.12	160
2,4-Dinirotoluene	0.32	140
2,6-Dinitrotoluene	0.55	28
Di-n-octyl phthalate	0.017	28
Di-n-propylnitrosamine	0.4	14
1,4-Dioxane	12	170
Diphenylamine	0.92	13
Diphenylnitrosamine	0.92	13
1,2-Diphenylhydrazine	0.087	N/A
Disulfoton	0.017	6.2
Endosulfan I	0.023	0.066
Endosulfan II	0.029	0.13
Endosulfan sulfate	0.029	0.13
Endrin	0.0028	0.13
Endrin aldehyde	0.025	0.13
Ethyl acetate	0.34	33
Ethyl benzene	0.057	10
Ethyl cyanide (Propanenitrile)	0.24	360
Ethyl ether	0.12	160
Ethyl methacrylate	0.14	160
Ethylene oxide	0.12	N/A
bis(2-Ethylhexyl) phthalate	0.28	28
Famphur	0.017	15
Fluoranthene	0.068	3.4
Fluorene	0.059	3.4
Heptachlor	0.0012	0.066
1,2,3,4,6,7,8-Heptachlorodilbenzo-p-dioxin	0.000035	0.0025
1,2,3,4,6,7,8-Heptachlorodibenzofluran	0.000035	0.0025
1,2,3,4,7,8,9-Heptachlorodibenzofluran	0.000035	0.0025
Heptachlor epoxide	0.016	0.066
Hexachlorobenzene	0.055	10
Hexachlorobutadiene	0.055	5.6
Hexachlorocyclopentadiene	0.057	2.4
Hexachloroethane	0.055	30
Hexachloropropylene	0.035	30
HxCDDs (All Hexachlorodibenzo-p-dioxins)	0.000063	0.001
HxCDFs (All Hexachlorodibenzofurans)	0.000063	0.001
Indeno (1,2,3-c,d) pyrene	0.0055	3.4
Iodomethane	0.19	65

concentrations above the stated levels. The regulatory levels are in total concentrations, unless noted with an asterisk. (# Explosives, water- reactive and other reactives only) (WW = Wastewater; NWW = Non-Wastewater).

EXCEL TSD OF TN, L.L.C.
UNIVERSAL TREATMENT STANDARDS (UTS) / UNDERLYING HAZARDOUS CONSTITUENTS (UHC) FORM

Constituent	WW	NWW
Isobutyl alcohol	5.6	170
Isodrin	0.021	0.066
Isosafrole	0.081	2.6
Kepone	0.0011	0.13
Methacylonitrile	0.21	84
Methanol	5.6	0.75*
Methapyrilene	0.081	1.5
Methoxychlor	0.25	0.18
Methyl ethyl ketone	0.28	36
Methyl isobutyl ketone	0.14	33
Methyl methacrylate	0.14	160
Methyl methansulfonate	0.018	N/A
Methyl parathion	0.014	4.6
3-Methylcholanthrene	0.0055	15
4,4-Methylene bis(2-chloroaniline)	0.5	30
Methylene Chloride	0.089	30
Naphthalene	0.059	5.6
2-Naphthylamine	0.52	N/A
o-Nitroaniline	0.27	14
p-Nitroaniline	0.028	28
Nitrobenzene	0.068	14
5-Nitro-o-toluidine	0.32	28
o-Nitrophenol	0.028	13
p-Nitrophenol	0.12	29
N-Nitrosodiethylamine	0.4	28
N-Nitrosodimethylamine	0.4	2.3
N-Nitroso-di-n-butylamine	0.4	17
N-Nitrosomethylethylamine	0.4	2.3
N-Nitrosomorpholine	0.4	2.3
N-Nitrosopiperidine	0.013	35
N-Nitrosopyrrolidine	0.013	35
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.000063	0.005
1,2,3,4,6,7,8,9-Octachlorodibenzofluran	0.000063	0.005
Parathion	0.014	4.6
Total PCBs	0.1	10
Pentachlorobenzene	0.055	10
PeCDDs (All Pentachlorodibenzo-p-dioxins)	0.000063	0.001
PeCDFs (All Pentachlorodibenzofurans)	0.000035	0.001
Pentachloroethane	0.055	6
Pentachloronitrobenzene	0.055	4.8
Pentachlorophenol	0.089	7.4
Phenacetin	0.081	16
Phenanthrene	0.059	5.6
Phenol	0.039	6.2
Phorate	0.021	4.6
Phthalic Acid	0.055	28
Phthalic anhydride	0.055	28
Pronamide	0.093	1.5

Constituent	WW	NWW
Pyrene	0.067	8.2
Pyridine	0.014	16
Safrole	0.081	22
Silvex (2,4,5-TP)	0.72	7.9
1,2,4,5-Tetrachlorobenzene	0.055	14
TCDDs (All Tetrachlorodibenzo-p-dioxins)	0.000063	0.001
TCDFs (All Tetrachlorodibenzofurans)	0.000063	0.001
1,1,1,2-Tetrachloroethane	0.057	6
1,1,2,2-Tetrachloroethane	0.057	6
Tetrachloroethylene	0.056	6
2,3,4,6-Tetrachlorophenol	0.03	7.4
Toluene	0.08	10
Toxaphene	0.0095	2.6
Triallate	0.042	1.4
Tribromomethane (Bromoform)	0.63	15
1,2,4-Trichlorobenzene	0.055	19
1,1,1-Trichloroethane	0.054	6
1,1,2-Trichloroethane	0.054	6
Trichloroethylene	0.054	6
Trichlorofluoromethane	0.02	30
2,4,5-Trichlorophenol	0.18	7.4
2,4,6-Trichlorophenol	0.035	7.4
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	0.72	7.9
1,2,3-Trichloropropane	0.85	30
1,1,2-Trichloro-1,2,2-trifluorethane	0.057	30
tris-(2,3-Dibromopropyl) phosphate	0.11	0.1
Vinyl chloride	0.27	6
Xylene(s)	0.32	30
Cyanides (Total)	1.2	590
Cyanides (Amenable)	0.86	30
Fluoride**	35	N/A
Sulfide	14	N/A
Antimony	1.9	1.15*
Arsenic	1.4	5.0*
Barium	1.2	21.0*
Beryllium	0.82	1.22*
Cadmium	0.69	0.11*
Chromium (Total)	2.77	0.60*
Lead	0.69	0.75*
Mercury (Non-wastewater from Retort)	N/A	0.20*
Mercury (All others)	0.15	0.025*
Nickel	3.98	11.0*
Selenium	0.82	5.7*
Silver	0.43	0.14*
Thallium	1.4	0.20*
Vanadium**	4.3	1.6*
Zinc**	2.61	4.3*

*TCLP Values (268.2(i))

**Not UHC in characteristic waste

EXCEL TSD OF TENNESSEE, L.L.C.

R.O.R. MASTER LISTING

MONTH:_____ YEAR:__

ROR#	MTN#	CUST#	CUSTOMER NAME	DATE ISSUED	DATE RECEIVED	VOID DATE
77688						
77689						
77690						
77691						
77692						
77693						
77694						
77695						
77696						
77697						
77698						
77699						
77700						
77701						
77702						
77703						
77704						
77705						
77706						
77707						
77708						
77709						
77710						
77711						

Excel TSD of Tennessee, LLC. Drum Inspection Report *Page ____ of ____*

Generator Name:
Manifest Document No:
Line:
Material Name:
Proper Shipping Name:
Disposal Restrictions:
Unusual Hazards:

RORNo:
Itemno:

Date Arrived:
Tenth Day:
MPF No:
Number of Containers:
Inspection Date:

Inventory as Code profiled:
Hazard Class:

Drum No.	INV Code	Cap.	HS	Liq.	Sludge	Solid	T	L	W	Sample No.	Lot No.	Comments

Excel TSD of Tennessee, LLC. *Verification of Analysis Request*

Generator Name:
Manifest Document No:
Line:
Material Name:
Proper Shipping Name:
Disposal Restrictions:
Unusual Hazards:

ROR No:
Itemno:

Date Arrived:
Tenth Day:
MPF No:
Number of Containers:
Inspection Date:

Inventory as Code profiled:
Hazard Class

LOAD STATUS

_____Load was in good order
_____Drums had to be resealed
_____ Drums dented
_____Drums improperly labeled
Driver's Name: .....

_____Excessive waste on drums
_____Drums required repackaging
----------Drum Count off
_____Off spec material
_____Overfull drums

Describe Problem:

_____
_____
_____
_____

certify that _____ % of the container(s) in the shipment above have been sampled, and that the sample(s) are representative of the materials received.

Sampler Signature_____

_____ samples from _____lots delivered to the laboratory. Date---------- , _

MATERIAL ACCEPTANCE

Accepted: ( ) Yes ( ) No Rejected for:_____

Disposal Categories	Container Count	Volume	Location
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Accepted by:._____ Date:._____

Excel TSD of Tennessee, LLC. Analytical Report *Sample No:*_____

Generator Name:
Manifest Document No: RORNo: Date Arrived:
Line: itemno: Tenth Day:
Material Name: MPF No:
Proper Shipping Name: Number of Containers:
Disposal Restrictions:
Unusual Hazards: Inventory as Code profiled:
Hazard Class:

Physical Data

Viscosity: (circle one) Low Medium High Non-Pumpable

pH: _____ **Layering/Physical State**

Flash Pt: _____

	%	Description
Specific Gravity: _____lbs.___	_____	_____
Heat Content: _____	_____	_____
%W Chlorine: _____	_____	
Comments% Water: _____		_____
Color: _____	_____	_____

Odor:(circle one) **None** Mild Strong

Comments _____

Reviews: Lab Director.....Date:.....

Attachment 2.2

WASTE TESTING SUPPORT FOR PROCESS DETERMINATIONS

Fingerprint Waste Testing

	Fuel Blending	Off-Site Landfill (1)	Wastewater for Offsite (2)	Non-Haz. Landfill (3)
Odor	X	X	X	X
Visual	X	X	X	X
pH	4		4	4
Flash Point	5		5	5
Heating Value	X			
Total Halides	X			
Specific Gravity	6		6	6
Bulk Density	7	7	7	7
Water Content	8		8	8

Notes:

1. Landfill includes debris for macro encapsulation and bulk solids off-site disposal in a Subtitle C landfill
2. Wastewater includes waters and corrosives for off-site treatment or deep well injection
3. Non-Haz. Landfill includes RCRA non-hazardous solids, liquids, and sludges for off-site disposal in a Subtitle D landfill
4. pH is measured on the aqueous portion of free liquids only
5. Flash point is measured on the light, non-aqueous portion of free liquids only
6. Specific gravity is measured on the free liquid portion
7. Bulk density is measured on the solid portion
8. Water content is measured on the free liquid portion

Attachment 2.3

ETSD PROCEDURE FOR DETERMINING WASTE VOLUME IN A CONTAINER

ETSD PROCEDURE FOR DETERMINING WASTE VOLUME IN A CONTAINER

As described in the Waste Analysis Plan, most of the containers received at the ETSD Facility are opened during the receiving process for visual inspection and sampling in efforts to determine if the waste in the container is as it is described on the manifest and the previously submitted Material Profile Form. During this process, the volume of waste in the container is also determined, as described below, and recorded on the outside of the container using a marker or grease pencil. All ETSD personnel performing these functions have received the 40-hour OSHA Hazardous Waste Operations and Emergency Response ("HAZWOPER") training as well as ETSD- specific classroom training and On-the-Job training that teaches them safe and effective techniques. All such personnel are also provided appropriate personal protective equipment ("PPE"), such as gloves, eyewear, coveralls, and air-purifying respirators, and are trained in its proper use.

In addition to PPE, marking pens/pencils, and profile information on the waste that is supposed to be in the container, ETSD Receiving personnel are also provided with other necessary tools and equipment such as non-sparking wrenches, sorbent wipes/pads, graduated measuring sticks, and (where necessary) "strap charts" for such containers that show how depth in inches converts to gallons of contents. The graduated measuring stick used for the most common type of container – the standard 55G drum, measured directly in gallons. Some containers, such as translucent plastic totes, may themselves have graduated markings to show volumes. Depending upon the type and size of container, the specific tools and equipment needed may be different.

Containers are opened from the top by loosening the closure device for the appropriate opening and carefully removing the cover (i.e., lid, bung, hatch) while watching and listening for indications of pressure release (e.g., bubbling, hissing). Covers and removed closure devices are carefully set aside so that they can be readily accessed and re-installed after the screening process is completed.

If a container is found to be full or almost so, then the full volume of the container will be marked on the outside of the container. For containers that are only partially filled, the volume must be determined or estimated. If there are no graduated markings on the container itself that allow the waste volume to be determined by direct visual observation, the waste volume is determined using measuring sticks and strap chart information for such container. If the waste in the opened container is observed to be a liquid, the measuring stick is pushed into the waste until it meets resistance from either the bottom of the container or settled solids in the container. Using the penetration depth indicated on the measuring stick and the known or measured interior height of the container, the strap chart information is used to determine both the overall volume of waste in the container and the relative amounts of liquids and solids. If the waste in the opened container is observed to be a solid, the measuring stick is lowered to the top of the waste to measure the unfilled volume of the container which is then subtracted from the container volume to provide the waste volume. If the waste in the opened container is observed to be a semi-solid, the initial attempt will be to measure it as if it were a liquid to again determine

if there may also be non-flowing solids in the bottom. However, if the semi-solid material is "sticky" such that it would be difficult to clean from the measuring stick, the volume will be determined as if it were a solid.

Except where it will be immediately used for another measurement in another container of what is supposed to be and visually appears to be the same waste, measuring sticks will be cleaned after each use by wiping them with a disposable absorbent wipe or pad. The used wipes/pad will be collected in a trash bag or other container and managed as a facility-generated hazardous waste. If a measuring stick becomes too contaminated for effective use, it will then be either decontaminated using more aggressive cleaning techniques or it too will be discarded and managed as facility-generated hazardous waste.

Sometimes, the volume determination must involve some level of estimation. For example, the surface of waste solids in a container (e.g., a roll-off box) may be irregular and an average depth may have to be estimated from one or more stick measurements. In some cases, such as when a container holds a piece of contaminated equipment, the volume must simply be estimated from the visual observation of the amount of container space the equipment occupies.

It must be noted that precise volume determinations do not have to be made for ETSD's purposes. Volume determinations do not have to be accurate to a fraction of a gallon or even to a gallon, and the level of accuracy becomes less practically achievable as the container sizes increase. Further, as long as the above methods are consistently applied, under-estimations and over-estimations should approximately balance to yield daily volume estimates that are sufficiently accurate. Daily inventories are based off size of container for compliance purposes.

ATTACHMENT 3

FACILITY SECURITY

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A. General 3-1
B. Barrier Fencing and Gates 3-2
C. Access Control Procedures 3-3
D. Warning Signs 3-4

Figure

Active Facility Layout Showing Truck Traffic Flow Patterns ..... Figure 3-1
One-Mile Radius Map ..... Figure 3-2
Aerial Photo ..... Figure 3-3
Flood Insurance Rate Map ..... Figure 3-4

A. GENERAL

This Section describes the structures and procedures used at the Excel TSD of Tennessee, LLC. ("ETSD") Facility to prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock into the active portions of the facility (i.e., the Active Facility). Attached Figure 3-1 shows the layout of the Active Facility, which incorporates the developed western portion of the ETSD property and the immediately adjacent property that ETSD leases from Best Wade Petroleum, Inc. ("BWP"). While the ETSD property includes undeveloped land north and east of the Active Facility, all ETSD activities take place in this Active Facility, and it is this area that is generally referred to as the "Facility".

Pursuant to its lease agreement with BWP, ETSD has exclusive right of use of the leased property except for the cross-hatched Underground Tank Farm area shown on Figure IV-1.Under the agreement, BWP retains the use of the underground storage tanks and dispensing equipment located in this area, and must be provided access to them, for its ongoing petroleum fuel wholesale distribution business. BWP also retains all operational, maintenance, and regulatory compliance responsibilities, and legal liabilities, for this petroleum underground storage tank system (which is registered with and regulated by the Tennessee Division of Underground Storage Tanks).

B. BARRIER FENCING AND GATES

Attached Figure 3-1 shows that the Active Facility is completely surrounded by a six-foot chain-link fence except for the southeast corner portion where an asphalt driveway and parking areas are located outside the fenced perimeter. This perimeter security fence basically confines vehicular and pedestrian access to the Facility to three locations. Vehicle access into the Facility is from Rivergate Road via Gate 1 and Gate 2. (There is another smaller personnel gate in the chain-link perimeter fence just west of Gate 1, but this personnel gate is rarely used and is normally kept securely closed and locked.) The Facility can be accessed by foot through Gates 1 and 2 and through the Administration Building via a doorway in its southern wall. This doorway provides access for employees and visitors to the administrative offices from the asphalted parking area located just south of the Administration Building.

There is another six-foot chain-link fence that controls access from the southern portion of the Facility to the northern portion of the Facility where all hazardous waste storage and treatment/processing operations, and most non-hazardous waste storage and treatment/processing operations, are conducted. As shown on Figure 3-1, this secondarily fenced "Operations Area" is dominated by the Contained Area, which is a concrete-paved and secondarily contained area where all hazardous waste storage and treatment operations and many solid waste storage and treatment operations (particularly those involving liquids) are conducted. Figure 3-1 also shows that access into the Contained Area and the rest of the Operations Area is controlled by gates. Gate 3 across the asphalt paved western driveway provides the only vehicle access. Gate 5, at the top of the Truck Loading Dock located at the west end of the Contained Area, allows the two- way movement of personnel and containers of waste (via hand truck and motorized forklifts) as trucks are unloaded and loaded. There are also three smaller gates that provide access to personnel on foot. Gate 4, located just north of Gate 3, provides for movement of operations personnel between the Operations Area and the employee parking areas along the western fence. Gates 6 and 7 provide convenient personnel access between the Contained Area and the southern portion of the Facility (particularly the Administration Building). Gate 6 is near the Loading Dock, and Gate 7 is near the Maintenance Building.

Other barriers to foot and/or vehicular access to the Active Facility are provided outside the perimeter fence. As shown on the One-Mile Radius Map in Figure 3-2, the Aerial Photo in Figure 3-3, and the Flood Insurance Rate Map in Figure 3-4, the remainder of the ETSD property to the north and east of the Active Facility is undeveloped and consists of the heavily wooded and swampy floodplain of Nonconnah Creek. This terrain basically prevents access by vehicles and strongly discourages even foot access to that portion of the Active Facility perimeter. The One-Mile Radius Map and Aerial Photo also show that the northwest side of the Active Facility is closely bounded by active railroad tracks of the Illinois Central Railway. This presence of active railroad tracks also discourages both foot and (especially) vehicular access to that portion of the Active Facility perimeter. The Aerial Photo also shows that most of the southeast side of the Active Facility is additionally protected from general foot and vehicular access by the perimeter fence around the adjacent Stericycle facility.

C. ACCESS CONTROL PROCEDURES

All gates (exterior Gates 1 and 2 and interior Gates 3 – 7) and the front doorway into the Administration Building from the southern parking area, are kept closed and locked when ETSD personnel are not present. Keys to these access points are provided to only a few key ETSD personnel. Keys to exterior Gates 1 and 2 are also provided to a few BWP personnel to allow them necessary off-hours access to the Underground Tank Farm system.

No ETSD personnel have specific responsibilities relating to Facility security, but all personnel are trained to identify and alert Facility managers as to the presence of unauthorized personnel. Facility managers will contact the Memphis Police Department for assistance in removing trespassers as needed. There are no actual gate attendants at any of these access points, and none are necessary to provide access control. During working hours, ETSD personnel visually monitor all these access points for unauthorized access by pedestrian and vehicular traffic. Administrative staff within the Administration Building can easily monitor the entry of personnel through the front doorway. Gate 1 is readily visible from the Contained Area Truck Loading Dock, while Gate 2 (and to some degree Gate 1) is readily visible from the Administration Building. Interior Gates 3 – 7 are readily visible to operations personnel at the Contained Area Truck Loading Dock and other points within the Facility.

Incoming truckloads of hazardous waste are controlled as described in the Waste Analysis Plan (Attachment 2). All other visitors and contractors are directed to administrative/management personnel in the Administration Building to obtain access authorization (as appropriate) and are then required to sign in and out on a visitor log located in the main office. Except for authorized contractors, visitors are allowed to enter the Operations Area of the Facility only when accompanied by ETSD personnel or an authorized representative of ETSD.

ETSD also implements a continuous video surveillance system at the Facility. Multiple cameras are installed at selected locations within the Facility to provide surveillance over key areas, including areas encompassing Gates 1, 2, 3 and 4. Each of these cameras is wired to a video monitoring and recording system in the Administration Building. This surveillance system allows personnel inside the Administrative Building to remotely monitor these gates to detect the entry or exit of vehicles or persons, and it provides a continuous video record of such movements. These video records may be kept for a period of time before they are erased. While this video surveillance system does not physically prevent unauthorized entry into the Facility, it does act as a deterrent to such and provides a video record that can help identify and apprehend the persons responsible if a break-in occurs.

D. WARNING SIGNS

The following warning signs are posted on the perimeter fence near Gates 1 and 2 and/or at the Gate 3 entry into the Active Area:

- "CAUTION / HAZARDOUS WASTE STORAGE AREA / UNAUTHORIZED PERSONS KEEP OUT
- "NOTICE / NO TRESPASSING"
- "NO ADMITTANCE / VISITORS MUST USE MAIN ENTRANCE"
- "CAUTION / FOR AUTHORIZED PERSONNEL ONLY"

Signs with the same or equivalent warning messages are also posted at interior personnel gates 4, 6, and 7. Similar "No Trespassing" or "Unauthorized Personnel Keep Out" signs are also posted at less than 75-foot intervals on all sides of the perimeter fence that surrounds the Active Facility. All signs are purchased commercially and are highly visible.

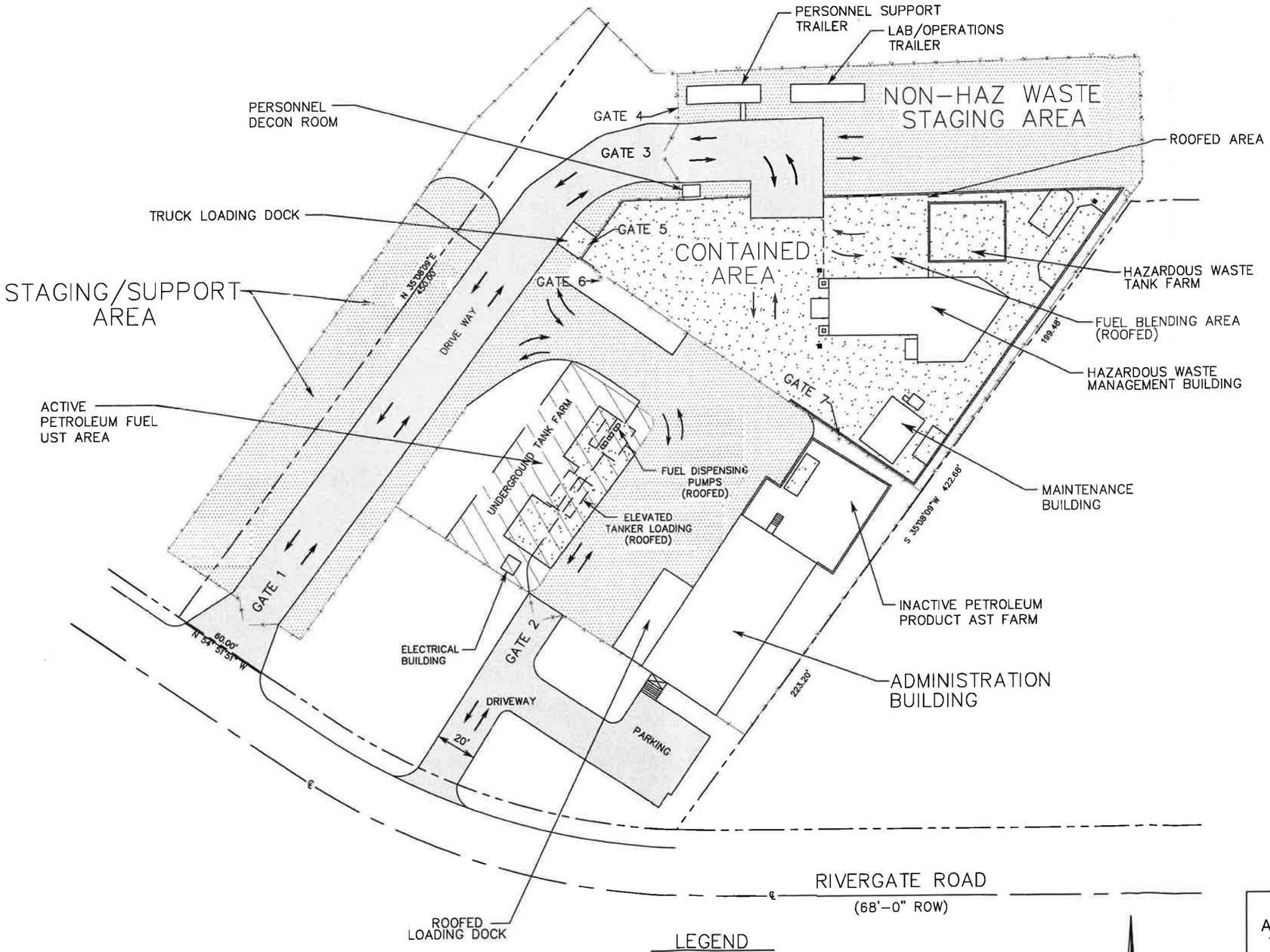
Figure 3-1

Active Facility Layout Showing Truck Traffic Flow Patterns

TriAD Environmental Consultants, Inc.

"Figure IV-1 Active Facility Layout Showing Truck Traffic Flow Patterns"

Project Number: 07-EXC01-01
Date: 03/28/2018



NOTE

THIS DRAWING WAS ORIGINALLY ADAPTED (BY DIGITIZATION) FROM A DRAWING PREPARED FOR BRYSON RECOVERY SERVICE BY DELTA PROCESS MANAGEMENT INC. (MEMPHIS, TN) DATED 06/21/91, TITLED "FACILITY PLOT PLAN", AND NUMBERED EPA-1; AND HAS BEEN MODIFIED TO SHOW DETAILS OF THE LEASED PROPERTY BASED ON A PHOTOCOPY OF A DRAWING BY BDK & ASSOCIATES (MEMPHIS, TN) DATED 01/04/89 (REV. 02/05/99) AND TITLED "SURVEY OF LOT 1, PHASE 1, RIVERPORT SUBDIVISION".

LEGEND

- FIRE HYDRANT
- CHAIN-LINK FENCE
- PROPERTY BOUNDARY
- TRAFFIC FLOW
- GRAVEL
- ASPHALT
- CONCRETE
- CONTAINMENT BERM/WALL

0 30 60
SCALE IN FEET

FIGURE III-1
ACTIVE FACILITY LAYOUT SHOWING TRUCK TRAFFIC FLOW PATTERNS

EXCEL TSD OF TENNESSEE, LLC.
MEMPHIS, TENNESSEE

SCALE: 1" = 60'	DR BLR	CHK VJB	REV CMS

PREPARED BY:
TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, Tn 37214
615-889-6888 fax 615-889-4004

PROJ: 07-EXC01-01	DATE: 3/28/2018	SHEET 1 OF 1

Figure 3-2

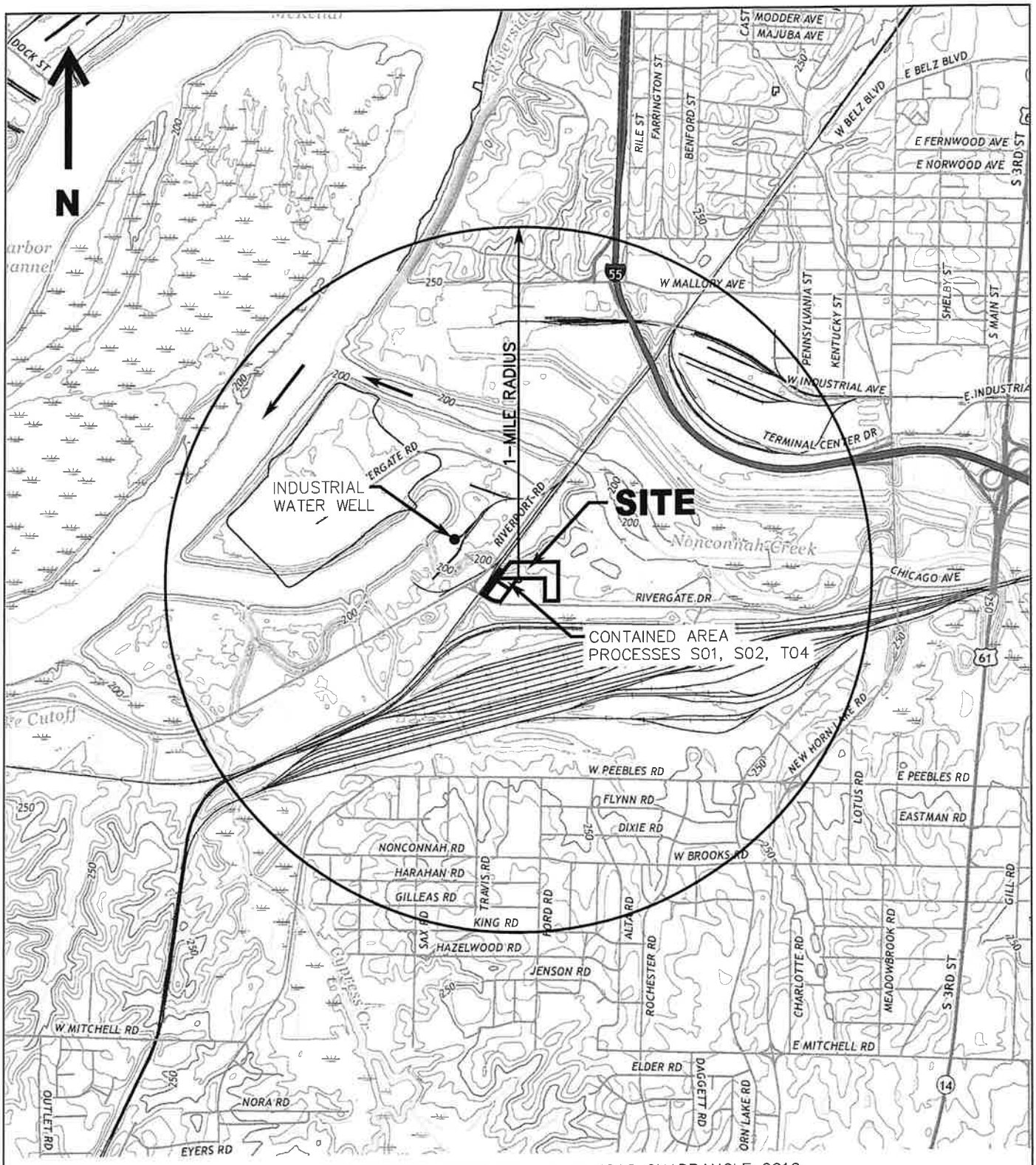
ONE-MILE RADIUS MAP

TriAD Environmental Consultants, Inc.

"One-Mile Radius Map"

Project Number: 07-EXC01-01 Date:

05/05/2020



SOURCE: USGS 7.5-MINUTE SOUTHWEST MEMPHIS, TENNESSEE-ARKANSAS QUADRANGLE 2016

PREPARED BY:

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, TN 37214
615-889-6888 fax 615-889-4004

ONE-MILE RADIUS MAP

EXCEL TSD OF TENNESSEE
MEMPHIS, TENNESSEE

DWG. DATE: 05/05/20	PROJECT NO.: 07-EXC01-01
SCALE: 1: 24,000	SHEET 1 OF 1

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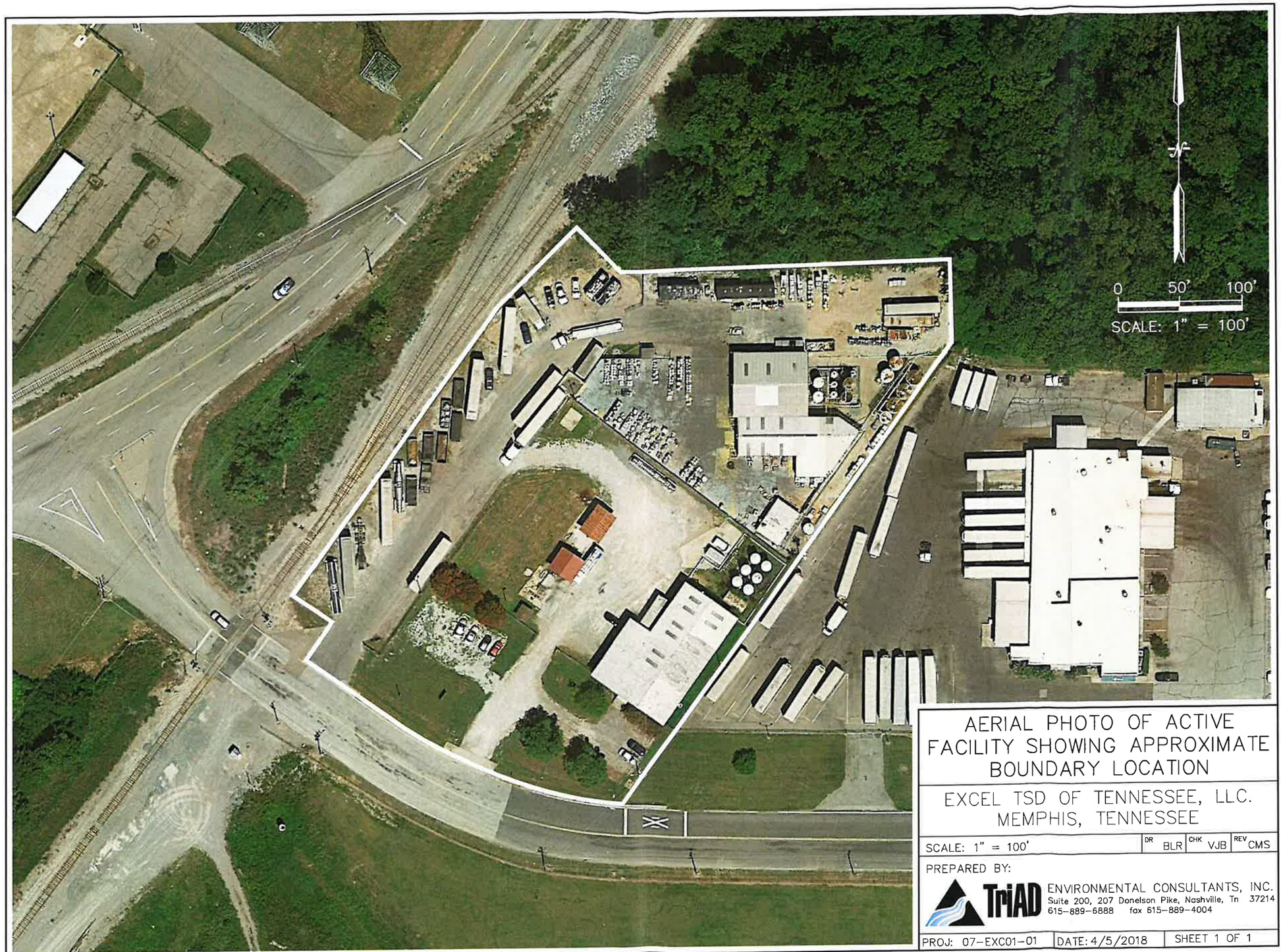
Figure 3-3

AERIAL PHOTO

TriAD Environmental Consultants, Inc.

"Aerial Photo of Active Facility Showing Approximate Boundary Location"

Project Number: 07-EXC01-01
Date: 04/05/2018



AERIAL PHOTO OF ACTIVE FACILITY SHOWING APPROXIMATE BOUNDARY LOCATION

EXCEL TSD OF TENNESSEE, LLC.
MEMPHIS, TENNESSEE

SCALE: 1" = 100'	DR BLR	CHK VJB	REV CMS

PREPARED BY:

TriAD ENVIRONMENTAL CONSULTANTS, INC.
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PROJ: 07-EXC01-01	DATE: 4/5/2018	SHEET 1 OF 1

N:\Jobs\EXC\DRAWINGS\0101-AERIAL-WITH-BOUNDARY.dwg SAVED: 3/28/2018 3:37 PM BY: BRICE

Figure 3-4

Flood Insurance Rate Map

TriAD Environmental Consultants, Inc.

"FEMA FIRM Map Showing Facility Location"

Project Number: 07-EXC01-01
Date: 03/28/2018

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth
- Regulatory Floodway *Zone AE, AO, AH, VE, AR*

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The base map shown complies with FEMA's base map accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/28/2018 at 4:21:59 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

FEMA FIRM MAP SHOWING FACILITY LOCATION

SCALE: AS SHOWN	DR BLR	CHK VJB	REV CMS

PREPARED BY:

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, Tn 37214
615-889-6888 fax 615-889-4004

PROJ: 07-EXC01-01	DATE: 3/28/2018	SHEET 1 OF 1

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ATTACHMENT 4

FACILITY INSPECTION PROGRAM

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A. INTRODUCTION

This Attachment describes how the Excel TSD of Tennessee, LLC hazardous waste management facility ("ETSD" or the "Facility") will be periodically inspected in compliance with Tennessee Rule 0400-12-01-.06(2)(f) [equivalent to 40 CFR § 264.15]. This rule requires ETSD to inspect the Facility for malfunctions and deterioration, operator errors, and discharges which may be causing or lead to (1) release of hazardous waste constituents to the environment, or (2) a threat to human health. These inspections must be conducted often enough to identify problems in time to correct them before they harm human health or the environment. Minimum inspection frequencies vary as described in the subsections below.

It should be noted that many of the formal, documented inspections described in this Attachment are supplemented by more frequent informal inspections conducted as part of routine operations. For example, the equipment used in daily routine operations is obviously checked for operability each working day. As another example, if a container is at any time observed to be leaking or

otherwise unfit for use, the container will be promptly placed in an overpack container, or its contents will be transferred to another container in good condition, and any spilled/leaked material will be promptly cleaned up.

B. INSPECTION SCHEDULES

This subsection identifies the equipment and features of the Facility that will be routinely inspected, provides the minimum frequency of such inspections, and describes what the ETSD inspectors will primarily be checking during the inspections. This information is summarized in the *Inspection Schedule Table* in Attachment 4.1.

1. Monitoring Equipment

Monitoring equipment used by ETSD is primarily portable equipment. This consists of photoionization detectors (PID's), multi-gas detectors, colorimetric tubes, etc. This equipment is inspected monthly (and prior to use) for damage and operability, and for the availability of proper calibration equipment and materials.

Fixed monitoring equipment is used on the building's fire suppression system and is monitored by an outside contractor. This system is tied to a dedicated phone line for monitoring and alarm notification. This system is inspected monthly to verify it is operational and sufficiently clean.

2. Safety Equipment

The fire system is inspected monthly by a designated ETSD employee. This includes verifying that portable fire extinguishers are present and readily accessible in the designated locations and checking each fire extinguisher to see that a contractor has serviced it within the last twelve months and that it has a sufficient charge. The inspector also checks rubber parts for wear or dry rot.

Each shower and eyewash unit is inspected monthly for accessibility, cleanliness and operability (good water flow). Each designated first aid kit location is checked monthly for the presence and ready accessibility of such a kit, and each first aid kit is inspected quarterly for missing or used

items. The siren at the Lab/Operations Trailer and the portable air horns located at four places in the Contained Area to provide alarm warnings are tested for proper operation monthly.

Facility personnel that have been issued personal protective equipment ("PPE", such as gloves, safety glasses, coveralls, respirators) inspect it before and after each use for wear or damage, and respirators are cleaned. PPE that is found to be damaged or determined unfit for reuse is replaced. PPE that cannot be decontaminated is disposed of as hazardous waste. Monthly, the Facility's inventory of PPE is checked for sufficient quantities/types and replenished as needed.

3. Emergency Response Equipment

All emergency spill kits are inventoried monthly. Spill kits consist of oversized polyethylene overpacks (salvage drums), spark proof shovels, absorbent socks and booms. Additional absorbent rolls, booms, pads and loose granular material, and materials to neutralize releases of acids or bases, are maintained on site to provide additional supplies for emergency response. The stored inventories of these materials are checked monthly and replenished as needed. Inventories of empty containers (including overpack containers) are also maintained at the Facility and also checked monthly and replenished as needed. Equipment or materials used in an emergency are decontaminated or replaced and readied for use prior to re-commencement of Facility operations.

The Facility equipment that is used in routine operations is also available for emergency use. This includes, but is not limited to, sump pumps, transfer pumps, forklifts, loaders, brooms, shovels, hand tools, and the telephone system. No formal, periodic inspection of this equipment is needed because it is checked/inspected for availability and operability through frequent, routine operations and promptly repaired or replaced as needed.

4. Security Systems

The security fencing at the Facility is visually inspected monthly for damage, deterioration (including soil washout) or breaches. All gates and locking mechanisms are inspected weekly for damage, deterioration, and functionality (e.g., working locks). The exterior signs are inspected monthly to ensure that they have not been stolen or obstructed with graffiti. The video surveillance

system will be checked monthly to verify that all cameras and video recorders are working properly.

5. Container Storage Areas

All containers in the container storage areas are inspected weekly for signs of deterioration, corrosion, leakage, or excess pressure, and for the presence of appropriate and legible labels and markings. Roll-off boxes are checked to verify that bows and tarps are in place, and that the tarps are in good condition (e.g., no tears or holes) and properly installed to completely cover the tops of the boxes. Pallets are checked to verify they are in good condition and being properly used. Portable containment units (e.g., spill pallets) are checked for the presence of accumulated liquids and to verify that they are in good condition and being properly used.

Aisle space in the Container Storage Areas and roll-off boxes are inspected weekly to verify that no less than 2.5 feet are between the containers and the limits (e.g., walls and containment curbs) to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment in an emergency.

The Container Storage Areas are inspected weekly to verify that containers holding hazardous wastes that are incompatible with any waste or other materials stored in nearby containers are sufficiently separated (by distance or barriers like berms or walls) from the other materials to prevent mixing of their incompatible contents in the event the containers break or leak. This is especially important if the hazardous waste and/or other materials are liquids, which may require placement in separate secondary contained areas or the use of portable containment units.

Each container storage area's secondary containment system is also inspected for collected liquids, cracks, spalling, coating damage, or other defects during the weekly inspection. More details on the inspection of secondary containment surfaces are provided in the *Secondary Containment Surfaces Inspection and Maintenance Plan* included as Attachment 4.3. The exterior perimeter of the Contained Area is also checked during these weekly inspections for evidence of releases. Additionally, ETSD will conduct thorough inspections of the secondary containment surfaces of the Contained Area including certification by a professional engineer of its integrity on a minimum

of a two-year basis for the duration of the permit. Records of this inspection including engineering certification will be submitted to the DSWM within 90 days of completion.

The Disperser Unit in the Fuel Blending Area and its vicinity is inspected daily unless it is not being used that day. Inspectors verify that the lid used to control liquid and vapor releases from the process vessels during Disperser operations is in good condition and provides no visible gaps around the shaft or at its perimeter contact with the process vessel. The Disperser Unit and the wall behind it are also inspected for the presence of spatter.

The Truck Loading Dock at the west end of the Outside Hazardous Waste Container Management Area is inspected each day it is used to check for cracks, gaps, or other deterioration of the dock's concrete surface or base, and for the presence of spill residues or debris.

6. Hazardous Waste Tank Systems

Each day when they are holding wastes, tanks F1 and F2, their ancillary equipment (e.g., pumps, valves, piping, fittings), and their support structures are visually inspected for signs of damage (e.g., cracks, gaps, spalling, coating deterioration) or leaks. Ancillary equipment is further checked for missing, inoperable, or damaged components, and each tank's high-level alarms are checked to verify they are operational.

During this daily inspection, the Tank Farm secondary containment system is visually inspected for collected liquids, signs of releases, and cracks or gaps in, or deterioration of, the coated interior surfaces or the exterior concrete surfaces. More details on the inspection of secondary containment surfaces are provided in the *Secondary Containment Surfaces Inspection and Maintenance Plan* included as Attachment 4.3.

7. Additional Inspection and Monitoring Procedures for Organic Air Emission Controls

There are additional inspection and monitoring requirements for tanks, equipment, and containers used in fuel blending operations at the Facility associated with prevention and control of organic air emissions. These additional inspection and monitoring requirements, and the checklists and

forms used in complying with them, are described/presented in Attachment 9 (Management of Tank Systems and Equipment Used in Fuel Blending).

C. INSPECTION CHECKLISTS

The inspections described in Subsections 4.B.1 through 4.B.6 above are performed and documented using checklists on which deficiencies are identified. Copies of the inspection checklists utilized at the Facility can be found in Attachment 4.2. These forms may be modified in form or style or to require more information, but they will not be modified to require less information. They may also be utilized in paper or electronic form (e.g., on a computer tablet). These inspection checklist will be available for DSWM inspection at the facility.

D. REMEDIES REQUIRED

If inspections reveal deficiencies, notations will be made on the inspection checklist. Deficiencies which can be corrected immediately will be corrected and the person performing the inspection will make notes on the checklist describing the corrections that were made. After completing an inspection, the inspector will promptly submit the completed checklist to his supervisor or Facility management and, if the completed checklist identifies unresolved deficiencies, immediately verbally notify his supervisor or Facility management of that finding. Upon receiving such notification, the supervisor and Facility management will take prompt actions to correct the deficiency. For deficiencies which require significant allocation of manpower, equipment, or budget, the supervisor will submit a work order to Facility management. If the deficiency or malfunction represents a significant threat of release or threat to human health and/or the environment, then all operations affected by the deficiency will cease until the corrections are made.

As soon as a deficiency is corrected, an ETSD inspector or ETSD management personnel will inspect the finished repairs, describe the nature of the repairs on either the inspection checklist on which the deficiency was initially identified or on a separate inspection checklist, and initial and date the new entries or new checklist.

E. RECORD KEEPING

All completed inspection checklists are kept as part of the Operating Record for three years. These checklists must include:

- Date of inspection
- Time of inspection
- Name of person performing inspection
- Observations made
- Date of any repairs or remedies
- Nature of any repairs or remedies

Attachment 4.1

INSPECTION SCHEDULE TABLE

Attachment 4.1

INSPECTION SCHEDULE TABLE

Area or Equipment	Inspection Objectives	Inspection Frequency
Safety and Emergency Equipment		
• Eye Wash Stations and Emergency Showers	Verify units operational/recharged (with good water flow), cleaned, and accessible (no obstructions)	Monthly
• Fire Extinguishers	Verify units present and accessible in designated locations, fully charged, and has been serviced in last 12 months; check rubber parts for wear and dry rot	Monthly
• First Aid Kits	Verify kits available in designated areas and accessible.	Monthly
• First Aid Kits	Verify kits are fully stocked with designated contents	Quarterly
• Emergency Alarms	Verify air horns present in designated areas, and that horn and siren are operational	Monthly
• Emergency Spill Kits	Verify kits stationed in designated areas and fully stocked with designated contents	Monthly
• Absorbent Materials	Verify sufficient amount available	Monthly
• Neutralization Materials	Verify sufficient types and Amounts available	Monthly
• Empty Containers & Overpack Drums	Verify sufficient number available, accessible, and in good condition	Monthly
• Respirators and associated supplies	Verify available in sufficient quantities, operable, and clean	Monthly
• Gloves, safety glasses, and other PPE clothing	Verify available in sufficient types and quantities	Monthly
• Portable monitoring equipment	Check for damage, operability, availability of calibration equipment and materials	Monthly

Area or Equipment	Inspection Objectives	Inspection Frequency
Safety and Emergency Equipment - cont'd.		
• HWM Building Fire Suppression System	Verify system operable, cleaned	Monthly
• Sump pumps	Operational, good repair	Monthly
• Transfer pumps	Operational, good repair	Monthly
• Forklifts & Loaders	Available, operational, good repair (spark arrestor, horns and back - up warning working)	Monthly
• Brooms & Shovels	Available, good conditions	Monthly
• Public Address System & Telephone System	Operational, clearly heard throughout facility	Monthly
Security System		
• Security Fence (perimeter and interior)	Check for breaches, damage (including soil washout), and deterioration	Weekly
• Gates	Check for deterioration and damage, verify operable locking mechanisms	Weekly
• Warning Signs	Verify signs present and legible at designated locations	Weekly
• 24-hour video surveillance Systemj	Verify all cameras and recorders operable	Weekly

Area or Equipment	Inspection Objectives	Inspection Frequency
Container Storage Areas (Inside and Outside)		
• Aisle Space	Verify at least 2.5-foot aisle space between rows of containers, rows no more than two containers wide	Weekly
• Containers	Check for improper stacking, inadequate closure, leakage, corrosion, bulging, dents; verify presence of appropriate, legible labels and markings	Weekly
• Roll-off boxes	Verify bows and tarps in place and presence of appropriate, legible labels and markings; check for over-filling, tears, holes, leaking, inadequate aisle space	Weekly
• Pallets	Verify in good condition and properly used	Weekly
• Portable containment Units (e.g., spill pallets)	Verify in good condition and properly used; check for presence of accumulated liquids	Weekly
• Secondary containment surfaces	Check sumps for accumulated liquids, and all surfaces for spill residues, debris, cracks, spalling, coating damage, or other deterioration; check outside of containment walls/curbs/edges for evidence of release	Weekly
• Truck Loading Dock	Check for cracks, gaps, deterioration in surface or base, presence of spill residues or debris	Daily when used
• Disperser Unit	Verify lid in good condition (unbent), with no visible holes/gaps around shaft or at contact with process vessel; check for spatter on stand and wall behind it	Daily when used
• Incompatible Waste Storage	Improper Segregation, not on PCUs	Weekly
• Building B Ignitable & Reactive Waste Storage Boundary(ies	No ignitable or reactive waste beyond boundary line, lines adequately marked & visible	Weekly

Area or Equipment	Inspection Objectives	Inspection Frequency
Tank Systems F1 and F2		
• Tank/piping structural supports	Check for cracks, gaps, spalling, coating deterioration, signs of leakage/spills	Daily
• Tank Exterior Surfaces	Check for cracks, discoloration, corrosion, bulging, signs of leakage or overfilling	Daily
• Ancillary equipment (e.g., pumps, valves, piping, fittings)	Check for missing, inoperable, or damaged components, signs of leakage	Daily
• Secondary containment surfaces	Check sump for accumulated liquids, and all surfaces for spill residues, debris, cracks, spalling, coating damage, or other deterioration; check outside of containment walls/curbs/edges for evidence of release	Daily
•High Level Alarms	Verify system is operational	Daily

Attachment 4.2

INSPECTION CHECKLISTS

Excel TSD of Tennessee, LLC

Inspection Checklists

DAILY

Inspector: _____ **Date of Inspection:** _____ **Time:** _____

Item	Area(s) of Concern	Status Acceptable/Unacceptable	Observation	Date & Name of Repairs / Remedial Action
Loading / Unloading Areas				
Concrete Surface	Presence of spill/drip residues or debris; cracks, spalling, or other deterioration/damage; joint/crack sealant not in good condition			
Disperser Unit				
Lid	Good condition (not bent) and covers to avoid splattering & spillage; forms a continuous barrier with no visible holes, gaps or other open spaces into the interior of the container			
Walls	No splatter or other signs of waste residues			

Daily - means each day the area / unit is used.

Additional Comments: _____

_____

_____

Excel TSD of Tennessee, LLC

Inspection Checklists

DAILY

Inspector: _____ **Date of Inspection:** _____ **Time:** _____

Item	Area(s) of Concern	Status Acceptable/Unacceptable	Observation	Date & Name of Repairs / Remedial Action
Tanks				
Structural Supports (steel and concrete)	Cracks, spalling, erosion or other deterioration			
Piping/Tank Connections, Valves & Fittings	External corrosion or other deterioration; cracks; leaks; bulging or other distortion; improper valve operation; lack of gasket/seal integrity			
Tank Exterior Surface	Cracks, discoloration, rust spots, bulges, buckles, film lifting, or other deterioration			
Tank Bottom	Cracks, discoloration, corrosion, bulges, or other deterioration			
Secondary Containment Area	Presence of accumulated waste (including spill/drip residues), storm water, or debris; cracks, gaps or other deterioration of outside walls; cracks/scratches/ blisters/peeling/discoloration in interior surface coating			
High Level Alarms	Operational, not deteriorated			

Daily - means each day the tank or its systems (piping, valves, etc.) contain hazardous wastes.

Additional Comments: _____

_____

_____

Excel TSD of Tennessee, LLC

Inspection Checklists

WEEKLY

Inspector: _____ **Date of Inspection:** _____ **Time:** _____

Item	Area(s) of Concern	Status Acceptable/Unacceptable	Observation	Date & Name of Repairs / Remedial Action
Security System				
Perimeter Fence	Breached, damaged condition, deterioration			
Gates	Inoperable locks, signs of entry, other damage/deterioration			
Warning Signs	Posted, legible, adequate number			
24-hour video surveillance system	Operable			

Additional Comments: _____

Excel TSD of Tennessee, LLC

Inspection Checklists

WEEKLY

Inspector: _____ **Date of Inspection:** _____ **Time:** _____

Item	Area(s) of Concern	Status Acceptable/Unacceptable	Observation	Date & Name of Repairs / Remedial Action
Container Storage Areas (Inside & Outside)				
Containers	Improperly closed, signs of leaks, bulging, improperly labeled, damaged/corroded, not on pallets outside, pallets/PCUs not in good condition, stacked improperly			
Aisle Space	Adequate for unobstructed access by emergency equipment or personnel (2.5-ft. min)			
Secondary Containment including Sumps	Presence of accumulated liquids, spill/drip residues, or debris; cracks, spalling, or other damage/deterioration; joint/crack sealant not in good condition			
Concrete Surfaces including Ramps & Curbs	Cracks, spalling, or other damage/deterioration; presence of spill/drip residues or debris; joint/crack sealant not in good condition			
Incompatible Waste Storage	Improper segregation, not on PCUs			
Building B Ignitable & Reactive Waste Storage Boundary	No ignitable or reactive waste beyond boundary line, line adequately marked & visible			

Additional Comments: _____

Excel TSD of Tennessee, LLC

Inspection Checklists

WEEKLY

Inspector: _____ **Date of Inspection:** _____ **Time:** _____

Item	Area(s) of Concern	Status Acceptable/Unacceptable	Observation	Date & Name of Repairs / Remedial Action
Roll-Off Boxes				
Tarps	Box tarped, bows in place, free of tears or holes			
Aisle Space	Adequate for unobstructed access for equipment or personnel (2.5-ft. min)			
Box	Not overfilled, good condition, properly labeled			

Additional Comments: _____

_____

_____

Excel TSD of Tennessee, LLC

Inspection Checklists

MONTHLY

Inspector: _____ **Date of Inspection:** _____ **Time:** _____

Item	Area(s) of Concern	Status Acceptable/Unacceptable	Observation	Date & Name of Repairs / Remedial Action
Safety & Emergency Equipment				
Eye Wash Stations	Operational, flushed, cleaned, accessible, free of obstruction, units charged			
Fire Extinguishers	Accessible, fully charged, tagged to verify required inspections, check rubber parts for wear and dry rot			
First Aid Kits	Available in designated area, stocked with designated contents			
Emergency Alarms	Air horns present in designated areas, operational			
Emergency Spill Kits	Stationed in their designated area, fully stocked			
Sump Pumps	Operational, good repair			
Transfer Pumps	Operational, good repair			

Additional Comments: _____

Excel TSD of Tennessee, LLC

Inspection Checklists

MONTHLY

Inspector: _____ **Date of Inspection:** _____ **Time:** _____

Item	Area(s) of Concern	Status Acceptable/Unacceptable	Observation	Date & Name of Repairs / Remedial Action
Safety & Emergency Equipment (cont.d)				
Absorbent Materials	Available			
Neutralization Material	Available			
Overpack Drums	Available, Accessible, and sufficient number available			
Forklift Trucks	Available, operational, good repair (spark arrestor, horns and back-up warning working)			
Respirators	Available, operable			
Gloves	Available, good condition			
Safety Glasses	Available, good condition			
Coveralls	Available, good condition			
Brooms & Shovels	Available, good conditions			
Building Fire Suppression System(s)	Operable, cleaned			

Additional Comments: _____

_____

_____

Excel TSD of Tennessee, LLC

Inspection Checklists

MONTHLY

Inspector: _____ **Date of Inspection:** _____ **Time:** _____

Item	Area(s) of Concern	Status Acceptable/Unacceptable	Observation	Date & Name of Repairs / Remedial Action
Safety & Emergency Equipment				
Emergency/Safety Showers	Clean, water flow free of obstruction			
Decon Supplies	Soap, brushes, pool, sprayers			
Public Address System & Telephone System	Operational, clearly heard throughout facility			
Container Storage Areas (Inside & Outside)				

Additional Comments: _____

_____

_____

Attachment 4.3

EXCEL TSD of Tennessee, LLC

"Conserving our Natural Resources"

SECONDARY CONTAINMENT SURFACES INSPECTION AND MAINTENANCE PLAN

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Technical Information on DURAL MMA Concrete Healer/Sealer ..... Attachment 4.3.4

Figure

"Figure I-C-2 Contained Area Layout" ..... Figure 4.3-1

A. GENERAL

At its hazardous waste treatment and storage facility located at 552 Rivergate Road in Memphis, Tennessee, Excel TSD of Tennessee, LLC ("ETSD") is required by the facility's hazardous waste permit to have and maintain secondary containment systems for its three hazardous waste container management units and an aboveground hazardous waste Tank Farm. At all four units, secondary containment is provided by an external liner system constructed of concrete, with a concrete base (floor) sloped to drain any released liquids and incipient precipitation (for the two outdoor units) to sumps where the liquid is collected and removed. Concrete walls/curbs at the perimeter of the secondary containment systems prevent runoff and runon and provide the required containment volumes. The regulatory requirements for such secondary containment systems are set forth at Tennessee Rule 0400-12-01-.06(9)(f)2 for container management areas and at Tennessee Rule 0400-12-01-.06(10)(d)5(i) for tank systems. These secondary containment systems have been previously certified by a professional engineer to meet these regulatory and permit standards relative to design and construction, including having sufficient integrity and providing sufficient secondary containment volume. However, these secondary containment surfaces must be maintained to ensure that they continue to meet the regulatory standards. In the event of repair, a professional engineer will recertify the area. This document describes in detail the inspection and maintenance program that ETSD implements to maintain the integrity and full functionality of these secondary containment surfaces.

B. DESCRIPTION OF SECONDARY CONTAINMENT SYSTEMS

1. Hazardous Waste Management Building Areas A and B

The Hazardous Waste Management Building is comprised of two separate permitted hazardous waste container management units, Building A (a.k.a. Area A) and Building B (a.k.a. Area B), each with its own separate concrete liner system (i.e., sloped base with grated collection sump/trench and containment walls) that provides secondary containment. The base, collection sump/trench, and containment walls of each of these indoor concrete liner systems were reportedly constructed without construction joints (i.e., via a monolithic concrete pour). Although no surface coating has apparently ever been applied to these indoor concrete surfaces, a double application of concrete sealant was reportedly applied to the interior concrete containment surfaces of both systems during initial construction. These indoor concrete surfaces have aged well and remain in good condition.

2. Tank Farm

The Hazardous Waste Tank Farm (which houses hazardous waste tank systems F1 and F2 as well as certain other tanks) is actually defined by the sloped concrete base (with a concrete collection sump) and concrete walls of its secondary containment liner system. Again, the base, collection sump, and walls of this unroofed concrete liner system were reportedly constructed via a monolithic concrete pour and thus has no construction joints. The concrete walls have been the

subject of subsequent additional work to repair damage and to raise the containment height. Historically, the interior containment surfaces of the Tank farm have been sealed and painted, but in November 2017 ETSD had the interior concrete surfaces of the Tank Farm coated with an impermeable, chemical resistant coating. A contractor experienced with the materials first carefully sand-blasted and cleaned the concrete surfaces and then applied the following Milamar Coatings products in successive layers:

(1) "ICO Gel" – a 100% solids epoxy patching material for spot-filling seams, holes, and voids was applied as needed to the cleaned concrete surfaces;

(2) "ICO Floor SL" – a three-part 100% solids epoxy flooring resurfacer was applied as the first complete layer to the Tank Farm floor;

(3) "ICO Guard Coating" – a two-part, 100% solids epoxy coating providing impact/shock resistance and protection to concrete surfaces in corrosive environments was added as a second layer to the Tank Farm floor (with fine sand added to create an anti-slip texture) and the first complete layer on the interior walls;

(4) "PM500" – a urethane coating for further chemical resistance and UV protection was added as the final layer to the Tank Farm floor and interior walls.

Technical information on these products is included in Attachment 4.3.2. With this multi-layered coating, the interior secondary containment surfaces of the Tank Farm – which experience no truck or equipment traffic – are expected to provide several years of additional service.

3. Contained Area

The Contained Area portion of the ETSD Facility was constructed around the pre-existing Hazardous Waste Management Building, Maintenance Building, and Tank Farm to provide secondary containment for the hazardous waste management operations and most of the non-hazardous waste management operations performed at the Facility. Although Building A, Building B, and the Tank Farm are located within the boundaries of the Contained Area of the facility, neither of them relies on the secondary containment capacity provided by the overall Contained Area. In contrast, the permitted outdoor hazardous waste container management area known as the Outside Hazardous Waste Container Management Area ("OHWCMA") does rely on the secondary containment capacity provided by the Contained Area. The OHWCMA's northern, western, and southern boundaries are the boundaries of the Contained Area, but its eastern boundaries are established as shown on Figure 4.3-1. The variably sloped concrete base, three monolithically-poured concrete collection sumps, and the raised-edge/curbed perimeter of the Contained Area serve as a large secondary containment liner system for the hazardous waste containers in the OHWCMA as well as other liquid containments (containers and tanks) within the Contained Area. Except for that falling on the building roofs and the canopy over the Fuel Blending Area (which is drained off the Contained Area), the Contained Area also captures the precipitation that falls within its boundaries. Because accumulating rainfall can disperse released hazardous wastes and/or hazardous waste constituents over the entire Contained Area, the

secondary containment surfaces of the entire Contained Area must be inspected and maintained as described herein.

Unlike the monolithically poured concrete containment systems for Building A, Building B, and the Tank Farm, the concrete base of the Contained Area is constructed with longitudinal and transverse construction joints or control joints between the numerous "panels" which make up the concrete base. In addition to these "horizontal" joints, "vertical" construction joints also exist where the horizontal panels meet vertical concrete surfaces such as the walls of the Hazardous Waste Management Building, Maintenance Building, and Tank Farm as well as the perimeter curbing. The perimeter curbs are also constructed with construction joints. ETSD has no information on how the concrete panels and joints were originally constructed and sealed.

While the concrete secondary containment surfaces of Building A, Building B, and the Tank Farm have aged well and remain in good condition, the concrete panels and curbs of the much larger Contained Area are showing their age and the additional stresses of exposure to the elements and much heavier truck and equipment traffic. In the last several years, inspections have identified gaps in some of the control and construction joints and the presence of significant random cracks in the concrete panels and curbs, and ETSD has expended substantial and increasing efforts to seal these gaps and cracks by manual application of joint sealing compound.

In September 2018, ETSD entered into a contract with the professional engineering firm Fisher & Arnold, Inc. ("F&A") to evaluate the condition of the existing concrete secondary containment surfaces in the Contained Area and to develop a plan and cost estimates for repairing or replacing the concrete surfaces so as to ensure long-term compliance with the requirements of Tennessee Rule 0400-12-01-.06(9)(f)2 without continuous re-application of joint sealing compound. After a careful and thorough inspection of the existing concrete surfaces by its qualified and experienced professionals, ETSD and F&A developed a *Concrete Repair and Rehabilitation Plan* ("*CRR-Plan*") for the Contained Area found in Attachment 8.6 of the Permit. The *CRR-Plan* calls for the following primary remedial actions:

(1) Replacement of Certain Concrete Base Panels – At least 5,600 square feet of the concrete base panels will be replaced where the F&A professional engineer determined that the existing concrete panels could not be cost-effectively or reliably repaired. The existing concrete panels will be removed and new 10-inch thick, steel-reinforced concrete panels will be constructed in their place. Steel dowel rods will be added at construction joints between new concrete panels and between new and existing concrete panels to provide for load transfer and prevent differential settlement.

(2) Sealing/Re-sealing of Joints and Random Cracks – All joints and random cracks in the concrete containment surfaces (new and existing) will be carefully cut to appropriate

dimensions, cleaned, and then sealed by application of properly proportioned backer rod and self-leveling silicone sealant to provide a water-tight, flexible, durable, and somewhat chemical-resistant barrier to liquid migration into or through the joint/crack. The joint sealants selected for use are Dow Chemical's self-leveling "DOWSIL 890SL" for horizontal joints and cracks and its non-sag "DOWSIL 888" for vertical joints and cracks. Technical information concerning the properties and installation of these silicone joint sealants is included in Attachment 8.6.3. F&A estimated that 1,000 feet of control/construction joints in new replacement concrete, 1,600 feet of control/construction joints in existing concrete that will not be replaced, 1,200 feet of vertical surface joints, 150 feet of curb cracks and joints, and 1,150 feet of significant random cracks in existing concrete panels that will not be replaced will be sealed in this manner.

(3) Repair of Areas of Spalled Concrete – There are a few areas of surface spalling in the existing concrete base panels that will not be replaced that will be repaired by sawing the perimeter of such areas, chipping out the existing concrete to below the depth of spalling, cleaning the newly exposed concrete surface and coating it with an epoxy bonding agent immediately prior to filling the cavity to grade with concrete.

(4) Replacement of Portions of the Perimeter Curb – An estimated 100 feet of the perimeter curbing around the Contained Area will be removed and replaced due to damage or deterioration.

(5) Sealing of Concrete Containment Surfaces – As the final step in their repair and rehabilitation, all concrete secondary containment surfaces (including existing and new horizontal concrete panels, existing and new concrete perimeter curbing, and their sealed joints and cracks) will be sealed by application of the penetrating liquid concrete sealant *MasterProtect H100* manufactured by BASF Corporation. Technical information concerning the properties and installation of this product is included in Attachment 8.6.4. This concrete surface sealant will provide long-lasting prevention of water and acid penetration and abrasion resistance while also allowing the concrete to "breathe".

As described in the *CRR Plan*, the very extensive concrete repair and rehabilitation work described above will be implemented in phases to enable ETSD operations to continue and help ensure that required secondary containment capacity is maintained. The CRR Plan includes a schedule for implementing these phases. As also described in the *CRR Plan*, certain precautions and techniques will be utilized during each reconstruction phase to ensure that secondary containment requirements are continuously maintained and to minimize disruptions to ETSD's ongoing operations.

C. SECONDARY CONTAINMENT SURFACE STANDARD FOR CONTAINER AREAS

Regulatory standards and permit conditions require that the secondary containment surfaces of hazardous waste container management units be maintained to be "free of cracks or gaps and sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed". A central maintenance objective is thus the prompt identification and sealing of surface gaps and cracks as they may occur so that they do not provide a pathway for migration of liquids into and perhaps through the concrete. Of course, a crack or gap in a concrete surface may initially be so structurally debilitating, or may over time widen or deepen to a level of severity, such that it cannot be repaired by sealing the random crack or joint and the concrete surface must instead be rebuilt.

Gaps typically occur at control and construction joints in the concrete surfaces. Control joints in concrete surfaces, slabs, or pavements allow for concrete shrinkage during curing and provide relief for thermal movement. Control joints are generally "straight-line joints", are planned for in design and construction, and allow for the installation of a properly proportioned sealant material such as hot- or cold-applied elastomeric or silicone. Construction joints perform a similar function as control joints with one additional feature; they allow the contractor a starting and stopping point for concrete placement during initial construction. Random cracks are those which develop over time due to increased tensile stress from temperature, subgrade settlement, frost action, moving vehicular (trucks, forklifts, etc.) loads, and static loads (stored materials). While concrete pavements are designed for these anticipated loads and resulting tensile stresses, concrete may over time propagate a random crack. Random cracks do not result in the inability of concrete to carry load but can allow liquid penetration into and perhaps through the concrete. Because water expands as it freezes, the presence of water in such random cracks and in joint gaps can provide additional stresses that widen the crack or gap and further damage the concrete. Thus, even small cracks and gaps in the concrete surfaces should be sealed against water and other liquid penetration.

Concrete surfaces can also deteriorate and weaken through concrete spalling and reinforcement corrosion. Spalling is characterized by pitting and flaking and typically results from poor quality concrete, freeze-thaw damage, and/or load-induced stress. Corrosion of reinforcing steel or load transfer dowels within concrete can also cause spalling and cracking of concrete. Proper reinforcing steel placement and protection from moisture can help to mitigate such corrosion. Concrete spalling and reinforcement corrosion (which can occur simultaneously) degrade the smooth concrete surface necessary for proper drainage of liquids and can worsen over time, causing significant liquid ponding which typically exacerbates the conditions. If spalling and corroding concrete surfaces are not effectively repaired in a timely manner, the deterioration can become severe enough that the concrete must be removed and replaced in the affected area.

Another central maintenance objective is thus the prompt identification and repair of concrete surfaces where spalling or reinforcement corrosion are occurring.

It is important to note that not all damage to concrete secondary containment surfaces constitutes a secondary containment surface deficiency. Concrete surfaces frequently sustain damage with use over time. Chips or chunks can be knocked out of concrete drainage surfaces and walls/curbs (particularly at edges) without affecting the structural integrity of the concrete or the ability of the surface to carry or resist loads and perform its secondary containment purpose (e.g., drainage of liquids or containment of required liquid volume), and in most cases such damage is unlikely to develop into such problems.

D. SECONDARY CONTAINMENT SURFACE STANDARD FOR TANK FARM

Regulatory standards and permit conditions require that "external liner systems" used to provide secondary containment for hazardous waste tank systems must be maintained to be "free of cracks and gaps" and "prevent any migration of wastes or accumulated liquid to the underlying soil, groundwater, or surface water". The Region 4 office of the U.S. Environmental Protection Agency ("EPA") has required ETSD to comply with a regulatory standard that Tennessee's regulations make applicable to "vault" secondary containment systems but not to the "external liner" system utilized at ETSD's Tank Farm. That standard requires that the secondary containment system be "provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of waste into the concrete." As described in Paragraph 4.3.B.2 above, ETSD has had such a coating installed on the interior containment surfaces of the Tank Farm floor and walls.

Properly applied, such a coating will resolve many of the maintenance issues with bare concrete described in Subsection 4.3.C above. Any cracks in the concrete will be covered and sealed and spalling and corrosion will be prevented. Of course, the surface coating itself has to be maintained to be free of cracks and gaps that penetrate the coating to the bare concrete below. Scratches in the coating surface are not considered to be a crack and are typically not a problem unless they lead to blisters or peeling of the coating.

E. INSPECTION OF SECONDARY CONTAINMENT SURFACES AND IDENTIFICATION OF DEFICIENCIES

ETSD personnel are continuously performing informal inspections of the secondary containment systems described in Subsection 4.3.B above as they perform their duties and may thus identify and report deficiencies in secondary containment surfaces at any time. However, the secondary containment systems must be formally inspected by Facility personnel periodically as required by Permit Conditions II.E.1, III.F.2, III.G.A, IV.C.2, IV.C.6 and Permit Attachment 4. The Tank Farm secondary containment system is required to be inspected daily and kept in the operating

record, including weekends and holidays, when tanks F1 or F2 contain hazardous waste (which is every day or nearly every day of the year). The Building A and Building B secondary containment systems, and the entire Contained Area (which provides secondary containment for the Outside Hazardous Waste Container Management Area), must be inspected at least weekly and kept in the operating record. [Note: Permit Condition III.F.1 additionally requires that the Building A and/or Building B secondary containment systems and the Contained Area be inspected for the presence of any release of hazardous waste or accumulated liquid each day when hazardous wastes are being moved within the unit.]

Checklists are used during these formal inspections to record inspection observations and identify/describe the deficiencies that are found. The Daily Checklist is used for the Tank Farm and the Weekly Checklist is used for the container management areas. Among the items visually checked during each such inspection are areas outside the secondary containment walls/curbs for evidence of leakage and the integrity of the secondary containment surfaces (including the interior surfaces of the collection sumps as well as the base and both sides of containment walls/curbs).

In Building A, Building B, and the Contained Area, ETSD personnel visually examine all secondary containment surfaces for any visible unsealed random cracks or gaps at joints, and areas of concrete containment surfaces where spalling or corrosion may be occurring. Previously sealed cracks and gaps will be specifically inspected for missing, loose/unattached, or bulging sealant. Areas of spalling/corroding concrete previously repaired by application of a surface coating will also be specifically inspected for cracking, bubbling, or peeling of the coating and/or additional spalling/corroding of the concrete surface (particularly at the edges of the repair).

In the Tank Farm, ETSD personnel visually examine the coated surfaces for random cracks and gaps and other damage, and for blistering, peeling, or scaling of the coating. If scratches or gouges are observed, the inspector will determine whether the damage extends through the top urethane coat.

It should be noted that secondary containment surfaces have to be reasonably clean in order to be effectively inspected for deficiencies. This is particularly true for the Tank Farm's interior surfaces. The inspector may need to use a broom or water hose or other device to enable proper visual inspection.

If deficiencies are found (including any previously identified but not yet corrected), the ETSD inspector must describe each of them on the Inspection Checklist. The description must identify the nature of the deficiency (e.g., unsealed random crack in concrete, unsealed gap at joint, failed joint/crack seal, area of concrete spalling or corrosion) and its specific location.

The ETSD inspector should also mark the location of each identified deficiency in the field (e.g., using chalk, high visibility cones, or other highly visible indicators) so they can be readily re-located by the inspector or others.

Upon completion, each Inspection Checklist will be promptly submitted to the ETSD Facility Manager (or, in the Manager's absence, the on-site person acting in his/her stead). *If a deficiency in a secondary containment surface is identified, the inspector must immediately verbally notify the ETSD Facility Manager (or, in the Manager's absence, the on-site person acting in his/her stead).*

F. RESPONSE TO IDENTIFIED DEFICIENCIES IN SECONDARY CONTAINMENT SURFACES

Permit Condition II.E.2 requires ETSD to "remedy any deterioration or malfunction of equipment or structures which the inspection reveals on a schedule which ensures that the problem does not lead to an environmental or human health hazard" and to take remedial action immediately "where a hazard is imminent or has already occurred". With regard to the functions of ETSD's secondary containment systems, an "environmental or human health hazard" can only occur if contained liquids containing a significant amount of hazardous waste or hazardous waste constituents are released through, or over the top of, concrete secondary containment surfaces. Response/repair efforts must therefore focus on preventing such releases.

Upon discovering or being notified (via either informal communications by operations/maintenance personnel or via a formal inspection) of the identification of a secondary containment surface deficiency, and unless he/she determines the deficiency is one for which response actions have already been initiated, the ETSD Facility Manager (or, in the Manager's absence, the on-site person acting in his/her stead) will immediately visit, or direct another senior facility person to immediately visit, the location of the observed deficiency to confirm the deficiency and initiate response actions. This event will be documented in the operating record. If the deficiency is confirmed, the ETSD Facility Manager or his designated representative will ensure that the following response/repair actions are taken as appropriate:

1. To prevent the situation from worsening, the ETSD Facility Manager or his designated representative will ensure that the area around the identified deficiency (at least a 4-foot radius if possible) is immediately isolated by removal of all waste containers and then cordoned off (by use of high-visibility cones, tape, or ribbon or by physical barriers) from all vehicle/equipment traffic. Such areas will remain isolated until an effective temporary or permanent repair is completed (including appropriate product curing time).

2. Except as described in Paragraph 4.3.F.4 below, the ETSD Facility Manager or his designated representative will ensure that a plan for repair of the deficiency is promptly (that day) developed and a *Secondary Containment Surface Deficiency Response Log* (see form in Attachment 4.3.1) is initiated and utilized to document the taking of response actions, including repair efforts and the use of storm water barriers and other temporary corrective measures. The completed Logs (with attachments) will be maintained as part of the Facility's operating records until the Facility has been closed.

3. If the identified deficiency is an unsealed random crack in concrete or an unsealed gap at a joint or previously sealed crack/joint, the ETSD Facility Manager or his designated representative will ensure that:

i. Cracks in concrete and gaps at joints or previously sealed cracks/joints will be temporarily repaired as soon as practicable using the technique described in Subparagraph G.1.ii below.

ii. Cracks in concrete will be repaired as soon as practicable using the technique described in Subparagraph G.1.iii below.

iii. If rainy conditions are occurring or are expected that working day, temporary barriers (e.g., gel drain mats, gel spill control strips) will be immediately placed around and/or over the unsealed crack or gap to prevent potentially contaminated storm water runoff from entering the crack or gap.

iv. Unless the unsealed crack or gap has been effectively repaired as described in Subparagraph 4.3.F.3.i or 4.3.F.3.ii above, the temporary runoff control barriers described in Subparagraph 4.3.F.3.iii above must be in place by the end of the working day.

v. Cracks in concrete and gaps at joints or previously sealed cracks/joints must be permanently repaired as described in Subparagraph 4.3.G.1.i below within 12 months of their identification. The temporary repairs described in Subparagraph 4.3.F.3.i above must be continuously maintained until the permanent repairs are implemented.

4. Until the joints and cracks in the OHWCMA have been repaired as described in the *CRR Plan*, ETSD personnel must continue repairing such joints and cracks as described in Subparagraph 4.3.G.1.ii below. However, it is not necessary for ETSD to initiate and document such repairs on a *Secondary Containment Surface Deficiency Response Log*. Because of the frequency at which the movement of containers, vehicles, and equipment within the OHWCMA causes the joint sealant material to be dislodged from such cracks and joints, the prompt identification and temporary repair of joints and significant cracks by this technique has effectively become a part of routine operations.

5. If the identified deficiency is an area of spalling or corroding concrete, the ETSD Facility Manager or his designated representative will ensure that:

i. The spalling/corroded area of concrete will be repaired using an epoxy coating as described in Paragraph 4.3.G.2 below within 30 days of identification of the deficiency.

ii. If the deficiency is sufficient to cause the pooling of water on the secondary containment surface even after the epoxy coating is applied, the epoxy coating will be considered a temporary repair and the spalling/corroded area must be permanently remedied within 6 months by concrete surface repair as described in Paragraph 4.3.G.3 below or concrete replacement as described in Paragraph 4.3.G.4 below.

6. If a deficiency in the Contained Area or the Tank Farm is determined by the ETSD Facility Manager or his designated representative to be so severe that it cannot be effectively repaired within 30 days by temporary or permanent methods (e.g., if concrete surface repair or replacement is required), then the ETSD Facility Manager or his designated representative will ensure that temporary measures are taken immediately to prevent or minimize potential contaminant migration through the deficiency even if the facility was to experience a storm event that would typically inundate that portion of the secondary containment surface. Such measures would either effectively cover the deficiency or prevent potentially contaminated storm water from reaching it.

7. The ETSD Facility Manager or his designated representative will utilize temporary corrective measures as needed when the more permanent measures described in Subsections 4.3.G and 4.3.H below cannot be implemented in a timely manner. Such temporary corrective measures may include the placement of temporary physical barriers, the temporary implementation of special operational procedures, or combinations of such efforts, but they must be continuously effective at preventing a release of hazardous waste or hazardous waste constituents from the secondary containment system. Examples of the use of temporary physical barriers would be the placement of a gasketed steel plate over a crack or gap in the top of the Tank Farm containment wall, or using plastic sheeting and temporary diking (along with traffic control) to isolate small damaged portions of drainage surfaces in the Contained Area. An example of the use of temporary operational procedures would be the employing of additional pumps (along with constant surveillance and/or automatic float switches) to aggressively control the liquid height in a containment system. The most extreme temporary operational procedure that might be employed would be the removal of all hazardous waste from the secondarily contained area until appropriate repairs are implemented.

The use of temporary corrective measures may particularly be appropriate when weather conditions are unfavorable for application of sealant and/or coating as described in Subparagraphs 4.3.G.1.ii and 4.3.G.1.iii and Paragraph 4.3.G.2, or when insufficient sealing/coating material is temporarily unavailable. As described in Paragraph 4.3.F.6, the use of temporary corrective measures will be required when concrete surface repair or replacement is required because such efforts must be planned and scheduled with a qualified outside Registered Professional Engineer and qualified contractor and around bad weather conditions.

G. GENERAL REPAIR TECHNIQUES FOR UNCOATED CONCRETE SURFACES

The primary objective of this inspection and maintenance program is to promptly identify and repair any concrete containment surface conditions that do not meet the secondary containment surface standard described in Subsection 4.3.C above. A secondary objective is to promptly identify and repair any deficiencies (see Paragraph 4.3G.2. below) before they deteriorate to the point that the standard is not met. Ideally, deteriorating surface conditions will be identified and repaired before any non-compliance with the standard occurs, but deficient conditions cannot

always be prevented. Below in this Subsection are brief descriptions of the general techniques that will be employed to repair or prevent deficient concrete containment surface conditions.

1. Sealing of Joints, Random Cracks, and Other Gaps

Every identified not-already-sealed joint, random crack or other gap in a concrete secondary containment surface or in a joint/crack seal must be promptly sealed. [Note: This refers to any random crack or gap that is visible to the naked human eye from a standing height.]

Gaps and random cracks will be sealed (in their full length) as follows:

i. All cracks/gaps will ultimately be repaired by installation/re-installation of a DOWSIL 890SL silicone seal as described in the *CRR Plan.* Technical information concerning this product's properties and its installation is included in Attachment 8.6.3. An alternative industrial-quality product providing equivalent or near-equivalent features and benefits may also be used but only with a documented, written approval from a Registered Professional Engineer. This work will be performed by a contractor hired by ETSD that is experienced in installing the product. No sooner than 2 weeks after installation of the DOWSIL 890SL silicone sealant, but before the area containing the crack/gap is placed back into service, the repaired crack/gap and the concrete immediately surrounding it will be sealed by application of the penetrating liquid concrete sealant *MasterProtect H100* manufactured by BASF Corporation. Technical information concerning the properties and installation of this product is included in Attachment 8.6.4. This concrete surface sealant will provide long-lasting prevention of water penetration and abrasion resistance while also allowing the concrete to "breathe". An alternative industrial-quality products providing equivalent or near-equivalent features and benefits may also be used but only with a documented, written approval from a Registered Professional Engineer. To the extent practicable, any such product will be applied (including surface preparation) in accordance with the manufacturer's directions and recommendations, and temperature and moisture conditions could hinder implementation.

ii. A crack/gap may be temporarily sealed with *EUCO QWIKjoint 300* (or 200) polyurea floor joint filler and joint repair material or by *DURAL MMA HEALER/*SEALER methyl methacrylate penetrating concrete sealer, both manufactured by The Euclid Chemical Company. The *QWIKjoint* product is a high-performance, two-component product that is typically applied using side-by-side cartridges and a special two-barrel "caulking gun"-type device. Technical information concerning this product's properties and its application is included in Attachment 4.3.3. The *DURAL MMA* product is a penetrating liquid sealant that is typically poured on the concrete surface and then spread with a squeegee, roller, or brush. Technical information concerning the properties and application of this product is included in Attachment 4.3.4. Alternative industrial-quality products providing equivalent or near-equivalent features and benefits may also be used but only with a documented, written approval from a Registered Professional Engineer. To the extent practicable, any

such product will be applied (including surface preparation) in accordance with the manufacturer's directions and recommendations, and temperature and moisture conditions could hinder implementation. Although it may also be done by a contractor, this work will typically be performed by ETSD personnel, and ETSD will maintain usable application devices and a useable inventory of such sealant at the facility at all times.

iii. All random cracks may be sealed with the *DURAL MMA HEALER*/SEALER methyl methacrylate concrete sealer (or approved equivalent) described in Subparagraph 4.3.G.1.ii above. To the extent practicable, any such product will be applied (including surface preparation) in accordance with the manufacturer's directions and recommendations, and weather conditions may hinder implementation. Although it may also be done by a contractor, this work will typically be performed by ETSD personnel, and ETSD will maintain a usable application device and a useable inventory of such sealant at the facility at all times.

2. Coating of Spalling/Corroding Concrete Surfaces

Unless it has been damaged to the extent that liquids pool on the surface rather than freely drain to a collection sump, a spalling and/or corroding concrete drainage surface will typically be repaired by application of a high-quality impervious epoxy concrete surface coating. To the extent practicable, any such product will be applied (including surface preparation) in accordance with the manufacturer's directions and recommendations. Although it may also be done by a contractor, ETSD personnel will typically perform this work, and will purchase a suitable product locally as needed rather than trying to maintain a usable inventory of such product at the facility.

3. Concrete Surface Repair

If the spalling and/or corroding of a concrete drainage surface is severe enough to result in pooling of liquids on the surface, then the affected portions must be repaired as described in this Subsection or replaced as described in Paragraph 4.3.G.4 below. Concrete re-surfacing may also be utilized in lieu of the coating of spalling/corroding concrete described in Paragraph 4.3.G.2 above.

The repair of spalling/corroding concrete surfaces will be performed as described in the *CRR Plan.* Any joint segments removed or damaged by the repair will then be re-sealed as also described in the *CRR Plan*. The final step will be the sealing of the new concrete surface (and joint seals) by application of the MasterProtect H100 penetrating liquid concrete sealant as described in Subparagraph 4.3.G.1.ii above.

Because of the stringent secondary containment requirements imposed by ETSD's permit and Federal/State regulations, any such repair of concrete secondary containment bases and/or walls at the ETSD facility will be performed by a qualified contractor under the supervision of a qualified Registered Professional Engineer. The Engineer shall provide ETSD with a written certification that the repaired surface – including joints (if any) – meets the design and construction requirements set forth at Tennessee Rules 0400-12-01-.06(9)(f)2.

4. Concrete Replacement

If a portion of a concrete secondary containment base (including a collection sump) becomes structurally unstable or so damaged that a release to the underlying soils could occur, and if the lesser repair measures described in Paragraphs 4.3.G.1, 4.3.G.2, and 4.3.G.3 above are not adequate to render an effective and long-lasting remedy, then that portion of the base will have to be replaced. Similarly, if a portion of a concrete secondary containment wall or curb becomes structurally unstable or so damaged that it cannot reliably contain the full secondary containment volume required by regulation and permit, and if the lesser repair measures described in Paragraphs 4.3.G.1, 4.3.G.2, and 4.3.G.3 above are not adequate to render an effective and long-lasting remedy, then that portion of the wall or curb will have to be replaced.

Concrete base panels, walls, and curbs will be replaced as described in the *CRR Plan.* Any joint segments removed or damaged by the repair will then be re-sealed as also described in the *CRR Plan*. The final step will be the sealing of the new concrete surface (and joint seals) by application of the MasterProtect H100 penetrating liquid concrete sealant as described in Subparagraph 4.3.G.1.i above.

Again because of the stringent secondary containment requirements imposed by ETSD's permit and Federal/State regulations, any such replacement of a portion of the secondary containment base or wall/curb must be designed by a qualified Registered Professional Engineer and constructed by a qualified concrete contractor working under the supervision of the Engineer. Upon construction completion, the Engineer shall provide ETSD with a written certification that the repaired surface – including seams and joints (if any) – meets the design and construction requirements set forth at Tennessee Rules 0400-12-01-.06(9)(f)2.

H. REPAIR/MAINTENANCE TECHNIQUES FOR COATED CONCRETE SURFACES

As described in Paragraph 4.3.B.2 above, the coating on the Tank Farm walls is a two-layer system involving a thicker epoxy base coat topped with a chemical-resistant and UV-resistant urethane top coat, while the Tank Farm floor coating involves an additional initial resurfacing layer to establish a smooth base for the subsequent layers. Any permanent repair of the coated secondary containment surfaces of the Tank Farm will be performed by a qualified contractor experienced in the installation of the coating products. Damaged areas where only the top urethane coating is damaged may be repaired by re-application of the urethane coating to the damaged area. In the unlikely event that the damage extends into or through the lower epoxy coating(s), then all coating layers may have to be removed and re-applied in the damaged area. Of course, severe damage to the Tank Farm secondary containment system may require that concrete repairs be implemented as described in Subsection 4.3.E above before the necessary coating repairs can be made.

Temporary repairs of deficient areas of the coating may be made by ETSD personnel trimming away loose or peeling coating, cleaning the surface using a detergent and water, allowing the surface to completely dry, and then applying a locally available chemical-resistant urethane coating over the deficient area. Such temporary coatings will likely have to be removed during the permanent repair.

The manufacturer recommends that the top urethane coating be re-applied every five years, but ETSD may delay such re-application if a qualified Registered Professional Engineer inspects the coating after five years, and annually thereafter, and renders a written opinion that the urethane top coat is undamaged and likely to last another year.

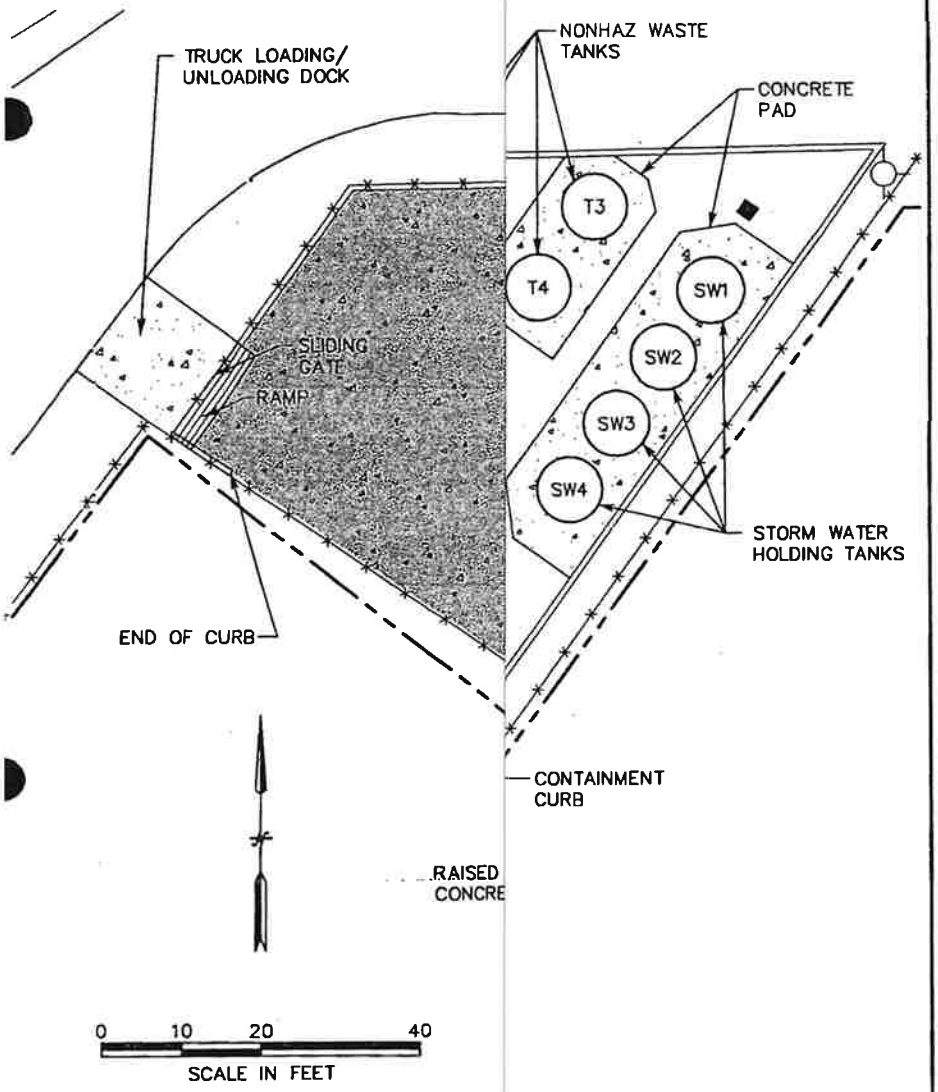
Figure 4.3-1

Outside Hazardous Waste Container Management Area Layout

TriAD Environmental Consultants, Inc.

"Figure I-C-3 Contained Area Layout"

Project Number: 07-EXC01-01
Date: 10/01/2007



LEGEND

- FIRE HYDRANT
- PUMP
- STORM WATER COL
- CHAIN-LINK FENCE
- PROPERTY BOUNDA
- CONCRETE
- CONTAINED AREA

FIGURE I-C-3
CONTAINED AREA LAYOUT

EXCEL TSD OF TENNESSEE, L.L.C.

SCALE: AS SHOWN | DR ALW | CHK TDH | REV TDJ

PREPARED BY:

TRIAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, Tn 37214
615-889-5888 fax 615-889-4004

PROJ: 07-EXC01-01 | DATE: 10/01/07 | SHEET 1 OF 1

ATTACHMENT 4.3.1

SECONDARY CONTAINMENT SURFACE DEFICIENCY RESPONSE LOG

SECONDARY CONTAINMENT DEFICIENCY RESPONSE LOG

This form is to be used to document the actions taken – including repair efforts – in response to the identification of a deficiency in a secondary containment surface at the Excel TSD of Tennessee, L.L.C. facility. Supplemental sheets and attachments are to be added as appropriate.

A. Date Identified? _____ By? __Inspection __Operations/Maint.

B. Describe Deficiency and Specific Location: _____

_____

_____

_____

_____

_____

B. RESPONSE/REPAIR ACTIONS – Enter below, for each response/repair effort made, the date of the effort, the name of the Excel person performing or coordinating the effort, and a brief description of the action(s) taken.

#1: Date: _____ Name: _____

Actions taken: _____

_____

_____

_____

#2: Date: _____ Name: _____

Actions taken: _____

_____

_____

_____

#3: Date: _____ Name: _____

Actions taken: _____

_____

_____

_____

#4: Date: _____ Name: _____

Actions taken: _____

_____

_____

_____

ATTACHMENT 4.3.2

TECHNICAL INFORMATION ON TANK FARM SURFACE COATING PRODUCTS

PM500 Chemical Resistant Urethane

Product Data Sheet

PRODUCT DESCRIPTION

Milamar PM500 Chemical Resistant Urethane Coating is an aliphatic, high build urethane, designed to be used where chemical, impact and abrasion resistance is paramount. It is virtually impervious to ultra violet attack and most common chemicals, including skydrol and brake fluid. The 500 Series urethane maintains its gloss level far longer than conventional coatings.

Varying levels of skid resistance can be obtained by adding slip resistant aggregate to the finish. When properly installed at 8 to 16 mils, it can out wear normal floor paints 10 times or more.

TYPICAL USE

Versatile **PM500** is typically used as a heavy duty industrial coating over primed concrete or as a gloss retentive finish coat for an epoxy mortar or broadcast floor.

Install **PM500** in automotive repair shops, aircraft hangars, chemical processing areas, high traffic warehouses, loading docks, or as an extra durable maintenance finish on **Milamar** seamless floors in commercial kitchens, customer waiting rooms, lockers or showers.

FEATURES

- Top Quality Formulation
- Long Wearing Gloss Finish
- Variety of Finished Textures
- Clear and Pigmented Versions
- Excellent Gloss Retention
- Very Good Chemical Resistance
- Excellent Abrasion Resistance
- Excellent Ultra Violet Resistance

INSTALLATION

The performance of any coating is highly reliant upon proper preparation of the substrate. Substrate must be free of all contamination such as laitance, curing compounds, dirt, oil and grease. Concrete should be lightly shot blasted, diamond ground or acid etched and neutralized to a smooth, even finish, similar in texture to 100 grit sand paper. Prime area with Milamar moisture tolerant epoxy primer. The **PM-500** urethane system develops adhesion properties stronger than concrete when substrate is properly prepared.

PM500 coating is normally either rolled or squeegeed and back rolled. If a slip resistant finish is required, the appropriately sized aggregate can be pre-mixed with the A and B components or it may be broadcast into the previous coat and locked in with **PM500** finish.

PACKAGING

PM500 is normally packaged in 3 gallon kits and 15 gallon units.

STORAGE

For best shelf life, store **PM500** in a dry area at temperatures between 50° F and 90° F. Protect product from freezing. Minimum shelf life is one year from date of manufacture when properly stored.

LIMITATIONS

Avoid on or below grade applications where water vapor transmission is greater than 5 lbs./1000 sq. ft. per 24 hrs. or where ambient operating temperatures exceed 180° F. Ideal application temperatures are above 60° F or below 85° F. All open foods must be removed from area during installation. Adequate ventilation must be available during installation and cure. Vehicles with rubber tires should not be parked on coating within 72 hours of installation.

COLOR SELECTION

PM500 is available in clear and pigmented versions. Standard colors are White, Gray, Dark Gray, Tile Red and Mocha. Custom colors are subject to minimum quantities and additional charge.

COMPLIANCES

PM500 urethane coating is compliant with most states volatile organic compound requirements but be sure to consult your states specific requirements before use. Lower V.O.C. urethanes are also available from Milamar Coatings where required.

REAGENT	30 MIN.	24 HRS.	7 DAYS
Acetone	N	N	F
Acetic Acid	N	D	F
Acetic Acid (20%)	N	N	N
Ammonium Hydroxide (30%)	N	N	N
Chlorine (5,000 ppm in water)	N	N	N
Citric Acid	N	N	N
Clorox	N	N	N
Ethylene Glycol	N	N	N
Gasoline	N	N	N
Hydrochloric Acid 32%	N	N	N
Isopropyl Alcohol (98%)	N	N	N
Mineral Spirits	N	N	N
Nitric Acid (10%)	N	N	N
Nitric Acid (40%)	N	N	N
Phenol	N	N	N
Skydrol #500	N	N	N
Sodium Chloride	N	N	N
Sodium Hydroxide (30%)	N	N	D
Sulfuric Acid (45%)	N	N	N
Toluene	N	N	N

N = NO ATTACK D = DISCOLORED F = FAILED

Physical Property	Test	Result
Tensile Strength	ASTM D-638	5,300 psi
Flexural Strength	ASTM C-580	5,351 psi
Bond Strength	ASTM D-4541	> 350 psi
Linear Shrinkage	ASTM C-883	nil
Hardness	ASTM D-2240	72 @ 75° F
Water Absorption	ASTM C-413	0.009%
Flammability	MIL-D-3134F	Fire Retardant
Abrasion Resistance	ASTM D-4060	51 mg loss
Indentation	MIL-D-3134F	nil
Solids		65%
Elongation	ASTM D-638	18%

Actual test results may vary due to the use of various aggregates, application methods and floor finish. The foregoing test results are based upon laboratory prepared samples and results may vary if not prepared by a professional technician.

AVAILABILITY

Milamar products are available only through selected and approved applicators and distributors. This material is intended for commercial and industrial installations and should be installed by skilled, seamless coating technicians. It is neither designed for nor available for consumer use.

Custom design assistance may be obtained by contacting Tele-Tech at 1-405-755-8448 8:00 AM through 4:00 PM Central time.

CAUTION:

COMPONENTS OF OR PRODUCTS USED WITH AND DURING THE INSTALLATION OF MILAMAR COATINGS PRODUCTS MAY INCLUDE HAZARDOUS MATERIALS. All personnel exposed to or handling materials before and during installation must read and fully understand label precautions and Material Safety Data Sheets.

LIMITED WARRANTY

Milamar Coatings products are manufactured to be free of defects in material and workmanship in meeting the properties specified on its individual Product Data Sheets. Users and installers of Milamar Coatings products are solely responsible for determining the suitability of the products for specific product applications. Milamar Coatings makes no Warranty or Guarantee, express or implied, including warranties of fitness, design compatibility or merchantability, for any particular use and shall have no responsibility or liability, including direct, indirect or consequential damages, due to injury, delay or third party claims for installation or repair. Likewise, Milamar Coatings assumes no liability of any nature for products that are adjusted in the field or that do not utilize all specified Milamar Coatings components.

Should any Milamar Coatings product be proved to be defective within one year from the date of shipment, Milamar Coatings will, at its sole discretion, either replace the material; issue a credit to the customer's account; or provide a cash refund for the initial, paid purchase price of the material. Potential claims regarding product quality must be received in writing by Milamar Coatings within 30 days of the discovery of such potential defect.
This Warranty is exclusive of all other warranties, expressed or implied, and may only be adjusted in writing, signed by an officer of Milamar Coatings.

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Milamar Coatings, L.L.C.
A CASS Polymers Company

ICO Guard Coating

Product Data Sheet

Product Description

ICO Guard Coating is a two part, 100% solids, epoxy coating for protecting concrete surfaces in corrosive environments. It is a USDA approved material, with zero VOC's, no odor, and excellent color stability. ICO Guard Coating is a flexibilized coating that has a tensile elongation of 9% allowing it to withstand impact and thermal shock far better than conventional, more brittle epoxy coatings. ICO Guard Coating has excellent adhesion to damp and dry substrates.

ICO Guard Coating can be ordered in a fast cure (FC) version for faster turnaround times and for applications with temperatures down to 40°F, while our ICO Guard Coating Extra Fast Cure (XFC) can cure at temperatures down to 32°F.

Note that both of the fast cure versions, if applied below 50°F, are prone to whitening under hot water wash-downs, so they should be top coated with our more color stable ICO Ure Guard 100, polyurethane coating.

Product Application

ICO Guard Coating is the top coat chosen in conjunction with ICO Guard Slurry resin system. The top coat of ICO Guard Coating is then seeded to refusal with aggregate to build up to the desired ¼" thickness. ICO Guard Coating can also be used as an optional top coat over ICO Guard 51 trowelled material.

Chemical Resistance

ICO Guard Coating has excellent chemical resistance to a wide variety of inorganic acids, holding up to 10% acetic acid, concentrated citric acid, 37% hydrochloric acid, 80% lactic acid, 85% phosphoric acid and 80% sulfuric acid, as well as most CIP cleaners. Please contact us at **1-800-459-7659** for a complete list.

Physical Properties

Tensile Strength (ASTM D-638):	1560 psi	**Gardner Impact Strength (D-2794):**	80 in lbs.
Tensile Elongation (D-638):	9%	**Bond Strength to Quarry Tile:**	>1000 psi
Flexural Strength (D-790):	4140 psi	**Water Absorption (D-570):**	0.2% in 24 hrs.
Hardness, Shore D (D-2240):	80	**Taber Abrasion (D-1044) <CS17, 1000g, 1000 cycles>:**	105 mg. loss
60° Gloss	100		

Physical Characteristics

Density, lbs./gal	
Part A:	15.4
Part B:	8.6
Mixed:	13

Viscosity @ 77°F, cps

Part A:	5500
Part B:	300
Mixed:	2000

Mixing Ratios

	By Volume	By Weight
Part A : Part B:	2.5:1	4.5:1
Part A : Part B, FC:	3.8:1	7:1
Part A : Part B, XFC:	3.3:1	5.6:1

Published technical data, to the best of our knowledge are correct, and are subject to change without notice. You may contact your Milamar representative for current technical data.

Curing Times

Curing Times @		32°F	40°F	50°F	70°F	90°F
ICO Guard Coating	Pot Life:	---	---	60 min.	50 min.	25 min.
	Work Time:	---	---	100 min.	75 min.	50 min.
	Tack Free:	---	---	28 hrs.	16 hrs.	7 hrs.
	Hard, Foot:	---	---	64 hrs.	30 hrs.	12 hrs.
	Hard, Truck:	---	---	72 hrs.	36 hrs.	16 hrs.
ICO Guard Coating FC	Pot Life:	---	20 min.	20 min.	15 min.	---
	Work Time:	---	35 min.	25 min.	20 min.	---
	Tack Free:	---	16 hrs.	10 hrs.	4 hrs.	---
	Hard, Foot:	---	26 hrs.	20 hrs.	8 hrs.	---
	Hard, Truck:	---	32 hrs.	26 hrs.	12 hrs.	---
ICO Guard Coating XFC	Pot Life:	20 min.	15 min.	15 min.	---	---
	Work Time:	18 min.	15 min.	8 min.	---	---
	Tack Free:	16 hrs.	10 hrs.	5 hrs.	---	---
	Hard, Foot:	30 hrs.	21 hrs.	10 hrs.	---	---
	Hard, Truck:	36 hrs.	25 hrs.	17 hrs.	---	---

Installation

Please refer to our application instruction sheet for more detailed information.

1. New concrete should be allowed to cure for 28 days; however, if shorter times are necessary, a plastic sheet and calcium chloride test should be taken. Call **1-800-459-7659** when results are obtained.
2. Floor must be abraded to a minimum 60 to 80 grit size depending on coating thickness and be free of all oils, grease and other impurities. When recoating over old surfaces, all gloss should be removed
3. Primer is not necessary; however, if floor is particularly porous, our low viscosity primer, ICO Primer LV or LVFC can be applied and allowed to dry tack free before applying first coat.
4. The two ingredients should be mixed in the prescribed ratios, using a low speed (<750rpm) jiffy-style mixer. Mix Part A first in its own bucket for about 30 seconds, then add Part B hardener and mix for at least 30-60 seconds at low speeds until uniform in color.
5. Immediately after mixing, pour the contents onto the floor in a ribbon pattern, spread with a notched rubber squeegee to the desired coverage rate, e.g. 160 sq. ft./gal for 10 mils, then back-roll with a ¼", adhesive type roller. Do not over-roll as this can result in bubble formation.
6. While still wet, broadcast suitable grit into the first coat. This may be back-rolled for obtaining a more uniform texture. Allow to dry tack free.
7. Apply second coat to lock in aggregate and obtain a minimum 20 mil thickness.
   Note: If only one thick coat can be applied (>15mils), a pin roller should be used to facilitate air release.

Note: Failure to follow the above instructions, unless expressly authorized by a Milamar Technical Service Representative, will void our material warranty.

Precautions

1. Recoat windows without sanding: Regular Cure at 70°F: 36 hours; Fast Cure at 70°F: 12 hours; XFC at 50°F: 18 hours.
2. Do not use Guard Coating below 50°F.
3. Do not use Guard Coating FC below 40°F or above 70°F.
4. Do not use Guard Coating XFC below 32°F or above 50°F.
5. If applied below 50°F, Guard Coating FC and XFC will water stain.

Product Specifications

The specified area shall receive an application of ICO Guard Coating™ as manufactured by Milamar Coatings L.L.C., of Oklahoma City, Oklahoma. The system shall be installed by precisely following the manufacturer's published recommendations pertaining to surface preparation, mixing and application. The material shall be a low odor, solvent-free, 100% solids, high gloss flexible epoxy system with good resilience to resist thermal and mechanical shock. The system must adhere to damp as well as dry concrete, wood, metal, tile, terrazzo, and sound existing epoxy and urethane coatings. It shall have an elongation of 9% in the unfilled form when tested using ASTM D-638. The film hardness shall be a Shore D of 80. The system shall be unaffected by oils, greases and resist such chemicals as 36% hydrochloric acid, 20% nitric acid, 50% sulfuric acid and 50% sodium hydroxide.

The data statements and recommendations set forth in this product information sheet are based on testing, research and other development work which has been

carefully conducted by us, and we believe such data. Statements and recommendations will serve as reliable guidelines. However, this product is subject to numerable uses under varying conditions over which we have no control, and accordingly we do NOT warrant that this product is suitable for any particular use. Users are advised to test the product in advance to make certain it is suitable for their particular production conditions and particular use or uses.

LIMITED WARRANTY

Milamar Coatings products are manufactured to be free of defects in material and workmanship in meeting the properties specified on its individual Product Data Sheets. Users and installers of Milamar Coatings products are solely responsible for determining the suitability of the products for specific product applications. Milamar Coatings makes no Warranty or Guarantee, express or implied, including warranties of fitness, design compatibility or merchantability, for any particular use and shall have no responsibility or liability, including direct, indirect or consequential damages, due to injury, delay or third party claims for installation or repair. Likewise, Milamar Coatings assumes no liability of any nature for products that are adjusted in the field or that do not utilize all specified Milamar Coatings components. Should any Milamar Coatings product be proved to be defective within one year from the date of shipment, Milamar Coatings will, at its sole discretion, either replace the material; issue a credit to the customer's account; or provide a cash refund for the initial, paid purchase price of the material. Potential claims regarding product quality must be received in writing by Milamar Coatings within 30 days of the discovery of such potential defect. This Warranty is exclusive of all other warranties, expressed or implied, and may only be adjusted in writing, signed by an officer of Milamar Coatings, L.L.C.

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ilamar Coatings

ICO Floor SL

Product Data Sheet

Product Description

ICO-Floor SL is a three part, 100% solids, low odor epoxy flooring resurfacer. Normally applied between 1/16" and 1/8" thick in a single step self leveling application, ICO-Floor SL quickly and economically restores a pitted, worn concrete floor to a smooth, glossy, easy-to-clean surface. It possesses good wear resistance and will resist chemical attack from most oils, greases, lubricants, caustics and mild acids. With its more resilient formulation, as indicated by a tensile elongation of 12%, ICO-Floor SL can better withstand vibration and impact, compared to more brittle, conventional floor resurfacers.

ICO-Floor SL dries to a smooth, high gloss finish. For anti-slip textures, fine silica sand or aluminum oxide can be broadcast into a top coat of ICO-Floor Coating. For a more decorative look, vinyl flakes can be added, followed by an application of a clear top coat of ICO Sealer or ICO Ure Guard 80. A faster cure version, ICO-Floor SL FC, is also available for faster turnaround time.

Typical Application

ICO-Floor SL is an ideal floor resurfacer for relatively dry areas such as warehouses, food distribution centers, airplane hangars, retail stores, schools, hospitals and general industrial use. Unlike a thin film coating that will "mirror" minor defects in the substrate, ICO-Floor SL, applied at a minimum of 1/16" thickness, will hide such imperfections, providing a "showroom quality" floor. By "seeding" the self-leveling floor to excess with silica sand, then top coating with ICO-Floor Coating, a high build, longer lasting, slip resistant floor can be delivered at relatively inexpensive costs.

Chemical Resistance

A complete list of chemical resistances is available in the Milamar Coatings Chemical Resistant Chart or contact Milamar Technical Service for specific recommendations.

Physical Properties

Tensile Strength (ASTM C-307):	1920 psi	**Coefficient of Thermal Expansion (D-696):**	$1.7x10^{-5}$ per °F
Tensile Elongation (C-307):	12%	**Gardner Impact:**	120 in lbs.
Flexural Strength (C-580):	1760 psi	**Water Absorption (D-570):**	0.2% in 24 hours
Compression Strength (C-579):	6170 psi	**Taber Abrasion CS17, 1000 cycles at 1kg. (D-1044):**	106 mg loss
Hardness, Shore D (D-2240):	73	**60° Gloss:**	93
Bond Strength to Quarry Tile:	>1000 psi		
Flammability:	Self Extinguishing		

Physical Characteristics

Product	Mixing Ratios	By Volume	By Weight
ICO Floor SL	Part A:Part B	2.53:1	2.96:1
	Aggregate:Liquid	1:1	1.5:1
ICO Floor SL FC	Part A:Part B	2.93:1	3.48:1
	Aggregate:Liquid	1:1	1.5:1

Viscosity @ 77F, CPS		Density, lbs./gal	
Part A:	750	Part A:	10.03
Part B:	420	Part B:	8.55
A&B Mixed:	700	A&B Mixed:	9.66

Product	Curing Times	50°F	77°F	90°F
ICO Floor SL	Pot Life	50 min	40 min	20 min
	Work Time	40 min	30 min	20 min
	Hard, Foot Traffic	60 hrs.	26 hrs.	14 hrs.
	Hard, Truck Traffic	70 hrs.	34 hrs.	20 hrs.

ICO Floor SL FC	**Pot Life**	20 min	15 min	10 min
	Work Time	15 min	12 min	10 min
	Hard, Foot Traffic	30 hrs.	18 hrs.	8 hrs.
	Hard, Truck Traffic	40 hrs.	24 hrs.	12 hrs.
Maximum Hardness achieved after 7 days @ 77°F				

Color Availability	**Packaging and Coverage Rates**	
Standard Colors: White, Gray, dark Gray, Beige, Yellow, Red, Green, Blue, Brown and Black	4 Gallon Kit:	50 SF at 1/8" Depth 100 SF at 1/16" depth
Shelf Life: 1 year at 60°F-80°F in unopened containers.		

Installation

Please refer to our Application Specs for detailed instructions. Particular care must be taken to follow those instructions precisely to assure proper installation.

1. New concrete should be allowed to cure a minimum of 28 days and/or be checked with a rubber mat or plastic sheet to insure adequate curing time has occurred.
2. All surfaces to be covered should be power washed, shot blasted, acid etched, scarified or sanded to present a clean, sound substrate to which to bond to. The prepared surface should have a ph of 7.
3. Cracks 1/8" wide or greater, pour joints and construction joints must be cleaned and filled with ICO-Gel. Patch all holes over 1/2" deep with ICO-Patch.
4. The three ingredients should be mixed in the prescribed ratios, using a low speed jiffy-style mixer (maximum 750 rpm), until uniform in color and consistency.
5. Do not add solvent to the mix.
6. Apply ICO-Floor SL with a notched rubber squeegee or steel trowel. Spike roll with porcupine roller to improve air release.
7. For an anti-slip surface, allow ICO-Floor SL to dry, apply a top coat of ICO- Floor Coating and broadcast in silica sand.

NOTE: Failure to follow the above instructions, unless expressly authorized by a Milamar Technical Service Representative, will void our material warranty.

Precautions

1. Only apply over a tack free primer to help prevent out gassing.
2. Do not apply either regular or fast cure versions below 50°F.
3. Do not apply less than 60 mils thick.
4. Do not apply on floor sloped > 1/8" per foot.
5. Do not apply fast cure version >70°F.
6. Do not apply in severe thermal shock environments.

Product Specification

The specified area shall receive an application of ICO-Floor SL™as manufactured by Milamar Coatings of Oklahoma City, Oklahoma. The system shall be installed by precisely following the manufacturer's published recommendations pertaining to surface preparation, mixing, and application. The material shall be a low odor, three part, solvent-free 100% solids epoxy system with moderate resilience to resist impact and vibration. It should be applied by notched trowel or squeegee in one application without needing a top coat. It shall be a resin-rich mix ratio of 1:1, **ICO-Fill™** aggregate to resin and hardener. It shall have an elongation of 12% when tested using ASTM C-307 and Gardner Impact of 120 inch pounds. The compressive strength when tested in accordance with ASTM C-579 shall not exceed 6200psi and the hardness shall not exceed 73 (Shore D). It shall have excellent adhesion to wood, metal, tile, brick as well as concrete. The system shall be unaffected by oils and greases and have high chemical resistance against acids such as 10% nitric, 30% phosphoric, citric, and 50% sulfuric, as well as resist such caustics as 50% sodium hydroxide and 26% ammonium hydroxide.

The data statements and recommendations set forth in this product information sheet are based on testing, research and other development work which has been carefully conducted by us, and we believe such data. Statements and recommendations will serve as reliable guidelines. However, this product is subject to numerable uses under varying conditions over which we have no control, and accordingly we do NOT warrant that this product is suitable for any particular use. Users are advised to test the product in advance to make certain it is suitable for their particular production conditions and particular use or uses.

LIMITED WARRANTY

Milamar Coatings products are manufactured to be free of defects in material and workmanship in meeting the properties specified on its individual Product Data Sheets. Users and installers of Milamar Coatings products are solely responsible for determining the suitability of the products for specific product applications. Milamar Coatings makes no Warranty or Guarantee, express or implied, including warranties of fitness, design compatibility or

merchantability, for any particular use and shall have no responsibility or liability, including direct, indirect or consequential damages, due to injury, delay or third party claims for installation or repair. Likewise, Milamar Coatings assumes no liability of any nature for products that are adjusted in the field or that do not utilize all specified Milamar Coatings components. Should any Milamar Coatings product be proved to be defective within one year from the date of shipment, Milamar Coatings will, at its sole discretion, either replace the material; issue a credit to the customer's account; or provide a cash refund for the initial, paid purchase price of the material. Potential claims regarding product quality must be received in writing by Milamar Coatings within 30 days of the discovery of such potential defect. This Warranty is exclusive of all other warranties, expressed or implied, and may only be adjusted in writing, signed by an officer of Milamar Coatings.

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ilamar Coatings

ICO-GEL

Product Data Sheet

Product Description

ICO-GEL™ is a three part, 100% solids epoxy patching material primarily designed for horizontal, vertical and overhead applications. Its smooth, creamy consistency enables the user to skim coat surfaces that are irregular or pockmarked. **ICO-GEL™** can fill holes up to 1" thick on vertical or overhead surfaces without shrinkage or sagging. For greater thickness, our **ICO Gel XT ™** product can be substituted.

ICO Gel has virtually no odor and adheres well to damp as well as dry concrete and masonry surfaces. Unlike cementitious or acrylic-based patch material it can be recoated in as little as six hours after application at room temperature. For faster cure our **ICO Gel MC** and **ICO Gel FC** are available; for applications temperatures below 50°F use **ICO Gel Cold Cure**.

Product Application

ICO-GEL™ is commonly used to fill bug holes, crevices and cracks on vertical walls as well as floors, vertical stair repairs and concrete columns. **ICO-GEL™** also serves as a trowelled-on skim coat underneath our **ICO Glaze** wall coating system where an extra smooth surface is required. It can also be used to repair badly eroded manholes, sumps and sewers. **ICO Gel** is particularly suited for vertical and overhead repairs where constant dampness is present, such as bridges and dams.

Chemical Resistance

ICO-GEL™ is almost always coated with one of **Milamar Coatings'** more chemically resistant coatings. A complete list is available in the **Milamar Coatings Chemical Resistant Chart or** contact **Milamar Technical Assistance.**

Physical Properties

Tensile Strength (ASTM C-307):	1810 psi	**Hardness, Shore D (D-2240):**	80
Tensile Elongation, unfilled (D-638):	10%	**Bond Strength to Quarry Tile: >1000 psi**	>1000 psi
Compression Strength (D-695):	6170 psi	**Water Absorption:**	0.3% in 24 hours

Physical Characteristics

Curing Times @		32°F	40°F	50°F	77°F	90°F
ICO Gel	Pot Life	---	---	45 min.	40 min.	15 min.
	Working Time	---	---	65 min.	50 min.	40 min.
	Hard, (for sanding)	---	---	72 hrs.	18 hrs.	10 hrs.
ICO Gel MC	Pot Life	---	---	45 min.	30 min.	10 min.
	Working Time	---	---	50 min.	40 min.	35 min.
	Hard	---	---	48 hrs.	10 hrs.	7 hrs.
ICO Gel FC	Pot Life	---	---	10 min.	8 min.	5 min.
	Working Time	---	---	40 min.	35 min.	25 min.
	Hard	---	---	20 hrs.	8 hrs.	4 hrs.
ICO Gel Cold Cure	Pot Life	15 min.	15 min.	14 min.	---	---
	Working Time	45 min.	40 min.	30 min.	---	---
	Hard	24 hrs.	20 hrs.	18 hrs.	---	---

Density, lbs. /gal.	
Part A:	9.7
Part B:	8.0
A&B Mixed:	9.3
Viscosity @ 77°F, cps	
Part A:	38000
Part B:	5500
A&B Mixed:	4400

ICO Gel		
Mixing Ratios	**By Volume:**	**By Weight:**
Part A : Part B	3.5:1	4.3:1
Aggregate : Liquid	0.6:1	1.5:1
ICO Gel MC		
Mixing Ratios	**By Volume:**	**By Weight:**
Part A : Part B	3.5:1	4.3:1
Aggregate : Liquid	0.6:1	1.5:1
ICO Gel FC		
Mixing Ratios	**By Volume:**	**By Weight:**
Part A : Part B	4.86:1	5.77:1
Aggregate : Liquid	0.6:1	1.5:1

Shelf Life 1 year at 77°F in unopened containers
Maximum Hardness achieved after 7 days **@77°F.**

Color Availability
Standard color: Neutral, but can be ordered in white, concrete gray and beige.

Packaging and Coverage Rates
3 Gal. Kit : 40 SF at 1/8" thick
Bulk Pack : 400 SF at 1/8" thick

Installation
Please refer to our Application Specs for detailed instructions. For application as part of our ICO Glaze® ES System, refer to the Application Spec Sheet "ICO Glaze® ES Wall Coating System". Particular care must be taken to follow those instructions precisely to assure proper installation.

1. All surfaces must be cleaned by acid etching, grinding, rough sanding or needle blasting. All loose or flaking coatings and other materials must be removed. All oils, fats, greases or chemically contaminated concrete must be removed.
2. No priming is necessary, as **ICO-GEL™** is a self-priming material.
3. Mix the contents of the Part A and Part B containers in a clean, plastic bucket with a slow speed paddle mixer or electric drill for about one minute. Then add in **ICO-GEL™ Flour** slowly for another minute or so, until the mixture is uniform in color and consistency. Only mix amount of material that can be applied within stated pot life
4. Use a clean margin trowel or spatula to apply the **ICO-GEL™**. The blade should be large enough to span the depression; use a 1-1/2" blade for filling cracks.
5. Press the **ICO-GEL™** firmly into place in a wiping motion. Use enough material to overfill the opening.
6. Under normal conditions, **ICO-GEL™** can be applied up to 1" depths without sagging. For greater thickness, use **ICO Gel XT** (up to 3" per pass).

Failure to follow the above instructions, unless expressly authorized by an Milamar Technical Service Representative, will void
our material warranty.

Precautions
1. Do not apply greater than 1" thick at 70°F; for greater thicknesses use Gel XT
2. Do not apply ICO Gel FC above 70°F
3. Do not apply ICO Gel Cold Cure above 50°F
4. Recoat windows without sanding at 70°F: Gel – 18 hours; Gel MC – 10 hours; Gel FC – 6 to 8 hours

Product Specification
The specified area shall receive an application of **ICO-GEL™** as manufactured by Milamar Coatings of Oklahoma City, Oklahoma. The material shall be installed by precisely following the manufacturer's published recommendations pertaining to surface preparation, mixing, and application. The material shall be a low odor, 100% solids, and three part epoxy system with bond strength exceeding 1000 psi on quarry tiles. It should be able to be applied on vertical surfaces up to 1" thick at 70°F in a single step application without sagging. The system must adhere to damp, as well as dry concrete. It shall be a resin-rich mixture, with an aggregate: liquid ratio not to exceed 1.5:1 by weight. The compressive strength when tested in accordance with ASTM C-579 shall not exceed 6200 psi and the tensile strength shall be 1810 psi when tested under ASTM C-307.

The data statements and recommendations set forth in this product information sheet are based on testing, research and other development work which has been carefully conducted by us, and we believe such data. Statements and recommendations will serve as reliable guidelines. However, this product is subject to numerable uses under varying conditions over which we have no control, and accordingly we do NOT warrant that this product is suitable for any particular use. Users are advised to test the product in advance to make certain it is suitable for their particular production conditions and particular use or uses.

LIMITED WARRANTY
Milamar Coatings products are manufactured to be free of defects in material and workmanship in meeting the properties specified on its individual Product Data Sheets. Users and installers of Milamar Coatings products are solely responsible for determining the suitability of the products for specific product applications. Milamar Coatings makes no Warranty or Guarantee, express or implied, including warranties of fitness, design compatibility or merchantability, for any particular use and shall have no responsibility or liability, including direct, indirect or consequential damages, due to injury, delay or third party claims for installation or repair. Likewise, Milamar Coatings assumes no liability of any nature for products that are adjusted in the field or that do not utilize all specified Milamar Coatings components. Should any Milamar Coatings product be proved to be defective within one year from the date of shipment, Milamar Coatings will, at its sole discretion, replace the material; issue a credit to the customer's account; or provide a cash refund for the initial, paid purchase price of the material. Potential claims regarding product quality must be received in writing by Milamar Coatings within 30 days of the discovery of such potential defect. This Warranty is exclusive of all other warranties, expressed or implied, and may only be adjusted in writing, signed by an officer of Milamar Coatings.

Milamar Coatings
311 NW 122nd St., Suite 100
Oklahoma City, OK 73114
405.755.8448
www.milamar.com

CHEMICAL RESISTANCE CHART

CHEMICAL COMPOUND	ICO FLOOR	ICO GUARD	ICO HI GUARD	ICO SUPER GUARD	ICO URE GUARD TL/SL	ICO URE GUARD 100
Acetic Acid – 10%	OS	R	I	I	I	I
Acetic Acid – 20%	OS	S	R	R	I	R
Acetic Acid – 36%	NR	NR	S	S	I	
Acetic Anhydride	NR	NR	R	I	S	OS
Acetone	NR	NR	OS	I	NR	NR
Acrylonitrile	NR	NR	NR	R	NR	NR
Alum (saturated)	R	I	I	I	I	
Ammonium Hydroxide	R	R	I	I	I	
Ammonium Nitrate	I	I	I	I		
Aniline	S	R*	I	I	S*	NR
Beer	I	I	I	I		
Benzene	OS	OS	I	I		
Black Liquor	I	I	I	I		
Bleach	R	I*	I	I	I	
Boric Acid	I	I	I	I	I	I
Brake Fluid	I	I	I	I	S	OS
Butyl Alcohol	R	I	I	I	S	NR
Butyl Cellusolv	R	I	I	I		
Calcium Chloride	I	I	I	I	I	I
Carbon Tetrachloride	R	I	I	I		
Carbonated Beverage	I	I	I	I		
Chlorine Water	I	I*	I	I		
Chloroform	NR	NR	OS	R	NR	NR
Chromic Acid: 0 – 30%	R	I*	I	I	I*	OS*
Citric Acid, conc.	R	I	I	I	I*	I
Copper Chloride	I*	I*	I	I	I	I*
Cumene Hydroperoxide	I	I	I	I		
Diesel Fuel	I	I	I	I	I	
Ethanol	OS	OS	I	I	OS	OS
Ethyl Acetate	NR	NR	I	I	NR	NR
Ethylene	NR	NR	OS	I	OS	
Ethylene Glycol	I	I	I	I	I	I
Ferric Chloride	I*	I*	I	I	I	I*
Formaldehyde	I	I	I	I	I	R
Formic Acid – 10%	NR	OS	R	OS		
Formic Acid – 30%	NR	NR	NR	OS	I	OS
Formic Acid – 50%	NR	NR	NR	OS		

Code: NR – Not Recommended
OS – Occasional Spill (Up to 24 hours)
S – Short Term Resistance (Up to 72 hours)
R – Recommended (up to7 days immersed)
I – Immersion (at least 30 days)
* - Stain, Color Change

Note: All chemical testing done at ambient conditions (75˚)

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Rev. 3/07

CHEMICAL RESISTANCE CHART

CHEMICAL COMPOUND	ICO FLOOR	ICO GUARD	ICO HI GUARD	ICO SUPER GUARD	ICO URE GUARD TL/SL	ICO URE GUARD 100
Gasoline	R	R	I	I	R	OS
Glacial Acetic Acid	NR	NR	S	R	R	NR
Green Liquor	I	I	I	I		
n-Hexane	I	I	I	I	I	
Hydrobromic Acid – 50%	R*	I*	I	I*	I*	S*
Hydrochloric Acid – 37%	S*	I*	I	I*	I*	S
Hydrofluoric Acid – 10%	NR	S	OS	S*		
Hydrofluoric Acid – 30%	NR	NR	NR	S*		
Hydrofluoric Acid – 50%	NR	NR	NR	NR		
Hydrofluorosilicic Acid – 30%	R	I	I	I	I	
Hydrogen Peroxide – 50%	NR	R	R	R	I*	S
Hydrogen Sulfide in H_2O	I	I	I	I	I	I
Isopropyl Alcohol	I	I	I	I	I	
Jet Fuel	I	I	I	I	I	I
Kerosene	I	I	I	I	I	I
Klenzade	See Table at End of Chart					
Lactic Acid – 20%	R	R	I	I	I	
Lactic Acid – 50%	S	R	I	I	I	
Lactic Acid – 80%	OS	R	I	I	I	R
Maleic Acid	R	R	I	I	R	R
Malic Acid	I	I	I	I		
Methanol	NR	NR	NR	I	OS	NR
Methyl Ethyl Ketone	NR	NR	NR	I	NR	NR
Methyl Isobutyl Ketone	R	OS	I	I	NR	NR
Methyl Methacrylate	OS	NR	R	I	OS	NR
N-Methyl Pyrolidone	NR	NR	OS	I	NR	NR
Methyl Salicylate	I	I	I	I	I	
Methylene Chloride	NR	NR	NR	S		
Mineral Oil	I	I	I	I	I	I
Nitric Acid – 10%	R	I	I	I	I*	I
Nitric Acid – 30%	R*	I*	I*	S*	R*	
Nitric Acid – 50%	NR	R*	NR	OS	NR	NR
Nitric Acid, conc.	NR	NR	NR	NR	NR	NR
Nitropropane	S	I	I	I	R	OS
Oleic Acid	R	I	I	I	I*	R
Oxalic Acid	R	I	I	I		

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CHEMICAL RESISTANCE CHART

CHEMICAL COMPOUND	ICO FLOOR	ICO GUARD	ICO HI GUARD	ICO SUPER GUARD	ICO URE GUARD TL/SL	ICO URE GUARD 100
Palm Oil	I	I	I	I		
Perchloroethylene	S	S	I	I	I	NR
Phenol	NR	NR	OS	I	NR	NR
Phosphoric Acid - 30%	R*	I	I	I	I	
Phosphoric Acid - 50%	R*	I	I	I	I	
Phosphoric Acid - 85%	R*	I*	I	I	I	S
Picric Acid	R*	I*	I*	I*	I	I*
Pyridine	NR	NR	NR	I	NR	NR
Salt Brine	R	I	I	I	I	I
Silver Nitrate	I*	I*	I*	I*	R*	
Skydrol	R*	I	I	I	R	R
Sodium Chloride	I	I	I	I		
Sodium Hydroxide - 30%	I	I	I	I		
Sodium Hydroxide - 50%	I	I	I	I	I	I
Sodium Hypochlorite - 5%	I	I*	I	I		
Sodium Hypochlorite - 10%	I	I*	I	I		
Sodium Hypochlorite - 15%	R	R	I	I	I*	I*
Stearic Acid, conc.	I	I	I	I	I	I
Styrene	S	OS	S	I	S	NR
Sugars	R	I	I	I	I	I
Sulfuric Acid, conc.	I	I	I	I		
Sulfuric Acid - 10%	R	I	I	I	I	I
Sulfuric Acid - 50%	R*	I*	I*	I*	I	R
Sulfuric Acid - 80%	R*	I*	I	I	NR	
Sulfuric Acid - 98%	NR*	NR	I*	I*	NR	NR
Tannic Acid - 50%	I	I*	I	I		
Tartaric Acid, conc.	R	I	I	I		
Tetrachloroethylene	R	S	I	I	NR	OS
Tetrahydrofuran	NR	NR	NR	I	S	NR
Toluene	OS	OS	I	I	S	
1.1.1 Trichloroethane	I	I	I	I	NR	OS
Trichloroethylene	NR	NR	NR	I		
Trichlorofluoroethane	I	I	I	I	I	I
Tri Sodium Phosphate	I	I	I	I		
Urea	R	I	I	I	I*	I
Urine	R	I	I	I	I	I

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Note: All chemical testing done at ambient conditions (75˚)

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CHEMICAL RESISTANCE CHART

CHEMICAL COMPOUND	ICO FLOOR	ICO GUARD	ICO HI GUARD	ICO SUPER GUARD	ICO URE GUARD TL/SL	ICO URE GUARD 100
Vinegar	S	I	I	I	I	
Water, Deionized	I	I	I	I		
Water, Distilled	I	I	I	I		
White Liquor	I	I	I	I		
Xylene	I	I	I	I	R	
Klenzade™ Cleaners						
AC-101	I	I	I	I	I	I
AC-101 dil 4oz/gal	I	I	I	I		
Enforce	I	I	I	I		
Enforce dil 4oz/gal	I	I	I	I		
Heavy Duty Acid LC-30	S	I	I	I		
Heavy Duty Acid LC-30 dil 4oz/gal	R	I	I	I		
Oxonia Active	OS*	S*	S*	R*	R*	NR
Oxonia Active dil 1oz/3 gal	R	I	I	I	I	I
Ultrasil 76	OS*	R*	R*	S*	I*	R
Ultrasil 76 dil 2oz/gal	I	I	I	I		
XY-12	I	I	I	I		
XY-12 dil 1oz/gal	I	I	I	I		
Note: Klenzade is a trademark of Ecolabs						

Code: NR – Not Recommended
OS – Occasional Spill (Up to 24 hours)
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Note: All chemical testing done at ambient conditions (75°)

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ATTACHMENT 4.3.3

TECHNICAL INFORMATION ON EUCO QWIKJOINT POLYUREA FLOOR JOINT FILLER

EUCO QWIKJOINT 200

Polyurea Floor Joint Filler

EUCLID CHEMICAL

Description

EUCO QWIKJOINT 200 is a fast-setting, semi-rigid polyurea used for filling control and construction joints in industrial concrete floors. EUCO QWIKjoint 200 represents a new generation of polyurea technology with features and benefits unlike any other polyurea joint filler on the market. Among these benefits are a super-fast set time and an extended shave time: EUCO QWIKjoint 200 can be trimmed flush with the floor immediately after placement or up to 24 hours later. EUCO QWIKjoint 200 supports and protects joint edges from heavy loads and wheel traffic, reducing spalling of the joint edges.

Primary Applications

- Concrete construction and control joints
- Crack repair for old floors
- Industrial and commercial floors
- Freezer floors

Features/Benefits

- Fast-setting formula reduces downtime
- Large shave time window allows for greater flexibility in scheduling joint filling operations
- No bubbles - no foaming when used in damp joints
- Tough performance reduces floor joint repairs and maintenance
- Suitable for filling cracks in older floors to reduce the rate of joint deterioration
- Will cure in temperatures as low as -20° F (-29°C)
- Less moisture-sensitive than standard polyureas

Technical Information

Typical Engineering Data

The following are typical values obtained under laboratory conditions. Expect reasonable variation under field conditions.

Property	Test Method	Result
Gel Time	--	25 seconds
Shore D Hardness	ASTM D2240	34 to 36
Shore A Hardness	ASTM D2240	84 to 88
Tensile Strength @ 7 days	ASTM D412	660 psi (4.6 MPa)
Elongation @ 7 days	ASTM D412	220% to 260%
Shave "Window"	--	30 min to 24 hours
Tack-Free Time	--	1 to 3 minutes
Traffic Ready Time	--	Light Traffic: 15 min Heavy Traffic: 30 min

Chemical Ratings:

Excellent - no effect after 2 weeks
Good - no effect for 24 hours
Poor - affected within 24 hours

Chemical Resistance, ASTM D1308	
Acetic Acid, 5%	excellent
Alcohol, 10%	excellent
Alkalies	excellent
Ammonium Hydroxide, 10%	excellent
Brake Fluid	good
Diesel Fuel	excellent
Ethylene Glycol (antifreeze)	good
Gasoline	excellent
Hydrochloric Acid, 20%	excellent
JP-4 Jet Fuel	excellent
Used Motor Oil	excellent
Salt Water	excellent
Sodium Hydroxide, 10%	excellent
Sulfuric Acid, 10%	good
Xylene	poor

Appearance: EUCO QWIKjoint 200 is available in Standard Gray only. The product may discolor over time if exposed to either natural or artificial ultraviolet light. If aesthetics are an important issue or if another color is desired, use EUCO QWIKjoint UVR, which is UV resistant and available in 33 standard colors.

Packaging

EUCO QWIKjoint 200 is a two-component product packaged in 10 gal (37.9 L) and 100 gal (379 L) kits. 22 oz (600 mL) side-by-side cartridges are packaged 12 per case. Each cartridge yields 40 in³ (655 cm³). The mix ratio for all packaging sizes is 1:1.

19215 Redwood Road • Cleveland, OH 44110
800-321-7628 t • 216-531-9596 f
www.euclidchemical.com

Shelf Life

1 year in original, unopened containers

Specifications/Compliances

EUCO QWIKjoint 200 complies with ACI 302 performance recommendations regarding control and construction joint fillers.

Canadian Food Inspection Agency Compliant

Coverage

1 gallon (3.78 L) of EUCO QWIKjoint 200 yields 231 in^3 (3,785 cm^3) of material.

Six 22 oz (600 mL) cartridges equal approximately 1 gallon (3.78 L) of material.

The following table gives rough guidelines on estimating the amount of material needed. These numbers represent the length of joint that can be filled with 1 gallon (3.78 L) of material, based on the joints' width and depth.

	Joint Depth				
	1"	1.5"	2"	2.5"	3"
Joint Width					
3/32" (2.4 mm)	205 ft (62.5 m)	136 ft (41.5 m)	102 ft (31.1 m)	82 ft (25.0 m)	68 ft (20.7 m)
1/8" (3.2 mm)	154 ft (46.9 m)	102 ft (31.1 m)	77 ft (23.5 m)	61 ft (18.6 m)	51 ft (15.5 m)
3/16" (4.8 mm)	102 ft (31.1 m)	68 ft (20.7 m)	51 ft (15.5 m)	41 ft (12.5 m)	34 ft (10.4 m)
1/4" (6.4 mm)	77 ft (23.5 m)	51 ft (15.5 m)	38 ft (11.6 m)	30 ft (9.1 m)	25 ft (7.6 m)
3/8" (9.5 mm)	51 ft (15.5 m)	34 ft (10.4 m)	25 ft (7.6 m)	20 ft (6.1 m)	17 ft (5.2 m)
1/2" (12.7 mm)	38 ft (11.6 m)	25 ft (7.6 m)	19 ft (5.8 m)	15 ft (4.6 m)	12 ft (3.7 m)

Directions for Use

Surface Preparation: All joints to be filled must be clean and dry. All oil, dirt, debris, paint and any other material that may be a bond breaker must be removed. The final step in cleaning must be the complete removal of all residue with a vacuum cleaner and oil-free compressed air. All joint facings must possess an open surface texture with all curing compounds and sealers removed. If this product will be used for filling floor cracks, the cracks must be routed out and cleaned before filling. For proper installation, all edges must be squared off.

Joint Backing: To provide proper load transfer, EUCO QWIKjoint 200 must be filled full depth of the joint or crack. Do not use backer rod or other fill material for the purpose of reducing volume. Dried silica sand, 1/16" to 1/8" (1.5 to 3 mm), may be used to fill the crack at the bottom of the joint to prevent materal loss through the slab.

Priming: EUCO QWIKjoint 200 does not require a primer before application.

Preparation of 10 gal (37.9 L) units

Mixing: Due to its extremely fast set time, EUCO QWIKjoint 200 requires machine mixing and placing. ****Slowly pre-mix Part B separately before using with a slow speed drill and mixing paddle for 2 to 3 minutes.** Do not whip air into the Part B while mixing. Follow mechanical pump manufacturer's equipment instructions for operation.

NOTE: If EUCO QWIKjoint 200 is to be stored in the dispensing pump overnight, place a sheet of plastic wrap directly on top of the liquid material in each tank to prevent exposure to air.

Preparation of 22 oz (600 mL) cartridges

QWIKjoint 200 cartridges must be shaken well before opening and using, as some settlement is normal during storage. Remove the threaded cartridge nut, then remove the white plastic plug from the top of the cartridge. The nut and plug can be set aside and later used to re-seal a partially used cartridge. To avoid cross contamination during re-sealing, clean the white plastic plug prior to re-inserting in the top of the cartridge. Thread the included static mixing nozzle onto the cartridge securely. Load the cartridge into a 1:1 ratio, dual-component dispensing gun, designed to accommodate 600 mL (300 mL x 300 mL) cartridges. Hold the gun with the mixing nozzle pointing straight upward, and pump EUCO QWIKjoint 200 up to the top of the static mixing nozzle. Then, tilt the gun downward and dispense the first 2 to 3 pumps (or until material appears uniform) of material into a disposable container. Discard this material. The cartridge is now prepared for the placement of EUCO QWIKjoint 200.

Placement for 10 gal (37.9 L) units and 22 oz (600 mL) cartridges

EUCO QWIKjoint 200 must be installed in the joint full depth. Joints should be slightly overfilled and shaved smoothly with the surrounding joint edges, giving the floor joints a flat appearance. Shaving of excess EUCO QWIKjoint 200 can begin approximately 1 hour after placement, and up to 24 hours later, depending on jobsite conditions such as the concrete and ambient temperatures.

WARRANTY: The Euclid Chemical Company ("Euclid") solely and expressly warrants that its products shall be free from defects in materials and workmanship for one (1) year from the date of purchase. Unless authorized writing by an officer of Euclid, no other representations or statements made by Euclid or its representatives, in writing or orally, shall alter this warranty. EUCLID MAKES NO WARRANTIES, IMPLIED OR OTHERWISE, AS TO THE MERCHANTABILITY OR FITNESS FOR ORDINARY OR PARTICULAR PURPOSES OF ITS PRODUCTS AND EXCLUDES THE SAME. If any Euclid product fails to conform with this warranty, Euclid will replace the product at no cost to Buyer. Replacement of any product shall be the sole and exclusive remedy available and buyer shall have no claim for incidental or consequential damages. Any warranty claim must be made within one (1) year from the date of the claimed breach. Euclid does not authorize anyone on its behalf to make any written or oral statements which in any way alter Euclid's installation information or instructions in its product literature or on its packaging labels. Any installation of Euclid products which fails to conform with such installation information or instructions shall void this warranty. Product demonstrations, if any, are done for illustrative purposes only and do not constitute a warranty or warranty alteration of any kind. Buyer shall be solely responsible for determining the suitability of Euclid's products for the Buyer's intended purposes.

CLEAN-UP

Tools, equipment and general clean-up can be done with EUCO SOLVENT or acetone. Clean equipment before EUCO QWIKjoint 200 has cured.

PRECAUTIONS/LIMITATIONS

- **Based on ACI 302 recommendations, joint fillers should be applied as late as possible after construction to allow for minimal additional slab shrinkage. Consult ACI 302 comments regarding concrete shrinkage, joint filling and user expectations.**
- EUCO QWIKjoint 200 material and all application equipment should be kept at ambient temperatures of 50°F (10°C) or above.
- Surface and ambient temperature during applications should be between -20°F and 90°F (-29°C and 32°C)
- For filling joints greater than 1/2 inch (1.3 cm) in width, the use of EUCO QWIKJOINT UVR is strongly recommended.
- Do not use EUCO QWIKjoint 200 as an expansion joint sealant.
- Contact surfaces must be clean and dry for best adhesion.
- Joint edges must be thoroughly cleaned prior to filling, particularly if a floor sealer or densifier has been applied.
- Coatings may not adhere to EUCO QWIKjoint 200. If the floor is intended to receive a seamless epoxy or urethane coating, refer to our "Epoxy & Urethane Coatings Application Guide".
- Product may discolor in direct sunlight or artificial light.
- In all cases, consult the Safety Data Sheet before use.

RRANTY: The Euclid Chemical Company ("Euclid") solely and expressly warrants that its products shall be free from defects in materials and workmanship for one (1) year from the date of purchase. Unless authorized iting by an officer of Euclid, no other representations or statements made by Euclid or its representatives, in writing or orally, shall alter this warranty. EUCLID MAKES NO WARRANTIES, IMPLIED OR OTHERWISE, AS TO THE MERCHANTABILITY OR FITNESS FOR ORDINARY OR PARTICULAR PURPOSES OF ITS PRODUCTS AND EXCLUDES THE SAME. If any Euclid product fails to conform with this warranty, Euclid will replace the product at no cost to Buyer. Replacement of any product shall be the sole and exclusive remedy available and buyer shall have no claim for incidental or consequential damages. Any warranty claim must be made within one (1) year from the date of the claimed breach. Euclid does not authorize anyone on its behalf to make any written or oral statements which in any way alter Euclid's installation information or instructions in its product literature or on its packaging labels. Any installation of Euclid products which fails to conform with such installation information or instructions shall void this warranty. Product demonstrations, if any, are done for illustrative purposes only and do not constitute a warranty or warranty alteration of any kind. Buyer shall be solely responsible for determining the suitability of Euclid's products for the Buyer's intended purposes.

This is a kit that contains the following components:
EUCO QWIKJOINT 200 PART A
EUCO QWIKJOINT 200 PART B - BULK

SAFETY DATA SHEET

1. Identification

Product identifier: EUCO QWIKJOINT 200 PART A
Product Code: 693 94

Recommended use and restriction on use

Recommended use: Curative
Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor Information
EUCLID CHEMICAL COMPANY
19218 REDWOOD ROAD
CLEVELAND OH 44110
US

Contact person:	EH&S Department
Telephone:	216-531-9222
Emergency telephone number:	1-800-424-9300 (US); 1-613-996-6666 (Canada)

2. Hazard(s) identification

Hazard Classification

Health Hazards

Skin Corrosion/Irritation	Category 2
Respiratory sensitizer	Category 1
Skin sensitizer	Category 1
Carcinogenicity	Category 2

Unknown toxicity - Health

Acute toxicity, oral	13.18 %
Acute toxicity, dermal	13.18 %
Acute toxicity, inhalation, vapor	100 %
Acute toxicity, inhalation, dust or mist	100 %

Unknown toxicity - Environment

Acute hazards to the aquatic environment	100 %
Chronic hazards to the aquatic environment	100 %

Label Elements

Hazard Symbol:



Signal Word:	Danger
Hazard Statement:	Causes skin irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. Suspected of causing cancer.
Precautionary Statement	
Prevention:	Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapors/spray. [In case of inadequate ventilation] wear respiratory protection. Contaminated work clothing must not be allowed out of the workplace. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.
Response:	If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER/doctor. IF ON SKIN: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. If exposed or concerned: Get medical advice/attention. Specific treatment (see this label). Wash contaminated clothing before reuse.
Storage:	Store locked up.
Disposal:	Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical Identity	CAS number	Content in percent (%)*
4,4'-Methylene bis(phenylisocyanate)	101-68-8	15 - 40%
Diphenylmethane diisocyanate	26447-40-5	10 - 30%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Ingestion:	Call a POISON CENTER/doctor/.../if you feel unwell. Rinse mouth.
Inhalation:	Call a physician or poison control center immediately. If breathing stops, provide artificial respiration. Move to fresh air. If breathing is difficult, give oxygen.
Skin Contact:	Get medical attention. Destroy or thoroughly clean contaminated shoes. Immediately remove contaminated clothing and shoes and wash skin with soap and plenty of water. If skin irritation or an allergic skin reaction develops, get medical attention.
Eye contact:	Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention.

Most important symptoms/effects, acute and delayed

Symptoms:	Prolonged or repeated contact with skin may cause redness, itching, irritation and eczema/chapping.

Indication of immediate medical attention and special treatment needed

Treatment:	Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards:	No unusual fire or explosion hazards noted.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media:	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical:	During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Special fire fighting procedures:	No data available.
Special protective equipment for fire-fighters:	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Ventilate closed spaces before entering them. Evacuate area. See Section 8 of the SDS for Personal Protective Equipment. Keep upwind. Keep unauthorized personnel away. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up:	Dam and absorb spillages with sand, earth or other non-combustible material. Collect spillage in containers, seal securely and deliver for disposal according to local regulations.
Notification Procedures:	In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.
Environmental Precautions:	Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling:	Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use personal protective equipment as required. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid contact with skin. Wash hands thoroughly after handling. Avoid contact with eyes, skin, and clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities:	Store locked up.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	type	Exposure Limit Values	Source
4,4'-Methylene bis(phenylisocyanate)	TWA	0.005 ppm	US. ACGIH Threshold Limit Values (2011)
	Ceiling	0.02 ppm 0.2 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)

Chemical name	type	Exposure Limit Values	Source
4,4'-Methylene bis(phenylisocyanate)	CEILING	0.01 ppm	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	TWA	0.005 ppm	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
4,4'-Methylene bis(phenylisocyanate)	TWAEV	0.005 ppm	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)
	CEV	0.02 ppm	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)

4,4'-Methylene bis(phenylisocyanate)	TWA	0.005 ppm	0.051 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (12 2008)
Diphenylmethane diisocyanate	TWA	0.005 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
	CEILING	0.01 ppm		Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)

Appropriate Engineering Controls

Observe good industrial hygiene practices. Observe occupational exposure limits and minimize the risk of inhalation of vapors and mist. Mechanical ventilation or local exhaust ventilation may be required.

Individual protection measures, such as personal protective equipment

General information:

Provide easy access to water supply and eye wash facilities. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Eye/face protection:

Wear safety glasses with side shields (or goggles).

Skin Protection

Hand Protection:

Use suitable protective gloves if risk of skin contact.

Other:

Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific information.

Respiratory Protection:

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Hygiene measures:

Observe good industrial hygiene practices. Wash hands before breaks and immediately after handling the product. Wash contaminated clothing before reuse. Avoid contact with skin. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance	
Physical state:	liquid
Form:	liquid
Color:	Colorless
Odor:	Mild
Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	No data available.
Initial boiling point and boiling range:	< -0.00 °C < 32 °F
Flash Point:	163 °C 325 °F
Evaporation rate:	Slower than Ether
Flammability (solid, gas):	No
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	Vapors are heavier than air and may travel along the floor and in the bottom of containers.
Relative density:	1.05
Solubility(ies)	
Solubility in water:	Practically Insoluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	No data available.
Chemical Stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	No data available.
Conditions to avoid:	Avoid heat or contamination.
Incompatible Materials:	Alcohols. Amines. Strong acids. Strong bases. Water, moisture.
Hazardous Decomposition Products:	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors.

11. Toxicological information

Information on likely routes of exposure

Ingestion:	May be ingested by accident. Ingestion may cause irritation and malaise.
Inhalation:	In high concentrations, vapors, fumes or mists may irritate nose, throat and mucus membranes.
Skin Contact:	Causes skin irritation. May cause an allergic skin reaction.
Eye contact:	Eye contact is possible and should be avoided.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: ATEmix: 25,313.52 mg/kg

Dermal
Product: No data available.

Inhalation
Product: No data available.

Specified substance(s):
4,4'-Methylene bis(phenylisocyanate): LC 50 (Rat, 4 h): 0.49 mg/l

Repeated dose toxicity
Product: No data available.

Skin Corrosion/Irritation
Product: No data available.

Serious Eye Damage/Eye Irritation
Product: No data available.

Specified substance(s):
4,4'-Methylene bis(phenylisocyanate): in vivo (Rabbit, 24 - 72 hrs): Not irritating

Respiratory or Skin Sensitization
Product: May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause sensitization by inhalation.

Carcinogenicity
Product: Suspected of causing cancer.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No data available.

In vivo
Product: No data available.

Reproductive toxicity
Product: No data available.

Specific Target Organ Toxicity - Single Exposure
Product: No data available.

Specific Target Organ Toxicity - Repeated Exposure
Product: No data available.

Aspiration Hazard
Product: No data available.

Other effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: No data available.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in Soil: No data available.

Other Adverse Effects: No data available.

13. Disposal considerations

Disposal instructions: Dispose of waste at an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Contaminated Packaging: No data available.

14. Transport information

TDG:

Not Regulated

CFR / DOT:

Not Regulated

IMDG:

Not Regulated

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
None present or none present in regulated quantities.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Identity	Reportable quantity
4,4'-Methylene bis(phenylisocyanate)	5000 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate (Acute) Health Hazards
Delayed (Chronic) Health Hazard

SARA 302 Extremely Hazardous Substance
None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

Chemical Identity	Reportable quantity
4,4'-Methylene bis(phenylisocyanate)	5000 lbs.

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
4,4'-Methylene bis(phenylisocyanate)	500 lbs
Diphenylmethane diisocyanate	500 lbs

SARA 313 (TRI Reporting)

Chemical Identity
4,4'-Methylene bis(phenylisocyanate)

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity
4,4'-Methylene bis(phenylisocyanate)
Diphenylmethane diisocyanate

US. Massachusetts RTK - Substance List

Chemical Identity
4,4'-Methylene bis(phenylisocyanate)

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity
4,4'-Methylene bis(phenylisocyanate)

US. Rhode Island RTK

Chemical Identity
4,4'-Methylene bis(phenylisocyanate)

Other Regulations:

When appropriately mixed with the other part, product has a VOC less water and exempt solvent of:
0 g/l

Inventory Status:

Australia AICS:	All components in this product are listed on or exempt from the Inventory.
Canada DSL Inventory List:	All components in this product are listed on or exempt from the Inventory.
EINECS, ELINCS or NLP:	One or more components in this product are not listed on or exempt from the Inventory.
Japan (ENCS) List:	One or more components in this product are not listed on or exempt from the Inventory.
China Inv. Existing Chemical Substances:	All components in this product are listed on or exempt from the Inventory.
Korea Existing Chemicals Inv. (KECI):	All components in this product are listed on or exempt from the Inventory.
Canada NDSL Inventory:	One or more components in this product are not listed on or exempt from the Inventory.
Philippines PICCS:	All components in this product are listed on or exempt from the Inventory.
US TSCA Inventory:	All components in this product are listed on or exempt from the Inventory.
New Zealand Inventory of Chemicals:	All components in this product are listed on or exempt from the Inventory.

Japan ISHL Listing:	One or more components in this product are not listed on or exempt from the Inventory.
Japan Pharmacopoeia Listing:	One or more components in this product are not listed on or exempt from the Inventory.

16.Other information, including date of preparation or last revision

Revision Date:	09/29/2015
Version #:	1.0
Further Information:	No data available.
Disclaimer:	For Industrial Use Only. Keep out of Reach of Children. The hazard information herein is offered solely for the consideration of the user, subject to their own investigation of compliance with applicable regulations, including the safe use of the product under every foreseeable condition.

SAFETY DATA SHEET

1. Identification

Product identifier: EUCO QWIKJOINT 200 PART B - BULK
Product Code: 693 94

Recommended use and restriction on use

Recommended use: Curative
Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor Information
EUCLID CHEMICAL COMPANY
19218 REDWOOD ROAD
CLEVELAND OH 44110
US

Contact person:	EH&S Department
Telephone:	216-531-9222
Emergency telephone number:	1-800-424-9300 (US); 1-613-996-6666 (Canada)

2. Hazard(s) identification

Hazard Classification

Health Hazards

Carcinogenicity	Category 2
Acute toxicity, oral	4.52 %
Acute toxicity, dermal	5.7 %
Acute toxicity, inhalation, vapor	100 %
Acute toxicity, inhalation, dust or mist	99.99 %

Environmental Hazards

Acute hazards to the aquatic environment	Category 2
Acute hazards to the aquatic environment	98.26 %
Chronic hazards to the aquatic environment	100 %

Label Elements

Hazard Symbol:



Signal Word: Warning

Hazard Statement: Suspected of causing cancer.
Toxic to aquatic life.

Precautionary Statement

Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.

Response: If exposed or concerned: Get medical advice/attention.

Storage: Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical Identity	CAS number	Content in percent (%)*
Diethyltoluenediamine	68479-98-1	15 - 40%
Propoxylated Amine	102-60-3	3 - 7%
Amorphous silica	7631-86-9	1 - 5%
Titanium dioxide	13463-67-7	0.5 - 1.5%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Ingestion: Call a POISON CENTER/doctor/.../if you feel unwell. Rinse mouth.

Inhalation: Move to fresh air.

Skin Contact: Wash skin thoroughly with soap and water. Get medical attention if symptoms occur.

Eye contact: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. If eye irritation persists: Get medical advice/attention.

Most important symptoms/effects, acute and delayed

Symptoms: May cause skin and eye irritation.

Indication of immediate medical attention and special treatment needed

Treatment: Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: No unusual fire or explosion hazards noted.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical: During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: No data available.

Special protective equipment for fire-fighters: Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: No data available.

Methods and material for containment and cleaning up: Dam and absorb spillages with sand, earth or other non-combustible material. Collect spillage in containers, seal securely and deliver for disposal according to local regulations.

Notification Procedures: In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid release to the environment.

7. Handling and storage

Precautions for safe handling: Wash hands thoroughly after handling. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use personal protective equipment as required. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities: Store locked up.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	type	Exposure Limit Values	Source
Amorphous silica	TWA	20 millions of particles per cubic foot of air	US. OSHA Table Z-3 (29 CFR 1910.1000) (2000)
	TWA	0.8 mg/m3	US. OSHA Table Z-3 (29 CFR 1910.1000) (2000)
Titanium dioxide	TWA	10 mg/m3	US. ACGIH Threshold Limit Values (2011)
Titanium dioxide - Total dust.	PEL	15 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)

Chemical name	type	Exposure Limit Values	Source
Amorphous silica - Total	TWA	4 mg/m3	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
Amorphous silica - Respirable.	TWA	1.5 mg/m3	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
Amorphous silica	TWAEV	10 mg/m3	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)
Amorphous silica - Respirable dust.	TWA	6 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (12 2008)
Titanium dioxide - Total dust.	TWA	10 mg/m3	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
Titanium dioxide - Respirable fraction.	TWA	3 mg/m3	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
Titanium dioxide	TWAEV	10 mg/m3	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)
Titanium dioxide - Total dust.	TWA	10 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (12 2008)

Appropriate Engineering Controls

Observe good industrial hygiene practices. Observe occupational exposure limits and minimize the risk of inhalation of vapors and mist. Mechanical ventilation or local exhaust ventilation may be required.

Individual protection measures, such as personal protective equipment

General information:

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. Supplementary local exhaust ventilation, closed systems, or respiratory and eye protection may be needed in special circumstances, such as poorly ventilated spaces, heating, evaporation of liquids from large surfaces, spraying of mists, mechanical generation of dusts, drying of solids, etc.

Eye/face protection:

Wear safety glasses with side shields (or goggles).

Skin Protection
Hand Protection:

Use suitable protective gloves if risk of skin contact.

Other:	Wear suitable protective clothing.
Respiratory Protection:	In case of inadequate ventilation use suitable respirator. Seek advice from local supervisor.
Hygiene measures:	Observe good industrial hygiene practices. Wash hands before breaks and immediately after handling the product.

9. Physical and chemical properties

Appearance	
Physical state:	liquid
Form:	liquid
Color:	Colorless
Odor:	Mild pungent
Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	No data available.
Initial boiling point and boiling range:	No data available.
Flash Point:	> 93 °C > 200 °F(Closed Cup)
Evaporation rate:	Slower than Ether
Flammability (solid, gas):	No
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	Vapors are heavier than air and may travel along the floor and in the bottom of containers.
Relative density:	1.1
Solubility(ies)	
Solubility in water:	Insoluble in water
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	No data available.
Chemical Stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	No data available.

Conditions to avoid:	Avoid heat or contamination.
Incompatible Materials:	Strong acids.
Hazardous Decomposition Products:	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors.

11. Toxicological information

Information on likely routes of exposure

Ingestion:	May be harmful if swallowed.
Inhalation:	In high concentrations, vapors, fumes or mists may irritate nose, throat and mucus membranes.
Skin Contact:	May be harmful in contact with skin.
Eye contact:	Eye contact is possible and should be avoided.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: ATEmix: 4,562.74 mg/kg

Dermal
Product: ATEmix: 2,178.35 mg/kg

Inhalation
Product: No data available.

Repeated dose toxicity
Product: No data available.

Skin Corrosion/Irritation
Product: No data available.

Serious Eye Damage/Eye Irritation
Product: No data available.

Specified substance(s):

Diethyltoluenediamine	in vivo (Rabbit, 24 hrs): Category 1
Propoxylated Amine	in vivo (Rabbit): Irritating
Amorphous silica	in vivo (Rabbit, 24 hrs): Not irritating
Titanium dioxide	in vivo (Rabbit, 24 - 72 hrs): Not irritating

Respiratory or Skin Sensitization
Product: No data available.

Carcinogenicity
Product: Suspected of causing cancer.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

Titanium dioxide	Overall evaluation: Possibly carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No data available.

In vivo
Product: No data available.

Reproductive toxicity
Product: No data available.

Specific Target Organ Toxicity - Single Exposure
Product: No data available.

Specific Target Organ Toxicity - Repeated Exposure
Product: No data available.

Aspiration Hazard
Product: No data available.

Other effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Specified substance(s):

Titanium dioxide	LC 50 (Mummichog (Fundulus heteroclitus), 96 h): > 1,000 mg/l Mortality

Aquatic Invertebrates
Product: No data available.

Specified substance(s):
Titanium dioxide — EC 50 (Water flea (Daphnia magna), 48 h): > 1,000 mg/l Intoxication

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Specified substance(s):
Titanium dioxide — LC 0 (Coregonus autumnalis migratorius G., 30 d): 3 mg/l experimental result

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: No data available.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in Soil: No data available.

Other Adverse Effects: Toxic to aquatic organisms.

13. Disposal considerations

Disposal instructions: Dispose of waste at an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Contaminated Packaging: No data available.

14. Transport information

TDG:

Not Regulated

CFR / DOT:

Not Regulated

IMDG:

Not Regulated

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Chemical Identity	Reportable quantity
Diethyltoluenediamine	De minimis concentration: 1.0% One-Time Export Notification only.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Identity	Reportable quantity

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Delayed (Chronic) Health Hazard

SARA 302 Extremely Hazardous Substance

None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

Chemical Identity	Reportable quantity
Bis (2-propylheptyl) phthalate	
Diisodecyl phthalate	
Diisodecyl phthalate (mixed Is)	

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
Diethyltoluenediamine	500 lbs
Propoxylated Amine	500 lbs
Amorphous silica	500 lbs
Titanium dioxide	500 lbs

SARA 313 (TRI Reporting)
None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65
This product contains chemical(s) known to the State of California to cause cancer and/or to cause birth defects or other reproductive harm.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity
Amorphous silica

US. Massachusetts RTK - Substance List

Chemical Identity
Amorphous silica
Crystalline Silica (Quartz)/ Silica Sand

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity
Bis (2-propylheptyl) phthalate
Amorphous silica

US. Rhode Island RTK

Chemical Identity
Bis (2-propylheptyl) phthalate

Other Regulations:

Regulatory VOC (less water and exempt solvent):	0 g/l
VOC Method 310:	0.00 %

Inventory Status:

Australia AICS:	One or more components in this product are not listed on or exempt from the Inventory.
Canada DSL Inventory List:	One or more components in this product are not listed on or exempt from the Inventory.

EINECS, ELINCS or NLP:	One or more components in this product are not listed on or exempt from the Inventory.
Japan (ENCS) List:	One or more components in this product are not listed on or exempt from the Inventory.
China Inv. Existing Chemical Substances:	One or more components in this product are not listed on or exempt from the Inventory.
Korea Existing Chemicals Inv. (KECI):	One or more components in this product are not listed on or exempt from the Inventory.
Canada NDSL Inventory:	One or more components in this product are not listed on or exempt from the Inventory.
Philippines PICCS:	One or more components in this product are not listed on or exempt from the Inventory.
US TSCA Inventory:	All components in this product are listed on or exempt from the Inventory.
New Zealand Inventory of Chemicals:	One or more components in this product are not listed on or exempt from the Inventory.
Japan ISHL Listing:	One or more components in this product are not listed on or exempt from the Inventory.
Japan Pharmacopoeia Listing:	One or more components in this product are not listed on or exempt from the Inventory.

16.Other information, including date of preparation or last revision

Revision Date:	09/29/2015
Version #:	1.0
Further Information:	No data available.
Disclaimer:	For Industrial Use Only. Keep out of Reach of Children. The hazard information herein is offered solely for the consideration of the user, subject to their own investigation of compliance with applicable regulations, including the safe use of the product under every foreseeable condition.

ATTACHMENT 4.3.4

TECHNICAL INFORMATION ON DURAL MMA Concrete Healer/Sealer

COATINGS - TRAFFIC DECK
Master Format #: 07 18 16

DURAL MMA HEALER/SEALER

METHYL METHACRYLATE PENETRATING SEALER

EUCLID CHEMICAL

PACKAGING

Dural MMA Healer/Sealer

1 gal (3.79 L) unit
Code: 044HS 01

5 gal (18.9 L) unit
Code: 044HS 05

50 gal (189 L) unit
Code: 044HS 50

Dural MMA Initiator

Initiator is required but sold separately due to varying quantity needed depending on jobsite conditions. See the chart under "Mixing" for estimating required quantity to order.

CLEAN UP

Clean tools and application equipment immediately with acetone, xylene, or MEK. Clean spills or drips with the same solvents while still wet. Hardened DURAL MMA HEALER/SEALER will require mechanical abrasion for removal.

SHELF LIFE

1 year in original, unopened, properly stored containers.

DESCRIPTION

DURAL MMA HEALER/SEALER is a 100% reactive ultra-low viscosity methyl methacrylate resin used as a penetrating crack healer/sealer or to fortify extremely porous concrete substrates. DURAL MMA HEALER/SEALER is typically used on bridge decks, parking structures or as a general penetrating sealer to prevent moisture intrusion. DURAL MMA HEALER/SEALER is a reactive methacrylate resin, which hardens rapidly with the addition of DURAL MMA HEALER/SEALER INITIATOR, even at low temperatures.

PRODUCT CHARACTERISTICS

FEATURES/BENEFITS

- Rapid cure, minimizes down time
- Use over wide temperature range - even below freezing
- Full cure in less than 60 minutes
- Ultra-low viscosity for excellent absorption into concrete
- Protects against water penetration into hairline cracks
- Low VOC content - 69 g/L

PRIMARY APPLICATIONS

- Parking decks
- Bridge decks
- Loading docks
- Warehouses

APPEARANCE

DURAL MMA HEALER/SEALER is clear to light amber.

COVERAGE

Coverage rate is approximately 80 to 100 ft²/gal per coat (1.96 to 2.45 m²/L per coat). Coverage rate will vary depending on the porosity of the concrete and quantity of cracks. Assume two coats on very absorbent surfaces.

Note: Coverage rates are approximate. Actual coverage depends on temperature, texture, and substrate porosity.

TECHNICAL INFORMATION

The following are typical values obtained under laboratory conditions. Expect reasonable variation under field conditions.

Test Method	Test Property	Values
ASTM C1583	Bond Strength	> 300 psi (2.1 MPa)
ASTM C579	Compressive Strength, 7 days	12,500 psi (86.2 MPa)
ASTM C790	Flexural Strength, Final	11,000 psi (75.8 MPa)
ASTM 2240	Hardness, Shore D	> 80 min
N/A	Precent Reactive	100%
N/A	Recoat Time	25 to 60 minutes
ASTM D638	Tensile Elongation	4.5 to 5.0%
ASTM D638	Tensile Strength, Final	> 7,800 psi (53.8 MPa)
N/A	Viscosity (mixed) Brookfield Viscometer, Model RVT	5 to 15 cps
ASTM D570	Water Aborption, 24 hour	0.50%
N/A	Working Life Varies w/ temperature & hardener addition	5 to 25 minutes

WARRANTY: The Euclid Chemical Company ("Euclid") solely and expressly warrants that its products shall be free from defects in materials and workmanship for one (1) year from the date of purchase. Unless authorized in writing by an officer of Euclid, no other representations or statements made by Euclid or its representatives, in writing or orally, shall alter this warranty. EUCLID MAKES NO WARRANTIES, IMPLIED OR OTHERWISE, AS TO THE MERCHANTABILITY OR FITNESS FOR ORDINARY OR PARTICULAR PURPOSES OF ITS PRODUCTS AND EXCLUDES THE SAME. If any Euclid product fails to conform with this warranty, Euclid will replace the product at no cost to Buyer. Replacement of any product shall be the sole and exclusive remedy available and buyer shall have no claim for incidental or consequential damages. Any warranty claim must be made within one (1) year from the date of the claimed breach. Euclid does not authorize anyone on its behalf to make any written or oral statements which in any way alter Euclid's installation information or instructions in its product literature or on its packaging labels. Any installation of Euclid products which fails to conform with such installation information or instructions shall void this warranty. Product demonstrations, if any, are done for illustrative purposes only and do not constitute a warranty or warranty alteration of any kind. Buyer shall be solely responsible for determining the suitability of Euclid's products for the Buyer's intended purposes.

DIRECTIONS FOR USE

Surface Preparation: The surface must be structurally sound, clean and free of grease, oil, curing compounds, soil, dust and other contaminants. New concrete and masonry must be at least 28 days old. Surface laitance must be removed. Concrete surfaces must be roughened and made absorptive, preferably by mechanical means, and then thoroughly cleaned of all dust and debris. Expose surface cracks and clean out cracks with oil-free compressed air. If cracks have latent moisture, use a propane torch to flame the concrete at a rate of 10 feet per minute or as needed to dry out cracks. Allow surface to cool to ambient temperature, then immediately begin to apply sealer. Do not apply if there is excessive moisture in the concrete or if the moisture vapor emission rate (MVER) is high. Contact Euclid Chemical if results indicate a MVER greater than 3.0 lbs. per 1,000 square feet per 24 hours. After surface preparation and moisture testing, a test section application of the healer/sealer is recommended to confirm good adhesion and compatibility of the healer/sealer with the surface, and also to confirm appearance and aesthetics.

Mixing: DURAL MMA HEALER/SEALER requires the addition of DURAL MMA HEALER/SEALER INITIATOR to start the hardening process. After adding the INITIATOR to the resin, use a low-speed drill and mixing paddle and mix for 2 minutes. The amount of Initiator must be adjusted to the respective surface temperature (see table below).

DURAL MMA HEALER / SEALER RESIN			
Temp of Resin, Air & Floor	**Initiator, Volume oz/gal**	**Working life, mins**	**Hardening Time, mins**
+40 °F (4 °C)	13 vol. oz	15	60
+50 °F (10 °C)	9 vol. oz	12 to 16	45 to 50
+60 °F (16 °C)	6 vol. oz	15 to 20	45 to 50
+70 °F (21 °C)	4 vol. oz	15 to 20	45 to 50
+80 °F (27 °C)	2* vol. oz	20 to 25	45 to 50
+90° to 105°F (32° to 41°C)	2* vol. oz	5 to 10	25 to 30

***Note:** Do not use less than 2 vol. oz. of DURAL MMA HEALER/SEALER INITIATOR

***Note:** There are 124 vol. oz. per 5 lb. box of DURAL MMA HEALER/SEALER INITIATOR

Application: Inspect underside of elevated decks for evidence of full depth cracks that may require additional treatment to prevent draining of resin. Cracks greater than 1/8" width should be repaired individually prior to application of flood coat. Fill 1/8" or larger cracks with loose sand and pour small quantity of mixed DURAL MMA HEALER/SEALER into the crack and spread with a paint brush, allow to cure before applying flood coat. DURAL MMA HEALER/SEALER is spread evenly on the surface as a flood coat with a squeegee or rollers and allowed to absorb completely into the concrete substrate. Do not allow to form puddles. There should be very little resin film on the surface upon completion. Some applications may require the broadcast of silica sand at an approximate rate of 0.2 to 0.8 lbs/ft^2 (0.98 to 3.9 kg/m^2) and/ or until there are no wet spots. Wait until at least 15 minutes has elapsed since the DURAL MMA application before broadcasting aggregate, but broadcasting must be completed before DURAL MMA has become tack free. Before opening to traffic, remove any loose aggregate and verify that the skid resistant properties are adequate for the intended purpose of the substrate. Apply subsequent applications of resin only after the previous application is completely hardened.

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PRECAUTIONS/LIMITATIONS

- Store DURAL MMA HEALER/SEALER indoors, out of direct sunlight, protected from moisture, at temperatures below 80°F (26 °C).
- Do not store near open flame or food.
- After extended storage: Additives and fillers can separate with storage, materials should be inspected for any visible signs of settlement, polymerization, or paraffin coagulation (clumps, strands).
- Do not thin DURAL MMA HEALER/SEALER.
- Adequate cross ventilation should be provided. Good ventilation during the processing ensures a good cross linking and hardening.
- Application of a test area is recommended to confirm final appearance and texture of the system with the end user.
- In all cases, consult the product Safety Data Sheet before use.

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ATTACHMENT 5

PERSONNEL RESPONSIBILITIES AND TRAINING

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Attachment 5.2 .....ETSD Job Description 5.2-1

A. INTRODUCTION

Excel TSD of Tennessee, L.L.C. ("ETSD" or the "Facility") operates a hazardous waste storage and treatment facility and receives a wide variety of both hazardous and non- hazardous wastes. Many of the materials handled by the Facility pose a significant threat to human health and/or the environment if they are improperly managed. ETSD's operations are subject to stringent regulatory requirements by both Federal and State agencies under the hazardous waste management programs, occupational safety and health programs, hazardous materials transportation programs, etc. Therefore, it is imperative that facility operators and personnel receive training that teaches them to perform their job safely and satisfactorily, effectively performing their duties while minimizing potential for release of hazardous materials into the environment and any exposure to themselves and others by proper use of personal protective equipment and engineering controls.

B. PERSONNEL TRAINING – GENERAL

Facility personnel must complete a program of classroom instruction or on-the-job training ("0JT") that teaches them to perform their duties in a way that ensures ETSD's compliance with the requirements of Tennessee Rule 0400-12-01-.06(2)(g) [equivalent to 40 CFR §264.16]. Additionally, facility personnel must receive Hazardous Waste Operations and Emergency Response ("HAZWOPER") training as required by 29 CFR§1910.120. All new ETSD personnel must successfully complete this training within six months of initial employment or assignment to a new position. The contents of the training program(s) are described in Attachment 5.1.

The level of training required of ETSD is summarized in the following table:

Level of Training Required

↓Topic \ Personnel →	OP	SS	STP	LS
Hazardous Waste Management Regulations	Summary	Detail	Detail	Summary
Hazardous Waste Handling and Operations	Detail	Detail	Detail	Detail
Reports and Record-Keeping	Summary	Detail	Detail	Detail
Personnel Safety	Detail	Detail	Detail	Detail
Spill Prevention and Emergency Response	Detail	Detail	Detail	Summary
Inspections	Summary	Detail	Detail	Summary
Equipment	Detail	Detail	Summary	Summary
Train-the-Trainer	N/A	Detail	Detail	N/A

OP = Operations Personnel: Process and Assistant Process Operators

SS = Supervisory Staff: Laboratory Manager, Operations Manager, and Compliance Manager.

STP = Safety and Training Personnel: Safety Director and Facility Manager.

LS = Laboratory Staff: Laboratory Technicians, Chemists.

To augment classroom instruction, ETSD provides OJT performed under the direction of a trained supervisor. OJT is structured to provide specific standards for job performance. Acceptable employee performance is based on his/her ability to apply classroom knowledge to the actual job situation. The ETSD training program uses a variety of teaching aids to facilitate the employees learning to include introductory and specialized courses, exams, handouts, laboratory observation, visual aids, films, etc. Completion of training programs are documented and retained in each employee's file. Personnel who serve as on-site emergency responders will receive HAZWOPER training as required by 29 CFR §1910.120. Personnel will not be required or allowed to respond to spills or emergencies until they have completed this training. ETSD training records identify the personnel who have completed this training.

In addition to the detailed introductory training, ETSD also implements a program of continuing training of all personnel involved in the management of hazardous wastes. This also is comprised of both classroom instruction and OJT. Such persons will undergo an annual refresher classroom training course. A more detailed description of ETSD's personnel training program is included as Attachment 5.1.

C. QUALIFICATIONS/RESPONSIBILITIES OF TRAINING DIRECTOR

ETSD combines the responsibilities of Training Director and Safety Director and refers to that person as Safety Director. It is the responsibility of the Safety Director ("SD") to identify the specific training needs for each employee and oversee the training programs. The SD must be proficient in hazardous waste management procedures, facility operations, have extensive knowledge of all emergency response procedures, and be aware of all applicable health and safety requirements.

The responsibilities of the Safety Director include:

- Assessment of training requirements.
- Development of training plans and forecasts.
- Approval of courses developed and presented to contractors.
- Preparation and approval of all announcements and schedules of courses to be presented.
- Approval of rosters of employees to attend training courses.
- Maintenance of records of training activities.

D. Maintenance of Training Records

The training records are kept in the individual employee's file and are maintained by the Office Manager or his/her designee. Documentation that the required training has been completed for each employee includes:

- Written description of the type and amount of training;
- Completion dates
- Job title and written job description
- Trainee's signature

The SD or Operations Manager is responsible for reviewing personnel training records to determine which individuals have not completed training or which are approaching their annual refresher training date. The SD or Operations Manager notifies the individual's supervisor and provides the dates of the next available required training course. The following is a listing of information used to identify the type of training required for the specific job function.

- Job title and name of employee filling job.
- Written job description.
- Required qualifications (e.g., skill, education, etc.).

At a minimum, training records on personnel are maintained until either completion of Facility closure or three years from the date of their termination of employment with ETSD, whichever comes first.

ATTACHMENT 5.1

ETSD TRAINING PROGRAM OUTLINE

PERSONNEL TRAINING PROGRAM

1.0. OVERVIEW

1. Ensuring Personnel safety
2. Protection of human health and the environment
3. Compliance with regulatory requirements
4. Efficient operations

These objectives have been established to ensure the health and safety of Excel TSD of Tennessee, LLC ("ETSD") personnel.

The ETSD facility is separated into various operational areas. This approach provides entry level employees the opportunity to progress in ETSD's organization after completion of training and demonstration of proficiency in each operational area. The operational areas have been categorized into the following:

- Administration - involved with receiving, shipping, manifests, record- keeping, inventory, regulatory matters, and accounting.
- Plant operations - involved with management, supervision, maintenance, training, and operation of processing units and equipment.
- Laboratory - conducting quality control analysis on incoming and outgoing waste streams and products.

The following presents the ETSD training program and its implementation at the facility. Training is provided to all employees and it covers general safety requirements of the facility and specifics for each job function. The training also establishes requirements for the safe and efficient job performance by each employee.

1.1. Training Requirements

The ETSD hazardous waste management program is comprehensive, covering a wide range of individuals with varying job responsibilities and levels of involvement. Accordingly, training is tailored to meet the specific needs for each job function.

The Safety Director identifies the personnel involved in hazardous materials handling and ensures

that each individual receives the necessary training.

1.2. Training Program

Each new employee is placed on a 90-day probationary period. When an employee is introduced to his/her job area, each is assigned to a shift supervisor or other personnel who has completed the required training. Depending on the experience of the new employee, introductory training and job familiarization can be provided by a qualified designee in lieu of the Safety Director. Until the new employee has had sufficient training in the work area, the employee remains under constant and direct supervision.

The training program consists of two phases; 1) involving introductory training for new workers and 2) continuing training for experienced employees. Each of these phases includes both classroom and on-the-job aspects and is described in more detail in the following sections.

1.2.1. Introductory Training

Introductory training consists of a combination of classroom training and on-the-job- training (OJT). The classroom training provides direct, formal instruction on necessary actions and requirements of the employee's specific job. The OJT demonstrates to the employee how to apply the knowledge obtained in the classroom to the specific job function. Introductory training is primarily intended for new workers, but at times, experienced employees will be enrolled as part of ETSD's periodic retraining efforts. The training programs are developed and implemented under direction of the Safety Director.

In addition to training courses, operational procedures ("OP") have been developed for the processes performed at ETSD. The OP contains waste and hazardous waste definitions, responsibilities of the operators, supervisors, maintenance crew, and laboratory staff. The procedures also contain details on loading/unloading activities, manifesting of wastes/hazardous wastes, inspections, sampling, and testing.

Additional training supplements include specialized courses, literature, laboratory experience, visual aids, field study, and other formal learning tools.

OJT provides instruction in procedures specific and unique to each job function. This instruction will be provided by a fully trained supervisor. Until completion of this training, personnel shall only perform jobs when supervised. The OJT will require strict adherence to the operational procedures developed for the safe and effective management and control of operations. Outlines of the OJT topics for Loading/ Unloading Operations and Process Operations are provided as Tables 5.A-3 and 5.A-4.

1.2.2 Continuing Training

Periodic classroom training is also provided to all employees involved in hazardous waste management operations. This includes annual classroom refresher training which overviews the courses described in Sections 2.1 and 2.2 below and focuses on specific topics which Facility managers or the Safety Director have determined need to be stressed. Additional classroom training sessions, specific workplace task demonstrations, or one-on-one OJT will also be held as deemed necessary by Facility managers or the Safety Director to address actual or potential performance problems or observed personnel weaknesses.

2.0 CLASSROOM TRAINING PROGRAMS

All new personnel must attend classroom training to receive direct, formal instruction on hazardous waste management and handling procedures pertinent to the employee's specific job responsibilities. The ETSD training program includes at a minimum three different classroom programs.

- Hazardous Waste Management Training Program
- Emergency Response Training Program
- Train-the-Trainer Courses

2.1 Hazardous Waste Management Course

The syllabus of the ETSD hazardous waste management training program is presented in Table 5.A-1. All personnel handling hazardous waste will complete the training course within six months of their date of hire. These personnel also receive an annual eight-hour refresher training course.

The training program is designed to identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations.

This program incorporates the following:

- Hazardous waste identification.
- Implementation of the contingency plan
- Hazardous waste laws, regulations, and policies.
- Health and environmental problems and safety.
- Hazardous waste identification and classification.
- Labeling and packaging requirements.
- Hazardous waste handling and storage.
- Performing Facility inspections
- Utilizing the Facility's alarm and communications systems
- Hazardous waste transportation (including U.S. DOT hazardous materials transportation regulatory requirements)

2.2 Emergency Response Training Course

The emergency response training provides specific information to each employee on the emergency response team depending upon his/her duties. This includes, but is not limited to, training on pertinent aspects of OSHA/TOSHA Hazard Communication standards, use of personal protective equipment ("PPE"), use and testing/maintenance of fire extinguishers, and decontamination procedures. Before an employee can be a member of the emergency response team, completion of all training must occur. Additionally, the knowledge obtained must be demonstrated during OJT.

The syllabus of the hazardous waste clean-up course is presented in Table 5.A-2. In addition to the basic course material, supplemental materials are presented.

First Responder Training

First responders are trained to respond to material releases in a defensive manner and they are not responsible for stopping the release. Their function is to contain the release from a safe distance

and prevent human exposure. A minimum of 8 hours training will be provided to a first responder in the following areas:

- Knowledge of the basic hazard and risk assessment techniques;
- Implementation of the contingency plan;
- Know how to select and use proper personal equipment provided to the first responder operational level;
- Understand basic hazardous materials terms;
- Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment (PPE) available;
- Know how to implement basic decontamination procedures.

All employees who receive emergency response training will receive annual refresher training to present any new material and ensure that their expertise is maintained.

Hazardous Materials Technician Training

Hazardous materials technicians are individuals who respond to releases in an offensive fashion. Their job is to prevent or stop the release of the waste. In addition to all previous training, hazardous materials technicians are provided the 40-hour hazardous waste clean-up training. The completion of the course provides the technician expertise in the following areas:

- Implementation of ETSD's contingency plan.
- Classification, identification and verification of known and unknown materials by use of field survey instruments and equipment.
- Selection and proper use of specialized chemical Personal Protective Equipment ("PPE").
- Hazard and risk assessment techniques.
- Performance of advance control, containment, and/or confinement operations within the capabilities of the resources and available PPE.
- Implementation of decontamination and termination procedures.
- Basic chemical and toxicological terminology and behavior.

Hazardous Materials Specialist Training

Hazardous materials specialists are individuals who respond with and provide support to

hazardous materials technicians. Their duties parallel those of the hazardous materials technicians, but require specific knowledge of the various substances, which could be released. They serve as a liaison with Federal, State, local and other government authorities. Hazardous materials specialists are provided the 40-hour hazardous waste cleanup course training and must demonstrate competency in the following areas:

- Implementation of contingency plan.
- Classification, identification and verification of known and unknown materials by using field survey instruments and equipment.
- State emergency response plan.
- Selection and use proper specialized chemical personal protective equipment ("PPE") provided to hazardous materials specialist.
- Hazard and risk assessment techniques.
- Control, containment, and/or confinement operations within the capabilities of the resources and available PPE.
- Determination and implementation of decontamination procedures.
- Development of a site-safety and control plan.
- Basic chemical and toxicological terminology and behavior.

On-Scene Incident Commander Training

The Incident Commander (IC), assumes control of the release site and is responsible for the participating personnel and their actions. Each IC also must demonstrate competency in the following areas:

- Implementation of ETSD's incident command system and contingency plan.
- Hazards and risks associated with employees working in chemical protective clothing.
- Implementation of the local emergency response plan.
- State emergency response and/or the Federal Response Team.
- Knowledge and understanding of the importance of decontamination procedures.

2.3 Train-the-Trainer Course

The objective of the `Train-the-Trainer" course is to instruct selected personnel (supervisors, foreman, etc.,) in the use of the Hazardous Waste Facility Operator's Course training modules. The Safety Director instructs the course and ensures proficiency is demonstrated. Once the training is

completed, these personnel will be qualified to present introductory training to new employees.

2.4 First Aid / CPR Training Course

Selected ETSD personnel will undergo the American Red Cross training program for Standard First Aid/CPR. Upon completion of the training, personnel will be tested and certified.

3.0 TRAINING PROGRAM ADMINISTRATION

Administration of the training program involves activities in record keeping, program audit and review. These efforts are necessary to assure that the training program complies with the regulatory requirements. OJT objectives and completion of each training area are documented and retained in the employee's file. Records are retained until the facility closes. Employee training records will be kept by the Office Manager or his/her designee and maintained at the facility. Training records on current employees will be kept until facility closure and records on former employees will be kept for a minimum of three years. These records will include:

- Employee name.
- Job title (Attachment 5.1).
- Job description, and duties assigned (Attachment 5.1).
- Required qualifications (Attachment 5.1).
- Written description of type and amount of both introductory and continuing training (Attachment 5.1).
- Documentation of completion of necessary training.

4.0 MEDICAL SURVEILLANCE

4.1 General

Medical surveillance is provided to all employees who are or may be exposed to hazardous substances or health hazards at or above permissible exposure limits (PELs), including a physical examination and medical surveillance annually.

The examination includes a medical and work history evaluation. The exam focuses on symptoms related to the handling of hazardous substances and "fitness for duty", such as the ability to wear

any required PPE. The results of the medical examination are made available to employees when requested. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician knowledgeable in occupational medicine. The exam is provided without cost to the employee, without loss of pay, and at a reasonable time and place.

The medical examination shall be made available:

- Prior to assignment.
- At least once per year, unless the attending physician believes a shorter or longer interval (not greater than annually) is appropriate.
- At termination of employment or reassignment to an area where the employee would not be covered, if the worker has not had an exam within the last six months.
- As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances, or that the employee has been injured or exposed above the acceptable limits in an emergency situation.

4.2 Information Made Available to the Physician

- A description of the employee's duties as they relate to the employee's exposures;
- A description of any personal protection equipment used or to be used; and,
- Information from previous medical examinations or exposures of the employee which is not readily available to the examining physician.

4.3 Physician's Written Opinion

ETSD shall obtain and furnish the employee, if requested, with a copy of a written opinion from the attending physician containing the following:

- The physician's opinion will state if there are any detected medical conditions which would place the employee at an increased health risk while performing his/her job.
- The physician's recommended limitations upon the employee's assigned work.
- The results of the medical examination and tests if requested by the employee.
  A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which may require further examination or treatment.

4.4 Medical Record-Keeping

An accurate record of the medical surveillance shall be retained until the Facility closes. The record shall include the following information:

- The employees name and social security number;
- Physician's written opinions, recommended limitations, and results of examinations and tests;
- Any employee medical complaints related to exposure to hazardous substances;
- A copy or description of the information provided to the examining physician by ETSD.

5.0 TRAINING PROGRAM REVIEW AND AUDIT

The Safety Director will review and audit training activities annually to attempt to ensure that the training program is being properly and effectively implemented. At a minimum, this audit will review the following areas:

- Overall program effectiveness
- Identification of personnel requiring training.
- Identification of specific classroom and job site training requirements (including introductory training and training updates) for various personnel.
- Conformance of training provided to employees with their training needs.
- Qualification and training of instructors.
- Procedures to prevent unsupervised work by employees who have not completed the required training.

Accuracy and completeness of training records.

As part of this annual audit, the training program is to be reviewed at least annually and updated as deemed necessary. When problems are identified, more frequent review may be conducted until the Safety Director is satisfied that the issue has been resolved.

TABLE 5-1
SYLLABUS FOR 24-HOUR HAZARDOUS WASTE MANAGEMENT COURSE

- Employee rights and responsibilities under OSHA and CERCLA.
- Overview of relevant topics such as, but not limited to; chemical exposures, biological exposures, fire and explosion hazards, heat and cold exposures.
- General safety hazards including those associated with electrical hazards, powered equipment, and walking-working surfaces.
- Confined space hazards and procedures.
- Overview of the principles of toxicological and biological monitoring.
- "Hands-on" field exercises and demonstrations.
- A review of ETSD's training program and the personnel responsible for that program.
- Overview of ETSD's Emergency Response Plan and procedures including first- aid.
- A review of ETSD's waste handling procedures including the materials handling program and the spill containment program.
- A review of ETSD's Hazard Communication Program.
- Work practices that will minimize employee risk from workplace hazards.
- Implementation of the contingency plan.
- Spill response, cleanup and decontamination.
- Fire and explosion response.
- Final Examination.

TABLE 5-2
SYLLABUS FOR HAZARDOUS WASTE CLEANUP COURSE

- Employee rights and responsibilities under OSHA and CERCLA
- Overview of the principles of toxicological, biological monitoring, and chemical exposures to hazardous substances.
- Use of monitoring equipment with hands-on practice and an overview of a site monitoring program.
- Overview of site hazards including fire and explosion, confined space, oxygen deficiency, electrical hazards, powered equipment hazards, walking-working surface hazards.
- The contents of an effective site safety and health plan.
- Use of personal protective equipment and the implementation of the personal protective equipment program.
- Work practices that will minimize employee risk from site hazards.
- Site simulations with "hands-on" exercises and practice.
- Emergency response planning and response including first- aid.
- Content of the medical surveillance program and requirements, including the recognition of signs and symptoms of overexposure to hazardous substances.
- Decontamination programs and procedures.
- Safe use of engineering controls and equipment.
- Sources of references and efficient use of relevant manuals and knowledge of hazard coding systems.
- Truck loading/unloading procedures.
- Implementation of the contingency plan
- Final Examination.

TABLE 5-3
OJT PROGRAM FOR LOADING/UNLOADING ACTIVITIES

- Standard loading and unloading procedures.
- Safety precautions and procedures for handling wastes and hazardous wastes.
- Site Safety Plans.
- Safe use of tools, equipment, machinery, and vehicles.
- Chemical safety.
- Communication or Alarm Systems.
- Testing requirements and procedures.
- Tank gauging techniques.
- Hazardous waste manifest procedure.
- Waste sampling procedures.
- Transportation requirements.
- Regulatory agency requirements.
- Review of material safety data sheets.
- Basic first aid.
- Basic fire-fighting technique.
- Basic pump operation.
- Truck loading/unloading procedures.
- Emergency procedures associated with the loading area.
- Field performance testing.
- Contingency plan implementation

TABLE 5-4
OJT PROGRAM FOR PROCESS OPERATIONS

- Equipment operational procedures.
- Safety precautions and procedures for handling wastes and hazardous wastes.
- Basic first aid.
- Added fire fighting techniques.
- Communications or Alarm Systems.
- Response to fires and explosions.
- Standard unit operation procedures.
- Basic pump operation.
- Site Safety plans.
- Safe use of tools, equipment, and machinery.
- Additional fire-fighting techniques and equipment operation.
- Chemical safety.
- Key parameters for automatic waste feed cut-off systems.
- Shutdown of operations.
- Response to groundwater contamination incidents.
- Emergency procedures associated with process operations.

ATTACHMENT 5.2

ETSD JOB DESCRIPTIONS

Excel TSD, Inc. is equivalent to Excel TSD
of Tennessee, LLC within this attachment

EXCEL TSD, INC.
POSITION DESCRIPTION

TITLE:	Operations Manager
LOCATION:	Memphis, TN
DEPARTMENT:	Facility
REPORTS TO:	Facility Manager / General Manager
POSITION DESCRIPTION:	This position is full time exempt with a normal work schedule of 7:00 AM to 4:00 PM. The individual is required to carry a pager when off duty. The position has direct supervisory responsibility for Lead Process Person(s) and process workers. Individual(s) in the position who meet the qualifications would be considered promotable to Facility or Division level management positions.

SUMMARY OF POSITION'S PRIMARY PURPOSE OR CONTRIBUTION TO THE ORGANIZATION:

Provides management of the receipt, processing, storage and disposal of customer generated wastes. Essential member of the Facility Management Team and performs management input for the direction of the Facility.

Essential duties and responsibilities include the following with other duties assigned as required:

1. Reviews orders and schedules to ascertain data such as types, quantities and specifications of material and scheduled dates in order to plan department operations
2. Plans production operations establishing priorities and sequences of for processing
3. Prepares operational schedules and coordinates activities to ensure production and quality standards are met
4. Reviews production and operating reports and resolves operational and maintenance problems to ensure minimum casts and prevent delays
5. Inspect machines and equipment to ensure specific operational performance and optimize utilization
6. Performs inventory control and optimization of resources
7. Sets long and short term objectives for the area of responsibilities and evaluates actual performances to objectives
8. Serves as hiring manager for positions within area of responsibility and provides review of hiring needs
9. Initiates, reviews and approves standard operating procedures
10. Ensures safety, housekeeping, environmental and operational standards are met in the facility
11. Ensures assigned employees are trained and evaluates their proficiency
12. Checks and ensures all assigned employees are following accepted standard procedures
13. Resolves work place problems and personnel matters and assists employees in resolving problems
14. Plans and schedules vacations for employees assigned to area of responsibility

Essential requirement for individuals entering and/or maintaining the position are representative of the knowledge, skills, education, and experience of others in the position and/or established by regulations, permits and/or contractual agreements.

EDUCATION REQUIRED:	High School Graduate or General Equivalency Degree (GED).
EXPERIENCE REQUIRED:	The position requires a minimum of four years of experience in a similar management position or combination of positions in the hazardous waste management or process industry.
LANGUAGE SKILLS:	Ability to read, analyze, and interpret the most sensitive and complex documents using the English language. Ability to make effective presentations to top management and/or the public.
MATHEMATICAL SKILLS:	Ability to do basic math (add, subtract, etc.) using whole numbers, common fractions and decimals. Ability to apply concepts such as fractions, percentages, ratios and proportions to practical situations.
REASONING SKILLS:	Ability to apply principles of logical or scientific thinking to a wide range of problems. Ability to deal with a variety of abstract and concrete variables.

Physical demands of the position are representative of those required by individuals who successfully perform the essential duties and responsibilities of the position. Individuals must be able to wear all applicable personal protective equipment in accordance with federal regulations (when applicable).

The position requires that the individual occasionally stand in a stationary position; walk from one location to another; sit at a work station; climb/balance; stoop, kneel, crouch or crawl and reach with hands/arms. The position also requires that the individual routinely talk/hear activities in the work area and use hands/fingers. The position requires that the individual occasionally lift and/or apply force up to 25 Lb.

The position requires that the individual occasionally work in wet/humid conditions (non-weather) and be exposed to the risk of electrical shock. The individual also routinely work near or around moving mechanical parts; work near or around fumes or airborne particles, and be exposed to mechanical vibrations in the environment. Position requires that the individual routinely be exposed to a moderate noise environment.

Position requires that the individual be medically monitored and 24-Hour trained in RCRA, OSHA, and DOT Regulations.

EXCEL TSD, INC.
POSITION DESCRIPTION

TITLE:	Laboratory Manager
LOCATION:	Memphis, TN
DEPARTMENT:	Facility
REPORTS TO:	Technical Service Manager
POSITION DESCRIPTION:	This position is full time exempt with a normal work schedule of 8:00 AM to 5:00 PM. The individual is sometimes required to carry a pager when off duty. The position has direct supervisory responsibility for Laboratory Chemist and Laboratory Technician positions. Individual(s) in the position who meet the qualifications would be considered promotable to the Facility or Corporate level management positions.

SUMMARY OF POSITION'S PRIMARY PURPOSE OR CONTRIBUTION TO THE ORGANIZATION:

Manages the chemical analysis and waste approval for material sent to and leaving the Facility and provides technical support to the customer, Facility and Sales. Essential member of the Facility's Management Team and performs management input for the direction of the Facility.

Essential duties and responsibilities include the following with other duties assigned as required:

1. Plans, coordinates, and directs programs for analysis and testing of incoming and outgoing wastes for compliance to regulatory requirements using appropriate sampling plans
2. Reviews testing, quality control and operational reports to ensure standards, efficiency and schedules are met
3. Interprets results of laboratory activities and recommends actions based on results
4. Plans, coordinates, and directs the maintenance and calibration programs for laboratory instruments and equipment
5. Interfaces with sales and customer representatives on waste approval/rejection based upon results of sampling
6. Inspects facility and makes recommendations to ensure environmental compliance. Also evaluates and helps audit outside facilities
7. Performs budget preparation, administration, and control for the area of responsibility
8. Sets long and short term objectives for the area of responsibility and evaluates actual performance to objectives
9. Ensures safety, housekeeping, environmental and operational standards are met in the facility
10. Checks and ensures all assigned employees are following accepted standard procedures
11. Resolves work place problems and personnel matters and assists employees in resolving problems
12. Plans and schedules vacations for direct report employees

Essential requirement for individuals entering and/or maintaining the position are representative of the knowledge, skills, education, and experience of others in the position and/or established by regulations, permits and/or contractual agreements.

EDUCATION REQUIRED:	Bachelors Degree from and accredited United States college or university specializing in Engineering, Physical Sciences, Health Sciences, or a related discipline.
EXPERIENCE REQUIRED:	The position requires a minimum of two years of experience in a similar management position or combination of positions in the hazardous waste management or process industry.
LANGUAGE SKILLS:	Ability to read, analyze, and interpret the most sensitive and complex documents using the English language. Ability to make effective presentations to top management and/or the public is desireable.
MATHEMATICAL SKILLS:	Ability to do basic math (add, subtract, etc.) using whole numbers, common fractions and decimals. Ability to apply concepts such as fractions, percentages, ratios and proportions to practical situations.
REASONING SKILLS:	Ability to apply principles of logical or scientific thinking to a wide range of problems. Ability to deal with a variety of abstract and concrete variables.

Physical demands of the position are representative of those required by individuals who successfully perform the essential duties and responsibilities of the position. Individuals must be able to wear all applicable unmodified personal protective equipment in accordance with federal regulations (when applicable).

The position requires that the individual occasionally stand in a stationary position; walk from one location to another; sit at a work station; climb/balance; stoop, kneel, crouch or crawl and reach with hands/arms. The position also requires that the individual routinely talk/hear activities in the work area and use hands/fingers. The position requires that the individual occasionally lift and/or apply force up to 25 Lb.

The position requires close vision, distance vision, color vision, peripheral vision, depth perception, and the ability to adjust focus.

Work environment characteristics of the position are representative of those encountered by an individual while performing the essential duties and responsibilities of the position. The position require that the individual occasionally work near or around fumes or airborne particles, work near or with toxic or caustic chemicals; be exposed to outdoor weathers. Position requires that the individual routinely be exposed to a moderate noise environment.

Position requires that the individual be medically monitored and 40-Hour OSHA trained, with familiarity in RCRA and DOT Regulations.

EXCEL TSD, INC.
POSITION DESCRIPTION

TITLE:	Laboratory Chemist/Technician
LOCATION:	Memphis, TN
DEPARTMENT:	Facility
REPORTS TO:	Laboratory Manager
POSITION DESCRIPTION:	This position is full time nonexempt with a normal work schedule of 8:00 AM to 5:00 PM. Individual(s) in the position who meet the qualifications would be considered promotable to the Facility level management positions.

SUMMARY OF POSITION'S PRIMARY PURPOSE OR CONTRIBUTION TO THE ORGANIZATION:

Conducts and/or monitors chemical and physical laboratory tests of waste and analyzes test data. Provides overall guidance of the laboratory's daily operations for adherence to generally accepted practices. Performs anaylsis of samples and organizes results for submission to Facility Managment.

Essential duties and responsibilities include the following with other duties assigned as required:

1. Sets up laboratory equipment and instrumentation required for tests, research or process control. Also operates and perofrms analysis on samples
2. Tests and analyzes (or directs) incoming and outgoing wastes using approved samplings plans for compliance with regulations and permits
3. Documents results of tests and analyses and provides information to Facility management
4. Prepares chemical solutions for use in processing materials following standardized formulas or experimental procedures
5. Monitors and maintains the Facility's QA/QC programs
6. Monitors and maintains laboratory programs for maintenance and calibration of laboratory instruments and calibration
7. Performs or directs irregular sampling and testing as requested by Facility Management
8. Develops and maintains laboratory standard operating procedures and provides technical expertise in the development of other procedures as requested
9. Maintains safety, housekeeping, environmental and operational standards are met in the facility
10. Serves as integral member of the Laboratory Team
11. Responsible for sample disposition and disposal
12. Cross-trained in operations to provide additional/overflow help as needed

Essential requirement for individuals entering and/or maintaining the position are representative of the knowledge, skills, education, and experience of others in the position and/or established by regulations, permits and/or contractual agreements.

EDUCATION REQUIRED:	High School graduateor General Equivalency Diploma (GED) for Technician position or university specializing in Chemistry, or a related discipline.
EXPERIENCE REQUIRED:	The position requires a minimum of one year of experience in a similar position or combination of positions in the hazardous waste management or process industry.
LANGUAGE SKILLS:	Ability to read, analyze, and interpret the most sensitive and complex documents using the English language. Ability to make effective presentations to top management and/or the public.
MATHEMATICAL SKILLS:	Ability to do basic math (add, subtract, etc.) using whole numbers, common fractions and decimals.
REASONING SKILLS:	Ability to interpret a variety of insructions furnished in written, oral, diagram, or schedule form. Ability to solve practical problems with a variety of concrete variables with limited guidelines.

Physical demands of the position are representative of those required by individuals who successfully perform the essential duties and responsibilities of the position. Individuals must be able to wear all applicable unmodified personal protective equipment in accordance with federal regulations (when applicable).

The position requires that the individual occasionally stand in a stationary position; walk from one location to another; sit at a work station; climb/balance; stoop, kneel, crouch or crawl and reach with hands/arms. The position also requires that the individual routinely talk/hear activities in the work area and use hands/fingers. The position requires that the individual occasionally lift and/or apply force up to 25 Lb.

The position requires close vision, distance vision, color vision, peripheral vision, depth perception, and the ability to adjust focus.

Work environment characteristics of the position are representative of those encountered by an individual while performing the essential duties and responsibilities of the position. The position require that the individual routinely work near or around moving mechanical parts; work near or around fumes or airborne particles, work near or with toxic or caustic chemicals; and be exposed to outdoor weathers. Position requires that the individual routinely be exposed to a moderate noise environment.

Position requires that the individual be medically monitored and 24-Hour OSHA trained, with familiarity in RCRA and DOT Regulations.

EXCEL TSD, INC.
POSITION DESCRIPTION

TITLE:	Process Lead Worker
LOCATION:	Memphis, TN
DEPARTMENT:	Facility
REPORTS TO:	Operations Manager
POSITION DESCRIPTION:	This position is full time nonexempt with a normal work schedule of eight hour shift scheduled to support operations. There is paid overtime in accordance with current policies. Individual(s) in the position who meet the qualifications would be considered promotable to Facility level positions.

SUMMARY OF POSITION'S PRIMARY PURPOSE OR CONTRIBUTION TO THE ORGANIZATION:

Performs activities involved in receipt, processing and preparation for transportation of wastes at the direction of the Operations Manager and/or Facility Management.

Essential duties and responsibilities include the following with other duties assigned as required:

1. Operates and maintains material handling equipment such as forklifts, bobcats, dollies, etc.
2. Performs packaging/repackaging of materials in accordance with standard operating procedures
3. Properly tracks activities involved in processing
4. Performs incoming and outgoing shipment preparation such as staging, loading/unloading, Verification Analysis Reports, etc.
5. Maintains proper warehouse and tank storage procedures
6. Performs offloading of liquids from drums and containers into bulk storage tanks
7. Performs offloading of liquids from bulk storage tanks into shipment vessels (drum/container or tank trucks)
8. Performs routine repair and preventative maintenance of all operations equipment and Facility property
9. Maintains safety, housekeeping, environmental and operational standards in the work area
10. Serves as integral member of the Operations Team
11. Helps evaluate assigned employees proficiency
12. Supervises workers assigned to that area or shift

Essential requirement for individuals entering and/or maintaining the position are representative of the knowledge, skills, education, and experience of others in the position and/or established by regulations, permits and/or contractual agreements.

EDUCATION REQUIRED:	High School Graduate or General Equivalency Degree (GED)- (Experience may be substitued at Management discretion.
EXPERIENCE REQUIRED:	The position requires a minimum of one year of experience in a similar position or combination of positions in the hazardous waste management or process industry.
LANGUAGE SKILLS:	Ability to read, analyze, and interpret documents using the English language.
MATHEMATICAL SKILLS:	Ability to do basic math (add, subtract, etc.) using whole numbers, common fractions and decimals.
REASONING SKILLS:	Ability to apply principles of logical or scientific thinking to a wide range of problems.

Physical demands of the position are representative of those required by individuals who successfully perform the essential duties and responsibilities of the position. Individuals must be able to wear all applicable unmodified personal protective equipment in accordance with federal regulations (when applicable).

The position requires that the individual occasionally stand in a stationary position; walk from one location to another; sit at a work station; climb/balance; stoop, kneel, crouch or crawl and reach with hands/arms. The position also requires that the individual routinely talk/hear activities in the work area and use hands/fingers. The position requires that the individual occasionally lift and/or apply force up to 75 Lb.

The position requires close vision, distance vision, color vision and the ability to adjust focus.

The position requires that the individual occasionally work in wet/humid conditions (non-weather) and be exposed to the risk of electrical shock. The individual must also routinely work near or around moving mechanical parts; work near or around fumes or airborne particles; work near or with toxic or caustic chemicals; be exposed to outdoor weather conditions and be exposed to mechanical vibrations in the environment. the position also requires that the individual routinely be exposed to a moderate noise environment.

Position requires that the individual be medically monitored and 24-Hour OSHA trained, with familiarity in RCRA and DOT Regulations.

EXCEL TSD, INC.
POSITION DESCRIPTION

TITLE:	Process Worker
LOCATION:	Memphis, TN
DEPARTMENT:	Facility
REPORTS TO:	Process Lead Worker
POSITION DESCRIPTION:	This position is full time nonexempt with a normal work schedule of eight hour shift scheduled to support operations. There is paid overtime in accordance with current policies. Individual(s) in the position who meet the qualifications would be considered promotable to Facility level positions.

SUMMARY OF POSITION'S PRIMARY PURPOSE OR CONTRIBUTION TO THE ORGANIZATION:

Performs activities involved in receipt, processing and preparation for transportation of wastes at the direction of the Operations Manager and/or Lead Process Person.

Essential duties and responsibilities include the following with other duties assigned as required:

1. Operates and maintains material handling equipment such as forklifts, bobcats, dollies, etc.
2. Performs packaging/repackaging of materials in accordance with standard operating procedures
3. Properly tracks activities involved in processing.
4. Performs incoming and outgoing shipment preparation such as staging, loading/unloading, Verification Analysis Reports, etc
5. Maintains proper warehouse and tank storage procedures
6. Performs offloading of liquids from drums and containers into bulk storage tanks
7. Performs offloading of liquids from bulk storage tanks into shipment vessels (drum/container or tank trucks)
8. Performs routine repair and preventative maintenance of all operations equipment and Facility property
9. Maintains safety, housekeeping, environmental and operational standards in the work area
10. Operates equipment and machinery as needed.
11. Serves as integral member of the Operations Team
12. Performs any duty or activity directed to accomplish by any management member.

Essential requirement for individuals entering and/or maintaining the position are representative of the knowledge, skills, education, and experience of others in the position and/or established by regulations, permits and/or contractual agreements.

EDUCATION REQUIRED:	High School Graduate or General Equivalency Degree (GED) is desirable
EXPERIENCE REQUIRED:	Previous warehouse and/or laborer experience is a plus.
LANGUAGE SKILLS:	Ability to read, analyze, and interpret documents using the English language.
MATHEMATICAL SKILLS:	Ability to do basic math (add, subtract, etc.) using whole numbers, common fractions and decimals.
REASONING SKILLS:	Ability to apply principles of logical or scientific thinking to a wide range of problems.

Physical demands of the position are representative of those required by individuals who successfully perform the essential duties and responsibilities of the position. Individuals must be able to wear all applicable personal protective equipment in accordance with federal regulations (when applicable).

The position requires that the individual occasionally stand in a stationary position; walk from one location to another; sit at a work station; climb/balance; stoop, kneel, crouch or crawl and reach with hands/arms. The position also requires that the individual routinely talk/hear activities in the work area and use hands/fingers. The position requires that the individual occasionally lift and/or apply force up to 75 Lb.

The position requires close vision, distance vision, color vision and the ability to adjust focus.

The position requires that the individual occasionally work in wet/humid conditions (non-weather) and be exposed to the risk of electrical shock. The individual must also routinely work near or around moving mechanical parts; work near or around fumes or airborne particles; work near or with toxic or caustic chemicals; be exposed to outdoor weather conditions and be exposed to mechanical vibrations in the environment. the position also requires that the individual routinely be exposed to a moderate noise environment.

Position requires that the individual be medically monitored and 24-Hour OSHA trained, with familiarity in RCRA and DOT Regulations.

EXCEL TSD, INC.
POSITION DESCRIPTION

TITLE:	Receptionist/Secretary, Document Control
LOCATION:	Memphis, TN
DEPARTMENT:	Facility
REPORTS TO:	Customer Service Manager
POSITION DESCRIPTION:	This position is full time non-exempt with a normal work schedule of 8:00 AM to 5:00 PM. There is paid overtime in accordance with current policies. Individual(s) in the position who meet the qualifications would be considered promotable to Facility level administrative positions.

SUMMARY OF POSITION'S PRIMARY PURPOSE OR CONTRIBUTION TO THE ORGANIZATION:

Primarily serve to greet callers at the Facility Administration area and receives and/or routes telephone calls to the Facility during normal work hours. Also perform general secretarial duties such as word processing, filing, correspondence preparation, etc.

Essential duties and responsibilities include the following with other duties assigned as required:

1. Answer telephone console and give information to callers, or route calls to appropriate area, and places outgoing calls
2. Greet visitors, ascertains nature of business, and conducts visitors to appropriate area
3. Issue visitor passes (when required)
4. Make future appointments and answer inquiries
5. Arrange reservations when needed for affiliated companies (Consolidated Recycling, Professional Resource Management, Etc.)
6. Route incoming mail and prepares mail for distribution (internal and external)
7. Make copies of correspondence or other printed matter
8. File correspondence and other records
9. Prepare (word processes or types) memos, correspondence, reports, and other documents
10. Perform variety of clerical duties
11. Functions as a Customer Service Technician overflow person
12. Prepare documents required for inbound shipments

Essential requirement for the individual(s) entering and/or maintaining the position is representative of the knowledge, skills, education, and experience of others in the position and/or established by regulations, permits and/or contractual agreements.

EDUCATION REQUIRED:	High School Diploma or General Equivalency Degree (GED)
EXPERIENCE REQUIRED:	The position requires a minimum of 1 year experience in a similar position or combination of positions. Also required is the ability to operate and use a personal computer using word processing and database programs.
LANGUAGE SKILLS:	Ability to read, analyze, and interpret documents and procedures using the English language. Ability to effectively present information and respond to questions.
MATHEMATICAL SKILLS:	Ability to do basic math (add, subtract, etc.) using whole numbers.
REASONING SKILLS:	Ability to apply common sense to carry out given instructions. Ability to deal with situations with only occasional managerial intervention.

Physical demands of the position are representative of those required by individuals who successfully perform the essential duties and responsibilities of the position. Individuals must be able to wear all applicable unmodified personal protective equipment in accordance with federal regulations (when applicable).

The position requires that the individual routinely use hands and fingers, and reach with hands and arms. The individual will be frequently sitting at a work station and talk/hear activities in the work area. Also requires that the individual occasionally lift and/or apply force up to 25 pounds.

The position requires close vision and peripheral vision, and the ability to adjust focus.

Work environment characteristics of the position are representative of those encountered by an individual while performing the essential duties and responsibilities of the position. Position requires that the individual routinely be exposed to a moderate noise environment.

EXCEL TSD, INC.
POSITION DESCRIPTION

TITLE:	Customer Service Manager
LOCATION:	Memphis, TN
DEPARTMENT:	Facility
REPORTS TO:	Technical Services Manager
POSITION DESCRIPTION:	This position is full time exempt with a normal work schedule of 8:00 AM to 5:00 PM. This position has direct supervisory responsibility for the Receptionist/Secretary position, and/or any Customer Service Technicians.

SUMMARY OF POSITION'S PRIMARY PURPOSE OR CONTRIBUTION TO THE ORGANIZATION:

Primarily coordinates all administrative activities of the Facility to include secretarial, records retention, etc. either directly or through assigned employee. Also performs administrative activities associated with receipt and tracking a shipment of customer wastes.

Essential duties and responsibilities include the following with other duties assigned as required:

1. Analyzes and organizes office operations and procedures such as typing, flow of correspondence, filing, requisition of supplies and other clerical services
2. Evaluates office production, revises procedures, or devises new forms to improve efficiency of work flow
3. Establishes uniform correspondence procedures and style practices
4. Formulates procedures for systematic retention, protection, retrieval, transfer, and disposal of records
5. Works directly with sales staff and customers on a daily basis
6. Reviews and updates customer information and maintains contact with Sales Representatives to verify correct information
7. Prepares shipping documents as needed
8. Handle or direct all customer inquiries or needs (Profiling, pricing, etc.)
9. Maintains all required facility records
10. Records and maintains recertification on active approvals/profiles
11. Acts as liaison between the different departments
12. Sets long and short term objectives for the area of responsibility and evaluated performance to objectives
13. Ensures safety, housekeeping, environmental and operational standards are met in the work area
14. Ensures assigned employees are trained and evaluates their proficiency
15. Checks and ensures all assigned employee are following accepted standard procedures
16. Resolves work place problems and personnel matters and assists employees in resolving problems
17. Schedules pick ups for incoming waste (and sales orders); coordinates with Transportation Manager in Evansville, IN
18. Analyzes results of inventories, documents findings and reports to Facility Manager
19. Inputs information to the computer system on incoming and outgoing wastes and maintains inventory tracking system
20. Checks and ensures accuracy of Bills of Lading, manifests, and all documents related to incoming shipments
21. Provides Certificates of Disposal (as required) to customers

Essential requirement for individuals entering and/or maintaining the position are representative of the knowledge, skills, education, and experience of others in the position and/or established by regulations, permits and/or contractual agreements.

EDUCATION REQUIRED:	High School Diploma with at least one year work experience in the environmental service industry.
EXPERIENCE REQUIRED:	The position requires a minimum of 1 year experience in a similar position or combination of positions The position requires the ability to operate and use a Personal Computer using a spreadsheet, word processing, and a database.
LANGUAGE SKILLS:	Ability to read, analyze, and interpret the most sensitive and complex documents using the English language. Ability to make effective presentations to top management and/or public.
MATHEMATICAL SKILLS:	Ability to do basic math (add, subtract, etc.) using whole numbers, common fractions, and decimals. Ability to apply concepts such as fractions, percentages, ratios, and proportions to practical situations.
REASONING SKILLS:	Ability to interpret a variety of instructions furnished in written, oral, diagram, or schedule form. Ability to solve practical problems with a variety of concrete variables with limited guidelines.

Physical demands of the position are representative of those required by individuals who successfully perform the essential duties and responsibilities of the position. Individuals must be able to wear all applicable unmodified personal protective equipment in accordance with federal regulations (when applicable).

The position requires that the individual occasionally to stand in a stationary position; walk from one location to another; climb, balance and stoop, or kneel. The position also requires the individual sit at a work station; talk and hear activities in the work area; use hands and fingers and reach with hands and arms. Also requires that the individual occasionally lift and/or apply force up to 25 pounds.

The position requires close vision and peripheral vision, and the ability to adjust focus.

Work environment characteristics of the position are representative of those encountered by an individual while performing the essential duties and responsibilities of the position. Position requires that the individual routinely be exposed to a moderate noise environment.

ATTACHMENT 6

PREPAREDNESS AND PREVENTION

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A. INTRODUCTION

Tennessee Rule 0400-12-01-.06(3) requires that hazardous waste management facilities must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment. Hazardous wastes are managed at the Facility only in containers and certain tanks.

Hazardous waste containers are managed within three separate designated areas (units) – the Outside Hazardous Waste Container Management Area (OHWCMA) and Areas A and B of the Hazardous Waste Management Building. The design and construction features of the secondary containment systems for these units minimize the possibility of an unplanned release of hazardous waste or hazardous waste constituents to soil or surface water are described in Attachment 8, Subsections 8.B and 8.C of this Permit. Maintenance of these secondary containment systems is provided by the inspection and remedy

requirements set forth in Attachment 4. The operating procedures that minimize the potential for fires, explosions, or the unplanned release of hazardous waste or hazardous waste constituents to air are set forth in Subsection 8.E (especially Paragraphs 8.E.7 and 8.E.11) of Attachment 8 and in Attachments 2, 4, and 7. See also Section 6.G below.

The only tanks at the Facility that are used to manage hazardous waste are Tanks F1 and F2. The design and construction features of the secondary containment system for these tank systems that minimize the possibility of an unplanned release of hazardous waste or hazardous waste constituents to soil or surface water are described in Attachment 9, Subsection 9.B of this Permit. The design and construction features of the tanks, along with controls, practices, and operating procedures, that minimize the possibility of a release from the tanks and their ancillary equipment are described in Attachment 9, Subsections 9.B, 9.C, 9.D, and 9.E. Specific procedures to minimize the possibility of unplanned releases to the air are also provided by the organic air emission control provisions of Attachment 9, Subsections 9.F, 9.G, and 9.H. The operating procedures that minimize the potential for fires, explosions, or the unplanned release of hazardous waste or hazardous waste constituents to air are set forth in Attachment 9 (Subsection 9.D and Subsection 9.G) and Attachments 2, 4, and 7. Maintenance of the secondary containment system, the tanks, their ancillary equipment and controls, and equipment which could release organic vapors is provided by the inspection and remedy requirements set forth in Attachment 4 and Attachment 9, Subsections 9.F, 9.G, and 9.H.

In addition to the general requirement set forth in the first paragraph above, Tennessee Rule 0400-12-01-.06(3) also establishes certain specific equipment and other requirements. Excel TSD of Tennessee, LLC's ("ETSD") compliance with these specific requirements is addressed in the subsections below.

B. REQUIRED EQUIPMENT

1. Communications / Alarm Systems

Internal and external emergency communications are provided by the telephones also used in routine operations. The Main Office in the Administration Building is equipped with "landline" telephones, and all management personnel, supervisors, and the Lab/Operations Trailer are equipped with mobile telephones and/or two-way radios. As needed, telephones will be used to communicate directly with the Fire Department, Police Department, and state or local emergency response teams.

Portable air horns are used in the Contained Area to alert Facility personnel that an emergency exists. Such horns are maintained in Hazardous Waste Management Building Areas A and B, the Fuel Blending Area, and the Personnel Primary Decon Room near the Receiving Area. There is also an electronic siren that can be activated in the Lab/Operations Trailer to provide evacuation notification to Facility personnel. The locations of the air horns and siren are shown on the layout drawing in the Contingency Plan (Attachment 7).

2. Water Supply

Potable water for all uses, including fire suppression and decontamination, is provided by the City of Memphis water supply system. The municipal water supply provides adequate water volume and pressure to operate all emergency equipment and systems. The adequacy of the water supply is verified during the quarterly inspections by an outside vendor of the sprinkler/alarm system in the HWM Building, and during the periodic inspections by the Memphis Fire Department (see Subsection C below). Water supply lines run to the Administration Building, Hazardous Waste Management Building, Maintenance Building, Personnel Support Trailer, and Lab/Operations Trailer where various valved taps are available.

3. Fire Response Equipment

The Hazardous Waste Management Building (both Area A and Area B) is equipped with an automatic, overhead sprinkler and alarm system. The system includes strategically placed sensors that detect the heat from an ignited fire. Such a detection automatically triggers the sprinkler system and sends an alarm notification to an outside contractor who in turn notifies ETSD management and the Memphis City Fire Department. The post indicator valve (PIV) for the Hazardous Waste Management Building's sprinkler system (which controls the water flow to the sprinkler system) is located outside the north end of the Maintenance Building. Additionally, portable fire extinguishers (Type A, B, C) are located at various locations throughout the facility. To support fire-fighting/suppression activities, there is a fire hydrant located just across Rivergate Road to the south of the facility, and another located near the northeast corner of the Contained Area. The locations of the sprinkler system PIV, fire extinguishers, and fire hydrants are shown on the layout drawing in the Contingency Plan (Attachment 7).

[Note: The warehouse portion of the Administration Building is also equipped with a sprinkler system whose post indicator valve is located at the southeast corner of the Facility (also shown on the layout drawing in the Contingency Plan). However, no hazardous wastes are managed in this building.]

4. Spill Response / Decontamination Equipment

ETSD maintains various items of equipment that are available for use in responding to a spill and/or for decontaminating structural components (e.g., wall/floor surfaces) or equipment as needed. This equipment is listed/described in Table 6-1. Water hoses and soaps/detergents are also available for decontamination use.

5. Other Available Equipment

ETSD also maintains the safety equipment identified in Table 6-2 for routine operational use, and it will also be utilized as needed in responding to a fire or spill. In addition, ETSD maintains certain additional emergency equipment that are identified in the Contingency Plan (Attachment 7).

TABLE 6-1 – SPILL RESPONSE / DECONTAMINATION EQUIPMENT

EQUIPMENT[1]	TYPE	QUANTITY[2]	LOCATION
Forklifts/Skid-steer loader	Propane / Diesel	3	Contained Area[3]
Pumps	Portable	4	Maintenance Building
Spill Kits	Self-contained in overpack container	3	Receiving Area near Truck Loading Dock, NW corner of HWM Building, just east of Tank Farm
Absorbent Material	Granular Clay/ Vermiculite	20 bags	Maintenance Building / Fuel Blending Area / Plant Storage[4]
Absorbent Material	Booms/Pads	5 cases	HWM Building / Plant Storage[4]
Absorbent Material	General Purpose Socks	2 cases	HWM Building / Plant Storage[4]
Containers	Drums/buckets	10-20	Contained Area[3] / Plant Storage[4]
Plastic Sheeting	Rolled	2	HWM Building / Plant Storage[4]
Pressure Washer	Hot water	1	Maintenance Building
Containers	Overpacks (Poly/Steel)	5	HWM Building / Plant Storage[4]
Hand Tools (Non-sparking)	Shovels, brooms, squeegees, etc.	Varies	Contained Area[3]

1 – Many of these items are used daily and are available for spill clean-up and control.

2 – These are the minimum quantities to be maintained on-site, which may be split among the designated locations. Additional, reserve quantities of consumables will typically be maintained in Plant Storage.

3 – May be located in various locations within the Contained Area.

4 – "Plant Storage" refers to the warehouse portion of the Administration Building and/or storage containers located in the Non-Haz Waste Staging Area.

TABLE 6-2 – SAFETY EQUIPMENT

EQUIPMENT	TYPE	QUANTITY	LOCATION
Personal Protective Equipment	Various	*	Lab/Operations Trailer / Plant Storage**
Monitoring Equipment	PID	One	Lab/Operations Trailer
Safety Data Sheets	Misc.	Two Sets	Lab/Operations Trailer and Main Office (Admin. Bldg.)

* Appropriate PPE is worn daily by operations personnel, so ETSD maintains an abundant supply.

** "Plant Storage" refers to the warehouse portion of the Administration Building and/or storage containers located in the Non-Haz Waste Staging Area.

C. EQUIPMENT TESTING AND MAINTENANCE

ETSD inspects/inventories all spill response, decontamination, emergency, and safety equipment according to the schedule set forth in Table 6-3. Attachment 4 (Facility Inspection Program) provides more details on required periodic inspections. As needed, equipment that does not operate properly will be promptly repaired or replaced, and inventories will be promptly replenished. Deficiencies with equipment used in daily operation will of course be identified and corrected more rapidly.

Additionally, the sprinkler/alarm system including battery backup in the HWM Building is inspected by a qualified outside vendor on a quarterly basis, and an annual inspection of all fire extinguishers is performed by a qualified outside vendor. Records of these quarterly and annual inspections are kept on file in the Main Office in the Administration Building. The Facility is also periodically inspected by the Memphis Fire Department.

TABLE 6-3 – EQUIPMENT TESTING / MAINTENANCE SCHEDULE

EQUIPMENT	DAILY	WEEKLY	MONTHLY
Fire Extinguishing/Alarm System in HWM Building			X
Fire Extinguishers			X
Portable Pumps			X
Alarm Systems (Air horns, Siren)			X
Telephone System	X*		

* The telephone system is tested daily through routine business operations.

D. ACCESS TO COMMUNICATIONS OR ALARM SYSTEMS

Whenever hazardous waste is being poured, mixed, or otherwise handled (which will only occur within the Contained Area), the involved ETSD personnel will have immediate direct access to the portable air horns maintained in strategic locations as described in Paragraph 6.B.1 above. The mobile telephones carried by Supervisors and Management personnel also indirectly provide such personnel with access to an emergency communication device.

In the unlikely event that only one ETSD employee is on the premises while hazardous wastes are being poured, mixed, or otherwise handled, that person will be a supervisor or manager and will have a mobile telephone that can be used to summon external emergency assistance.

E. MAINTENANCE OF AISLE SPACE

At all times during Facility operation, ETSD will ensure that equipment, vehicles, and containers are managed to provide sufficient aisle space for the unobstructed movement of personnel and emergency response vehicles and equipment to any area where hazardous waste operations are being conducted (i.e., the Contained Area). The Facility's layout and spacious driveways and parking/staging areas facilitate such efforts. Within the permitted container storage areas, a minimum aisle space of 2.5 feet will be maintained as described in Subparagraph 8.E.4.(d) of Attachment 8.

F. ARRANGEMENTS WITH LOCAL AUTHORITIES

Since taking over operation of the Facility in 2003, ETSD has made numerous attempts to familiarize those local authorities and private firms that may be called upon to provide emergency response services with the Facility and its operations. These local authorities include the City of Memphis Fire Department (including its Emergency Response Team and the Memphis and Shelby County Ambulance Service), the City of Memphis Police Department, the Shelby County Sheriff's Department, Memphis' Baptist Memorial Hospital, the Shelby County Emergency Management Agency, and the Tennessee Emergency Management Agency. The private emergency response services firms include Waste Services, Inc. of Little Rock, Arkansas, Hepaco, Inc. of Memphis, and First Response, Inc. of Memphis. The familiarization efforts have principally involved sending these authorities/firms copies of ETSD's Emergency Response / Contingency Plan. Little response has been received from the local authorities except for the City of Memphis Fire Department, which has become very familiar with the ETSD facility and with which ETSD has long had a good relationship. As noted in Subsection 6.D above, the Fire Department periodically inspects the Facility.

Upon the issuance of the permit or a modification to the Emergency Response / Contingency Plan included in Attachment 7, ETSD will send the revised plan to the local authorities identified above, and selected private emergency response services firms, and request their review and comment. ETSD will document the sending of the plan to the aforementioned parties upon issuance of the permit and any subsequent modifications. ETSD will follow up with any agency that responds to the Plan with comments or questions and enter into arrangements with such authorities as appropriate.

G. SPECIAL PROVISIONS CONCERNING POWER/EQUIPMENT FAILURES

Not counting artificial lighting and computerized data management systems, the Facility has only three safety/monitoring/operational systems that rely on electrical power provided by the local utility (Memphis, Light, Gas and Water). Each of these systems is described below along with the impacts a failure of the power supply would have on the system and ETSD's operational alternatives:

1. Automatic Overhead Sprinkler and Alarm System in Hazardous Waste Management Building

As described in Paragraph 6.B.3 above, the HWM Building is equipped with an automatic overhead sprinkler and alarm system that automatically detects the heat from a fire, triggers the water sprinkling system and audible alarm, and sends an alarm notification to summon outside emergency assistance. This system is equipped with a battery backup system that in the case of failure of the external power supply will automatically provide the electrical energy needed to ensure the continuous proper functioning of the sprinkler and alarm system. The battery

system is checked during the quarterly inspection described in Subsection 6.C above and will sustain proper function of the sprinkler and alarm system for a few days. In the unlikely event of a power outage extending more than a few hours, ETSD will have to mobilize a gasoline- or diesel- powered electricity generator to the Facility to provide continuing electrical power.

2. High-Level Detection and Alarm Systems on Tanks F1 and F2

As described in Subsection 9.C of Attachment 9, Tanks F1 and F2 are each equipped with a monitoring sensor and alarm system that sounds an audible alarm when the waste level in the tank reaches a pre-set distance from the top of the tank, warning operators to stop the addition of waste to the tank. A failure of the electrical power supply will prevent the proper functioning of this important overfill prevention system. If a power failure occurs, ETSD will cease any further addition of wastes to the tanks until the power has been restored and the high-level detection/alarm systems have been tested and shown to be functioning properly.

3. Pneumatic Pumps

The permanently installed pumps that are used to empty storm water and other collected liquids from the secondary containment sumps in the Contained Area and the Tank Farm, and the portable pumps used to transfer waste materials from and into containers and tanks, are pneumatic pumps powered by compressed air piped from an electric-powered compressor located at the Maintenance Building. Such pumps are used because they cannot cause a spark that might ignite organic vapors. However, a failure of the electrical power supply results in the shutdown of the compressor and prevents operation of the pneumatic pumps. ETSD personnel are trained to respond to any such power failure by closing all valves on pneumatic material transfer pumps to prevent backflow or overflow of wastes or storm water. Except for those that can be performed by pouring or using hand pumps, material transfer operations will thus cease until electrical power is restored. In the unlikely event of a power outage extending more than a few hours, ETSD will have to mobilize a gasoline- or diesel-powered electricity generator to the Facility to provide continuing electrical power.

ATTACHMENT 7 CONTINGENCY PLAN

Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, TN 38109
(901) 774-8146

CONTINGENCY PLAN

Revised: August 2024

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LETTER OF PROMULGATION

This Emergency Response Contingency Plan, hereinafter referred to as the "Plan", was developed to provide a mechanism for coordinating responses to any and all emergency conditions affecting the Excel TSD of Tennessee, LLC facility in Memphis, TN.

Comments and recommendations regarding this plan are welcome and should be addressed to:

Excel TSD of Tennessee, LLC
550 Rivergate Road
Memphis, TN 38109
Attn: Stephen B. Neal

This plan will be kept under continual review. Changes, additional information and/or corrections will be promulgated as necessary and documented.

Stephen B. Neal, REM, CEA, CEI
Managing Member

Excel TSD of Tennessee, LLC

Emergency Use Index

Facility Primary Emergency Coordinator	
Nathan Jenkins	Office # (90 l) 774-8146 Mobile # (901) 283-2267
Facility Secondary Emergency Coordinator	
Stephen B. Neal	Office# (901) 774-8146 Office # (501) 888-4323 Mobile # (501) 804-4030
	911
Emergency Contacts	
Memphis & Shelby County Ambulance	(901)458-3311
(Memphis Fire Dept)	(901)516-3700
Methodist South Hospital	(662)772-4000
Baptist Memorial Hospital – Desoto	(901)226-5000
Baptist Memorial Hospital	(901)458-3311
Memphis Fire Department	(901)545-2677
Memphis Police Department	(901)545-5500
Shelby County Sheriff's Department	(901) 515-2525
Emergency Management Agency	1-800-262-3300
(Memphis & Shelby County)	
Tennessee Emergency Management Agency	(90 l) 544-0555
(Toxic Chemicals and Oil Spills)	1-800-424-8802
US Coast Guard	1-800-424-9300
National Response Center (NRC)	1-800-222-1222
Chemtrec	
Poison Control Center	
	501-804-4030
Contractors	(901) 345-6333
Waste Services, Inc	
Hepaco, Inc.	

1. Introduction

This contingency plan was developed following guidelines outlined in subparts C and D of 40 CFR parts 264 and 265 which provides for the preparation, revision, publication and amendments of an emergency response contingency plan.

This plan provides for a pattern of coordinated and integrated responses by facility personnel to respond to an emergency with a system for prompt notification of local and state governmental agencies concerning any emergency at Excel TSD of Tennessee, LLC ("ESTD").

The objectives of this plan are to provide for efficient, coordinated and effective actions to minimize damage and injuries from fire, explosion, spills or inadvertent discharges of chemicals (including containment and removal). This facility operates a hazardous waste treatment, storage facility. Our primary goal is to treat, transfer and store waste materials properly and safely and to minimize employee exposure. We do this by the following:

- Proper use of personal protective equipment (PPE) during all operations.
- Inspection of all containers (materials) prior to loading/unloading at the facility; and
- Following proper site safety procedures specified in this plan and Universal Transport Inc.'s (UTI) safety plan.

This Emergency Response Contingency Plan provides for:

- Assignment of Emergency Coordinator duties and responsibilities (see Part 2);
- Planning, implementation and response procedures (see Part 3);
- A list of emergency contacts (see Emergency Use Index);
- Emergency equipment and location (see Part 5 and Appendix A);
- Emergency evacuation procedures (see Part 4); and;
- Notification/reporting procedures (see Part 6 and Appendix B)

2. Assignment of Emergency Coordinator Duties and Responsibilities

At all times, the emergency coordinator ("EC") will be on the facility premises or on call to respond to an emergency condition with the authority to coordinate and implement all necessary emergency response measures. The EC will be thoroughly familiar with all aspects of the facility's contingency plan, facility operations and activities, location and characteristics of wastes handled, location of all records within the facility and the facility layout. ESTD has designated the following personnel as EC's:

Primary Emergency Coordinator
Nathan Jenkins
325 E. Raines Rd.
Memphis, TN 38109
Mobile # (901)283-2267
Work# (901)774-8146

Secondary Emergency Coordinator
Stephen B. Neal
122 Sunset Dr. No.
Little Rock, AR 72118
Mobile # (501)804-4030
Work# (901)774-8146
Work # (501)888-4323

3. Planning, Implementation and Response Procedures

3.1 Planning

Federal regulations 40 CFR 264.51(b) require that the provisions of the facility contingency plan be implemented whenever there is a fire, explosion or release of hazardous waste or hazardous waste constituents that could threaten human health or the environment.

The provisions of this plan will be performed **immediately** whenever an emergency condition occurs or exists that could threaten human health or the environment. Designated EC's are authorized and will ensure successful plan implementation.

3.2 Implementation

All personnel will be trained to immediately notify the EC if they detect a potential hazard. The EC will respond and evaluate the situation in the following manner:

1. Immediately identify the character, exact source, amount and actual extent of any released materials through their familiarity with operations and activities of the facility and the location and characteristics of waste(s) handled.
2. Identification may be made by observation, review of safety data sheets (SDSs), facility records, manifests and/or laboratory analysis.
3. If an immediate threat exists, the EC will sound the emergency alarm, evacuate unnecessary personnel and take appropriate action to mitigate the incident; and
4. If no immediate threat exists, the EC will be responsible for ensuring that prompt corrective action is taken.

After the EC has made his/her evaluation, measures will be taken to prevent the occurrence/reoccurrence or spread of fires, explosions or releases at the facility. Such actions may include:

1. The uses of water spray to control vapor and prevent heat build-up.

2. Construction of dikes/dams to prevent the spread of spills.
3. Pumping and/or solidification of free liquids.
4. Clean up, collect and contain released waste material and isolate containers.
5. Notification of outside agencies for the purpose of securing assistance in addressing the emergency; and
6. Decontaminate emergency equipment and ready it for reuse prior to resumption of facility operations, at the conclusion of the emergency.

3.3 Emergency Response Procedures

In the event of a fire, explosion, discharge or release of hazardous materials/waste that has the potential to endanger human health or the environment, the first person detecting such a condition will notify the EC immediately.

Until the EC arrives, the supervisor (present) or reporting person will be responsible for directing other personnel to:

1. Evacuate the area.
2. Assemble evacuees and prepare for receiving directives; and
3. Attempt to mitigate the emergency by appropriate response procedures.

3.4 Spill Containment

In the event of a spill at the facility, all efforts will be made and taken to contain and remediate any spilled materials as described in this plan.

This facility was designed and constructed to prevent leaks or spills from leaving the site. All hazardous waste management activities are in areas of impervious secondary containment. The concrete surface is sloped and directed towards spill traps (sumps) for ease in collecting liquid wastes.

Spill supplies are located throughout the facility and consist of metal and poly salvage drums with various containment products. These materials include loose vermiculite, absorbent pads, socs, booms, spark proof shovels and scoops. These items may be used to clean up and prevent the spread of spilled material.

The spill containment team will:

1. Respond to the spill wearing the appropriate level of personal protective equipment as directed by the EC.
2. Determine which container(s) are leaking and their compatibility group.
3. Determine if additional fire fighting equipment and/or PPE is needed.
4. Begin to repair or overpack leaking container(s) and clean the affected area; and
5. After containment, place all absorbents and other contaminated items into an approved DOT container for proper disposition.

4. Emergency and Evacuation Procedures

In the event of an emergency where evacuation is necessary, the facility emergency siren will be activated from the Lab/Operation Trailer. All facility personnel and visitors will be directed to the designated emergency exit in their area.

In the event of an emergency in the Contained Area of the facility, the discovery person or personnel responding will sound the air horn with three long blasts and notify the EC.

In the event of an emergency involving fire where control is beyond plant capabilities, the EC (or his designee) will notify the fire department by telephone.

Evacuation routes and emergency exits to be utilized during an emergency situation are identified on Figure in Appendix A.

5. Emergency Equipment and Locations

The emergency equipment available at the ESTD facility and the locations where it is maintained is described in Table 1 and the Figure in Appendix A.

6. Incident Notification/Reporting

If the EC determines that the facility has had a release, fire, or explosion, which could threaten human health or the environment, outside the facility, he/she must report their findings as follows:

- Notify appropriate local authorities if evacuation of local areas is advisable or if additional outside assistance is needed. The Shelby County Sheriff's Department is to take the lead in the evacuation of areas surrounding the site and assist in directing traffic, as necessary. The EC will assist appropriate local authorities in their efforts.

TABLE 7-1 Emergency Equipment and Location

EQUIPMENT	TYPE	QUANTITY	LOCATION
Telephone System	Internal and External	1	Lab/Operations Trailer and Administration Bldg.
Public Address System	Telephone	1	See above
First Aid Stations	Wall Mount/ Portable	3	Personnel Support & Lab/Operations Trailers and Decon. Room

Eyewash	Portable/ Stationary	4	See Appendix A
Safety Shower	Stationary	4	See Appendix A
Fire Extinguisher(s)	Portable (A, B, C)	15 +	See Appendix A
Electronic Siren	Stationary	1	See Appendix A
Air Horns	Portable	4	See Appendix A
Personal Protective Equipment (PPE) (Level C, D)	Portable/Stationary	Numerous	Lab/Operations Trailer and Maintenance Bldg.
Misc. supplies: Pumps, spill containment supplies, etc.	Portable/ Stationary	Numerous	Maintenance Bldg./etc.*

*Additional equipment and supplies will be stored in the warehouse portion of the Administration Building and/or in storage containers located in the Non-Haz Waste Staging Area

- Notify Tennessee Emergency Management Agency **immediately** and/or National Response Center (NRC), as applicable, if reportable quantity (RQ) is exceeded, by telephone. The notification must include:

  - Name and telephone number of reporter;
  - Name and address of facility;
  - Time and type of incident (e.g., release, fire);
  - Name and quantity of material(s) involved, to the extent known;
  - Extent of injuries, if any; and
  - Possible hazards to human health, or the environment, outside the facility.

- Notify the Commissioner (TDEC) and State/local authorities that released material was isolated from incompatible materials during clean up and emergency equipment is clean and ready for use prior to resuming operations in the affected part of the facility.

- Make note to the operating record of date, time and details of any incident requiring implementation of the Contingency Plan.

- Submit written report to the Commissioner (TDEC) within 15 days of the incident using Incident Reporting Form in Appendix C. .

7. Amendments of Contingency Plan

This Contingency Plan is subject to review and amendment, if necessary, whenever:

1. The facility permit is revised;
2. The plan fails in an emergency;
3. The facility changes in design, construction, operation, maintenance, or other circumstances in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency;
4. The list of emergency coordinators (EC's) changes; or
5. The list of emergency equipment changes.

When the plan changes or is modified, a new plan will be prepared and distributed to current plan holders and facility personnel.

8. Distribution of Contingency Plan

Promptly following promulgation of this contingency plan, copies of it will be distributed to the following entities using the model letter included in Appendix C:

1. Memphis Fire Department/
   Memphis & Shelby County Ambulance Service
2. Shelby County Sheriff's Department
3. Memphis Police Department
4. Baptist Memorial Hospital
5. Shelby County Emergency Management Agency
6. Tennessee Emergency Management Agency
7. Waste Services, Inc.
8. Hepaco, Inc.

Attachment 7.1

Figure 7-1

Evacuation Route / Emergency Equipment Location Map

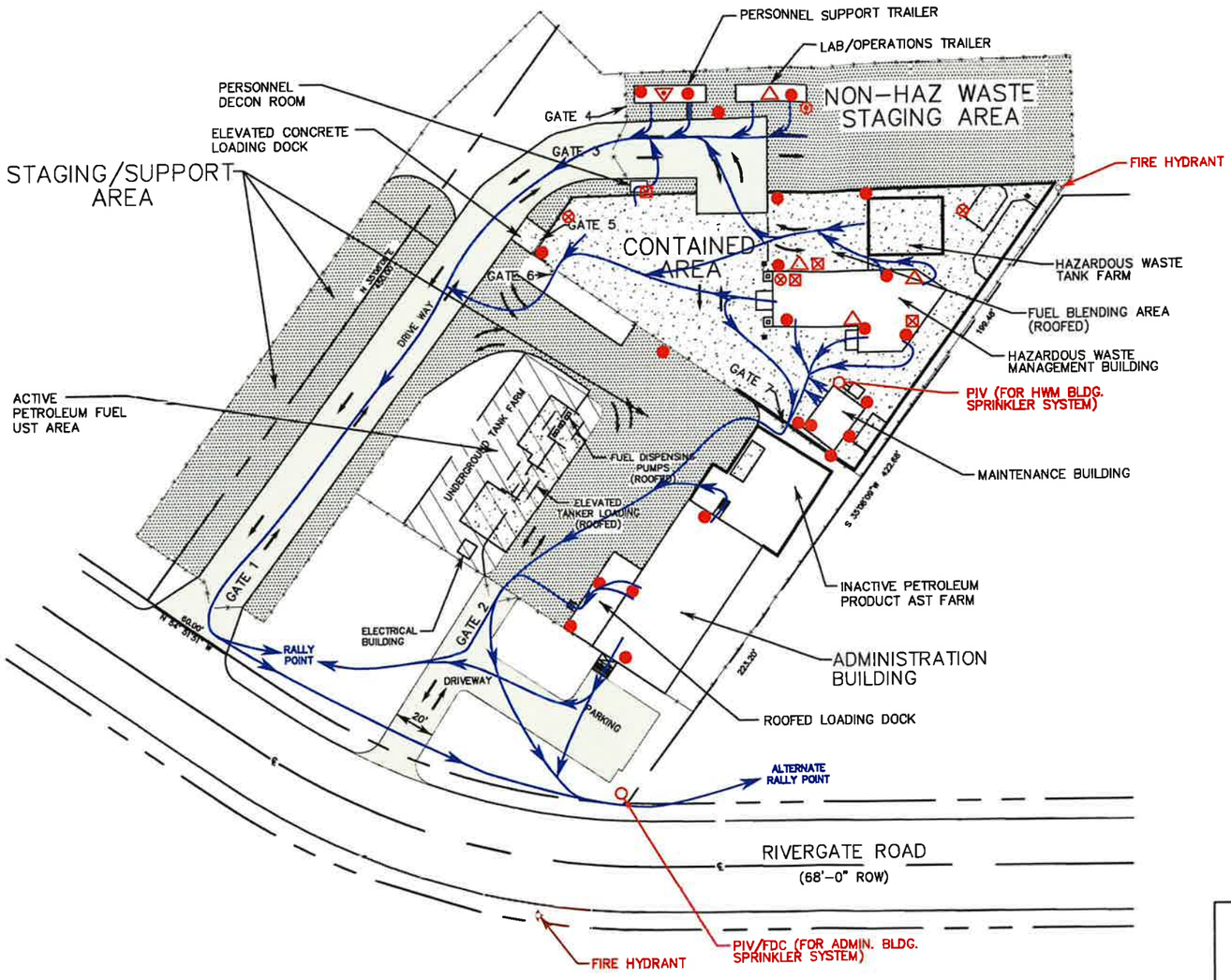
TriAD Environmental Consultants, Inc.

"Figure VI-1 Evacuation Routes and Emergency

Equipment Location Map"

Project Number: 07-EXC01-01

Date: 05/05/2020



0 50' 100'

SCALE: 1" = 100'

LEGEND

- FIRE HYDRANT
- CHAIN-LINK FENCE
- PROPERTY BOUNDARY
- CONTAINMENT BERM/WALL
- TRAFFIC FLOW
- GRAVEL
- ASPHALT
- CONCRETE

EMERGENCY EQUIPMENT

- FIRE EXTINGUISHER
- EYE WASH UNIT
- AIR HORN
- SAFETY SHOWER
- SIREN
- SPILL KIT
- EVACUATION ROUTE

NOTE

THIS DRAWING WAS ORIGINALLY ADAPTED (BY DIGITIZATION) FROM A DRAWING PREPARED FOR BRYSON RECOVERY SERVICE BY DELTA PROCESS MANAGEMENT INC. (MEMPHIS, TN) DATED 06/21/91, TITLED "FACILITY PLOT PLAN", AND NUMBERED EPA-1; AND HAS BEEN MODIFIED TO SHOW DETAILS OF THE LEASED PROPERTY BASED ON A PHOTOCOPY OF A DRAWING BY BDK & ASSOCIATES (MEMPHIS, TN) DATED 01/04/89 (REV. 02/05/99) AND TITLED "SURVEY OF LOT 1, PHASE 1, RIVERPORT SUBDIVISION".

FIGURE VII-1
EVACUATION ROUTES AND EMERGENCY EQUIPMENT LOCATION MAP

EXCEL TSD OF TENNESSEE, LLC.
MEMPHIS, TENNESSEE

SCALE: 1" = 100'	DR ALW	CHK VJB	REV CMS

PREPARED BY:

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, Tn 37214
615-889-8888 fax 615-889-4004

PROJ: 07-EXC01-01	DATE: 05/05/20	SHEET 1 OF 1

C:\DRAWINGS\DWIGHT\07-EXC01-01\0101-FIG-VII-1-EVACUATION-ROUTES-AND-EMERGENCY-EQUIPMENT-LOCATION-MAP-05-04-20.dwg SAVED: 5/5/2020 9:54 AM BY: AWATTS

ATTACHMENT 7.2

INCIDENT REPORTING FORM

Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, TN 38109
901.774.8146 fax# 901.775.5181
EPA ID#TND980847024

Commissioner
Tennessee Department of Environment & Conservation
Davy Crockett Tower
500 James Robertson Parkway
Nashville, Tennessee 37243

RE: REPORT OF INCIDENT

Dear Commissioner:
I am submitting this written report, as required, to follow up on an incident that required implementation of our contingency plan at the above named facility. The following information includes:

1) NAME, ADDRESS AND TELEPHONE OF OWNER OR OPERATOR:

_____

_____

_____

_____

2) DATE OF INCIDENT:_____ TIME OF INCIDENT: _____

TYPE OF INCIDENT: SPILL_____ RELEASE_____ FIRE_____

EXPLOSION_____ OTHER:_____

BRIEF DESCRIPTION OF INCIDENT:

_____

_____

_____

_____

3) NAME OF MATERIAL(S) INVOLVED: _____

QUANTITY OF MATERIAL(S) INVOLVED: _____

4) INJURIES DURING INCIDENT:

ANYONE INJURED DURING INCIDENT? (Yes/No)	JOB TITLE OF INJURED PERSON(S)	EXTENT OF INJURIES

5) ASSESSMENT OF ACTUAL OR POTENTIAL HAZARDS TO HUMAN HEALTH OR THE ENVIRONMENT:

_____

_____

_____

_____

6) QUANTITY OF MATERIAL(S) RECOVERED: _____

DISPOSITION OF MATERIAL(S) RECOVERED: _____

PURSUANT TO TENNESSEE RULE 0400-12-01-.06(4)(g) 9.A COPY OF THIS INCIDENT REPORT MUST BE SUBMITTED TO THE COMMISSIONER WITHIN 15 DAYS OF THE INCIDENT.

DATE _____

NAME OF EMERGENCY COORDINATOR : _____

SIGNATURE OF EMERGENCY COORDINATOR: _____

ATTACHMENT 7.3

Model Distribution Letter

Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, TN 38109
901.774.8146 fax # 901.775.5181

(Date of letter)

(Name and address of Receiving entity)

Re: Emergency Aid Agreement

To Whom It May Concern:

Enclosed you will find an updated copy of the emergency response contingency plan for the Excel TSD of Tennessee, L.L.C. hazardous waste management facility located at the letterhead address in Memphis, Tennessee. This contingency plan describes how the facility will respond to a fire, explosion, release of hazardous wastes or hazardous waste constituents, or other emergency that could threaten human health or the environment. We have the plan in effect and are providing a copy to your organization/facility for review (and comment if appropriate) to help you understand the emergency services we may be calling upon your organization/facility to provide. We ask that you please acknowledge that your organization/facility received this updated contingency plan and is willing, if called upon, to provide emergency assistance to us to the extent of its capability and availability. Such acknowledgement can be provided by signing and dating on the lines below and returning a copy of this letter to us in the enclosed self-addressed and stamped envelope.

If you have any questions or comments, please don't hesitate to call me at 901-774-8146.

Sincerely,

Stephen B. Neal, REM, CEA, CEI
President
Excel TSD of Tennessee, L.L.C.

Acknowledged by: _____
Signature

_____
Name/Title

_____
Date

ATTACHMENT 8

MANAGEMENT OF HAZARDOUS WASTE IN CONTAINERS

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Attachment 8.6 ..... Concrete Repair and Rehabilitation Plan for the Contained Area 8.6-1

A. GENERAL

This Section describes the three separate secondarily contained areas at the Facility where hazardous wastes are managed in containers and the procedures, limitations, and other requirements that are followed to ensure that such containers are managed in accordance with applicable standards from Tennessee Rule 0400-12-01-.06, and particularly those of paragraph (9) and subparagraph (32)(g) of that rule. The 3 hazardous waste container management units at the Facility are the Outside Hazardous Waste Container Management Area ("OHWCMA") and Areas A and B inside the Hazardous Waste Management ("HWM") Building.

Some portions of this Section distinguish between "Received" and "Facility-generated" hazardous wastes which are defined as follows:

> "Received hazardous wastes" are those generated by others that are transported in containers (bulk or non-bulk) to the Facility and off-loaded for subsequent management at the Facility (does not include those containers/wastes that are not off-loaded from, or that are off-loaded and immediately re-loaded onto, the transport vehicle).
>
> "Facility-generated hazardous wastes" are those that are generated at the Facility, including (but not limited to) those that result from treating received hazardous waste or from combining received wastes from different generators in a container or tank.

This document does not include any sketches or diagrams showing how containers will be arranged and stored in the permitted container storage areas because such arrangements vary. The arrangement of containers depends upon variable factors including (but not necessarily limited to): (1) the number of containers present at any time, (2) the sizes and shapes of such containers, (3) whether they are palletized, (4) how they may have to be stored to provide separation of incompatible materials, and (5) how they are to be managed at the facility. ETSD receives a wide variety of wastes and containers

in somewhat irregular shipments from a large number of generators/shippers, so the mix of containers present at any time can be widely varying and is basically unpredictable.

B. OUTSIDE HAZARDOUS WASTE CONTAINER MANAGEMENT AREA

1. Design and Construction

The Outside Hazardous Waste Container Management Area or "OHWCMA" consists simply of the designated outdoor portion of the concrete-paved Containment Area where hazardous waste container management operations will be conducted. On the north, south and west, the unit is physically defined by the curbed and raised edge boundaries of the Contained Area. On the east, the OHWCMA boundary south of the HWM Building is arbitrarily established as the western outside wall of the HWM Building extended southward to the edge of the Contained Area. North of the HWM Building, the OHWCMA boundary is arbitrarily established as the west wall of the Tank Farm extended south to the HWM Building and north to the edge of the Contained Area. These boundaries are depicted on Figure 8.1-3 found in Attachment 8.1. The portion of the OHWCMA immediately north of the Hazardous Waste Management Building and immediately west of the Tank Farm is also referred to as the Fuel Blending Area. This Fuel Blending Area is the only portion of the OHWCMA that is currently roofed, although ETSD also intends to construct a roof over the western end of the OHWCMA in the future. The eastern boundaries of the OHWCMA were arbitrarily established for practicality and convenience, as it should be easy to visually maintain and verify compliance with these boundaries. Except within the confines of the Hazardous Waste Management Building, no hazardous waste containers should be set down in the Contained Area east of these boundaries. A painted line approximately 4 inches wide and or other marking is maintained on the concrete surface from the southwest corner of the Hazardous Waste Management Building to the southern edge of the Contained Area to visually define the eastern limit of hazardous waste management in the Outside Hazardous Waste Container Management Area.

2. Secondary Containment Evaluation

Secondary Containment for the OHWCMA is provided by the Contained Area of which the OHWCMA comprises the western part as described in Paragraph 8.B.1 above. The entire "ground" surface within the Contained Area is constructed of concrete and is sloped so that all precipitation

that hits the concrete surface and any liquids that might be spilled or leaked onto the surface are drained to three collection sumps from which they can be more readily removed. There is also a concrete berm or raised edge around the outer perimeter of the Contained Area which prevents liquid run-off, provides additional secondary containment capacity, and prevents storm-water run-on from adjacent areas. The locations of the perimeter berms/raised edges and the three storm-water collection sumps are shown on Figure 8.1-1 in Attachment 8.1. Figure 8.1-1 is a drawing showing the dimensions, elevations, and other details of the Contained Area that was prepared by the engineering firm Fisher & Arnold, Inc. ("F&A"), in 2009. Despite its age, this drawing is still applicable because there have been no significant changes to the Contained Area in the intervening years.

After storms, the accumulated storm water is pumped from the collection sumps into the four storm-water holding tanks (Tanks SW1, SW2, SW3, and SW4) located near the northeastern corner of the Contained Area (again see Figure 8.1-1). The pumps are pneumatically powered and manually controlled. Each of the holding tanks has a volume of approximately 10,000 gallons, providing a total storm-water holding capacity of 40,000 gallons. The accumulated storm water is subsequently tested to verify compliance with ETSD's sanitary sewer discharge limitations and then discharged to the Memphis sanitary sewer system via aboveground piping to the POTW Sewer Separator located just north of the Maintenance Building in the southeastern portion of the Contained Area.

Not much is known about the construction of the Contained Area. The current concrete surface was apparently constructed around the pre-existing HWM Building, Tank Farm, and Maintenance Building in the late 1980s or very early 1990s (it was in place in the fall of 1991). It is not known whether any of the tank pads at the east end of the Contained Area were present when the concrete surface was constructed. The thickness of the concrete base in unknown and likely varies. However, a concrete base thickness of 10 inches was found near the sump off the southwest corner of the HWM Building during a February 2017 maintenance effort. This effort involved replacing a small portion of the concrete base where severe spalling had occurred and was performed pursuant to ETSD's then concrete containment surface inspection and maintenance program. It is

also not known if any of the concrete base has reinforcing steel, but none was encountered during that February 2017 concrete replacement effort. There are some top- sealed construction joints in the surface of the Contained Area, but it is not known whether water stops were installed in the joints during construction. All three sumps in the Contained Area seem to have been formed with the surrounding slab by a monolithic concrete pour and have no apparent construction joints. In August 2015, again in conformance with its then concrete containment surface inspection and maintenance program, ETSD had a contractor coat the interior surfaces of the sumps with a chemical- resistant product to address some minor cracking and spalling that was observed.

The concrete surface of the Contained Area is principally bare concrete. The surface has been painted in some areas to provide operational instructions, and there are remnants in the OHWCMA of a gray surface coating that was poorly installed in the fall of 2008. There are several cracks in the concrete that have been sealed at the top pursuant to the *Secondary Containment Surfaces Inspection and Maintenance Plan* included in Attachment 4.3, and such maintenance efforts are ongoing. On April 11, 2018, ETSD had the contractor that applied coating to the Tank Farm's interior concrete surfaces in November 2017 apply the same 3 to 4-layer chemical- and wear-resistant Milamar coating system to an approximately 18-foot by 47-foot area of the OHWCMA where widespread surface spalling had occurred. This coated area is along the southeastern boundary of the OHWCMA northwest of the Maintenance Building and Gate 7.

The concrete surface, curbs, and sumps within the Contained Area are inspected and maintained, as described in the *Secondary Containment Surfaces Inspection and Maintenance Plan* (Attachment 4.3 to meet the regulatory standard found in Rule 0400-12-01-.06(9)(f)2(i)) which states "A base must underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed.". In Attachment 8.2 is an April 13, 2018 letter report from a F&A professional engineer that certifies, based on the engineer's inspection, that the secondary containment surfaces of the Contained Area continue to meet this regulatory requirement. As described in Paragraph 8.B.3 below, however, it was subsequently determined that the aged concrete secondary containment surfaces of the Contained Area required substantial repair and

rehabilitation to ensure long-term compliance with the regulatory standard, and a plan for the needed work was developed.

The F&A professional engineer's April 2018 letter also reaffirmed the Contained Area secondary containment volume calculations and determinations previously made by another F&A professional engineer in a December 9, 2009 report, and includes that December 2009 report as an attachment. As noted in Paragraph 8.B.3, the concrete repair and rehabilitation work is planned to retain the elevations and slopes of the existing concrete surfaces and thus should result in no significant changes to these calculations and determinations.

The OHWCMA shares the secondary containment capacity of all portions of the Contained Area except for the HWM Building and the Tank Farm which have sufficient, separate, secondary containment systems. Figure 8.1-1 in Attachment 8.1 was prepared by F&A in 2009 as part of its efforts to determine whether the Contained Area met the regulatory requirement of providing sufficient volume to accommodate the volume of the largest hazardous waste container that may be managed in the OHWCMA (a 6,000-gallon tanker truck, which would be greater than 10% of the total volume of liquid hazardous wastes that may be managed in containers in the OHWCMA) plus the rainfall from a 24-hour, 25- year storm. Making this determination is complicated by the Contained Area's irregular shape, multiple sloped surfaces, the added capacity provided by the storm-water collection sumps, and the capacity displacements by the HWM Building, Maintenance Building, Tank Farm, and other structures within its perimeter. Calculating the rainfall volume is also complicated by the Contained Area's irregular shape and the fact that certain portions of the Area must be excluded. These excluded areas include the roofs of the HWM Building and Maintenance Building as well as the canopy over the Fuel Blending Area because incipient rainfall onto these intercepting surfaces is drained by gutters and piping to discharge outside the Contained Area. The Tank Farm area is also excluded because incipient rainfall is separately captured.

In Attachment 8.2, F&A's professional engineer uses a combination of AutoCAD software calculations (using topographic survey information from Figure 8.1-1) and manual calculations to determine the secondary containment capacity of the Contained Area below its "spill-over

elevation" of 226.72 feet above MSL (the low point elevation of the perimeter berm/edge identified on Figure 8.1-1 of Attachment 8.1). These calculations result in a total net containment capacity of 15,209 cubic feet. The F&A report also calculates the rainfall volume that would result in the Contained Area from a 24-hour, 25-year storm event, which is 10,001 cubic feet. The Contained Area thus has a secondary containment capacity that is 5,208 cubic feet or 38,956 gallons greater than is needed to accommodate the storm event. This capacity will thus easily accommodate a 6,000-gallon liquid hazardous waste container release with over 32,000 gallons to spare.

The above evaluation does not factor in the storm water displacements that will be created by the temporary presence of containers and equipment in the Contained Area. It is not possible to exactly calculate such temporary displacements because (1) the number, size, and configuration of containers and equipment in the Contained Area will fluctuate greatly over time, and (2) many containers will be on pallets or otherwise designed for movement by forklift such that the actual storm water displacement at the bottom of the container is small. The displacement effect will be substantially lessened by ETSD's practice – performed to minimize interference with truck and forklift traffic – of placing most containers along the sloped perimeters of the Contained Area where storm water would be very shallow. Despite the inability to show an exact calculation, it is easy to see that the 38,956 – 6,000 = 32,956 gallons of excess secondary containment capacity far exceeds any such temporary displacements that might be envisioned. Considering that a standard 55-gallon drum will displace roughly 2 gallons per inch of height, this 32,956 gallons would allow for the equivalent displacement of 1,373 such drums sitting one foot deep in the accumulated storm water or 2,746 such drums sitting six inches deep in the accumulated storm water.

3. Planned Repair/Rehabilitation of Secondary Containment Surfaces

Except for a few areas where more recent repairs have been performed, the concrete base panels and perimeter curbs of the Contained Area were constructed from poured concrete more than 25 years ago. Some of these concrete secondary containment surfaces are now showing their age, and ongoing and increasing efforts have been necessary over the last several years to apply and replace joint sealing compound in cracks and joints to seal them against leaks. In September 2018, ETSD

entered into a contract with F&A to have a professional civil engineer with extensive experience and expertise in the concrete design and construction industry evaluate the condition of the existing concrete secondary containment surfaces and develop a plan for repairing or replacing the concrete surfaces to bring them into long-term compliance with the Tennessee Rule 0400-12-01-.06(9)(f)2 requirements. These efforts by ETSD and F&A, along with review and comment by Tennessee Division of Solid Waste Management ("TDSWM") personnel, have resulted in the *Concrete Repair and Rehabilitation Plan for the Contained Area* that is included in Attachment 8.6. This plan describes in detail the extensive concrete replacement, joint/crack sealing, and other repair efforts that F&A's concrete expert identified as necessary for long-term secondary containment effectiveness and regulatory compliance of the Contained Area. Notably, the plan requires that any new replacement concrete surfaces be constructed to the same elevation and slopes as the old surfaces being replaced. This work will have to be performed in several separate phases so as to enable continued facility operations and to maintain compliance with secondary containment requirements during these construction activities. The plan thus also sets forth a multi-phased schedule by which these efforts are to be implemented, keyed to the effective date of the facility's renewal permit. Further, the Plan also describes certain subsurface investigations that will be performed during the planned replacement of many of the existing concrete panels, provisions that will be implemented during construction to help maintain secondary containment compliance and facilitate ongoing ETSD operations during construction, and how the concrete debris and residues from construction activities will be managed.

C. HWM BUILDING AREAS A AND B

1. Design and Construction

The HWM Building is a steel-framed, steel-sided, and steel-roofed building with a concrete floor (equipped with grated, blind, spill collection trenches) and concrete containment walls that provide indoor secondary containment separate from that provided by the Contained Area itself. This building is comprised of two separate areas which each have their own secondary containment system. Each such area has ramped doorways to the Contained Area outside to provide foot and forklift access, and there is also a ramped doorway between them that provides foot and forklift access. The western portion of the building is known as "Building A" (or "Area A"), while the

eastern portion is known as "Building B" (or "Area B").

In Attachment 8.1, Figure 8.1-2 is a scale drawing showing how the HWM Building (referred to on the drawing as the "RCRA Container Storage Building") was designed and constructed. This drawing was prepared in January 1991 by Brough and Stephens, Inc. for Bryson Recovery Services which owned the Facility at that time. Although quite dated, there have been no non-maintenance structural changes to the building so the floor plan and layout details still apply. In its 1991 permit application, Bryson Recovery Services noted that the building's concrete containment floor, 12-inch-high perimeter containment walls, 12-inch-high dike between Area A and Area B, and collection trenches for the building was constructed in a monolithic pour (thus no construction joints) and consists of 7-inch reinforced concrete slab (4,000 psi, 28-day, with 0.006 vapor barrier). It was also noted that the concrete was coated with a double epoxy coating.

2. Secondary Containment Evaluation

The concrete floor, walls, and collection trenches within Areas A and B of the HWM Building are inspected and maintained, as described in the *Secondary Containment Surface Inspection and Maintenance Plan* included in Attachment 4.3, to meet the regulatory standard of being free of cracks and gaps and sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed. In Attachment 8.2 is a January 4, 2019 letter report from a F&A professional engineer that certifies, based on the engineer's recent inspection, that the secondary containment surfaces of HWM Building Areas A and B continue to meet this regulatory requirement. The professional engineer's letter also confirms that Figure 8.1-2 (an April 3, 1991 drawing of the "RCRA Container Storage Building" by Brough & Stephens, Inc.) in Attachment 8.1 still accurately represents the building design and construction and reaffirms the secondary containment volume calculations and determinations previously made by another F&A professional engineer in a December 9, 2009 report. The 1991 drawing and that December 2009 report are included with the January 2019 F&A letter report in Attachment 8.2.

The December 2009 professional engineer's report in Attachment 8.2 also shows the calculations of secondary containment capacity for both Building A and Building B. For Building A, the

rectangular geometry provides for simple calculations which yield a net secondary containment volume of 10,274 gallons. For Building B, the building geometry is more complex and results in much more complex calculations. These calculations yield a net secondary containment volume of 12,114.7 gallons.

Because the HWM Building has a roof and walls, including the containment walls that prevent storm water run-on, the secondary containment volume requirement for these areas is simply that they have sufficient volume to accommodate whichever is greater of the volume of the largest container, or 10% of the total volume of hazardous waste in containers, that is allowed in the secondary contained area as described in Subsection 8.E below. For Building A, 10% of the maximum operating capacity limit (see Subsection 8.E below) is 1,672 gallons. For Building B, 10% of the maximum operating capacity limit (see Subsection 8.E below) is 1,100 gallons. These volumes are both greater than the volume of the largest container that might be contained within the areas, but they are obviously much less than the available secondary containment calculated by the F&A engineer in Attachment 8.2. In fact, considering that a single drum would displace approximately 23.5 gallons of secondary containment capacity when sitting on the concrete floor of these containments, it is clear that both Building A and Building B will have sufficient secondary containment volume even if the containers are placed directly on the floor.

D. MAXIMUM OPERATING CAPACITIES

1. Operating Capacity Limitations

As specified in Permit Condition III.A, ETSD has established both maximum operating capacity limits (in gallons of hazardous waste allowed at any one time) for each of the three permitted container storage units and a separate "facility-wide" maximum operating capacity limit (61,720 gallons) that applies to the combined amount allowed in all three units at any one time. For business reasons, ETSD does not want to have as much hazardous waste in the three secondarily contained container management units at the Facility as would be allowed by the design or secondary containment capacity of the units. ETSD has therefore established the following maximum operating capacity limits:

- Facility-wide Total,.....61,720 gallons
- HWM Building A,.....16,720 gallons

- HWM Building B, ... 11,000 gallons
- OHWCMA, ... 42,000 gallons

The most meaningful of the operating capacity limits listed above is the Facility-wide Total limit, which is obviously much less than the combined operating capacity limits for the three permitted container management units. The difference provides ETSD with the flexibility to adjust to changing business conditions, which at any given time can result in a surge in received volumes of one or more particular types of hazardous wastes, or in the size of received containers, which may dictate where the received waste will be stored and processed. As described in Paragraphs 8.B.2 and 8.C.2 above, secondary containment capacity is not a limiting factor for any of these operating capacity limits.

"Facility-generated" (a.k.a. "site-generated') hazardous wastes are included in the above operating capacity limits. ETSD prefers and fully intends to hold containers of such facility-generated wastes within the secondarily contained units during their allowed accumulation period. The vast majority of such facility-generated wastes will be generated and accumulated in bulk containers in the OHWCMA.

2. Determining Compliance with Operating Capacity Limits

For purposes of determining compliance with the operating capacity limitations established above, the volume of hazardous waste present will be determined by:

- For each container having a volume of 55-gallons or less, the container size will be used to calculate capacity. ;
- For an "over-pack" container, counting the volume of the largest container it could hold (maximum of 55 gallons);
- For containers larger than 55-gallons, the container size will be used to calculate capacity.

ETSD will ensure that containers of facility-generated hazardous waste and any non- hazardous waste containers in the permitted areas are clearly marked or labeled as such. These containers will be counted toward capacity limits.

3. Daily Container Inventory

To help ensure compliance with the operating capacity limitations set forth in Paragraph 8.D.1 above, ETSD personnel shall perform a Daily Container Inventory each operating day. The Daily Container Inventory requires ETSD personnel to visually inspect each of the three "container operating areas" at the Facility, perform the container counts and volume determinations as described in Paragraph 8.D.2 above for each such area, and document the capacity determinations using the Daily Container Inventory form included in Attachment 8.3. Also included in Attachment 8.3 is a diagram showing the three container operating areas at the Facility.

Completed Daily Container Inventory forms will be maintained at the Facility for a period of three years and made available to TDSWM/USEPA inspectors upon their request.

E. CONTAINER MANAGEMENT PROCEDURES AND OTHER REQUIREMENTS

1. Co-Management of Other Materials

ETSD manages a wide range of hazardous and non-hazardous wastes at the facility, and in a variety of different containers. Containers of non-hazardous wastes are generally managed at the facility in the same manner as containers of hazardous wastes. Pursuant to Tennessee Rule 0400-12-01-.06(2)(k), containers of non- hazardous wastes or other material may be co-managed in the hazardous waste container management units only if:

- The containers of non-hazardous waste or other material is labeled, marked, or otherwise clearly identifiable as to their contents;

- ETSD personnel are able to demonstrate that the other waste or material is not a hazardous waste; and

- The containers of non-hazardous waste or other materials are managed in a manner that does not adversely impact compliance with the Rule 0400-12-01-.06 standards.

2. Movement and Tracking of Waste Containers Through the Facility

Waste containers are received into and shipped from the Contained Area of the facility. Within its secondary containment perimeter are all three of the individually permitted hazardous waste container management units (Areas A and B of the HWM Building and the OHWCMA) and both permitted hazardous waste tanks (Tanks F1 and F2). Wastes are received at the facility by truck in containers of all types and sizes ranging from 6,000-gallon tanker trucks to one-gallon containers or smaller (although smaller containers are typically packaged in larger containers for ease of handling). By far the most common container received and handled is the steel 55-gallon drum. A truck may on occasion be driven into and off-loaded almost anywhere within the OHWCMA. However, most incoming waste shipments are received in box vans or trailers which are off-loaded at the Truck Loading Dock located at the west end of the Contained Area. The off-loaded containers are then moved into the western portion of the OHWCMA, which is referred to as the Receiving Area. As described in Attachment 2 (Waste Analysis Plan) of this Permit, received waste containers are typically held in the Receiving Area until they complete the Incoming Shipment Screening Procedures and are accepted for management at the facility. Once accepted, the containers are typically moved from the Receiving Area to the waste processing or container storage areas. However, because the Receiving Area is also used for gathering and loading outgoing shipments of smaller containers, some containers that are managed on a simple container-in, container-out basis simply move from an incoming load to an outgoing load that is being prepared in the Receiving Area.

Some incoming waste shipments, particularly fuel-candidate liquids, are received in tanker trucks which are moved to the Fuel Blending Area portion of the OHWCMA (north of the HWM Building) for incoming shipment screening and off-loading. Once the waste is accepted, such tanker loads are then off-loaded by pumping into either Hazardous Waste Tanks F1 or F2 or into other containers. Some truckloads of bulk liquid containers may also be received and off-loaded in this manner. Outgoing shipments of hazardous waste-derived fuel are also loaded and shipped from this area. Typically, the blended fuel is pumped into a tanker truck for off-site transport in bulk.

Wastes destined for landfill disposal are typically consolidated into roll-off box containers located (perpendicular to the fence) along the southern side of the OHWCMA (but are not necessarily restricted to this location). The fence and curb along the south side of the OHWCMA parallel the property line between the adjacent ETSD and Best Wade Petroleum properties that comprise the Facility.

The size and configuration of the HWM Building and especially the OHWCMA provides a great deal of operational flexibility in exactly where processing operations are performed and hence in the internal movement of waste containers. The fixed locations of the Tank Farm and the Disperser Unit confine fuel blending activities to the designated Fuel Blending Area, but precursor decanting and consolidation activities can be performed almost anywhere within Areas A and B of the HWM Building and the OHWCMA. Basically, any operations involving storage and treatment in containers can similarly be performed almost anywhere within these three hazardous waste container management units. The only real limitation is the 50-foot separation distance that must be maintained, within Area B of the HWM Building, between containers of ignitable and/or reactive wastes and ETSD's eastern property line. This operational variability means that the received containers of hazardous wastes that are to be processed at the Facility may be placed and moved almost anywhere within Area A, Area B, and the OHWCMA (subject to the requirements and limitations described in this Section) as they are stored and then assembled for processing. The containers in a received shipment that hold the same waste stream from a generator are typically kept together during storage and then processed together.

All processing of wastes at the Facility is performed on a "batch basis" and typically involves the mixing of wastes from smaller containers (55-gallon drums and smaller) into bulk containers (e.g., totes, roll-off boxes, tanker trailers) or Tanks F1 or F2. Each such batch operation is "built" from received containers of process-amenable wastes and is scheduled and implemented when a sufficient volume of such wastes has been received. The selected containers will then be moved to the targeted location for processing.

The variability (e.g., in timing, location, and the number and type(s) of containers involved) inherent in the container processing operations performed at the Facility means that containers may be moved from one storage location to another while the batch is being built and then ultimately processed. It is neither practicable nor necessary to formally track such movements of individual containers from one location in the three integrated container storage areas to another location. However, the processing (and thus emptying) of received waste containers is tracked on a container-by-container basis using the Process Batch Sheet form included in Attachment 4.3. A Process Batch Sheet is initiated for each batch operation and is used to record each individual waste container that is processed in that batch. The following key information is recorded on the Process Batch Sheet (which may consist of more than one page):

- Date the processing of the batch began
- Process type
- Number or other identifier for the container or tank which receives the wastes (i.e., where the processing is performed) [Note: The date the processing of the batch began is also the date that accumulation begins in such containers.]
- For each received container of waste from which waste is removed and placed in the receiving container/tank, the following information:
    - MPF number marked on the container (this is the number of the approved Material Profile Form for this waste stream)
    - ROR/container number marked on the container (this is the container's unique identifying number assigned during the shipment Receiving process)
    - Container size
    - Quantity of waste removed from the container for processing
    - Quantity remaining in the container [Note: Some containers holding stratified layers of waste may be subjected to two or even three processes before they are emptied.]

The completed Process Batch Sheets typically are affixed to and accompany the hazardous waste manifest utilized in shipping the processed batch off-site. Copies of all completed Process Batch Sheets are retained in ETSD's operating records, typically in combination with the generator copy of such manifests, until closure of the Facility.

Forklifts, hand dollies, and pallet jacks are used to unload containers from trucks and to move containers within the facility. Containers are moved on pallets, with forklift drum clamps, or by hand dolly. Prior to any forklift movement, any containers to be moved are closed. No more than four 55-gallon drums are moved on a pallet at a time; drums are never double-stacked while being moved. Five-gallon or smaller containers may be stacked, to a total height of no more than four feet, while being moved. Higher stacking is only permitted if the containers on the pallet are secured (i.e., shrink-wrapped or banded) so that they cannot fall off the pallet.

3. Container Type, Condition, and Replacement

(a) Except as provided in Subsection Subparagraph 8.E.3.(c) below, it is ETSD's intent that the containers utilized at the facility for managing hazardous wastes meet applicable U.S. Department of Transportation ("USDOT") regulations on packaging hazardous material for transportation. This ensures that the containers used to hold hazardous waste at the facility are in good condition and made of or lined with materials which will not react with, and are otherwise compatible with, the hazardous waste to be contained, so that the ability of the container to contain the waste is not impaired. It also helps ensure compliance with the "RCRA Subpart CC" requirements for containers set forth at Tennessee Rule 0400-12-01-.06(32)(g) [equivalent to 40 CFR §264.1086]. Key ETSD personnel are trained in USDOT hazardous material packaging requirements, and a supply of empty USDOT-approved containers and parts is kept on hand.

(i) ETSD personnel trained in USDOT hazardous material packaging requirements ensure that the containers in which Facility-generated hazardous wastes are placed meet the applicable USDOT packaging requirements (except as provided in Subparagraph 8.E.3.(c) below).

(ii) ETSD presumes that all containers in which received hazardous waste arrive at the Facility were selected by the generator/shipper to meet applicable USDOT packaging requirements (as required by USDOT regulations, USEPA/State hazardous waste management regulations, and the manifest certification). Due to the complexity of the USDOT packaging requirements (including exemptions and special permits), it is not

practicable for ETSD to try to verify that received hazardous wastes are in appropriate USDOT- approved packaging. However, if a received hazardous waste arrives in a container that is obviously inappropriate, or must be placed in another container as described in Subparagraph 8.E.3.(b) below, then ETSD personnel trained in USDOT hazardous material packaging requirements will ensure that the waste is placed in a receiving container meets the applicable USDOT packaging requirements (except as provided in Subparagraph 8.E.3.(c) below).

(b) If and when ETSD personnel identify a container holding hazardous waste at the facility that is not in good condition (e.g., leaking, severe rusting, apparent structural defects, improper covers or closure devices) or that is not properly closed, then corrective actions will be taken as described in sub-items (i) through (iv) below. As described in Attachment 2 (Waste Analysis Plan) of this Permit, containers of waste that are received via incoming shipments are inspected for these problems and corrective actions are taken prior to acceptance. However, these corrective actions will also be taken any time a container of hazardous waste with such problems is identified:

(i) If a container is found to be not in good condition, then efforts are initiated to either (1) transfer the hazardous waste to another container(s) that is in good condition; (2) transfer the hazardous waste to a tank; (3) place the bad container in an "overpack" container that is in good condition; or (4) manage the waste in some other way that complies with the requirements of Tennessee Rule 0400-12-01-.06.

(ii) If a container is found to be improperly closed because of poorly installed covers or closure devices, then the covers or closure devices will be properly installed.

(iii) If a container is found to be improperly closed because of improper or damaged covers or closure devices, then either the covers or closure devices will be repaired or replaced and properly re-installed or one of the actions described in (i) above will be taken.

(iv) ETSD will make its first efforts at implementing these corrective actions immediately after the problem is detected, and the corrective actions will be completed as soon as possible. Any corrective action requiring additional time must be documented in the facility operating record providing adequate reason why it could not be completed in a timely manner.

(c) ETSD utilizes some containers as process vessels at the facility. Although such process vessels may not meet all applicable USDOT packaging requirements for containers in transport, ETSD will ensure that such containers are in good condition, equipped with effective covers/closure devices, and made of or lined with materials which will not react with, and are otherwise compatible with, the hazardous waste to be contained, so that the ability of the container to contain the waste is not impaired. If it is discovered that such a container is not in good condition, then its contents will be transferred to one that is in good condition. See also Subsection 9.H of this Permit.

4. General Container Handling Procedures

(a) Containers holding hazardous waste are not opened, handled, or stored in a manner which may rupture the container or cause it to leak, unless such rupturing or puncturing is part of the planned processing of the waste container.

(b) Hazardous waste containers are stored and processed only within the OHWCMA or the HWM Building. These areas have secondary containment meeting the requirements of Tennessee Rule 0400-12-01-.06(9)(f).

(c) As more fully described in Attachment 4 (Facility Inspections) of this Permit, ETSD personnel will formally inspect all areas where containers of hazardous wastes are stored or processed at least weekly, looking for leaks or other deterioration of containers and the containment system caused by corrosion or other factors.

(d) Drums and other small containers (<119 gallons) will be managed in rows no more than one 4-drum pallet (4 to 5 feet) wide, with a minimum aisle space of 2.5 feet between rows. Larger

containers will be similarly managed in rows no more than two containers wide, again with a minimum aisle space of 2.5 feet between rows. This allows for personnel access so that each container can be readily inspected for label information, condition, and leaks. Such rows may extend perpendicular from perimeter walls and berms without providing aisle space between the containers and the wall or berm, but otherwise only individual containers may be placed against such walls or berms. Where they parallel perimeter walls or berms, rows that are 2 containers wide must be separated from the wall or berm by a minimum aisle space of 2.5 feet.

(e) For ease of movement, containers in storage or processing are normally placed on pallets. However, containers may be placed directly on the secondary containment surfaces anywhere within the HWM Building or the OHWCMA as long as such placement is in compliance with the other provisions of this Section.

(f) Containers larger than five gallons in size may be stored in stacks of no more than three container layers high.

(g) Where drums are stacked, each layer will be separated by a pallet.

5. Opening and Closing Containers

For purposes of this Section, a container is (1) "closed" if the cover and closure devices are in place and secured in the closed position, and (2) "open" if it is not closed.

(a) Except as provided in items (b), (c), and (d) below, ETSD personnel will ensure that containers holding hazardous wastes are kept closed while they are being managed at the facility. Containers that are stacked will be closed.

(b) As described in Attachment 2 (Waste Analysis Plan), newly received containers may be opened for visual inspection and sampling as part of the screening process for incoming wastes. In preparation for or subsequent to processing, containers may also be opened for such routine

activities as volume measurement, visual inspection, instrument monitoring, or sampling. Following completion of the activity, ETSD personnel will promptly close the container.

(c) When wastes or other materials are being transferred into or out of a container, ETSD personnel will open and close containers as follows:

- When a container becomes "RCRA-empty" (as defined at Tennessee Rule 0400- 12-01-.02(1)(g)), it may remain open;
- When a container is being emptied to "RCRA-empty" condition in a continuous operation, it may remain open;
- When a container is being filled to the intended level in a continuous operation, it may remain open until filling is complete and then it must be promptly closed; and
- When a container is being emptied or filled in intermittent batches, it must be promptly closed when either of the following occur:
  - When the container has been filled to the intended level;
  - When a batch has been removed or added and no other removal or addition will occur within 15 minutes;
  - When the person performing the loading/unloading operation leaves the immediate vicinity of the container; or
  - When the process generating the material being added to the container shuts down.

(d) For reasons of safety and efficiency, it is frequently appropriate to open and process waste containers in multiple-container batches (e.g., bulking wastes from tote tanks, drums, or

smaller containers into larger containers or tanks). In such cases, multiple containers may be moved into the processing area and opened in order to facilitate such processing, subject to the following limitations:

- The processing area will be located and configured in a permitted unit, or portion thereof, such that batches of containers can be placed and safely processed in the immediate vicinity of the processing equipment without blocking access to the processing area or the rest of the unit for emergency equipment.

- Opened containers will not be moved again until re-closed or rendered "RCRA- empty".

- While the devices that securely close the container may be removed (e.g., clamping or bolted rings) or loosened (e.g., unscrewed), the container lids themselves will be kept in place until that container is processed.

- For purposes of this exception from container closure requirements, a container batch can include no more than 20 individual containers.

- Prior to any work stoppage longer than 15 minutes (e.g., lunch break, shift change, end of workday), any containers that have been opened for batch processing will be closed if they have not been rendered "RCRA-empty."

- Any containers that have been opened for batch processing and not yet rendered "RCRA-empty" must be closed before the operator responsible for the operation leaves the immediate processing area.

6. Managing Spills in Container Management Units

When ETSD personnel inadvertently cause a spill from a container, or encounter a spill or leaking container inside a secondarily contained container management unit, they will take prompt action to:

- First, isolate the area and warn others so as to minimize employee exposure and tracking by personnel and equipment;

- Second, identify the source and prevent continuing releases (e.g., righting tilted drums, tightening container closures, overpacking or transferring the contents of leaking containers); and

- Third, clean up the spilled material and properly manage the spill cleanup residues. As described in Attachment 6 (Preparedness and Prevention) and Attachment 7 (Contingency Plan) of this Permit, ETSD maintains emergency and spill response equipment and supplies at various locations throughout the facility. Spills of solid materials are typically cleaned up using shovels, brooms, and pans, and the spill residues are placed back into the original container (if such can be identified). Spills of liquid materials are typically cleaned up using sorbent booms or pads or granular sorbents. If the container that is the source of the spill is known and if such is feasible, the spill cleanup residues are placed back into the original container. If the source of the spilled material is unknown, or if the spill cleanup residues cannot feasibly be placed back into the original container, then the spill cleanup residues will be containerized, characterized, and managed as a facility-generated waste in accordance with Tennessee Rule 0400-12-01-.03.

7. Special Requirements for Ignitable, Reactive, and/or Incompatible Wastes

(a) ETSD personnel will ensure that containers holding ignitable or reactive waste are located at least 50 feet from the facility's property line. This 50-foot Rule impacts container management operations only along the eastern side of Area B of the HWM Building. ETSD personnel are trained to simply not place containers with labels or markings indicating ignitable or reactive contents (including newly received waste containers that have not yet been accepted into the facility) near these boundaries. Painted lines or other markings will be maintained on the floor of Area B at least 50 feet inside the eastern property line to help ETSD personnel identify this boundary.

(b) ETSD personnel will ensure that, except as specified in item (c) below, (1) incompatible wastes, or incompatible wastes and materials, are not placed in the same container, and (2) wastes are not placed in an unwashed container that previously held an incompatible waste or material. Because waste consolidation and re-containerization are principal processes performed at the facility, material incompatibility is a primary topic of personnel training and a major focus of fingerprint analysis of wastes targeted for consolidation.

(c) Received containers of incompatible materials are identified and segregated principally using the *Segregation Table for Hazardous Materials* found at 49 CFR §177.848(d) of the U.S. Department of Transportation's regulations governing transportation of hazardous materials. A copy of this table is included in Attachment 8.4. It provides a very convenient guide for managing received containers because each such container of "hazardous materials" – a U.S. DOT term that includes "hazardous wastes" as well as other materials – is required to have a label identifying the U.S. DOT hazard class(es) or division(s) that apply to the material contained. The *Segregation Table* will be used as follows to guide the management of received containers of potentially incompatible materials:

(i) Except as provided in item (iv) below, the letters "X" and "O" in the table indicate that the containers may not be stored together or must be separately secondarily contained during storage (as described in item (f) below).

(ii) The absence of any hazard class or division or a blank space in the table indicates that no restrictions apply.

(iii) Although not restricted by the table, containers holding Class 8 (corrosive liquids) materials that are acidic and containers holding Class 8 materials that are basic must be separately secondarily contained (as described in item (iv) below) except as provided in (d) below.

(iv) If ETSD has performed testing that demonstrates that the materials, if commingled

under uncontrolled conditions, will not react to produce heat or pressure, fire or explosion, violent reaction, toxic dusts, mists, fumes, or gases, or flammable fumes or gases, then containers of such materials do not have to be separately secondarily contained.

(v) ETSD does not accept Class 1.1, 1.2, 1.3, 1.4, or 1.5 explosive materials.

(d) Containers of incompatible ETSD-generated wastes will be identified and segregated using the guidance provided in Appendix V of Tennessee Rule 0400- 12-01-.06, except as provided in sub-item (c)(iv) above. A copy of that guidance is included in Attachment 8.5. Segregation will be accomplished by separately secondarily containing incompatible wastes as described in item (f) below.

(e) ETSD does perform neutralization and stabilization of corrosive wastes in containers. Special precautions (i.e., selection of candidate waste streams, bench testing in ETSD's on-site laboratory, careful control of input rates, monitoring of pH and temperature) are taken to prevent reactions which (1) generate extreme heat or pressure, fire or explosions, or violent reactions; (2) produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment; (3) produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; (4) damage the structural integrity of the container or other device or facility; or (5) through other like means threaten human health or the environment.

(f) ETSD personnel will ensure that a storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers is separately secondarily contained. The facility has four separate secondarily contained container management areas at the facility as follows:

- HWM Building A,

- HWM Building B,
- The northern portions of the OHWCMA that drain to the collection sump off the northwest corner of the HWM Building, and
- The southern portions of the OHWCMA that drain to the collection sump off the southwest corner of the HWM Building.

The required separation of incompatibles is accomplished using these different secondarily contained container management areas and/or portable containment units ("PCUs" – e.g., spill pallets). Such PCUs must (1) be of sufficient size to contain the greater of the volume of the largest container or 10% of the combined volume of all containers within the PCU plus, for PCUs placed in unroofed areas of the Outside Hazardous Waste Container Management Area, the volume of rainfall the PCU would collect during the 24-hour, 25-year storm event; (2) be constructed of materials compatible with the material it contains; and (3) allow ready inspection of the containers it holds. Containers of incompatible materials will be managed using PCUs and the four separate secondarily contained areas as follows:

(i) Except as provided in (ii) and (iii) below, any container holding a material that is incompatible with the contents of one or more of the other containers in a secondarily contained area must be placed on a portable containment unit ("PCU").

(ii) Containers located in the Receiving Area (the westernmost portion of the Outside Hazardous Waste Container Management Area) that have been received but not yet accepted or have been gathered for an off-site shipment, are exempt from this container separation requirement (except as may be required by applicable USDOT requirements).

(iii) Containers that do not hold free liquids will be considered adequately separated from containers holding incompatible liquids if they are separated by a collection

sump or trench or other means.

(g) Water-reactive (dangerous when wet) wastes may be stored in any permitted container management unit at the Facility as long as the waste is in an appropriate U.S. DOT-approved container; the container is properly labeled, in good condition (with no evidence of leaks), and securely closed; and the waste container is managed in accordance with the other provisions of this Section. When outdoor conditions are rainy or wet, such containers may be opened only in areas under roof.

8. Special Considerations for the HWM Building

(a) Except possibly for temporary placement immediately after or before transport, containers shall not be placed over the grated collection trenches such that they would impede inspection of such trenches for collected liquids or removal of such collected liquids.

(b) Spilled or leaked materials (and accumulated precipitation, if any) must be removed from the collection trenches immediately.

9. Special Considerations for the OHWCMA

(a) Containers (except those loaded onto trucks) may not be placed within 10 feet of the collection sumps located off the northwest and southwest corners of the HWM Building. This will help ensure that proper vehicle access to all portions of the Contained Area is maintained, and it will also minimize the potential for containers to stand in pooled storm water or to interfere with storm water management operations. For the same reasons, containers will be generally stored along the outer perimeter of the OHWCMA.

(b) Containers constructed such that exposure to rainfall might cause a rapid deterioration of their structural integrity (e.g., paper or cardboard containers) or expose their contents to such precipitation may be placed in the OHWCMA only if:

(i) They are to be immediately processed when no precipitation is occurring;

(ii) They are placed on pallets (or otherwise elevated above the concrete containment surface) and under roofed portions of the OHWCMA; or

(iii) They are placed on pallets or otherwise elevated above the concrete containment surface and protected from rainfall by other secured cover (e.g., tied-down tarp).

(c) Roll-off boxes placed in unroofed portions of the OHWCMA will be equipped with bows and tarps or other covering devices such that rainfall will not enter the box.

(d) Spilled or leaked wastes will be removed from secondary containment collection sumps in a timely manner (i.e., as soon as practicable to prevent overflow of the collection sump, to minimize the potential for such wastes to become mixed with large amounts of storm water, and to minimize potential container exposure to standing liquids).

(e) Storm water (and any spilled or leaked wastes that it may include) will be removed from the secondary containment collection sumps in a timely manner (i.e., as soon as practicable to prevent overflow of the collection sump and to minimize potential container exposure to standing liquids). Removal will be accomplished using pumps to transfer the accumulated water from the collection sumps into the Storm Water Holding Tanks located along the eastern edge of the facility or, if necessary or appropriate, into other tanks or containers. Prior to any such pumping, the sumps will be inspected for visible waste residues and, to the extent necessary or practicable, such residues will be removed. Waste residue removal will be accomplished using sorbent booms and pads or other physical means, in combination with controlled pumping. Removed residues, including used booms and pads, will be placed in containers and subsequently managed, including characterization as a hazardous or non-hazardous waste, as a facility-generated waste pursuant to Tennessee Rule 0400-12-01-.03.

(f) Along much of the southern edge of the OHWCMA, secondary containment is provided by

the raised edge of the sloped concrete base rather than by a berm or wall. To help ensure that no spilled or leaked wastes is released over such concrete edge, ETSD will apply and maintain a painted line at least 12 inches inside the un- bermed raised concrete edge and ensure that all waste containers are placed inside that line.

10. Management of Emptied Containers

(a) Containers that have been partially emptied but have not been rendered "RCRA- Empty" (as defined at Tennessee Rule 0400-12-01-.02(1)(g)) will be managed as if they are full.

(b) Containers that have been rendered "RCRA-Empty" (as defined at Tennessee Rule 0400-12-01-.02(1)(g)) are subject only to the following requirements:

(i) They will be managed so as to minimize any loss of the hazardous wastes residues they may still contain to containment or ground surfaces.

(ii) They will be managed to avoid any accidental accumulation of rain water or other material that would render them non-RCRA-Empty.

11. Additional Provisions for Compliance with Organic Air Emissions Standards for Containers

ETSD is primarily a fuel-blending facility, and thus much of the waste received and generated (e.g., waste-derived fuel) contains an average volatile organics concentration greater than 500 ppm by weight. Thus, containers within which such waste is managed are subject to the "Subpart CC" requirements of Tennessee Rule 0400-12-01-.06(32)(g), as applicable. Consequently, ETSD's container management procedures as described in Subsection 8.E have been designed to ensure that virtually all containers at the facility with a design capacity greater than 26 gallons that hold hazardous wastes will be managed in compliance with Subpart CC requirements.

(a) General

Containers having a design capacity greater than 26 gallons but less than or equal to (≤) 119 gallons will be managed in compliance with the Container Level 1 standards of Tennessee Rule 0400-12-01-.06(32)(g)3. Containers having a design capacity greater than (>) 119 gallons will be managed in compliance with the Container Level 2 standards of Tennessee Rule 0400-12-01-.06(32)(g)4. ETSD's compliance with these standards, except as provided in Subparagraph 8.E.11(b) and 8.E.11(c) below, is described in earlier paragraphs of this Subsection 8.E. The only containers that might be reused for a period of 1 year or more at the facility for managing hazardous wastes with an average volatile organic concentration of 500 ppm by weight or greater will be the totes and other bulk containers used as process vessels in fuel blending. Subsection 9.H describes how organic air emissions from these process vessels are controlled.

(b) Transfer of Wastes Into and Out of Bulk Containers Other than Process Vessels Used in Fuel Blending-

How wastes are transferred in and out of bulk containers (>119 gallons) depends upon the chemical and physical properties of the waste, the design of the receiving container, the size and design of the discharging vessel, and good engineering and safety practices for handling hazardous materials; however, such transfers will be performed in such a manner as to minimize exposure of hazardous wastes containing volatile organics to the atmosphere, to the extent practical. Transfers will typically be performed as described in (i) through (iii) below:

(i) Liquid wastes (that are pumpable) will typically be transferred in and out of bulk containers using pumps or gravity flow and chemical transfer hoses, and the discharge end of the hose will initially be lowered to the bottom of the receiving container and withdrawn slowly such that waste discharge occurs under the liquid surface in the receiving container (i.e., submerged fill).

(ii) Non-pumpable liquid, semi-solid, and solid wastes will typically be transferred into and out of bulk containers by pouring the waste from the discharging container into the

open top of the receiving container. As necessary, transfer devices such as buckets, shovels, scoops, etc., will be manually utilized by ETSD personnel to implement such transfer. Where such non-pumpable liquid, semi-solid, and solid wastes are to be combined with pumpable liquids in a bulk container (such as in the fuel blending process vessels), the pumpable liquids will typically be added last.

(iii) Liquid wastes from containers which can be readily handled by hand (e.g., 5-gallon size or smaller), may be poured by hand from the discharging container into the open top of the receiving bulk container.

ATTACHMENT 8.1

FIGURES

Figure 8.1 - 1

CONTAINMENT VOLUME AT WATER SURFACE ELEV. 226.72

Fisher & Arnold, Inc..

"CONTAINMENT VOLUME AT
WATER SURFACE ELEV. 226.72"

Project Number: G6378

Date: 11/12/2009

NET VOLUME below Elevation 226.72
15,147 cu. ft.

FISHER & ARNOLD, INC.
9180 Crestwyn Hills Drive • Memphis, Tennessee 38125-8538
901-748-1811 • Fax: 901-748-3115 • Web: www.fisherarnold.com
Architects • Engineers • Environmental Consultants • Interior Designers • Landscape Architects • Planners • Surveyors

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EXCEL TSD INCORPORATED
CONTAINMENT VOLUME CERTIFICATION
552 RIVERGATE ROAD
MEMPHIS, TN 38109

Rev.	Date	Revision Description

Seal

Issue Date:	11/12/09
Project No:	G6348
Drawn By:	B. S.
Checked By:	R.A.P.

Sheet Title:
Containment Volume
At Water Surface Elev. 226.72

SHEET 1 OF 1

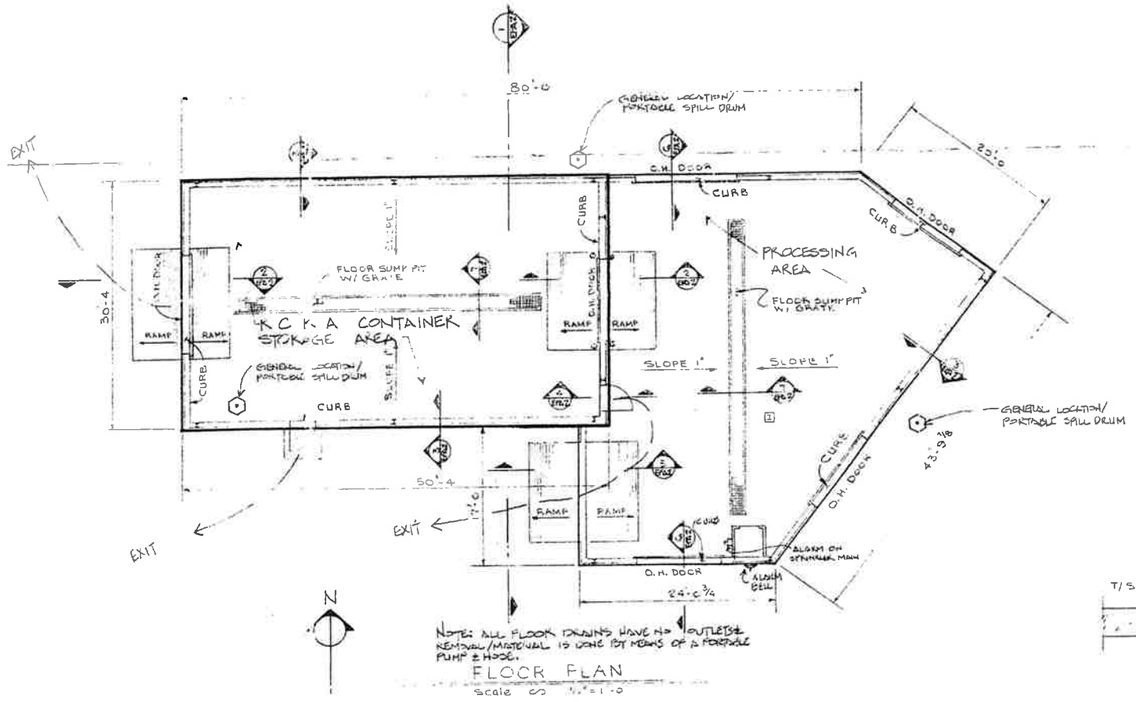
Figure 8.1 - 2

RCRA CONTAINER STORAGE BUILDING FLOOR PLAN & SECTIONS

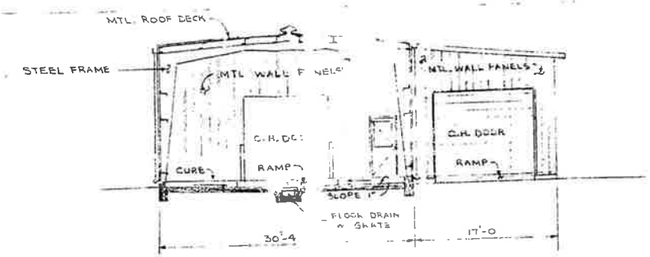
Brough and Stevens, Inc..

"RCRA CONTAINER STORAGE BUILDING FLOOR PLAN & SECTIONS"

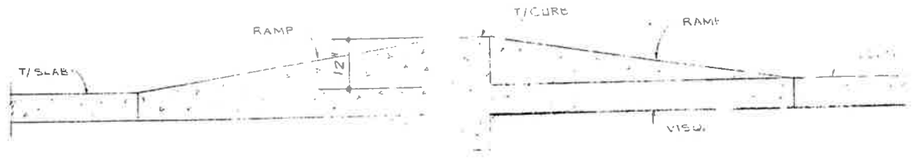
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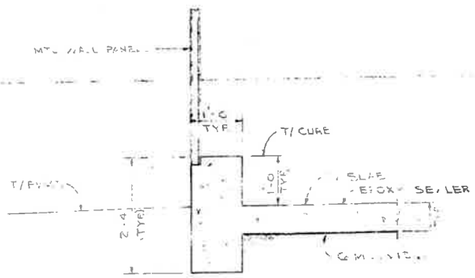
FLOOR PLAN
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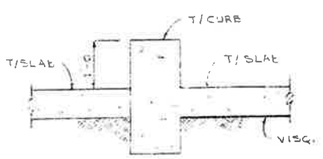
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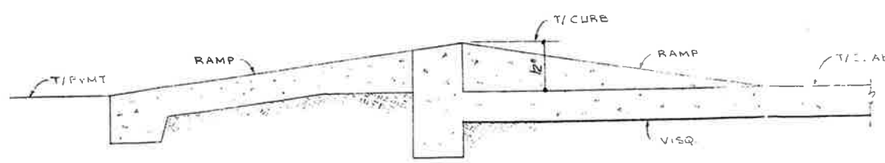
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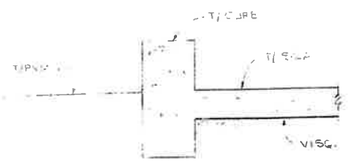
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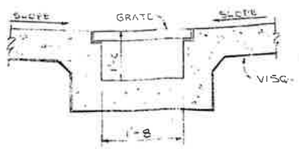
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SECTION (5) EPA 2
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SECTION (6) EPA 2
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SECTION (7) EPA 2
Scale 0 3/4"=1'-0

NO.	DESCRIPTION	BY	DATE
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1	GENERAL	T.L.	1/22/71

REVISION

BRYSON [illegible]
BSP RIVERDALE [illegible] MF
R.C.R.A. CONTAINER STORAGE [illegible] BUILDING
FLOOR PL[illegible] & S[illegible]

Drawn A.B.
Checked [illegible]
Scale 1/4"=1'-0
Date 1/21/71

BROUGH and STEPHENS, INC.
Consulting Engineers
MEMPHIS, TENNESSEE

PROJ. NO.
SHT. NO. EPA 2

Figure 8.1 - 3

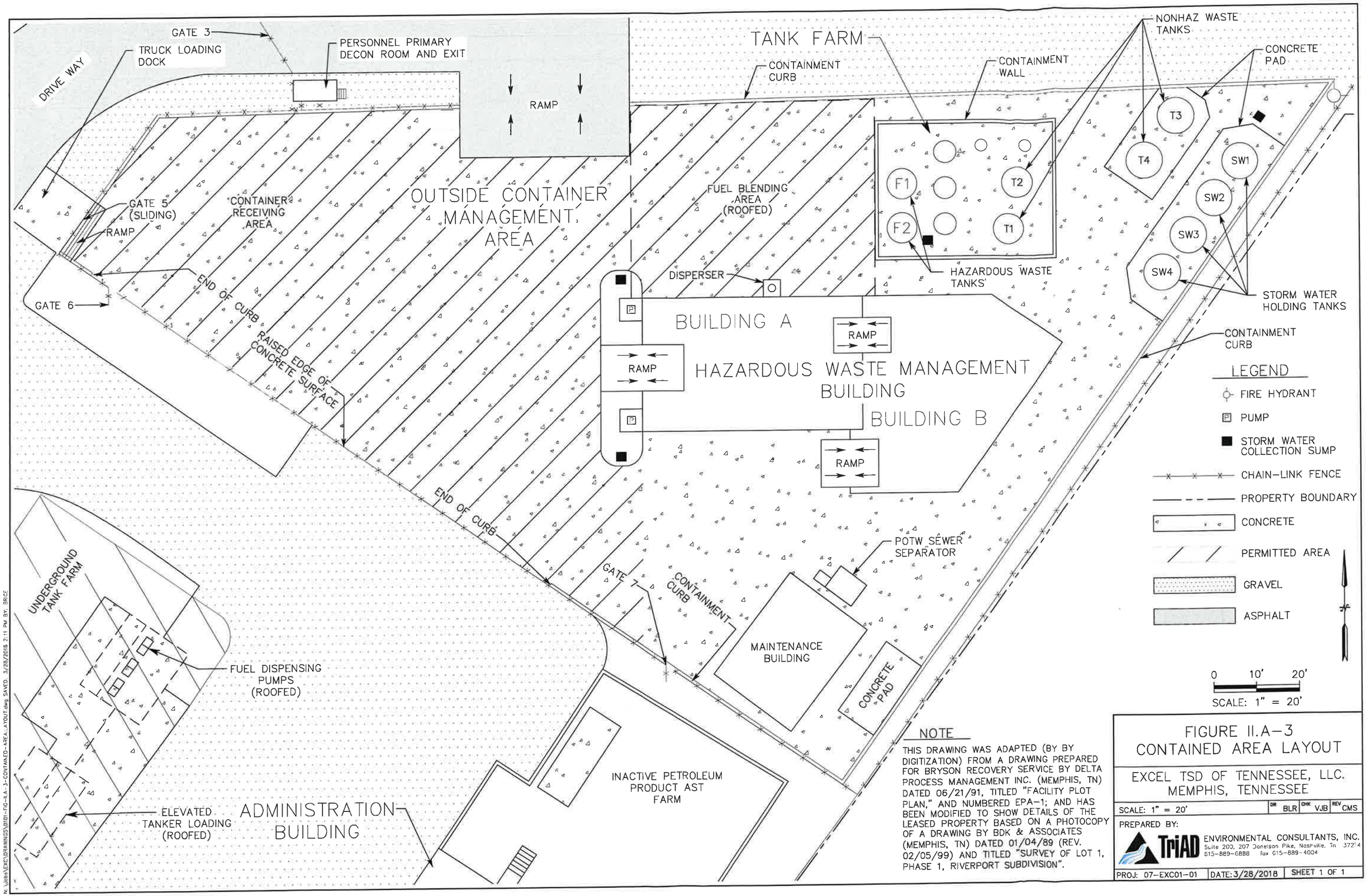
CONTAINED AREA LAYOUT

TriAD Environmental Consultants, Inc.

"FIGURE II.A-3 CONTAINED AREA LAYOUT"

Project Number: 07-EXC01-01

Date: 03/28/2018



N:\jobs\EXCL\DRAWINGS\DTBI-FIG-II.A.-3-CONTAINED-AREA_LAYOUT.dwg SAVED 3/28/2018 2:11 PM BY: BRICE

NOTE

THIS DRAWING WAS ADAPTED (BY BY DIGITIZATION) FROM A DRAWING PREPARED FOR BRYSON RECOVERY SERVICE BY DELTA PROCESS MANAGEMENT INC. (MEMPHIS, TN) DATED 06/21/91, TITLED "FACILITY PLOT PLAN," AND NUMBERED EPA-1; AND HAS BEEN MODIFIED TO SHOW DETAILS OF THE LEASED PROPERTY BASED ON A PHOTOCOPY OF A DRAWING BY BDK & ASSOCIATES (MEMPHIS, TN) DATED 01/04/89 (REV. 02/05/99) AND TITLED "SURVEY OF LOT 1, PHASE 1, RIVERPORT SUBDIVISION".

FIGURE II.A-3
CONTAINED AREA LAYOUT

EXCEL TSD OF TENNESSEE, LLC.
MEMPHIS, TENNESSEE

SCALE: 1" = 20'	DR BLR	CHK VJB	REV CMS

PREPARED BY:

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, Tn 37214
615-889-6888 fax 615-889-4004

PROJ: 07-EXC01-01	DATE: 3/28/2018	SHEET 1 OF 1

ATTACHMENT 8.2

P.E. CERTIFICATIONS OF SECONDARY CONTAINMENT ADEQUACY

NOTE: Both the January 4, 2019 and February 13, 2018 F&A Letter Reports included in this appendix reference as an attachment an earlier and more detailed December 9, 2009 F&A Report. For brevity and to avoid confusion, only one copy of the December 2009 report is included. The three F&A reports are presented in chronological order, beginning with the most recent.

FISHER ARNOLD

ENGINEERING INTEGRATION

January 4, 2019

Mr. Stephen B. Neal
Managing Partner
Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, Tennessee 38109-2428

RE: Re-Assessment of Secondary Containment Surface Integrity and Storage Volumes
Container Storage Buildings A and B
Excel TSD of Tennessee, LLC
Memphis, Tennessee

Dear Mr. Neal:

I have read the attached report dated December 9, 2009, titled "Existing Secondary Containment Assessment, RCRA CONTAINER STORAGE BUILDING & CONTAINED AREA", signed and certified by Ron Powell, P.E.

On January 3, 2019 per your request, I examined the current condition of the integrity of the concrete surfaces of Container Storage Buildings A and B and I have analyzed the containment volumes described in that report. I also confirmed that the attached drawing, dated April 3, 1991 by Brough & Stephens, Inc., continues to accurately represent the building design and construction, as far as can be visually observed.

I am providing my professional certification that those surfaces were found to be free of unsealed cracks and gaps and sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected materials are detected and removed. In addition, I certify that the volumes as presented in the December 9, 2009 report are still accurate and adequate for the storage of spills.

If you have any questions or require additional information, please do not hesitate to contact me at this office.

Sincerely,

FISHER & ARNOLD, INC.



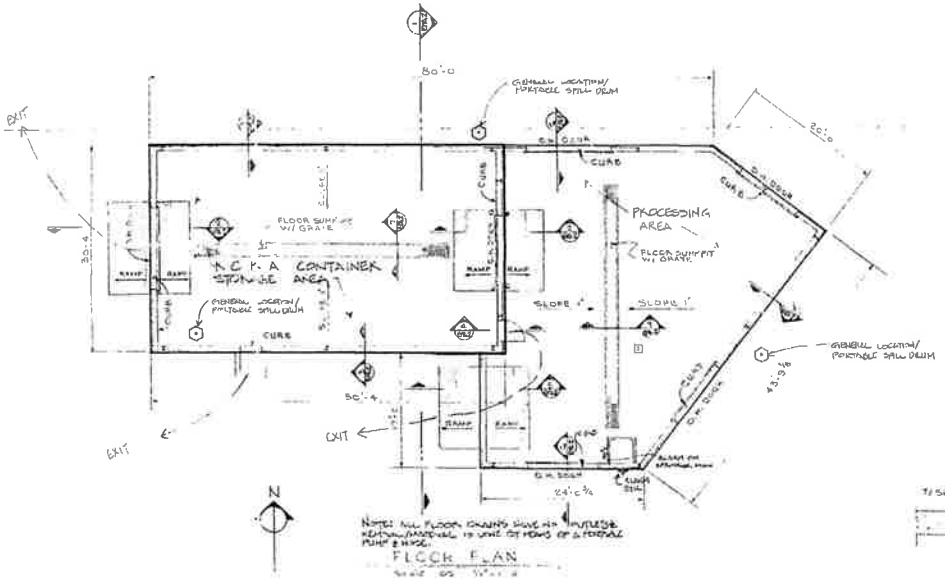
Jeffrey W. Old, P.E.
Director – General Civil

Attachment

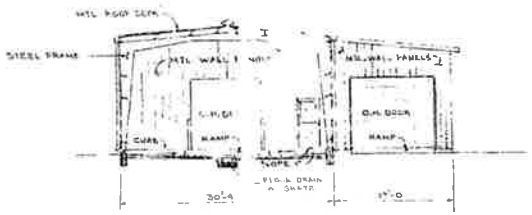
9180 Crestywyn Hills Drive
Memphis, TN 38125

901.748.1811
Toll Free: 1.888.583.9724

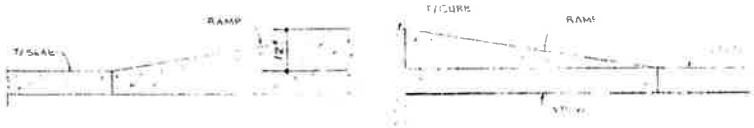
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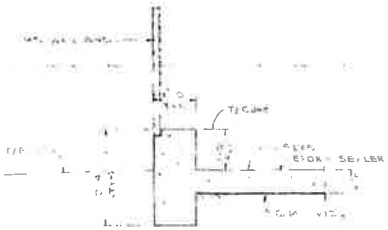
FLOOR PLAN



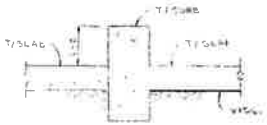
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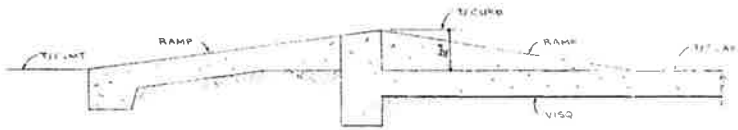
SECTION



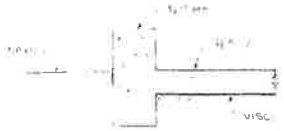
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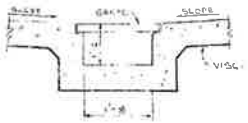
SECTION



SECTION



SECTION



NO	DESCRIPTION	BY	DATE
0	ISSUE		1/11/91
1	ADDENDA		1/22/91

BRYCE'S [illegible]
85% SIZER AT [illegible]
RCRA CONTAINER STORAGE BUILDING
FLOOR PLAN & SECTIONS

BROUJIN and STEPHENS, INC.
Consulting Engineers
MEMPHIS, TENNESSEE

FISHER ARNOLD

ENGINEERING INTEGRATION

April 13, 2018

Mr. Stephen B. Neal
Managing Partner
Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, Tennessee 38109-2428

RE: Re-assessment of Secondary Containment Surface Integrity and Storage Volumes
Container Storage Buildings A and B and Contained Area
Excel TSD of Tennessee, LLC
Memphis, Tennessee

Dear Mr. Neal:

I have read the attached report dated December 9, 2009, titled "Existing Secondary Containment Assessment, RCRA CONTAINER STORAGE BUILDING & CONTAINED AREA", signed and certified by Ron Powell, P.E.

On March 21, 2018 per your request, I examined the current condition of the integrity of the concrete surfaces and I have analyzed the containment volumes described in that report.

I am providing my professional certification that those surfaces were found to be free of unsealed cracks and gaps and sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected materials are detected and removed. In addition, I certify that the volumes as presented in the December 9, 2009 report are still accurate and adequate for the storage of spills and rainfall.

If you have any questions or require additional information, please do not hesitate to contact me at this office.

Sincerely,
FISHER & ARNOLD, INC.

Jeffrey W. Old, P.E.
Director – General Civil



9180 Crestywyn Hills Drive
Memphis, TN 38125

901.748.1811
Toll Free: 1.888.583.9724

www.fisherarnold.com

Existing Secondary Containment Assessment
RCRA CONTAINER STORAGE BUILDING & CONTAINED AREA

Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, TN 38109

Prepared By:

Fisher and Arnold Environmental
9180 Crestwyn Hills Drive
Memphis, TN 38125
888-583-9724

December 9, 2009

1.0 CONTAINMENT CALCULATIONS FOR RCRA CONTAINER STORAGE BUILDING A

Net Volume = Gross Volume + Floor Slope Volume + Floor Sump Volume
- Ramp A Volume – Ramp B Volume

Gross Volume (Inside Curbs/Walls)

- Inside Length 48.33 ft
- Inside Width 28 ft
- Curb Height 12 inches = 1 foot
- Slope to Sump = 1 inch to curb
- Cross Section Area = 48.33 ft x 28 ft x 1 ft. = 1,353.2 cf = 10,121.9 gallons

Gross Volume = 10,121.9 Gallons

Floor Slope Volume

- Volume Added from Slope to Sump
- Altitude = 0.083 ft
- Base = (28 ft - 1.67 ft)/2 = 13.17 feet
- Cross Sec. Area = 2 x (0.5 x base x altitude) = 2 x (0.5 x .083 ft x 13.17 ft) = 1.10 sf per foot of length
- Length at Sump = 36.0 ft
- Slope Volume = 36 ft x Area = 36 sq. ft. x 1.10 ft. = 39.6 cf = 296.2 gallons
- Volume Above Sump Inside Slope = .083 ft x 1.67 ft x 36 = 4.99 cf = 37.3 gallons

Floor Slope Volume = 333.5 Gallons

Floor Sump Volume

- Width of Sump = 1.67 ft
- Depth (below grate) of Sump = 0.80 ft
- Cross Section of Sump = 1.67 ft x 0.8 ft = 1.34 sf
- Length of Sump = 36.00 ft
- Volume of Floor Sump at RCRA Cont. Storage Bldg A = 1.34 sq. ft x 36 ft = 48.2 cf
- Sump Volume = 48.2 cf x 7.48 Gallons/cf = 360.8 Gallons

Sump Volume = 360.8 Gallons

Ramp A Volume (Section Inside RCRA Cont. Storage Bldg A)

- Altitude = 12 inches = 1 Foot
- Base = 9 ft
- Cross Sectional Area = 0.5 x 1ft x 9 ft = 4.5 sf
- Width = 10 ft
- Volume Displaced by Ramp A = Area x Ramp Width = 4.5 sf x 10 ft = 45.5 cubic feet = 340.3 gallons

Volume Displaced by Ramp A = 340.3 gallons

Ramp B Volume (Section Inside RCRA Cont. Storage Bldg A)

- Altitude = 12 inches = 1 Foot
- Base = 6 ft
- Cross Sectional Area = 0.5 x 1ft x 6.0 ft = 3.0 sf
- Width = 9 ft
- Volume Displaced by Ramp A = Area x Ramp Width = 3.0 sf x 9 ft = 27 cf = 201.9 Gallons

Volume Displaced by Ramp B = 201.9 Gallons

Net Volume For RCRA Container Storage Building A

- Net Volume = Gross Volume + Floor Slope Volume + Sump Volume – Ramp A Volume – Ramp B Volume
- Net Volume = 10,121.9 gal + 333.5 gal + 360.8 gal – 340.3 gal – 201.9 gal = 10,274 gallons

RCRA Building A Net Volume = 10,274 gallons

2.0 CONTAINMENT CALCULATIONS FOR RCRA CONTAINER STORAGE BUILDING B

Net Volume = Gross Volume + Floor Slope Volume + Floor Sump Volume
- Ramp A Volume – Ramp B Volume

Gross Volume (Inside Curbs/Walls)

- Area from AutoCAD = 1,597 sf
- Curb Height = 12 inches = 1 foot
- Gross Volume = 1,597 sq. ft. x 1 ft = 1,597 cf = 11,945 gallons

Gross Volume = 11,945 Gallons

Floor Slope Volume (Volume added from Slope to Sump)

Because of the building geometry the sloped floor is depicted as 3 segments. Segments 1 and 2 both are rectangles with different lengths and widths. Segment 3, on the east end of the building, is only 1 inch deep at the greatest distance from the floor sump.

Segment 1

- Altitude = 1 inch = 0.083 ft
- Lateral distance = 15.83 ft.
- Length of slope = 17.25 ft.
- Cross Section Area = (0.5 x altitude x length) = 0.5 x .083 ft x 17.25 ft = 0.72 sf per foot of lateral distance
- Slope Volume = 15.83 ft x Area = 15.83 sf. x 0.72 ft. = 11.33 cf = 84.75 gallons

Segment 2

- Altitude = 1 inch = 0.0717 ft
- Lateral distance = 21.92 ft.
- Length of slope = 14.75 ft.
- Cross Section Area = (0.5 x altitude x length) = 0.5 x 0.0717 ft x 14.75 ft = 0.529 sf per foot of lateral distance
- Slope Volume = 21.92 ft x Area = 21.92 sf. x 0.529 ft. = 11.59 cf = 86.70 gallons

Segment 3

Segment 3 was subdivided into 46 slices to account for the differing altitudes and the varying distance from the floor sump to the east walls.
The volume of segment 3 was calculated to be 23.49 cf. = 175.7 gallons

Total floor slope volume = 84.75 gal. + 86.7 gal. + 175.7 gal. = 347.15 gallons

Floor Slope Volume = 347.15 gallons

Floor Sump Volume

- Width of Sump = 1.67 ft
- Depth (below grate) of Sump = 0.83 ft
- Cross Section of Sump = 1.67 ft x 0.83 ft = 1.39 sf
- Length of Sump = 36.00 ft
- Volume of Floor Sump at RCRA Cont. Storage Bldg B = 1.39 sf x 36 ft = 49.9 cf
- Sump Volume = 49.9 cf x 7.48 gallons/cf = 373.2 gallons

Sump Volume = 373.2 Gallons

Ramp B Volume (Section Inside RCRA Cont. Storage Bldg B)

- Altitude = 12 inches = 1 Foot

- Base = 7 ft
- Cross Sectional Area = 0.5 x 1ft x 7.0 ft = 3.5 sf
- Width = 9 ft
- Volume Displaced by Ramp A = Area x Ramp Width = 3.5 sf x 9 ft = 31.5 cf = 235.6 gallons

Volume Displaced by Ramp B = 235.6 Gallons

Ramp C Volume (Section Inside RCRA Cont. Storage Bldg B)

- Altitude = 12 inches = 1 Foot
- Base = 7 ft
- Cross Sectional Area = 0.5 x 1ft x 7.0 ft = 3.5 sf
- Width = 12 ft
- Volume Displaced by Ramp A = Area x Ramp Width = 3.5 sf x 12 ft = 42 cf = 315 gallons

Volume Displaced by Ramp C = 315 Gallons

Net Volume For RCRA Container Storage Building B

- Net Volume = Gross Volume + Floor Slope Volume + Sump Volume – Ramp B Volume – Ramp C Volume
- Net Volume = 11,945 gal + 347.1 gal + 373.2 gal – 235.6 gal – 315 gallons = 12,114.7 gallons

Net Volume RCRA Building B = 12,114.7 gallons

3.0 CONTAINMENT CALCULATIONS FOR CONTAINED AREA (INCLUDING OUTSIDE HAZARDOUS WASTE CONTAINER MANAGEMENT AREA

AutoCAD-Calculated Net Volume

Using the containment surface elevations determined from Fisher & Arnold Environmental's November 19, 2007 topographic survey of the Contained Area, AutoCAD was used to calculate the Net Volume of secondary containmant capacity between the containment surface and the lowest Perimeter Curb Elevation (Secondary Containment Spillover Location) of 226.72 above mean sea level. The attached drawing, titled "Containment Volume Certification" shows the contours of the containment and, in the lower right of the drawing, the AutoCAD-calculated Net Volume. This AutoCAD Net Volume of 15,147 cubic feet accounts for the displacement of secondary containment capacity provided by the major structures within the Contained Area, including RCRA Container Storage Buildings A and B and associated Ramps A and C, Tanks SW1-4 and their support Pads, Tanks T3 and T4 and their Support Pads, and the Tank Farm Secondary Containment (as modified

in August 2009). This volume is based upon the difference between a surface at 226.72 above mean sea level and the sloped site surfaces below elevation 226.72. However, the AutoCAD calculations do not account for the additional capacity displacements caused by minor structural components or the additional capacity created by the three storm water collection sumps in the Contained Area. These are manually calculated below ad added to/subtracted from the AutoCAD Net Volume to yield the Total Containment Capacity.

AutoCAD Net Containment Volume = 15,147 Cubic Feet

Manually Calculated Displacements

- 4 Fuel Blending Area Roof Structure Supports (3'x3'x1') = 36 cf
- 20 - Pipe Rack Supports (1' Diameter x 1' tall) = 0.8 cf x 20 ea. = 16 cubic feet
- 40 Bollards (4 & 6 inch) = 6 cubic feet

Total Displacements = 36 cf + 16 cf + 6 cf = 58 cf

Structures that add capacity to the secondary containment volume are:

- Stormwater Collection Sumps (4' x 2.5' x 4') = 40 cf x 3 ea = 120 cf

Total Added Capacity = 120 cf

Total Containment Capacity = 15,147 cf + 120 cf – 58 cf = 15,209 cf

Rainfall Volume for Contained Area

The rainfall volume is based upon the Total Contained area which is curbed to contain all storm water that falls in it, less roofed areas that are equipped with gutter systems that route storm water outside of the Contained Area, and the Tank Farm Area. The Total Contained Area is defined by the exterior curb which surrounds the active concrete paved working area. Contained Area = 26,358 sf. (from the survey)

Roofed areas that are excluded are:

- RCRA Buildings A & B (exterior area = 3,257 sf. (from the survey)
- Fuel Blending Area Roof (56 ft. x 46 ft.) = 2,576 sf.
- Maintenance Building (exterior dimensions 30 ft. x 22 ft.) = 660 sf.

Tank Farm exterior dimensions are 42 ft. x 32 ft. = 1,344 sf.

Net Contained Area = Contained Area – RCRA Buildings A & B – Fuel Blending Roof Area – Tank Farm area.
Net Contained Area = 26,358 sf – 3,257 sf – 2,576 sf – 660 sf - 1,344 sf = 18,521 sf.

Using a value of 6.5 inches (0.54 ft.) for the maximum rainfall for a 24-hour 25-year rainfall event for this site (per *Hydrology for Small Watersheds,* Technical Release No. 55) and the Net Contained area of 18,521 sf produces a Rainfall Volume of 10,001 cubic feet.

Rainfall Volume Across Active Area = 10,001 cubic feet

Excess Containment Capacity = Total Containment Capacity – Rainfall Volume
= 15,209 cf – 10,001 cf = 5,208 cf x 7.48 gallons/cf
= 38,956 gallons

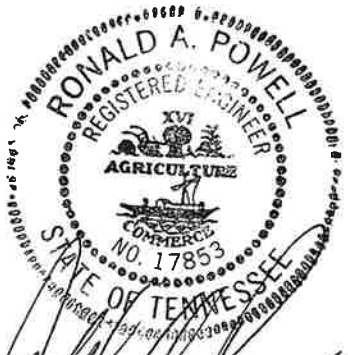
Excess Containment Capacity = 38,956 Gallons

4.0 ASSESSMENT OF SECONDARY CONTAINMENT SURFACE INTEGRITY

I have or another qualified Fisher & Arnold Environmental employee under my direct supervision has, recently inspected the secondary containment surfaces (floors, curbs/walls, and sumps) of RCRA Container Storage Buildings A and B and the Contained Area at the Excel TSD of Tennessee facility and found those surfaces to be free of unsealed cracks or gaps and sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed.

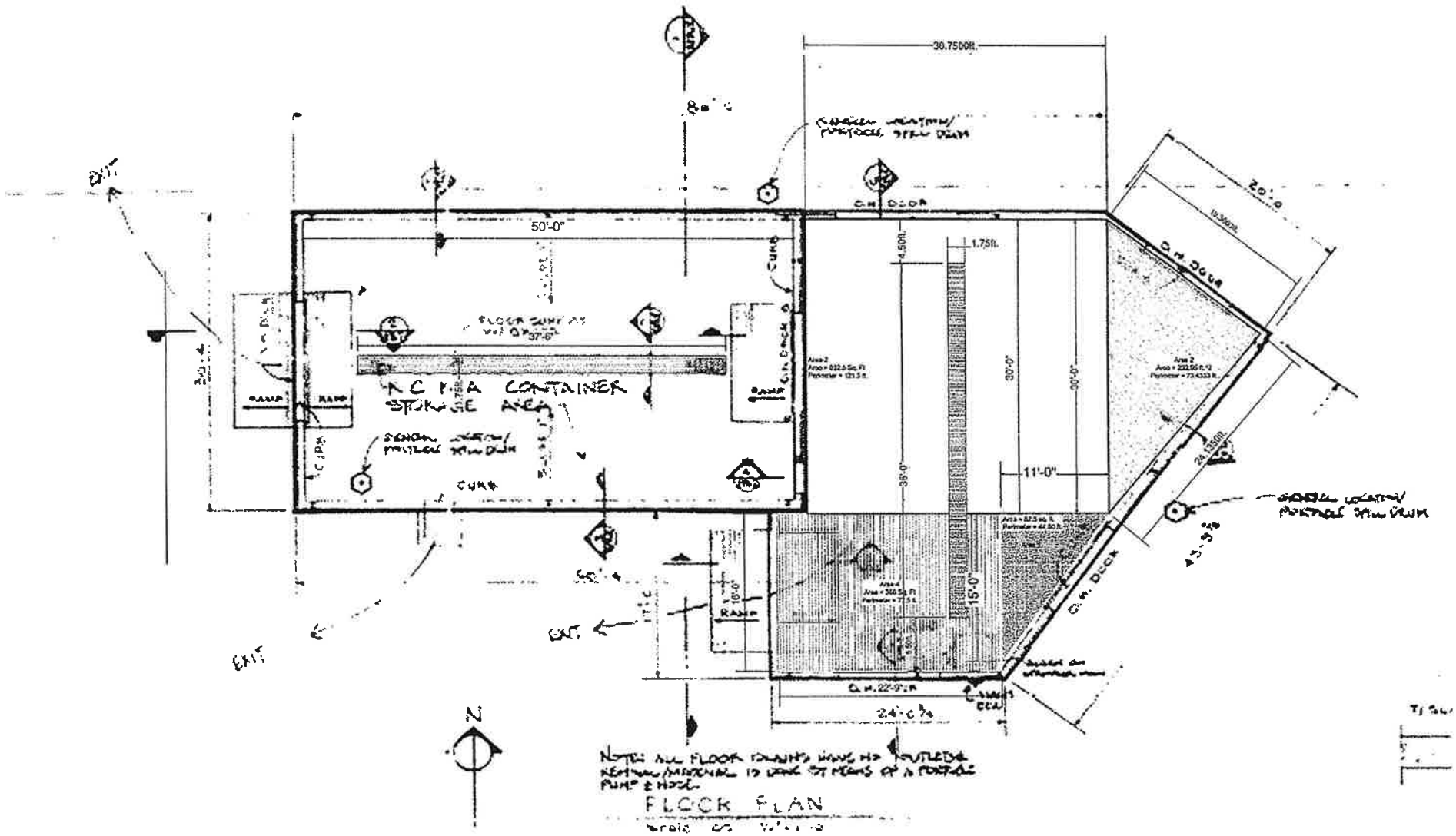
Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



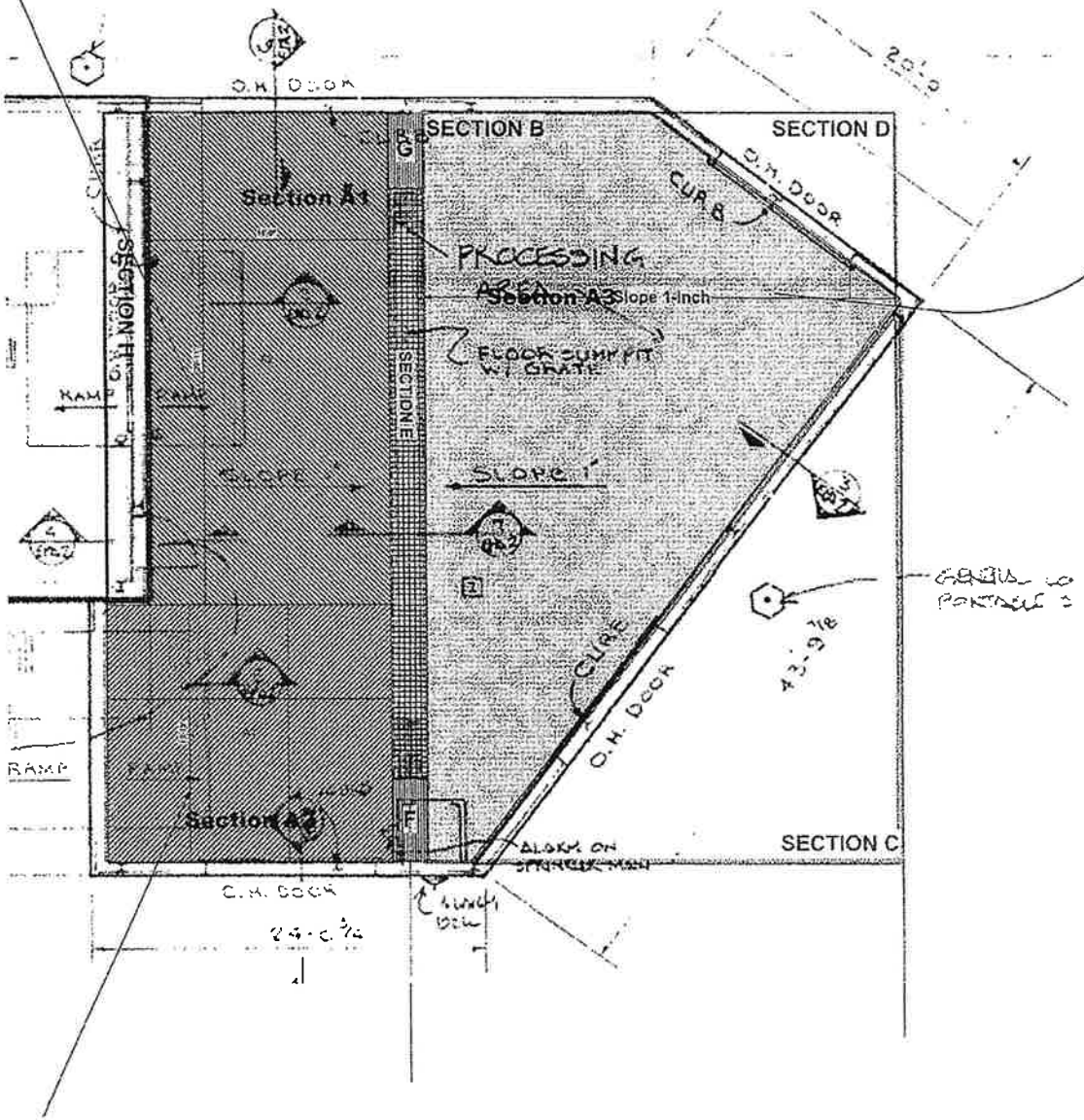
Signed: _____ Date: 12/10/09

Ronald A. Powell, P.E.
General Civil Department Head


30.7500ft.
50'-0"
1.75ft.
11'-0"
15'-0"
EXIT
EXIT
N
NOTE: ALL FLOOR DRAINS HAVE NO OUTLETS.
FLOOR PLAN

Section A1
Slope Floor Volume

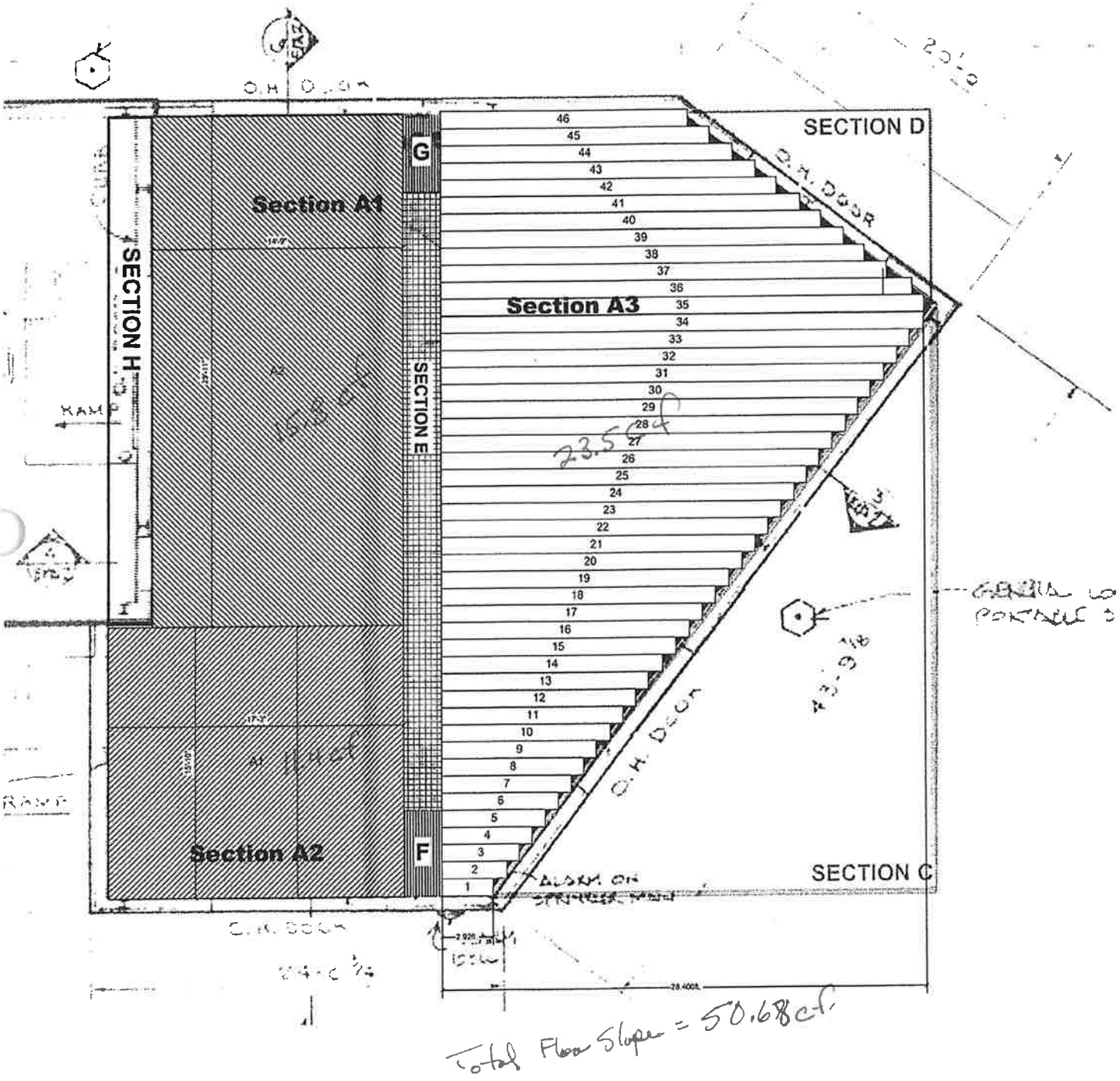
Calculation Support
Sloped Floor Volumes



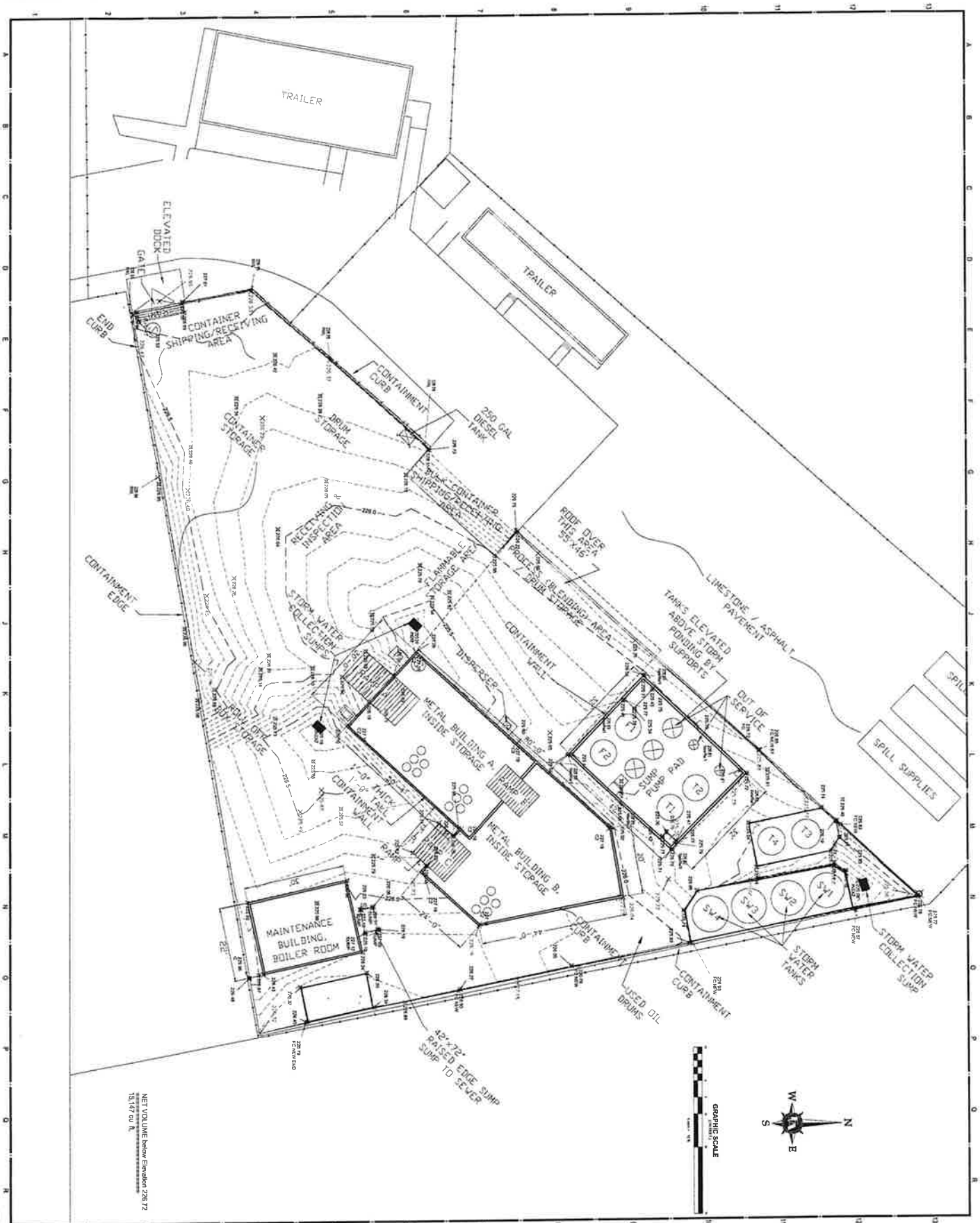
This Shaded Area is Inside Area of RCRA Bld. B

Section A2
Slope Floor Volume

Calculation Support
Sloped Floor Volumes



Total Floor Slopes = 50,688 c.f.



EXCEL TSD INCORPORATED
CONTAINMENT VOLUME CERTIFICATION
552 RIVERGATE ROAD
MEMPHIS, TN 38109

FISHER & ARNOLD, INC.
9180 Crosswyn Hills Drive • Memphis, Tennessee 38125-8538
901-748-1811 • Fax: 901-748-3115 • Web: www.fisherarnold.com
Architects • Engineers • Environmental Consultants • Interior Designers • Landscape Architects • Planners • Surveyors

Issue Date: 11/12/08
Project No: 02045
Drawn By: B.S.
Checked By: R.A.P.
Sheet Title: Containment Volume
All Water Surface Elev: 226.72

Seal

Rev	Date	Revision Description

SHEET 1 OF 1

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ATTACHMENT 8.3

OPERATING FORMS

DAILY CONTAINER INVENTORY FOR _____

CONTAINER SIZE/TYPE	AREA 1		AREA 2		AREA 3		AREA 4		AREA 5		AREA 6	
	#	VOL	#	VOL	#	VOL	#	VOL	#	VOL	#	VOL
Tanker Truck												
Tanker Truck												
Roll-off												
Roll-off												
275 g Tote												
330 g Tote												
Over Pack												
OTHER:												
OTHER:												
OTHER:												
TOTAL VOLUMES												

Notes:

SUMMARY	Pg 1 TOTALS	+ Pg 2 TOTALS	= TOTAL FACILITY VOLUMES
AREAS 1-4			
AREA 5			
AREA 6			
AREAS 1-6			

1. COUNT CONTAINERS.
2. FOR OVERPACKS, USE FULL VOLUME OF INNER CONTAINERS.
3. FOR CONTAINERS LARGER THAN 55 g, USE ACTUAL SIZE OF CONTAINER.
4. AREAS 1, 2, 3, AND 4 ARE IN THE OUTSIDE HAZARDOUS WASTE CONTAINER MANAGEMENT AREA (OHWCMA)
5. AREA 5 IS HAZARDOUS WASTE MANAGEMENT BUILDLING A
6. AREA 6 IS HAZARDOUS WASTE MANAGEMENT BUILDLING B

SIGNATURE _____

DAILY CONTAINER INVENTORY FOR _____

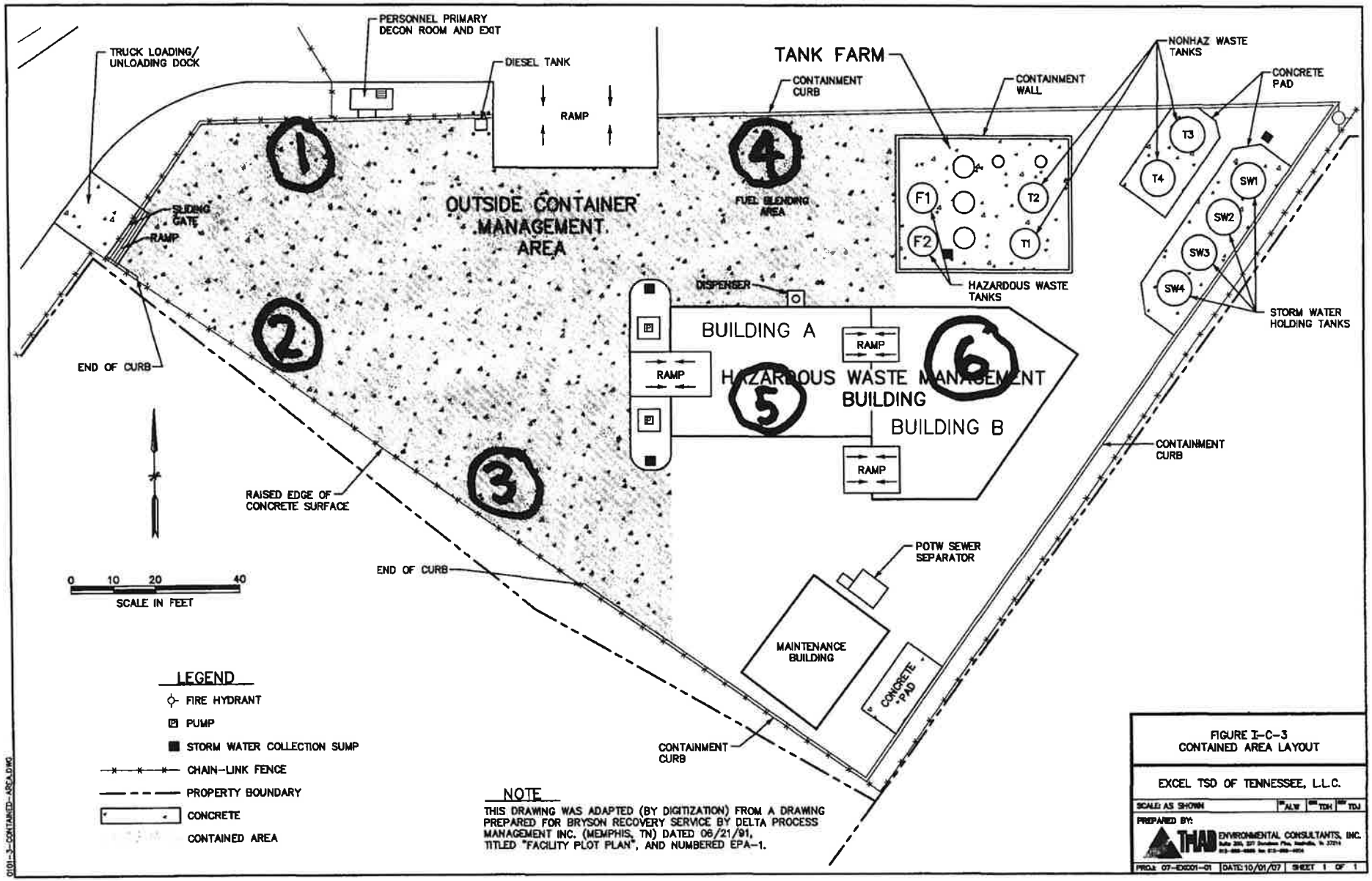
CONTAINER SIZE/TYPE	AREA 1		AREA 2		AREA 3		AREA 4		AREA 5		AREA 6	
	#	VOL	#	VOL	#	VOL	#	VOL	#	VOL	#	VOL
Tanker Truck												
Tanker Truck												
Roll-off												
Roll-off												
275 g Tote												
330 g Tote												
Over Pack												
OTHER:												
OTHER:												
OTHER:												
TOTAL VOLUMES												

Notes:

SUMMARY	Pg 1 TOTALS	+ Pg 2 TOTALS	= TOTAL FACILITY VOLUMES
AREAS 1-4			
AREA 5			
AREA 6			
AREAS 1-6			

1. COUNT CONTAINERS.
2. FOR OVERPACKS, USE FULL VOLUME OF INNER CONTAINERS.
3. FOR CONTAINERS LARGER THAN 55 g, USE ACTUAL SIZE OF CONTAINER.
4. AREAS 1, 2, 3, AND 4 ARE IN THE OUTSIDE HAZARDOUS WASTE CONTAINER MANAGEMENT AREA (OHWCMA)
5. AREA 5 IS HAZARDOUS WASTE MANAGEMENT BUILDLING A
6. AREA 6 IS HAZARDOUS WASTE MANAGEMENT BUILDLING B

SIGNATURE _____



CONTAINER INVENTORY AREAS

Excel TSD of TN, LLC

Process Batch Sheet

Date:_____

Page ___ of ___

Fuel Blend _____ Macro ____

Neutralization ____ Consolidation ____

Bulking ____ Labpack ____

Receiving Container/Tank #:_____

MPF #	ROR #	Original Container Size	Quantity Processed	Quantity Remaining

Completed By:_____

Reviewed By:_____

Notes:_____

_____

_____

ATTACHMENT 8.4

U.S. DOT SEGREGATION TABLE FOR HAZARDOUS MATERIALS

49 CFR § 177.848(d) - Segregation Table for Hazardous Materials

Class or division		Notes	1.1 1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3 gas zone A	2.3 gas Zone B	3	4.1	4.2	4.3	5.1	5.2	6.1 liquids PG I zone A	7	8 liquids only
Explosives	1.1 and 1.2	A	*	*	*	*	*	X	X	X	X	X	X	X	X	X	X	X	X	X
Explosives	1.3		*	*	*	*	*	X		X	X	X		X	X	X	X	X		X
Explosives	1.4		*	*	*	*	*	O		O	O	O		O				O		O
Very insensitive explosives	1.5	A	*	*	*	*	*	X	X	X	X	X	X	X	X	X	X	X	X	X
Extremely insensitive explosives	1.6		*	*	*	*	*													
Flammable gases	2.1		X	X	O	X				X	O							O	O	
Non-toxic, non-flammable gases	2.2		X			X														
Poisonous gas Zone A	2.3		X	X	O	X		X				X	X	X	X	X	X			X
Poisonous gas Zone B	2.3		X	X	O	X		O				O	O	O	O	O	O			O
Flammable liquids	3		X	X	O	X				X	O					O		X		
Flammable solids	4.1		X			X				X	O							X		O
Spontaneously combustible materials	4.2		X	X	O	X				X	O							X		X
Dangerous when wet materials	4.3		X	X		X				X	O							X		O
Oxidizers	5.1	A	X	X		X				X	O	O						X		O
Organic peroxides	5.2		X	X		X				X	O							X		O
Poisonous liquids PG I Zone A	6.1		X	X	O	X		O				X	X	X	X	X	X			X
Radioactive materials	7		X			X		O												
Corrosive liquids	8		X	X	O	X				X	O		O	X	O	O	O	X		

Instructions for using the segregation table for hazardous materials are as follows:
(1) The absence of any hazard class or division or a blank space in the table indicates that no restrictions apply.
(2) The letter "X" in the table indicates that these materials may not be loaded, transported, or stored together in the same transport vehicle or storage facility during the course of transportation.
(3) The letter "O" in the table indicates that these materials may not be loaded, transported, or stored together in the same transport vehicle or storage facility during the course of transportation unless separated in a manner that, in the event of leakage from packages under conditions normally incident to transportation, commingling of hazardous materials would not occur. Notwithstanding the methods of separation employed, Class 8 (corrosive) liquids may not be loaded above or adjacent to Class 4 (flammable) or Class 5 (oxidizing) materials; except that shippers may load truckload shipments of such materials together when it is known that the mixture of contents would not cause a fire or a dangerous evolution of heat or gas.
(4) The "*" in the table indicates that segregation among different Class 1 (explosive) materials is governed by the compatibility table in paragraph (f) of this section.
(5) The note "A" in the second column of the table means that, notwithstanding the requirements of the letter "X", ammonium nitrate (UN1942) and ammonium nitrate fertilizer may be loaded or stored with Division 1.1 (explosive) or Division 1.5 materials, unless otherwise prohibited by § 177.835(c).

ATTACHMENT 8.5

EXAMPLES OF POTENTIALLY INCOMPATIBLE WASTES

TENNESSEE RULE 0400-12-01-.06 APPENDIX 5 (APPENDIX V TO 40 CFR PART 264) EXAMPLES OF POTENTIALLY INCOMPATIBLE WASTE

Many hazardous wastes, when mixed with other waste or materials at a hazardous waste facility, can produce effects which are harmful to human health and the environment, such as (1) heat or pressure, (2) fire or explosion, (3) violent reaction, (4) toxic dusts, mists, fumes, or gases, or (5) flammable fumes or gases.

Below are examples of potentially incompatible wastes, waste components, and materials, along with the harmful consequences which result from mixing materials in one group with materials in another group. The list is intended as a guide to owners or operators of treatment, storage, and disposal facilities, and to enforcement and permit granting officials, to indicate the need for special precautions when managing these potentially incompatible waste materials or components.

This list is not intended to be exhaustive. An owner or operator must, as the regulations require, adequately analyze his wastes so that he can avoid creating uncontrolled substances or reactions of the type listed below, whether they are listed below or not.

It is possible for potentially incompatible wastes to be mixed in a way that precludes a reaction (e.g., adding acid to water rather than water to acid) or that neutralizes them (e.g., a strong acid mixed with a strong base), or that controls substances produced (e.g., by generating flammable gases in a closed tank equipped so that ignition cannot occur, and burning the gases in an incinerator).

In the lists below, the mixing of a Group A material with a Group B material may have the potential consequence as noted.

Group 1–A	Group 1–B
Acetylene sludge	Acid sludge
Alkaline caustic liquids	Acid and water
Alkaline cleaner	Battery acid
Alkaline corrosive liquids	Chemical cleaners
Alkaline corrosive battery fluid	Electrolyte, acid
Caustic wastewater	Etching acid liquid or solvent
Lime sludge and other corrosive alkalies	Pickling liquor and other corrosive acids
Lime wastewater	Spent acid
Lime and water	Spent mixed acid
Spent caustic	Spent sulfuric acid

Potential consequences: Heat generation; violent reaction.

Group 2–A	Group 2–B
Aluminum	Any waste in Group 1–A or 1–B
Beryllium	
Calcium	
Lithium	
Magnesium	
Potassium	
Sodium	
Zinc powder	
Other reactive metals and metal hydrides	

Potential consequences: Fire or explosion; generation of flammable hydrogen gas.

Group 3–A	Group 3–B
Alcohols	Any concentrated waste in Groups 1–A or I-B
Water	Calcium
	Lithium
	Metal hydrides
	Potassium
	SO_2Cl_2, $SOCl_2$, PCl_3, CH_3SiCl_3
	Other water-reactive waste

Potential consequences: Fire, explosion, or heat generation; generation of flammable or toxic gases.

Group 4–A	Group 4–B
Alcohols	Concentrated Group 1–A or 1–B wastes
Aldehydes	Group 2–A wastes
Halogenated hydrocarbons	
Nitrated hydrocarbons	
Unsaturated hydrocarbons	
Other reactive organic compounds and solvents	

Potential consequences: Fire, explosion, or violent reaction.

Group 5–A	Group 5–B
Spent cyanide and sulfide solutions	Group 1–B wastes

Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulfide gas.

Group 6–A	Group 6–B
Chlorates	Acetic acid and other organic acids
Chlorine	Concentrated mineral acids
Chlorites	Group 2–A wastes
Chromic acid	Group 4–A wastes
Hypochlorites	Other flammable and combustible wastes
Nitrates	
Nitric acid, fuming	
Perchlorates	
Permanganates	
Peroxides	
Other strong oxidizers	

Potential consequences: Fire, explosion, or violent reaction.

Source:"Law, Regulations,and Guidelines for Handling of Hazardous Waste." California Department of Health, February 1975.

ATTACHMENT 8.6
CONCRETE REPAIR AND REHABILITATION PLAN
FOR THE CONTAINED AREA

Excel TSD of Tennessee, LLC

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I. INTRODUCTION

This Plan (text, drawings, and other attachments) describes how the outdoor concrete containment surfaces of the Contained Area at the Excel TSD of Tennessee, LLC. ("ETSD") hazardous and

solid waste management facility will be repaired and rehabilitated to meet the requirements of Tennessee Rule 0400-12-01-.06(9)(f)2. It also presents the schedule by which ETSD intends to implement the repair and rehabilitation efforts, describes the precautions and techniques to be used to ensure maintenance of adequate secondary containment and minimize disruptions to ETSD operations during the concrete repair/replacement work, and describes how the removed concrete and other wastes generated from the work will be characterized and managed.

The Contained Area is shown on Sheets C1.1, C1.2, and C1.3 of the Drawings included in Attachment 8.6.1. It consists of a horizontal concrete surface, in the shape of a truncated right triangle, that was constructed around the facility's pre-existing Hazardous Waste Management Building, Maintenance Building, and Tank Farm to provide secondary containment for the hazardous waste management operations and most of the non-hazardous waste management operations performed at the facility. With raised edges or concrete curbs around its perimeter and variably sloped concrete surfaces that drain to three concrete collection sumps, the Contained Area provides for the capture and controlled removal of spilled liquids and incipient precipitation. While only the portion designated as the Outside Hazardous Waste Container Management Area is actually used for the storage and handling of hazardous wastes (in containers only), the entire Contained Area (including the canopied Fuel Blending Area immediately west of the Tank Farm) is relied upon to provide the required secondary containment for these hazardous waste container management operations and must meet the Tennessee Rule 0400-12-01-.06(9)(f)2 requirements.

It should be noted that this concrete repair and rehabilitation plan applies to the horizontal concrete drainage surfaces and perimeter curbs of the Contained Area, but it does not apply to the three collection sumps in which spilled liquids and precipitation are collected for removal. Each of these sumps was constructed via a single pour of concrete and thus has no joints. A chemical-resistant coating was applied to the interior concrete surfaces of these grated concrete sumps in July 2015 and inspections show that it remains in good condition.

II. PLAN DEVELOPMENT

Except for a few areas where more recent repairs have been performed, the concrete surface and perimeter curbs were constructed from poured concrete more than 25 years ago. These concrete secondary containment surfaces are now showing their age, and ongoing and increasing efforts have been necessary over the last several years to apply and replace joint sealing compound in cracks and joints to seal them against leaks. In September 2018, ETSD entered into a contract with Fisher & Arnold, Inc. ("F&A") to evaluate the condition of the existing concrete secondary containment surfaces and to develop a plan and cost estimates for repairing or replacing the concrete surfaces to bring them into long-term compliance with the Tennessee Rule 0400-12-01-.06(9)(f)2 requirements. This effort was and continues to be led by Andrew Maybe, P.E, M.L.E., a F&A professional civil engineer with over 28 years of experience in the concrete design and construction industry. A copy of Mr. Maybee's curriculum vitae is included in Attachment 8.6.2.

The first task performed by Mr. Maybee and a crew of F&A technicians was to perform field visual observation and documentation of the existing condition of concrete base panels, curb segments, and joints (both construction joints and sawed control joints to control thermal

expansion/contraction). A camera mounted on an Unmanned Aerial Vehicle was used to capture high-resolution imagery and develop an orthographic plan of the concrete flatwork within the Contained Area. Joints and *significant* random cracks in the concrete surface were identified and mapped and are shown in plan view on Sheets C1.1, C1.2, and C1.3 of the Drawings in Attachment 8.6.1. On these drawings, the horizontal concrete panels bounded by joints are sequentially numbered for specific identification and reference. Sheet C1.1 shows the concrete conditions of the Contained Area as they existed in the fall of 2018. Sheet C1.2 shows these existing concrete conditions on an aerial image of the Contained Area along with photos depicting typical conditions or features to be addressed in the concrete repair and rehabilitation efforts.

The distinction between "significant cracks" in the concrete surface and cracks that were not deemed "significant cracks" was made by Mr. Maybee and his team using professional judgment to answer the following two questions: (1) "Is there any likelihood of differential movement along the crack which requires a flexible seal?"; and (2) "Is the crack too wide to be effectively sealed against water penetration using the BASF MasterProtect H-1000 surface sealant product?". If the answer to either question was "yes", then the crack was deemed to be a "significant crack".

III. PLANNED REMEDIAL ACTIONS

Using the information gained from their Field Evaluation of the existing condition of the concrete secondary containment surfaces, Mr. Maybee and his team developed a plan of remedial actions to repair and rehabilitate the concrete surfaces to ensure long-term compliance with the applicable regulatory requirements. The plan is shown on Sheet C1.3 in Attachment 8.6.1 and supported by the Details on Sheet C1.4 and the Notes and Specifications on Sheet C1.5. The identified remedial actions are principally described in the subsections below. Certain other minor efforts identified on Sheets C1.2 and C1.3, such as the reconstruction of concrete supports for pipe rack columns, will also be performed (as appropriate) in conjunction with these remedial actions.

A. Replacement of Certain Horizontal Concrete Panels

Using professional judgement honed by his many years of professional experience, Mr. Maybee identified several horizontal concrete panels which could not be cost-effectively or reliably repaired and thus need to simply be replaced. These panels are identified on Sheet C1.3. Unsurprisingly, most of these panels are located in areas subject to heavy truck traffic. Detail drawings on Sheet C1.3 and notes/specifications on Sheet C1.5 show/describe how the 10-inch thick replacement concrete panels will be steel-reinforced and how steel dowel rods will be added at construction joints between new concrete panels and between new and existing concrete panels to provide for load transfer and prevent differential settlement. Another detail drawing on Sheet C1.3 shows how the ramp from the access road into the Contained Area will be re-constructed. Sheet C1.5 includes notes and specifications (including testing requirements) for the concrete to be used and for the forming, placement, finish, and curing of the new concrete panels.

It should be noted that the design intent is that the new replacement concrete panels have the same finished elevations and slopes as the existing panels (except that areas where the existing concrete surface has been damaged will be corrected by the replacement panels). This intent is imposed by Note 11 on Sheet C1.5 under the "Concrete Pavement Forming, Placement, Finish, & Curing" heading. This ensures that there will be no significant change in the secondary containment

volume provided by the Contained Area. As described in paragraph B.2 of Attachment 8 (Management of Hazardous Waste In Containers), the Contained Area provides around 30,000 more gallons of liquid storage than required by the regulatory requirements, and it is thus almost inconceivable that the concrete panels could be replaced in a manner that would not maintain compliance with regulatory requirements.

As shown on the Estimated Quantities of Repairs table on Sheet C1.5, F&A has estimated that 5,600 square feet of new concrete panels will be constructed. However, this amount may increase. The deteriorated horizontal concrete panels designated for replacement on Sheet C1.3 were identified based on the field visual observations conducted in the fall of 2018. When the panel replacement efforts are being conducted, additional concrete panels or portions thereof may also be replaced if they are determined to have additionally deteriorated to the point that they also cannot be cost-effectively or reliably repaired. Replacement activities will include replacement of the synthetic barrier under the concrete.

The existing concrete and asphalt pavement materials (and joint/crack sealant materials) that are removed during these reconstruction activities will be managed as described in Section IV of this Plan.

B. Sealing/Re-sealing of Joints and Significant Random Cracks

All joints and significant random cracks (as defined in Section II above and shown on Sheet C1.4) in the concrete containment surfaces (the horizontal base and the perimeter curbs) will be sealed or resealed as described by the applicable Detail drawings and notes on Sheet C1.4 and the Concrete Pavement Joint Sawing and Joint/Crack Sealing/Resealing notes on Sheet C1.5. This includes all construction joints between (1) existing concrete panels that are not replaced, (2) such existing concrete panels and new replacement concrete panels, (3) new replacement concrete panels, (4) segments of the perimeter curbs, and (5) horizontal concrete panels and the perimeter curbs, building walls, and other vertical concrete surfaces within the Contained Area that could provide a route for release of liquids. It also includes all sawed control joints (to control thermal expansion/contraction) in the existing concrete panels that will not be replaced and in the new replacement concrete panels.

Joints and significant random cracks will be sealed in the same manner. Existing joints and cracks to be re-sealed will first be cleaned of old sealant material and foreign material. Joints will then be sawed, and random cracks routed, to the dimensions specified in Table A on Sheet C1.4. After the sawed joints and routed cracks have been carefully cleaned as specified in the notes on Sheets C1.4 and C1.5, a compressible backer rod of the appropriate diameter shown in Table A will be installed in the cut grooves to the minimum depths specified in Table A. The specified joint sealant will then promptly be applied to the groove above the backer rod in the bead thickness specified in Table A.

The specified joint sealant for horizontal joints and cracks is *DOWSIL 890SL*, a one part, cold-applied, self-leveling silicone sealant for concrete-to-concrete joints that is frequently used at airfields. This joint sealant was selected because of its relative ease of application and demonstrated durability in highway applications, and because it provides a good combination of

properties that help ensure its long-term effectiveness. These properties include secure bonding to Portland cement concretes, an ultra-low modulus of elasticity that provides seal integrity even with significant joint movement, and good resistance to weather conditions (water and temperature extremes), UV radiation in sunlight, and short-term exposure to jet fuel and other fuels (which would include many of the chemical types to which it would most likely be exposed at the ETSD facility). Technical information concerning this product and its use is included in Attachment 8.6.3. A note on Sheet C1.5 requires that this sealant be applied in strict accordance with the manufacturer's recommendations, which requires that the backer rods be constructed of material(s) that Dow Chemical verifies is chemically compatible with the *DOWSIL 890SL* silicone product.

For vertical joints and cracks (e.g. at curb-base joints and in concrete curbing), and for horizontal cracks and joints with sufficient slope to cause the *DOWSIL 890SL* to "run" and result in uneven sealant thickness, the similar Dow Chemical product *DOWSIL 888* will be used. This product has similar properties (except for self-leveling) to the 890SL product but it is substantially more viscous and does not "run" even when applied to vertical joints. Technical information concerning this product is also included in Attachment 8.6.3, and it is also to be applied in strict accordance with the manufacturer's recommendations.

In the Estimated Quantities of Repairs table on Sheet C1.5, F&A has estimated the linear footage of the various types of joints and significant random cracks that will be sealed/resealed. However, these amounts – especially for the sealing of significant random cracks – may increase. The significant random cracks designated for sealing/re-sealing on Sheet C1.3 were identified based on the field visual observations conducted in the fall of 2018. When the significant random crack repair efforts are being conducted, any such cracks that are newly identified will also be repaired.

These joint/crack sealing/re-sealing efforts will be performed in phases as described in Section IV of this Plan. The joint/crack sealant materials and debris that are removed from existing concrete joints and cracks, along with the cuttings and concrete debris resulting from sawing/routing out such joints/cracks, will be managed as described in Section V of this Plan.

C. Repair of Areas of Spalled Concrete

As shown on Sheet C1.3, there are a few areas in the existing horizontal concrete panels that will not be replaced where surface spalling has occurred. These areas will be repaired as described in the applicable Detail drawings and notes on Sheet C1.4. The perimeter of each area of spalled concrete will be sawed and the existing concrete within that perimeter will be chipped out to below the depth of spalling. The new exposed surface of the concrete surface cavity will then be cleaned of all loose material and foreign matter and coated with an epoxy bonding agent immediately prior to filling the cavity to grade with concrete. Sheet C1.5 includes notes and specifications (including testing requirements) for the concrete to be used and for the forming, placement, finish, and curing of the new concrete surface. It should be noted that the depth to which spalled areas will be repaired is not limited to the 2-4 inches shown on the detailed drawings on Sheet C1.4 (although deeper spalling is not anticipated). As clarified by the notes, the 4-inch depth merely defines the unit rate at which the contractor will be paid.

In the Estimated Quantities of Repairs table on Sheet C1.5, F&A has estimated that 100 square feet of concrete spall repair will be required. However, this amount may increase. The areas of spalled concrete designated for repair on Sheet C1.3 were identified based on the field visual observations conducted in the fall of 2018. When the concrete surface repairs are being conducted, any newly identified areas of spalled concrete will also be repaired.

These concrete spall repair efforts will be scheduled and performed as described in Section IV of this Plan. The concrete residues and debris removed pursuant to these efforts will be managed as described in Section V of this Plan.

D. Replacement of Portions of the Perimeter Curb

As shown on Sheet C1.3, there are a few areas where the concrete perimeter curb has been damaged or has deteriorated such that it needs to be replaced. The curb replacement will be performed by saw cutting through the curb segments outside the boundaries of the damaged/deteriorated portions, removing the concrete and any joint sealant and debris between the saw cuts, constructing appropriate wooden forms around the resulting gap in the curb, and pouring sufficient new concrete into the forms to achieve (at a minimum) the original curb height. Sheet C1.5 includes notes and specifications (including testing requirements) for the concrete to be used and for the forming, placement, finish, and curing of the new concrete curbs. Joints will then be sealed as described in Section III.B above.

In the Estimated Quantities of Repairs table on Sheet C1.5, F&A has estimated that 100 linear feet of concrete curb will be required. However, this amount may increase. The concrete curb portions designated for repair on Sheet C1.3 were identified based on the field visual observations conducted in the fall of 2018. When the concrete surface repairs are being conducted, any curb segments newly identified as needing replacement will be replaced.

These concrete curb replacement efforts will be scheduled and performed as described in Section IV of this Plan. The concrete residues and debris removed pursuant to these efforts will be managed as described in Section V of this Plan.

E. Sealing of Concrete Containment Surfaces

As the final step in their repair and rehabilitation, all concrete secondary containment surfaces (including existing and new horizontal concrete panels, existing and new concrete perimeter curbing, and their sealed joints and cracks) will be sealed by application of the penetrating liquid concrete sealant *MasterProtect H1000* manufactured by BASF Corporation. This 100% silane, breathable, water repellent concrete sealant was selected for use because of its ease of application and demonstrated success in highway applications at preventing damage from freeze/thaw cycles. By penetrating deeply into the concrete surface and chemically reacting within the pores, it strengthens the concrete surface and provides long-lasting abrasion resistance and prevention of water and acid penetration while also allowing the concrete to "breathe" (providing for the escape of interior moisture without damaging the sealer). Technical information concerning this product and its use is included in Attachment 8.6.4. The concrete surfaces will be prepared, and the sealer applied, in strict accordance with the manufacturer's directions. As indicated in the "Additive Alternate" notes on Sheet C1.5, surface preparation efforts will include the shot-blasting of

portions of the existing concrete surfaces to remove previous-applied concrete coatings and paint. These "Additive Alternate" notes, and notes on Sheet C1.3, indicate that ETSD may utilize a different contractor to perform the concrete sealing work.

In the Estimated Quantities of Repairs table on Sheet C1.5, F&A has estimated that 5,600 square feet of new concrete surface and 14,300 square feet of existing concrete surface will be sealed. This total 19,900 square foot area represents the entire Contained Area surface.

These concrete surface sealing efforts will be scheduled and performed as described in Section IV of this Plan. The residues from the concrete surface preparation efforts will be managed as described in Section V of this Plan.

IV. IMPLEMENTATION OF REMEDIAL ACTIONS

The remedial actions described in Section III will be implemented in phases as described in Subsection IV.A below. Phasing of the work is necessary for ETSD operations to be able to continue while the very extensive concrete repair and rehabilitation efforts are being performed. Because the removal of a portion of the concrete base must also remove the secondary containment volume of the storm-water isolation area around that portion of the concrete (see Subsection V.C below), phasing of the work is also necessary to maintain the necessary secondary containment volume of the Contained Area. For the same reasons, it is necessary to promptly re-open the reconstructed/repaired areas of concrete following completion of the concrete repair and rehabilitation work as described in Subsection IV.B below. ETSD also plans to take advantage of the removal of portions of the concrete surface to investigate the subsurface soil surface for possible releases of hazardous wastes or hazardous waste constituents as described in Subsection IV.C below.

A. Phased Implementation Schedule

The remedial actions described in Section III will be implemented in phases as described below. Identification of the exact concrete panels that will be replaced in each phase will be determined later by representatives of ETSD and the Contractor selected to actually perform the work. Because it will take an estimated 3-4 weeks to complete each phase of concrete panel replacement (including sealing of joints and application of surface sealant) and place the area back into service, careful planning and coordination between ETSD and the Contractor will be required to minimize disruption of ETSD operations and maintain compliance with secondary containment requirements. Because the ramp and concrete panels at the sole driveway access to the Contained Area will also be replaced, continuing ETSD operations while that is occurring will also require the construction of a new, temporary access driveway (likely located immediately west of the current access driveway).

The Target Completion Dates for each phase below are expressed as the number of calendar days from the effective date of the permitting action by which this Plan is incorporated into ETSD's hazardous waste management facility permit.

1. Phase 1: Target Completion Date = 30 days from effective date of permit.

This phase will include the following activities:

i. Except for the joints between concrete panels that will remain and those that will be removed, all joints and significant cracks in those concrete panels that will not be replaced will be cleaned and sealed as described in Subsection III.B above. Until they are also cleaned and sealed as described in Subsection III.B, the excepted joints will continue to be temporarily sealed using *EUCO QWIKjoint 300* polyurea floor joint filler and joint repair material manufactured by The Euclid Chemical Company (or equivalent).
ii. All areas of spalled concrete in the concrete panels that will not be replaced will be repaired as described in Subsection III.C above.
iii. Damaged and deteriorated perimeter curbing adjacent to those concrete panels that will not be replaced will be repaired/replaced as described in Subsection III.D above.
iv. The surfaces of all concrete panels that will not be replaced (including their newly sealed joints and cracks and areas where spalling has been repaired) and their adjacent perimeter curbing will be sealed as described in Subsection III.E above.

2. Phase 2: Target Completion Date = 90 days from effective date of permit.

This phase will include the following:

i. Approximately 20% of the concrete panels to be replaced will be replaced as described in Subsection III.A above.
ii. Except for the joints between the newly replaced concrete panels and those still to be removed, all joints between these new panels and between the new panels and panels that will not be replaced will be cleaned and sealed as described in Subsection III.B above. Until they are also cleaned and sealed as described in Subsection III.B, the excepted joints will continue to be temporarily sealed using *EUCO QWIKjoint 300* polyurea floor joint filler and joint repair material manufactured by The Euclid Chemical Company (or equivalent).
iii. Damaged and deteriorated perimeter curbing adjacent to those newly replaced concrete panels will be repaired/replaced as described in Subsection III.D above.
iv. The surfaces of all newly replaced concrete panels (including their newly sealed joints) and their adjacent perimeter curbing will be sealed as described in Subsection III.E above.

3. Phase 3: Target Completion Date = 150 days from effective date of permit.

This phase will include the following:

i. Approximately 20% of the concrete panels to be replaced will be replaced as described in Subsection III.A above.
ii. Except for the joints between the newly replaced concrete panels and those still to be removed, all joints between these new panels and between the new panels and panels that will not be replaced will be cleaned and sealed as described in Subsection III.B above. Until they are also cleaned and sealed as described in Subsection III.B, the excepted joints will continue to be temporarily sealed using *EUCO QWIKjoint 300* polyurea floor joint filler and joint repair material manufactured by The Euclid Chemical Company (or equivalent).
iii. Damaged and deteriorated perimeter curbing adjacent to those newly replaced concrete panels will be repaired/replaced as described in Subsection III.D above.
iv. The surfaces of all newly replaced concrete panels (including their newly sealed joints) and their adjacent perimeter curbing will be sealed as described in Subsection III.E above.

4. Phase 4: Target Completion Date = 210 days from effective date of permit.

This phase will include the following:

i. Approximately 20% of the concrete panels to be replaced will be replaced as described in Subsection III.A above.

ii. Except for the joints between the newly replaced concrete panels and those still to be removed, all joints between these new panels and between the new panels and panels that will not be replaced will be cleaned and sealed as described in Subsection III.B above. Until they are also cleaned and sealed as described in Subsection III.B, the excepted joints will continue to be temporarily sealed using *EUCO QWIKjoint 300* polyurea floor joint filler and joint repair material manufactured by The Euclid Chemical Company (or equivalent).

iii. Damaged and deteriorated perimeter curbing adjacent to those newly replaced concrete panels will be repaired/replaced as described in Subsection III.D above.

iv. The surfaces of all newly replaced concrete panels (including their newly sealed joints) and their adjacent perimeter curbing will be sealed as described in Subsection III.E above.

5. Phase 5: Target Completion Date = 270 days from effective date of permit.

This phase will include the following:

i. Approximately 20% of the concrete panels to be replaced will be replaced as described in Subsection III.A above.

ii. Except for the joints between the newly replaced concrete panels and those still to be removed, all joints between these new panels and between the new panels and panels that will not be replaced will be cleaned and sealed as described in Subsection III.B above. Until they are also cleaned and sealed as described in Subsection III.B, the excepted joints will continue to be temporarily sealed using *EUCO QWIKjoint 300* polyurea floor joint filler and joint repair material manufactured by The Euclid Chemical Company (or equivalent).

iii. Damaged and deteriorated perimeter curbing adjacent to those newly replaced concrete panels will be repaired/replaced as described in Subsection III.D above.

iv. The surfaces of all newly replaced concrete panels (including their newly sealed joints) and their adjacent perimeter curbing will be sealed as described in Subsection III.E above.

6. Phase 6: Target Completion Date = 330 days from effective date of permit.

This phase will include the following:

i. The final approximately 20% of the concrete panels to be replaced will be replaced as described in Subsection III.A above.

ii. Except for the joints between the newly replaced concrete panels and those still to be removed, all joints between these new panels and between the new panels and panels that will not be replaced will be cleaned and sealed as described in Subsection III.B above. Until they are also cleaned and sealed as described in Subsection III.B, the excepted joints will continue to be temporarily sealed using *EUCO QWIKjoint 300* polyurea floor joint filler and joint repair material manufactured by The Euclid Chemical Company (or equivalent).

iii. Damaged and deteriorated perimeter curbing adjacent to those newly replaced concrete panels will be repaired/replaced as described in Subsection III.D above.

iv. The surfaces of all newly replaced concrete panels (including their newly sealed joints) and their adjacent perimeter curbing will be sealed as described in Subsection III.E above.

B. Phase Completion Certification and Area Reuse

While it is important for the construction work to be performed in phases, it is also important for each impacted portion of the Contained Area to be returned to ETSD operational use promptly after the concrete repair and rehabilitation work has been completed. The work on any phase described in Subsection IV.A above, or on any component of a phase identified as a "work area" as described in Section V below, will be considered complete only when the concrete surface sealant has been applied as described in Subsection III.E above and allowed to cure, and when the supervising Registered Professional Engineer has inspected the work and certified in writing to ETSD that that phase of the concrete repair and rehabilitation work has been satisfactorily completed. ETSD must keep the impacted portion of the Contained Area (i.e., the "work area") isolated from ETSD operational use and potentially contaminated storm water as described in Section V below until such written certification has been received.

C. Investigation/Removal of Exposed Soils During Concrete Panel Replacement

I. During each phase of the concrete panel replacement work described in Subsection III.A above, ETSD plans to take the opportunities afforded by the removal of the existing concrete surface to investigate the subsurface soil surface for possible releases of hazardous wastes or hazardous waste constituents through joints and cracks and to possibly remove shallow soils contaminated by such releases. If a gravel or sand layer is encountered beneath the concrete, the material must be removed prior to screening the soil. The investigation and removal efforts will be performed as described in Attachment 8.6.5. Additionally, the collection of surface soil samples in areas that have been exposed to the atmosphere should not exceed two minutes for low level VOCs as per the Region 4, EPA, Laboratory Services & Applied Science Division's operating procedure for soil sampling, LSASDPROC-300-R5. Samples must be collected in a manner to ensure that VOCs have not volatilized prior to sample collection. Shallow subsurface soils (approx. 6 inches) should be collected. This will also help to determine whether contamination has migrated below the first couple of inches of the soil column. USEPA soil sampling methodology should be referenced in the sampling logs. While the procedures in Attachment 8.6.5 will be fully implemented during the first 2 or 3 phases of concrete panel replacement work, ETSD may utilize the information gained to modify the procedures implemented in subsequent phases. For example, the subsurface investigations of such subsequent phases will include actual collection and analysis of subsurface soil samples. The sampling field log will also define how high from the ground the probe will be held during the OVM-PID screening, at what speed the probe will be moved across the surface, and how long the probe will be held in place over certain areas based on visual indicators of contamination. Sampling Field Logs will be kept in the Operating Record for the life of the facility. Due to the contaminant cleanup levels being low for some constituents, an equipment blank for each type of non-disposable sampling equipment should be collected and analyzed for the full constituent list. Duplicates are also required, at an appropriate percentage rate, to be collected and analyzed when doing confirmation sampling. The facility will also collect and analyze field blanks if VOCs are contaminants of concern. As mentioned in Attachment 12, the SAP must also include Data Quality Objectives (DQOs) which

should describe decisions to be made based on the data and provide criteria for which these decisions will be made (EPA's Guidance for Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4, February 2006) should be consulted for more information on DQOs)." ETSD will characterize the entire area by sampling. Excel will detail the criteria used to distinguish a "Hot Spot" as well as what warrants additional testing in the area as part of the Sampling Field Logs as well as keep in the operating record in perpetuity. In the event, that RSL exceedances are identified, and concrete is placed over the area, the area will be considered a capped SWMU and will require permit modification to incorporate.

Excel will utilize levels found in the Regional Screening Level (RSL) Resident Soil Table (TR=1E-06, HQ=1) May 2024 as the levels to determine if soil has been adequately removed. Groundwater monitoring wells will be required to be installed if ETSD leaves soil contamination in place at concentrations exceeding the Regional Screening Level, Resident Soil Table levels. Groundwater monitoring will also be required if excavations reveal that soil contamination extends to the saturated zone.

Vapor migration is considered a possible target of "other actions." Evaluation of sampling results must include a conceptual site model (CSM) including soil gas samples on the perimeter of the buildings and/or sub slab soil gas samples from the buildings' interior. The risk of vapor intrusion into nearby buildings will be determined by the CSM and sampling results.

ETSD will follow Attachment 12. Soil Sampling Plan, during the implementation of the Concrete Repair and Rehabilitation Plan.

V. MAINTAINING CONTAINMENT AND ETSD OPERATIONS DURING CONSTRUCTION

During the implementation of the concrete remedial actions, ETSD will implement the precautions and techniques described in this Section to ensure that (1) any spilled wastes and potentially contaminated rain water (or ice/snow melt water) does not drain into any portions of the Contained Area where the secondary containment surfaces are being remediated, (2) the secondary containment volume of the Contained Area is maintained at a volume sufficient to meet regulatory requirements, and (3) adverse impacts to ETSD's ongoing operations are minimized. It is important to note that, as described in Paragraph 8.B.2 of Attachment 8 of the Permit , the Contained Area provides over 30,000 gallons more secondary containment capacity than necessary to meet the regulatory requirements.

A. General Requirements

1. No actual concrete removal and joint/crack repair activities will be performed when precipitation is occurring or the targeted portion of the concrete pad is wet (i.e., free water is present). ETSD will monitor, and will require the Contractor to monitor, local weather

forecasts to identify upcoming rainfall events so as to try to ensure that no concrete removal or joint/crack repair activities are initiated that cannot be completed prior to a rainfall event.

2. No actual concrete removal and joint/crack repair activities will be performed unless and until the Work Area has been established and prepared as described in Paragraph IV.B.2 below.

3. Prior to moving into a Work Area, the excavator to be utilized will be checked for fluid leaks and any identified leaks will be repaired, and the excavator will then be cleaned using a pressure washer. This equipment decontamination may be performed on-site or off-site. If performed on-site, the decontamination will occur near one of the storm-water collection sumps. [Note: The decontamination water will be collected and pumped into the Facility's storm water tanks and then managed accordingly.]

4. To the extent practicable, the Contractor's activities, equipment, materials storage, and personnel will be restricted to the designated Work Area. Except as necessary to deliver equipment and materials to the Work Area, the vehicles of the Contractor and its employees and subcontractors will be kept out of the Contained Area.

B. Work Area Preparation – The following will be performed/implemented by ETSD and Contractor personnel working together shortly prior to initiating concrete removal and/or joint crack repair activities on any portion of the Contained Area:

1. A Work Area must be established and maintained that is (1) free of all hazardous waste containers and (2) isolated, to the extent feasible, from the movement of vehicles, equipment, and personnel associated with ETSD operations.
   i. The boundaries of the Work Area will be designated and cordoned off by placement of signs, high-visibility tape, ribbon, or cones, or other highly visible means that will alert ETSD and other vehicle and equipment operators that they are to stay out of this area. The vehicle access point(s) into the Work Area must be clearly identified. While the size of the designated Work Area should be kept as compact as practicable, it must not only encompass the portion of the concrete containment surface to be removed/repaired but also provide sufficient space for the roll-off box in which excavated materials will be placed, the storage and handling of the materials and equipment to be utilized by the Contractor, and the storage and handling of the materials/equipment described in Subparagraph IV.B.2(3) below.
   ii. While the size of the Work Area may be enlarged or reduced over time to reflect changing equipment/material storage and handling needs, the isolation of the portion of the concrete containment surface being removed/repaired must be maintained until that phase of work is completed as described in Subsection IV.B above.

2. A pressure washer will be used to clean the concrete containment surfaces of the Work Area, beginning on the topographically upgradient side such that the water and residues will be flushed away from the work area and toward a collection sump. [Note: The

decontamination water will be collected and pumped into the Facility's storm water tanks and then managed accordingly.]

3. The materials/equipment needed to divert storm-water runoff away from the work area as described in Paragraph IV.C.1 below and to prepare the excavation for rainfall as described in Paragraph IV.C.3 below will be mobilized into and stored in the Work Area.

C. Managing Storm Water in the Work Area – From the beginning of any phase of the construction work until its completion as described in Subsection IV.B above, ETSD must ensure that storm water controls are utilized, and storm water is managed, as described below to prevent or minimize the potential release of hazardous waste constituents through the Work Area concrete containment surfaces:

1. Prior to any rain event, and at the end of each working day, temporary barriers (e.g., spill containment berms/dikes, flood barriers, sand bags) must be placed around the edges of a Work Area (or at least the targeted portion of the concrete containment surface within the Work Area) in a manner that will prevent potentially contaminated storm water runoff from other upgradient areas from draining into open excavations or areas where unsealed joints/significant cracks are present. For sloped areas and times when the likelihood of a significant rain event are low, it may be adequate to place such temporary barriers only around the upgradient edges of the area to be protected. For lower portions of the Contained Areas (e.g., in the vicinities of the collection sumps), effective temporary barriers will need to be placed around the entire perimeter of the area to be protected.

2. In addition to the use of such temporary barriers, ETSD will also operate its storm water removal system as needed to prevent the water level in the Contained Area from rising to the point where it will drain either (1) into open excavations or areas where unsealed joints/significant cracks are present, or (2) over the top of the Contained Area's perimeter curb. If necessary, the existing manually controlled system of pumps and piping will be supplemented by additional pumps and hosing to control the water level. Further, as necessary to ensure water level control when ETSD personnel are not present at the Facility to operate the existing manually controlled storm water removal system, the supplemental pumps will be equipped with automatic float switches set to an elevation below the water level at which collected storm water will either (1) drain into open excavations or areas where unsealed joints/significant cracks are present, or (2) over the top of the Contained Area's perimeter curbing.

3. Prior to any rain event or cessation of daily construction work that occurs while an excavation is fully or partly open, the bottom and sides of the excavation will be fully covered by plastic sheeting (at least 6-mil thick) smoothly laid in wide strips that overlap each other (more than 1 foot) and extend several feet over the edges of the excavation where they will be anchored in place (e.g., by large chunks of excavated concrete, equipment/materials, or other means). The objective of this plastic "lining" is to capture all or most of the rain (or other precipitation) that falls into the excavated area.

i. At the end of the rainfall event or the beginning of the next work day, whichever occurs first, the water that has collected in the plastic-lined excavation (which should not be contaminated) will be pumped out of the lined excavation and discharged outside the Contained Area.

ii. When as much of the collected water has been pumped from the lined excavation as is practicable, the strips of plastic will be pulled from the excavation and rolled/folded for storage and re-use or disposal to the Facility's solid waste container (depending upon each strips condition upon removal).

iii. The work to replace the concrete panel(s) will then continue.

VI. MANAGEMENT OF CONCRETE DEBRIS AND RESIDUES GENERATED BY CONSTRUCTION ACTIVITIES

As described in Subsections III.A through E above, various waste materials will be generated by the planned concrete repair and rehabilitation efforts. These materials will be characterized and managed as described in this Section. The primary determination to be made will of course be whether the material is a hazardous waste.

A. "Old" Concrete Waste from Concrete Panel/Curb Replacement

1. Generation and Containerization – This waste will include chunks and pieces (>$2^1/_2$ inches in any dimension) of the existing concrete resulting from the excavation of the existing concrete panels and curbing that are to be removed as described in Subsections III.A and D above. [Note: No effort will be made to remove from excavations pieces of concrete smaller than $2^1/_2$ inches unless such removal is required to remove contamination or to prepare the subsurface for the replacement concrete panel.] It will also include the relatively tiny amounts of filler and debris from the joints and cracks in the concrete panels being removed. Upon removal, the broken-up concrete will be placed into a roll-off box container placed along one side of the excavation. When the excavation is completed or a container is full, the roll-off box(es) of concrete rubble will be moved from the Work Area to another portion of the Outside Hazardous Waste Container Management Area ("OHWCMA") for subsequent management as described in Paragraph VI.A.3 below.

There will also be some relatively minor amounts of asphalt paving removed from the access driveway into the Contained Area during the replacement of the concrete panels in this area. The removed asphalt paving will be managed as part of the concrete debris.

Also included in this waste category is the dust and small pieces of concrete that will be generated during the sawing/routing and cleaning of joints and cracks as part of the sealing/re-sealing of joints and significant random cracks as described in Subsection III.B above. While special efforts will be made during the Phase 1 construction efforts to collect sufficient saw dust for characterization testing as described in Paragraph VI.A.2 below, most of the dust and the concrete pieces resulting from this joint/crack repair work will be collected and managed as part of the joint/crack cleanout waste described in Subsection VI.B below.

The concrete saw dust and chipped broken concrete resulting from the repair of areas of spalled concrete as described in Subsection III.C above will also be included in this waste category. This

waste will be shoveled/swept up and placed in containers (e.g., 55-gallon drums), and then subsequently managed in the same manner as the concrete debris from panel replacement.

2. Characterization – The concrete debris is clearly a solid waste that will be disposed of off-site, but it is not a listed hazardous waste or derived from or mixed with a listed hazardous waste (Excel has no records of significant releases of listed hazardous waste in the Contained Area). Further, such material will clearly not meet the hazardous waste characteristics of Ignitability, Corrosivity, or Reactivity. Thus, the only question relative to determining whether the concrete debris is a hazardous waste is whether it will meet the Hazardous Waste Toxicity Characteristic at TN Rule 0400-12-01-.02(3)(e). There is no reason to think that the concrete itself will exhibit the Toxicity Characteristic, but it must be determined if any of the Toxicity Characteristic Table 1 hazardous waste constituents have penetrated into or adhered to the surface of the concrete sufficient to render the concrete a hazardous waste. However, this determination will realistically require testing for only the metals and semi-volatile organic compounds ("SVOCs") listed in Table 1. The Table 1 pesticide/herbicide constituents – including but not necessarily limited to Chlordane, 2,4-D, Endrin, Heptachlor, Lindane, Methoxychlor, Toxaphene, and 2,4,5-TP (Silvex) – will be excluded because of the very low likelihood they might be present. Such pesticides/herbicides are not processed and rarely even handled by ETSD. The Table 1 volatile organic constituents ("VOCs") will also be excluded but for very different reasons. Although most of the VOCs listed in Table 1 are frequently handled and processed at the Facility, there is also a very low likelihood that they will be present in the concrete. . All of the concrete panels being removed are from drainage surfaces on which released liquid or solid wastes was contained on and said wastes did not reside on the concrete containment surface for any significant period(s) of time. Thus, there is no standing head of liquid pushing the VOCs into the concrete except for the occasional and short-duration (hours only) of inundation by storm water. On the other hand, these outdoor surfaces are much more frequently subject to the drying/volatilizing effects of air currents and sunshine. For these reasons, VOCs – even those that are low-viscosity, dense, non-aqueous phase liquids – are much more likely to migrate out of the concrete than into it. There is a possibility that the concrete will contain trace amounts of VOCs (and potentially SVOCs).

Determining whether a physically solid waste meets the Toxicity Characteristic requires subjecting a representative sample of the waste to the Toxicity Characteristic Leaching Procedure ("TCLP"), testing the resulting TCLP "leachate" for its total concentrations (in mg/L) of the targeted Table 1 hazardous waste constituents, and then comparing the results to the regulatory levels set forth in Table 1. If the measured TCLP concentration for one of more of the tested constituents is equal to or greater than the constituents' Table 1 regulatory levels, then the waste meets the Toxicity Characteristic for those constituent(s) and the waste is a hazardous waste.

Collecting a representative sample of a monolithic solid such as concrete can be difficult because the TCLP requires that solids be reduced to the particle size that will pass through a $^{3}/_{8}$-inch standard sieve. Fortunately, much of the concrete upper surface of the Contained Area – that surface of the concrete most likely to have been exposed to releases of hazardous waste constituents – will be subjected to a process that will generate a significant volume of concrete particles of suitable size. This will occur when the joints and cracks in the concrete panels that will not be replaced are widened by sawing and routing during Phase 1 of the re-construction work

as described in Paragraph IV.A.1 above. As described in Subsection VI.B below, a sample will be collected from these concrete cuttings and tested to determine if it meets the Toxicity Characteristic for any of the Table 1 metal and SVOC constituents. For the reasons described above, the results from the testing of these concrete "cuttings" will also apply to the concrete debris.

3. Management of the Waste – It is anticipated that the TCLP testing of the concrete cuttings will demonstrate that the concrete cuttings and the concrete debris are not hazardous wastes. If so, ETSD will use the testing results to pursue any necessary approvals to have the wastes disposed in a local permitted non-hazardous solid waste landfill. If the results instead show that the concrete debris should be considered a hazardous waste, then ETSD will either (1) ship the concrete debris to a permitted hazardous waste landfill for treatment to meet applicable Land Disposal Restriction treatment standards followed by landfill disposal, or (2) attempt to decontaminate the concrete debris, collect new samples for TCLP testing to determine if the decontaminated concrete still meets the Toxicity Characteristic, and send the waste to either a hazardous or non-hazardous landfill based on the new testing results.

B. Joint/Crack Cleanout Wastes

1. Generation and Containerization – This waste stream will consist of the concrete dust and cuttings, old joint/crack filler/sealant, and foreign material that will be generated during the sealing/re-sealing of joints and significant random cracks as described in Subsection III.B above. These residues will be swept, shoveled, and/or vacuumed up and placed in containers (e.g., open-topped 55-gallon drums) which will then be moved from the Work Area to another portion of the Outside Hazardous Waste Container Management Area ("OHWCMA") where it will be held for subsequent evaluation and testing as described below.

2. Characterization – The concrete components of this waste will be characterized as described in Paragraph VI.A.2 above and are expected to be non-hazardous. However, there is a distinctly different component of filler/sealant/foreign material that will make up a significant portion of this waste stream and must be separately evaluated. As with the concrete waste, this material is not a listed hazardous waste or derived from or mixed with a listed hazardous waste (Excel has no records of significant releases of listed hazardous waste in the Contained Area) and will clearly not meet the hazardous waste characteristics of Ignitability, Corrosivity, or Reactivity. Thus, the only question relative to determining whether the filler/sealant/foreign material is a hazardous waste is whether it will meet the Hazardous Waste Toxicity Characteristic at TN Rule 0400-12-01-.02(3)(e).

To make this determination, a representative sample of the non-concrete components of this waste stream will be collected and subjected to TCLP testing as described in Paragraph VI.A.2 above, and the resulting leachate will again be tested for its concentrations (in mg/L) of the relevant Toxicity Characteristic Table 1 hazardous waste constituents and the concentrations compared to the Table 1 regulatory levels to determine if the material is a hazardous waste. As described above for the concrete debris, the Table 1 pesticide/herbicide constituents will be excluded from the testing because of the very low likelihood that they might be present.

3. Management of the Waste – It is anticipated that the TCLP testing of the filler/sealant/foreign material will demonstrate that the material is not a hazardous waste. If so, ETSD will use the testing results to pursue any necessary approvals to have the wastes disposed in a local permitted non-hazardous solid waste landfill. If the results instead show that the concrete debris should be considered a hazardous waste, then ETSD will manage it as a site-generated hazardous waste in accordance with applicable regulatory and permit requirements.

C. Shot Blasting and Other Concrete Surface Cleaning Residues

1. Generation and Containerization – This waste stream will consist of the shot blast media, paint and coating residues, and other solid residues (e.g., dirt and grit) that will be removed from the old concrete surfaces of the Contained Area in preparation for the application of the penetrating liquid concrete sealant as described in Subsection III.E above. These materials will be swept, shoveled, and/or vacuumed up as they are generated and placed in containers (e.g., open-topped 55-gallon drums) which will then be moved from the Work Area to another portion of the Outside Hazardous Waste Container Management Area ("OHWCMA") where it will be held for subsequent evaluation and testing as described below.

2. Characterization – Again, this material will not be a listed hazardous waste or derived from or mixed with a listed hazardous waste (Excel has no records of significant releases of listed hazardous waste in the Contained Area) and will clearly not meet the hazardous waste characteristics of Ignitability, Corrosivity, or Reactivity. Thus, the only question relative to determining whether the shot-blasting/cleaning residue is a hazardous waste is whether it will meet the Hazardous Waste Toxicity Characteristic at TN Rule 0400-12-01-.02(3)(e).

To make this determination, a representative sample of the collected waste will be collected and subjected to TCLP testing as described in Paragraph VI.A.2 above, and the resulting leachate will again be tested for its concentrations (in mg/L) of the relevant Toxicity Characteristic Table 1 hazardous waste constituents and the concentrations compared to the Table 1 regulatory levels to determine if the material is a hazardous waste. As described above for the concrete debris, the Table 1 pesticide/herbicide and volatile organic constituents will be excluded from the testing because of the very low likelihood that they might be present.

3. Management of the Waste – It is anticipated that the TCLP testing of the shot-blasting/cleaning residues will demonstrate that the material is not a hazardous waste. If so, ETSD will use the testing results to pursue any necessary approvals to have the wastes disposed in a local permitted non-hazardous solid waste landfill. If the results instead show that the concrete debris should be considered a hazardous waste, then ETSD will manage it as a site-generated hazardous waste in accordance with applicable regulatory and permit requirements.

ATTACHMENT 8.6.1

DESIGN DRAWINGS

Figure 8.6.1-1

Sheet C1.1

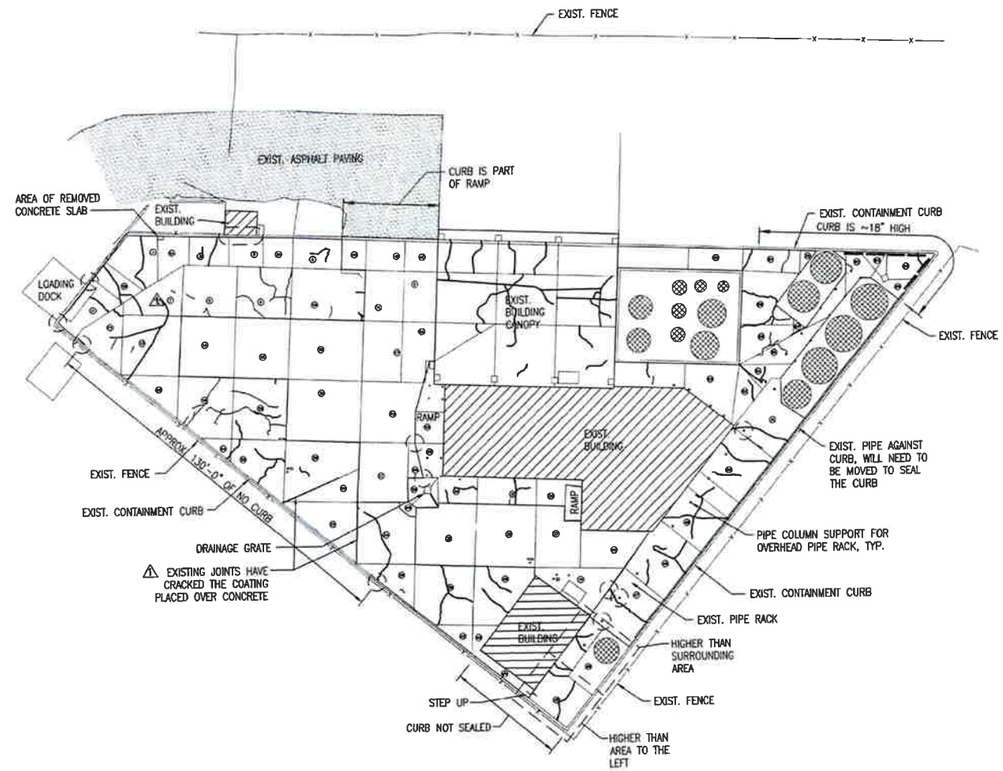
Fisher Arnold

"PLAN OF EXISTING

CONDITIONS"

Project Number: EXCELTSD.0002ST

Date: 12/14/2018



PLAN OF EXISTING CONDITIONS

SCALE: 1"=20'

FIELD OBSERVATION JOINT/CRACK QUANTITIES		
	SIGNIFICANT CRACKS	1,787.09' L.F.
	LINEAR JOINTS	2,550' L.F.
	CURBS (I.F.)	900' L.F.

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EXCEL TSD
PANEL REPLACEMENT / JOINT RESEALING
MEMPHIS, TENNESSEE

Rev.	Date	Revision Description
1	8/15/19	MINOR REVISIONS

Seal

ANDREW P. MAYER
REGISTERED ENGINEER
STATE OF TENNESSEE

Issue Date: DEC. 14, 2018
Project No: EXCELTSD.0002ST
Drawn By: FHS
Checked By: APM
Sheet Title:

PLAN OF EXISTING CONDITIONS

C1.1
SHEET 1 OF 5

Figure 8.6.1-2

Sheet C1.2

Fisher Arnold

"PLAN OF EXISTING AERIAL

IMAGE OF SITE & SITE PHOTOS"

Project Number: EXCELTSD.0002ST

Date: 12/14/2018



PHOTO SHOWING RANDOM CRACKS IN PAVEMENT NEAR LOADING DOCK



PHOTO SHOWING PROPOSED CURB REPLACEMENT ALONG LOADING DOCK



PHOTO SHOWING RANDOM CRACK AND CONSTRUCTION/CONTROL JOINT TO BE RESEALED



PHOTO SHOWING ASPHALT RAMP TO BE REMOVED



PHOTO SHOWING GENERAL OVERVIEW OF SITE LOOKING SOUTH FROM ASPHALT RAMP



PHOTO SHOWING GENERAL OVERVIEW OF SITE LOOKING WEST



PHOTO SHOWING TANK FARM AREA



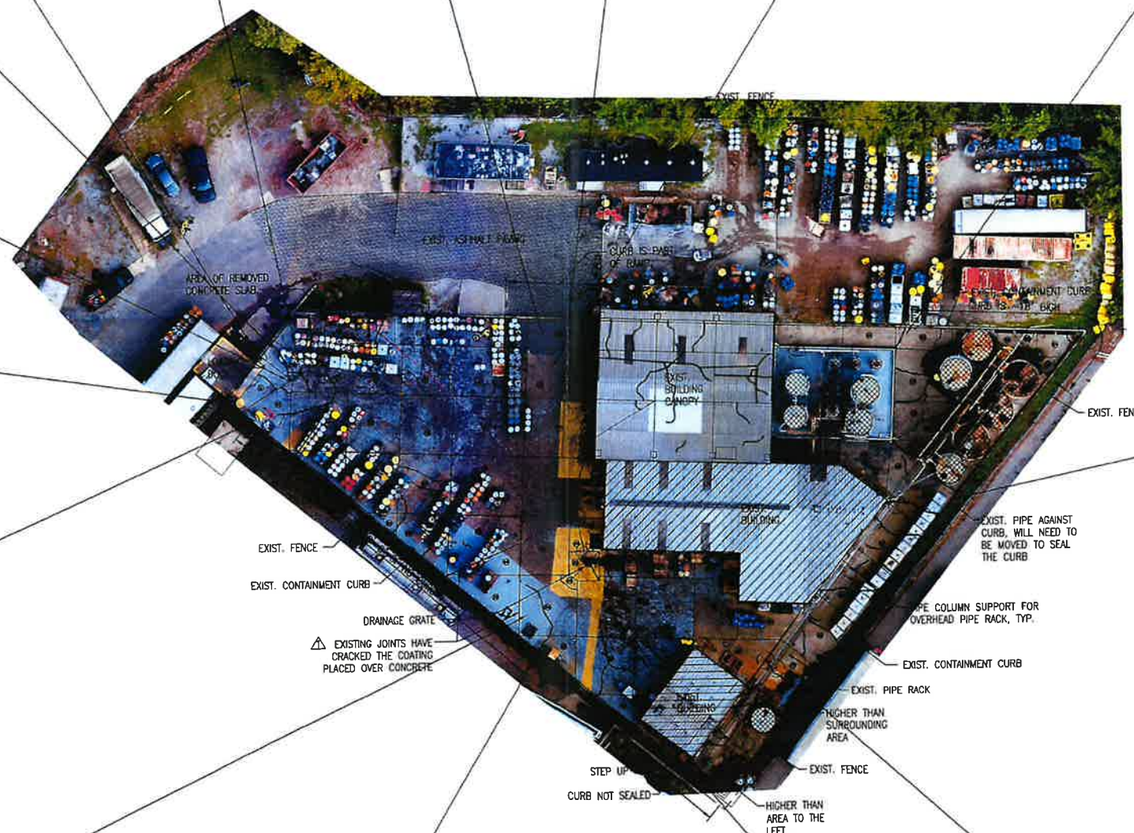
PHOTO SHOWING TYPICAL EXISTING CONTROL/CONSTRUCTION JOINTS TO BE RESEALED



PHOTO SHOWING CURB CRACK TO BE ROUTED AND SEALED



PHOTO SHOWING RANDOM CRACK IN PAVEMENT, JOINT AT INTERFACE WITH CURB, AND CRACK IN CURB TO BE RESEALED



PLAN OF EXISTING AERIAL IMAGE OF SITE & SITE PHOTOS

SCALE: 1"=20'



PHOTO SHOWING GENERAL VIEW OF SITE LOOKING EAST



PHOTO SHOWING EXISTING SEALANT IN CURB, PAVEMENT & ALONG CURB



PHOTO SHOWING EXISTING CONDITIONS AT PAVEMENT TO VERTICAL SURFACES AND CURBS FOR JOINTS TO BE RESEALED



PHOTO SHOWING PIPE RACK FOUNDATION TO BE REPLACED



PHOTO SHOWING PIPE BLOCKING CURB RESEALING

LEGEND

- BUILDING
- TANKS
- CONCRETE PARKING CURB
- YARD CLEAN-OUT, (2) TYP. ⚠
- SPALL REPAR OR REPAIR TO SUPPORT COL. OR REPAIR TO CURB

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ANDREW P. MAYER — REGISTERED ENGINEER — STATE OF TENNESSEE

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PLAN OF EXISTING AERIAL IMAGE OF SITE & SITE PHOTOS

C1.2
SHEET 2 OF 5

Figure 8.6.1-3

Sheet C1.3

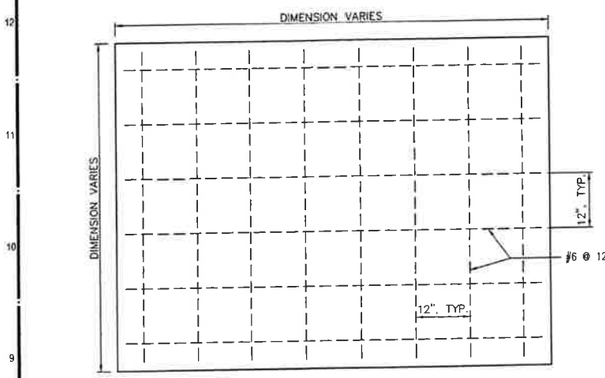
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"PROPOSED CONCRETE REPAIR

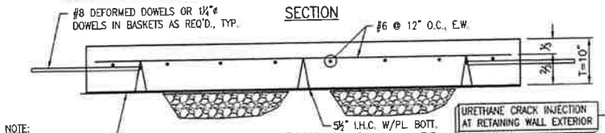
& REHABILITATION PLAN"

Project Number: EXCELTSD.0002ST

Date: 12/14/2018



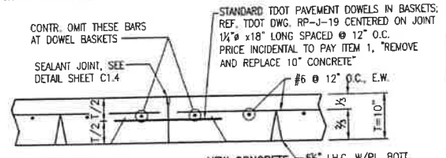
SECTION



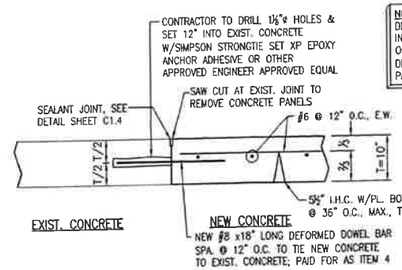
PLAN

NOTE:
MEMBRANE BETWEEN SLAB & STONE BASE. MEMBRANE TO REMAIN CONTRACTOR TO REPLACE AT NO EXTRA CHARGE IF DAMAGED

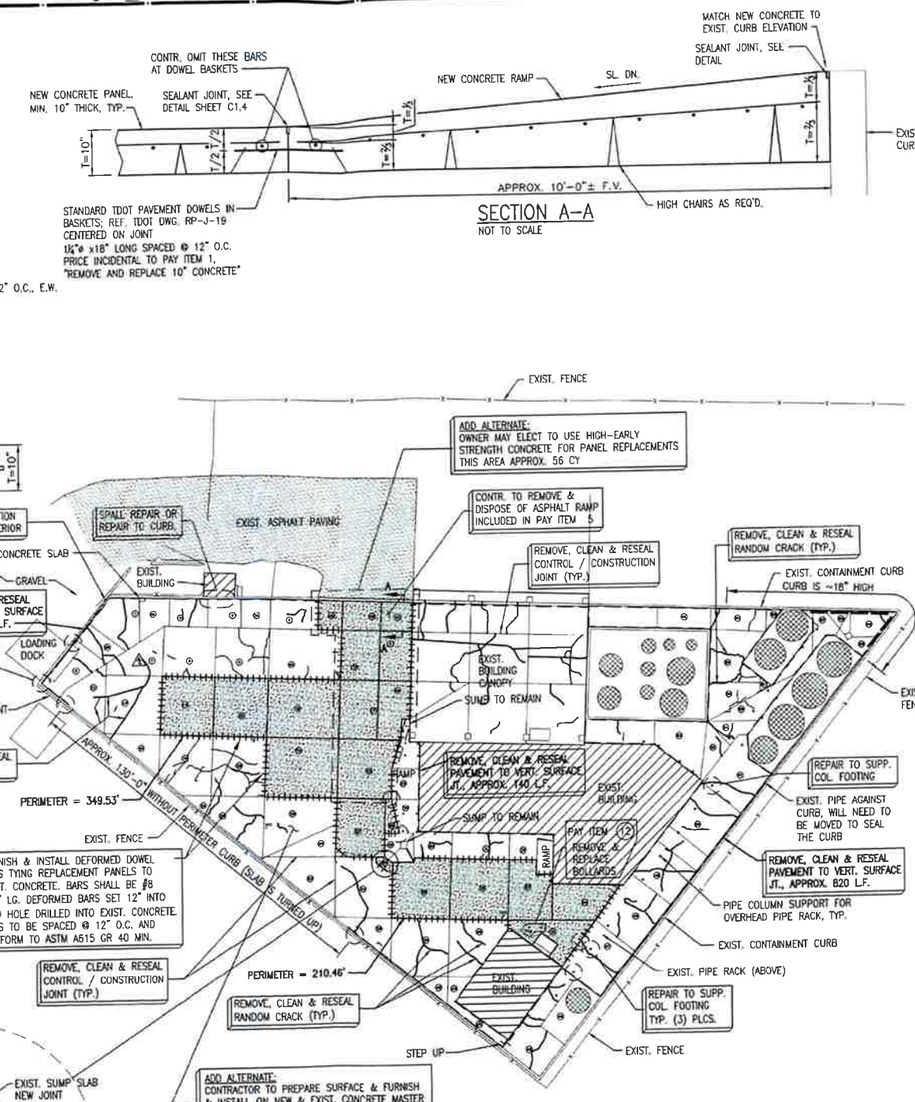
REPLACEMENT PANEL REINF. DETAIL
NOT TO SCALE



DOWELED CONSTRUCTION JOINT DETAIL AT PANEL REPLACEMENT INTERIOR JOINT
NOT TO SCALE



TIED CONSTRUCTION JOINT DETAIL AT PANEL REPLACEMENT PERIMETER JOINT TO EXISTING CONCRETE
NOT TO SCALE

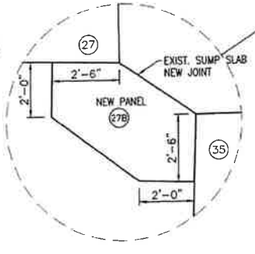


SECTION A-A
NOT TO SCALE

PROPOSED REPAIR PLAN
SCALE: 1"=20'

NOTE:
DEFORMED DOWELS SHOWN IN PLAN FOR LOCATION ONLY; DO NOT COUNT TO DETERMINE REQ'D. QUANTITY PAID FOR AS ITEM 4

FURNISH & INSTALL DEFORMED DOWEL BARS TYING REPLACEMENT PANELS TO EXIST. CONCRETE. BARS SHALL BE #8 x24" LG. DEFORMED BARS SET 12" INTO 1⅛"ø HOLE DRILLED INTO EXIST. CONCRETE. BARS TO BE SPACED @ 12" O.C. AND CONFORM TO ASTM A615 GR 40 MIN.



ALL CONCRETE PANEL REPLACEMENTS AND REPAIRS SHALL RESULT IN A SURFACE WHICH POSITIVELY DRAINS TOWARD EXISTING SUMPS. CONTRACTOR SHALL MATCH EXISTING GRADES AND CONSTRUCT NEW CONCRETE TO A SURFACE TOLERANCE WITHIN ⅜" IN 10' MEASURED IN ANY DIRECTION WITH A STRAIGHT EDGE.

ENGINEER MAY IDENTIFY ADDITIONAL AREAS FOR REPAIR OR REPLACEMENT DURING CONSTRUCTION. CONTRACTOR SHALL COMPLETE ALL ADDITIONAL WORK REQUIRED BY ENGINEER AT THE AGREED UNIT PRICE.

REMOVE & REPLACE 10" THICK CONCRETE & FURNISH & INSTALL NEW CONCRETE PANELS AT THE FOLLOWING LOCATIONS

PAY ITEMS (1) & (3) APPROX. 5,600 S.F.:

PANEL	APPROX. LENGTH x WIDTH	SHAPE
4A	8'-4"x10'-0"	
4B	13'-4"x10'-0"	
4C	11'-0"x10'-0"	
5	11'-0"x17'-0"	
5A	11'-0"x20'-0"	
11	13'-4"x20'-0"	
14	18'-4"x20'-0"	
15	18'-6"x20'-0"	
16	25'-0"x20'-0"	
17	13'-4"x20'-0"	
21	25'-0"x20'-6"	
22	21'-0"x20'-6"	
27	17'-0"x20'-0"	
27A	12'-0"x5'-0"	
27B	7'-6"x3'-6"	
35	21'-0"x20'-4"	
36	20'-0"x20'-4"	
37	16'-0"x20'-4"	
37A	23'-6"x12'-8"	
41	30'-6"x19'-0"	

LEGEND

- BUILDING
- TANKS
- CONCRETE PARKING CURB
- YCO — YARD CLEAN-OUT, (2) TYP. (TO REMAIN)
- SPALL REPAIR OR REPAIR TO SUPPORT COL. OR REPAIR TO CURB
- NEW REPLACEMENT CONCRETE

NOTE:
CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS, ELEVATIONS & EXIST. CONDITIONS PRIOR TO THE FABRICATION OF ANY MATERIALS

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MEMPHIS, TENNESSEE

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ANDREW P. MAY — 21 — STATE OF TENNESSEE

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PROPOSED CONCRETE REPAIR & REHABILITATION PLAN

C1.3
SHEET 3 OF 5

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Filename: Z:\EXCEL TSD\0002ST\CAD\PLANS\Plans - Rev. 1.dwg
Plotted: Thursday, September 19, 2019 - 4:40 pm
By: FHS

Figure 8.6.1-4

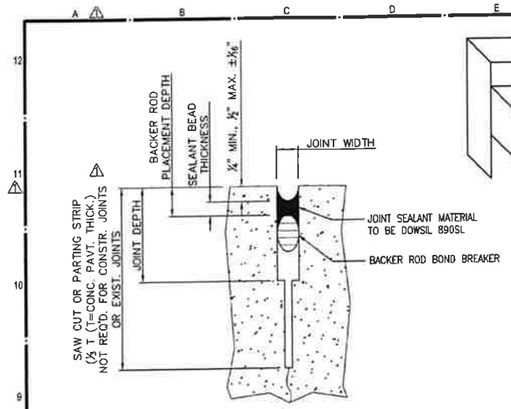
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"DETAILS"

Project Number: EXCELTSD.0002ST

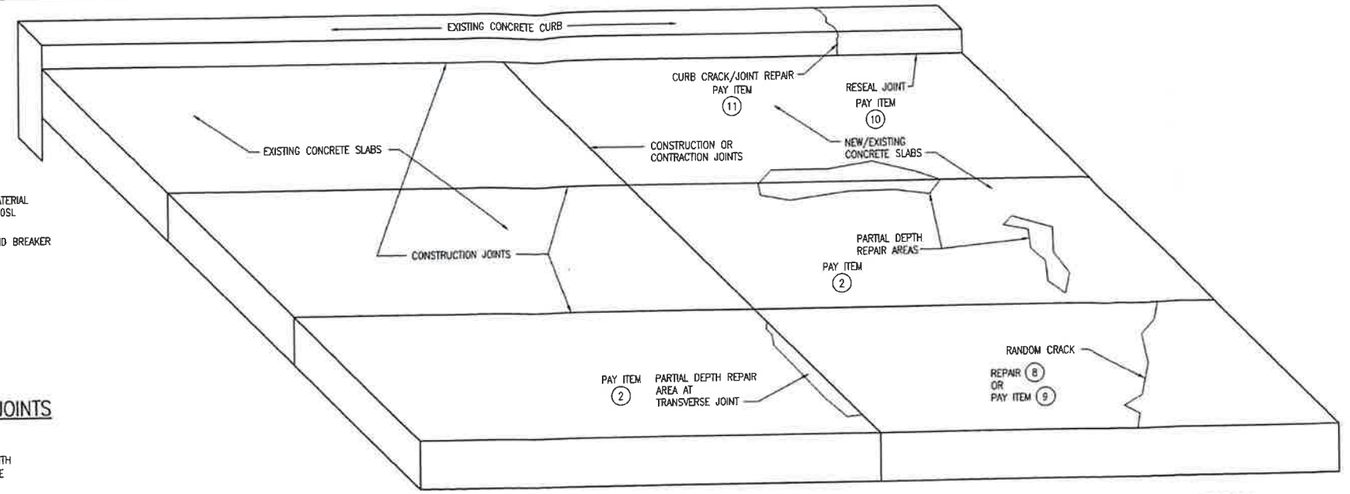
Date: 12/14/2018



JOINT DETAIL FOR CONTROL/CONSTRUCTION JOINTS

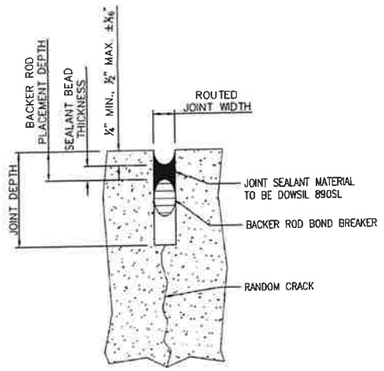
PAY ITEM NO. (7)

NOTE:
INTERNAL JOINTS & PERIMETER JOINTS ASSOCIATED WITH "REMOVE & REPLACE 10" THICK CONCRETE" SHALL BE INCLUDED IN PAY ITEM (1).



PLAN VIEW OF JOINT RESEALING, SPALL REPAIR, AND RANDOM CRACK REPAIR

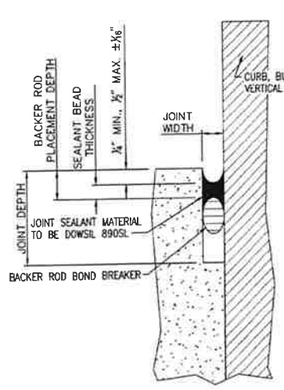
N.T.S.



JOINT DETAIL FOR RANDOM CRACK REPAIR

PAY ITEM NO. (8) OR (9)

NOTE:
THIS DETAIL FOR SIMILAR REPAIRS TO RANDOM CRACKS IN CURB, PAY ITEM (11).



JOINT DETAIL AT PAVEMENT / VERTICAL SURFACE INTERFACE

PAY ITEM NO. (10)

GENERAL NOTES REGARDING CONCRETE PAVEMENT JOINT SEALANTS

SEE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS FOR CONCRETE PAVEMENT JOINTS AND SEALANTS.

PAVEMENT JOINTS SHALL BE SAWED TO THE DIMENSIONS SHOWN ON THIS SHEET. BOTH SIDES OF THE JOINT ARE TO BE THOROUGHLY CLEANED OF ALL OIL, GREASE, OLD SEALANT, AND ALL OTHER FOREIGN MATERIAL. THE FACES OF THE JOINT ARE TO BE SANDBLASTED. JUST PRIOR TO PLACEMENT OF SEALANT. ALL JOINTS ARE TO BE HIGH-PRESSURE AIR BLOWN TO REMOVE ANY WIND-BLOWN MATERIAL THAT MAY BE PRESENT. COMPRESSED AIR SHALL BE CLEAN & FREE OF OIL OR WATER.

PAYMENT FOR RESEALING OF JOINTS SHALL BE FULL COMPENSATION FOR ALL CLEANING AND PREPARATION OF JOINTS PRIOR TO SEALANT APPLICATION.

WHEN SILICONE SEALANT IS USED TO RESEAL PAVEMENT CONTROL/CONSTRUCTION JOINTS, THEN ITEM NO. (7), "REMOVE, CLEAN & RESEAL CONTROL/CONSTRUCTION JOINTS" PER LINEAR FOOT IS TO BE USED.

TABLE A
JOINT DIMENSIONS (INCHES)

JOINT WIDTH	SEALANT BEAD THICKNESS	BACKER ROD DIAMETER	MINIMUM JOINT DEPTH	BACKER ROD PLACEMENT DEPTH
¼"	¼" ± 1/16"	⅜"	⅝"	½"
⅜"	¼" ± 1/16"	½"	⅞"	½"
½"	¼" ± 1/16"	⅝"	1¼"	½"
⅝"	5/16" ± 1/16"	¾"	1½"	⅝"
¾"	⅜" ± 1/16"	⅞"	1¾"	⅝"
⅞"	⅜" ± 1/16"	1"	1¾"	⅝"
1"	⅜" ± 1/16"	1⅛"	1¾"	1⅛"
1"	½" ± ⅛"	1¼"	2"	¾"
>1"	½" ± ⅛"	1¼"+	2"+	¾"

1.) UNLESS OTHERWISE INDICATED ON THE PLANS THE JOINT WIDTH FOR NEW CONSTRUCTION WILL BE ⅜".

2.) FOR REHABILITATION PROJECTS THE JOINT WIDTH WILL BE SHOWN ON THE PLANS OR ESTABLISHED BY THE ENGINEER BASED ON FIELD CONDITIONS.

3.) ENGINEER SHALL PERFORM FIELD REVIEW & APPROVAL OF ALL JOINT REPAIRS BEFORE PAYMENT WILL BE MADE.

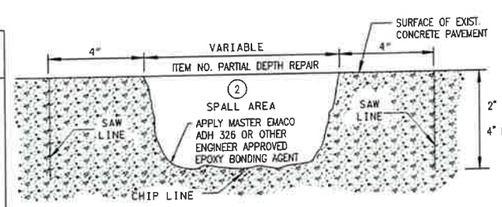
GENERAL NOTES REGARDING CONCRETE SPALL REPAIR

ALL PARTIAL DEPTH SPALL REPAIR AREAS SHALL BE SAWED AND CHIPPED TO THE APPROXIMATE LINES SHOWN IN THE ABOVE DETAIL. ALL COSTS OF THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR ITEM NO. 2 SPALL REPAIR PER SQUARE FOOT.

BEFORE BEGINNING REPAIR PROCESS, EACH SPALL AREA SHALL BE CLEAN, DRY, AND FREE OF ANY FOREIGN MATERIAL.

IF DEPTH OF SPALL EXCEEDS 4" THEN IT SHALL BE MEASURED BY THE SQUARE FOOT AND PAID FOR UNDER ITEM NO. (1) & (3) "REMOVE & REPLACE 10" THICK CONCRETE".

ALL PARTIAL DEPTH REPAIRS ARE TO BE MADE AT THE DIRECTION OF THE ENGINEER & IN ACCORDANCE WITH THE PLANS & SPECIFICATIONS.



PROFILE VIEW

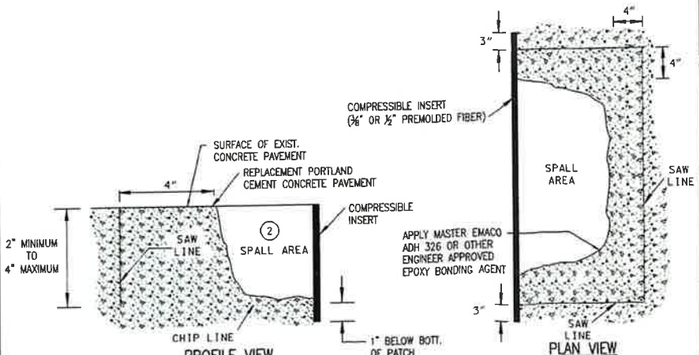
DETAIL FOR PARTIAL DEPTH SPALL REPAIR

GENERAL NOTES REGARDING RANDOM CRACK REPAIR

RANDOM CRACKS SHALL BE ROUTED TO A MINIMUM DIMENSION OF ¼" WIDE AND ⅜" DEEP AND THEN SEALED. JOINT PROPORTIONS SHALL MATCH THOSE SHOWN IN TABLE "A" JOINT PROPORTIONS.

WHEN SILICONE SEALANT IS USED TO SEAL RANDOM CRACKS IN SLAB, THEN ITEM NO. (8) OR (9) "REMOVE, CLEAN, & RESEAL RANDOM CRACK" PER LINEAR FOOT IS TO BE USED.

ALL RANDOM CRACKS ARE TO BE REPAIRED AT THE DIRECTION OF THE ENGINEER & IN ACCORDANCE WITH THE PLANS & SPECIFICATIONS.



PROFILE VIEW PLAN VIEW

DETAIL FOR PARTIAL DEPTH SPALL REPAIR AT JOINT

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EXCEL TSD
PANEL REPLACEMENT / JOINT RESEALING
MEMPHIS, TENNESSEE

Rev.	Date	Revision Description
1	9/19/19	MINOR REVISIONS

Seal



Issue Date: DEC. 14, 2018
Project No: EXCELTSD.0002ST
Drawn By: FHS
Checked By: APM
Sheet Title:

DETAILS

C1.4
SHEET 4 OF 5

Figure 8.6.1-5

Sheet C1.5

Fisher Arnold

"ESTIMATED QUANTITIES,

GENERAL NOTES, AND

TECHNICAL SPECIFICATIONS"

Project Number: EXCELTSD.0002ST

Date: 12/14/2018

NOTES AND TECHNICAL SPECIFICATIONS ⚠

1. THE GENERAL CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. CROSS CHECK AND COORDINATE ALL DIMENSIONS & DETAILS WITH SITE CONDITIONS DRAWING. REPORT ANY DISCREPANCIES TO ENGINEER PRIOR TO CONTINUING WORK.CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED WORK. UNLESS SPECIFICALLY NOTED, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEANS AND MEASURES NECESSARY TO PROTECT THE FLATWORK AND TO PROVIDE FOR THE SAFETY OF WORKMEN AND THE PUBLIC DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE BUT NOT BE LIMITED TO BARRICADES, WARNING DEVICES, CLOSURES, ETC.

2. THE GENERAL CONTRACTOR AND ANY SUBCONTRACTORS SHALL COORDINATE WORK SCHEDULES, WORK SPACE REQUIREMENTS, MATERIAL STORAGE, AND WORK FLOW WITH EXCEL TSD. THE CONTRACTOR UNDERSTANDS THAT THE SITE IS AN ACTIVE WASTE PROCESSING FACILITY AND THAT THE REPAIR WORK DESCRIBED IN THE CONTRACT DOCUMENTS SHALL BE COMPLETED WITH MINIMAL INTERRUPTION TO THE EXCEL TSD OPERATIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF SITE FACILITIES (I.E. PIPING, CONDUIT, BOLLARDS, FENCE, STEEL RAMPS, ETC.) WHICH CONFLICT WITH JOINT RESEALING OPERATIONS

3. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REQUIREMENTS OF OSHA, TOSHA, TDEC, EXCEL TSD, AND/OR OTHER GOVERNING OR REGULATORY BODIES HAVING JURISDICTION AT THE SITE. CONTRACTOR SHALL BE TOTALLY RESPONSIBLE FOR FULL COMPLIANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS CONCERNING HEALTH AND SAFETY OF WORKERS AND THE PUBLIC IN AND AROUND THE CONSTRUCTION SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SECURE ALL NECESSARY PERMITS FOR PERFORMING THE WORK DESCRIBED IN THE DRAWINGS.

4. THE CONTRACTOR SHALL PREVENT VECHICLE ACCESS TO THE FINISHED GRADE AND CONCRETE PAVEMENTS UNTIL THE STRENGTH ACCEPTANCE CRITERIA HAVE BEEN MET AND ALL JOINT SEALING ACTIVITIES ARE COMPLETE. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO CONCRETE PAVEMENTS BEFORE THE WORK IS ACCEPTED.

5. THE CONTRACTOR SHALL TAKE ANY PRECAUTIONS NECESSARY TO PREVENT DAMAGE TO EXISTING, TO-REMAIN CONCRETE AND SITE INFRASTRUCTURE. THESE PRECAUTIONS MAY INCLUDE BUT ARE NOT LIMITED TO THE USE OF SMALLER, LIGHT-WEIGHT EQUIPMENT, USE OF PROTECTIVE MATTING OR LUMBER, OR USE OF RUBBER TIRE EQUIPMENT. CONCRETE THAT IS DAMAGED BY THE CONTRACTOR SHALL BE REMOVED AND REPLACED AT THE DIRECTION OF THE ENGINEER AND AT NO ADDITIONAL COST TO THE OWNER.

⚠ DEMOLITION / SUBGRADE PREPARATION ⚠

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF ALL CONCRETE, ASPHALT, SUBGRADE MATERIALS, AND JOINT SEALANT/SLURRY WHICH ARE GENERATED AS A RESULT OF THIS CONCRETE REHABILITATION PROJECT. EXCEL TSD SHALL BE RESPONSIBLE FOR DISPOSAL OF ANY CONCRETE, ASPHALT, SUBGRADE MATERIALS, AND JOINT SEALANT/SLURRY THAT ARE GENERATED AS RESULT OF THIS CONCRETE REHABILITATION PROJECT.

2. THE CONTRACTOR IS REQUIRED TO PROTECT THE EXISTING MEMBRANE (20 MIL +/-) BELOW THE CONCRETE. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY DAMAGED MEMBRANE AT NO ADDITIONAL CHARGE.

3. FOLLOWING REMOVAL OF EXISTING CONCRETE PAVEMENT, THE CONTRACTOR SHALL ENSURE THAT THE SUBGRADE IS FIRM BY PROOFROLLING OR OTHER MEANS. SUBGRADE AREAS EXHIBITING POOR SUPPORT WILL REQUIRE REMOVAL AND REPLACEMENT. DURING CONSTRUCTION, THE ENGINEER WILL OBSERVE AND INDICATE ANY AREAS WHERE SUBGRADE SHALL BE REMOVED AND REPLACED WITH COMPACTED GRAVEL.

SITEWORK/EROSION CONTROL

1. THE CONTRACTOR SHALL MAKE PROVISIONS SUCH THAT NO PORTION OF THE COMPLETED PAVEMENTS WILL BE ERODED OR UNDERCUT BY CONSTRUCTION ACTIVITIES OR RAINFALL.

CONCRETE FOR PAVEMENTS

1. ALL CONCRETE SHOWN IN THE PLANS SHALL BE MINIMUM SIX-SACK MIX WITH A MAXIMUM W/C RATIO OF 0.45. THE CONTRACTOR SHALL SUBMIT THE CONCRETE MIX DESIGN, MATERIAL SOURCES AND CERTIFICATIONS, AGGREGATE GRADATIONS, AND MILL CERTIFICATIONS FOR REVIEW AND APPROVAL BY THE ENGINEER BEFORE BEGINNING ANY CONCRETE CONSTRUCTION.

2. CONCRETE SHALL HAVE THE FOLLOWING MINIMUM STRENGTHS FOR ACCEPTANCE:

   ASTM C78 7-DAY FLEXURAL STRENGTH REQUIREMENT: 650 PSI MINIMUM

   THE CONTRACTOR SHALL SUBMIT DATA FROM A TESTING LABORATORY WHICH CORRELATES THE COMPRESSIVE STRENGTH OF THE APPROVED MIX DESIGN WITH THE FLEXURAL STRENGTH. COMPRESSIVE STRENGTH TESTS MAY BE USED FOR ACCEPTANCE BY COMPARING THE RESULT TO THE FLEXURAL STRENGTH CORRELATION CURVE TO MEET A MINIMUM 650 PSI FLEXURE AT 7-DAYS. IF CORRELATION CURVES CANNOT BE PROVIDED, THEN THE ASTM C78 TEST WILL BE REQUIRED FOR ACCEPTANCE.

3. ALL CONCRETE SHALL USE CRUSHED LIMESTONE COARSE AGGREGATE AND NATURAL SILACEOUS SAND FOR FINE AGGREGATE.

4. ALL CONCRETE SHALL BE AIR-ENTRAINED (6% +/- 1%).

5. FIBER REINFORCEMENT WILL BE ALLOWED AND THE TYPE AND DOSAGE SHALL BE INCLUDED WITH THE CONCRETE MIXTURE DESIGN SUBMITTAL.

6. SET ACCELERATING ADMIXTURES HAVING CALCIUM CHLORIDE WILL NOT BE ALLOWED.

7. ALL CONCRETE SHALL HAVE A MAXIMUM SLUMP OF 3". IF A HIGH RANGE WATER REDUCING ADMIXTURE (SUPERPLASTICIZER) IS USED, THE CONCRETE SHALL HAVE A VERIFIED MAXIMUM SLUMP OF 3" PRIOR TO THE ADDITION OF SUPERPLASTICIZER. THE MAXIMUM ALLOWABLE SLUMP FOLLOWING ADDITION OF SUPERPLASTICIZER SHALL BE 8".

8. PORTLAND CEMENT SHALL MEET THE REQUIREMENTS OF ASTM C150 TYPE I OR II.

9. THE CONTRACTOR MAY INCORPORATE AN ASTM C618 CLASS F FLY ASH AT LESS THAN OR EQUAL TO 20% PORTLAND CEMENT REPLACEMENT BY WEIGHT.

10. THE CONTRACTOR SHALL SUBMIT A CONCRETE PLACEMENT PLAN FOR ALL CONCRETE PAVEMENT, SHOWING THE LOCATION OF ALL PLANNED CONSTRUCTION JOINTS.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FRESH AND HARDENED CONCRETE QUALITY CONTROL TESTS FOR COMPLIANCE WITH THE REQUIREMENTS. TESTS SHALL BE PERFORMED BY A QUALIFIED LABORATORY, WITH RESULTS FURNISHED TO THE OWNER/ENGINEER. THESE TESTS SHALL INCLUDE AT A MINIMUM THE FOLLOWING:
   A. SLUMP (ASTM C143); ONE TEST AT THE BEGINNING OF A DAY'S PLACEMENT AND EACH 25 CY THEREAFTER.
   B. AIR (ASTM C231); ONE TEST AT THE BEGINNING OF A DAY'S PLACEMENT AND EACH 25 CY THEREAFTER.
   C. UNIT WEIGHT/YIELD (ASTM C138); ONE TEST AT THE BEGINNING OF A DAY'S PLACEMENT AND EACH 25 CY THEREAFTER.
   D. COMPRESSIVE STRENGTH (ASTM C39) OF TEST CYLINDERS MADE AND FIELD CURED IN ACCORDANCE WITH (ASTM C31); ONE TEST AT THE BEGINNING OF EACH DAY'S PLACEMENT AND EACH 25 CY THEREAFTER.

REINFORCING STEEL AND LOAD TRANSFER DOWELS

1. LOAD TRANSFER DOWELS SHALL BE 1.25" DIAMETER X 18" LONG ASTM A615M GRADE 60 SMOOTH STEEL DOWELS PLACED IN BASKET ASSEMBLIES AND LOCATED AS SHOWN ON THE PLANS. BASKETS SHALL ASSURE THAT DOWELS ARE PLACED AT THE MID-HEIGHT OF THE PAVEMENT AND THAT THE DOWELS REMAIN PARALLEL DURING CASTING OPERATIONS. THE CONTRACTOR SHALL FASTEN THE BASKETS TO THE SUBBASE ADEQUATELY TO PREVENT MOVEMENT.
2. DOWELS AND BASKETS SHALL BE SHOP PAINTED FULL LENGTH. PRIOR TO CONCRETE PLACEMENT, DOWELS SHALLRECIEVE A LIGHT COATING OF GREASE ON ALTERNATING ENDS OF DOWELS TO ALLOW FOR MOVEMENT OF THE JOINT.
3. THE LOCATIONS OF DOWEL BASKETS SHALL BE CLEARLY IDENTIFIED ALONG THE SUBGRADE SHOULDER, SO THAT JOINTS MAY BE SAWN DIRECTLY ABOVE THE BASKETS AFTER CONCRETE PLACEMENT.
4. REINFORCING STEEL SHALL BE ASTM A-615 GRADE 60 STEEL DEFORMED BARS FOR CONCRETE REINFORCEMENT. THE BARS SHALL BE FREE OF MILL SCALE OR RUST WHEN INCORPORATED INTO THE WORK.
5. DEFORMED DOWELS SHALL BE #6 X 24" LONG AND SHALL BE INSTALLED INTO 1 1/8" DIAMETER HOLES DRILLED INTO EXISTING CONCRTE AS SHOWN IN THE PLANS. THE CONTRACTOR SHALL INSURE THAT HOLES ARE DRILLED AT THE PROPER LOCATIONS, SPACING, AND ALIGNMENT. HOLES SHALL BE CLEANED AND DOWELS TO BE INSTALLED AND BONDED USING SIMPSON STRONG TIE SET-XP, OR APPROVED EQUAL, EPOXY ANCHOR ADHESIVE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
6. REINFORCING STEEL AND ACCESSORIES SHALL BE DETAILED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE LATEST ACI CODE AND THE ACI STANDARD DETAILING MANUAL.
7. REINFORCING STEEL IN CONCRETE SHALL BE CLASS B TENSION SPLICE UNLESS NOTED OTHERWISE.
8. REINFORCING STEEL SHALL BE FABRICATED AND HELD SECURELY IN PLACE WITH STANDARD, APPROVED ACCESSORIES, AND PLACED IN ACCORDANCE WITH ACI SP-66. WELDING OF REINFORCING STEEL SHALL NOT BE ALLOWED.
9. UNLESS NOTED OTHERWISE, THE CONTRACTOR SHALL MAINTAIN THE FOLLOWING REINFORCING STEEL COVERAGE:
   A. REINFORCING STEEL AT UNFORMED SURFACES IN CONTACT WITH EARTH: 3"
   B. ALL OTHER REINFORCING STEEL: 2"

CONCRETE PAVEMENT FORMING, PLACEMENT, FINISH, & CURING

1. ALL CONCRETE PAVEMENT SHALL BE MECHANICALLY PLACED AND SCREEDED BY MEANS OF A ROLLER SCREED, VIBRATORY TRUSS SCREED, LASER SCREED, OR SUPFORM PAVER. POWER TROWELING AND/OR USE OF A HAND-HELD OR JITTERBUG SCREED WILL NOT BE ALLOWED.

2. FORMING OF CONCRETE PAVEMENT ALONG THE ROADWAY EDGE AND AT TRANSVERSE CONSTRUCTION JOINTS WILL BE ALLOWED. FORMING OF A LONGITUDINAL JOINT AT THE ROADWAY CENTERLINE WILL NOT BE ALLOWED; CONCRETE PAVING SHALL BE COMPLETED FOR THE FULL 30 FT ROADWAY WIDTH.

3. THE FOUNDATION UNDER THE FORMS SHALL BE FIRM AND TRUE TO GRADE SO THAT EACH FORM, WHEN SET, WILL BE FIRMLY IN CONTACT FOR ITS WHOLE LENGTH AND AT THE SPECIFIED GRADE. ANY GRADE AT THE FORM LINE FOUND BELOW ESTABLISHED GRADE SHALL BE FILLED TO GRADE WITH SUITABLE MATERIAL IN LIFTS OF 1/2 IN.(13 MM) OR LESS FOR A DISTANCE OF 18 IN (450 MM) ON EACH SIDE OF THE BASE OF THE FORM, AND THOROUGHLY COMPACTED. ANY GRADE AT THE FORM LINE FOUND ABOVE GRADE SHALL BE CORRECTED BY TAMPING OR BY CUTTING AS NECESSARY. PEDESTALS OF EARTH OR OTHER MATERIAL UPON WHICH TO REST THE FORMS TO BRING THEM TO GRADE WILL NOT BE PERMITTED.

4. FORMS SHALL BE STEEL OR WOOD AND STAKED INTO PLACE WITH NOT LESS THAN THREE PINS FOR EACH 10 FT SECTION. A PIN SHALL BE PLACED AT EACH SIDE OF EVERY JOINT. FORM SECTIONS SHALL BE TIGHTLY LOCKED AND FREE FROM PLAY OR MOVEMENT IN ANY DIRECTION. THE FORMS SHALL NOT DEVIATE FROM TRUE LINE BY MORE THAN 1/4 IN. AT ANY POINT. FORMS THAT SETTLE OR SPRING UNDER THE SPREADING AND FINISHING EQUIPMENT SHALL BE RESET OR REMOVED AS DIRECTED. THE TOP AND FACE OF FORMS SHALL BE CLEANED AND OILED PRIOR TO THE PLACING OF CONCRETE. THE ALIGNMENT AND GRADE ELEVATIONS OF THE FORMS SHALL BE CHECKED AND CORRECTIONS MADE BY THE CONTRACTOR IMMEDIATELY BEFORE PLACING THE CONCRETE. WHEN ANY FORM HAS BEEN DISTURBED OR ANY GRADE HAS BECOME UNSTABLE, THE FORM SHALL BE RESET AND RECHECKED.

5. CONCRETE FOR PAVEMENT SHALL BE WELL CONSOLIDATED. THE CONCRETE ADJACENT TO JOINTS SHALL BE COMPACTED OR FIRMLY PLACED WITHOUT VOIDS OR SEGREGATION AGAINST THE JOINT MATERIAL, UNDER AND AROUND ALL LOAD TRANSFER DEVICES, JOINT ASSEMBLY UNITS, AND OTHER FEATURES DESIGNED TO EXTEND INTO THE PAVEMENT. AREAS EXHIBITING HONEYCOMB, SEGREGATION, OVER VIBRATION, OR EXCESSIVE BLEEDING WILL NOT BE ACCEPTED.

6. THE CONTRACTOR SHALL SUBMIT, FOR APPROVAL BY THE ENGINEER, A CONCRETE PLACEMENT PLAN FOR ALL CONCRETE PAVEMENT, SHOWING THE LOCATION OF ALL PLANNED CONSTRUCTION JOINTS.

7. ALL CONCRETE PAVEMENT AND FLATWORK SHALL BE SMOOTH FLOATED AND FINISHED WITH A FINE BROOM TRANSVERSE TO THE DIRECTION OF TRAFFIC. USE OF ADDITIONAL WATER TO FINISH THE SURFACE SHALL NOT BE ALLOWED.

8. DURING CURING THE CONCRETE SHALL BE PROTECTED FROM EXTREME TEMPERATURES BY APPROPRIATE MEASURES. THE CONCRETE SHALL NOT BE EXPOSED TO FREEZING TEMPERATURES FOR A MINIMUM OF 5 DAYS FOLLOWING PLACEMENT. ALL PROTECTIVE MEASURES FOR PROPER CURING INCLUDING BUT NOT LIMITED TO INSULATED BLANKETS, HEATING, FOGGING, BURLAP MATS, ETC, SHALL BE AT THE CONTRACTOR'S EXPENSE. THE GUIDELINES IN ACI 305R-10 (GUIDE TO HOT WEATHER CONCRETING) AND AC306R-10 (GUIDE TO COLD WEATHER CONCRETING) SHALL BE FOLLOWED.

9. ALL CONCRETE FLATWORK SHALL BE CURED WITH A SPRAY-APPLIED, WHITE-PIGMENTED, LIQUID MEMBRANE CURING COMPOUND MEETING THE REQUIREMENTS OF ASTM C309 AND MIXED AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. GENERALLY, THE MANUFACTURER'S RECOMMENDED APPLICATION RATES ARE 200 SQUARE FEET PER GALLON, AND THE CONTRACTOR IS ADVISED THAT THIS IS DIFFICULT TO ACHIEVE BY SIMPLY USING ORCHARD SPRAYERS.

10. AS SOON AS THE CONCRETE HAS HARDENED SUFFICIENTLY, THE PAVEMENT SURFACE SHALL BE TESTED WITH A 10 FT STRAIGHTEDGE. WHEN THE STRAIGHTEDGE IS PLACED PARALLEL TO THE CENTERLINE OF THE PAVEMENT, THE SURFACE DEVIATION FROM THE LOWER EDGE OF THE STRAIGHTEDGE SHALL NOT EXCEED 1/8 IN. ANY REQUIRED CORRECTION SHALL BE PERFORMED WITH APPROVED GRINDING EQUIPMENT. ALL CORRECTIVE WORK SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE.

⚠ 11. ALL CONCRETE PANEL REPLACEMENTS AND REPAIRS SHALL RESULT IN A SURFACE WHICH POSITIVELY DRAINS TOWARD EXISTING SUMPS. CONTRACTOR SHALL MATCH EXISTING GRADES AND CONSTRUCT NEW CONCRETE TO A SURFACE TOLERANCE WITHIN ⅛" IN 10' MEASURED IN ANY DIRECTION WITH A STRAIGHT EDGE.

⚠ ESTIMATED QUANTITIES OF REPAIRS

PAY ITEM NO.	DESCRIPTION	ESTIMATED QUANTITIES	UNIT
1	REMOVE & REPLACE 10" THICK CONCRETE	5,600	SQ. FT.
2	PARTIAL DEPTH REPAIR CONCRETE PAVEMENT	100	SQ. FT.
3	CONCRETE FOR PAVEMENT	200	CU. YD.
4	LOAD TRANSFER DOWELS	575	EACH
5	ASPHALT MILLING & CONCRETE DISPOSAL	1	LUMP
6	NEW PAVEMENT JOINT SEALING	1,000	LINEAR FT.
7	REMOVE, CLEAN, & RESEAL CONTROL/CONSTR. JOINT	1,600	LINEAR FT.
8 & 9	REMOVE, CLEAN, & RESEAL RANDOM CRACK	1,150	LINEAR FT.
10	REMOVE, CLEAN, & RESEAL PAVEMENT TO VERTICAL SURFACE JOINT	1,200	LINEAR FT.
11	CLEAN & RESEAL CURB CRACK/JOINT	150	LINEAR FT.
12	REMOVE & RESET PIPE BOLLARD	4	EACH
13	REMOVE & REPLACE PIPE RACK FOUNDATION W/ANCHOR BOLTS	3	EACH
14	URETHANE CRACK INJECTION (VERTICAL SURFACE)	200	LINEAR FT.
15	REMOVE & REPLACE PERIMETER CURB	100	LINEAR FT.

ADDITIVE ALTERNATE ESTIMATED QUANTITIES

PAY ITEM NO.	DESCRIPTION	ESTIMATED QUANTITIES	UNIT
A1	SURFACE PREPARATION (EXIST. CONCRETE)	14,300	SQ. FT.
A2	SURFACE PREPARATION (NEW CONCRETE)	5,600	SQ. FT.
A3	FURNISH & INSTALL MASTER PROTECT H1000	19,900	SQ. FT.
A4	HIGH-EARLY STRENGTH CONCRETE	56	CU. YD.

CONCRETE PAVEMENT JOINT SAWING AND JOINT/CRACK SEALING/RESEALING

1. THE CONTRACTOR SHALL SAW CUT THE JOINTS AT THE LOACTIONS AND TO THE DEPTH NOTED ON THE PLANS BY MEANS OF EARLY-ENTRY SAWING. JOINTS SHALL BE SAWN AS SOON AS THE CONCRETE HAS HARDENED SUFFICIENTLY TO SUPPORT THE WEIGHT OF THE SAW AND AVOID UNACCEPTABLE RAVELING OF THE COARSE AGGREGATE. THE SAWING WINDOW MAY VARY DEPENDING ON TEMPERATURE AND OTHER FACTORS, AND THE CONTRACTOR IS ADVISED THAT PROPER JOINT SAWING MAY REQUIRE NIGHT WORK

2. THE CONTRACTOR SHALL WIDEN THE EARLY-ENTRY JOINTS AS SHOWN IN THE PLANS FOR THE REQUIRED JOINT TYPE AND SEALANT (SEE TABLE A ON SHEET C1.4).

3. RANDOM CRACKS SHALL BE ROUTED AND PREPARED FOR THE APPLICABLE JOINT DIMENSIONS SHOWN IN TABLE A ON SHEET C1.4.

4. JOINTS SHALL BE SEALED WITH A LOW MODULUS SILICONE SEALANT, DOWSIL 890SL, APPROVED BY THE ENGINEER. THE SEALANT SHALL BE INSTALLED BEFORE THE PAVEMENT IS OPENED TO TRAFFIC AND AS SOON AFTER COMPLETION OF THE CURING PERIOD AS IS FEASIBLE. THE SEALANT SHALL BE APPLIED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. JUST PRIOR TO SEALING, EACH JOINT SHALL BE THOROUGHLY CLEANED OF ALL FOREIGN MATERIAL, INCLUDING MEMBRANE CURING COMPOUND, BY SAND-BLASTING AND WITHOUT ROUNDING OR DAMAGING THE JOINT EDGES. ALL JOINTS ARE TO BE HIGH-PRESSURE AIR BLOWN PRIOR TO SEALING. THE JOINT FACES SHALL BE CLEAN AND DRY WHEN THE SEAL IS APPLIED. THE SEALANT SHALL BE APPLIED TO THE JOINT IMMEDIATELY AFTER CLEANING. THE SEALING MATERIAL SHALL BE APPLIED TO EACH JOINT OPENING TO CONFORM TO THE DETAILS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE SEALING SHALL BE DONE IN SUCH MANNER THAT MATERIAL WILL NOT BE SPILLED ON THE EXPOSED SURFACE OF THE CONCRETE. ANY EXCESS MATERIAL ON THE SURFACE OF THE CONCRETE PAVEMENT SHALL BE REMOVED IMMEDIATELY AND THE PAVEMENT SURFACE CLEANED. SEALING MATERIAL THAT DOES NOT BOND TO THE CONCRETE SHALL BE REMOVED, THE JOINT RECLEANED, AND RESEALED AT THE CONTRACTOR'S EXPENSE.

ADDITIVE ALTERNATE ⚠

1. THE CONTRACTOR SHALL PROVIDE THE OWNER WITH PRICING FOR THE ADDITIVE ALTERNATE PAY ITEMS AS SHOWN ON SHEET C1.5.
2. SURFACE PREPARATION WILL BE REQUIRED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, PRIOR TO APPLICATION OF SILANE SEALER, MASTER PROTECT H1000. CONTRACTOR SHALL EXPECT SHOT BLASTING AS MEANS OF SURFACE PREPARATION FOR EXISTING CONCRETE WHERE PREVIOUS COATINGS EXIST AND ARE VISIBLE ON PLANS SHEET C1.2. THE CONTRACTOR, CONTRACTOR IS NOT TO APPLY SILANE SEALER UNTIL A MINIMUM OF 14 DAYS AFTER JOINT SEALING IS COMPLETE.
3. HIGH EARLY STRENGTH CONCRETE MAY BE REQUIRED IN THE AREA DESIGNATED ON THE PLANS (SEE SHEET C1.3) TO FACILITATE EXCEL TSD OPERATIONS. CONTRACTOR SHALL FURNISH THE ADDITIONAL PRICE PER CUBIC YARD OF HIGH-EARLY STRENGTH CONCRETE FOR THE QUANTITY USED IN THIS AREA. THE 650 PSI FLEXURAL STRENGTH SHALL BE ACHIEVED WITHIN 48 HOURS FOR HIGH EARLY STRENGTH CONCRETE.

FISHER ARNOLD
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EXCEL TSD
PANEL REPLACEMENT / JOINT RESEALING
MEMPHIS, TENNESSEE

Rev.	Date	Revision Description
1	9/19/19	MINOR REVISIONS

Seal



Issue Date: DEC. 14, 2018
Project No: EXCELTSD.0002ST
Drawn By: FHS
Checked By: APM
Sheet Title:
ESTIMATED QUANTITIES, GENERAL NOTES, AND TECHNICAL SPECIFICATIONS

C1.5
SHEET 5 OF 5

ATTACHMENT 8.6.2

CURRICULUM VITAE OF

ANDREW MAYBEE, P.E.



Andrew P. Maybee, PE, MLE

Vice President
Structural/Bridge Design

FISHER ARNOLD

RELEVANT EXPERIENCE

Mr. Andrew Maybee, PE has over 28 years of experience with structures. Mr. Maybee serves as Fisher Arnold's Vice President for Bridge, Structures and Pavements. He has over 27 years of experience in road building, Precast and Prestressed Bridge design and construction, concrete mixture design, material quality control, and concrete durability and performance. His experience with design, detailing, specifications, fabrication, transport, and erection of prestressed bridge components culminated at a regional PCI Certified Concrete Fabricator where he served as Vice President of Engineering for nine years. He was responsible for design of prestressed bridge and roadway products including foundation piling, bridge slabs and box beams, AASHTO and Bulb Tee girders, deck panels, precast wingwalls, precast bridge caps, precast drainage structures, prestressed strain and distribution poles, and post-tensioned pavement slabs. He was responsible for all design calculations for precast and prestressed components as well as for development of proper rigging, lifting and transport methods to assure safety, stability, and prevent overstressing. His precast and prestressed designs have been used on highway, railroad, industrial projects, and airport bridges across the Mid-South area.

PROJECT EXPERIENCE

BNSF Railroad Over Mississippi River West Approach Spans Replacement West Memphis, AR & Memphis, TN

Fisher Arnold (FA) was contracted by Kraemer North America to provide construction phase engineering services for the replacement of the West Approach Spans of the BNSF Railroad over the Mississippi River near Memphis, TN. The original bridge was completed in 1892 and was the first bridge built to span the Mississippi River south of St. Louis, Mo. The existing bridge was scheduled to remain under train traffic during the construction of the replacement west approach structures. FA's construction engineering work began with a full pre-construction condition survey of the existing bridge. Following the field condition survey and written report of findings, FA developed and implemented a bridge movement monitoring plan. This monitoring plan involved establishment of project super-control and installation of over 100 target monitoring points on the steel and masonry towers of the existing structure. These points were monitored throughout construction and at multiple times throughout the days when deep foundation construction was ongoing. FA utilized ultra-high-precision robotic total station monitoring equipment in conjunction with software based data analysis to detect bridge movements within 0.01 ft. Additionally, FA provided all construction survey layout, elevations, and staking for the general contractor.



Corps of Engineers Bridge Projects - Little Rock, Memphis, & Vicksburg Districts

Mr. Maybee, while at CPI, was responsible for the fabrication and delivery of foundation piling and bridge components for over 25 bridge crossings in the referenced Corps Districts. His role involved all structural detailing for 14" & 16" square prestressed foundation piling and precast/prestressed superstructure components. Generally, these structures were 3 ft & 4 ft side-by-side box beams with precast parapets or guardrail, grouted keyways, and tie rods. Several of these bridges were stringer-type AASHTO beam structures. Mr. Maybee prepared prestressing calculations for redesigned strand patterns, prepared fabrication, handling, and erection drawings, developed concrete mixture designs, and was responsible for all plant quality control and submittals.

EDUCATION

UNIVERSITY OF MEMPHIS

- Bachelor of Science - Civil Engineering (1991)

ACTIVE REGISTRATION

PROFESSIONAL ENGINEER

- AR #16731; CO #PE.0051983; FL #80289; KS #PE25345; MA #53692; MO #2001031658; MS #26626; NC #046355; TN #104540; TX #120876

PROFESSIONAL ORGANIZATIONS & CERTIFICATIONS

- American Concrete Pavement Association Chapter/State Executive Committee 2014 Chairman, 2013 Vice-Chairman
- E-Railsafe and BNSFcontractor.com
- National Council of Examiners for Engineering and Surveying (NCEES) Model Law Engineer (MLE) Designation
- Member, American Society of Civil Engineers
- Member, Precast/Prestressed Concrete Institute
- Member, ASCE



Andrew P. Maybee, PE, MLE

Vice President
Structural/Bridge Design

FISHER ARNOLD

Tennessee Southern Railroad over Sugar Creek



($78,000 Precast Components Only) Mr. Maybee, while at CPI, was responsible for the design, fabrication, and delivery of precast pier caps and box beams for TSR's A-Line over Sugar Creek in Mt. Pleasant, TN. The voided box beams were designed for railroad loadings and provided monolithic curbs for walkways and guardrails. Prestressing and doweled connections were incorporated for rapid connection to the cast-in place footings and columns. Transport and installation of all precast bridge components utilized accelerated construction techniques and allowed for the new bridge to be erected over a single weekend when trains were not operating. Mr. Maybee led all aspects of precast/ prestressed design, fabrication, transportation, and plant quality control.

LADOTD – I-10 over Lake Pontchartrain - Hurricane Katrina Bridge Replacement



($28M Precast Components only) In 2006, Mr. Maybee led the engineering efforts to fabricate and deliver 78" Bulb-Tee Girders, 24", 30", & 36" Square Prestressed Concrete Foundation Piling for the bridge replacement following Hurricane Katrina. The project involved design of stressing equipment, specialty formwork, and development of rigging and handling plans for barge and truck transport of piling up to 190 feet, and girders up to 170 feet. Concrete materials and mixture designs were developed using ternary cementitous materials to achieve rapid chloride permeability test results less than 1500 coulombs. Mr. Maybee led all aspects of precast/prestressed design, fabrication, transportation, and plant quality control.

Memphis International Airport Runway 36C-18C, Taxiway Y and Taxiway S over Winchester Road



($5.6 M Precast Components Only) Mr. Maybee , while at CPI, served as the project engineer for three separate contracts to extend the World Runway across Winchester Road. These contracts involved fabrication and delivery of over 600 modified 54" Bulb-Tee girders to frame a two-span cut and cover bridge tunnel. Mr. Maybee redesigned the girder framing plan which originally incorporated AASHTO Type IV Modified beams. The redesigned structure placed the Bulb-Tees side-by-side with steel diaphragms, thus eliminating the need for deck forming, saving significant time and expense. Savings for the value engineering proposition on the initial contract were shared with the owner. The subsequent contracts incorporated the more-efficient modified 54" Bulb-Tee girders. Mr. Maybee led all aspects of girder redesign, fabrication, transportation, and plant quality control.

Condition Survey, Structural Assessment, & Repair Design – William R. Moore Building Autozone Park

Mr. Maybee, while at Wiss Janney Elstner,, was a key engineer on a team responsible for the condition assessment and ancillary work needed to develop construction documents allowing for incorporation of the circa 1913 William R. Moore Building into the new Autozone Park in downtown Memphis. The 8-story cast-in-place concrete frame structure with masonry facade was unoccupied for years, until it became a potential design element in the ballfield complex and new home of the AAA Memphis Redbirds. Mr. Maybee, investigated the in-situ concrete strength, and determined concrete slab capacity after field and laboratory investigations. Additionally, the masonry facade was stabilized with shelf-angle repairs and tuckpointing.



Andrew P. Maybee, PE, MLE

Vice President
Structural/Bridge Design

FISHER ARNOLD

Jack Daniels Roller Compacted Concrete Warehouse Expansions - Lynchburg, TN



Mr. Maybee, while with the American Concrete Pavement Association's local chapter, worked with local cement and concrete producers, to develop a roller compacted concrete design for their industrial warehouse expansion projects. The roller-compacted concrete allowed for a cost-effective, yet durable hardstand to be placed allowing for truck access, trailer dolly-downs, and reduced lighting requirements.

City of Memphis, TN Main to Main Multimodal Connector - Light Pole Foundation Design, 2015

Mr. Maybee, while at Fisher Arnold, designed and detailed drilled shaft foundations for various height luminares along this multimodal connector. These light poles were designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Mr. Maybee designed 16 in. diameter and 24 in. diameter drilled shafts for the 20 ft. and 30 ft. light poles respectively.

TDOT Shelby Co. State Route 14 & Bolen Huse Traffic Signal Strain Pole Foundation Analysis 2015

Mr. Maybee was responsible for the design and detailing of the redesign of drilled shaft foundations for steel strain poles carrying span wire and mast arm mounted signalization and camera equipment. The contractor elected to value engineer the foundations for this project and following a detailed foundation investigation, Mr. Maybee redesigned a more economical and easily constructible drilled shaft foundation system. Design calcuations and details were prepared for submittal to TDOT by Mr. Maybee.

City of Jonesboro, AR – West College Ave over Christian Creek 2015 thru 2016

Mr. Maybee, has led the Fisher Arnold team in the design and development of construction plans and specifications for this single 60 ft. span precast concrete GRS-IBS bridge structure. The geosynthetic reinforced soil integrated bridge system (GRS-IBS) allows for use of easily constructed abutments without the need for deep foundations. The use of side-by-side precast beams allows for rapid construction and opening to traffic following erection. Mr. Maybee is the lead bridge engineer on this project and is designing the bridge superstructure in accordance with AASHTO LRFD Bridge Design Specifications, 7th Edition. Mr. Maybee has interacted regularly with the geotechnical consultant and is responsible for the detailing of the GRS-IBS foundation system. He was responsible for the overall design of the bridge. In addition, Mr. Maybee will be responsible for all construction phase inspection and review of submittals.

ATTACHMENT 8.6.3

TECHNICAL INFORMATION RE DOW CHEMICAL *DOWSIL* JOINT SEALING PRODUCTS

Technical Data Sheet

DOWSIL™ 890-SL Silicone Joint Sealant

Self-leveling silicone sealant for concrete and concrete to asphalt pavement joints.

Features & Benefits

- Self-leveling, no tooling required.
- Can be extruded from -20 to 120°F.
- Flows into irregular joint widths and does not require tooling.
- Movement capability 100% extension and 50% compression.
- Ultra-low modulus.
- Weather and UV resistant.
- Fuel resistant-short term exposure. Refer to Dow form number 62-207 for more information.
- Cold applied, ready-to-use as supplied. No heating or special preparation.
- Unprimed adhesion-primer is not required for Portland cement concrete and asphalt which results in labor and material savings.
- Skin over- typically, the sealant will have a skin-over time of one hour or less at standard conditions allowing roadways to quickly be opened to traffic.

Composition

- One-part, cold applied, self-leveling silicone

Applications

- DOWSIL™ 890-SL Silicone Joint Sealant can be used for concrete to concrete and concrete to asphalt pavement joints.
- For use in new construction, repair or remedial applications. DOWSIL 890-SL Silicone Joint Sealant can be used to seal irregularly shaped and spalled joints.

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Test[1]	Property	Result	D 5893 Requirement
	As supplied		
	Color	Dark gray	
ASTM C 639	Flow	Pass	Smooth, level
ASTM C 1183	Extrusion rate, minimum	231 mL/min	20 mL/min
ASTM C 679	Tack free time	Pass	5 hours max

1. ASTM: American Society for Testing and Materials

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Form No. 62-017-01 O

Typical Properties (Cont.)

Test	Property	Result	D 5893 Requirement
ASTM C 792	Heat aging	0.97%	10% loss max
ASTM C 661	Durometer Shore 00	41	30 minimum
ASTM D 1475	Specific gravity	1.26–1.34	
	Cure time, ½" x ½" x 2" (73°F, 50% R.H.)	Pass	21 day cure
	As Cured – 21 days at 25°C (77°F) and 50% RH		
	Bond, non-immersed	Pass	No cracks or separation
	Bond, water immersed	Pass	No cracks or separation
	Bond, oven aged	Pass	No cracks or separation
ASTM D 412	Ultimate elongation	1400%	600% min
ASTM D 412	Tensile stress @ 150%	19 psi	45 psi max
ASTM C 793	Effects of accelerate weathering	Pass	5,000 hours
	Resilience	77%	75% min
ASTM C 719	Joint movement capability, +100/-50 percent, 10 cycles	No failure	

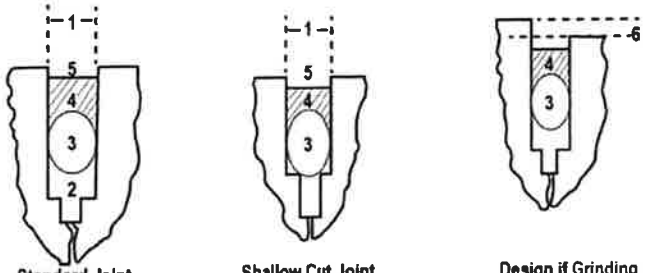


Figure 1: Good Joint Design

[1]Joint width wide enough to accommodate movement. (For additional information on joint width, see papers by Spells and Klosowski, "Silicone Sealants for Use in Concrete Construction," Vol. 1, No. 1, American Concrete Institute, SP-70, 1981; J.B. Cook, "Construction Sealants and Adhesives," Wiley-Interscience, 1970; and J.M. Klosowski, "Sealants in Construction," Marcel Dekker, 1989.).
[2]Joint sawed deep enough to allow backer rod/sealant placement and space for pumping of old sealant compounds. NOTE: This applies to standard joints only; void space beneath backer rod in new construction is not needed.
[3]Proper backer rod placement to prevent three-sided adhesion.
[4]Sealant installed to proper depth and width.
[5]Sealant recessed a minimum of 3/8 inch to 1/2 inch (9.53 mm to 12.7 mm) below pavement surface.
[6]Depth of lowest slab determines the amount of recess required if grinding is anticipated; once grinding is complete, the sealant will have proper recess below the pavement surface.

Description

DOWSIL 890-SL Silicone Joint Sealant is a one-part, self-leveling silicone material that cures to an ultra-low-modulus silicone rubber upon exposure to atmospheric moisture. The cured silicone rubber remains flexible from -20 to 300°F.

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Form No. 62-017-01 O

Description (Cont.)

Asphaltic paving materials have low tensile strengths. It is important to use an ultra-low modulus material when sealing these substrates to ensure minimal strain is placed on the asphaltic joint face.

Applicable Standards

- ASTM D 5893 Type SL
- FAA P-605 for silicone joint sealants
- Meets SS-S-200E (section 4.4.12) Flame Test Requirements
- EN 14187-5 Hydrolysis Test
- EN 14188-2 Class B, C and D

How To Use

Please refer to the Dow Silicone Pavement Sealants Installation Guide, form number 61-507.

Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT WWW.CONSUMER.DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

Usable Life And Storage

Keep stored in original, unopened containers at or below 32°C (90°F). Refer to product packaging for "Use By" date. Keep containers tightly closed.

Packaging Information

DOWSIL 890-SL Silicone Joint Sealant is supplied in 29 fl oz (857 mL) disposable plastic cartridges, 4.5 gal (17 L) bulk pails, and 50 gal (189 L) bulk drums.

Limitations

DOWSIL 890-SL Silicone Joint Sealant is not recommended for continuous water immersion. It should not be applied in totally confined spaces where the sealant is not exposed to atmospheric moisture.

The sealant should never be applied to wet or damp asphalt or concrete pavements or installed during inclement weather.

Contact Dow prior to specifying for or installing in airfield runway applications.

Dow does not promote or warrant the use of DOWSIL™ sealants in applications associated with spill containment areas of any kind.

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Shipping Limitations

None.

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Health And Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, www.consumer.dow.com or consult your local Dow representative.

Table 1: Recommended Backer Rod Installation (Shallow Cut)[1]

Measured in Inches						
Joint Width	1/4	3/8	1/2	3/4	1	> 1
Recessed Below Surface	3/8	3/8	3/8–1/2	3/8–1/2	1/2+	Contact Dow
Sealant Thickness	1/4	1/4	1/4	3/8	1/2	
Backer Rod Diameter	3/8	1/2	5/8	7/8	1 1/4	
Total Joint Depth	1–1 1/8	1 1/8–1 1/4	1 1/4–1 3/8	1 5/8–1 3/4	2 1/4–2 3/8	
Measured in Millimeters						
Joint Width	6	9	13	19	25	
Recessed Below Surface	9	9	9–13	9–13	13+	
Sealant Thickness	6	6	6	9	13	
Backer Rod Diameter	9	13	16	22	32	
Total Joint Depth	25–29	29–32	32–35	41–45	57–60	

1. On road surfaces where grinding is planned at a later date, the sealant and backer rod should be installed so that sealant is approximately 3/8 inch (9.35 mm) below the road surface after grinding is complete. An additional small amount should be added to allow for surface imperfections on the bottom and to provide room for old sealant to pump up from below during rehabilitation work in the summer months.

http://www.consumer.dow.com

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY
The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that our products are safe, effective, and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

Dow's sole warranty is that our products will meet the sales specifications in effect at the time of shipment.

Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

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DOW DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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Dow Performance Silicones

Jet Fuel Resistance Testing
Airfield Applications

DOWSIL™

As stated in FAA Engineering Brief No. 36 (dated 5/86), "The function of a sealant is to seal the joint between two concrete surfaces. Therefore, the sealant's strength characteristics are less important than its ability to withstand joint movement and maintain adhesion." This document goes on further to state that "Silicone sealant is not degraded by contact with jet fuel. Some swelling of the material will normally occur, but it will return to its original shape upon evaporation of the fuel, without loss of bond."

Generally, for a sealant to be successful in an airfield application, it must meet the following requirements:

- Resistance to ultraviolet light
- Wide temperature flexibility
- Cyclic movement capability (both extension and compression)
- Fuel/oil resistance
- Jet blast resistance

Federal Specifications SS-S-200E, SSS-S-1614A and ASTM Specification D 3569 attempt to test for the above performance requirements. However, when it comes to cyclic movement capability, they all fall short. The best cyclic movement test that closely relates to actual field conditions is ASTM C 719. See Table I for a brief comparison of these specifications.

Since there are few federal or ASTM specifications presently written for silicones, Dow developed a test method to verify that silicone sealants can meet the requirements for airfield applications mentioned above.

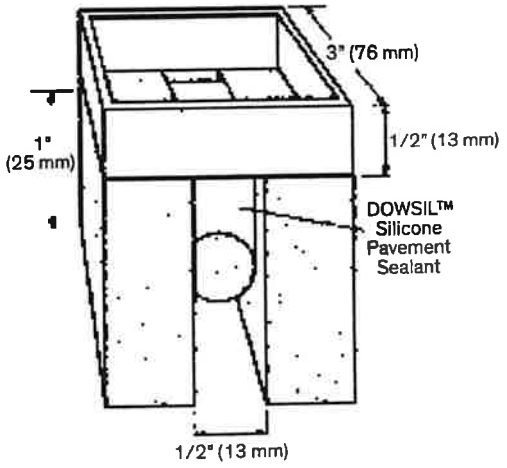
A simulated fuel spill test joint (see Figure 1) was chosen along with ASTM C 719 cyclic testing. This test joint in combination with C 719 appeared to be a more accurate depiction of actual field conditions.

The test consists of forming several sealant test joints between two concrete blocks with a dam on top of each block (see Figure 1). The sealant is allowed to cure. The dam is filled with the test fluid (i.e., jet fuel). The fluid is then allowed to dissipate, as it would in the field. If more than one fluid is to be tested on the same joint, then approximately one week separates each fluid application. At the end of the fluid exposure, these same test joints are then subjected to cyclic testing per the ASTM C 719 specification.

Table I. Specification Comparison

		Cyclic Movement Capability	
Specification	**Sealant Type**	**Extension**	**Compression**
SS-S-200E	Cold Applied	3 cycles @ 0°F (-17°C)	None
SS-S-1614A	Hot Applied	3 cycles @ 0°F (-17°C)	None
ASTM D 3569	Hot Applied	3 cycles @ 0°F (-17°C)	None
ASTM C 719	Cold Applied	10 cycles @ -15°F (-26°C)	10 cycles @ 158°F (70°C)

Figure 1. Simulated Fuel Spill Test Joint



During the initial contact with some fluids, the test joints showed some visual volume increase. However, after dissipation of the fluids, these same test joints did return to their original shape (see Figure 2 and Table II). More importantly, after further subjecting the same test joints to cyclic testing (after fluid dissipation), they showed no signs of bond loss.

The airfield application test method from Dow is a good indication that DOWSIL™ silicone pavement products can provide the necessary airfield performance requirements. But the best indication is Dow's actual field track record, with applications dating back to 1980.

Figure 2. Effect of Fuel Spill on DOWSIL™ Silicone Joint Sealant

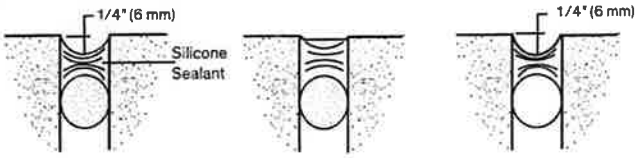


Table II. Approximate Volume Change after Exposure to Fluids

	Percent Volume Swell – Visual	
Fluid	**DOWSIL™ 888 Silicone Joint Sealant**	**DOWSIL™ 890-SL Silicone Joint Sealant**
JP-4	5 percent	15-20 percent
Skydrol B	None	None
50/50 Glycol/H2O	None	None
Hydraulic Fluid	None	None

[1]After drying, all samples passed +100/-50 percent movement testing.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that our products are safe, effective and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

Dow's sole warranty is that our products will meet the sales specifications in effect at the time of shipment.

Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, DOW SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.

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30023848

Form No. 62-207-01 D

Technical Data Sheet

DOWSIL™ 888 Silicone Joint Sealant

FEATURES & BENEFITS

- Can be extruded from -20 to 120°F.
- May be used in joints that are not uniform in width.
- Movement capability 100% extension and 50% compression.
- Low modulus.
- Weather and UV resistant.
- Fuel resistant-short term exposure. Refer to Dow form number 62–207 for more information.
- One component, cold applied, ready-to-use as supplied; dispensed directly from the bulk container into the joint by hand or with an air-powered pump.
- Unprimed adhesion – primer is not required for bonding to Portland cement concrete. For optimum adhesion, the surface must be clean, dry and frost-free.
- Cure time – typically, the sealant will have a skin-over time of one hour or less at standard conditions.

COMPOSITION

- One-part, cold applied, non-sag silicone sealant.

Non-sag silicone joint sealant for Portland cement concrete pavement joints.

APPLICATIONS

- DOWSIL™ 888 Silicone Joint Sealant can be used for concrete to concrete pavement joints.
- For use in new construction, repair or remedial applications. DOWSIL 888 Silicone Joint Sealant may be used to seal joints that are not uniform in width provided the movement capability of the sealant is not exceeded. May also be used in joints with minor spalling.

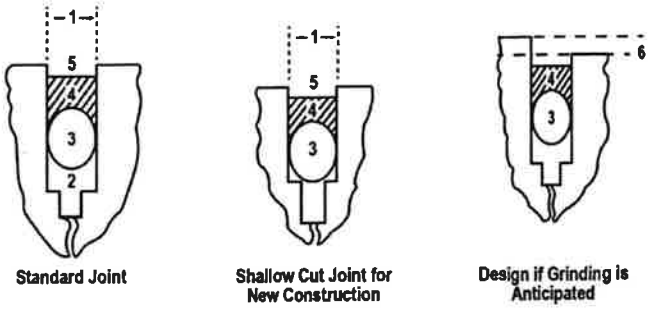
TYPICAL PROPERTIES

Specification Writers: These values are not intended for use in preparing specifications.

Test* - Property	Result	D 5893 Requirement
As Supplied		
Color	Gray	
ASTM D 2202, Slump	Pass	< 0.30 inches
ASTM C 1183, Extrusion Rate, minimum	72 mL/min	20 mL/min
ASTM C 679, Tack Free Time	Pass	5 hours max
ASTM C 792, Heat Aging	3.05%	10% loss max
ASTM C 661, Durometer Shore A-2	15	25 maximum
ASTM C 792, Specific Gravity	1.48	
Cure Time, ½" x ½"x 2" (73°F, 50% R.H.)	Pass	21 day Cure
As Cured – 21 days at 25°C (77°F) and 50% RH		
Bond, Non-Immersed	Pass	No cracks or separation
Bond, Water Immersed	Pass	No cracks or separation
Bond, Oven Aged	Pass	No cracks or separation
ASTM D 412 (Die C), Ultimate Elongation	≥ 1000%	600% min
ASTM D 412 (Die C), Tensile Stress @ 150%	28 psi	45 psi max
ASTM C 793, Effects of Accelerate Weathering	Pass	5,000 hours
Resilience	77%	75% min
ASTM C719, Joint Movement Capability, +100/-50 percent, 10 cycles	No failure	

*ASTM: American Society for Testing and Materials.

Figure 1: Good Joint Design



1. Joint width wide enough to accommodate movement. (For additional information on joint width, see papers by Spells and Klosowski, "Silicone Sealants for Use in Concrete Construction," Vol. 1, No. 1, American Concrete Institute, SP-70, 1981; J.B. Cook, "Construction Sealants and Adhesives," Wiley-Interscience, 1970; and J.M. Klosowski, "Sealants in Construction," Marcel Dekker, 1989.).
2. Joint sawed deep enough to allow backer rod/sealant placement and space for pumping of old sealant compounds. NOTE: This applies to standard joints only; void space beneath backer rod in new construction is not needed.
3. Proper backer rod placement to prevent three-sided adhesion.
4. Sealant installed to proper depth and width.
5. Sealant recessed a minimum of 3/8 inch to 1/2 inch (9.53 mm to 12.7 mm) below pavement surface.
6. Depth of lowest slab determines the amount of recess required if grinding is anticipated; once grinding is complete, the sealant will have proper recess below the pavement surface.

DESCRIPTION

DOWSIL 888 Silicone Joint Sealant is a one-part, non-sag silicone material that cures to a low-modulus silicone rubber upon exposure to atmospheric moisture. Can be applied over a wide temperature range.

APPLICABLE STANDARDS

- ASTM D 5893 Type NS
- FAA P-605 for silicone joint sealants
- Meets SS-S-200E (section 4.4.12) Flame Test Requirements
- EN 14187-5 Hydrolysis Test

HOW TO USE

Please refer to *the Dow Silicone Pavement Sealants Installation Guide*

HANDLING PRECAUTIONS

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT WWW.CONSUMER.DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

USABLE LIFE AND STORAGE

Keep stored in original, unopened containers at or below 32°C (90°F). Refer to product packaging for "Use By" date. Keep containers tightly closed.

PACKAGING INFORMATION

DOWSIL 888 Silicone Joint Sealant is supplied in 29 fl oz (857 mL) disposable plastic cartridges, 4.5 gal (17 L) bulk pails, and 50 gal (189 L) bulk drums.

LIMITATIONS

DOWSIL 888 Silicone Joint Sealant is not recommended for continuous water immersion. It should not be applied in totally confined spaces where the sealant is not exposed to atmospheric moisture.

Not intended for use with asphalt.

The sealant should never be applied to wet or damp asphalt or concrete pavements or installed during inclement weather.

Dow does not promote or warrant the use of Dow sealants in applications associated with spill containment areas of any kind.

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

SHIPPING LIMITATIONS

None.

UNRESTRICTED – May be shared with anyone
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Semco® is a registered trademark of PRC-Desoto International, Inc.
UL® is a registered trademark of Underwriters Laboratories, Inc.
DOWSIL™ 888 Silicone Joint Sealant
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HEALTH AND ENVIRONMENTAL INFORMATION

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, www.consumer.dow.com or consult your local Dow representative.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that our products are safe, effective, and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

Dow's sole warranty is that our products will meet the sales specifications in effect at the time of shipment.

Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, DOW SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.

DOW DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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Table 1: Recommended Backer Rod Installation (Shallow Cut)[1]

Measured in Inches						
Joint Width	1/4	3/8	1/2	3/4	1	> 1
Recessed Below Surface	3/8	3/8	3/8 to 1/2	3/8 to 1/2	1/2+	Contact
Sealant Thickness	1/4	1/4	1/4	3/8	1/2	Dow
Backer Rod Diameter	3/8	1/2	5/8	7/8	$1\frac{1}{4}$	
Total Joint Depth	$1–1\frac{1}{8}$	$1\frac{1}{8}–1\frac{1}{4}$	$1\frac{1}{4}–1\frac{3}{8}$	$1\frac{5}{8}–1\frac{3}{4}$	$2\frac{1}{4}–2\frac{3}{8}$	
Measured in Millimeters						
Joint Width	6	9	13	19	25	
Recessed Below Surface	9	9	9 to 13	9 to 13	13+	
Sealant Thickness	6	6	6	9	13	
Backer Rod Diameter	9	13	16	22	32	
Total Joint Depth	25–29	29–32	32–35	41–45	57–60	

[1]On road surfaces where grinding is planned at a later date, the sealant and backer rod should be installed so that sealant is approximately 3/8 inch (9.35 mm) below the road surface after grinding is complete. An additional small amount should be added to allow for surface imperfections on the bottom and to provide room for old sealant to pump up from below during rehabilitation work in the summer months.

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High Performance Building

Dow Performance Silicones

DOWSIL™ Brand Silicone Pavement Sealants

Installation Guide



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Preface

Highway and airport joints call for tough sealants that can withstand horizontal and vertical movement, have good weatherability and are easy to install with a short downtime and long service life.

DOWSIL™ 888 Silicone Joint Sealant and DOWSIL™ 890-SL Silicone Joint Sealant are one-part silicone formulations that can be extruded from -20°F to 120°F. In addition, DOWSIL™ 890-SL Silicone Joint Sealant can be used on asphalt. These sealants cure upon exposure to moisture in the air to form a flexible, low- to ultra-low-modulus, high-elongation silicone rubber seal. These sealants will collectively be referred to as DOWSIL™ silicone pavement sealants throughout this guide.

DOWSIL™ silicone pavement sealants are capable of withstanding extension of 100 percent and compression of 50 percent of the original joint width. They have excellent recovery, which makes them ideal for use in joints that experience a high degree of movement. DOWSIL™ 890-SL Silicone Joint Sealant is an ultra-low-modulus sealant that can be used to seal joints in asphalt pavements because it places very little stress on the asphalt joint face. Asphalt paving materials have low tensile strengths and require a sealant that places very little stress on the asphalt itself while keeping the joint sealed.

To fully utilize these capabilities, the sealant must be properly installed in properly designed joints. This guide provides the correct installation procedures, which begin with good joint design and preparation. The pamphlet also covers backer rod installation, giving a list of installation equipment and manufacturers of recommended equipment, as well as the most frequently asked questions and answers. In addition to this guide, installation videos are also available and viewing is suggested.

DOWSIL™ 888 Silicone Joint Sealant
www.youtube.com/watch?v=pZazfD0ObDw

DOWSIL™ 890-SL Silicone Joint Sealant
www.youtube.com/watch?v=Dqty3sONzkU

DOWSIL™ Silicone Pavement Sealants

What are they?

DOWSIL™ silicone pavement sealants are members of the same family and based on similar technologies. DOWSIL™ 888 Silicone Joint Sealant is a one-part, non-sag silicone formulation that can be extruded from -20°F to 120°F. It requires tooling and cures when exposed to atmospheric moisture to form a durable, flexible, low-modulus, high-elongation silicone rubber joint sealant for use on Portland Cement Concrete (PCC). Primer is not required on most applications. During application, no heating or cooling of the sealant is required. It retains its gunnability and can be pumped at low temperatures.

DOWSIL™ 890-SL Silicone Joint Sealant is a one-part, self-leveling silicone sealant that can be extruded from -20°F to 120°F. It cures when exposed to atmospheric moisture to form a durable, flexible, ultra-low-modulus, high-elongation silicone rubber joint seal for use on asphalt and/or Portland Cement Concrete. Primer is not required on most applications. During application, no heating or cooling of the sealant is required. It retains its gunnability and can be pumped at low temperatures.

Where to Use Them

DOWSIL™ 888 Silicone Joint Sealant is ideal for use in concrete-to-concrete joints (PCC) that experience a high degree of movement, such as transverse pavement expansion and contraction joints in highways, airports and other pavements. It withstands extension of 100 percent and compression of 50 percent of original joint width and has excellent recovery. It can be used in transverse, longitudinal, centerline and shoulder joints. Its non-slump characteristic makes it an excellent choice for vertical joints in curbs. It is often used in remedial work where joint widths may not be uniform.

DOWSIL™ 890-SL Silicone Joint Sealant is ideal for use in asphalt-to-concrete and concrete-to-concrete joints that experience a high degree of movement, such as transverse pavement expansion and contraction joints in highways, airports and other pavements. It can be used in longitudinal, centerline and shoulder joints.

It is also ideal for use in sealing concrete-to-asphalt joints such as shoulder joints. Its self-leveling characteristic makes it an excellent choice for horizontal joints and for joints on moderate slopes. It can also be used in remedial work where joint widths may not be uniform.

Some joints, such as bridge joints, may experience a great deal of movement shortly after sealant installation. DOWSIL™ 902 RCS Joint Sealant is ideal for those types of applications due to this product's rapid cure characteristics.

Other Applications

Contact your Dow representative for more information on the applications listed below or others:

- Airports
- Fast Track Pavements
- Bridge Joints
- Pavements on Grades
- Steel/Armor Joints
- Short-term Exposure Fuel Resistance (See Dow literature form number 62-207)

Important Considerations

Joint faces must be clean, dry and frost-free when the sealant is installed. Joints must be free of standing water, and under no circumstances should sealing take place during inclement weather.

Joint Cleanliness – A clean joint should have no visible signs of residual sealant or debris on the joint face and leave no residual cement powder or dust on your fingers after rubbing the joint face.

Pavement Drainage – DOWSIL™ silicone pavement sealants are not recommended for conditions where continuous water or moisture exposure is expected. Sources of subsurface water infiltration include a high water table, shallow or poor drainage ditches or improperly designed or maintained

subsurface drainage systems. All potential applications should be reviewed to ensure the pavement has positive drainage. The correct application of a primer has been shown to enhance performance of the sealant in these situations; contact your Dow representative for more details.

Dew Point – This is the temperature at which the air is saturated with moisture vapor and liquid water (dew) begins to form. Do not install sealant when the temperature is at or below the dew point. Additionally, conditions should be closely monitored if temperatures are approaching the dew point.

Inclement Weather – If rain or other inclement weather occurs during joint preparation or sealing, all operations should cease and sufficient time must be allowed so the joints are dry prior to starting or continuing the sealing operation. Joints that were cleaned but left open during inclement weather may need to be cleaned again prior to sealing due to the potential for contamination from run-off water.

Confined Spaces – DOWSIL™ silicone pavement sealants are not recommended for use in totally confined joints where the sealant is not exposed to atmospheric moisture during cure.

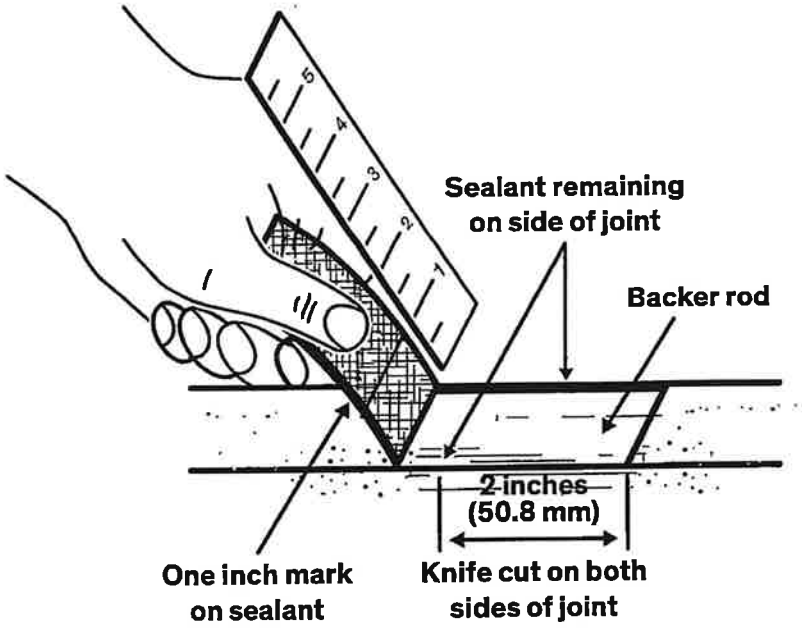
Field Adhesion Test

Prior to work of any kind pertaining to joint sealing, the joint sealing contractor, the owner or owner's representative and the Dow representative, should meet and discuss methods of installation and install a test section. A field adhesion test must be performed on the test section as outlined in Dow's field adhesion test procedure to confirm adhesion under site conditions. Field adhesion tests should also be performed and documented as the project proceeds.

The field adhesion test is a simple screening procedure that may help detect application problems, such as improper cleaning, use of improper primer, poor primer application or improper joint configuration. The sealant typically needs to cure 14 to 21 days prior to performing field adhesion tests.

1. Make a knife cut perpendicular to the joint from one side of the joint to the other.
2. Make two parallel cuts approximately 2" long, along each side of the joint.
3. Place a 1" mark on the sealant tab as shown in Figure 1.
4. Grasp the 2" piece of sealant firmly just beyond the 1" mark and pull at a 90° angle. Hold a ruler alongside the sealant.
5. If the 1" mark on the sealant can be pulled to the 5 1/2" mark on the ruler (total pull of 4 1/2" or 450% elongation) and held with no failure of sealant, the sealant should perform in a joint designed for +100/-50% movement.

Figure 1 – Standard Field Adhesion Hand Pull Test



How to Use DOWSIL™ Silicone Pavement Sealants

Cure Characteristics

DOWSIL™ silicone pavement sealants cure by reacting with atmospheric moisture, but the rate of cure is dependent on temperature and humidity. The cure will be faster with higher temperatures and humidity and slower with lower temperatures and humidity.

At a temperature of 75°F (24°C) and relative humidity of 50 percent, DOWSIL™ 888 Silicone Joint Sealant will skin over in under an hour and reach its ultimate properties in 7 to 14 days. Higher temperatures will reduce the initial skin over time and performance property time. Conversely, low temperatures will increase the skin-over time and increase the total cure time.

At a temperature of 75°F (24°C) and a relative humidity of 50 percent, DOWSIL™ 890-SL Silicone Joint Sealant will skin over in under an hour. The self-leveling sealant will reach its ultimate properties in 14 to 21 days. Like DOWSIL™ 888 Silicone Joint Sealant, skin over and cure times will decrease with warmer temperatures and increase with colder temperatures.

While it may require several days for the sealant to reach ultimate properties, roads or airfield applications may be reopened to traffic once the sealant forms a skin, generally within an hour during warm weather.

Joint Design

Good sealant installation begins with good joint design, and anticipated movement is a key design consideration. While the high movement capability of DOWSIL™ silicone sealants provides added safety when anticipated and actual movements differ, proper design and correct installation procedures will maximize performance.

Joint Width

Joints may either be sawed or formed to the required dimensions. The minimum joint width recommended for DOWSIL™ silicone pavement sealants is 1/4 inch (6.35 mm).

Transverse joints must be wide enough to prevent excessive movement. A 1/4 inch (6.35 mm) wide joint with 20 foot (6 m) spacing may be satisfactory in a warm climate, but more severe climates with wide temperature ranges or less frequent spacing will require a wider joint. Joint spacing, the coefficient of thermal expansion of the pavement, expected temperature range, and the anticipated temperature at time of sealing must all be considered.

The pavement should be designed and joints sized so the maximum extension and compression do not exceed +100 and -50 percent respectively.

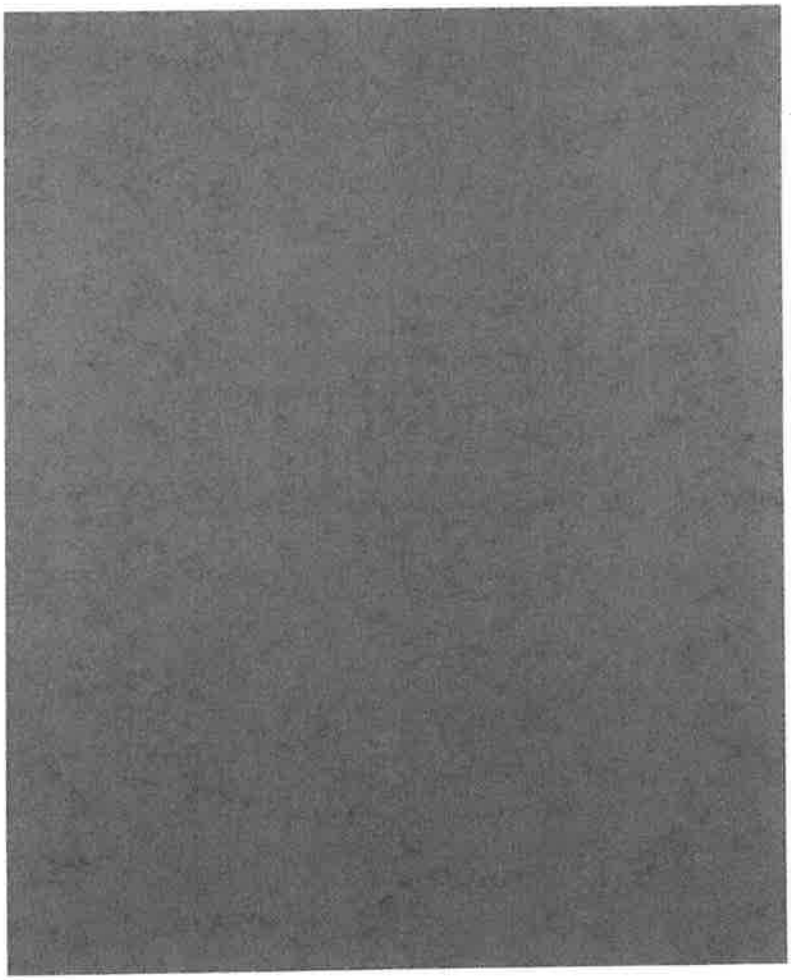
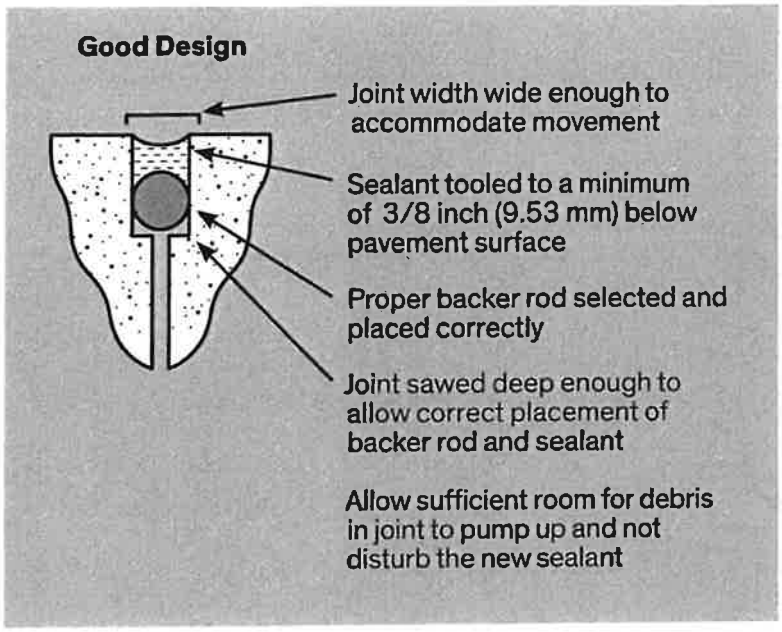


Figure 2 – Joint Design Considerations: DOWSIL™ 888 Silicone Joint Sealant



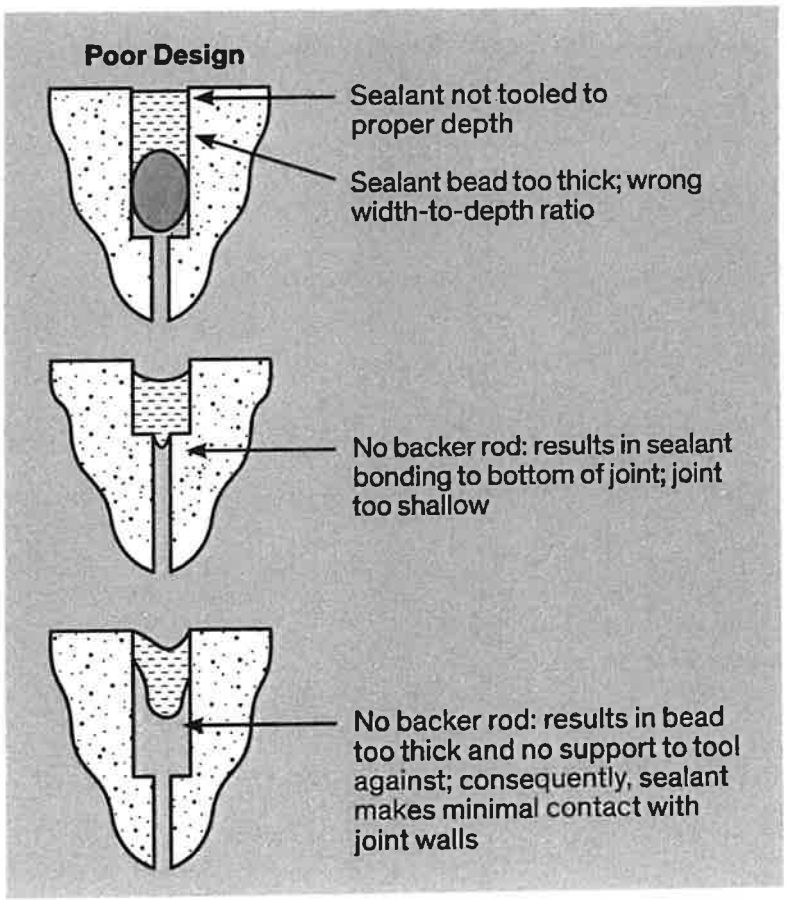
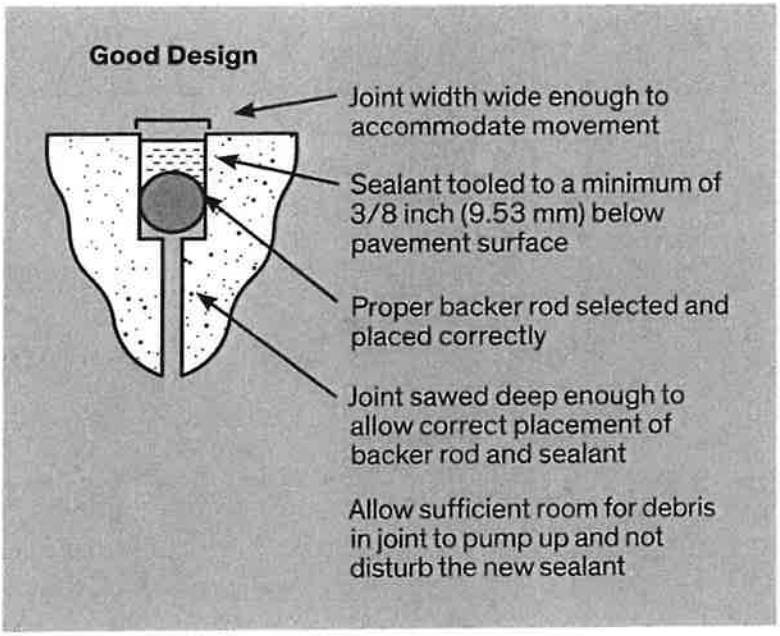
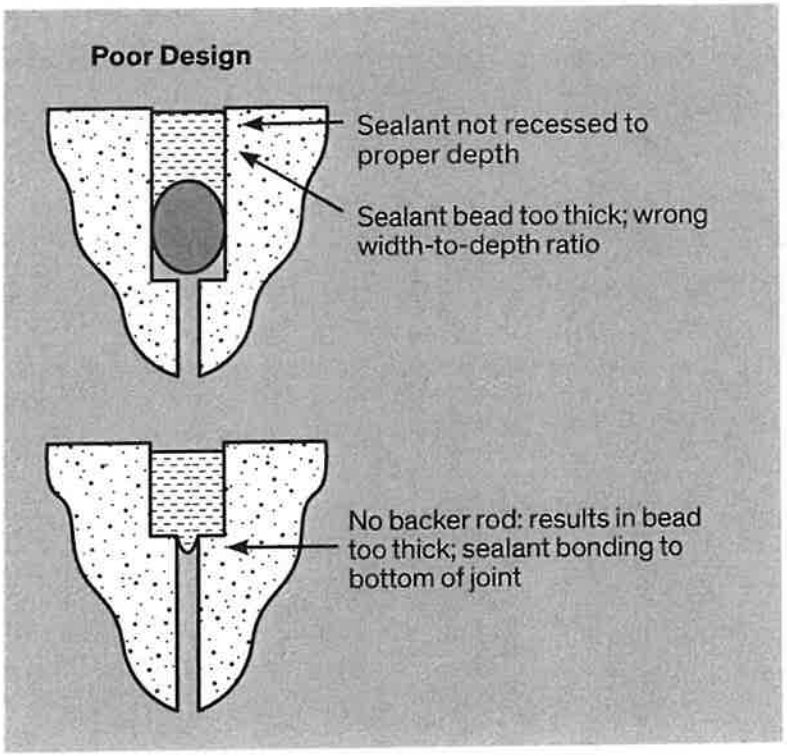


Figure 3 – Joint Design Considerations: DOWSIL™ 890-SL Silicone Joint Sealant





* Recess is measured from the highest point of the installed backer material to the lowest point of the pavement surface at the joint wall.

Joint Depth

The joint must be deep enough to allow proper placement of the sealant and a bond breaker/backer rod. Minimum depth requirements will vary slightly depending on joint width.

Table 1 – Recommended Joint Depth

Joint Width	Minimum Recess
1/4 to 1 inch (6.35 to 25.4 mm)	3/8 inch (9.53 mm)
> 1 inch (> 25.4 mm)	1/2 inch (12.7 mm)

Experience has shown that better performance of DOWSIL™ silicone pavement sealants can be obtained by maintaining a recess of 3/8 inch (9.53 mm) or greater. It is especially important to maintain the proper recess as the joint width approaches and/or exceeds 1 inch.

Joint Preparation

Obtaining the desired performance depends on using correct installation procedures. All contaminants, especially dried laitance from saw-cutting and previous sealants, must be removed with a high-pressure water wash followed by a sandblast after the joint dries. Leaving materials of this type on the surface of the joint face will prevent development of a good adhesive bond. A clean joint will have no visible signs of residual sealant or debris on the joint wall, and will leave no residual cement powder or dust on your fingers after rubbing the joint face.

DOWSIL™ 888 Silicone Joint Sealant will not bond to wet concrete. DOWSIL™ 890-SL Silicone Joint Sealant will not bond to wet asphalt or concrete. Moisture in and on the pavement is difficult to detect. The pavement must be allowed to dry. When in doubt, it is wiser to allow additional drying time than to risk sealant adhesion failure.

After drying, it is especially important to sandblast the top portion of the joint the sealant will contact. When sandblasting, follow all federal, state and local laws and regulations regarding the proper use and handling of equipment. The primary purpose is to remove traces of residual laitance. The sandblasting nozzle must be held at an angle to the joint face and within 1 or 2 inches (25.4 or 50.8 mm) of the pavement. Pointing it toward the bottom of the joint or at too great a distance from the face allows the force of the blast to dissipate resulting in ineffective cleaning. These points and others regarding surface preparation of new and old concrete pavement are expanded upon in following sections.

Backer Rod Selection

An essential element in good joint design is the use of a bond breaker or backer rod. A primary function of the backer rod is to act as a bond breaker, preventing three-sided adhesion of the sealant while at the same time forming the desired cross-section of the sealant bead. Failure to utilize a backer rod will allow the sealant to bond to the bottom of the joint, which may result in excessive stress on the sealant.

Another function of the backer rod is to control the thickness of the sealant bead. The backer rod should be approximately 25 percent oversized so that it fits tightly into the joint. A loose backer rod will be pushed deeper into the joint when the sealant is installed and will not provide adequate support for proper tooling of DOWSIL™ 888 Silicone Joint Sealant. Thus, the thickness of the sealant bead cannot be controlled as required. With proper tooling, DOWSIL™ 888 Silicone Joint Sealant is pushed down onto the backer rod and firmly against the joint walls, resulting in intimate contact, proper wetting and good adhesion with the joint walls. DOWSIL™ 890-SL Silicone Joint Sealant requires a tight fitting backer rod to control thickness of the sealant bead and to prevent the sealant from bypassing the backer rod to the bottom of the joint.

Failure to use a backer rod, or use of the wrong material, will likely result in reduced performance of the sealant. Dow recommends the use of a closed cell, expanded polyethylene foam rod for general use with DOWSIL™ silicone pavement sealants. Where the joints are irregular, backer rods with a skin that prevents water absorption help prevent the self-leveling sealants from bypassing the backer rod and allow the sealants to enter the bottom of the joint. In all cases, the backer rod must be oversized so that it fits tightly in the joint.

Sealant and Backer Rod Placement Depths

The sealant bead must be recessed a minimum of 3/8 inch (9.53 mm) below the pavement surface. The sealant bead should be a minimum of 1/4 inch (6.35 mm) thick but not greater than 1/2 inch. A width-to-depth ratio of 2:1 is suggested for joints less than one inch wide and should be maintained throughout the bead whenever possible. This ratio is not applicable for joints 1/4 inch wide or joints over 1 inch wide.

If other operations, such as diamond grinding, are to be performed after sealant installation, the sealant recess and the resulting joint depth and backer rod placement may need to be increased. Preferably, the sealant should be installed after surface grinding to avoid damage to the sealant.

Sealing New Concrete Pavement

Before attempting to seal joints in new concrete, the concrete must be given adequate time to cure, dry and develop strength so the joint reservoir can be sawed without concrete damage (e.g. raveling, spalling, etc.). The time between sawing of the initial cut (contraction cut to control cracking) and the joint sealant reservoir will depend on such factors as mix design (e.g. conventional, Fast Track, High Early Concrete mixes), cement type, time of year concrete is placed, temperature, etc. Only clean and dry joints should be sealed.

For conventional concrete mixes, it is recommended that the concrete be allowed to cure and dry a minimum of seven days in good drying weather before installing DOWSIL™ silicone pavement sealants. Cold, wet, inclement weather will require a longer drying time. An additional day of good drying weather should be allowed for each day of poor drying weather.

DOWSIL™ silicone pavement sealants have been successfully used in many Fast Track and High Early Concrete applications. Because of the continued introduction of new methods and mix types, please contact your Dow representative for current recommendations in these applications.

Joint sealant reservoirs are prepared by saw-cutting the concrete to the specified width and depth. It is recommended that freshly sawed joints be washed with high-pressure water immediately after sawing to remove most of the saw slurry from the joint faces. Joint washing should be in one direction (working forward) to minimize recontamination.

After the joints have dried, they should be sandblasted to remove residual laitance from the joint walls. Sandblasting should be done in two passes, one pass for each face, with the nozzle held at an angle to the joint face and within 1 or 2 inches (25.4 or 50.8 mm) of the pavement. Sandblasting should be done to the depth at which the sealant and backer rod are to be installed.

Experience has shown that the best method for removing contaminants is by sandblasting the dry joint that was previously flushed with water after the saw-cutting process. Other techniques, such as grinding or wire-brushing, are not recommended. They have been found to be less effective due to possible operator error and/or equipment problems. If conditions are such that sandblasting is not permitted, high-pressure waterblasting may be used as an alternative. Contact your Dow representative *before* attempting to use this joint cleaning method to discuss the appropriate procedures.

After sandblasting, the blasting media, as well as any dust and dirt deposited by wind and traffic, must be blown out of the joint and away from the area around it using a high-pressure air blast. As with the water wash, the air blast should move in only one direction (forward) to prevent recontamination of the joint. Compressed air, at a pressure of at least 90 psi (620 kPa), should be used to blow out the joint just before installation of the backer rod. Air compressors used for this purpose must be equipped with traps capable of providing moisture-free and oil-free air.

Just before the backer rod is installed into the joint, rub your finger across the dry joint face to determine that residual dust or dirt has been removed. If joints still contain dust or dirt, contaminants must be removed before backer rod and sealant installation.

Solvents should not be used to remove oils, because they generally only carry the materials further into the concrete pores or spread them over the surface. Solvents that have not completely flashed may also affect the sealant cure process.

***Note**: Many new concrete additives are being sold to the highway industry that allow concrete to be placed and opened to traffic in less time. These materials may be additives to or substitutions for Portland Cement Concrete. When using any of these new materials, adhesion testing of DOWSIL™ silicone pavement sealants is suggested. To test adhesion, submit samples of the material to Dow at least 30 days before anticipated use. Dow will test the material and provide you with specific recommendations.*

Resealing Old Concrete Pavement

The installation techniques required for resealing can be summarized as removal of old sealant/seal, proper cleaning of the joint and installation of the bond breaker and sealant.

The tools and techniques used to remove the existing sealant or joint filler will be determined by the material in the joint and by available equipment. The old sealant can be removed by cutting or saw-cutting, which slightly widens the joint, to produce a new surface for sealing. Some materials, compression seals for example, are simply pulled out of the joint and then sandblasted to remove the lubricant/adhesive.

After removing previous materials, immediately high-pressure water wash the joint to remove sawing residue. Wash in one direction (forward) to prevent recontamination. When the joint has dried, it should be sandblasted to remove any residual dust using techniques described previously.

After sandblasting, the joint should be blown out with compressed air at a pressure of at least 90 psi (620 kPa) to remove blasting media and dust. Air should be free of oil and water.

As a final check before bond breaker and sealant installation, the joints should be inspected for residual dust and/or old sealing material. If dust or old sealing materials remain, contaminants should be removed using techniques described previously.

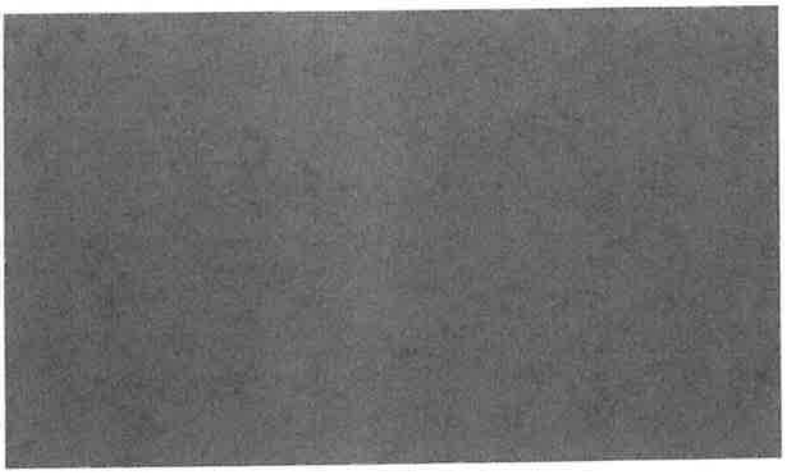


Table 2 – Theoretical Estimating Requirements*

Joint Width, inches	Sealant Bead Thickness, inches	Minimum Joint Depth, inches	Backer Rod Diameter, inches	Coverage, linear feet per gallon
1/4	1/4	1-1/8	3/8	309
3/8	1/4	1-3/8	1/2	205
1/2	1/4	1-3/8	5/8	154
5/8	5/16	1-5/8	3/4	99
3/4	3/8	1-7/8	1	69
7/8	7/16	2	1	51
1	1/2	2-1/8	1-1/4	39
>1	1/2	>2-1/8	≥1-1/4	

*Actual yield will vary depending on deviation from calculated bead shape, tooling techniques, backer material placement, waste, and applicator experience.

Table 3 – Metric Estimating Equivalents*

Joint Width, mm	Sealant Bead Thickness, mm	Minimum Joint Depth, mm	Backer Rod Diameter, mm	Coverage, linear meters per liter
6.35	6.35	28.6	15.9	26
9.35	6.35	34.9	15.9	17.6
12.7	6.35	34.9	15.9	13
15.9	7.94	41.3	17.5	8.3
19.1	9.53	47.6	19.1	5.5
22.2	11.1	50.8	20.6	4.2
25.4	12.7	54	22.2	3
>25.4	12.7	>54	25.4	

*Actual yield will vary depending on deviation from calculated bead shape, tooling techniques, backer material placement, waste, and applicator experience.

Full Depth Asphalt Pavements

Note: *Only DOWSIL™ 890-SL Silicone Joint Sealant is recommended for sealing joints in asphalt pavements.*

Sealing New Asphalt Pavements

Before attempting to seal joints in new asphalt, the asphalt must be given sufficient time to cool and to cure so damage will not result from sawing. This time will depend upon a number of factors, such as mix design, time of year for placement, geographic location and past experiences. The asphalt must also be completely dry prior to sealant installation.

Joints should be prepared by saw-cutting to the specified width and depth. Routers (i.e. impacting devices) should not be used, as routing of asphalt pavements can cause damage to the pavement, which in turn may lead to poor joint performance. In new construction, a shallow cut is recommended where the backer material is placed on the bottom of the joint. A shallow cut saves time and saw blades. All joints to be sealed must be sound, clean, dry and frost-free.

Freshly sawed joints should be washed with water immediately after sawing to remove any loose material from the joint faces. Wash the joint in a forward direction to prevent or minimize recontamination. Any contaminants remaining on the surface of the joint wall may prevent development of a good bond.

Experience has shown the best method for removing contaminants is by sandblasting the dry joint that was previously flushed with high-pressure water after the sawcutting process. Other techniques, such as grinding, wirebrushing or routing, have been found to be less effective and may cause damage to the joint.

Sandblasting should be done in two passes, one pass for each face, with the nozzle held at an angle to the joint face and within 1 or 2 inches (25.4 or 50.8 mm) of the pavement. Sandblasting should be done to the depth at which the sealant and backer material are to be installed. The blasting media, as well as dust and dirt deposited by wind and traffic, must be blown out of the joint and away from the area around it using a high-pressure air blast. The air blast should move in a forward direction.

Compressed air, at a pressure of at least 90 psi (620 kPa), should be used to blow out the joint just before installation of the backer rod. Air compressors used for this purpose must be equipped with traps capable of providing moisture-free and oil-free air. Just before actual sealing the joint, rub your finger across the dry joint face to determine that residual dust has been removed. If joints still contain dust or dirt, these contaminants must be removed before backer rod and sealant installation.

Resealing Old Asphalt Pavements

All old sealant and/or joint filler must be removed prior to sealant installation. The tools and techniques used to remove the existing sealant or joint filler will be determined by the material in the joint and by available equipment. The old sealant typically can be removed by cutting, plowing and/or saw-cutting, which also widens the joint to the required dimensions. Residue from sawing (i.e. wet sawing) of asphalt and any old caulk or sealant material still remaining on the joint face must be removed before backer rod placement and resealing. As discussed in previous sections, any debris and residue left by the wet sawing operation must be removed by an immediate high-pressure water wash. This is followed, after drying, by sandblasting using techniques described previously.

After sandblasting, the joint is blown out with compressed air to remove final dust and dirt from the previous step and any dust and dirt that may have been blown in by traffic, wind, etc. The compressed air is supplied from a compressor equipped with traps to provide oil-free and water-free air at a minimum of 90 psi (620 kPa).

As a final check prior to installing backer material and sealant, the joints should be checked to ensure that joints are dry and no residual dust remains. This is accomplished by rubbing your finger along the joint face to examine for dust. If dust is present, it must be removed before proceeding with backer material installation.

Asphalt Overlays

***Note**: Only DOWSIL™ 890-SL Silicone Joint Sealant is intended for sealing joints in asphalt pavements.*

Sealing Joints in New Asphalt Overlays

It is recommended that joints in fresh asphalt be sawed after the asphalt has cooled and 'cured' so that sawing does not damage the asphalt joint (i.e. raveling). The joints should be centered *directly over* the concrete joints below. To control cracking, it is common practice to carefully saw these joints to a depth of 1/2 of the total asphalt thickness. Then the sealant reservoir should be sawed to proper dimensions. Joint dimensions should comply with state specifications.

As discussed previously, the joint must be free of moisture, sawing residues, dirt, dust, etc. prior to sealant installation. The removal techniques have been described in previous sections.

Sealing Concrete / Asphalt Shoulder Joints

***Note**: Only DOWSIL™ 890-SL Silicone Joint Sealant is intended for sealing joints in asphalt pavements.*

When DOWSIL™ 890-SL Silicone Joint Sealant is used to seal concrete-to-asphalt shoulder joints, the asphalt should be completely removed from the concrete face to which the sealant will be bonding. This can be accomplished by saw-cutting tightly along the concrete. Failure to remove all the asphalt may result in joint failure. A fresh and sound joint face must also be prepared in the asphalt by saw-cutting. Saw-cut the asphalt a minimum of 1/4 inch (6.35 mm) beyond any raveled edges. If the concrete-to-asphalt shoulder has been sealed before, the previous sealant should be removed from both the concrete and asphalt faces. This is accomplished by saw-cutting.

As discussed previously, any debris left by the sawing operation must be removed by an immediate high-pressure water wash. This is followed, after drying, by sandblasting using techniques described previously.

Backer Material Installation

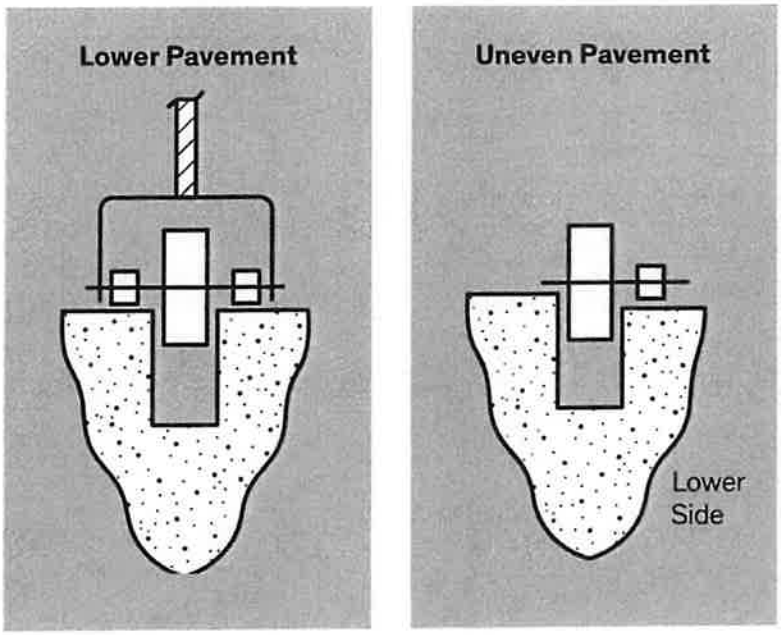
After the final cleaning, the backer material should be installed at the proper depth, as shown in Table 2. The depth is measured from the paved surface of the lowest slab (if faulting is present) to the top of the backer rod.

Backer rod may be installed by hand, but a roller device (Figure 4) to aid in placement can be easily constructed. This device will not only speed installation, but also ensures a consistent, uniformly placed backer at the proper depth.

For new construction that has deep tining, the backer material should be placed deeper so the sealant will be below tining and have the specified bead thickness.

In cases where the pavement is faulted or where future surface grinding is anticipated, the backer material (and sealant) may be installed deeper than normal so after grinding, the sealant is at the recommended recess. Ideally, grinding should be performed prior to backer material and sealant placement. If grinding is performed after sealant installation, any areas damaged by grinding should be repaired by removing and replacing sealant.

Figure 4 – Backer Rod Installation Tools



Sealant Installation

DOWSIL™ silicone pavement sealants should be pumped directly from the original drum or pail into the joint by use of an air-powered pump. The nozzle should be moved steadily along the joint to form a uniform sealant bead. With proper backer rod installation, the following applies:

- DOWSIL™ 888 Silicone Joint Sealant should fill the joint from the top of the backer rod to slightly below the pavement surface. Immediately after placement and before a skin forms, DOWSIL™ 888 Silicone Joint Sealant must be tooled so it is forced against the joint faces and the bead is recessed below the pavement surface as recommended by Dow. This tooling is required because the material is not self-leveling and must be forced against the joint faces to wet them and gain maximum adhesion.
- DOWSIL™ 890-SL Silicone Joint Sealant should fill the joint from the top of the backer rod and recessed below the pavement surface as recommended by Dow. Tooling is not required.

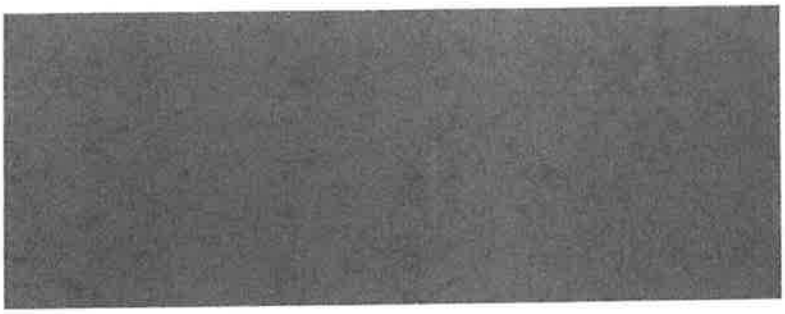
Preferably, sealants should be installed when the temperature is at 40°F (4°C) and rising. However, it has been installed at lower temperatures. Situations of this type require caution that the joint is clean, dry and frost-free. They should be discussed with representatives of the manufacturer before installation.

In new construction, where the concrete pavement is deeply tined, it is recommended that the sealant be placed below the tining grooves. Thus, if concrete chipping occurs at the joint face, a watertight seal will be maintained. Excess sealant on the pavement surface should be scraped up and removed to prevent possible tracking.

When the specifications call for non-silicone sealants, especially asphalt-based materials in the longitudinal joints and silicone in the transverse, the silicone sealant should always be installed first in order to prevent contamination of the joint faces. Preferably, the silicone will also be installed in the longitudinal joint a foot (305 mm) or so in both directions from the transverse joint. This should reduce the possibility of a weak point at the intersection of transverse and longitudinal joints.

Many devices for injecting and tooling the sealant are shop-fabricated. The specific device selected depends largely upon the applicator's personal preference. For assistance, please contact your Dow representative.

For DOWSIL™ 888 Silicone Joint Sealant, success has been achieved with flexible spatulas and backer rods of larger diameter than the joint width. Flexible devices seem to offer better results, because they are able to form the sealant to the contours of the pavement.

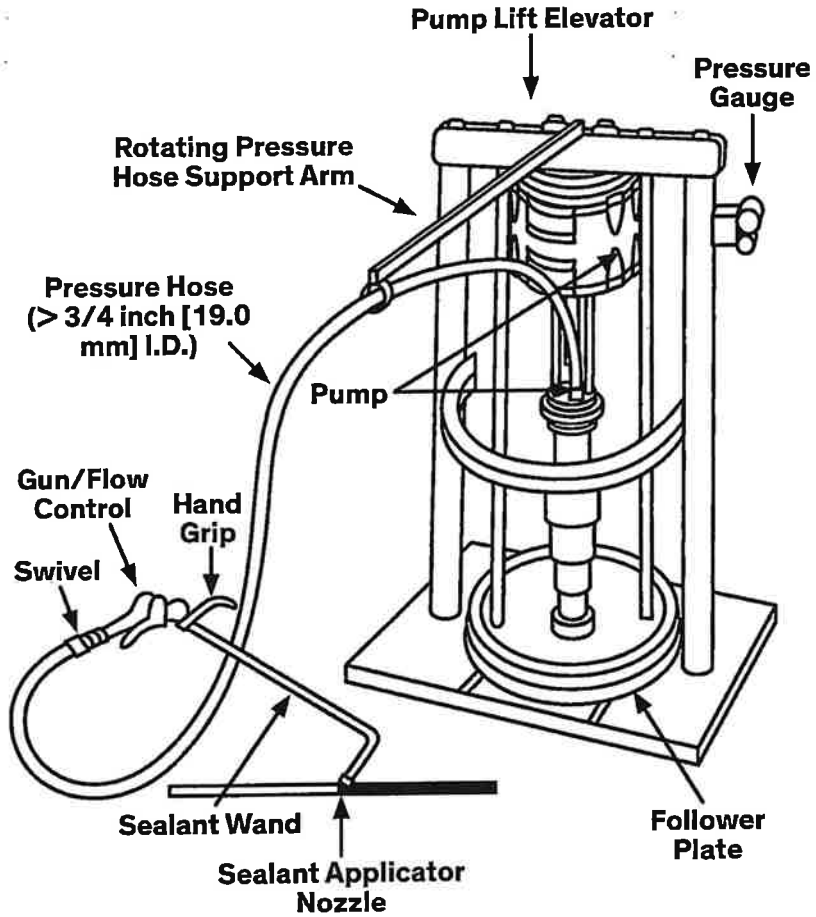


Installation Equipment

Equipment needed to install DOWSIL™ silicone pavement sealants can be operated manually or with power. Powered equipment is recommended because of the speed and ease of application. Manually operated equipment can be successfully used for small applications. Cartridges (29 ounce [858mL]) are available for activities of this type. Air-powered versions of the small, hand-held caulking guns are also available.

The major pieces of power equipment required to install DOWSIL™ silicone pavement sealants are an extrusion pump (Figure 5) to transfer the material from the container to the joint and an air compressor capable of delivering air at 60 CFM (28.3 L/s) and 100 psi (690 kPa). Complete units including air-powered pump, follower plate and hose are required for both pails and drums. For versatility, the same unit can be used for both drums and pails, provided the system offers interchangeable follower plates.

Figure 5 – Extrusion Pump



Air-powered equipment is available with varying output capacities. The ratio of the extrusion pump and accessory components of the system, especially hose diameter, will determine output volume. Specific ratios vary among manufacturers, but a ratio of 35:1 is the minimum capable of delivering a sufficient volume of sealant for efficient operation. Selection of the pump and accessory equipment should be based on desired production rates.

A partial list of manufacturers of this equipment is shown in Table 4. They should be contacted for specific recommendations. Please contact manufacturers directly for most current pump equipment information. This is not intended to be a complete list of pump manufacturers.

Table 4 – Manufacturers of Power Installation Equipment

Ingersoll-Rand Industrial Technologies ARO Fluid Products One Aro Center Bryan, OH 43506 +1 800 495 0276 www.arozone.com	Graco, Inc. 88-11th Ave. N.E. Minneapolis, MN 55413 +1 800 328 0211 www.graco.com

Regardless of which manufacturer's system is chosen, several common equipment features will be required. DOWSIL™ silicone pavement sealants cure on exposure to atmospheric moisture, so seals and hoses should be selected that will prevent or minimize moisture permeation.

Hoses and hose connections must not only prevent moisture permeation, but must also be able to withstand pumping pressures and be tough enough to resist abrasion on the job site. Hoses lined with Teflon are recommended because their low air and moisture permeability will provide long, trouble-free service. Other hoses, such as the BUNA-N hose, have also been found to provide satisfactory performance over an entire construction season. Nylon-lined hoses are not recommended.

Most unlined hoses allow the sealant to cure in the hose and block flow. This blockage may take several weeks to several months to form but, in extreme cases may take just one to two days, depending on the hose material,

wall thickness and temperature and humidity conditions. Regular cleaning of hoses of this type will be necessary.

All seals and packings should be made of Teflon. The more common neoprene, urethane and leather seals are not satisfactory, because they do not prevent moisture permeation.

Hose runs should be kept to a minimum and reasonable length to reduce pressure drops. A hose I.D. (inside diameter) of at least 3/4 inch (19.0 mm) is recommended. When longer hose runs are needed, it is suggested that a larger diameter hose (1 to 2 inches [25.4 to 50.8 mm]) be coupled with a smaller, 3/4-inch (19.0 mm) whip hose near the wand to minimize the overall pressure drop.

Daily cleanup is not needed. However, the sealant nozzle should be sealed to prevent curing. When the equipment and hoses will not be used on a regular basis, they should be cleaned by flushing the entire system with a solvent. Mineral spirits has proven to effectively clean uncured silicone. Follow manufacturer's instructions for use and handling and conform to all local, state and federal regulations. Proper eye protection should be worn. On startup, care must be taken that these materials are completely flushed from the pump and hoses.

Do not use grease to purge or clean the pump.

Manual Installation Equipment

Manually operated equipment is available from various manufacturers and can be obtained from local supply houses. Many Dow distributors stock this equipment. You can obtain their contact information from Dow.

Specification Information

Please contact your local Dow representative for product specification information.

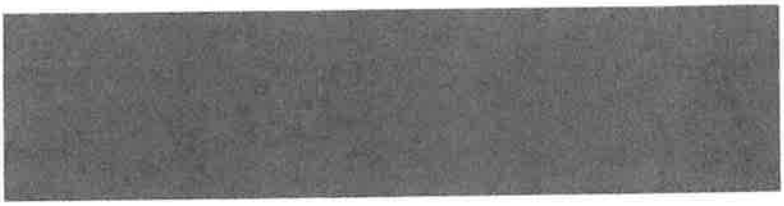
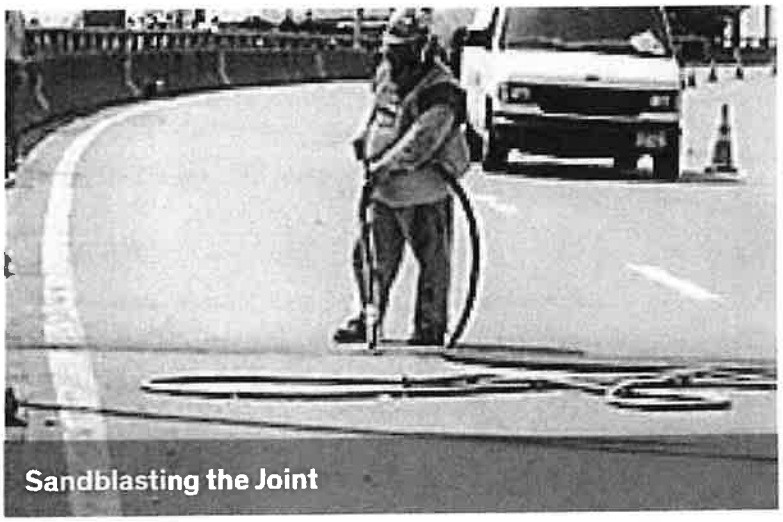


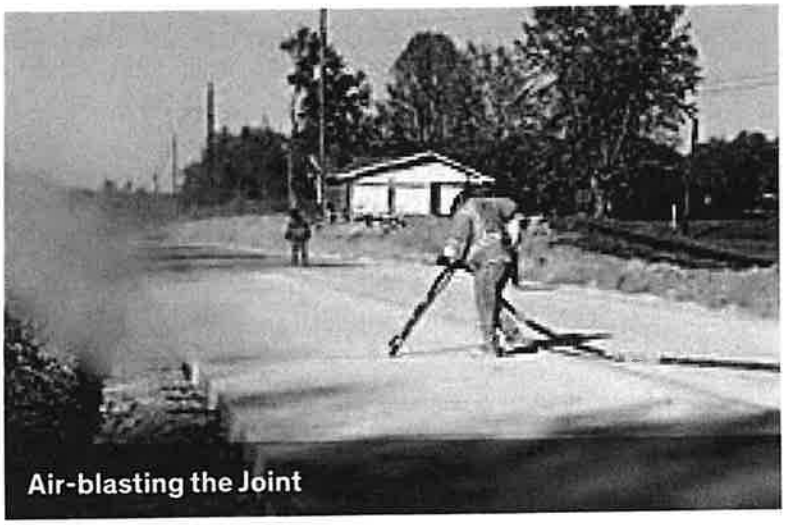
Figure 6 – Installation



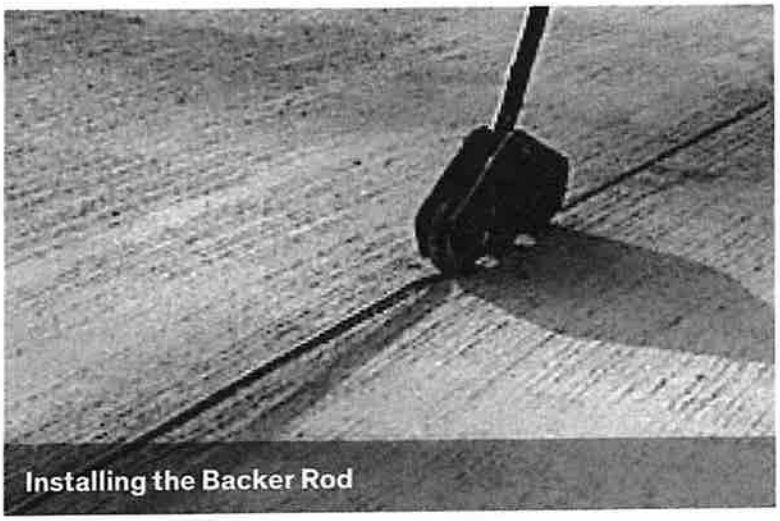
Water-washing the Joint



Sandblasting the Joint



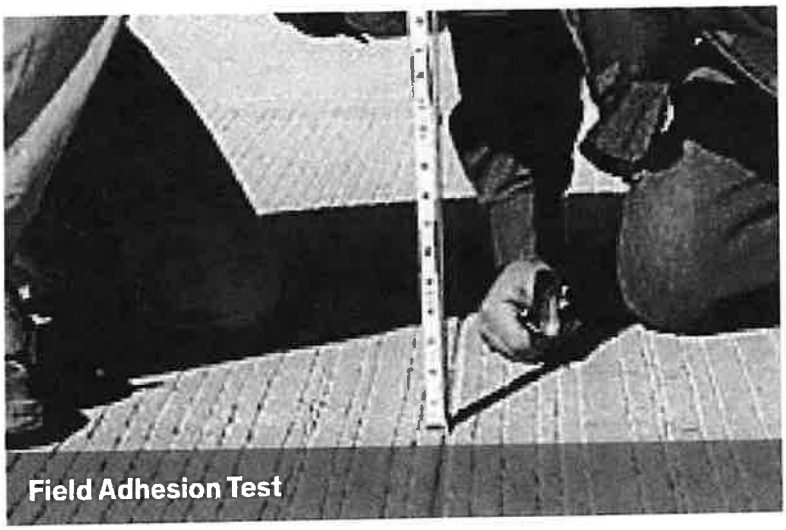
Air-blasting the Joint



Installing the Backer Rod



Installing DOWSIL™ 890-SL Silicone Joint Sealant



Field Adhesion Test

Questions and Answers

Q: What different kinds of equipment are needed to install DOWSIL™ 888 Silicone Joint Sealant?

A: Basic equipment needed is 1) an air-powered dispensing pump and 2) a conventional air compressor. The product does not require heating, so expensive heating kettles are not needed. It also requires no mixing.

Q: Can both DOWSIL™ silicone pavement sealants be installed with the same equipment?

A: Yes, both sealants are compatible, and no special equipment is needed to install the self-leveling sealant. However, care should be exercised to ensure that only DOWSIL™ 890-SL Silicone Joint Sealant is used on asphalt.

Q: Can the same equipment be used to install DOWSIL™ silicone pavement sealants and other silicone sealants?

A: Due to possible differences in the sealant chemistry, cross-contamination could cause cure inhibition. If other silicones are used, the equipment must be thoroughly flushed with an aromatic solvent, such as mineral spirits, prior to using DOWSIL™ silicone pavement sealants.

Q: What is the minimum joint width that can be sealed?

A: Minimum joint width should be 1/4 inch, though a 3/8 inch (9.53 mm) wide joint will likely make cleaning and sealant installation easier.

Q: What is the maximum joint width that can be sealed?

A: It is recommended that joints to be sealed should be no more than 2 inches (50.8 mm) wide. A Dow representative should be consulted on a case-by-case basis for sealing joints wider than 2 inches (50.8 mm). In the case of repair of asphalt, the joints must be widened enough so that all existing cracks are removed. The asphalt to be sealed must be sound.

Q: How long after resealing can the road be opened to traffic?

A: Generally, the road may be reopened in approximately one hour. This allows the sealant to skin over,

minimizing the possibility of dirt and stones penetrating the wet sealant. More time may be necessary depending on local conditions or specification requirements.

Q: Why must DOWSIL™ 888 Silicone Joint Sealant be tooled?

A: DOWSIL™ 888 Silicone Joint Sealant is not a flowable or self-leveling sealant. Therefore, it must be tooled to ensure intimate contact with the substrate.

Q: Why does Dow recommend that all silicones be recessed below the road surface?

A: By recessing the silicone sealant at least 3/8 inch (9.53 mm) below the road surface, the contact between vehicle tires and sealant is eliminated. Since silicones are not abrasion-resistant, vehicle tire contact should be eliminated. Depending on joint movement, a recess greater than 3/8 inch (9.38 mm) may be necessary.

Q: What is the most effective way to seal concrete joints where an edge has been chipped off?

A: Assuming the chipped area is small, the sealant should be installed so it is recessed below the lowest point of the chipped area and does not come in contact with traffic.

Silicone sealants are not designed to be concrete patching materials. When the chips or spalls become large, joints should be repaired prior to sealing.

Q: What federal or ASTM specifications do DOWSIL™ silicone joint sealants meet?

A: DOWSIL™ silicone pavement sealants are tested to several ASTM test methods. Listed below are a few frequently requested test methods and specifications.

- ASTM D5893
- ASTM C719 (+100%/-50%)
- ASTM 793 (5,000 hours)

Please refer to the Dow data sheet for a specific product, or contact your local Dow representative for additional test information.

Q: Are DOWSIL™ silicone joint sealants resistant to jet fuels?

A: Independent evaluations, Dow internal testing and field tests have shown silicone pavement sealants will not

degrade with short-term exposure to jet fuel. Dow has created a literature piece explaining the jet fuel resistance characteristics of DOWSIL™ silicone pavement sealants (Form No. 62-207). Additionally, airfield case histories of our products are available upon request. Contact your Dow representative for additional information.

Q: Can DOWSIL™ 888 Silicone Joint Sealant be used in asphalt pavement or with asphalt shoulders?

A: Dow does not recommend use of this product in this type of situation. However, DOWSIL™ 890-SL Silicone Joint Sealant is an ultra-low-modulus sealant designed to exert minimal force on the substrate to which it is adhered, so it provides excellent performance where asphalt pavement is involved.

Q: Can a torch be used to dry previously used wet joints?

A: This technique is not recommended for two reasons. First, the torch will draw water from the bottom of the joint and give the substrate the appearance of being dry at the surface even though it is not dry throughout. Second, the carbon by-products of burning will be deposited on the joint surface, and these deposits will prevent or minimize adhesion.

Q: Do silicones require more cleaning than other materials?

A: Silicone sealants do *not* require more cleaning than other materials. Good preparation techniques are a fundamental requirement for all applications that rely on the formation of an adhesive bond. Improper cleaning prevents or minimizes the contact between the substrate and the sealant, thus minimizing the life expectancy of the product.

Q: Are all silicones alike?

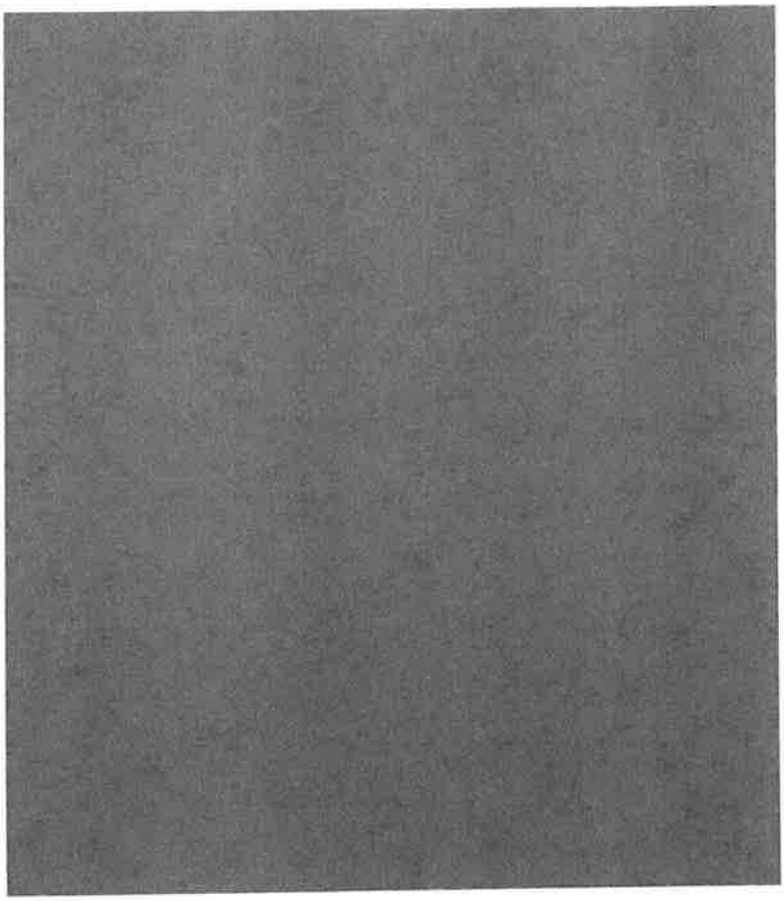
A: All silicones are *not* alike. All true silicones have certain inherent properties, such as weather and UV resistance and high- or low-temperature performance capabilities. Aside from these similarities, there are product differences that allow one silicone sealant to out-perform another silicone sold for the same application. Because of Dow's leadership in the field of silicone technology, we offer the best available product for pavement sealing requirements of all kinds.

Q: When sealing asphalt, why is an ultra-low-modulus sealant, such as DOWSIL™ 890-SL Silicone Joint Sealant, necessary?

A: When sealing to asphalt, the tensile strength of the sealant at its maximum rated extension should be less than the tensile strength of the asphalt, otherwise the asphalt may fail cohesively due to the strain the sealant places on the asphalt. DOWSIL™ 890-SL Silicone Joint Sealant typically meets this requirement. Confirming the asphalt on a particular job has sufficient tensile strength for the sealant proposed for use is recommended.

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For more information on these products, please refer to the Dow technical data sheets and installation guides, or visit our website at **consumer.dow.com/construction**.

Your local distributor is:

DOWSIL™

silicones by DOW

Image: dow_40609984508, dow_ 40264428445, dow_40264429465, dow_40609983329, dow_40609983665, dow_40609984469

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30023848

Form No. 61-507-01 P

ATTACHMENT 8.6.4

TECHNICAL INFORMATION RE BASF *MASTERPROTECT H1000* CONCRETE SURFACE SEALER

BASF

We create chemistry

Technical Data Guide

7 | 07 19 16
Water Repellents

MasterProtect® H 1000

High-performance, clear, breathable, 100% silane penetrating sealer

FORMERLY HYDROZO® 100

PACKAGING
– 5 gallon (18.9 L) pails
– 55 gallon (208 L) drums

COLOR
Clear

YIELD
250–400 ft²/gallon (6–10 m²/L)

Coverage may vary greatly with porosity of the substrate; extreme porous substrate may require two coats. Perform test panels to ensure desired results and coverage rates.

STORAGE
Store in unopened containers in a clean, dry area between 35 and 110 °F (2 and 43 °C). Keep from freezing.

SHELF LIFE
18 months when properly stored

VOC CONTENT
Less than 350 g/L less water and exempt solvents

DESCRIPTION
MasterProtect H 1000 is a clear, breathable, high-performance, 100% silane, water repellent sealer that achieves highest depth of penetration.

PRODUCT HIGHLIGHTS
- No masking of windows necessary and requires no cleaning after application
- No residue, will not harm glass windows, metal frames, or painted surfaces
- 100% silane
- Protects against chloride ion penetration
- Excellent depth of penetration
- Breathability allows interior moisture to escape without damaging sealer
- Solvent based, excellent for cold weather applications
- Protects the structure from damage caused by wind-driven rain
- Does not alter surface appearance
- Surface sealer helps reduce efflorescence, atmospheric staining, and mildew
- Superior water repellence so it penetrates deeply and chemically reacts within the pores of concrete to provide long-lasting protection
- Abrasion resistant so it provides long-lasting protection to horizontal substrates subject to traffic, such as bridge decks and highway surfaces

APPLICATIONS
- Interior and exterior
- Horizontal and vertical
- Above grade
- Traffic-bearing concrete substrates
- Bridge decks and substructures
- Concrete highway surfaces
- Ramps and barrier rails
- Parking garages
- Buildings
- Stadiums
- Many other reinforced concrete structures

SUBSTRATES
- Concrete
- Brick and masonry
- Stucco

MASTER® BUILDERS SOLUTIONS

Technical Data

Composition

MasterProtect H 1000 is 100% silane by weight.

Compliances

- Alberta DOT, Type 1c

Typical Properties

PROPERTY	VALUE
Penetration, in (mm), average depth, depending upon substrate	0.35 (9)
Surface appearance after application	Unchanged

Test Data

PROPERTY	RESULTS	TEST METHOD
Flash point, °F (°C)	165 (62.7)	SETA
Water repellency after heavy abrasion, %	83.5 – exceeds criteria	Alberta DOT penetrating sealer, Type 1c (0.35 w/c ratio)
Water weight gain, % reduction		NCHRP 244
250 ft²/gal (6.1 m²/L)	90	Series II-cube test
400 ft²/gal (9.8 m²/L)	85	
Absorbed chloride, % reduction		NCHRP 244
250 ft²/gal (6.1 m²/L)	96	Series II-cube test
400 ft²/gal (9.8 m²/L)	87	
Absorbed chloride, % reduction	98 – exceeds criteria	NCHRP 244 Series IV - Southern climate
Skid Resistance, BPN		
Broomed Concrete		
Untreated	90	ASTM E 303
Treated	90	
Water penetration of masonry, % Reduction		
Facing Brick		
Dampness	100	ASTM E 514
Leakage	100	
Water Exclusion, %		
Brick	99	ASTM D 6532
Concrete	90	
Water Absorption, %		
Brick	0.05	ASTM D 6532
Concrete	0.96	
Water Vapor Transmission		
WVT (grains/h/ft²)	2.0	ASTM D 6490
Permeance (Perms)	4.8	
Elevated Temperature Volatility, % Weight Loss		
@85° F / 50% RH		BASF Method
30 min.	<1	
60 min.	<1	
@122 °F / 50% RH		
30 min.	2	
60 min.	6	

Test results are averages obtained under laboratory conditions. Reasonable variations can be expected.

HOW TO APPLY

SURFACE PREPARATION

1. Verify substrate has properly cured. Concrete should obtain 80% of design strength, typically achieved within 14–28 days.
2. Clean all surfaces of all sand, surface dust and dirt, oil, grease, chemical films and coatings, and other contaminants prior to application. Power wash, sandblast, or shotblast as necessary to achieve the desired surface condition. Repoint any loose, disintegrated, or cracked mortar and allow a minimum of 72 hours drying time before application.
3. Air, substrate, and material temperatures should be 20 °F (-7 °C) and rising at the time of the application. Substrate must be frost free. Do not apply sealer when temperatures are expected to fall below 20 °F (-7 °C) within 12 hours or when rain is expected within 4 hours following application. Maximum application temperature is 95 °F (35 °C). May be applied to slightly damp surfaces.
4. Crack control, caulking, patching, and expansion joint sealants can be installed before or after application of the sealer. Allow adequate curing time following sealant-manufacturer's recommendations. Following the application, remove excess product that might pond on a concave sealant joint.

APPLICATION

1. Test a small area of the surface (minimum 5 by 5 ft [1.5 by 1.5 m]) before general application to ensure desired performance results, aesthetics and coverage rates and to verify application technique. Allow 5–7 days for the product to fully react before evaluating. Contact Technical Service for detail.
2. Stir material thoroughly before and during application.
3. For horizontal surfaces, apply with a flooding action. Sealer may be applied with low-pressure spray, followed by brooming for even distribution.
4. For vertical surfaces, apply by low-pressure, non-atomizing sprayer. Apply from the bottom up for uniform distribution of the sealer. Apply to saturation, with a controlled rundown of 8" (20 cm). In certain cases, a mist coat before general application will help break the surface tension and assure maximum penetration of saturation coat.

DRYING TIME

Typical drying time for MasterProtect H 1000 is 4–6 hours at 70 °F (21 °C) and 50% relative humidity. Cooler temperatures or higher relative humidity can extend the drying time.

CLEAN UP

Clean equipment with xylene or MasterSeal 990.

FOR BEST PERFORMANCE

- Do not apply during inclement weather or when inclement weather is anticipated within 12 hours.
- To prevent damage to nearby shrubbery and landscaping, cover or protect with drop cloth.
- Protect asphalt-based products such as roofing materials or plastic products from overspray.
- Caution should be taken with specialty coated glass. Small areas should be tested prior to application to ensure the product does not discolor the coating. Plastic windows will turn opaque when sprayed with this products.
- MasterProtect H 1000 will not inhibit water penetration through unsound or cracked surfaces or surfaces with defective flashing, caulking, or structural waterproofing.
- Variations in the texture and porosity of the substrate will affect the coverage and performance of the product.
- Paint line striping after the application of MasterProtect H 1000.
- Windows or other non-absorbent substrates subject to overspray should be clean and contaminate free at the time of application. Cleaning may be required after application if dirt or dust is present for the silane to react with.
- Make certain the most current versions of product data sheet and SDS are being used; visit master-builders-solutions.basf.us to verify the most current version.
- Proper application is the responsibility of the user. Field visits by BASF personnel are for the purpose of making technical recommendations only and are not for supervising or providing quality control on the jobsite.

HEALTH, SAFETY AND ENVIRONMENTAL

Read, understand and follow all Safety Data Sheets and product label information for this product prior to use. The SDS can be obtained by visiting www.master-builders-solutions.basf.us, e-mailing your request to basfbscst@basf.com or calling 1(800)433-9517. Use only as directed. **For medical emergencies only, call ChemTrec® 1(800)424-9300.**

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ATTACHMENT 8.6.5

PROCEDURE FOR INVESTIGATING SUBSURFACE CONDITIONS DURING CONCRETE PANEL REPLACEMENT

PROCEDURE FOR INVESTIGATING SUBSURFACE CONDITIONS DURING CONCRETE PANEL REMOVAL
Excel TSD of Tennessee LLC ("ETSD")

I. Purpose/Scope – As part of the implementation of the *Concrete Repair and Rehabilitation Plan for the Contained Area* ("*CRRPlan*") at the Excel TSD of Tennessee, LLC ("ETSD") facility, several of the concrete panels that comprise the base of the Contained Area secondary containment system will be removed and then replaced with new poured concrete panels in multiple phases of work. At question is whether the joints and cracks in the existing concrete panels have allowed hazardous wastes or hazardous waste constituents to significantly migrate into the subsurface soils. While neither ETSD or the Tennessee Division of Solid Waste Management ("TDSWM") are aware of any evidence that such releases have occurred, both entities believe it prudent to take the opportunities afforded by the planned concrete replacement efforts to verify whether or not such releases have occurred in those portions of the Contained Area. This document describes the investigation and evaluation procedures that ETSD personnel and/or consultant/contractor personnel hired by ETSD will utilize during each concrete panel removal effort to rapidly gain information on subsurface conditions that will help answer this question.

II. Preparation – The team of ETSD personnel/representatives will prepare for the investigation by planning the work with the contractor performing the excavation and the outside analytical laboratory that will analyze the samples that are collected, and by assembling all of the equipment, materials, and supplies that might be needed. The appropriate containers for the collection of soil samples for the analyses specified below will be obtained from the laboratory along with container labels, a chain of custody form, and a cooler and packaging materials for storing and transporting the samples. Ice will be added to the cooler before the sample collection effort on the day of sampling. An appropriate and adequately charged Organic Vapor Meter ("OVM") as described below will be obtained and properly calibrated before use on the day of the investigation. An adequate supply of nitrile gloves and decontaminated stainless-steel spoons or other sampling tools (protectively sealed in plastic bags or aluminum foil) will be assembled along with a plastic trash bag, paper towels, field notebook, and permanent marker pen. A digital camera will be used to document observations with photographs. Appropriate personal protective equipment for each member of the team will also be assembled.

III. Organic Vapor Screening – A properly calibrated OVM that utilizes photoionization detection ("PID"), such as a Honeywell MiniRAE 3000 portable handheld VOC monitor, will be used to detect and measure emissions of volatile organic compounds ("VOCs") from the subsurface. The OVM-PID, which does not detect methane, will be used first to detect whether VOC vapor emissions are occurring (which could indicate the presence of released VOC-containing wastes in the subsurface environment). If VOC emissions are detected, the portable instrument will then be used to identify the specific areas of the exposed subsurface where VOC emissions are highest for potential collection of samples for analysis. [Note: The fact that an OVM-PID cannot detect methane is very useful in such subsurface investigation where anaerobic conditions can result in the generation of methane gas.]

During the breaking up and removal of the concrete, an ETSD staffer/representative experienced in the use and reading of the OVM-PID will station himself/herself on the down-wind side of the excavation and monitor the breathing zone for VOCs. This information will be used not only to assess subsurface conditions but also to identify potential respiratory threats to workers that might require the use of respirators or other breathing protection. Once the large pieces of concrete have been removed, operation of the excavator will be stopped and the ETSD staffer/representative (equipped with appropriate personal protective equipment) will promptly enter the shallow excavation and move the OVM-PID probe over the exposed subsurface to identify the specific area(s) where VOC emissions are highest. The area or areas (up to 3) exhibiting the highest VOC readings will be marked using sequentially numbered (e.g., 1, 2, 3) pin flags (or ribboned stakes) of a specific color. The measured VOC readings for these areas will be recorded in field notes.

IV. Visual Evaluation – In addition to the organic vapor screening, the ETSD personnel/representatives will also visually inspect the exposed subsurface for staining or other indications that waste materials may have migrated into the subsurface. Such persons will observe and note the approximate locations of joints and cracks in the concrete surface before the concrete excavation begins and will particularly inspect the areas of the subsurface beneath those former joints and cracks. The area or areas (up to 3) that exhibit the greatest visible indications of potential contamination will then be marked using sequentially lettered (e.g., A, B, C) pin flags (or

ribboned stakes) of a different color than those used to mark high-VOC locations. Field notes will be made describing why each such location was marked. Photographs will be taken to document the observed conditions in the excavation, including close-up (3-6 feet) photographs of the flagged locations.

V. Sample Collection – Once the organic vapor screening and visual evaluation described above is completed, the ETSD personnel /representatives will select at least one and perhaps two -pin-flagged locations from which soil samples will be collected. Typically, this will include the location that exhibited the highest OVM-PID reading (provided such is greater than 10 ppm) and the location that exhibited the greatest visual indications of contamination (provided the visual indications are strong). If one location meets both criteria, only that location will be sampled. Field notes will be recorded describing the rationale for selecting each "worse-case" sampling location. If there are no significant OVM-PID readings and no visual indications of contamination (and thus no pin-flagged locations), then a sample may or may not be collected at a random location.

Surface or near-surface (for VOC analysis) samples at each selected location will be collected using freshly gloved hands and a decontaminated stainless-steel spoon, trowel, or other tool to transfer the soil material into laboratory-supplied sample containers. Once the sample containers have been filled, their lids will be tightly closed and labels identifying the sample collection date, the number of the sampling location, and other pertinent information will be applied to each container. The sample containers will then be placed in the ice-chilled cooler (bagged as necessary to prevent exposure to ice melt water) for storage and transport to the lab. A trip blank sample will likely be provided by the laboratory, but no equipment blank or field blank samples will need to be collected for this sampling event where the objective is to identify gross contamination. The laboratory-provided chain-of-custody form will be completed before the collected samples are taken to the laboratory.

VI. Sample Analysis – The collected subsurface soil samples will be delivered under chain-of-custody procedures to the analytical laboratory where they will be submitted for RUSH analysis for their total concentrations of Priority Pollutant metals by EPA Method 6010B (and 7471A for mercury), for the laboratory's standard suite of VOCs by EPA Method 8260B, and for

the laboratory's standard suite of semi-volatile organic compounds by EPA Method 8270C.

ATTACHMENT 9

MANAGEMENT OF TANK SYSTEMS AND EQUIPMENT AND CONTAINERS USED IN FUEL BLENDING

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A. INTRODUCTION

This Attachment describes how the tank systems and certain specialized equipment used in fuel blending operations at the Excel TSD of Tennessee, L.L.C. hazardous waste management facility ("ETSD" or the "Facility") will be managed in compliance with Tennessee Rule 0400-12-01-.06(10), (31), and (32). The only hazardous waste tank systems at the Facility are Tanks F1 and F2 which are used solely in ETSD's waste-derived fuel blending operations (which are performed on a batch basis). The design and construction of these tank systems, including the Tank Farm which provides their secondary containment system, are described in Subsection 9.B below and Attachments 9.1, 9.2, and 9.3. Subsections 9.C through 9.E below describe how tank systems F1 and F2 will be operated and maintained in compliance with applicable provisions of Tennessee Rules 0400-12-01-.06(10) (RCRA Subpart J). Subsection 9.F describes how Tanks F1 and F2 are designed, constructed, operated, and maintained to comply with the applicable provisions of Tennessee Rule 0400-12-01-.06(32)(e) [equivalent to 40 CFR Part 264 Subpart CC]. Subsection 9.G below describes how the equipment used in fuel-blending operations as described in will be operated and maintained in compliance with applicable provisions of Tennessee Rule 0400-12-01-.06(31) [equivalent to 40 CFR Part 264 Subpart BB]. Finally, Subsection 9.H below describes how the process vessels (bulk containers dedicated to long-term on-site use) are operated and maintained in compliance with applicable provisions of Tennessee Rule 0400-12- 01-.06(32)(g) [equivalent to 40 CFR Part 264 Subpart CC].

B. TANK SYSTEMS DESIGN AND CONSTRUCTION

1. Tanks F1 and F2

Tanks F1 and F2 are located along with several other tanks in the Tank Farm located north of the Hazardous Waste Management Building. Both Tanks F1 and F2 are steel cylindrical tanks with rounded ends, 16 feet long and 8 feet in diameter, and mounted vertically on steel legs with concrete supports. The design capacity of each tank is 6,000 gallons. Piping connects to each tank at the bottom, side, and the top, and both tanks have flanged round access ports in the side and top that are closed with bolted plates. Tank F2 is also equipped with an electric-powered, top-mounted agitator. All piping and other ancillary equipment (e.g., valves) is fully contained within the Tank Farm secondary containment. A pipe at the top connects the two tanks together and to a conservation vent, which allows pressure equalization between the air and vapors in the tops of

the tanks and the atmosphere. There are no other pressure relief devices in the two tank systems, and there are no sampling ports. Included in Attachment 9.1 is a report by a qualified professional engineer with the firm Fisher Arnold Engineering Integration that provide more details on the F1 and F2 tank systems and the required assessment as to the adequacy of the structural integrity of the tank systems. Included in Attachment 9.3 are (1) a Plan-view Diagram of the Tank Farm secondary containment system, and (2) a Piping and Instrumentation Diagram for Tank Systems F1 and F2.

2. Secondary Containment System

As shown on the Tank Farm Secondary Containment Plan View diagram in Attachment 9.2, secondary containment for the F1 and F2 tank systems is provided by the concrete Tank Farm floor, collection/removal sump, and walls. This diagram also shows that the floor slopes to the sump. The floor, sump, and walls were reportedly originally formed with a monolithic pour of concrete, and thus have no construction joints. Additional concrete work has subsequently been done on the walls as needed to repair damage, and in 2009 the concrete walls were heightened to increase the secondary containment volume sufficient to meet the regulatory requirement of holding both the volume of Tanks F1 or F2 plus the incipient rainfall from the 24-hour, 25-year rainfall event. In November 2017, ETSD had the interior concrete surfaces of the Tank Farm coated with an impermeable, chemical resistant coating. Included in Attachment 9.2 is a report from a qualified professional engineer with the firm Fisher Arnold Engineering Integration that certifies that the Tank Farm secondary containment system meets applicable regulatory requirements for structural integrity and containment volume.

C. CONTROLS AND PRACTICES TO PREVENT SPILLS AND OVERFLOWS

All loading and unloading of Tanks F1 and F2 is performed using chemical transfer hoses that attach to valved piping connections located within the Tank Farm secondary containment. (Note: If it becomes necessary, non-pumpable solids or semi-solids may be removed from the tanks via their side access manways.) All such loading and unloading occurs from the Fuel Blending Area portion of the Outside Hazardous Waste Container Management Area, which is located immediately west of the Tank Farm and also secondarily contained. As shown on the Piping and Instrumentation Diagram in Attachment 9.3, loading is typically performed using the valved pipe

connections on the sides of the tanks near their bottoms, and unloading is typically performed using the valved pipe connections to the bottoms of the tanks. However, both valved pipe connections may be used for either purpose. Material is loaded into the tanks from tank trucks, process vessels (site-dedicated bulk containers), or other containers situated in the Fuel Blending Area using portable pumps also situated in the Fuel Blending Area. The pumps used may be either the pumps located on board the tank trucks, the pump on board the ETSD (or other) vacuum truck, or the cart-mounted portable air-powered diaphragm pump that is housed in the Fuel Blending Area. Material is unloaded from the tanks in the same ways, except that gravity flow rather than pumping may sometimes be used. Material transfer from one tank to another is rarely (if ever) done, but it could be similarly performed using a portable pump and hoses connected to the appropriate valved pipe connection of each tank. The feed systems for Tanks F1 and F2 are thus simple manually operated systems and involve no safety cutoff or bypass systems.

During these material transfer operations, the following controls and practices will be implemented or relied upon to prevent or minimize spills and overflows:

(a) At least one ETSD employee will be present during all material transfer operations to perform or monitor the operations and ensure compliance with these procedures. If this person leaves the immediate vicinity of the transfer operation, the operation will be stopped.

(b) Prior to material transfer:

- All pumps and containers will be grounded or bonded to prevent static electricity buildup and discharge;
- Available volume in the receiving container or tank will be verified – available volume in a container will be checked in a container by visual inspection or by using a measuring stick, while available volume in a tank will be checked using input/output records (and it may be verified by visual check or measuring stick from the top of the tank);
- All hoses will be visually checked for leaks and wet spots and replaced or repaired as needed;
- Hose ends will be tightly capped while moving hoses into position;

- The pumping circuit will be checked and the proper alignment of valves will be verified;
- All hose connections will be made and checked prior to opening valves;
- All equipment in the immediate vicinity of the transfer operations that might create an igniting spark will be shut down;

(c) During material transfer:

- Hose connections will be monitored;
- The condition of bonding/grounding will be periodically checked;
- The liquid level in the receiving container will be visually monitored;
- Transfer into the tank will be slowed and stopped if high level alarm goes off;

(d) Upon completion of material transfer:

- All tank and container valves will be closed before disconnecting any hoses;
- A 5-gallon bucket will be placed under transfer hose couplings before they are broken, and then such hoses will be drained into such buckets and then tightly capped before they are moved to their proper storage location within the Tank Farm or the Fuel Blending Area or on the truck from which they came;
- Any liquid that collects in the 5-gallon buckets under the hose couplings will be transferred into the receiving container (for tank discharges) or into a fuel blending process vessel in the Fuel Blending Area." to enhance clarity. All bonding/grounding wires will be disconnected;
- All pipe outlets and valves will be double-checked to verify no leaks; and
- The secondary containment surfaces will be inspected for drips or spills, and they will be immediately cleaned up using sorbent pads or granules.

D. GENERAL TANK SYSTEM OPERATING PROCEDURES

1. ETSD personnel will ensure that no hazardous wastes or treatment reagents are placed in Tanks F1 or F2 if they could cause the tank, its ancillary equipment, or the containment system to rupture, leak, corrode, or otherwise fail. Reactive wastes (having hazardous waste code D003) and wastes which are incompatible with a tank system's contents (including residues) or its materials of construction will not be added to a tank system. Because the mixing and blending of

wastes into fuels is the principal process performed at the Facility, material incompatibility is a primary topic of personnel training and a major focus of fingerprint analysis of wastes targeted for blending.

2. As more fully described in Facility Inspection Program, ETSD personnel will formally inspect each tank system every operating day (i.e., each day that there is hazardous waste in the tank system), checking the tanks, their ancillary equipment, and the secondary containment system to detect corrosion or releases of wastes.

3. Spilled or leaked wastes and accumulated precipitation will be removed from the Tank Farm's secondary containment system within 24 hours, or in as timely a manner as is possible. Accumulated storm water is pumped from the Tank Farm's collection sump into the four storm-water holding tanks (Tanks SW1, SW2, SW#, and SW4) located near the northeastern corner of the Contained Area. The pump is pneumatically powered and manually controlled. Following testing, the stored storm water is discharged in compliance with the permitted POTW discharge limits.

E. RESPONSE TO TANK SYSTEM LEAKS OR SPILLS

If at any time a leak or spill is detected from the F1 or F2 tank systems or if such system(s) is found to be unfit for use, ETSD will immediately remove the tank system(s) from service and implement the response actions set forth in Rule 0400-12-01-.06(10)(g). If at any time a leak or spill is detected from the Tank Farm secondary containment system or if such system if found to be unfit for use, ETSD will immediately remove both the F1 and F2 tank systems from service and implement the response actions set forth in Rule 0400-12-01-.06(10)(g).

F. CONTROL OF ORGANIC AIR EMISSIONS FROM TANKS

Based on the information provided by the generators, ETSD knows that the fuel- candidate wastes and blended fuels that may be stored in Tanks F1 and F2 will contain an average volatile organics concentration greater than 500 ppm by weight, and thus these tanks are subject to the requirements of Tennessee Rule 0400-12-01-.06(32)(e) [equivalent to 40 CFR Part 264 Subpart CC], as applicable. ETSD has always operated these tanks – which are operated at atmospheric pressure

and not heated – pursuant to Tank Level 1 organic air emission controls. This requires ETSD to ensure that the fuel-candidate wastes and blended waste fuels that may be stored in the tanks do not have a Maximum Organic Vapor Pressure ("MOVP) equal to or greater than 11.1 psi (76.6 kPa). ETSD accomplishes this by using component information provided by its customers who generate fuel-candidate wastes along with vapor pressure data from technical references and actual vapor pressure testing data to ensure that the MOVP (at ambient temperatures) of each material placed in the tanks is less than 11.1 psi (76.6 kPa). ETSD maintains in its operating records documentation demonstrating that the materials it inputs into Tanks F1 and F2 have a Maximum Organic Vapor Pressure less than 11.1 psi (76.6kPa).". Examples of the information used by ETSD in making these determinations are included in Attachment 9.6.

The design and construction of Tanks F1 and F2 meet the Tank Level 1 control requirements. They are vertically mounted, factory-manufactured cylindrical steel tanks with fixed roofs that are an integral part of the tank structural design (and therefore have no interfaces between the roof edge and the tank wall). The fixed roofs and their closure devices are designed to form a continuous barrier over the entire surface area of the liquids in the tanks. Each opening in the fixed roofs of the tanks is equipped with a welded flanged connector and each such connector is equipped with a closure device (e.g., bolted hatches) designed to operate such that when the closure device is secured in the closed position there are no visible cracks, holes, gaps, or other open spaces in the closure device or between the perimeter of the flanged connector opening and the closure device. Like the tanks, these closure devices (e.g., bolted hatches, flanges, etc.) are made of steel. Where necessary or advisable, gaskets or sealant is used to ensure that there are no open spaces between the closure device and the perimeter of the tank opening. ETSD selects gaskets/sealants for this purpose that are made of materials that are chemically resistant to vapors from the organic solvent constituents (aliphatic napthas and aromatic napthas) that are the primary constituents of the fuel- candidate wastes used and the blended fuels produced by ETSD's fuel-blending operations.

The Tank Level 1 control standards also include certain operational and maintenance requirements that are addressed in Paragraphs F.1 and F.2 below.

1. Maintaining Closure Devices in Closed Position

Whenever a hazardous waste is in Tank F1 or F2, ETSD personnel will ensure that the closure device for each opening in the tank's fixed roof is secured in the closed position except when it is necessary to open such device to provide access to the tank for performing routine inspection, maintenance, or other activities needed for normal operations. Such activities might include collecting a sample, using a measuring stick to confirm the depth of waste in the tank, and inspecting or performing maintenance on equipment (e.g., high-level alarm sensors, the agitator on Tank F2). Following completion of the activity, ETSD personnel will ensure that the closure device is promptly again secured in the closed position.

It should be noted that the fixed roofs of Tanks F1 and F2 are connected by a pipe that allows air and vapor to move between tanks and thus equalize their internal pressures. A conservation vent is mounted on this pipe (thus serving both tanks) that allows the tanks' internal pressure to equalize with atmospheric pressure. This valve opens to vent air and vapors when internal pressure exceeds atmospheric pressure, and it opens to allow inflow of air when internal pressure is less than atmospheric pressure.

2. Inspection and Repair of Fixed Roof and Closure Devices

At least once each year, ETSD personnel will visually inspect the fixed roofs and closure devices of Tanks F1 and F2 to check for defects that could result in air pollutant emissions. Such defects include, but are not limited to, visible cracks, holes, or gaps in the roof of the tank or its welded flanged connectors, broken or missing hatches, access covers, caps, or other closure devices; and broken, cracked, or otherwise damaged seals or gaskets on closure devices. If a defect is detected, ETSD will make first efforts at repair of the defect no later than 5 calendar days after detection, and repair shall be completed as soon as possible but no later than 45 calendar days after detection.

These inspection and repair efforts will be documented on a *Tank Roof Subpart CC Inspection/Repair Log* form (see Attachment 9.5). Pursuant to TN Rule 0400-12-01-.06(32)(j)1, ETSD will retain the completed Logs as part of the Facility's operating record for a minimum of 3 years.

G. CONTROL OF ORGANIC AIR EMISSIONS FROM EQUIPMENT UTILIZED IN FUEL BLENDING

1. Description of Tennessee Rule 0400-12-01-.06(31) Equipment

Certain equipment at the Facility is utilized in transferring, blending, and mixing organic wastes into waste-derived fuels and is subject to the applicable organic air emission leak detection and control requirements of Tennessee Rule 0400-12-01-.06(31) [equivalent to 40 CFR Part 264 Subpart BB]. This equipment is identified in the *RCRA Subpart BB Summary Table* included in Attachment 9.4 along with a summary description of compliance requirements that apply or the reason the equipment is excluded from such requirements. As noted on the Table, all of this equipment is in "light-liquid service". Most of this equipment is associated with the twin piping systems associated with Tank Systems F1 and F2. Also included in Attachment 9.4 are *Subpart BB Diagrams* of each tank's piping system that schematically show the locations of the regulated equipment and the appropriate leak detection monitoring points. Each such piece of equipment has a tag attached to it that identifies the equipment's Identification number (from the *RCRA Subpart BB Summary Table*), and this tag differentiates such equipment from other similar equipment in the Tank Farm.

Multiple portable pumps will be used in transferring liquid wastes between tanks and containers in ETSD's fuel blending (batch basis) operations as described in Subsection 9.C above. Because of this distribution of pumping efforts between multiple pumps, each of these pumps will contain or contact such liquids for less than 300 hours per calendar year. Pursuant to TN Rule 0400-12-01-.06(31)(a)(6), and as described in the *RCRA Subpart BB Summary Table*, these portable pumps are exempt from tagging, leak detection monitoring, and record-keeping requirements.

2. Monitoring and Repair of Valves

In addition to the weekly visual inspections described in Paragraph 9.D.2 above, each valve in light liquid service is monitored monthly for organic vapor leaks as described in Paragraph 9.G.4 below. Any valve for which no leak is detected for two successive months may be monitored the first month of each quarter beginning with the next quarter. Any valve found to leak in the future will be returned to the monthly monitoring schedule. If a leak is detected, the valve will be monitored monthly until a leak is not detected for two successive months.

If a leak is detected, a weatherproof and readily visible "LEAK" tag (or other identification), will be promptly attached to the valve. In addition to the word "LEAK", the tag will be marked with the equipment identification number (as specified in Attachment 9.4) and the date the leak was first detected. Even if the valve is repaired, this tag will remain on the valve until two successive monthly inspections reveal no leaks. It will be removed if the valve is removed from service (i.e., removed from contact with organic liquids).

When a leak is detected, the leaking valve will be removed from service (i.e., removed from contact with organic liquids) and replaced or repaired as soon as practicable. A *Subpart BB Equipment Repair Log* (see Attachment 9.5) will be promptly initiated and used to document the efforts to repair or replace the valve. The first attempt at repair will be no more than 5 days after the leak is detected and repair must be complete within 15 days unless repair of the leaking valve is technically infeasible without a hazardous waste management unit shutdown. In such a case, repair of this equipment will occur before the end of the next hazardous waste management unit shutdown. Such delays in the repair of a leaking valve must be explained on the *Subpart BB Equipment Repair Log*. Completed *Subpart BB Equipment Repair Logs* will be retained as part of the Facility's operating record as described in Paragraph 9.G.7 below.

First attempts at repair include, but are not limited to the following best practices;

- Tightening of bonnet bolts
- Replacement of bonnet bolts.
- Tightening of packing gland nuts.
- Injection of lubricant into lubricated packing.

As indicated on the *Subpart BB Equipment Repair Log* form in Attachment 9.5, repair of a leaking valve is not complete unless and until it has been monitored for organic vapor emissions and found not to be leaking as described in Paragraph 9.G.4. If the valve is replaced with a new valve, the new valve does not have to be monitored until the next routine monitoring event.

3. Monitoring and Repair of Flanges, Elbows, and Other Connectors

If evidence of a potential leak from a flange, elbow, or other connector is found by visual, audible, olfactory, or any other detection method, then the connector will be monitored for organic vapor

leaks as described in Paragraph 9.G.4 below within 5 days. If a leak is detected, a weatherproof and readily visible "LEAK" tag (or similar identification), will be promptly attached to the valve. In addition to the word "LEAK", the tag will be marked with the equipment identification number (as specified in Attachment 9.4) and the date the leak was first detected. The tag will be removed when the connector is replaced or repaired.

When a leak is detected, the leaking connector will be removed from service (i.e., removed from contact with organic liquids) or repaired as soon as practicable. A *Subpart BB Equipment Repair Log* (see Attachment 9.5) will be promptly initiated and used to document the efforts to repair or replace the connector. The first attempt at repair will be no more than 5 days after the leak is detected and repair must be complete within 15 days unless repair of the leaking connector is technically infeasible without a hazardous waste management unit shutdown. In such a case, repair of this equipment will occur before the end of the next hazardous waste management unit shutdown. Such delays in the repair of a leaking connector must be explained on the *Subpart BB Equipment Repair Log*. Completed *Subpart BB Equipment Repair Logs* will be retained as part of the Facility's operating record as described in Paragraph 9.G.7 below.

First attempts at repair include, but are not limited to the following best practices;

- Tightening of bonnet bolts
- Replacement of bonnet bolts.
- Tightening of packing gland nuts.
- Injection of lubricant into lubricated packing.

As indicated on the *Subpart BB Equipment Repair Log* form in Attachment 9.5, repair of a leaking connector is not complete unless and until it has been monitored for organic vapor emissions and found not to be leaking as described in Paragraph 9.G.4. If the connector is replaced with a new connector, the new connector does not have to be monitored unless and until evidence of a potential leak from the connector is found by visual, audible, olfactory, or any other detection method.

4. Monitoring for Organic Vapor Leaks

The leak detection monitoring required in Paragraphs 9.G.2 and 9.G.3 above will be performed in compliance with U.S. Environmental Protection Agency Reference Method 21 using a

Honeywell/RAE Systems MiniRAE 3000 Portable Handheld VOC Monitor or other similar organic vapor meter ("OVM") that meets the instrument requirements specified in Reference Method 21. The OVM will be calibrated before use on each day of its use as required by the procedures of Reference Method 21 and the manufacturer's instructions, and the calibration gases will be a Zero air (less than 10 ppm of hydrocarbon in air) and a Span gas mixture of n-hexane and air at a concentration of approximately, but less than, 10,000 ppm n-hexane. This calibration will be included in the operating records. Leak detection monitoring will be performed by traversing the instrument probe around all potential leak interfaces as close to the interface as possible as described in Reference Method 21. An instrument reading of 10,000 ppm or more indicates a leak and triggers the responses described in Paragraphs 9.G.2 and 9.G.3 above.

Each leak detection monitoring event (including the prior instrument calibration) – whether performed as routine monthly monitoring, to attempt to confirm completion of a repair, or in response to the finding of evidence of a potential leak at a connector – will be documented by completion of a *Subpart BB Leak Detection Monitoring Log* form (see Attachment 9.5). Completed *Subpart BB Leak Detection Monitoring Logs* will be retained as part of the Facility's operating record as described in Paragraph 9.G.7 below.

5. Open-Ended Valves and Lines

As shown on the *Tank System F1* and *F2 Subpart BB Diagrams* included in Attachment 9.4, each open-ended valve or line is equipped with a cap (or alternatively a second valve) that will used to seal the open end at all times except during operations requiring hazardous waste stream flow through the open-ended valve or line.

6. Disperser Unit

The Disperser Unit is not a type of equipment to which TN Rule 0400-12-01-.06(31) or TN Rule 0400-12-01-.06(32) standards directly apply; it is nothing more than a rotating shaft with a blade on the end that is lowered into a process vessel to perform the mixing/blending. During this process, organic vapor emissions are controlled by a process vessel (tote) lid that is fitted around the rotating shaft and then fitted over the process vessel opening. This assembly is fitted and operated such that there are no visible holes, gaps, or other open spaces into the interior of the

container. When the mixing/blending of the contents of a process vessel is completed, the lid is removed, the Disperser shaft and blade is raised, and absorbent pads are immediately used to wipe residual blended material from the blade and impacted portions of the shaft into the process vessel. The used pads are then placed in a nearby Satellite Accumulation container. This procedure minimizes organic vapor emissions from "drag-out" residuals on the Disperser shaft and blade.

7. Record-Keeping and Reporting for Subpart BB Equipment

The *Subpart BB Leak Detection Monitoring Log* and *Subpart BB Equipment Repair Log* forms in Attachment 9.5, in conjunction with the *RCRA Subpart BB Summary Table* and *Tank System F1 and F2 Subpart BB Diagrams* included in Attachment 9.4, were developed to collect/provide the information required by the applicable recordkeeping requirements of TN Rule 0400-12-01-.06(31)(o). The *RCRA Subpart BB Summary Table* and *Tank System F1 and F2 Subpart BB Diagrams* included in Attachment 9.4, and any subsequent modifications of these documents, will be maintained as part of the Facility's permanent operating record. Pursuant to TN Rule 0400-12-01-.06(31)(o)12, the completed *Subpart BB Leak Detection Monitoring Logs* and *Subpart BB Equipment Repair Logs* will be retained as part of the Facility's operating record for a minimum of 3 years.

If the repair of any valve found to be leaking is delayed beyond 15 days during a semi- annual reporting period (i.e. January 1 through June 30 or July 1 through December 31), then a semiannual report shall be filed with the Director of the Tennessee Division of Solid Waste Management that includes the following:

- The facility USEPA ID number, facility name, and address
- For each month during the reporting period, the equipment number of each valve that was leaking and not repaired within 15 days
- The dates of related hazardous waste management unit shutdowns during the reporting period.

Such reports will be submitted no later than 45 days following the end of the reporting period.

H. CONTROL OF ORGANIC AIR EMISSIONS FROM PROCESS VESSELS UTILIZED IN FUEL BLENDING

1. Description of Process Vessels

In addition to the equipment described in Subsection 9.G above, ETSD has several bulk containers (capacity greater than 119 gallons) which are used as "process vessels" in fuel blending operations and which are thus subject to the applicable organic air emission standards for containers at Tennessee Rule 0400-12-01-.06(32) [equivalent to 40 CFR Part 264 Subpart CC]. These include several plastic or steel "totes" and a vacuum truck. Each of these containers was designed and manufactured to meet applicable U.S. DOT Hazardous Materials Transportation specifications. These tote containers are now dedicated to long-term (> 1 year) on-site use and no longer meet the USDOT packaging requirements because they are repeatedly used without reconditioning as is required for such containers in transport. The totes are utilized in conjunction with the Disperser Unit to mix and blend wastes into waste-derived fuels and are also used to store both fuel candidate wastes prior to fuel blending and the blended fuels themselves. When it is available on-site, the vacuum truck will be used to commingle fuel-candidate wastes from smaller containers (e.g., drums) and to transfer both fuel-candidate wastes and blended fuels between the tanks, totes, and tanker trucks. (Note: Tanker trucks may thus also be temporarily utilized in fuel-blending operations, but they are provided by others and are not dedicated to on-site use and are thus not considered "process vessels".) These process vessels are considered to be in *light material service* and thus subject to the Container Level 2 standards of Rule 0400- 12-01-.06(32)(g)4. Except for the vacuum truck, these containers are not equipped with pressure relief or other safety devices but are marked or labeled with a uniquely identifying container number.

2. Controlling Organic Air Emissions from Process Vessels

Organic air emissions from process vessels are controlled by the "Opening and Closing Containers" provisions set forth in Paragraph 8.E.5. ETSD's fuel blending operations are performed in small batches and involve a wide variety of waste types (including physical forms) transferred from a variety of container types, and some precursor efforts such as the decanting of liquid fuel-candidate wastes from small containers and combining them in larger containers may occur in any portion of the permitted container management areas. The use of submerged-fill and other loading/unloading methods/techniques described at TN Rule 0400-12-01-.06(32)(g)4(ii) to control organic vapor emissions are not generally practicable (except for the limited use of the vacuum truck).

3. Inspection, Testing, and Repair of Process Vessels

Each process vessel (i.e., tote containers and vacuum truck), including its cover and closure devices, is visually inspected by ETSD personnel at least once each year to check for visible cracks, holes, gaps, or other open spaces into the interior of the container when the cover and closure devices are secured in the closed position. Each such inspection and its findings will be documented by completing a *Process Vessel Subpart CC Inspection/Repair Log* form (see Attachment 9.5). Completed Logs will be retained as part of the Facility's operating records as described in Paragraph 9.H.5 below.

In addition to the visual inspection, each process vessel will also be subjected to No Detectable Emissions testing by ETSD personnel at least every 12 months. This testing will be performed as described in Paragraph 9.H.4 below and when:

(i) The process vessel (including its cover or closure devices) has been visually inspected and found to have no defects; and

(ii) The process vessel is filled with a material having a volatile organic concentration representative of the range of volatile organic concentrations for the hazardous wastes expected to be managed in such process vessels (Note: For purposes of this testing, any hazardous waste fuel that has been blended to meet a customer's specifications will be presumed to be so representative.); and

(iii) The process vessel's cover and closure devices are secured in the closed position.

If this testing shows that the process vessel (including its cover or closure devices) does not "operate with no detectable emissions", then the process vessel will be considered defective.

When a defect is detected in a process vessel (including its cover or closure devices) by either visual inspection or No Detectable Emissions testing, ETSD will make first efforts at repair of the defect no later than 24 hours after detection, and repair will be completed as soon as possible but no later than 5 calendar days after detection. Repair efforts will be documented on the *Process Vessel Subpart CC Inspection/Repair Log* form (see Attachment 9.5). As indicated on this Log form, a defect will not be considered to be repaired or corrected unless and until additional No Detectable Emissions testing performed as described in the paragraph above and Paragraph 9.H.4

below demonstrates that the process vessel (including its cover or closure devices) does "operate with no detectable emissions". If repair of a defect cannot be completed within 5 calendar days, then the hazardous waste will be removed from the process vessel and the vessel will not be used to manage hazardous waste until the defect is corrected.

4. Testing for *No Detectable Emissions*

The No Detectable Emissions testing required in Paragraph 9.H.3 above will be performed in compliance with U.S. Environmental Protection Agency Reference Method 21 using a Honeywell/RAE Systems MiniRAE 3000 Portable Handheld VOC Monitor or other similar organic vapor meter ("OVM") that meets the instrument requirements specified in Reference Method 21. The OVM will be calibrated before use on each day of its use as required by the procedures of Reference Method 21 and the manufacturer's instructions, and the calibration gases will be a Zero air (less than 10 ppm of hydrocarbon in air) and a Span gas mixture of n-hexane and air at a concentration of approximately, but less than, 10,000 ppm n-hexane. In accordance with Section 8.3.2 of Reference Method 21, the OVM will first be used to determine the background level of organic vapor in the air around the process vessel and then the instrument probe will be traversed around the potential leak interfaces (i.e., the locations where organic vapor leakage could occur) as close to the interface as possible to detect and measure organic vapor emissions. In the case when the configuration of the cover or closure device prevents a complete traverse of the interface, all accessible portions of the interface will be sampled. Potential leak interfaces associated with process vessels include, but are not limited to, the interface of the cover rim and the container wall, the periphery of any opening on the container or container cover and its associated closure devices, and the sealing seat interface on a spring-loaded pressure-relief valve.

Each time a process vessel is tested for No Detectable Emissions (whether performed as an annual testing event or as an attempt to confirm completion of a repair), the performance and results of the test (including the prior instrument calibration) will be documented by completion of a *No Detectable Emissions Test Log* form (see Attachment 9.5). Completed *No Detectable Emissions Test Logs* will be retained as part of the Facility's operating record as described in Paragraph 9.H.5 below.

5. Record-Keeping for Process Vessels

The *Process Vessel Subpart CC Inspection/Repair Log* and *No Detectable Emissions Test Log* forms in Attachment 9.5 were developed to collect the information required by the applicable recordkeeping requirements of TN Rule 0400-12-01-.06(32)(j). Pursuant to TN Rule 0400-12-01-.06(32)(j)1, ETSD will retain the completed Logs as part of the Facility's operating record for a minimum of 3 years.

ATTACHMENT 9.1

P.E. STRUCTURAL INTEGRITY ASSESSMENT OF TANK SYSTEMS F1 AND F2

FISHER ARNOLD

ENGINEERING INTEGRATION

April 16, 2018

Mr. Steve Neal, President
Excel TSD of Tennessee, L.L.C.
550 Rivergate Road
Memphis, TN 38109

RE: Structural Integrity Assessment of Tanks F1 and F2
Excel TSD of Tennessee, L.L.C.
Memphis, Tennessee

Dear Mr. Neal,

We are pleased to transmit herewith the Structural Integrity Assessment Reports of Tanks F1 and F2. The assessments are in pdf format, attached.

In summary, the assessments conclude the F1 and F2 Tanks would be in compliance with the Tennessee and RCRA regulations. The required RCRA Certification is also attached.

These assessments are not a warranty nor guarantee as to the future performance of these tanks.

If you have any questions or require additional information, please do not hesitate to call.

Sincerely,

John D. Hughes

John D. Hughes, P.E.

256 Seaboard Lane
Suite A101
Franklin, TN 37067

615.353.1340
Toll Free: 1.888.583.9724

www.fisherarnold.com

STRUCTURAL INTEGRITY ASSESSMENT
HAZARDOUS WASTE TANK F1

EXCEL TSD OF TENNESSEE, LLC

MEMPHIS, TENNESSEE



Prepared by:

FISHER ARNOLD

ENGINEERS | ARCHITECTS | CONSULTANTS | PLANNERS

256 Seaboard Lane, Suite A101 | Nashville, TN 37067

615.353.1340 Office | 888.583.9724 Toll Free

www.fisherarnold.com

April 16, 2018

1. HAZARDOUS WASTE TANK F1

1.1 TANK F1 DESCRIPTION AND CONSTRUCTION

8'-0" diameter x 15'-2" straight side wall ht, vertical cylindrical tank with standard flanged & dished head bottom and top. Tank supported by (4) W6x15 steel vertical supports @ 90 degrees o.c.; 3'-5" ht. from top of bottom head to top of support base slab. Nominal storage volume= 6,000 gals. Reference Tank Elevation Drawing, attached.

Carbon steel construction

Shell t = 0.25" bottom dished head t = 0.25" top dished head t = 0.25"

Design pressure: Atmospheric

Design temperature: Ambient

Specific gravity: 1.0

Approx. tank weight empty: 4,600 lbs.

Manufacturer: Unknown Date of manufacture: 1988 estimated

Design specifications: Unknown, API 620 (assumed for check)

Check Tank Design

Cylindrical Shell

$$\text{Min. } t = \frac{R\,(P_L + P_G)}{S \times E} + C.A.$$

S = Allowable tensile stress, 18,000 psi
E = weld efficiency factor = 0.70
P_L = .036 x 1.0 x 182" = 6.6 psi
P_G = 0 psi
R = 48"
C.A. = Corrosion Allowance = 0"

$$\text{Min. } t = \frac{48\,(6.6 + 0)}{18{,}000 \times .70} + 0" = 0.025" < 1/8" \text{ min.}, < 0.25", \text{ ok}$$

Bottom Dished Head

t = 0.25"

$$\text{min. } t = \frac{0.885\ PL}{SE - 0.2\ P}$$

P = .036x1.0x197" = 7.1 psi
L = 96"
S = 18,000 psi
E = 0.85

$$\text{Min. } t = \frac{.885 \times 7.1 \times 96}{18{,}000 \times .85 - .2 \times 7.1} = \frac{603}{15{,}286} = 0.039" < 1/4", \text{ ok}$$

Check local stresses at W6x15 supports
Ref: Pressure Vessel Design Handbook by Bednar

Gravity Loads

Tank wgt. Empty (approx.) 4,600 lbs.

Tank contents wgt. 6,000 gals. x 8.33 lbs/gal. x 1.0 = 50,000 lbs

Load to ea. Support = 54,600 lbs./4 =13,650 lbs.

Check Vertical Welds of Support to Tank Shell

P = 13,650 lbs.
Assume 3/16" weld cap. = 0.707 x0.1875" x13,600 = 1,800 lb./in.
Weld Cap = 1,800 x2 x22" = 79,200 lbs. > 13,650 lbs.

Check Tank Shell Compressive Stress, Sc

$Sc = P/L_2\, t$ $P = 13{,}650$ lbs. $L_2 = 6" + (2 \times 48 \times 0.25)^{1/2} = 10.9"$

$Sc = 13{,}650$ lbs./10.9" x0.25" = 5,010 psi

Allow comp. stress = Fc $r/t = 48/0.25" = 192$

$$Fc = \left(\frac{110}{0.833 \times 192} - \frac{3{,}025}{(0.833 \times 192)^2}\right) \times 18{,}000 \text{ psi}$$

Fa = (0.68 – 0.12) x 18,000 psi = 10,080 psi > 5,010 psi, ok

Gravity and Wind Loading

Wind Load = 14 psf x0.7 x8' x17' = 1,333 lbs.
M_{OT} = 1,333 x11' = 14,663 ft-lbs.
Max. Support Loads = 14,663/8.5' = 1,725 lbs. vert. down or uplift
Min. Dead Load = (4,600 lbs.)/4 + concrete = 1,150 lbs. + 800 lbs. = 1,950 lbs. > 1,725 lbs., : no uplift
MR = 4.25' x4,600 lbs. = 19,550 ft.-lbs. F.S. = 19,550 / 14,663 = 1.33, ok
Max. V = 1,333 lbs. x 0.38 = 506 lbs. / Support Leg
Check Sliding; F.S. = 0.4 x1,150+800 / 506 = 1.54, ok.
Max. Support Load = 13,650 lbs. + 1,725 lbs. = 15,375 lbs.

Gravity & Seismic Loading

V = ZIKCSW Zone 3
Z =0.75 I=1.0 K=2.0 C=0.11 S=1.5

Tank Empty, W=4.6 kips

V=0.75x1.0x2.0x0.11x1.5x4.6 = 0.25x4.6 = 1.15 kips, less than wind load, ok.

Tank Full, W=54.6 kips

V=0.25x54.6k = 13.65 kips
$M_{OT.}$ = 13.65k x11' = 150.1 k-ft.
$M_{RT.}$ = 54.6 x 4.25' = 232.0 k-ft.
F.S. = 1.54, ok

Max. Load to Support =(13,650 +2x0.38x13,650x11'/8.5' lbs.)=13,650 lbs. + 13,425 = 27,075 lbs.

Tank supports

(4) W6x15 steel column supports design ht, = 4.34 ft.
Pg = 13,650 lbs.
A = 4.43 r = 1.46 KL/r = 2 x 4.34 x 12 / 1.46 = 71.3 Fa = 16.3 ksi Sx = 9.7 Fb = 22 ksi
Pg allowable = 72.2 kips > 13.65 kips, ok fa = 13.65/4.43 = 3.1 ksi Pg x e = 13.65 kips x0.25 ft. = 3.4 k-ft. fb support = 3.4x12/9.7 = 4.2 ksi

All Stresses within Allowable with Code Allowed 33% Increase for wind & earthquake loading.

1.2 HAZARDOUS CHARACTERISTICS OF WASTE MATERIAL

Blended waste purge solvents for fuel.

1.3 TANK PROTECTION

Carbon Steel Tank, compatible with materials stored and compactible with exterior environment; with exterior of tank painted. Tank protection is adequate with monitoring.

1.4 TANK INSPECTION AND TESTING

An IN-SERVICE STI SP001 & NDE INSPECTION REPORT of the F-1 Tank, was made on April 11, 2018 by STRONGHOLD INSPECTION, LTD. See attached F1 Tank Final Report 01 4112018.doc.pdf.

During the service life of the tank, the tank will be monitored on a daily basis and checked for any leaks.

1.5 TANK FOUNDATION

Tank foundation consists of a 12" thick reinforced concrete base slab, per plant personnel in charge of the construction.

Check foundation bearing pressure; q:

Tank weight empty & mixer	4,600 lbs.
Contents weight:	
6,000 gal. x 8.33 x 1.0	50,000 lbs.
Total	54,600 lbs. gravity load

54,600 lbs. / 4 = 13,650 lbs. bearing on four support legs; Bearing area = 3'x3' = 9 s.f.
q = 13,650 lb./9 s.f. = 1,520 psf < 2,500 psf allow. for 12" thick reinforced concrete slab, ok

Max. load to support with earthquake loading = 27,075 lbs.
q = 27,075 lb./9 s.f. = 3,000 psf < 2,500 x 1.33 psf, ok.

1.6 CONTROLS AND PRACTICES TO PREVENT SPILLS AND OVERFLOWS

A. Tanks:

Controls to prevent spills and overflows for tank involve both operating procedures and instrumentation. Instrumentation is provided with high-level alarm which allows sufficient time to cease transfer operations prior to tank overflow. All purge solvent material transfers are monitored by operating personnel. The operators verify the tank has sufficient capacity prior to making the transfer. Level in tanks is monitored and recorded on a daily basis.

B. Secondary Containment

Overflow of secondary containment areas is prevented by inspecting the areas daily, with the removal of any spilled materials within 24 hrs. or as soon as practical. Any spills or overflows from the tank are collected within the curbed containment area. The condition of the containment area is monitored and checked on a daily basis. See separate report for Assessment of Secondary Containment.

1.7 ASSESSMENT

Based on the data presented above, in my opinion, the 6,000 gal. Tank F1 would have sufficient strength and compatibility with wastes stored to ensure it would not collapse, rupture, or fail.

CERTIFICATION

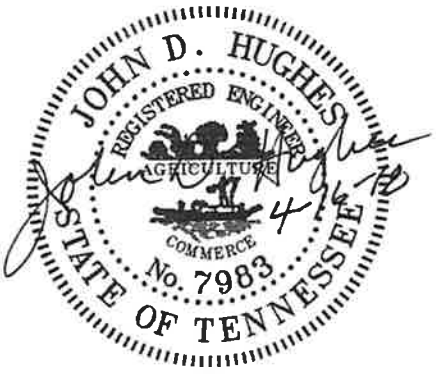
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

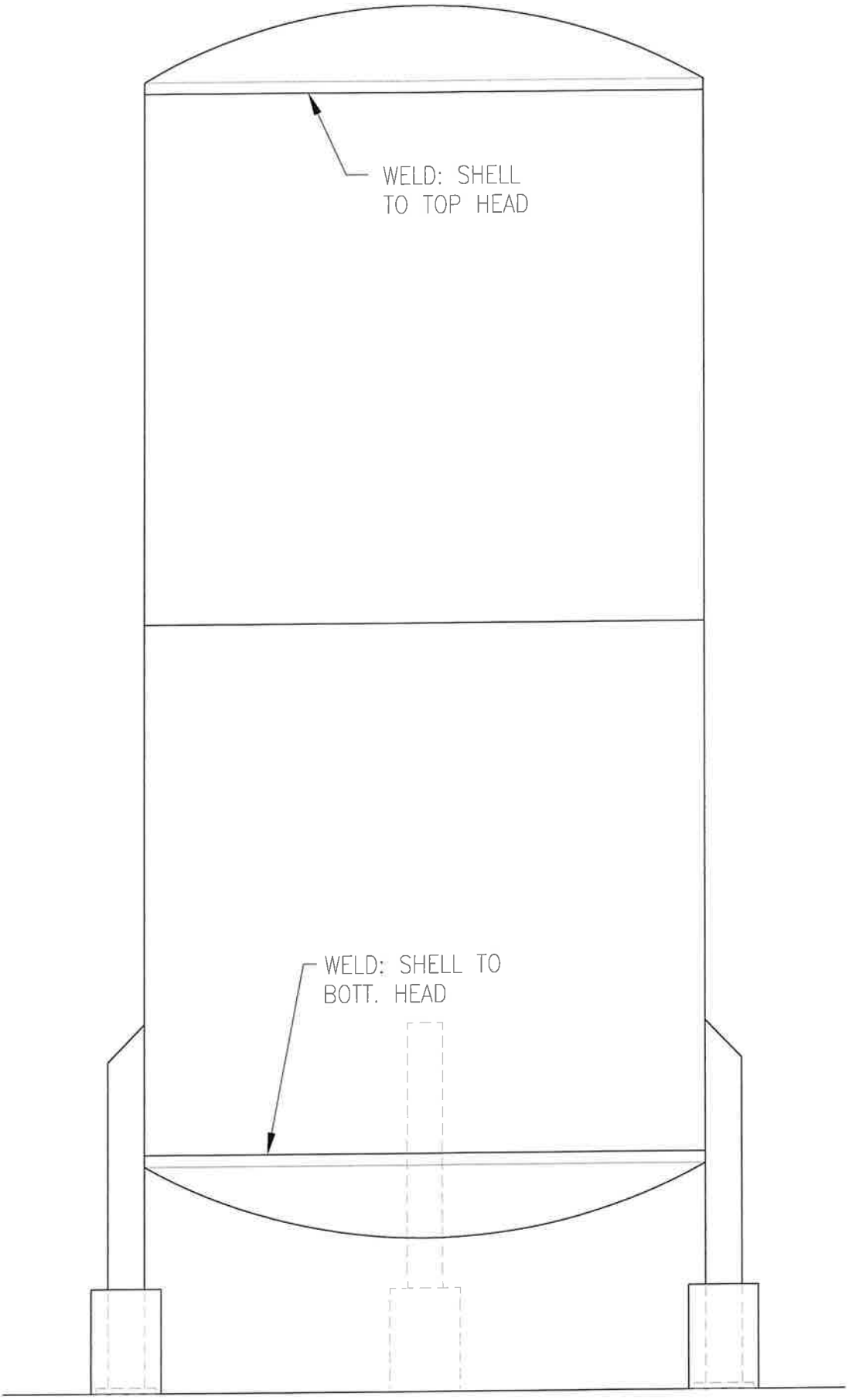
Signed: John D. Hughes Date: 4-16-2018

John D. Hughes

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615.353.1340 Office | 888.583.9724 Toll Free
www.fisherarnold.com





F-1 TANK EXCEL TSD

SCALE: ½" = 1'-0"

STRONGHOLD
INSPECTION, LTD.
A Stronghold Company

Excel TSD
IN-SERVICE STI SP001 & NDE INSPECTION REPORT
F-1 Tank



Memphis, TN
04-11-2018

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1.0 EXECUTIVE SUMMARY

SUITABILITY FOR SERVICE

A visual external STI SP001 inspection was performed with the aid of non-destructive testing on the F-1 Tank located at Excel TSD of Tennessee. The F-1 Tank had No previous history of the original construction or repairs at time of inspection. The visual (VT) and Ultrasonic (UT) testing found The F-1 Tank suitable for service with no corrosion; however the coating has failed in areas.

INSPECTION / SERVICE INTERVALS

OUT-OF-SERVICE: No out- of-service inspection was done at this time.

IN-SERVICE: The next external inspection should be conducted within 5 years and no later than April 12, 2023
Short term shell corrosion rate could not be established with no previous history available at time of inspection. The next shell Ultrasonic (UT) thickness measurements should be collected and re-evaluated again within 5 years and no later than February 23, 2023

STRONGHOLD INSPECTION PERSONNEL

Jason Kee
Certification Number 37706

Joe Skinner
Level II Technician

Reviewed By: Ronnie Poole

1.1 DESCRIPTION

Tank Number:	F-1 Storage Tank
Owner:	Excel TSD
Location:	Memphis, TN
DOT Regulated:	No
Type of Inspection:	External

Design Standard:	Unknown
Manufacturer:	Unknown
Year Built:	Unknown
Data Plate:	No

Diameter:	- ft.
Height:	- ft.
Capacity Gross:	--

Foundation Type:	None
Cathodic Protection:	None
Leak Detection:	No
Containment:	None

Bottom Type:	-
Coatings:	-

Shell Type:	But Welded			
Coatings:	External:	Paint	Internal:	-

Fixed Roof Type:	None			
Coatings:	External:	No	Internal:	-

Floating Roof Type:	-			
Coatings:	External:	-	Internal:	-
Primary Seal:	-			
Secondary Seal:	-			

Product Stored:		Specific Gravity:	-
Last Inspection:	Unknown		
Date Last Coated:	No Data Available		
Date Last Strapped:	None		

2.0 INSPECTION RESULTS & EVALUATIONS

2.1 CONTAINMENT & FOUNDATION

.

2.**1 a)** The F-1 Tank is supported by (4) legs resting on a concrete foundation.

2.1 b) The F-1 Tank is located in the tank farm area.

2.2 BOTTOM

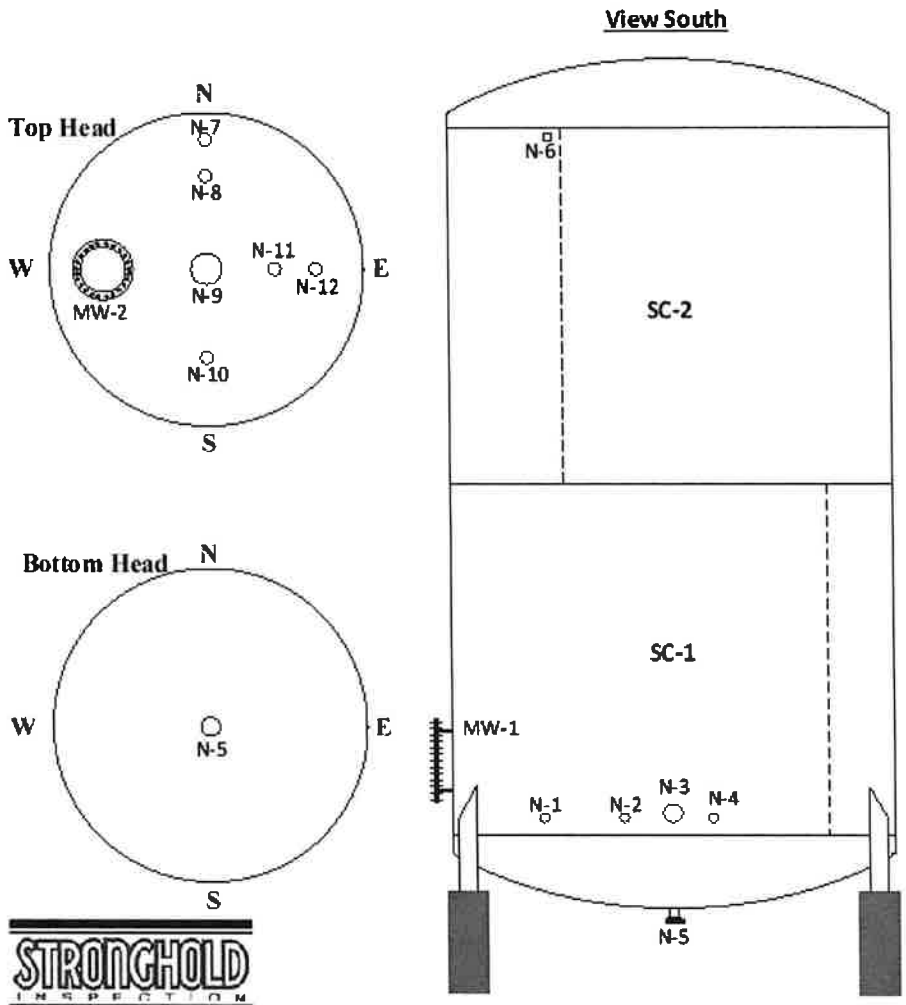
2.2 a) The F-1 tank has a round bottom. The F-1 Tank had no previous history of original construction or repairs. The Visual (VT) inspection and Ultrasonic (UT) testing found the bottom suitable for service. The testing found the tank bottom suitable for service with no corrosion or mechanical integrity issues at the time of inspection. The lowest thickness reading recorded on the tank bottom was .248 in.

2.3 SHELL

2.3 a) Visual (VT) inspection and Ultrasonic (UT) testing found the shell suitable for service with no sign of corrosion; however there were areas of coating failure.

STI SP001 In-Service Inspection Report

2.3.3 Shell Layout



DRAWING NOT TO SCALE

NOZZLE SIZES

MW-1 = 24 "
N-1 = 3/4" Coupling
N-2 = 1" Coupling
N-3 = 3" Nozzle
N-4 = 1" Coupling
N-5 = 3" *BRASS * Nozzle
N-6 = ¾" Coupling
MW-2 = 24"
N-7 = 2" Nozzle
N-8 = 2" Nozzle
N-9 = 10" Nozzle
N-10 = 2" Nozzle
N-11 = 2" Nozzle
N-12 = 2" Nozzle

NOTES

*SC = Shell Course
* N-5 Brass

STRONGHOLD INSPECTION
Memphis, TN.
(901) 334-0919

Title: F-1
Customer: Excel TSD
Material: Carbon Steel
Drawn By: J. Skinner
Date: 04-11-18

2.4 ATTACHMENTS & APPURTENANCES

2.4 a) External Visual (VT) inspection and Ultrasonic (UT) examinations over all found the associated nozzle and attachments suitable for service with no indications of mechanical or service related deficiencies. Bottom nozzle was a brass material.

5.0 WARRANTY

WARRANTY

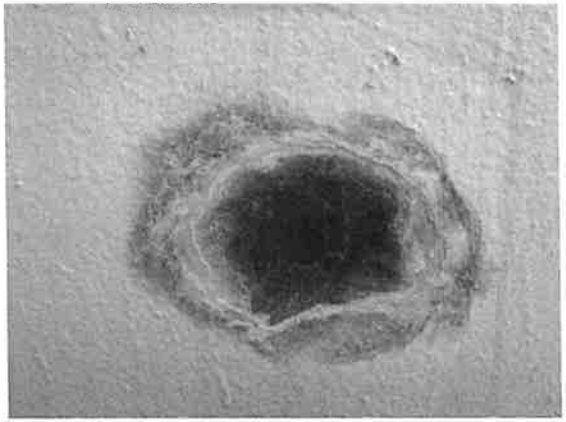
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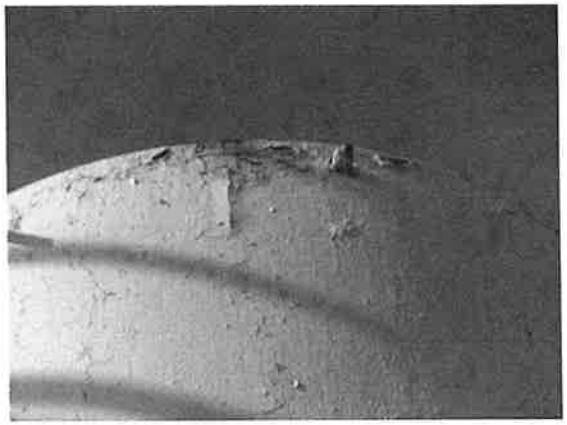
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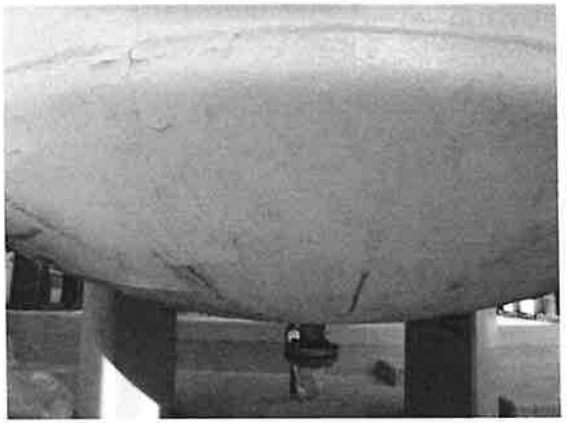
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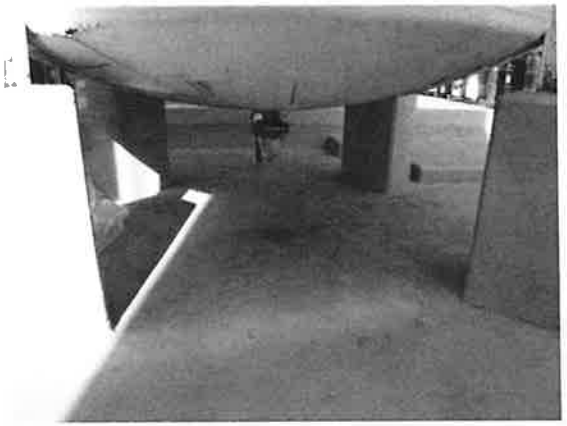


001 Overview


002 Buffed for UT thickness testing


003 Coating failure


004 bottom



005 Supports



006 Roof

STRONGHOLD INSPECTION

Ultrasonic Thickness Monitoring Historical Data Sheet

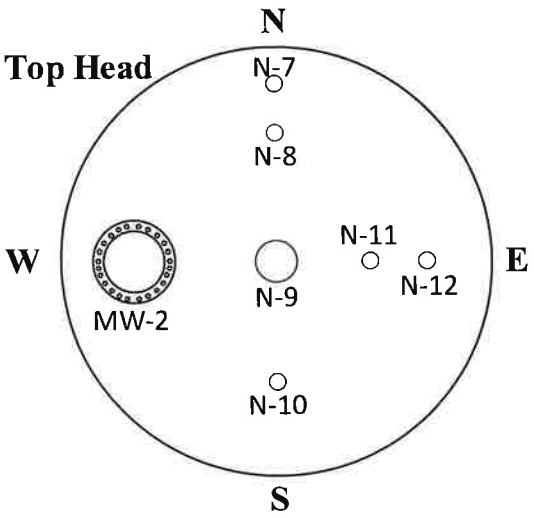
Excel TSD

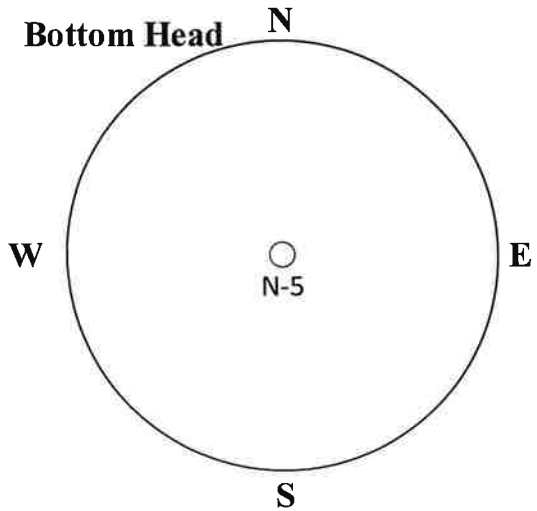
Equipment:	F-1	**Plant/Sub Area:**	N/A	**Technician Name:**	J Skinner
Process:	Waste water storage	**Insulated/Painted:**	Painted	**Certifications:**	Level II.
Area:	N/A	**Thickness Gauge:**	Olympus 38DL +	**Company Name:**	Stronghold Insp.
Material:	Carbon Steel	**Thickness Gauge SSN:**	110215106	**Date:**	4/11/2018

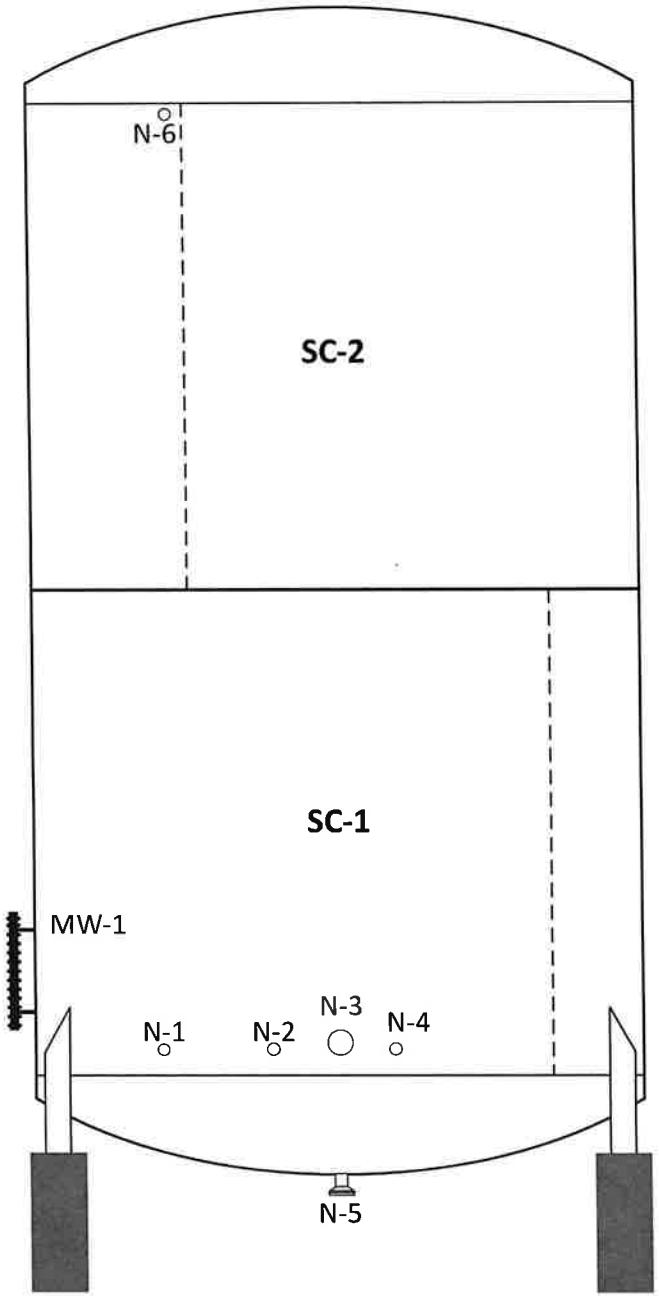
TML Number	Reading Location	Current Survey Thickness	NOTES	Previous Survey Thickness	Previous Survey Date	Nominal	Corrosion Allowance	Retirement Thickness	Retirement Thickness Date
SC-1	N	0.292				N/A			
	S	0.284				N/A			
	E	0.289				N/A			
	W	0.283				N/A			
SC-2	S	0.248				N/A			
	W	0.260				N/A			
Bottom Head	N	0.252				N/A			
	S	0.248				N/A			
	E	0.252				N/A			
	W	0.250				N/A			
Top Head	S	0.292				N/A			
	W	0.300				N/A			
MW-1	T	0.341				N/A			
24"	B	0.343				N/A			
	N	0.340				N/A			
	S	0.345				N/A			
	Cover	0.300				N/A			
N-3	T	0.179				N/A			
3"	B	0.181				N/A			
	E	0.180				N/A			
	W	0.172				N/A			
N-5	N	0.181				N/A			
3"	S	0.174				N/A			
	E	0.166				N/A			
	W	0.187				N/A			
Legs	NE	0.272				N/A			
		0.271				N/A			
		0.270				N/A			
	NW	0.274				N/A			
		0.273				N/A			
		0.274				N/A			
	SE	0.274				N/A			
		0.272				N/A			
		0.272				N/A			
	SW	0.274				N/A			
		0.273				N/A			
		0.273				N/A			

Stronghold Inspection utilized the "echo to echo" function that is available on the Olympus thickness meter.
The echo to echo function is utilized to receive thickness measurements minus the painting thickness. This functions standard is set by Olympus calibration annually.

View South







NOZZLE SIZES

MW-1 = 24 "
N-1 = 3/4" Coupling
N-2 = 1" Coupling
N-3 = 3" Nozzle
N-4 = 1" Coupling
N-5 = 3" *BRASS* Nozzle
N-6 = ¾" Coupling
MW-2 = 24"
N-7 = 2" Nozzle
N-8 = 2" Nozzle
N-9 = 10" Nozzle
N-10 = 2" Nozzle
N-11 = 2" Nozzle
N-12 = 2" Nozzle

NOTES

*SC = Shell Course
* N-5 Brass

STRONGHOLD INSPECTION

DRAWING NOT TO SCALE

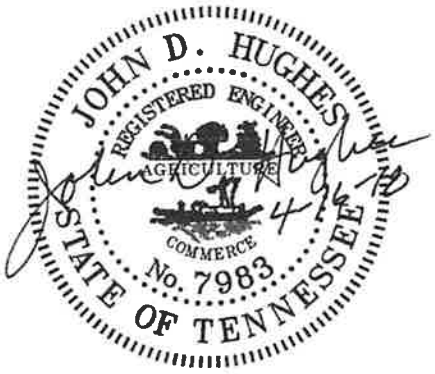
STRONGHOLD INSPECTION
Memphis, TN.
(901) 334-0919

Title: F-1
Customer: Excel TSD
Material: Carbon Steel
Drawn By: J. Skinner
Date: 04-11-18

STRUCTURAL INTEGRITY ASSESSMENT
HAZARDOUS WASTE TANK F2

EXCEL TSD OF TENNESSEE, LLC

MEMPHIS, TENNESSEE



Prepared by:

FISHER ARNOLD

ENGINEERS | ARCHITECTS | CONSULTANTS | PLANNERS

256 Seaboard Lane, Suite A101 | Nashville, TN 37067

615.353.1340 Office | 888.583.9724 Toll Free

www.fisherarnold.com

April 16, 2018

1. HAZARDOUS WASTE TANK F2

1.1 TANK F2 DESCRIPTION AND CONSTRUCTION

8'-0" diameter x 15'-2" straight side wall ht, vertical cylindrical tank with standard flanged & dished head bottom and top. Tank supported by (4) W6x15 steel vertical supports @ 90 degrees o.c.; 3'-5" ht. from top of bottom head to top of support base slab. Nominal storage volume= 6,000 gals. Reference Tank Elevation Drawing, attached.

Carbon steel construction

Shell t = 0.20" bottom dished head t = 0.26" top dished head t = 0.25"

Design pressure: Atmospheric

Design temperature: Ambient

Specific gravity: 1.0

Approx. tank weight empty: 4,600 lbs. Mixer wgt. approx.: 1,400 lbs.

Manufacturer: Unknown Date of manufacture: 1988 estimated

Design specifications: Unknown, API 620 (assumed for check)

Check Tank Design

Cylindrical Shell

$$\text{Min. } t = \frac{R\,(P_L + P_G)}{S \times E} + C.A.$$

S = Allowable tensile stress, 18,000 psi
E = weld efficiency factor = 0.70
P_L = .036 x 1.0 x 182" = 6.6 psi
P_G = 0 psi
R = 48"
C.A. = Corrosion Allowance = 0"

$$\text{Min. } t = \frac{48\,(6.6 + 0)}{18{,}000 \times .70} + 0" = 0.025" < 1/8" \text{ min.}, < 0.20", \text{ ok}$$

Bottom Dished Head

t = 0.26"

$$\text{min. } t = \frac{0.885\ PL}{SE - 0.2\ P}$$

P = .036x1.0x197" = 7.1 psi
L = 96"
S = 18,000 psi
E = 0.85

$$\text{Min. } t = \frac{.885 \times 7.1 \times 96}{18{,}000 \times .85 - .2 \times 7.1} = \frac{603}{15{,}286} = 0.039" < 1/4", \text{ ok}$$

Check local stresses at W6x15 supports
Ref: Pressure Vessel Design Handbook by Bednar

Gravity Loads

Tank wgt. Empty (approx.) 4,600 lbs. Mixer wgt. approx.: 1,400 lbs.

Tank contents wgt. 6,000 gals. x 8.33 lbs/gal. x 1.0 = 50,000 lbs

Load to ea. Support = 56,000 lbs./4 =14,000 lbs.

Check Vertical Welds of Support to Tank Shell

P = 14,000 lbs.
Assume 3/16" weld cap. = 0.707 x0.1875" x13,600 = 1,800 lb./in.
Weld Cap = 1,800 x2 x22" = 79,200 lbs. > 14,000 lbs.

Check Tank Shell Compressive Stress, Sc

$Sc = P/L_2\ t$ $P = 14{,}000$ lbs. $L_2 = 6" + (2x48x0.20)^{1/2} = 10.4"$

$Sc = 14{,}000$ lbs./10.4" x0.20" = 6,730 psi

Allow comp. stress = Fc r/t = 48/0.20" = 240

$$Fc = \left(\frac{110}{0.833 \times 240} - \frac{3{,}025}{(0.833 \times 240)^2}\right) \times 18{,}000 \text{ psi}$$

Fa = (0.55 – 0.076) x 18,000 psi = 8,530 psi > 6,730 psi, ok

Gravity and Wind Loading

Wind Load = 14 psf x0.7 x8' x17' = 1,333 lbs.
M_{OT} = 1,333 x11' = 14,663 ft-lbs.
Max. Support Loads = 14,663/8.5' = 1,725 lbs. vert. down or uplift
Min. Dead Load = (4,600 + 1,400 lbs.)/4 + concrete = 1,500 lbs. + 800 lbs. = 2,300 lbs. > 1,725 lbs., : no uplift
MR = 4.25' x6,000 lbs. = 25,500 ft.-lbs. F.S. = 25,500 / 14,663 = 1.74, ok
Max. V = 1,333 lbs. x 0.38 = 506 lbs. / Support Leg
Check Sliding; F.S. = 0.4 x1,500 / 506 = 1.18, ok.
Max. Support Load = 14,000 lbs. + 1,725 lbs. = 15,725 lbs.

Gravity & Seismic Loading

V = ZIKCSW Zone 3
Z =0.75 I=1.0 K=2.0 C=0.11 S=1.5

Tank Empty, W=6.0 kips

V=0.75x1.0x2.0x0.11x1.5x6 = 0.25x6 = 1.5 kips, approx.. equal to wind load, ok.

Tank Full, W=56 kips

V=0.25x56k = 14.0k
$M_{OT.}$ = 14.0k x11' = 154 k-ft.
$M_{RT.}$ = 56 x 4.25' = 238.0 k-ft.
F.S. = 1.54, ok

Max. Load to Support =(14,000 +2x0.38x14,000x11'/8.5' lbs.)=14,000 lbs. + 13,800 = 27,800 lbs.

Tank supports

(4) W6x15 steel column supports design ht, = 4.34 ft.
Pg = 14,000 lbs.
A = 4.43 r = 1.46 KL/r = 2 x 4.34 x 12 / 1.46 = 71.3 Fa = 16.3 ksi Sx = 9.7 Fb = 22 ksi
Pg allowable = 72.2 kips > 14 kips, ok fa = 14/4.43 = 3.2 ksi Pg x e = 14 kips x0.25 ft. = 3.5 k-ft. fb support = 3.5x12/9.7 = 4.3 ksi

All Stresses within Allowable with Code Allowed 33% Increase for wind & earthquake loading.

1.2 HAZARDOUS CHARACTERISTICS OF WASTE MATERIAL

Blended waste purge solvents for fuel.

1.3 TANK PROTECTION

Carbon Steel Tank, compatible with materials stored and compactible with exterior environment; with exterior of tank painted. Tank protection is adequate with monitoring.

1.4 TANK INSPECTION AND TESTING

An IN-SERVICE STI SP001 & NDE INSPECTION REPORT of the F-2 Tank, was made on April 11, 2018 by STRONGHOLD INSPECTION, LTD. See attached F2 Tank Final Report 01 4112018.doc.pdf.

During the service life of the tank, the tank will be monitored on a daily basis and checked for any leaks.

1.5 TANK FOUNDATION

Tank foundation consists of a 12" thick reinforced concrete base slab, per plant personnel in charge of the construction.

Check foundation bearing pressure; q:

Tank weight empty & mixer	6,000 lbs.
Contents weight:	
6,000 gal. x 8.33 x 1.0	50,000 lbs.
Total	56,000 lbs. gravity load

56,000 lbs. / 4 = 14,000 lbs. bearing on four support legs; Bearing area = 3'x3' = 9 s.f.
q = 14,000 lb./9 s.f. = 1,555 psf < 2,500 psf allow. for 12" thick reinforced concrete slab, ok

Max. load to support with earthquake loading = 27,800 lbs.
q = 27,800 lb./9 s.f. = 3,100 psf < 2,500 x 1.33 psf, ok.

1.6 CONTROLS AND PRACTICES TO PREVENT SPILLS AND OVERFLOWS

A. Tanks:

Controls to prevent spills and overflows for tank involve both operating procedures and instrumentation. Instrumentation is provided with high-level alarm which allows sufficient time to cease transfer operations prior to tank overflow. All purge solvent material transfers are monitored by operating personnel. The operators verify the tank has sufficient capacity prior to making the transfer. Level in tanks is monitored and recorded on a daily basis.

B. Secondary Containment

Overflow of secondary containment areas is prevented by inspecting the areas daily, with the removal of any spilled materials within 24 hrs. or as soon as practical. Any spills or overflows from the tank are collected within the curbed containment area. The condition of the containment area is monitored and checked on a daily basis. See separate report for Assessment of Secondary Containment.

1.7 ASSESSMENT

Based on the data presented above, in my opinion, the 6,000 gal. Tank F2 would have sufficient strength and compatibility with wastes stored to ensure it would not collapse, rupture, or fail.

CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

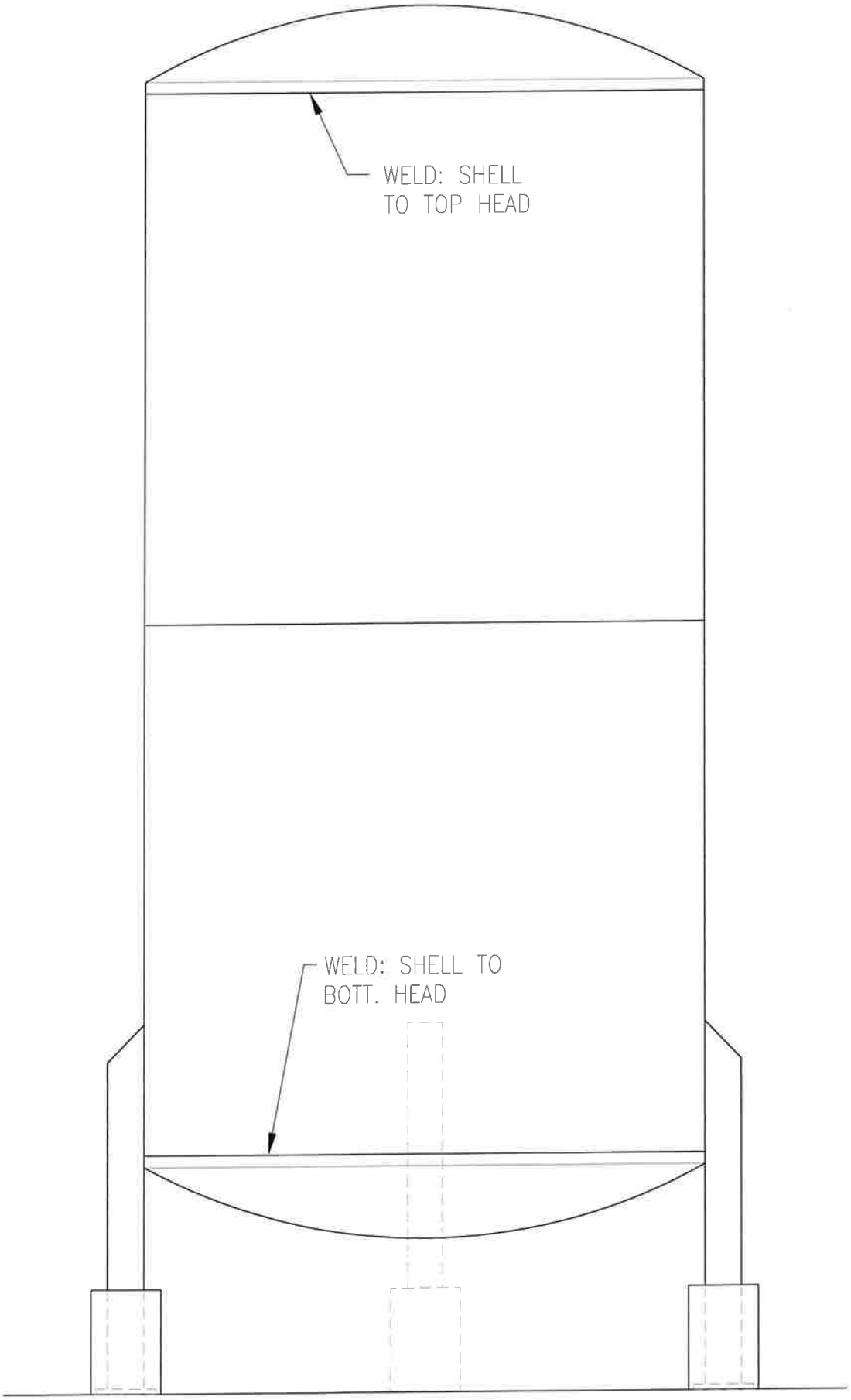
Signed: John D. Hughes Date: 4-16-2018

John D. Hughes

Firm: **FISHER ARNOLD**
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F-2 TANK EXCEL TSD

SCALE: ½" = 1'-0"

Excel TSD
IN-SERVICE STI SP001 & NDE INSPECTION REPORT
F-2 Tank



Memphis, TN
04-11-2018

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4.0 EQUIPMENT & PROCEDURES 10

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1.0 EXECUTIVE SUMMARY

SUITABILITY FOR SERVICE

A visual external STI SP001 inspection was performed with the aid of non-destructive testing on the F-2 Tank located at Excel TSD of Tennessee. The F-2 Tank had No previous history of the original construction or repairs at time of inspection. The visual (VT) and Ultrasonic (UT) testing found The F-2 Tank suitable for service with no corrosion; however the coating has failed in areas.

INSPECTION / SERVICE INTERVALS

OUT-OF-SERVICE: No out- of-service inspection was done at this time.

IN-SERVICE: The next external inspection should be conducted within 5 years and no later than April 12, 2023
Short term shell corrosion rate could not be established with no previous history available at time of inspection. The next shell Ultrasonic (UT) thickness measurements should be collected and re-evaluated again within 5 years and no later than February 23, 2023

STRONGHOLD INSPECTION PERSONNEL

Jason Kee
Certification Number 37706

Joe Skinner
Level II Technician

Reviewed By: Ronnie Poole

1.1 DESCRIPTION

Tank Number:	F-2 Storage Tank
Owner:	Excel TSD
Location:	Memphis, TN
DOT Regulated:	No
Type of Inspection:	External

Design Standard:	Unknown
Manufacturer:	Unknown
Year Built:	Unknown
Data Plate:	No

Diameter:	- ft.
Height:	- ft.
Capacity Gross:	--

Foundation Type:	None
Cathodic Protection:	None
Leak Detection:	No
Containment:	None

Bottom Type:	-
Coatings:	-

Shell Type:	But Welded			
Coatings:	External:	Paint	Internal:	-

Fixed Roof Type:	None			
Coatings:	External:	No	Internal:	-

Floating Roof Type:	-			
Coatings:	External:	-	Internal:	-
Primary Seal:	-			
Secondary Seal:	-			

Product Stored:	Potassium Hydroxide	Specific Gravity:	-
Last Inspection:	Unknown		
Date Last Coated:	No Data Available		
Date Last Strapped:	None		

2.0 INSPECTION RESULTS & EVALUATIONS

2.1 CONTAINMENT & FOUNDATION

.

2.1 a) The F-2 Tank is supported by (4) legs resting on a concrete foundation.

2.1 b) The F-2 Tank is located in the tank farm area.

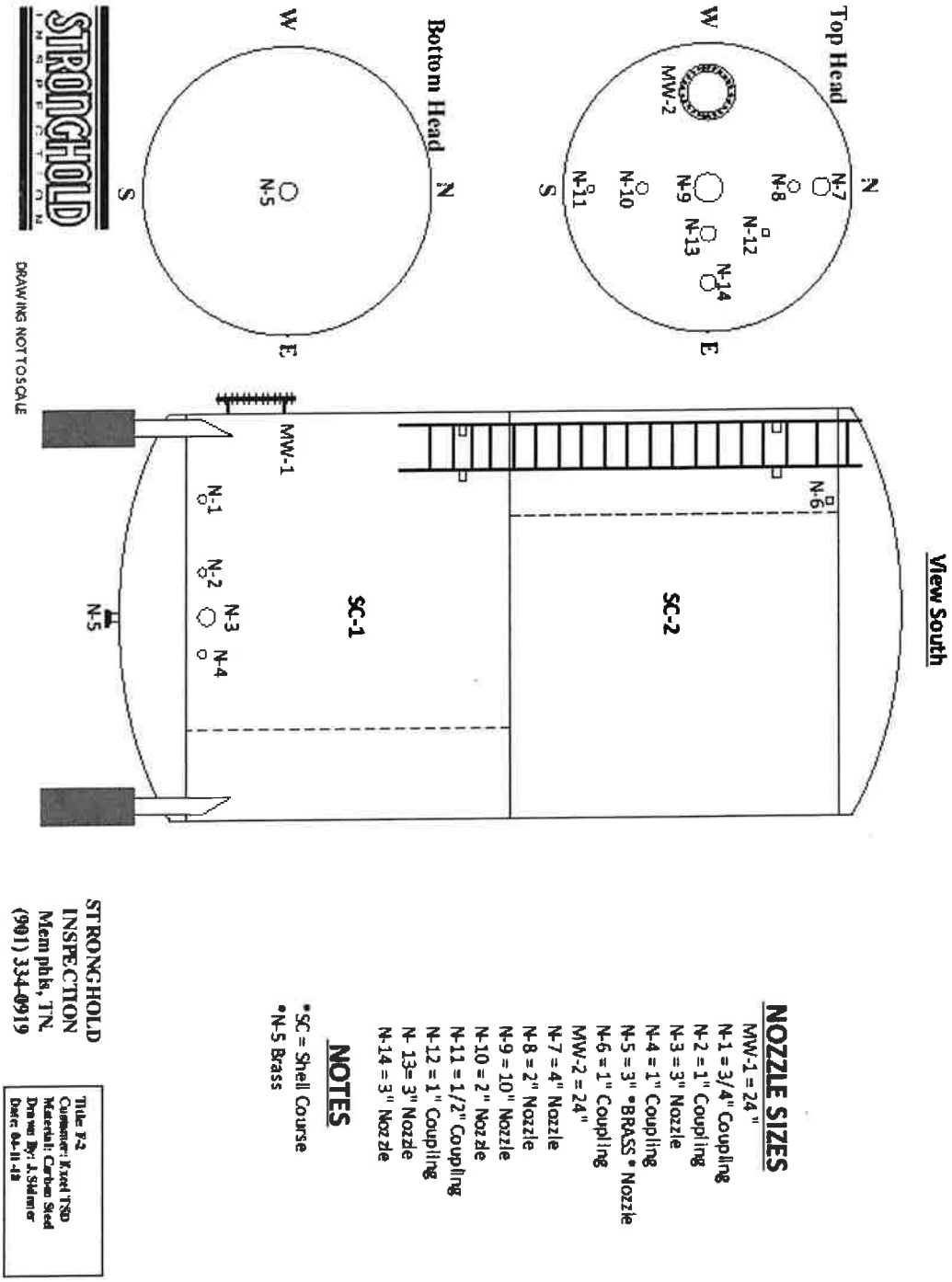
2.2 BOTTOM

2.2 a) The F-2 tank has a round bottom. The F-2 Tank had no previous history of original construction or repairs. The Visual (VT) inspection and Ultrasonic (UT) testing found the bottom suitable for service. The testing found the tank bottom suitable for service with no corrosion or mechanical integrity issues at the time of inspection. The lowest thickness reading recorded on the tank bottom was .259 in.

2.3 SHELL

2.3 a) Visual (VT) inspection and Ultrasonic (UT) testing found the shell suitable for service with no sign of corrosion; however there were areas of coating failure.

2.3.3 Shell Layout



NOZZLE SIZES

MW-1 = 24"
N-1 = 3/4" Coupling
N-2 = 1" Coupling
N-3 = 3" Nozzle
N-4 = 1" Coupling
N-5 = 3" *BRASS* Nozzle
N-6 = 1" Coupling
MW-2 = 24"
N-7 = 4" Nozzle
N-8 = 2" Nozzle
N-9 = 10" Nozzle
N-10 = 2" Nozzle
N-11 = 1/2" Coupling
N-12 = 1" Coupling
N- 13= 3" Nozzle
N-14 = 3" Nozzle

NOTES

*SC = Shell Course
*N-5 Brass

STRONGHOLD INSPECTION
Memphis, TN
(901) 334-0919

Title: F-2
Customer: Excel TSD
Material: Carbon Steel
Drawn By: J. Skinner
Date: 04-11-18

2.4 ATTACHMENTS & APPURTENANCES

2.4 a) External Visual (VT) inspection and Ultrasonic (UT) examinations over all found the associated nozzle and attachments suitable for service with no indications of mechanical or service related deficiencies. Bottom nozzle was a brass material.

5.0 WARRANTY

WARRANTY

The data collected by Stronghold Inspection is collected by visual inspection and/or by other means or apparatus indicated in this report. The inspection services performed by Stronghold Inspection are limited in scope to the collection and reporting of such data, and the extent of such inspection is limited by both the time constraints imposed by the Owner and the accessibility of the equipment as controlled by the Owner.

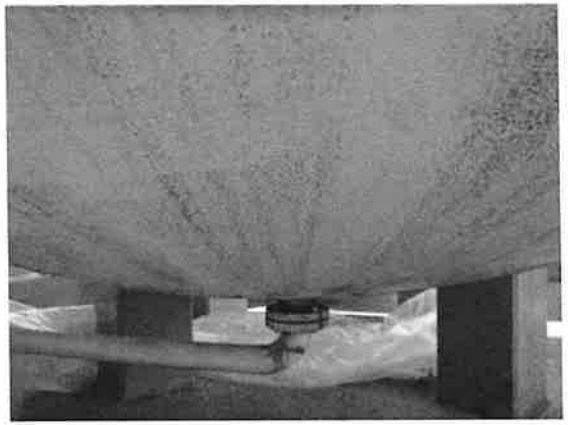
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001 F-2 Tank overview


002 Area on shell buffed off for UT thickness


003 Bottom


004 Roof



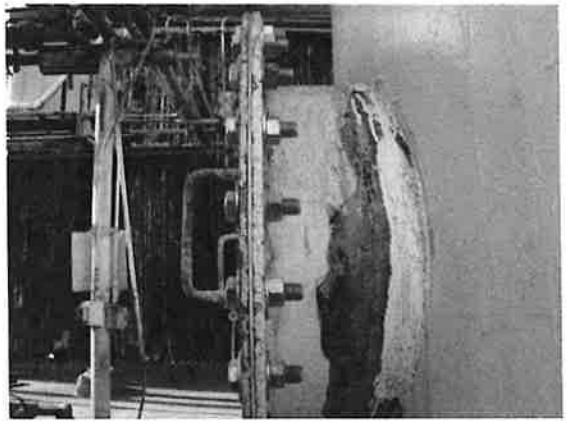
005 Coating damage



006 Flame Arrestor



007 Man-way



008 Coating failure on man-way

STRONGHOLD INSPECTION

Ultrasonic Thickness Monitoring Historical Data Sheet

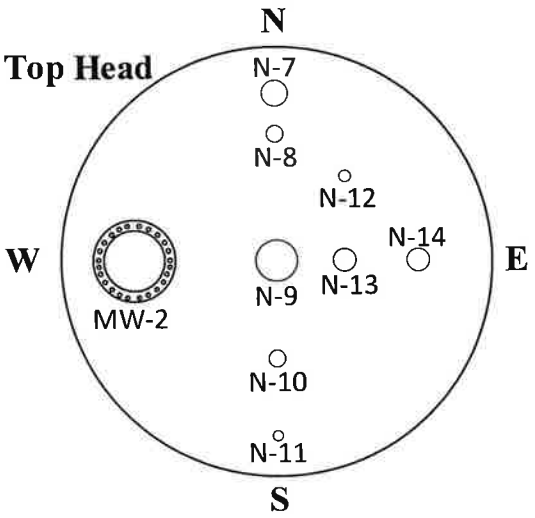
Excell TSD

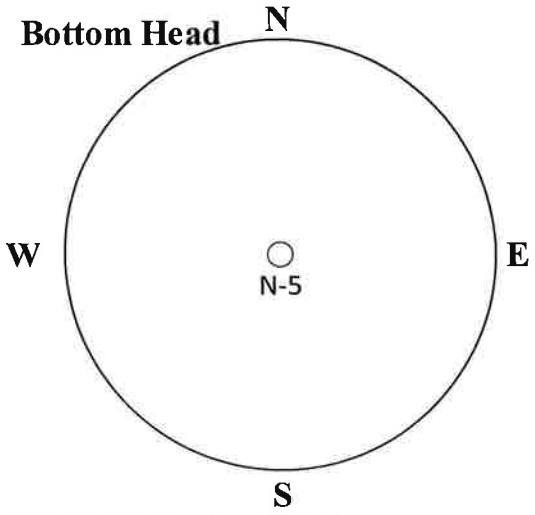
Equipment:	F-2	**Plant/Sub Area:**	N/A	**Technician Name:**	J Skinner
Process:	Waste water storage	**Insulated/Painted:**	Painted	**Certifications:**	Level II.
Area:	N/A	**Thickness Gauge:**	Olympus 38DL +	**Company Name:**	Stronghold Insp.
Material:	Carbon Steel	**Thickness Gauge SSN:**	110215106	**Date:**	4/11/2018

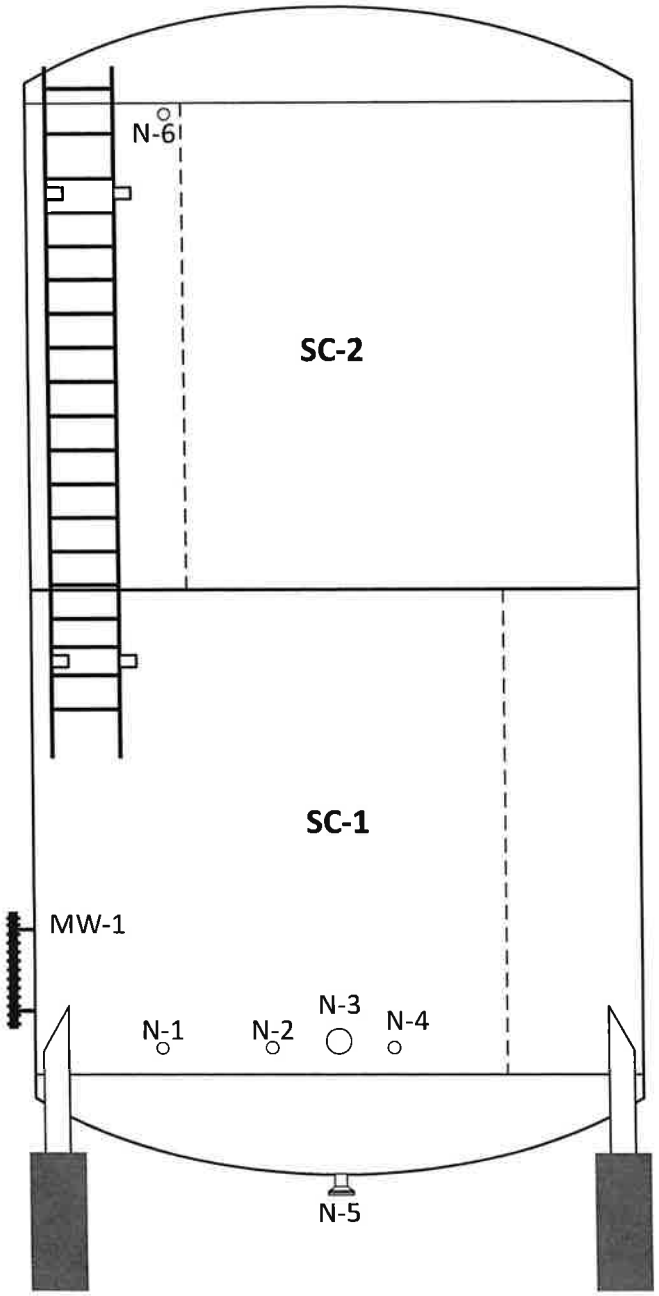
TML Number	Reading Location	Current Survey Thickness	NOTES	Previous Survey Thickness	Previous Survey Date	Nominal	Corrosion Allowance	Retirement Thickness	Retirement Thickness Date
SC-1	N	0.207				N/A			
	S	0.209				N/A			
	E	0.229				N/A			
	W	0.205				N/A			
SC-2	N	0.224				N/A			
	W	0.236				N/A			
Bottom Head	N	0.259				N/A			
	S	0.263				N/A			
	E	0.260				N/A			
	W	0.262				N/A			
Top Head	N	0.252				N/A			
	W	0.250				N/A			
MW-1	T	0.344				N/A			
24"	B	0.355				N/A			
	N	0.351				N/A			
	S	0.350				N/A			
	Cover	0312				N/A			
N-3	T	0.178				N/A			
3"	B	0.181				N/A			
	E	0.180				N/A			
	W	0.171				N/A			
N-5	N	0.185				N/A			
3"	S	0.162				N/A			
	E	0.160				N/A			
	W	0.162				N/A			
Legs	NE	0.273				N/A			
		0.274				N/A			
		0.274				N/A			
	NW	0.271				N/A			
		0.274				N/A			
		0.275				N/A			
	SE	0.273				N/A			
		0.274				N/A			
		0.274				N/A			
	SW	0.274				N/A			
		0.273				N/A			
		0.272				N/A			

Stronghold Inspection utilized the "echo to echo" function that is available on the Olympus thickness meter.
The echo to echo function is utilized to receive thickness measurements minus the painting thickness. This functions standard is set by Olympus calibration annually.

View South







NOZZLE SIZES

MW-1 = 24 "
N-1 = 3/4" Coupling
N-2 = 1" Coupling
N-3 = 3" Nozzle
N-4 = 1" Coupling
N-5 = 3" *BRASS* Nozzle
N-6 = 1" Coupling
MW-2 = 24"
N-7 = 4" Nozzle
N-8 = 2" Nozzle
N-9 = 10" Nozzle
N-10 = 2" Nozzle
N-11 = 1/2" Coupling
N-12 = 1" Coupling
N- 13= 3" Nozzle
N-14 = 3" Nozzle

NOTES

*SC = Shell Course
*N-5 Brass

STRONGHOLD INSPECTION

DRAWING NOT TO SCALE

STRONGHOLD INSPECTION
Memphis, TN.
(901) 334-0919

Title: F-2
Customer: Excel TSD
Material: Carbon Steel
Drawn By: J. Skinner
Date: 04-11-18

ATTACHMENT 9.2

P.E. ADEQUACY CERTIFICATION FOR TANK FARM SECONDARY CONTAINMENT SYSTEM

FISHER ARNOLD

ENGINEERING INTEGRATION

January 4, 2019

Mr. Stephen B. Neal
Managing Partner
Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, Tennessee 38109-2428

RE: Re-Assessment of Secondary Containment Adequacy
Tank Farm
Excel TSD of Tennessee, LLC
Memphis, Tennessee

Dear Mr. Neal:

I have read the attached report dated December 9, 2009, titled "Existing Secondary Containment Assessment, TANK FARM", signed and certified by Ron Powell, P.E. I have also reviewed my attached December 19, 2017 report to you titled "Update on Tank Farm Integrity", which described the November 2017 application of a chemical-resistant coating to the interior surfaces of the Tank Farm secondary containment system.

Please find attached calculations from our structural engineer, Mr. Jack Hughes, PE, that demonstrates that the tank farm is structurally adequate and adequately supported.

On March 21, 2018 per your request, I examined the current condition of the integrity of the concrete surfaces and I have analyzed the containment volumes described in the December 9, 2009 report.

Based on my March 21, 2018 inspection, I hereby re-affirm the certifications stated in my December 19, 2017 report. In addition, I certify that the volumes as presented in the December 9, 2009 report are still accurate and adequate for the storage of spills and rainfall.

If you have any questions or require additional information, please do not hesitate to contact me at this office.

9180 Crestywyn Hills Drive
Memphis, TN 38125

901.748.1811
Toll Free: 1.888.583.9724

www.fisherarnold.com

Sincerely,
FISHER & ARNOLD, INC.

Jeffrey W. Old, P.E.
Director – General Civil

Atttachment

Figure 9.2-1

TANK FARM SECONDARY CONTAINMENT PLAN VIEW DIAGRAM

Fisher Arnold

"SECONDARY CONTAINMENT
STRUCTURAL ASSESSMENT"

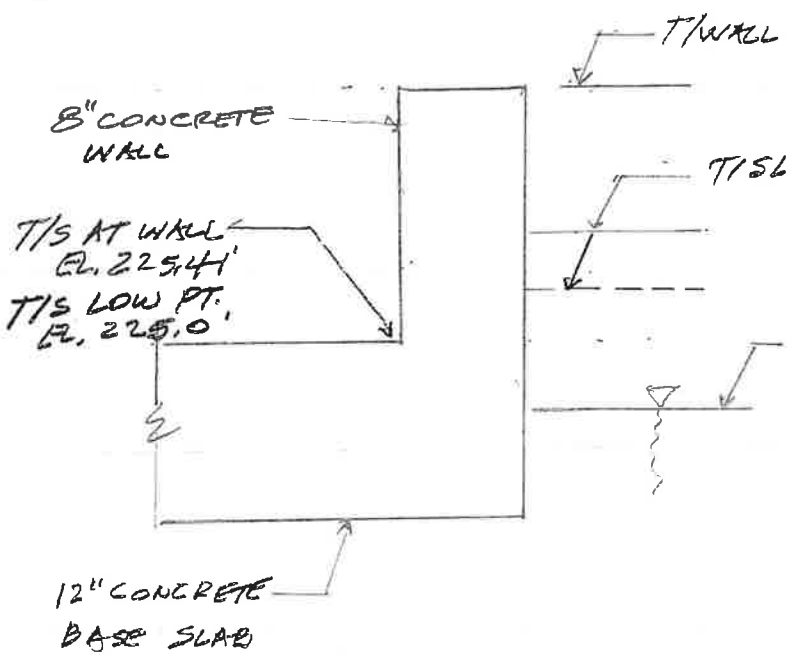
Project Number: G8858

Date: 01/03/2019

FISHER ARNOLD
888.583.9724 www.fisherarnold.com

1-3-19 G8858 1 OF 3
EXCEL TSD, INC. PART B PERMIT APPL. NOD
JACK HUGHES
EXCEL TSD OF TENNESSEE LLC
MR. STEPHEN B. NEAL, PRESIDENT
NOD ITEM 43
SECONDARY CONTAINMENT STRUCTURAL ASSESSMENT

NOD ITEM 43) RESPONSE REGARDS STRUCTURAL INTEGRITY.



NOTE: CONCRETE WALL & BASE SLAB POURED MONOLITHIC. ASSUME f'c = 3,000psi

TYPICAL TANK FARM
SECONDARY CONTAINMENT WALL SECTION

CHECK UPLIFT FROM HYDROSTATIC FORCES

MAX. SLAB UPLIFT PRESSURE = 1.0' × 62.5 pcf = 62.5 psf
UPLIFT RESISTANCE = 1.0 × 145PCF = 145 psf
F.S. AGAINST UPLIFT = 145/62.5 = 2.32 > 1.5 OK

CHECK FROST HEAVE

ACTUAL DEPTH = 10", MIN. DESIGN DEPTH = 12", WHICH EQUATES 12" SLAB, OK
REF. PAR. 1302.1.3, PAGE 326, 1991 STD. BLDG. CODE.

CHECK INTERNAL LIQUID PRESSURE

FH = 1.83' × 62.5 × 1.83'/2 = 105 PLF @ 0.61' ABV. TOP/SLAB.
Mw = 105 × 0.61' = 64 FT-LB STRESS = 64×12/128 = 6.0 psi, OK

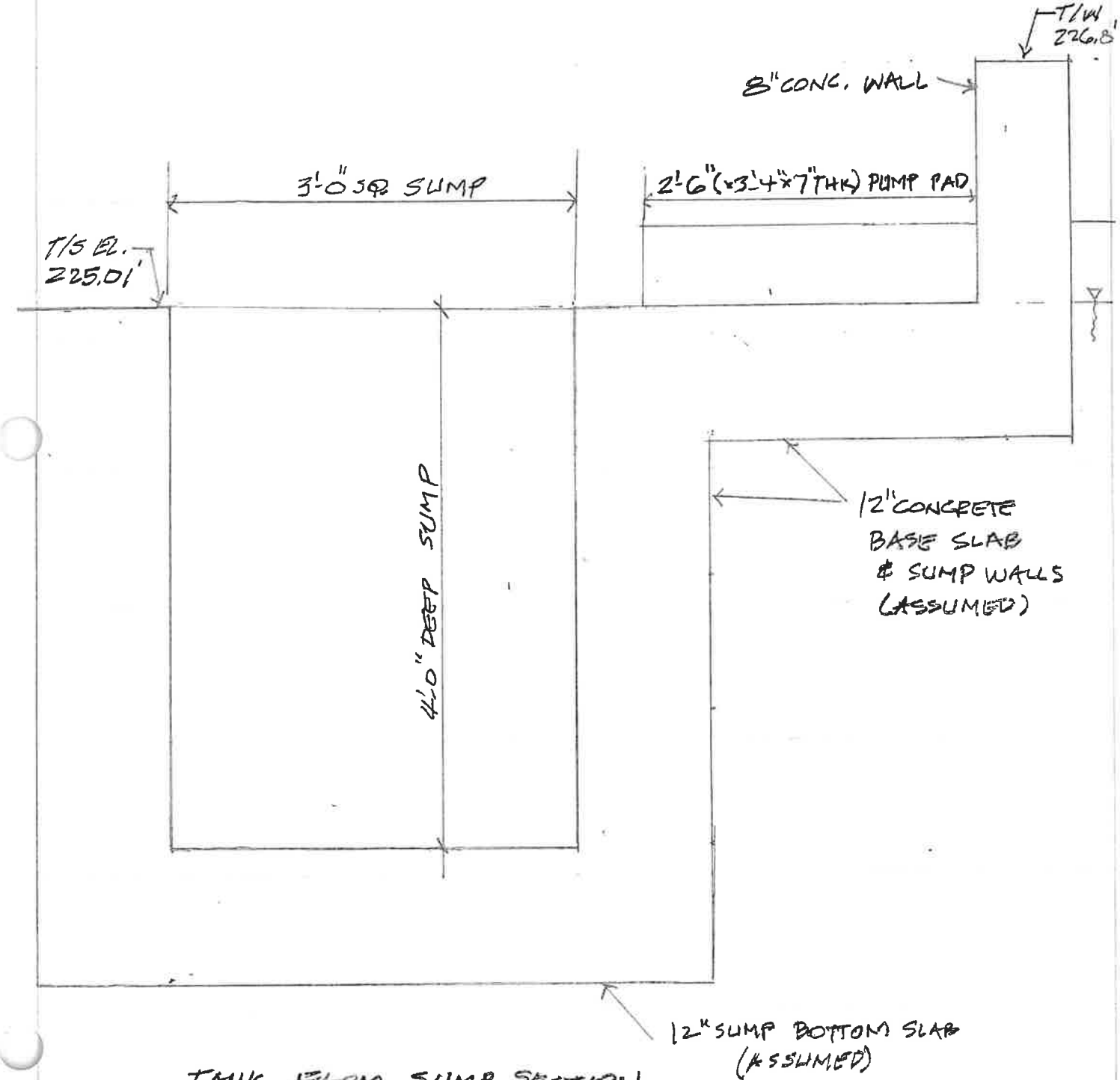
CHECK EXTERNAL PRESSURE; (300 PSF SURCHARGE + 150PCF) × 0.5
FH = 300 × .5 × .65' @ .32' + .150 × 0.5 × .65'/2 @ .22'
FH = 97.5 LB @ .32' + 16 LB @ 0.22'
Mw = 31.2 + 3.5 = 34.7 FT-LB STRESS = 34.7×12/128 = 3.2 psi, OK

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EXCEL TSD, INC. PART B PERMIT APPL.
JACK HUGHES
EXCEL TSD OF TENNESSEE, LLC
MR. STEPHEN B. NEAL, PRESIDENT
NOD ITEM 43
SECONDARY CONTAINMENT STRUCTURAL ASSESSMENT

NOD ITEM 43) RESPONSE REGARDS STRUCTURAL INTEGRITY



TANK FARM SUMP SECTION

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JACK HUGHES
EXCEL TSD OF TENNESSEE, LLC
MR. STEPHEN B NEAL, PRESIDENT
NOD ITEM 43
SECONDARY CONTAINMENT STRUCTURAL ASSESSMENT

NOD ITEM 43) RESPONSE REGARDS STRUCTURAL INTEGRITY

REF. TANK FARM SUMP SECTION ON SHT. 2 of 3

CHECK UPLIFT FROM HYDROSTATIC FORCES

MAX UPLIFT PRESSURE = 5' x 62.5 = 312.5 PSF.

UPLIFT RESISTANCE = 25 SQ FT x 145 PCF + 16'x4x145PCF
= 3625 + 9280 = 12,905 LBS.

UPLIFT = 25 SQ FT x 312.5 PSF = 7,812.5 LBS

F.S. = 12,905/7812.5 = 1.65, OK

CHECK INTERNAL LIQUID PRESSURE.

MAX P = 5.83' x 625 = 3644 PSF.

MAX M_W = 1/8 x 4'^{2} x 3644 = 729 FT-LB MAX. V_W = 1.5 x 3644#/144 = 4 1/2 OK

STRESS = 729 x 12/288 = 30.4 PSI, OK

CHECK EXTERNAL PRESSURE FROM BACKFILL & SURCHARGE

BACKFILL 120 PCF x 0.5 x 3' = 180PSF.
SLAB SURCHARGE 450 PCF x 0.5 x 4' = 900PSF
HYDROSTATIC 4' x 625 = 250PSF
1330 PSF

M_W = 1/8 x 4'^{2} x 1330 = 2660 FT-LB.

STRESS = 2660 x 12/288 = 110.8 PSI, OK

JOHN D. HUGHES
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 7983
STATE OF TENNESSEE

Existing Secondary Containment Assessment
TANK FARM

Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, TN 38109

Prepared By:

Fisher and Arnold Environmental
9180 Crestwyn Hills Drive
Memphis, TN 38125
888-583-9724

December 9, 2009

1.0 TANK FARM CONTAINMENT CALCULATIONS

Gross Containment Capacity (Inside Curbs/Walls)

- Containment Area = (30.67 feet x 40.67 feet) = 1,247 sf
- Curb Depth = 16.92 inches (1.41 feet)
- Minimum Gross Volume = 1,247 sf x 1.41 ft = 1,758.3 cubic feet = 13,152 gallons

Gross Tank Farm Containment = 13,152 Gallons

Volume Displacement for Supports of Small Tanks P1-5

- Small Support Length = 16 inches = 1.33 feet
- Small Support Width = 16 inches = 1.33 feet
- Section for Small Support = Length x Width = 1.33 ft x 1.33 ft = 1.77 sf
- Height @ Curb = 16.92 inches = 1.41 feet
- Displaced Volume for One (1) Small Support
- Volume = Cross Area x Curb Height = 1.77 sq. ft. x 1.41 ft = 2.5 cf = 18.7 gallons
- One (1) Small Tank Support = 18.7 gallons
- There are Four (4) Supports per Tank and five (5) tanks = 20 Small Supports
- Total Displacement for the Small Supports = 5 tanks x 4 supports x 18.7 gallons/support = 374 gallons

Small Tank P1-5 Supports Displacement = 374 Gallons

Volume Displacement for Supports of Tanks F1 & F2

- F1 & F2 Support Length = 24 inches = 2 feet
- F1 & F2 Support Width = 24 inches = 2 feet
- Cross Area for F1 & F2 Support = Length x Width = 2 ft x 2 ft = 4 square feet
- Height @ Curb = 16.92 inches = 1.41 feet
- Displaced Volume for One (1) F1 & F2 Support
- Volume = Cross Area x Curb Height = 4 sq. ft. x 1.41 ft = 5.64 cf
- Gallons = 5.64 cf x 7.48 gallons/cubic feet = 42.2 Gallons
- There are four (4) Supports per Tank and two (2) tanks = 8 Supports
- Total Displacement for the F1 & F2 Supports
- 8 supports x 42.2 gallons/support = 337.6 gallons

F1 & F2 Tank Supports Displacement = 337.6 Gallons

Volume Displacements for Lower Supports of Tanks T1 & T2

- Large Support Length = 36 inches = 3 feet
- Large Support Width = 36 inches = 3 feet
- Cross Area for T1 & T2 Base Support = Length x Width = 3 ft x 3 ft = 9 sq ft Height @ Height of Base = 8 inches = 0.67 feet
- Displaced Volume for T1 & T2 Base Support
- Volume = Base Cross Area x Height = 9 sq. ft. x 0.67ft = 6 cubic feet
- Gallons = 6 cubic feet x 7.48 gallons/cubic feet = 45 Gallons
- T1 & T2 Lower Base Support = 45 Gallons
- There are four (4) Supports per Tank and two (2) tanks = 8 Base Supports
- Total Displacement for the Large Supports
- 2 tanks x 4 supports x 45 gallons/support = 360 gallons Total

T1 & T2 Base Displacement = 360 Gallons

Volume Displacements for Upper Supports of Tanks T1 & T2

- Upper Support Length = 24 inches = 2 ft
- Upper Width = 24 inches = 2 ft
- Cross Area for Upper Support = Length x Width = 2 ft x 2 ft = 4 sf
- Additional Above Lower Support 16.92 – 8 = 8.92 inches = 0.743 feet
- Displaced Volume for One (1) Upper Support
- Volume = Cross Area x Curb Height = 4 sf. x 0.743 ft = 2.97 cf
- Gallons = 2.97 cf x 7.48 gallons/cf = 22.2 gallons
- There are four (4) Supports per Tank and two (2) tanks = 8 Upper Supports
- Total Displacement for the Upper Supports
- 8 supports x 22.2 gallons/support = 177.6 gallons Total

T1 & T2 Upper Support Displacement = 177.6 Gallons

Total Volume Displacement from Tank Supports

P1-5 Tank Support Volumes + F1 & F2 Support Volumes + T1 & T2 Base Support Volumes + T1 & T2 Upper Support Volumes = 374 gal + 337.6 gal + 360 gal + 177.6 gal = 1,249.2 Gallons

All Tanks Supports Volumes Displacement = 1,249.2 Gallons

Volume Additions/Subtractions from Other Structures Inside Containment

- Stormwater Sump (3 x 3 x 4) Adds Volume of **270 Gallons**
- Pump Support (3.33' x 2.5' x 0.58') Displaces **36 Gallons**
- NW Corner Slab (8' x 4.5' x 0.33') Displaces **90 Gallons**
- SW Corner Slab (3' x 2.5' x 0.25') Displaces **14 Gallons**

NetVolume from Other Structures = +130 Gallons

Total Net Containment Capacity

Total Net Containment Capacity = Gross Tank Farm Containment – Tank Support Volumes – Other Structures = 13,152 gallons – 1,249.2 gallons + 130 gallons = 12,032.8 gallons

Total Net Containment Capacity = 12,032.8 Gallons

Volume of 24 Hour, 25 year Rainfall Event

Maximum Rainfall for A 24-Hour 25-Year Rainfall Event = 6.5 inches or 0.54 Feet (Per Hydrology for Small Watersheds Technical Release No. 55)

- Rainfall Volume = Rainfall Height x Containment Area
- Rainfall Volume = 0.54 feet x 1,247 square feet = 673.4 cubic feet = 5,037 gallons

Volume of 24 Hour, 25 year Rainfall Event = 5,037 Gallons

EXCESS CONTAINMENT CAPACITY

Excess Containment Capacity = Total Net Containment Capacity – Volume of 24 Hour, 25 year Rainfall Event = 12,032.8 gallons – 5,037 gallons = 6,995.8 gallons

EXCESS CONTAINMENT CAPACITY = 6,995.8 Gallons

2.0 ASSESSMENT OF SECONDARY CONTAINMENT SURFACE INTEGRITY

I have, or another qualified Fisher & Arnold Environmental employee under my direct supervision has, recently inspected the secondary containment surfaces (floors, curbs/walls, and sumps) of the Hazardous Waste Tank Farm at the Excel TSD of Tennessee facility and found those surfaces to be free of unsealed cracks or gaps and sufficiently impervious to contain leaks, spills and accumulated precipitation until the collected material is detected and removed.

Certification:
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Signed: _____ Date: 12/10/09

Ronald A. Powell, P.E.
General Civil Department Head

FISHER ARNOLD

ENGINEERING INTEGRATION

December 19, 2017

Mr. Stephen B. Neal
Managing Partner
Excel TSD of Tennessee, LLC
552 Rivergate Road
Memphis, Tennessee 38109-2428

RE: Update on Tank Farm Integrity
Excel TSD of Tennessee, LLC
Memphis, Tennessee

Dear Mr. Neal:

Per your request, I have observed the preparation work and application of the coating system for the Tank Farm at your above referenced facility. The system includes four distinct parts, or layers (product data sheets are attached in Appendix A):

1) ICO Gel by Milamar Coatings – a 100% solids epoxy patching material for spot-filling seams, holes, and voids applied as needed to the Tank Farm Floor and interior walls.
2) ICO Floor SL by Milamar Coatings – a three-part 100% solids epoxy flooring resurfacer applied as the first complete layer to the Tank Farm Floor.
3) ICO Guard Coating by Milamar Coatings – a two-part, 100% solids epoxy coating for protecting concrete surfaces in corrosive environments was added as a second layer to the Tank Farm Floor and the first complete layer on the interior walls. This layer adds a level of impact and shock resistance. For the floor, a fine sand was also added to this layer to create an anti-slip texture.
4) PM500 by Milamar Coatings – a chemical-resistant urethane for further chemical resistance and UV protection added as the final layer to the Tank Farm floor and interior walls.

My on-site observations occurred on the days listed below. Photos of each day are attached to this letter as Appendix B.

a) November 13, 2017: Observation of the fully prepared surface. The surfaces of the Tank Farm were sand blasted and cleaned prior to application of the coating system.
b) November 14, 2017: Observation of materials delivered to the site.
c) November 16, 2017: Observation of the construction crew applying the coating system.

9180 Crestywyn Hills Drive
Memphis, TN 38125

901.748.1811
Toll Free: 1.888.583.9724

www.fisherarnold.com

d) November 21, 2017: Construction crew is applying the final layer, the urethane coating.

I spoke with the material supplier, Josh Thompson of Milamar Coatings, and with the contractor, Sonny Tomaszewski of C & I Flooring, Inc., and satisfied myself with their experience and ability to perform the work.

Based on my monitoring and evaluation of the recent surface coating work at the Tank Farm, my previous evaluations and certifications of the Tank Farm secondary containment system, my evaluation of the Tank Farm secondary containment system evaluations and certifications previously performed by other Fisher & Arnold professional engineers, and my understanding of Excel's operating practices, I hereby certify that the Tank Farm's external liner secondary containment system:

1) Is constructed of or lined with materials (concrete with a chemical-resistant surface coating) that are compatible with the wastes to be placed in Tanks F-1 and F-2 and that have sufficient strength and thickness to prevent failure owing to pressure gradients (including static head and external hydrological forces), physical contact with the waste to which it is exposed, climatic conditions, and the stress of daily operation (including stresses from nearby vehicular traffic);
2) Is placed on a foundation or base capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift;
3) Is provided with a leak detection system (daily visual observation) that is designed and operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours;
4) Is sloped and operated to drain and remove liquids resulting from leaks, spills, or precipitation within 24 hours;
5) Is designed and installed to completely surround Tanks F-1 and F-2 and their ancillary equipment, to cover all surrounding earth likely to come into contact with the waste if the waste is released from the tanks, and to prevent surface water run-on from adjacent areas;
6) Is designed to contain 100 percent of the capacity of the largest tank within its boundary plus the precipitation from a 25-year, 24-hour rainfall event;
7) Is free of unsealed cracks or gaps; and
8) Has its internal concrete surfaces covered with a corrosion-resistant impermeable coating.

I am therefore confident that the Tank Farm secondary containment system is (a) designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during the use of the tank systems, and (b) capable of detecting and collecting releases and accumulated liquids until the collected material is removed.

If you have any questions, please feel free to contact me.

Sincerely,
FISHER & ARNOLD, INC.

Jeffrey W. Old, P.E.
Civil / Sanitary Department Head

JWO/jwo

Appendix A – Product Data Sheets

ilamar Coatings

ICO-GEL

Product Data Sheet

Product Description

ICO-GEL™ is a three part, 100% solids epoxy patching material primarily designed for horizontal, vertical and overhead applications. Its smooth, creamy consistency enables the user to skim coat surfaces that are irregular or pockmarked. **ICO-GEL™** can fill holes up to 1" thick on vertical or overhead surfaces without shrinkage or sagging. For greater thickness, our **ICO Gel XT ™** product can be substituted.

ICO Gel has virtually no odor and adheres well to damp as well as dry concrete and masonry surfaces. Unlike cementitious or acrylic-based patch material it can be recoated in as little as six hours after application at room temperature. For faster cure our **ICO Gel MC** and **ICO Gel FC** are available; for applications temperatures below 50°F use **ICO Gel Cold Cure.**

Product Application

ICO-GEL™ is commonly used to fill bug holes, crevices and cracks on vertical walls as well as floors, vertical stair repairs and concrete columns. **ICO-GEL™** also serves as a trowelled-on skim coat underneath our **ICO Glaze** wall coating system where an extra smooth surface is required. It can also be used to repair badly eroded manholes, sumps and sewers. **ICO Gel** is particularly suited for vertical and overhead repairs where constant dampness is present, such as bridges and dams.

Chemical Resistance

ICO-GEL™ is almost always coated with one of **Milamar Coatings'** more chemically resistant coatings. A complete list is available in the **Milamar Coatings Chemical Resistant Chart or** contact **Milamar Technical Assistance.**

Physical Properties

Tensile Strength (ASTM C-307):	1810 psi	**Hardness, Shore D (D-2240):**	80
Tensile Elongation, unfilled (D-638):	10%	**Bond Strength to Quarry Tile: >1000 psi**	>1000 psi
Compression Strength (D-695):	6170 psi	**Water Absorption:**	0.3% in 24 hours

Physical Characteristics

Curing Times @		32°F	40°F	50°F	77°F	90°F
ICO Gel	Pot Life	---	---	45 min.	40 min.	15 min.
	Working Time	---	---	65 min.	50 min.	40 min.
	Hard, (for sanding)	---	---	72 hrs.	18 hrs.	10 hrs.
ICO Gel MC	Pot Life	---	---	45 min.	30 min.	10 min.
	Working Time	---	---	50 min.	40 min.	35 min.
	Hard	---	---	48 hrs.	10 hrs.	7 hrs.
ICO Gel FC	Pot Life	---	---	10 min.	8 min.	5 min.
	Working Time	---	---	40 min.	35 min.	25 min.
	Hard	---	---	20 hrs.	8 hrs.	4 hrs.
ICO Gel Cold Cure	Pot Life	15 min.	15 min.	14 min.	---	---
	Working Time	45 min.	40 min.	30 min.	---	---
	Hard	24 hrs.	20 hrs.	18 hrs.	---	---

Density, lbs. /gal.	
Part A:	9.7
Part B:	8.0
A&B Mixed:	9.3
Viscosity @ 77°F, cps	
Part A:	38000
Part B:	5500
A&B Mixed:	4400

ICO Gel		
Mixing Ratios	**By Volume:**	**By Weight:**
Part A : Part B	3.5:1	4.3:1
Aggregate : Liquid	0.6:1	1.5:1
ICO Gel MC		
Mixing Ratios	**By Volume:**	**By Weight:**
Part A : Part B	3.5:1	4.3:1
Aggregate : Liquid	0.6:1	1.5:1
ICO Gel FC		
Mixing Ratios	**By Volume:**	**By Weight:**
Part A : Part B	4.86:1	5.77:1
Aggregate : Liquid	0.6:1	1.5:1

Shelf Life 1 year at 77°F in unopened containers
Maximum Hardness achieved after 7 days **@77°F.**

Color Availability
Standard color: Neutral, but can be ordered in white, concrete gray and beige.

Packaging and Coverage Rates
3 Gal. Kit : 40 SF at 1/8" thick
Bulk Pack: 400 SF at 1/8" thick

Installation
Please refer to our Application Specs for detailed instructions. For application as part of our ICO Glaze® ES System, refer to the Application Spec Sheet "ICO Glaze® ES Wall Coating System". Particular care must be taken to follow those instructions precisely to assure proper installation.

1. All surfaces must be cleaned by acid etching, grinding, rough sanding or needle blasting. All loose or flaking coatings and other materials must be removed. All oils, fats, greases or chemically contaminated concrete must be removed.
2. No priming is necessary, as **ICO-GEL™** is a self-priming material.
3. Mix the contents of the Part A and Part B containers in a clean, plastic bucket with a slow speed paddle mixer or electric drill for about one minute. Then add in **ICO-GEL™ Flour** slowly for another minute or so, until the mixture is uniform in color and consistency. Only mix amount of material that can be applied within stated pot life
4. Use a clean margin trowel or spatula to apply the **ICO-GEL™**. The blade should be large enough to span the depression; use a 1-1/2" blade for filling cracks.
5. Press the **ICO-GEL™** firmly into place in a wiping motion. Use enough material to overfill the opening.
6. Under normal conditions, **ICO-GEL™** can be applied up to 1" depths without sagging. For greater thickness, use **ICO Gel XT** (up to 3" per pass).

Failure to follow the above instructions, unless expressly authorized by an Milamar Technical Service Representative, will void
our material warranty.

Precautions
1. Do not apply greater than 1" thick at 70°F; for greater thicknesses use Gel XT
2. Do not apply ICO Gel FC above 70°F
3. Do not apply ICO Gel Cold Cure above 50°F
4. Recoat windows without sanding at 70°F: Gel – 18 hours; Gel MC – 10 hours; Gel FC – 6 to 8 hours

Product Specification
The specified area shall receive an application of **ICO-GEL™** as manufactured by Milamar Coatings of Oklahoma City, Oklahoma. The material shall be installed by precisely following the manufacturer's published recommendations pertaining to surface preparation, mixing, and application. The material shall be a low odor, 100% solids, and three part epoxy system with bond strength exceeding 1000 psi on quarry tiles. It should be able to be applied on vertical surfaces up to 1" thick at 70°F in a single step application without sagging. The system must adhere to damp, as well as dry concrete. It shall be a resin-rich mixture, with an aggregate: liquid ratio not to exceed 1.5:1 by weight. The compressive strength when tested in accordance with ASTM C-579 shall not exceed 6200 psi and the tensile strength shall be 1810 psi when tested under ASTM C-307.

The data statements and recommendations set forth in this product information sheet are based on testing, research and other development work which has been carefully conducted by us, and we believe such data. Statements and recommendations will serve as reliable guidelines. However, this product is subject to numerable uses under varying conditions over which we have no control, and accordingly we do NOT warrant that this product is suitable for any particular use. Users are advised to test the product in advance to make certain it is suitable for their particular production conditions and particular use or uses.

LIMITED WARRANTY
Milamar Coatings products are manufactured to be free of defects in material and workmanship in meeting the properties specified on its individual Product Data Sheets. Users and installers of Milamar Coatings products are solely responsible for determining the suitability of the products for specific product applications. Milamar Coatings makes no Warranty or Guarantee, express or implied, including warranties of fitness, design compatibility or merchantability, for any particular use and shall have no responsibility or liability, including direct, indirect or consequential damages, due to injury, delay or third party claims for installation or repair. Likewise, Milamar Coatings assumes no liability of any nature for products that are adjusted in the field or that do not utilize all specified Milamar Coatings components. Should any Milamar Coatings product be proved to be defective within one year from the date of shipment, Milamar Coatings will, at its sole discretion, replace the material; issue a credit to the customer's account; or provide a cash refund for the initial, paid purchase price of the material. Potential claims regarding product quality must be received in writing by Milamar Coatings within 30 days of the discovery of such potential defect. This Warranty is exclusive of all other warranties, expressed or implied, and may only be adjusted in writing, signed by an officer of Milamar Coatings.

Milamar Coatings
311 NW 122nd St., Suite 100
Oklahoma City, OK 73114
405.755.8448
www.milamar.com

ICO Floor SL

Product Data Sheet

Product Description

ICO-Floor SL is a three part, 100% solids, low odor epoxy flooring resurfacer. Normally applied between 1/16" and 1/8" thick in a single step self leveling application, ICO-Floor SL quickly and economically restores a pitted, worn concrete floor to a smooth, glossy, easy-to-clean surface. It possesses good wear resistance and will resist chemical attack from most oils, greases, lubricants, caustics and mild acids. With its more resilient formulation, as indicated by a tensile elongation of 12%, ICO-Floor SL can better withstand vibration and impact, compared to more brittle, conventional floor resurfacers.

ICO-Floor SL dries to a smooth, high gloss finish. For anti-slip textures, fine silica sand or aluminum oxide can be broadcast into a top coat of ICO-Floor Coating. For a more decorative look, vinyl flakes can be added, followed by an application of a clear top coat of ICO Sealer or ICO Ure Guard 80. A faster cure version, ICO-Floor SL FC, is also available for faster turnaround time.

Typical Application

ICO-Floor SL is an ideal floor resurfacer for relatively dry areas such as warehouses, food distribution centers, airplane hangars, retail stores, schools, hospitals and general industrial use. Unlike a thin film coating that will "mirror" minor defects in the substrate, ICO-Floor SL, applied at a minimum of 1/16" thickness, will hide such imperfections, providing a "showroom quality" floor. By "seeding" the self-leveling floor to excess with silica sand, then top coating with ICO-Floor Coating, a high build, longer lasting, slip resistant floor can be delivered at relatively inexpensive costs.

Chemical Resistance

A complete list of chemical resistances is available in the Milamar Coatings Chemical Resistant Chart or contact Milamar Technical Service for specific recommendations.

Physical Properties

Tensile Strength (ASTM C-307):	1920 psi	**Coefficient of Thermal Expansion (D-696):**	$1.7x10^{-5}$ per °F
Tensile Elongation (C-307):	12%	**Gardner Impact:**	120 in lbs.
Flexural Strength (C-580):	1760 psi	**Water Absorption (D-570):**	0.2% in 24 hours
Compression Strength (C-579):	6170 psi	**Taber Abrasion CS17, 1000 cycles at 1kg. (D-1044):**	106 mg loss
Hardness, Shore D (D-2240):	73	**60° Gloss:**	93
Bond Strength to Quarry Tile:	>1000 psi		
Flammability:	Self Extinguishing		

Physical Characteristics

Product	Mixing Ratios	By Volume	By Weight
ICO Floor SL	Part A:Part B	2.53:1	2.96:1
	Aggregate:Liquid	1:1	1.5:1
ICO Floor SL FC	Part A:Part B	2.93:1	3.48:1
	Aggregate:Liquid	1:1	1.5:1

Viscosity @ 77F, CPS		Density, lbs./gal	
Part A:	750	Part A:	10.03
Part B:	420	Part B:	8.55
A&B Mixed:	700	A&B Mixed:	9.66

Product	Curing Times	50°F	77°F	90°F
ICO Floor SL	Pot Life	50 min	40 min	20 min
	Work Time	40 min	30 min	20 min
	Hard, Foot Traffic	60 hrs.	26 hrs.	14 hrs.
	Hard, Truck Traffic	70 hrs.	34 hrs.	20 hrs.

ICO Floor SL FC	**Pot Life**	20 min	15 min	10 min
	Work Time	15 min	12 min	10 min
	Hard, Foot Traffic	30 hrs.	18 hrs.	8 hrs.
	Hard, Truck Traffic	40 hrs.	24 hrs.	12 hrs.
Maximum Hardness achieved after 7 days @ 77°F				

Color Availability	**Packaging and Coverage Rates**	
Standard Colors: White, Gray, dark Gray, Beige, Yellow, Red, Green, Blue, Brown and Black	4 Gallon Kit:	50 SF at 1/8" Depth 100 SF at 1/16" depth
Shelf Life: 1 year at 60°F-80°F in unopened containers.		

Installation

Please refer to our Application Specs for detailed instructions. Particular care must be taken to follow those instructions precisely to assure proper installation.

1. New concrete should be allowed to cure a minimum of 28 days and/or be checked with a rubber mat or plastic sheet to insure adequate curing time has occurred.
2. All surfaces to be covered should be power washed, shot blasted, acid etched, scarified or sanded to present a clean, sound substrate to which to bond to. The prepared surface should have a ph of 7.
3. Cracks 1/8" wide or greater, pour joints and construction joints must be cleaned and filled with ICO-Gel. Patch all holes over 1/2" deep with ICO-Patch.
4. The three ingredients should be mixed in the prescribed ratios, using a low speed jiffy-style mixer (maximum 750 rpm), until uniform in color and consistency.
5. Do not add solvent to the mix.
6. Apply ICO-Floor SL with a notched rubber squeegee or steel trowel. Spike roll with porcupine roller to improve air release.
7. For an anti-slip surface, allow ICO-Floor SL to dry, apply a top coat of ICO- Floor Coating and broadcast in silica sand.

NOTE: Failure to follow the above instructions, unless expressly authorized by a Milamar Technical Service Representative, will void our material warranty.

Precautions

1. Only apply over a tack free primer to help prevent out gassing.
2. Do not apply either regular or fast cure versions below 50°F.
3. Do not apply less than 60 mils thick.
4. Do not apply on floor sloped > 1/8" per foot.
5. Do not apply fast cure version >70°F.
6. Do not apply in severe thermal shock environments.

Product Specification

The specified area shall receive an application of ICO-Floor SL™as manufactured by Milamar Coatings of Oklahoma City, Oklahoma. The system shall be installed by precisely following the manufacturer's published recommendations pertaining to surface preparation, mixing, and application. The material shall be a low odor, three part, solvent-free 100% solids epoxy system with moderate resilience to resist impact and vibration. It should be applied by notched trowel or squeegee in one application without needing a top coat. It shall be a resin-rich mix ratio of 1:1, **ICO-Fill™** aggregate to resin and hardener. It shall have an elongation of 12% when tested using ASTM C-307 and Gardner Impact of 120 inch pounds. The compressive strength when tested in accordance with ASTM C-579 shall not exceed 6200psi and the hardness shall not exceed 73 (Shore D). It shall have excellent adhesion to wood, metal, tile, brick as well as concrete. The system shall be unaffected by oils and greases and have high chemical resistance against acids such as 10% nitric, 30% phosphoric, citric, and 50% sulfuric, as well as resist such caustics as 50% sodium hydroxide and 26% ammonium hydroxide.

The data statements and recommendations set forth in this product information sheet are based on testing, research and other development work which has been carefully conducted by us, and we believe such data. Statements and recommendations will serve as reliable guidelines. However, this product is subject to numerable uses under varying conditions over which we have no control, and accordingly we do NOT warrant that this product is suitable for any particular use. Users are advised to test the product in advance to make certain it is suitable for their particular production conditions and particular use or uses.

LIMITED WARRANTY

Milamar Coatings products are manufactured to be free of defects in material and workmanship in meeting the properties specified on its individual Product Data Sheets. Users and installers of Milamar Coatings products are solely responsible for determining the suitability of the products for specific product applications. Milamar Coatings makes no Warranty or Guarantee, express or implied, including warranties of fitness, design compatibility or

merchantability, for any particular use and shall have no responsibility or liability, including direct, indirect or consequential damages, due to injury, delay or third party claims for installation or repair. Likewise, Milamar Coatings assumes no liability of any nature for products that are adjusted in the field or that do not utilize all specified Milamar Coatings components. Should any Milamar Coatings product be proved to be defective within one year from the date of shipment, Milamar Coatings will, at its sole discretion, either replace the material; issue a credit to the customer's account; or provide a cash refund for the initial, paid purchase price of the material. Potential claims regarding product quality must be received in writing by Milamar Coatings within 30 days of the discovery of such potential defect. This Warranty is exclusive of all other warranties, expressed or implied, and may only be adjusted in writing, signed by an officer of Milamar Coatings.

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Milamar Coatings, L.L.C.
A CASS Polymers Company

ICO Guard Coating

Product Data Sheet

Product Description

ICO Guard Coating is a two part, 100% solids, epoxy coating for protecting concrete surfaces in corrosive environments. It is a USDA approved material, with zero VOC's, no odor, and excellent color stability. ICO Guard Coating is a flexibilized coating that has a tensile elongation of 9% allowing it to withstand impact and thermal shock far better than conventional, more brittle epoxy coatings. ICO Guard Coating has excellent adhesion to damp and dry substrates.

ICO Guard Coating can be ordered in a fast cure (FC) version for faster turnaround times and for applications with temperatures down to 40°F, while our ICO Guard Coating Extra Fast Cure (XFC) can cure at temperatures down to 32°F.

Note that both of the fast cure versions, if applied below 50°F, are prone to whitening under hot water wash-downs, so they should be top coated with our more color stable ICO Ure Guard 100, polyurethane coating.

Product Application

ICO Guard Coating is the top coat chosen in conjunction with ICO Guard Slurry resin system. The top coat of ICO Guard Coating is then seeded to refusal with aggregate to build up to the desired ¼" thickness. ICO Guard Coating can also be used as an optional top coat over ICO Guard 51 trowelled material.

Chemical Resistance

ICO Guard Coating has excellent chemical resistance to a wide variety of inorganic acids, holding up to 10% acetic acid, concentrated citric acid, 37% hydrochloric acid, 80% lactic acid, 85% phosphoric acid and 80% sulfuric acid, as well as most CIP cleaners. Please contact us at **1-800-459-7659** for a complete list.

Physical Properties

Tensile Strength (ASTM D-638):	1560 psi	**Gardner Impact Strength (D-2794):**	80 in lbs.
Tensile Elongation (D-638):	9%	**Bond Strength to Quarry Tile:**	>1000 psi
Flexural Strength (D-790):	4140 psi	**Water Absorption (D-570):**	0.2% in 24 hrs.
Hardness, Shore D (D-2240):	80	**Taber Abrasion (D-1044) <CS17, 1000g, 1000 cycles>:**	105 mg. loss
60° Gloss	100		

Physical Characteristics

Density, lbs./gal	
Part A:	15.4
Part B:	8.6
Mixed:	13

Viscosity @ 77°F, cps

Part A:	5500
Part B:	300
Mixed:	2000

Mixing Ratios

	By Volume	By Weight
Part A : Part B:	2.5:1	4.5:1
Part A : Part B, FC:	3.8:1	7:1
Part A : Part B, XFC:	3.3:1	5.6:1

Published technical data, to the best of our knowledge are correct, and are subject to change without notice. You may contact your Milamar representative for current technical data.

Curing Times

Curing Times @		32°F	40°F	50°F	70°F	90°F
ICO Guard Coating	Pot Life:	---	---	60 min.	50 min.	25 min.
	Work Time:	---	---	100 min.	75 min.	50 min.
	Tack Free:	---	---	28 hrs.	16 hrs.	7 hrs.
	Hard, Foot:	---	---	64 hrs.	30 hrs.	12 hrs.
	Hard, Truck:	---	---	72 hrs.	36 hrs.	16 hrs.
ICO Guard Coating FC	Pot Life:	---	20 min.	20 min.	15 min.	---
	Work Time:	---	35 min.	25 min.	20 min.	---
	Tack Free:	---	16 hrs.	10 hrs.	4 hrs.	---
	Hard, Foot:	---	26 hrs.	20 hrs.	8 hrs.	---
	Hard, Truck:	---	32 hrs.	26 hrs.	12 hrs.	---
ICO Guard Coating XFC	Pot Life:	20 min.	15 min.	15 min.	---	---
	Work Time:	18 min.	15 min.	8 min.	---	---
	Tack Free:	16 hrs.	10 hrs.	5 hrs.	---	---
	Hard, Foot:	30 hrs.	21 hrs.	10 hrs.	---	---
	Hard, Truck:	36 hrs.	25 hrs.	17 hrs.	---	---

Installation

Please refer to our application instruction sheet for more detailed information.

1. New concrete should be allowed to cure for 28 days; however, if shorter times are necessary, a plastic sheet and calcium chloride test should be taken. Call **1-800-459-7659** when results are obtained.
2. Floor must be abraded to a minimum 60 to 80 grit size depending on coating thickness and be free of all oils, grease and other impurities. When recoating over old surfaces, all gloss should be removed
3. Primer is not necessary; however, if floor is particularly porous, our low viscosity primer, ICO Primer LV or LVFC can be applied and allowed to dry tack free before applying first coat.
4. The two ingredients should be mixed in the prescribed ratios, using a low speed (<750rpm) jiffy-style mixer. Mix Part A first in its own bucket for about 30 seconds, then add Part B hardener and mix for at least 30-60 seconds at low speeds until uniform in color.
5. Immediately after mixing, pour the contents onto the floor in a ribbon pattern, spread with a notched rubber squeegee to the desired coverage rate, e.g. 160 sq. ft./gal for 10 mils, then back-roll with a ¼", adhesive type roller. Do not over-roll as this can result in bubble formation.
6. While still wet, broadcast suitable grit into the first coat. This may be back-rolled for obtaining a more uniform texture. Allow to dry tack free.
7. Apply second coat to lock in aggregate and obtain a minimum 20 mil thickness.
   Note: If only one thick coat can be applied (>15mils), a pin roller should be used to facilitate air release.

Note: Failure to follow the above instructions, unless expressly authorized by a Milamar Technical Service Representative, will void our material warranty.

Precautions

1. Recoat windows without sanding: Regular Cure at 70°F: 36 hours; Fast Cure at 70°F: 12 hours; XFC at 50°F: 18 hours.
2. Do not use Guard Coating below 50°F.
3. Do not use Guard Coating FC below 40°F or above 70°F.
4. Do not use Guard Coating XFC below 32°F or above 50°F.
5. If applied below 50°F, Guard Coating FC and XFC will water stain.

Product Specifications

The specified area shall receive an application of ICO Guard Coating™ as manufactured by Milamar Coatings L.L.C., of Oklahoma City, Oklahoma. The system shall be installed by precisely following the manufacturer's published recommendations pertaining to surface preparation, mixing and application. The material shall be a low odor, solvent-free, 100% solids, high gloss flexible epoxy system with good resilience to resist thermal and mechanical shock. The system must adhere to damp as well as dry concrete, wood, metal, tile, terrazzo, and sound existing epoxy and urethane coatings. It shall have an elongation of 9% in the unfilled form when tested using ASTM D-638. The film hardness shall be a Shore D of 80. The system shall be unaffected by oils, greases and resist such chemicals as 36% hydrochloric acid, 20% nitric acid, 50% sulfuric acid and 50% sodium hydroxide.

The data statements and recommendations set forth in this product information sheet are based on testing, research and other development work which has been

carefully conducted by us, and we believe such data. Statements and recommendations will serve as reliable guidelines. However, this product is subject to numerable uses under varying conditions over which we have no control, and accordingly we do NOT warrant that this product is suitable for any particular use. Users are advised to test the product in advance to make certain it is suitable for their particular production conditions and particular use or uses.

LIMITED WARRANTY

Milamar Coatings products are manufactured to be free of defects in material and workmanship in meeting the properties specified on its individual Product Data Sheets. Users and installers of Milamar Coatings products are solely responsible for determining the suitability of the products for specific product applications. Milamar Coatings makes no Warranty or Guarantee, express or implied, including warranties of fitness, design compatibility or merchantability, for any particular use and shall have no responsibility or liability, including direct, indirect or consequential damages, due to injury, delay or third party claims for installation or repair. Likewise, Milamar Coatings assumes no liability of any nature for products that are adjusted in the field or that do not utilize all specified Milamar Coatings components. Should any Milamar Coatings product be proved to be defective within one year from the date of shipment, Milamar Coatings will, at its sole discretion, either replace the material; issue a credit to the customer's account; or provide a cash refund for the initial, paid purchase price of the material. Potential claims regarding product quality must be received in writing by Milamar Coatings within 30 days of the discovery of such potential defect. This Warranty is exclusive of all other warranties, expressed or implied, and may only be adjusted in writing, signed by an officer of Milamar Coatings, L.L.C.

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PM500 Chemical Resistant Urethane

Product Data Sheet

PRODUCT DESCRIPTION

Milamar PM500 Chemical Resistant Urethane Coating is an aliphatic, high build urethane, designed to be used where chemical, impact and abrasion resistance is paramount. It is virtually impervious to ultra violet attack and most common chemicals, including skydrol and brake fluid. The 500 Series urethane maintains its gloss level far longer than conventional coatings.

Varying levels of skid resistance can be obtained by adding slip resistant aggregate to the finish. When properly installed at 8 to 16 mils, it can out wear normal floor paints 10 times or more.

TYPICAL USE

Versatile **PM500** is typically used as a heavy duty industrial coating over primed concrete or as a gloss retentive finish coat for an epoxy mortar or broadcast floor.

Install **PM500** in automotive repair shops, aircraft hangars, chemical processing areas, high traffic warehouses, loading docks, or as an extra durable maintenance finish on **Milamar** seamless floors in commercial kitchens, customer waiting rooms, lockers or showers.

FEATURES

- Top Quality Formulation
- Long Wearing Gloss Finish
- Variety of Finished Textures
- Clear and Pigmented Versions
- Excellent Gloss Retention
- Very Good Chemical Resistance
- Excellent Abrasion Resistance
- Excellent Ultra Violet Resistance

INSTALLATION

The performance of any coating is highly reliant upon proper preparation of the substrate. Substrate must be free of all contamination such as laitance, curing compounds, dirt, oil and grease. Concrete should be lightly shot blasted, diamond ground or acid etched and neutralized to a smooth, even finish, similar in texture to 100 grit sand paper. Prime area with Milamar moisture tolerant epoxy primer. The **PM-500** urethane system develops adhesion properties stronger than concrete when substrate is properly prepared.

PM500 coating is normally either rolled or squeegeed and back rolled. If a slip resistant finish is required, the appropriately sized aggregate can be pre-mixed with the A and B components or it may be broadcast into the previous coat and locked in with **PM50**0 finish.

PACKAGING

PM500 is normally packaged in 3 gallon kits and 15 gallon units.

STORAGE

For best shelf life, store **PM500** in a dry area at temperatures between 50° F and 90° F. Protect product from freezing. Minimum shelf life is one year from date of manufacture when properly stored.

LIMITATIONS

Avoid on or below grade applications where water vapor transmission is greater than 5 lbs./1000 sq. ft. per 24 hrs. or where ambient operating temperatures exceed 180° F. Ideal application temperatures are above 60° F or below 85° F. All open foods must be removed from area during installation. Adequate ventilation must be available during installation and cure. Vehicles with rubber tires should not be parked on coating within 72 hours of installation.

COLOR SELECTION

PM500 is available in clear and pigmented versions. Standard colors are White, Gray, Dark Gray, Tile Red and Mocha. Custom colors are subject to minimum quantities and additional charge.

COMPLIANCES

PM500 urethane coating is compliant with most states volatile organic compound requirements but be sure to consult your states specific requirements before use. Lower V.O.C. urethanes are also available from Milamar Coatings where required.

REAGENT	30 MIN.	24 HRS.	7 DAYS
Acetone	N	N	F
Acetic Acid	N	D	F
Acetic Acid (20%)	N	N	N
Ammonium Hydroxide (30%)	N	N	N
Chlorine (5,000 ppm in water)	N	N	N
Citric Acid	N	N	N
Clorox	N	N	N
Ethylene Glycol	N	N	N
Gasoline	N	N	N
Hydrochloric Acid 32%	N	N	N
Isopropyl Alcohol (98%)	N	N	N
Mineral Spirits	N	N	N
Nitric Acid (10%)	N	N	N
Nitric Acid (40%)	N	N	N
Phenol	N	N	N
Skydrol #500	N	N	N
Sodium Chloride	N	N	N
Sodium Hydroxide (30%)	N	N	D
Sulfuric Acid (45%)	N	N	N
Toluene	N	N	N

N = NO ATTACK D = DISCOLORED F = FAILED

Physical Property	Test	Result
Tensile Strength	ASTM D-638	5,300 psi
Flexural Strength	ASTM C-580	5,351 psi
Bond Strength	ASTM D-4541	> 350 psi
Linear Shrinkage	ASTM C-883	nil
Hardness	ASTM D-2240	72 @ 75° F
Water Absorption	ASTM C-413	0.009%
Flammability	MIL-D-3134F	Fire Retardant
Abrasion Resistance	ASTM D-4060	51 mg loss
Indentation	MIL-D-3134F	nil
Solids		65%
Elongation	ASTM D-638	18%

Actual test results may vary due to the use of various aggregates, application methods and floor finish. The foregoing test results are based upon laboratory prepared samples and results may vary if not prepared by a professional technician.

AVAILABILITY

Milamar products are available only through selected and approved applicators and distributors. This material is intended for commercial and industrial installations and should be installed by skilled, seamless coating technicians. It is neither designed for nor available for consumer use.

Custom design assistance may be obtained by contacting Tele-Tech at 1-405-755-8448 8:00 AM through 4:00 PM Central time.

CAUTION:

COMPONENTS OF OR PRODUCTS USED WITH AND DURING THE INSTALLATION OF MILAMAR COATINGS PRODUCTS MAY INCLUDE HAZARDOUS MATERIALS. All personnel exposed to or handling materials before and during installation must read and fully understand label precautions and Material Safety Data Sheets.

LIMITED WARRANTY

Milamar Coatings products are manufactured to be free of defects in material and workmanship in meeting the properties specified on its individual Product Data Sheets. Users and installers of Milamar Coatings products are solely responsible for determining the suitability of the products for specific product applications. Milamar Coatings makes no Warranty or Guarantee, express or implied, including warranties of fitness, design compatibility or merchantability, for any particular use and shall have no responsibility or liability, including direct, indirect or consequential damages, due to injury, delay or third party claims for installation or repair. Likewise, Milamar Coatings assumes no liability of any nature for products that are adjusted in the field or that do not utilize all specified Milamar Coatings components.

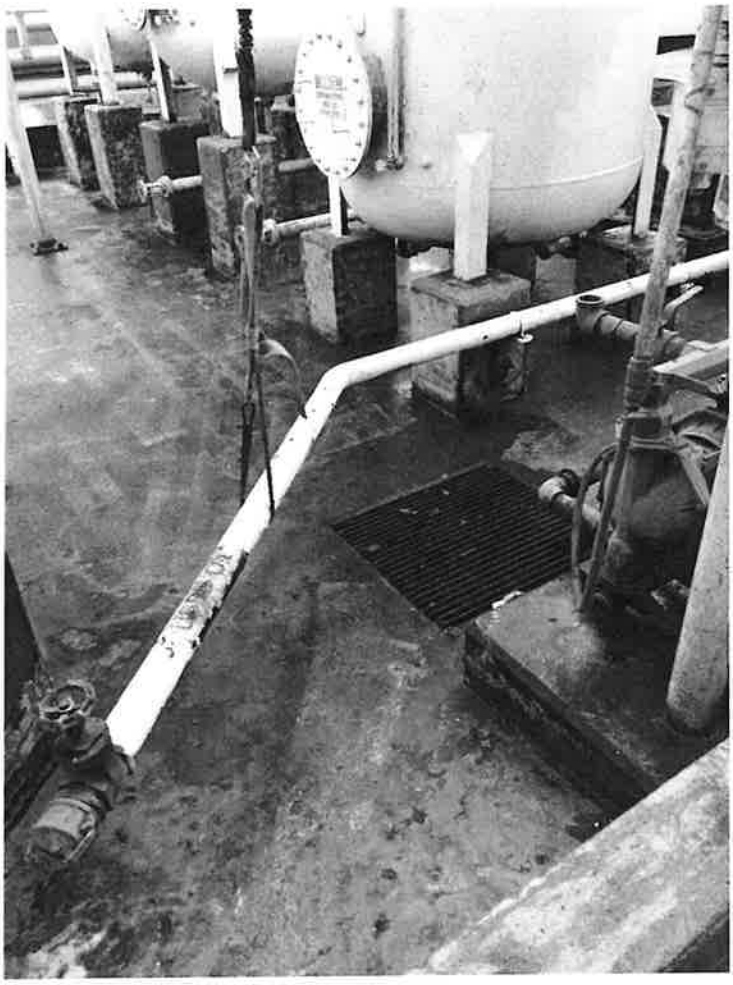
Should any Milamar Coatings product be proved to be defective within one year from the date of shipment, Milamar Coatings will, at its sole discretion, either replace the material; issue a credit to the customer's account; or provide a cash refund for the initial, paid purchase price of the material. Potential claims regarding product quality must be received in writing by Milamar Coatings within 30 days of the discovery of such potential defect.
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Appendix B – Coating Project Photos



November 13, 2017: The results of surface preparation. The old coatings have been blasted from the Tank Farm.



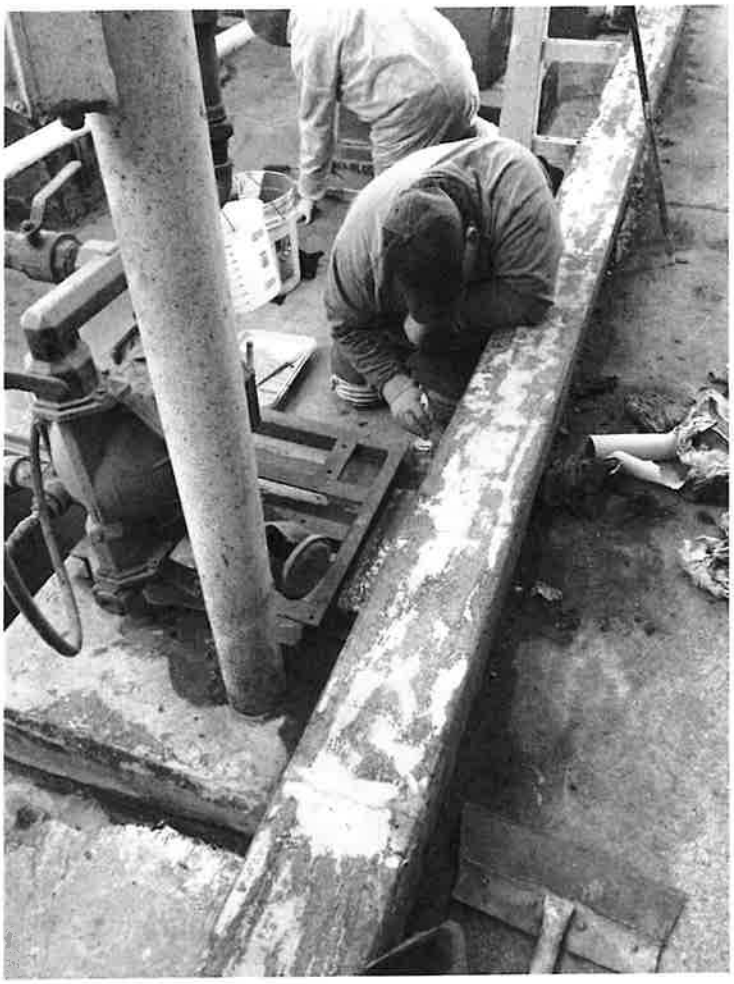
November 13, 2017: The results of surface preparation. The old coatings have been blasted from the Tank Farm.



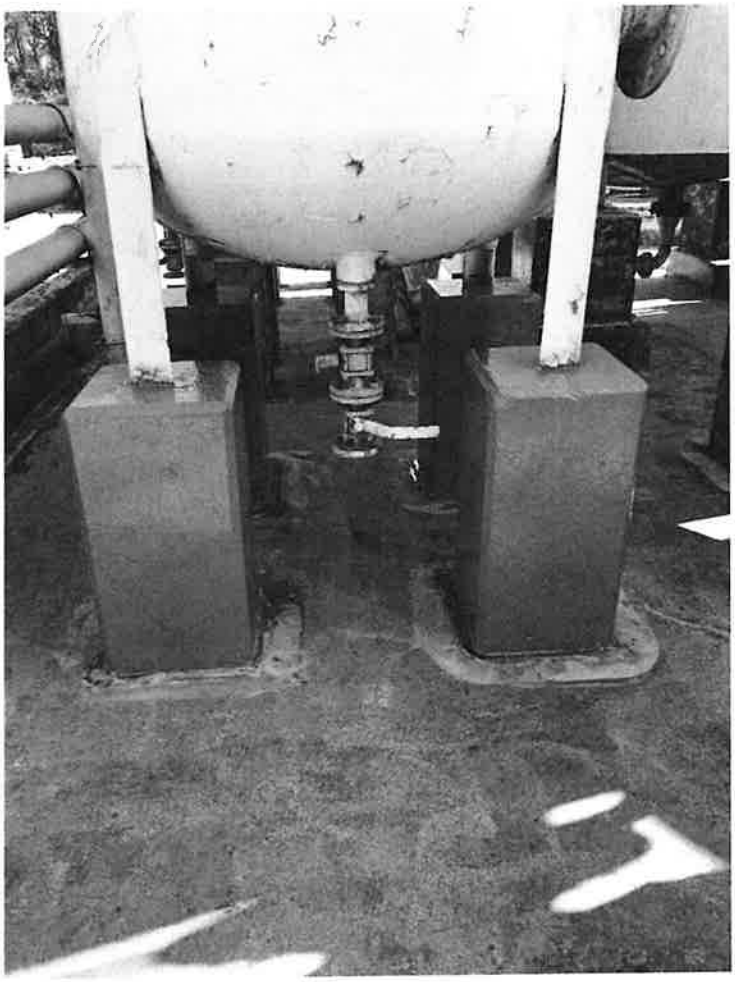
November 13, 2017: The results of surface preparation. The old coatings have been blasted from the Tank Farm.



November 14, 2017: The coating materials have been delivered to the site.



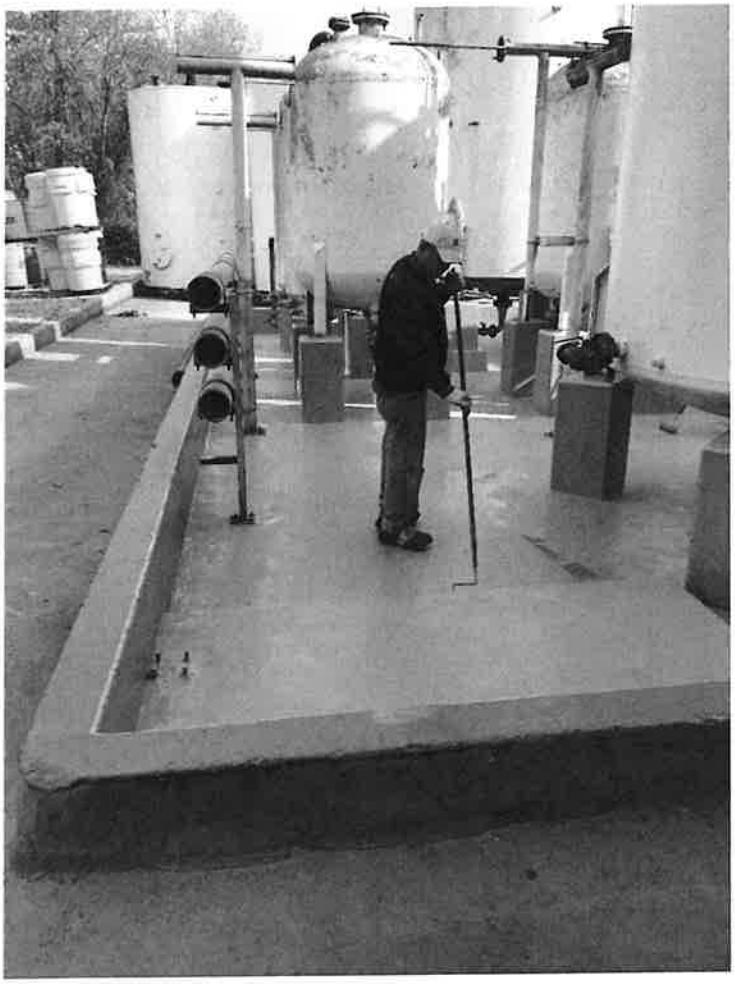
November 16, 2017: Workmen are applying the first coating to fill small holes and voids.



November 16, 2017: The surface product has been applied to some vertical surfaces.



November 21, 2017: The surface coating has cured and the urethane coating is being added.



November 21, 2017: The surface coating has cured and the urethane coating is being added.



November 21, 2017: The surface coating has cured and the urethane coating is being added. Note the fine aggregate in the anti-slip floor surface and the smooth finish on the interior wall.

ATTACHMENT 9.3

TANK SYSTEM

DIAGRAMS

Figure 9.3 - 1

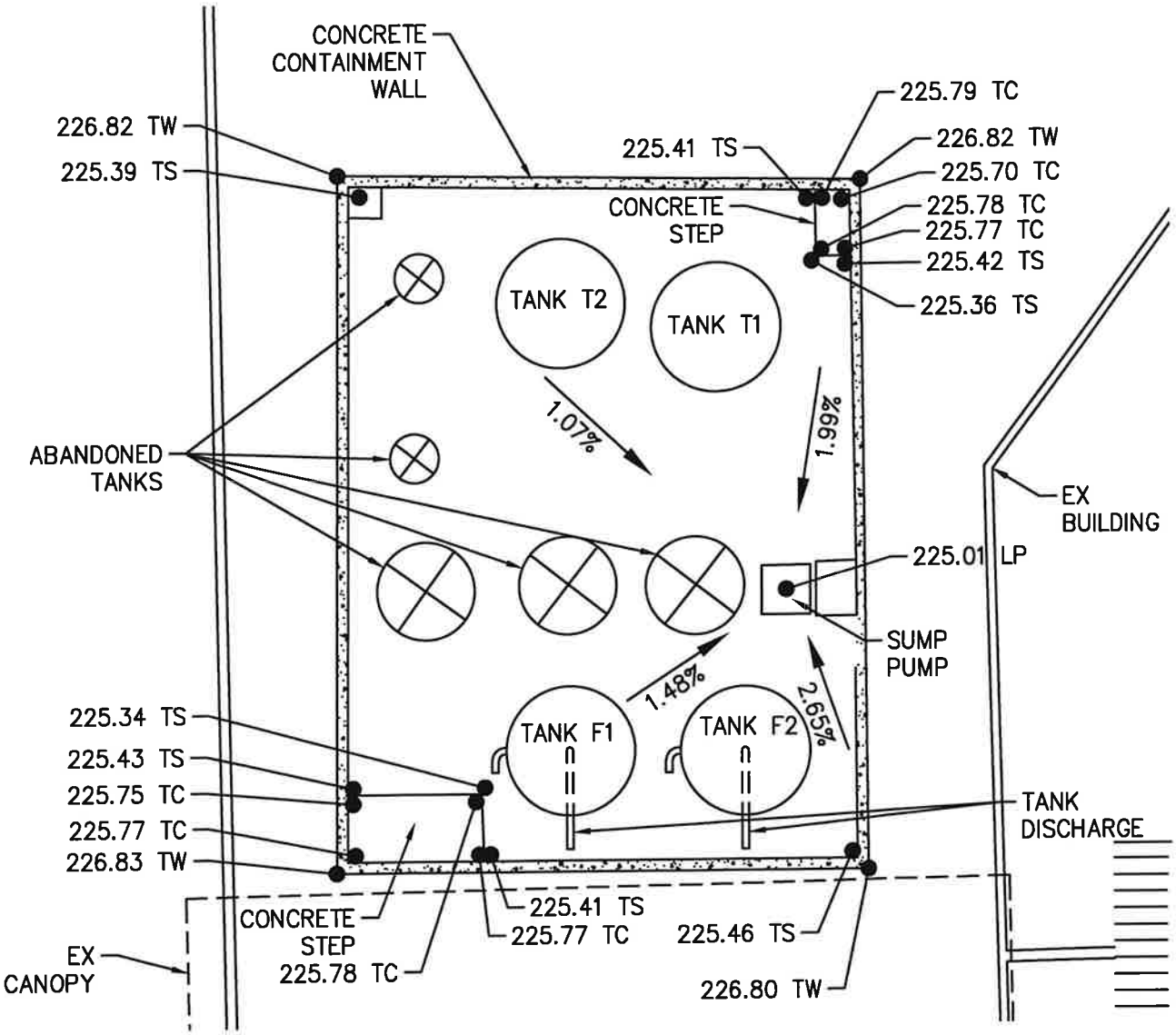
PLAN VIEW DIAGRAM OF TANK FARM SECONDARY CONTAINMENT SYSTEM

Fisher Arnold

"FIGURE C1 - TANK FARM
SECONDARY CONTAINMENT
PLAN VIEW"

Project Number: G8858

Date: 01/04/2019



LEGEND

TS — TOP OF SLAB
TC — TOP OF CONCRETE
TW — TOP OF WALL

GRAPHIC SCALE

(IN FEET)

10 0 5 10 20

1 inch = 10 ft.

FISHER ARNOLD
ENGINEERING INTEGRATION
9180 Crestwyn Hills Drive | Memphis, Tennessee 38125-8538
901.748.1811 | Fax: 901.748.1815 | www.fisherarnold.com

DESIGN: F&A	DRAWN: NSK	SCALE: 1"=10'	FIGURE
DATE: 01/04/2019	TANK FARM SECONDARY CONTAINMENT PLAN VIEW		C1
JOB. NO. 8858			

Figure 9.3 - 2

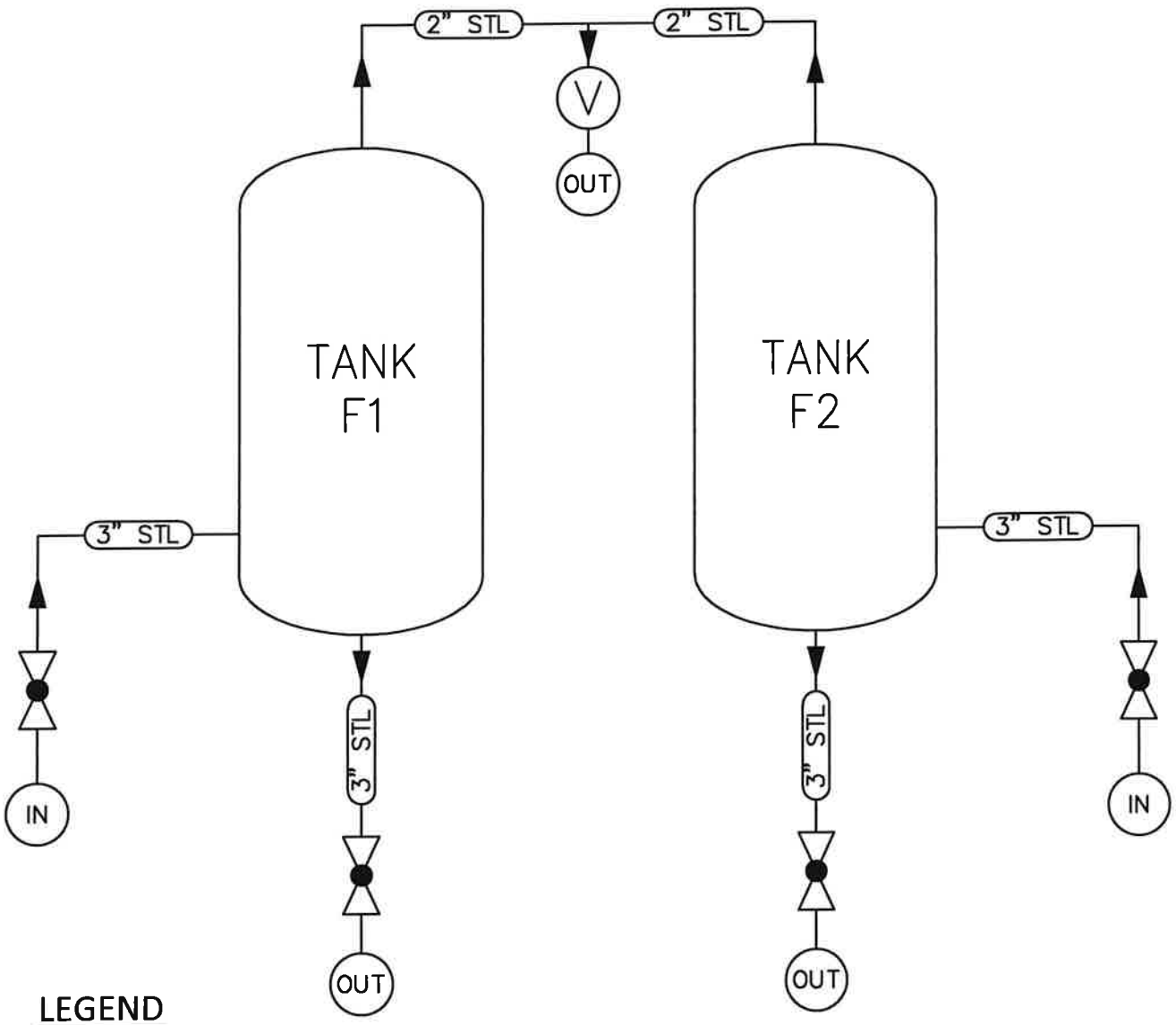
PIPING AND INSTRUMENTAL DIAGRAM FOR TANK SYSTEMS F1 AND F2

Fisher Arnold

"FIGURE C2 - P&ID DIAGRAMS
FOR TANK SYSTEM F1 AND F2"

Project Number: G8858

Date: 01/04/2019



LEGEND

- ► — FLOW DIRECTION
- (IN) — INFLOW
- (OUT) — OUTFLOW
- (V) — VENT
- ⋈ — ¼ TURN GLOBE VALVE

FISHER ARNOLD ENGINEERING INTEGRATION 9180 Crestwyn Hills Drive | Memphis, Tennessee 38125-8538 901.748.1811 | Fax: 901.748.3715 | www.fisherarnold.com	DESIGN: F&A	DRAWN: NSK	SCALE: N.T.S.	FIGURE
	DATE: 01/04/2019	P&ID DIAGRAMS FOR TANK SYSTEM F1 AND F2		C2
	JOB. NO. 8858			

ATTACHMENT 9.4

RCRA SUBPART BB SUMMARY TABLE AND DIAGRAMS

RCRA SUBPART BB SUMMARY TABLE
EXCEL TSD OF TENNESSEE. LLC, MEMPHIS, TN

Notes: (1) All of the below-listed equipment is associated with the piping systems for Hazardous Waste Tanks F1 and F2 located in the Tank Farm. See the Subpart BB Diagrams for Tank Systems F1 and F2 for locations of equipment and monitoring points.

(2) All of this equipment contains or contacts the same hazardous wastes with organic content of 50-100% by weight

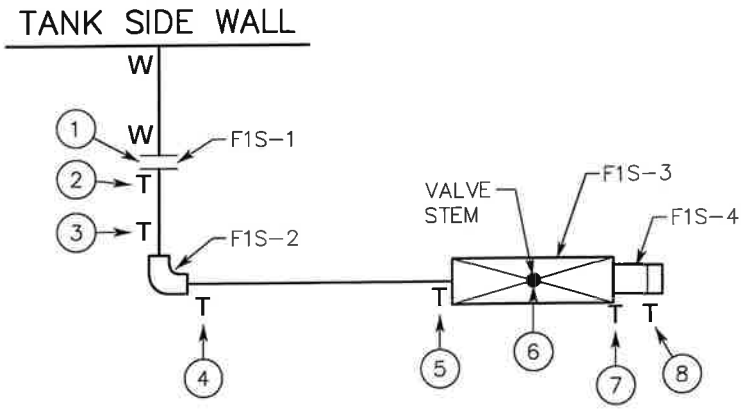
(3) All of this equipment is in *light liquid service*.

(4) All in-line piping and equipment connections have 3-in. ID.

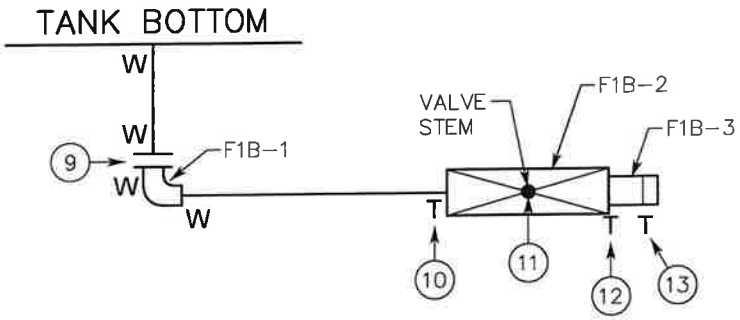
(5) No equipment is *designated for no detectable emissions*.

Monitoring Point	Equipment ID No.	Type of Equipment	Method of Compliance or Exclusion
None	None	Portable Pumps used to transfer liquids into and out of Tanks F1 and F2	Liquid transfer is performed using portable pumps situated in the Fuel Blending Area immediately west of the Tank Farm (within the Contained Area). The portable pumps used include: 1. the cart-mounted Yamada Model NDP-80BFS air-operated diaphragm pump (or equiv.) housed in the Fuel Blending Area; 2. the pump on board ETSD's vacuum truck; or 3. the pumps on board the tanker trucks that may be discharging liquids to, or receiving liquids from, the tanks. Each such pump will contain or contact such liquids for less than 300 hours per calendar year and are thus exempt from Subpart BB requirements except for this identification [per TN Rule 0400-12-01-.06(31)(a)(6)].
# 5 – threaded pipe connection	F1S-3	1/4 -Turn Globe Valves (in pipeline)	As specified in TN Rule 0400-12-01-.06(31)(h), monthly (or quarterly) leak detection monitoring (by OVM) must be performed, with timely repair of identified leaks. Monitoring and repair efforts must be documented, and records retained, as specified in TN Rule 0400-12-01-.06(31)(o)3, 4, and 12. Forms have been developed to help ensure proper documentation. Such completed forms must be retained in the facility's hazardous waste operating records for at least 3 years.
# 6 – valve stem entry			
# 7 – threaded connect-ion to Hose Connector			
# 10 – threaded pipe connection	F1B-2		
# 11 – valve stem entry			
#12 – threaded connect-ion to Hose Connector			

Monitoring Point	Equipment ID No.	Type of Equipment	Method of Compliance or Exclusion
# 1 – bolted flange connection	F1S-1	Pipe Flange	Although this equipment may be monitored more often, TN Rule 0400-12-01-.06(31)(i) only requires that leak detection monitoring (by OVM), be performed within 5 days after finding evidence of a potential leak by visual, audible, olfactory, or other means. The rule also requires that repairs be made in a timely manner to stop such leaks. Monitoring and repair efforts must be documented, and records retained, as specified in TN Rule 0400-12-01-.05(28)(o)3, 4, and 12. Forms have been developed to help ensure proper documentation. Such completed forms must be retained in the facility's hazardous waste operating records for at least 3 years.
# 2 – threaded pipe connection			
# 3 – threaded pipe connection	F1S-2	Pipe Elbow	
# 4 – threaded pipe connection			
# 8 – threaded Cap connection	F1S-4	Hose Connector with Cap	
# 9 – bolted flange connection	F1B-1	Flanged Pipe Elbow	
#13 – threaded Cap connection	F1B-3	Hose Connector with Cap	



SIDE INLET/OUTLET PIPING



BOTTOM INLET/OUTLET PIPING

LEGEND

W	WELDED CONNECTION
T	THREADED CONNECTION
(1)	MONITORING POINT

PREPARED BY:

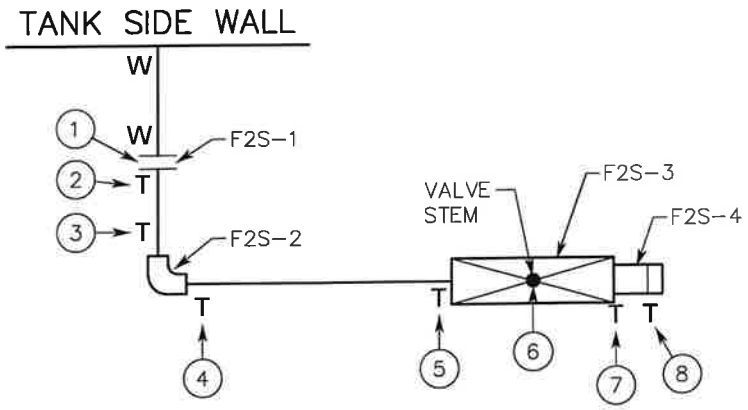
TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, TN37214
615-889-6888 fax 615-889-4004

TANK SYSTEM F1 SUBPART BB DIAGRAM

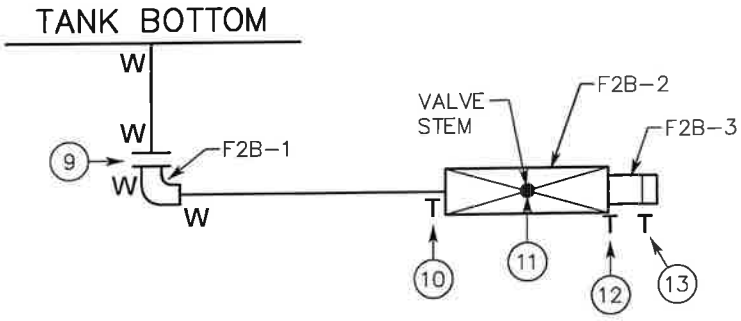
EXCEL TSD OF TENNESSEE, L.L.C.
MEMPHIS, TENNESSEE

DWG. DATE: 08/14/19	PROJECT NO.: 07-EXC01-01
SCALE: N.T.S.	SHEET 1 OF 1

N:\Jobs\EXC\07-EXC01-01\DRAWINGS\0101-C3 TANK SYSTEM.dwg SAVED: 8/15/2019 8:39 AM BY: AWATTS



SIDE INLET/OUTLET PIPING



BOTTOM INLET/OUTLET PIPING

LEGEND

W	WELDED CONNECTION
T	THREADED CONNECTION
(1)	MONITORING POINT

PREPARED BY:

TriAD ENVIRONMENTAL CONSULTANTS, INC.
Suite 200, 207 Donelson Pike, Nashville, TN37214
615-889-6888 fax 615-889-4004

TANK SYSTEM F2 SUBPART BB DIAGRAM

EXCEL TSD OF TENNESSEE, L.L.C.
MEMPHIS, TENNESSEE

DWG. DATE: 08/14/19	PROJECT NO.: 07-EXC01-01
SCALE: N.T.S.	SHEET 1 OF 1

N:\Jobs\EXC\07-EXC01-01\DRAWINGS\0101-C3 TANK SYSTEM F2.dwg SAVED: 8/15/2019 8:51 AM BY: AWATTS

ATTACHMENT 9.5

LOG FORMS FOR DOCUMENTING ORGANIC AIR EMISSION INSPECTION, MONITORING/ TESTING, AND REPAIR EFFORTS

Subpart BB is a Federal Rule Description

The Tennessee Equivalent is 0400-12-01-.06(31)

Subpart CC is a Federal Rule Description

The Tennessee Equivalent is 0400-12-01-.06(32)

TANK ROOF SUBPART CC INSPECTION/REPAIR LOG

At least annually, the roof of Tanks F1 and F2, each flanged opening in the tank roof, and the closure devices for each opening must be visually inspected for defects that could result in air pollutant emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in the roof or its welded flanged connectors; broken or missing hatches, access covers, caps, or other closure devices; and broken, cracked, or otherwise damaged seals or gaskets on closure devices. If a defect is detected, ETSD is required to make first efforts at repair of the defect no later than 5 calendar days after detection and to complete the repair as soon as possible but no later than 45 calendar days after detection. Each time the roof of a tank is inspected, a copy of this form is to be used to document these inspection and repair efforts. Use additional sheets as needed.

A. INSPECTION: **Date:** _____ **Tank No.** _____

Signature of Inspector(s): _____

Defects Found: ___ No ___ Yes [If Yes, describe: _____

_____

_____

_____

_____]

B. REPAIR – Enter below, for each attempt at repair of the defect, the date of the attempted repair, the name of the Excel person performing or coordinating the repair, and a brief description of the repair methods applied/attempted.

REPAIR ATTEMPT #1: Date: _____ Name: _____

Methods applied: _____

_____

_____

Repair completed? ___ Yes ___ No

REPAIR ATTEMPT #2: Date: _____ Name: _____

Methods applied: _____

_____

_____

Repair completed? ___ Yes ___ No

REPAIR ATTEMPT #3: Date: _____ Name: _____

Methods applied: _____

_____

_____

Repair completed? ___ Yes ___ No

SUBPART BB LEAK DETECTION MONITORING LOG: _____ DATE

PURPOSE: ___ **Routine Monthly Monitoring** ___ **Leak Repair Confirmation**

___ **Evidence of potential leak at connector (Date found: _____)**

Note: While leak detection monitoring of non-welded flanged and threaded connections may be performed and recorded routinely, it is required only upon, and within 5 days of, the finding of evidence of a potential leak by visual, audible, olfactory, or other detection method.

INSTRUMENT IDENTIFICATION AND CALIBRATION: (Must be performed daily prior to use!)

OVM Make/Model: _____ **Serial No.:** _____

OVM Calibration By: _____ **Time:** _____ **am/pm**
Signed Name

Note: EPA Reference Method 21 Paragraph 8.1.2 requires and describes a calibration precision test that must be performed on the instrument at least every 3 months.

LEAK DETECTION MONITORING: Performed by _____
Signed Name

Note: Leak detection monitoring must be performed as specified in paragraph 8.3.1 of EPA Reference Method 21. Place the OVM probe inlet at the surface of the component interface where leakage could occur. Remembering that the instrument has a response time of 3 seconds or more, move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time (6 or more seconds). If the maximum observed meter reading is greater or equal to 10,000 ppm, then a leak is occurring. Enter "Y" for "Yes" or "N" for "No" in the appropriate block in the table below.

Tank System F1 Monitoring Points			Tank System F2 Monitoring Points		
ID No.	**Description**	**Leak? (Y or N)**	**ID No.**	**Description**	**Leak? (Y or N)**
1	Bolted flange-to-flange connection		1	Bolted flange-to-flange connection	
2	Threaded pipe-to-flange connection		2	Threaded pipe-to-flange connection	
3	Threaded pipe-to-elbow connection		3	Threaded pipe-to-elbow connection	
4	Threaded pipe-to-elbow connection		4	Threaded pipe-to-elbow connection	
5	Threaded pipe-to-valve connection		5	Threaded pipe-to-valve connection	
6	Valve stem seal at housing		6	Valve stem seal at housing	
7	Threaded valve-to-hose connector connection		7	Threaded valve-to-hose connector connection	
8	Threaded cap-to-hose connector connection		8	Threaded cap-to-hose connector connection	
9	Bolted flange-to-flange connection		9	Bolted flange-to-flange connection	

Tank System F1 Monitoring Points			Tank System F2 Monitoring Points		
ID No.	**Description**	**Leak? (Y or N)**	**ID No.**	**Description**	**Leak? (Y or N)**
10	Threaded pipe-to-valve connection		**10**	Threaded pipe-to-valve connection	
11	Valve stem seal at housing		**11**	Valve stem seal at housing	
12	Threaded valve-to-hose connector connection		**12**	Threaded valve-to-hose connector connection	
13	Threaded cap-to-hose connector connection		**13**	Threaded cap-to-hose connector connection	

Refer to the Subpart BB Diagrams for Tank Systems F1 and F2 for the specific locations of the above monitoring points and the equipment to which they are associated.

If a leak is detected:
1. A weatherproof and readily visible tag (or other identification) must be promptly attached to the leaking equipment (e.g., the elbow, flange, valve). This tag must be marked with the word "LEAK", the Equipment ID number (not the monitoring point number from above), and the date the leak was detected.
2. A *Subpart BB Equipment Leak Repair Log* must be initiated and subsequently used to document the repair of the leaking piece of equipment. A copy of this completed *Leak Detection Monitoring Log* should be attached to the *Leak Repair Log*.

COMMENTS: _____

_____

_____

_____

SUBPART BB EQUIPMENT LEAK REPAIR LOG

A. EQUIPMENT IDENTIFICATION NUMBER: _____

B. DATE LEAK WAS DETECTED: _____

Leak detected by: ___**OVM Monitoring** ___**Observation** (visual, auditory, etc.)

Note: A weatherproof repair tag with the equipment ID number and date the leak was detected must be promptly attached to the leaking piece of equipment. The leak must be repaired within 15 calender days from this date except as may be described in Part D below.

C. REPAIR – Enter below, for each attempt at repair of the leak, the date of the attempted repair, the name of the Excel person performing or coordinating the repair, a brief description of the repair methods applied, and the results of the leak detection monitoring by Organic Vapor Meter ("OVM") performed to demonstrate that the repair succeeded or failed to stop the leak. Attach a copy of each completed *Subpart BB Leak Detection Monitoring Log.* REPAIR ATTEMPT #1: Date: _____ Signature: _____

Methods applied: _____

_____

_____

_____

OVM Results: Date: _____; ___Pass (≤10,000 ppm) ___Fail (>10,000 ppm)

REPAIR ATTEMPT #2: Date: _____ Name: _____

Methods applied: _____

_____

_____

OVM Results: Date: _____; ___Pass (≤10,000 ppm) ___Fail (>10,000 ppm)

REPAIR ATTEMPT #3: Date: _____ Name: _____

Methods applied: _____

_____

_____

OVM Results: Date: _____; ___Pass (≤10,000 ppm) ___Fail (>10,000 ppm)

D. **Tennessee Rule 0400-12-01-.06(31)(j) allows repairs of leaking equipment to be delayed beyond 15 days under certain conditions. If the repair of this leak is to be delayed, describe the reason for the delay and, for valves, attach any necessary documentation in compliance with part (j)3 of that rule:**

_____

_____

_____

_____

_____

_____

_____

_____

_____

Expected date of successful repair of leak: _____

The name, title, and signature of the individual who decided that the repair could not be performed within 15 days shall be entered below:

_____	_____	_____
Name	**Title**	**Signature**

E. **Date of successful repair:** _____

Note: The attached repair tag may be removed for a pump or flange upon the successful repair of the leak. The repair tag for a valve may be removed after it has been monitored for 2 successive months with no leak being detected.

F. **Comments:** _____

_____

_____

_____

PROCESS VESSEL SUBPART CC INSPECTION/REPAIR LOG

At least annually, each process vessel (i.e., tote containers and vacuum truck), including its cover and closure devices, must be visually inspected by ETSD personnel to check for visible cracks, holes, gaps, or other open spaces into the interior of the container when the cover and closure devices are secured in the closed position. If a defect is detected, ETSD is required to make first efforts at repair of the defect no later than 24 hours after detection and to complete the repair as soon as possible but no later than 5 calendar days after detection. If repair cannot be completed within 5 days, hazardous waste must be removed from the container and it cannot be re-used to old hazardous waste until it is repaired. Each time a process vessel is inspected, a copy of this form is to be used to document these inspection and repair efforts. Use additional sheets as needed.

A. INSPECTION: **Date:** _____ **Container ID:** _____

Signature(s) of Inspector(s): _____

Defects Found: ___ No ___ Yes [If Yes, describe: _____

_____

_____

_____]

B. REPAIR – Enter below, for each attempt at repair of the container, the date of the attempted repair, the name of the Excel person performing or coordinating the repair, a brief description of the repair methods applied, and the results of the *No Detectable Emissions* testing (by OVM) performed to demonstrate if the repair effort was successful. Attach a copy of each completed *No Detectable Emissions Test Log.*

REPAIR ATTEMPT #1: Date: _____ Name: _____

Methods applied: _____

_____

_____

NDE Test Results: Date: _____; ___Pass (<500 ppm) ___Fail (≥500 ppm)

REPAIR ATTEMPT #2: Date: _____ Name: _____

Methods applied: _____

_____

_____

NDE Test Results: Date: _____; ___Pass (<500 ppm) ___Fail (≥500 ppm)

REPAIR ATTEMPT #3: Date: _____ Name: _____

Methods applied: _____

_____

_____

NDE Test Results: Date: _____; ___Pass (<500 ppm) ___Fail (≥500 ppm)

C. CONTAINER REMOVED FROM SERVICE? If yes, enter date: _____

NO DETECTABLE EMISSIONS TEST LOG

This form has been prepared for use in RCRA Subpart BB/CC compliance efforts. It has been designed to document the testing (using an Organic Vapor Meter or OVM) of equipment and containers for "No Detectable Emissions" status as provided at Tennessee Rules 0400-12-01-.06(31) and (32). A copy of this form is to be completed each time a container or piece of equipment is tested for *No Detectable Emissions*. Such testing is required at least annually.

Testing Date: _____ **Tester's Signature**_____

Container/Equipment Being Tested? Type: _____**ID No.:** _____
(e.g., tote, valve, pump, pressure relief valve)

OVM Make/Model: _____ **Serial No:** _____

OVM Calibration Date: _____ **By (Name):** _____
(The OVM must be calibrated before use on each day of its use.)

I. Determine Ambient VOC Concentration = _____ ppm

[Note: Determine the local ambient VOC concentrations around the target container or equipment by moving the probe randomly upwind and downwind at a distance of one to two meters (3.3 - 6.6 ft.) from the target equipment. Record the maximum observed reading. If an interference exists with this determination due to a nearby emission or leak, the local ambient concentration may be determined at distances closer to the target equipment, but in no case shall the distance be less than 25 centimeters (9.8 inches).]

II. Determine Maximum Observed Emission Reading = _____ ppm

[Note: Survey the targeted equipment or container by placing the OVM probe inlet at the surface (or near the surface if it is oily, wet, or dirty) of the component interface where leakage could occur. Remembering that the OVM response time is approximately 3 seconds, slowly move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time (6 seconds or more) and record the maximum reading.]

III. Max. Emission Reading minus Ambient Concentration = Δ = _____ ppm

IV. *No Detectable Emissions* Determination: ___ **Yes** ___ **No**

[Note: If this testing found **Δ** < 500 ppm, check Yes above to show that the container/equipment identified above had *No Detectable Emissions.* If the testing found **Δ** ≥ 500 ppm, check No above to show that the container/equipment did not achieve *No Detectable Emissions* status and further efforts are required (see applicable regulation).]

Comments: _____

_____

_____

ATTACHMENT 9.6

EXAMPLE ETSD MOVP

DETERMINATION TOOLS

AMERICAN INTERPLEX CORPORATION
LABORATORIES

Waste Services, Inc.
Post Office Box 16471
Little Rock, AR 72231

ANALYTICAL RESULTS

AIC No. 231714-1
Sample Identification: D50 31-Jan-2019

Analyte	Result	RL	Units	Qualifier
Vapor Pressure @ 20 C 0.39 psi Isoteniscope	**20** Analyzed: 19-Feb-2019 1130 by 07		**mm** Batch: C21964	

AIC No. 231714-2
Sample Identification: Fuel Load 2-4 04-Feb-2019

Analyte	Result	RL	Units	Qualifier
Vapor Pressure @ 20 C 1.14 psi Isoteniscope	**59** Analyzed: 19-Feb-2019 1130 by 07		**mm** Batch: C21964	

AIC No. 231714-3
Sample Identification: Fuel Load 2-7 07-Feb-2019

Analyte	Result	RL	Units	Qualifier
Vapor Pressure @ 20 C 0.52 psi Isoteniscope	**27** Analyzed: 19-Feb-2019 1130 by 07		**mm** Batch: C21964	

AIC No. 231714-4
Sample Identification: TT Gasoline 11-Feb-2019

Analyte	Result	RL	Units	Qualifier
Vapor Pressure @ 20 C 1.16 psi Isoteniscope	**60** Analyzed: 19-Feb-2019 1130 by 07		**mm** Batch: C21964	

$psi = \frac{mm\ Hg}{51.715}$

Table 7.1-2. PROPERTIES (M_V, P_{VA}, W_L) OF SELECTED PETROLEUM LIQUIDS[a]

Petroleum Liquid	Vapor Molecular Weight at 60°F, M_V (lb/lb-mole)	Liquid Density At 60°F, W_L (lb/gal)	True Vapor Pressure, P_{VA} (psi)						
			40°F	50°F	60°F	70°F	80°F	90°F	100°F
Crude oil RVP 5	50	7.1	1.8	2.3	2.8	3.4	4.0	4.8	5.7
Distillate fuel oil No. 2	130	7.1	0.0031	0.0045	0.0065	0.0090	0.012	0.016	0.022
Gasoline RVP 7	68	5.6	2.3	2.9	3.5	4.3	5.2	6.2	7.4
Gasoline RVP 7.8	68	5.6	2.5929	3.2079	3.9363	4.793	5.7937	6.9552	8.2952
Gasoline RVP 8.3	68	5.6	2.7888	3.444	4.2188	5.1284	6.1891	7.4184	8.8344
Gasoline RVP 10	66	5.6	3.4	4.2	5.2	6.2	7.4	8.8	10.5
Gasoline RVP 11.5	65	5.6	4.087	4.9997	6.069	7.3132	8.7519	10.4053	12.2949
Gasoline RVP 13	62	5.6	4.7	5.7	6.9	8.3	9.9	11.7	13.8
Gasoline RVP 13.5	62	5.6	4.932	6.0054	7.2573	8.7076	10.3774	12.2888	14.4646
Gasoline RVP 15.0	60	5.6	5.5802	6.774	8.1621	9.7656	11.6067	13.7085	16.0948
Jet kerosene	130	7.0	0.0041	0.0060	0.0085	0.011	0.015	0.021	0.029
Jet naphtha (JP-4)	80	6.4	0.8	1.0	1.3	1.6	1.9	2.4	2.7
Residual oil No. 6	190	7.9	0.00002	0.00003	0.00004	0.00006	0.00009	0.00013	0.00019

[a] References 10 and 11

Table 7.1-3. PHYSICAL PROPERTIES OF SELECTED PETROCHEMICALS[a]

Name	Formula	Molecular Weight	Boiling Point At 1 Atmosphere (°F)	Liquid Density At 60°F (lb/gal)	Vapor Pressure (psia) At						
					40°F	50°F	60°F	70°F	80°F	90°F	100°F
Acetone	CH_3COCH_3	58.08	133.0	6.628	1.682	2.185	2.862	3.713	4.699	5.917	7.251
Acetonitrile	CH_3CN	41.05	178.9	6.558	0.638	0.831	1.083	1.412	1.876	2.456	3.133
Acrylonitrile	CH_2:CHCN	53.06	173.5	6.758	0.812	0.967	1.373	1.779	2.378	3.133	4.022
Allyl alcohol	CH_2:$CHCH_2OH$	58.08	206.6	7.125	0.135	0.193	0.261	0.387	0.522	0.716	1.006
Allyl chloride	CH_2:$CHCH_2Cl$	76.53	113.2	7.864	2.998	3.772	4.797	6.015	7.447	9.110	11.025
Ammonium hydroxide (28.8% solution)	NH_4OH--H_2O	35.05	83.0	7.481	5.130	6.630	8.480	10.760	13.520	16.760	20.680
Benzene	C_6H_6	78.11	176.2	7.365	0.638	0.870	1.160	1.508	1.972	2.610	3.287
iso-Butyl alcohol	$(CH_3)_2CHCH_2OH$	74.12	227.1	6.712	0.058	0.097	0.135	0.193	0.271	0.387	0.541
tert-Butyl alcoholv	$(CH_3)_3COH$	74.12	180.5	6.595	0.174	0.290	0.425	0.638	0.909	1.238	1.702
n-Butyl chloride	$CH_3CH_2CH_2CH_2Cl$	92.57	172.0	7.430	0.715	1.006	1.320	1.740	2.185	2.684	3.481
Carbon disulfide	CS_2	76.13	115.3	10.588	3.036	3.867	4.834	6.014	7.387	9.185	11.215
Carbon tetrachloride	CCl_4	153.84	170.2	13.366	0.793	1.064	1.412	1.798	2.301	2.997	3.771
Chloroform	$CHCl_3$	119.39	142.7	12.488	1.528	1.934	2.475	3.191	4.061	5.163	6.342
Chloroprene	CH_2:CCl·CH:CH_2	88.54	138.9	8.046	1.760	2.320	2.901	3.655	4.563	5.685	6.981
Cyclohexane	C_6H_{12}	84.16	177.3	6.522	0.677	0.928	1.218	1.605	2.069	2.610	3.249
Cyclopentane	C_5H_{10}	70.13	120.7	6.248	2.514	3.287	4.177	5.240	6.517	8.063	9.668
1,1-Dichloroethane	CH_3CHCl_2	98.97	135.1	9.861	1.682	2.243	2.901	3.771	4.738	5.840	7.193
1,2-Dichloroethane	CH_2ClCH_2Cl	98.97	182.5	10.500	0.561	0.773	1.025	1.431	1.740	2.243	2.804
cis-1,2- Dichloro-ethylene	CHCl:CHCl	96.95	140.2	10.763	1.450	2.011	2.668	3.461	4.409	5.646	6.807
trans-1,2-Dichloro-ethylene	CHCl:CHCl	96.95	119.1	10.524	2.552	3.384	4.351	5.530	6.807	8.315	10.016
Diethylamine	$(C_2H_5)_2NH$	73.14	131.9	5.906	1.644	1.992	2.862	3.867	4.892	6.130	7.541
Diethyl ether	$C_2H_5OC_2H_5$	74.12	94.3	5.988	4.215	5.666	7.019	8.702	10.442	13.342	Boils
Di-*iso*-propyl ether	$(CH_3)_2CHOCH(CH_3)_2$	102.17	153.5	6.075	1.199	1.586	2.127	2.746	3.481	4.254	5.298
1,4-Dioxane	O·$CH_2CH_2OCH_2CH_2$	88.10	214.7	8.659	0.232	0.329	0.425	0.619	0.831	1.141	1.508
Dipropyl ether	$CH_3CH_2CH_2OCH_2CH_2CH_3$	102.17	195.8	6.260	0.425	0.619	0.831	1.102	1.431	1.876	2.320
Ethyl acetate	$C_2H_5OOCCH_3$	88.10	170.9	7.551	0.580	0.831	1.102	1.489	1.934	2.514	3.191
Ethyl acrylate	C_2H_5OOCCH:CH_2	100.11	211.8	7.750	0.213	0.290	0.425	0.599	0.831	1.122	1.470
Ethyl alcohol	C_2H_5OH	46.07	173.1	6.610	0.193	0.406	0.619	0.870	1.218	1.682	2.320

Table 7.1-3 (cont.).

Name	Formula	Molecular Weight	Boiling Point At 1 Atmosphere (°F)	Liquid Density At 60°F (Pounds Per Gallon)	Vapor Pressure (Pounds Per Square Inch Absolute) At						
					40°F	50°F	60°F	70°F	80°F	90°F	100°F
Freon 11	CCl_3F	137.38	75.4	12.480	7.032	8.804	10.900	13.40	16.31	19.69	23.60
n-Heptane	$CH_3(CH_2)_5CH_3$	100.20	209.2	5.727	0.290	0.406	0.541	0.735	0.967	1.238	1.586
n-Hexane	$CH_3(CH_2)_4CH_3$	86.17	155.7	5.527	1.102	1.450	1.876	2.436	3.055	3.906	4.892
Hydrogen cyanide	HCN	27.03	78.3	5.772	6.284	7.831	9.514	11.853	15.392	18.563	22.237
Isopentane	$(CH_3)_2CHCH_2CH_3$	72.15	82.1	5.199	5.878	7.889	10.005	12.530	15.334	18.370	21.657
Isoprene	$(CH_2):C(CH_3)CH:CH_2$	68.11	93.5	5.707	4.757	6.130	7.677	9.668	11.699	14.503	17.113
Isopropyl alcohol	$(CH_3)_2{\cdot}CHOH$	60.09	180.1	6.573	0.213	0.329	0.483	0.677	0.928	1.296	1.779
Methacrylonitrile	$CH_2:CH(CH_3)CN$	67.09	194.5	6.738	0.483	0.657	0.870	1.160	1.470	1.934	2.456
Methyl acetate	CH_3OOCCH_3	74.08	134.8	7.831	1.489	2.011	2.746	3.693	4.699	5.762	6.961
Methyl acrylate	$CH_3OOCCH:CH_2$	86.09	176.9	7.996	0.599	0.773	1.025	1.354	1.798	2.398	3.055
Methyl alcohol	CH_3OH	32.04	148.4	6.630	0.735	1.006	1.412	1.953	2.610	3.461	4.525
Methylcyclohexane	$CH_3{\cdot}C_6H_{11}$	98.18	213.7	6.441	0.309	0.425	0.541	0.735	0.986	1.315	1.721
Methylcyclopentane	$CH_3C_5H_9$	84.16	161.3	6.274	0.909	1.160	1.644	2.224	2.862	3.616	4.544
Methylene chloride	CH_2Cl_2	84.94	104.2	11.122	3.094	4.254	5.434	6.787	8.702	10.329	13.342
Methyl ethyl ketone	$CH_3COC_2H_5$	72.10	175.3	6.747	0.715	0.928	1.199	1.489	2.069	2.668	3.345
Methyl methacrylate	$CH_3OOC(CH_3):CH_2$	100.11	212.0	7.909	0.116	0.213	0.348	0.541	0.773	1.064	1.373
Methyl propyl ether	$CH_3OC_3H_7$	74.12	102.1	6.166	3.674	4.738	6.091	7.058	9.417	11.602	13.729
Nitromethane	CH_3NO_2	61.04	214.2	9.538	0.213	0.251	0.348	0.503	0.715	1.006	1.334
n-Pentane	$CH_3(CH_2)_3CH_3$	72.15	96.9	5.253	4.293	5.454	6.828	8.433	10.445	12.959	15.474
n-Propylamine	$C_3H_7NH_2$	59.11	119.7	6.030	2.456	3.191	4.157	5.250	6.536	8.044	9.572
1,1,1-Trichloroethane	CH_3CCl_3	133.42	165.2	11.216	0.909	1.218	1.586	2.030	2.610	3.307	4.199
Trichloroethylene	$CHCl:CCl_2$	131.40	188.6	12.272	0.503	0.677	0.889	1.180	1.508	2.030	2.610
2,2,4-trimethyl pentane (isooctane)	$(CH_2)_3CCH_2CH(CH_3)_2$	114.23	210.6	5.76			0.596				
Toluene	$CH_3{\cdot}C_6H_5$	92.13	231.1	7.261	0.174	0.213	0.309	0.425	0.580	0.773	1.006
Vinyl acetate	$CH_2:CHOOCCH_3$	86.09	162.5	7.817	0.735	0.986	1.296	1.721	2.262	3.113	4.022
Vinylidene chloride	$CH_2:CCl_2$	96.5	89.1	10.383	4.990	6.344	7.930	9.806	11.799	15.280	23.210

[a] Reference 11.

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COMPILATION OF AIR POLLUTANT EMISSION FACTORS

VOLUME I: STATIONARY POINT AND AREA SOURCES

Office Of Air Quality Planning And Standards
Office Of Air And Radiation
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

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REFERENCES FOR SECTION 7.1

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ATTACHMENT 10. SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN

Attachment 10 consists of five separate sections as follows:

- Attachment 10.1 Summary Tables of Requirements for SWMUs and AOCs
- Attachment 10.2 RCRA Facility Investigation (RFI) Outline
- Attachment 10.3 Corrective Measures Study (CMS) Outline
- Attachment 10.4 Corrective Action Compliance Schedule
- Attachment 10.5 Corrective Action Remedies

ATTACHMENT 10.1 SUMMARY TABLES OF REQUIREMENTS FOR SWMUS AND AOCS

TABLE 10.1-1 List of solid waste management units (SWMUs) and areas of concern (AOCs) that require no further action under the corrective action conditions of this permit:

SWMU / AOC	SWMU / AOC Name	Unit Description	Dates of Operation	No Further Action Documentation [1]
1	Original Waste Accumulation Area	This is a 12-feet by 12-feet area where D-001 waste mineral spirits were stored.	November 1985 to August 1986	NFA per EPA Letter dated February 27, 1990
2	Original Distillation Area	This was a 11-feet by 15-feet shed that housed the solvent distillation unit used to reclaim waste mineral spirits.	November 1985 to August 1987	NFA per EPA Letter dated February 27, 1990
4	Process Area	This area was used to house hazardous waste processing equipment.	August 1987 to present	NFA per EPA Letter dated February 27, 1990
6	Solid Waste Dumpster	This unit is a portable, steel container that was located within SWMU 7 that was used for office trash.	1987 to 2003	NFA per EPA Letter dated February 27, 1990
8	Shredder	This closed unit is was located in SWMU 7 and used shred RCRA empty drums that were too damaged for reclamation.	1990 to 2002	NFA per EPA Letter dated February 27, 1990
9	Wastewater Holding Tanks	This unit is a series of above ground tanks T3, T4, W1, W2, W3, and W4 located within SWMU 7, used to store primarily rainwater collected from the facility sump pumps and SWMU 7.	1990 to present	NFA per EPA Letter dated February 27, 1990
10	90-day Accumulation Area	This 12-feet by 24-feet area is inside SWMU 7 on a curbed concrete pad. This unit accepts all currently permitted waste codes.	1992 to present	NFA per Addendum to RFA dated March 27, 1998
11	Process Area (North of HW Storage Building)	This 50-feet by 50-feet area is contained inside SWMU 7 on a curbed concrete pad. This unit accepts all currently permitted waste codes.	1990 to present	NFA per Addendum to RFA dated March 27, 1998

12	Satellite Accumulation Area	This 4-feet by 12-feet area is contained inside SWMU 7 on a curbed concrete pad. This SWMU accepts all currently permitted waste codes. This unit is used to store laboratory waste generated by incoming waste analysis.	July 1992 to present	NFA per Addendum to RFA dated March 27, 1998
13	Staging Area (Transfer Area)	This area is contained inside SWMU 7 on a curbed concrete pad. It is triangular and measures 5-feet by 30-feet by 50-feet. This unit accepts all currently permitted waste codes. When hazardous wastes are received, they are kept in this area until waste analysis is completed.	1990 to present	NFA per Addendum to RFA dated March 27, 1998
14	Roll-Off Box Accumulation Area	This 50-feet by 50-feet area is contained inside SWMU 7 on a curbed concrete pad. This unit accepts all currently permitted waste codes. The roll-off boxes are used for the storage of special waste and non-hazardous waste storage.	1990 to present	NFA per Addendum to RFA dated March 27, 1998
15	Decon Waste Container	A satellite accumulation area consisting of a 55-gallon drum is located inside the Personnel Primary Decontamination (Decon) Room. Excel personnel dispose of their contaminated outer protective equipment (e.g., booties and gloves) in this drum.	Unknown to present	NFA per addendum to RFA dated June 6, 2016
16	Lab Waste Containers	A satellite accumulation area consisting of two containers in Excel's onsite laboratory to collect lab waste for disposal.	Unknown to present	NFA per addendum to RFA dated June 6, 2016
17	Petroleum Underground Storage Tank System	Best Wade Petroleum Inc. (BWP) owns and operates the underground petroleum storage system. Tennessee Division of Underground Storage Tanks, Facility ID No. 9790831, regulates BWP's petroleum underground storage tank system.	Unknown to present	NFA per addendum to RFA dated June 6, 2016
Note [1]: A no further action (NFA) determination is made based upon the findings of the site assessment at that specific moment in time and is made on a unit-by-unit basis. An NFA determination is recommended for these units at this specific time. However, if additional information becomes available in the future regarding contamination in soils and/or groundwater and surface water at the Site, the Commissioner may determine that additional site assessment and/or corrective action is warranted.				

TABLE 10.1-2 List of solid waste management units (SWMUs) and areas of concern (AOCs) that require Confirmatory Sampling (CS):
As of permit issuance, there are no units identified that require Confirmatory Sampling in accordance with the Specific Conditions For Corrective Action section of this permit.

TABLE 10.1-3 List of solid waste management units (SWMUs) and areas of concern (AOCs) that require a RCRA Facility Investigation (RFI):
As of permit issuance, there are no units identified that require a RCRA Facility Investigation (RFI) in accordance with the Specific Conditions For Corrective Action section of this permit.

TABLE 10.1-4 List of solid waste management units (SWMUs) and areas of concern (AOCs) that require Interim Measures (IM):
As of permit issuance, there are no units identified that require Interim Measures in accordance with the Specific Conditions For Corrective Action section of this permit.

TABLE 10.1-5 List of solid waste management units (SWMUs) and areas of concern (AOCs) that require a Corrective Measures Study (CMS):
As of permit issuance, there are no units identified that require a Corrective Measures Study in accordance with the Specific Conditions For Corrective Action section of this permit.

TABLE 10.1-6 List of solid waste management units (SWMUs) and areas of concern (AOCs) that require an implementation of a Corrective Action Remedy:
As of permit issuance, there are no units identified that require a Corrective Action Remedy in accordance with the Specific Conditions For Corrective Action section of this permit.

TABLE 10.1-7 List of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) that are regulated by a Hazardous Waste Permit:

SWMU / AOC	SWMU / AOC Name	Unit Description	Dates of Operation	No Further Action Documentation [1]

3	Hazardous Waste Storage Building	This is permitted hazardous waste storage buildings A and B.	July 1987 to present	NFA per EPA Letter dated February 27, 1990. Implement Closure as required by Permit Condition
5	Tank Farm	This tank farm consists of tanks F1, F2, T1, T2, P1, P2, P3, P4 and P5. F1 and F2 are permitted hazardous waste storage tanks.	1990 to present	NFA per EPA Letter dated February 27, 1990
7	Curbed Concrete Slab	This unit includes the entire active portion of the facility. The western portion of the unit is the permitted outside hazardous waste container management area. SWMUs 3, 4, 5, 6, 8, 9, 10, 11, 12, and 13 are located within SWMU 7.	1987 to present	NFA per EPA Letter dated February 27, 1990
Note [1]: A no further action (NFA) determination is made based upon the findings of the site assessment at that specific moment in time and is made on a unit-by-unit basis. The permitted units shown in Table 10.1-7 are required to implement closure actions as detailed within this permit.				

ATTACHMENT 10.2. RCRA FACILITY INVESTIGATION (RFI) OUTLINE

The purpose of the RFI portion of the hazardous waste corrective action process is to evaluate the nature and extent of releases of hazardous wastes or hazardous constituents and to gather necessary to update the conceptual site model and to support the Corrective Measures Study or Interim Measures. Planning for the investigation is best accomplished through a logical progression of tasks:

- Gather information on the source of the release(s) to the environment (Source Characterization);
- Gather information on the physical aspects of the environment which will affect the migration and fate of the release and identification of exposure pathways for both humans and non-human members of the environment (Environmental Setting); and
- Use Source Characterization and Environmental Setting to develop a conceptual model of the release that will be used to plan and conduct a program to define the nature, rate, and extent of the release (Sampling and Analysis Plan).

An RFI Work Plan and RFI Report are generally required elements of the RCRA corrective action process. The requirements for a full, detailed RFI are listed in this attachment. The Tennessee Department of Environment and Conservation (the Department) recognizes that each facility is unique. Therefore, the scope and requirements of the RFI must be focused to fit the complexity of the site-specific situation. The work plan requirements listed in this attachment in no way limit the site-specific opportunities for the facility. For example, the RFI may be implemented in phases. Relevant information contained in previously developed documents, such as a RCRA Part B Plan application, may be referenced as appropriate, but must be summarized in either the RFI Work Plan or the RFI Report. In addition, the Department understands that Risk Assessments are becoming more widely utilized to place characterization information into context and to aid in determining remedial solutions. If a Risk Assessment is expected to be performed in the future, note that the U.S. EPA Region 4, has developed a series of Risk Bulletins to provide the facility and their contractors with the general format and process the Department expects a Risk Assessment to follow.

Additionally, EPA has developed guidance for the use of generic regional screening levels (RSLs) for most hazardous constituents of concern to enable simple risk evaluations through comparisons with the actual release concentration measured in the soil or water at the facility solid waste management units (SWMUs) and areas of concern (AOCs). These generic RSLs are conservative health-based concentrations of hazardous constituents determined to be risk indicators for the protection of human health or the environment. EPA Region 4 recommends use of these generic RSLs as guidance for both Superfund and RCRA sites. For several frequently detected industrial contaminants (lead, arsenic, PAHs, PCBs, dioxins, etc.), EPA has also developed risk-based cleanup levels for both residential and industrial land use scenarios approach may be appropriate in the following types of situations, among others: facilities where removal remedies have been proposed by the owner/operator, facilities with straightforward remedial solutions or where presumptive remedies can be applied, facilities where few remedial options are available, and facilities where the remedy is phased. The Department will determine on a case-by-case basis if a concurrent RFI/CMS

is appropriate. Because of the unique data collection requirements necessary for a remedial solution which includes natural attenuation of contaminants in groundwater, if natural attenuation is expected to be part of the remedial solution, then the Sampling and Analysis Plan must be crafted to include monitoring of specific water quality parameters unique to natural attenuation (e.g., nitrites/nitrates, ferrous iron, sulfides, dissolved oxygen, methane, hydrogen, etc.).

I. RFI WORK PLAN REQUIREMENTS - ELEMENTS OF THE RFI WORK PLAN

The RFI Work Plan must include, at a minimum, the following elements:

A. Introduction - Summary of any relevant existing assessment data

The permittee must describe the purpose or objective of the RFI Work Plan and provide a summary of any existing environmental data that is relevant to the investigation. At a minimum, the summary must provide all the following items:

1. Land ownership history;
2. Facility operating dates;
3. Facility's product(s);
4. Raw materials used in facility operations and wastes generated;
5. Nature and extent of any known contamination source areas (regulated units solid waste management units and areas of concern, spill locations, penitential migration pathways, and potential impacts to health and human environment [information must be depicted on maps];
6. Summary of any ongoing Interim Measures and past assessments; and
7. Summary of permit objective and how this objective will be satisfied.

B. Environmental Setting

The permittee must provide information on the environmental setting at the facility. The permittee must characterize the Environmental Setting as it relates to identified sources, pathways, and areas of releases of hazardous constituents from SWMUs or AOCs. Data gaps pertinent to characterization of releases must be identified and provisions made in Subsection I.E of this attachment to obtain the relevant information to fill the data gap. The Environmental Setting must cover the following items, at a minimum:

1. Hydrogeology

The permittee must formulate a conceptual site model using all available

information on the waste, unit characteristics, hydrological conditions, and any existing monitoring data. For groundwater, this model must account for the ability of the waste to be dissolved or to appear as a distinct phase, as well as geologic and hydrologic factors which affect the release pathway. The permittee must discuss all the above and include the following:

(a) A description of the regional and facility specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the facility, including:

(i) Regional and facility specific stratigraphy: description of strata including strike and dip, identification of stratigraphic contacts;

(ii) Structural geology: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, metamorphic foliation, etc.);

(iii) Depositional history;

(iv) Regional and facility specific groundwater flow patterns (porous media, fracture media, karst media); and

(v) Identification and characterization of areas and amounts of recharge and discharge (springs in karst terrane, base level streams and rivers).

(b) An analysis of any topographic features that might influence the groundwater flow system (e.g., sinkholes and sinking streams in karst terranes).

(c) Based on any existing field data, tests (e.g., pump tests, tracer tests), and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated units), including:

(i) Hydraulic conductivity and porosity (total and effective), groundwater flow velocity, groundwater basin discharge;

(ii) Lithology, grain size, sorting, cementation;

(iii) An interpretation of hydraulic interconnections between saturated zones (i.e., groundwater aquifers) and surface waters; and

(iv) The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content, etc.).

(d) Based on data obtained from groundwater monitoring wells and piezometers installed upgradient water wells or springs downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring, including:

(i) Water-level contour or potentiometric maps, including seasonal variations;

(ii) Hydrologic cross sections showing gradients;

(iii) The flow system, including the vertical and horizontal components of flow; and

(iv) Any temporal changes in hydraulic gradients, for example, due to tidal or seasonal influences and for karst terrane, storm flow.

(e) A description of man-made influences that may affect the hydrology of the site, identifying:

(i) Local water supply and production wells with an approximate schedule of pumping;

(ii) Man-made hydraulic structures (pipelines, french drains, ditches, roofs, runways, parking lots, etc.); and

(iii) Exposure pathways and potential receptors must be identified within a one-mile radius.

(iv) Other groundwater uses

2. Soils

The permittee must provide a conceptual site model of the release using all available information on the waste, unit characteristics, environmental setting, and any existing monitoring data. For soil investigations, this model must account for the ability of the waste to be dissolved by infiltrating precipitation, its affinity for soil particles, its degradability and decomposition products, unit-specific factors affecting the magnitude and configuration of the release, and address the potential for transfer of contaminants in soil to other environmental media. Permittee must provide a summary to include this information and also the following:

(a) Surface soil distribution;

(b) Soil profile, including ASTM classification of soils;

(c) Transects of soil stratigraphy;

(d) Hydraulic conductivity (saturated and unsaturated);

(e) Relative permeability;

(f) Bulk density;

(g) Porosity;

(h) Soil sorption capacity;

(i) Cation exchange capacity (CEC);

(j) Soil organic content;

(k) Soil pH;

(l) Particle size distribution;

(m) Depth of water table;

(n) Moisture content;

(o) Effect of stratification on unsaturated flow;

(p) Infiltration;

(q) Evapotranspiration;

(r) Storage capacity;

(s) Vertical flow rate; and

(t) Mineral content.

3. Surface Water and Sediment

The permittee must provide a description of the surface water bodies in the vicinity of the facility. This summary may include, but not be limited to, the following activities and information:

(a) Description of the temporal and permanent surface water bodies, including:

(i) For lakes and estuaries: location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;

(ii) For impoundments: location, elevation, surface area, depth, volume, freeboard, and construction and purpose;

(iii) For streams, ditches, and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, flooding tendencies (i.e., 100-year event), discharge point(s), and general contents;

(iv) Drainage patterns; and

(v) Evapotranspiration.

(b) Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients, chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.

(c) Description of sediment characteristics, including:

(i) Deposition area;

(ii) Thickness profile; and

(iii) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.).

4. Air

The permittee must provide information characterizing the climate in the vicinity of the facility. Such information may include, but not be limited to:

(a) A description of the following parameters:

(i) Annual and monthly rainfall averages;

(ii) Monthly temperature averages and extremes;

(iii) Wind speed and direction;

(iv) Relative humidity/dew point;

(v) Atmospheric pressure;

(vi) Evaporation data;

(vii) Development of inversions; and

(viii) Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence (i.e., hurricanes).

(b) A description of topographic and man-made features that affect air flow and emission patterns, including:

(i) Ridges, hills, or mountain areas;

(ii) Canyons or valleys;

(iii) Surface water bodies, e.g., rivers, lakes, or bays; and

(iv) Buildings.

5. Sub-Surface Gas

(a) A definition and description of environmental setting Characterization

(i) climate;

(ii) site-specific meteorological conditions;

(iii) soil conditions;

(iv) site-specific terrain;

(v) subsurface gas migration pathways;

(vi) location of engineered conduits; and

(vii) location of surrounding structures

C. Source Characterization

For those sources from which releases of hazardous constituents have been detected, the permittee must provide analytical data to completely characterize the wastes and the areas where wastes have been placed, to the degree that is possible without undue safety risks, including: type; quantity; physical form; disposition (containment or nature of deposits); and facility characteristics affecting release (e.g., facility security and engineering barriers). Data gaps on source characterization must be identified and provisions made in Subsection I.E of this attachment to obtain the relevant information to fill the data gap. This summary must include quantification of the following specific characteristics for each source area:

1. Unit/Disposal Area Characteristics

   (a) Location of unit/disposal area;

   (b) Type of unit/disposal area;

   (c) Design features (to include unit dimensions);

   (d) Operating practices (past and present);

   (e) Period of operation;

   (f) Age of unit/disposal area;

   (g) General physical conditions; and

   (h) Method used to close the unit/disposal area.

2. Waste Characteristics

   (a) Type of wastes placed in the unit:

      (i) Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent);

      (ii) Quantity; and

      (iii) Chemical composition (to include contaminants of concern and indicator parameters).

   (b) Physical and chemical characteristics, such as:

      (i) Physical form (solid, liquid, gas);

(ii) Physical description (e.g., powder, oily sludge);

(iii) Temperature;

(iv) pH;

(v) General chemical class (e.g., acid, base, solvent);

(vi) Molecular weight;

(vii) Density;

(viii) Boiling point;

(ix) Viscosity;

(x) Solubility in water;

(xi) Cohesiveness of the waste; and

(xii) Vapor pressure.

(c) Migration and dispersal characteristics of the waste, such as:

(i) Sorption capability;

(ii) Biodegradability, bioconcentration, or biotransformation;

(iii) Photodegradation rates;

(iv) Hydrolysis rates;

(v) Chemical transformations.
(vi) Determine background levels;

(vii) Vertical and horizontal extent of release including concentrations of constituents; and

(viii) Determine rate and direction of release migration (if migrating) to include inter-media transport.

D. Potential Receptors

The permittee must provide data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility. Data gaps pertinent to receptor analysis must be identified and provisions made in Subsection I.E of this attachment to obtain the relevant information to fill the data gap. The following characteristics must be identified at a minimum:

1. Current local uses and planned future uses of groundwater, including:

   (a) Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial); and

   (b) Location of groundwater users, to include withdrawal and discharge wells and springs, within one mile of the impacted area.

   The above information must also indicate the aquifer or hydrogeologic unit used or impacted for each item.

2. Current local uses and planned future uses of surface waters directly impacted by the facility, including:

   (a) Domestic and municipal uses (e.g., potable and lawn/gardening watering);

   (b) Recreational uses (e.g., swimming, fishing);

   (c) Agricultural uses;

   (d) Industrial uses; and

   (e) Environmental uses (e.g., fish and wildlife propagation).

3. Human use of or access to the facility and adjacent lands, including but not limited to the following:

   (a) Recreation;

   (b) Hunting;

   (c) Residential;

   (d) Commercial; and

   (e) Relationship of population locations and prevailing wind direction.

4. A general description of the biota in surface water bodies on, adjacent to, or affected by the facility.

5. A general description of the ecology within the area adjacent to the facility.

6. A general demographic profile of the people who use or have access to the facility and adjacent land, including, but not limited to age, sex, and sensitive subgroups.

7. A description of any known or documented endangered or threatened species near the facility.

E. Sampling and Analysis Plan(s) for Characterization of Releases of Hazardous Waste/Hazardous Constituents

The permittee must prepare a plan to document all monitoring procedures necessary to characterize the extent, fate, and transport of releases (i.e., identify sample locations, sample procedures, and sample analysis to be performed during the investigation to characterize the environmental setting, source, and releases of hazardous constituents, so as to ensure that all information and data are valid and properly documented). The sampling strategy and procedures must be in accordance with the most recent version of the EPA Region 4's Field Branches Quality System and Technical Procedures or an equivalent method approved by the Commissioner. Quality assurance samples must follow the most recent version of EPA Region 4 Field Services Branch's Field Sampling Quality Control. Data evaluations for purposed compliance must follow the Data Quality Objectives (DQOs) as outlined in the most recent version of "EPA's Guidance for Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)" . If a Risk Assessment is expected to be performed once release characterization is complete or nearly complete, Data Quality Objectives (DQO) for a Human Health Risk Assessment requires a DQO of Level 3 or greater.

The Sampling and Analysis Plan, at a minimum must specifically discuss the following unless a particular procedure in the Field Branches Quality System and Technical Procedure is directly referenced:

1. Sampling Design and Rationale

   (a) Rationale for choosing the sampling approach and method;

   (b) Rationale for obtaining all necessary ancillary data;

   (c) Rationale for determining conditions under which sampling must be conducted;

   (d) Rationale for determining which media are to be sampled (e.g.,

groundwater, air, soil, sediment, subsurface gas);

(e) Rationale for determining which constituents/parameters are to be measured and at which location(s);

(f) Rationale for selecting the frequency of sampling and length of sampling period; and

(g) Rationale for selecting the types of samples (e.g., composite vs. grab) and number of samples to be collected for each sampling location.

2. Sampling Procedures

(a) Documenting field sampling operations and procedures, including:

(i) Documentation of procedures for preparation of reagents or supplies that become an integral part of the sample (e.g., filters, preservatives, and absorbing reagents);

(ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;

(iii) Documentation of specific sample preservation method;

(iv) Calibration of field instruments;

(v) Submission of appropriate blanks (e.g., field, equipment, trip, etc.);

(vi) Potential interferences present at the facility;

(vii) Construction materials and techniques associated with monitoring wells and piezometers;

(viii) Field equipment listing and sampling containers;

(ix) Sampling order; and

(x) Decontamination procedures.

(b) Selecting appropriate sample containers;

(c) Sampling preservation; and

(d) Chain-of-custody, including:

(i) Standardized field tracking reporting forms to establish sample custody in the field prior to shipment;

(i) Pre-prepared sample labels containing all information necessary for effective sample tracking; and

(iii) Chain-of-custody seals for sample containers and coolers.

3. Sample Analysis

Sample analysis must be conducted in accordance with SW-846: Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, most recent version or an equivalent method approved by the Commissioner. The sample analysis section of the Sampling and Analysis Plan must specify the following:

(a) Chain-of-custody procedures, including:

(i) Identification of a responsible party to act as sampling custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;

(ii) Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and

(iii) Specification of laboratory sample custody procedures for sample handling, storage, and dispersement for analysis.

(b) Sample storage (e.g., maximum holding times);

(c) Sample preparation methods;

(d) Analytical Procedures, including:

(i) Scope and application of the procedure;

(ii) Sample matrix;

(iii) Potential interferences;

(iv) Precision and accuracy of the methodology; and

(v) Method Detection Limits; and

(vi) Practical Quantitative Limits.

(e) Calibration procedures and frequency;

(f) Data reduction, validation, and reporting;

(g) Internal quality control checks, laboratory performance and systems audits, and frequency, including:

(i) Method blank(s);

(ii) Laboratory control sample(s);

(iii) Calibration check sample(s);

(iv) Replicate sample(s);

(v) Matrix-spiked sample(s);

(vi) "Blind" quality control sample(s);

(vii) Control charts;

(viii) Surrogate samples;

(ix) Zero and span gases; and

(x) Reagent quality control checks.

(h) External quality control checks by TDEC, including:

(i) Spikes and blanks at sampling events for which TDEC or its technical representative provides oversight; and

(ii) The equivalent of a Contract Laboratory Program (CLP) data package for samples split with TDEC or for which TDEC specifically requests the data package.

(i) Preventive maintenance procedures and schedules;

(j) Corrective action (for laboratory problems); and

(k) Turnaround time.

F. Data Management Plan

The permittee must develop and initiate a Data Management Plan to document and track investigation data and results. This plan must identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan must also provide the format to be used to present the raw data, conclusions drawn from the analysis of samples and any trends found when evaluating the date (e.g., groundwater plume appears to be stable).

1. Data Record

The data record must include the following:

(a) Unique sample or field measurement code;

(b) Sampling or field measurement location and type;

(c) Sampling or field measurement raw data;

(d) Laboratory analysis ID number;

(e) Property or component measures; and

(f) Result of analysis (e.g., concentration, data qualifiers).

2. Tabular Displays and Trend Analysis

The following data must be presented in tabular displays:

(a) Unsorted (raw) data;

(b) Results for each medium or for each constituent monitored including any trends in the data;

(c) Data reduction for statistical analysis, as appropriate;

(d) Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

(e) Summary data.

3. Graphical Displays

The following data must be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

(a) Display sampling location and sampling grid;

(b) Indicate sampling boundaries and where more data are required;

(c) Display geographical extent of contamination, both horizontally and vertically;

(d) Illustrate changes in concentration in relation to distances from the source, time, depth, or other parameters; and

(e) Indicate features affecting inter-media transport and show potential receptors.

G. Project Management Plan - Schedule of Implementation

The permittee must prepare a Project Management Plan, which will cover qualifications of personnel categories and the management control structure for the project. The permittee must also provide a schedule for completing the planned RFI activities. The schedule must be as specific as possible (i.e., it must indicate the number of days/weeks/months required for each major work plan task).

II. RFI REPORT REQUIREMENTS - ELEMENTS OF THE RFI REPORT

The RFI Report must include, at a minimum, the following elements:

A. Introduction

The permittee must describe the purpose of the RFI Work Plan and provide a summary description of the project.

B. Environmental Setting

The permittee must describe the environmental setting in and around the facility. The RFI Work Plan must contain some, if not all, of the information on the environmental setting. Any information collected during implementation of the work plan that clarifies or improves understanding of the environmental setting must be provided in this section.

C. Source Characterization

The permittee must summarize the sources of contamination and nature of releases identified at the facility. The RCRA Facility Assessment and the RFI Work Plan must contain some, if not all, of the information on source characterization. Any information collected during work plan implementation or obtained from the sources (e.g., voluntarily or from other environmental programs) that directly addresses source characterization must be provided in this section.

D. Sampling and Analysis Results

The permittee must present data results obtained pursuant to the RFI Work Plan. The permittee must identify any work plan proposals which were not completed and explain why such actions were not finished. The permittee must also present its analysis/interpretation of how the sampling data meet the RFI objective and how the sampling data fits or modifies the contaminant conceptual model. For all analytical data, the permittee must discuss the results of data quality/data review.

E. Data Quality Assurance/Data Quality Data Review

The permittee must perform a Quality Assurance/Quality Control data review on all data present in the RFI. The Quality Assurance/Quality Control data review must be in accordance with the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA-540/R94-013) and the U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (EPA-540/R94-012). The data review must address the following, at minimum:

1. Holding times;

2. Blanks;

3. Laboratory Control Samples;

4. Field Duplicates;

5. Surrogate Recoveries;

6. Matrix Spike/Matrix Spike Duplicates; and

6. Data Assessment - Data Usability.

F. Conclusions

The permittee must summarize the major conclusions reached after analysis of the environmental setting, source characterization, sampling and analysis results, and

data quality. Any data gaps needed to complete characterization of the scope and extent of the releases from SWMUs or AOCs or to refine further the contaminant conceptual model, must be identified and recommendations made in the Recommendations section of the report.

G. Recommendations

The permittee must provide its recommendations on what, if any, further action is needed to complete the characterization of release(s) from SWMUs or AOCs.

H. Work Plan for Additional Investigations

If further investigations are determined to be needed to complete the objective of the RFI, then the permittee must provide a work plan to complete characterization of the release(s).

ATTACHMENT 10.3. CORRECTIVE MEASURE STUDY (CMS) OUTLINE

The purpose of the CMS portion of the hazardous waste corrective action process is to identify and evaluate potential remedial alternatives for the releases of hazardous constituents that have been identified at the facility through the RCRA Facility Investigation or other investigations that need further evaluation. The scope and requirements of the CMS are balanced with the expeditious initiation of remedies and rapid restoration of contaminated media. The scope and requirements of the CMS must be focused to fit the complexity of the site-specific situation. It is anticipated that permittees with sites with complex environmental problems may need to evaluate a number of technologies and corrective measure alternatives. For other facilities, however, the evaluation of a single corrective measure alternative may be adequate. Therefore, a streamlined or focused approach to the CMS may be initiated. Information gathered during any stabilizations or interim measures (IM), will be used to augment the CMS, and, in cases where corrective action goals are met, may be a substitute for the final CMS.

The requirements for a full, detailed CMS are listed below. TDEC has the flexibility not to require sections of the study, where site-specific situations indicate that all requirements are not necessary. Additionally, TDEC may require additional studies besides these discussed in order to support the CMS. The detail of a CMS may vary based upon the complexity of the site, on-going IM, established presumptive remedies, etc. However, the CMS Report may include the following elements:

I. CMS INTRODUCTION/PURPOSE

The permittee must describe the purpose of the CMS Report and provide a summary description of the project.

II. DESCRIPTION OF CURRENT SITUATION

The permittee must submit a summary and an update to the information describing the current situation at the facility and the known nature and extent of the contamination, as documented by the RFI Report. This discussion must concentrate on those issues which could significantly affect the evaluation and selection of the corrective measures alternative(s). The permittee must provide an update to information presented in the RFI regarding previous response activities and IM which have or are being implemented at the facility. The permittee must also make a facility-specific statement of the purpose for the response, based on the results of the RFI. The statement of purpose must identify the actual or potential exposure pathways that must be addressed by corrective measures.

III. ESTABLISHMENT OF PROPOSED CLEANUP OBJECTIVES

A. Clean up levels which are the site-specific concentrations in a given media that a final remedy must achieve for the remedy to be considered complete;

B. Points of compliance which represents where the media clean up levels are to be achieved; and

C. Remediation time frame which is the site-specific schedule for a remedy. It includes both the time frame to construct the remedy and estimate of the time frame to achieve the clean-up objectives at the point of compliance.

IV. IDENTIFICATION, SCREENING, AND DEVELOPMENT OF TECHNOLOGIES

The permittee must identify the corrective measure(s) and alternative measure(s) that are applicable to the facility and that will achieve the media clean up objectives. Technologies can be combined to form the overall corrective action measures and alternatives. The alternative or alternatives developed must represent a workable number of option(s).

A. Identification: List and briefly describe potentially applicable technologies for each affected media that may be used to achieve the corrective action objectives, including a table that summarizes the available technologies.

Note: The permittee must consider innovative treatment technologies, especially in situations where there are a limited number of applicable corrective measure technologies. Permittee must demonstrate the ability of the technology or the alternatives identified meet the clean-up objectives and the time frame to achieve the clean-up objectives at point of compliance.

B. Screening: The permittee must screen the corrective measure technologies to eliminate those that may prove infeasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measure objective within a reasonable time period. This screening process focuses on eliminating those technologies which have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent technology limitations.

Site, waste, and technology characteristics, which are used to screen inapplicable technologies, are described in more detail below:

1. Site Characteristics: Site data must be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics must be eliminated from further consideration.

2. Waste Characteristics: Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics must be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site).

3. Technology Limitations: During the screening process, the level of

technology development; performance record; and inherent construction, operation, and maintenance problems must be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

C. Corrective Measure Development: The permittee must assemble the technologies that pass the screening step into specific alternatives that have the potential to meet the corrective action objectives for each media. Options for addressing less complex sites could be relatively straight-forward and may only require evaluation of a single or limited number of alternatives. Each alternative may consist of an individual technology or a combination used in sequence (i.e., treatment train). Different alternatives may be considered for separate areas of the facility, as appropriate. List and briefly describe each corrective measure alternative.

V. EVALUATION OF FINAL CORRECTIVE MEASURE ALTERNATIVES

In evaluating the selected alternatives (i.e., those that passed through the screening step, including those situations when only one remedy is being proposed), the permittee must prepare and submit information that documents that each remedy will meet specific cleanup criteria. Using the guidance below, the permittee must provide detailed documentation of how all selected alternatives will comply with each of the following standards:

A. Protect Human Health and the Environment

Corrective action remedies must be protective of human health and the environment. Remedies may include those measures that are needed to be protective but are not directly related to media cleanup, source control, or management of wastes. An example would be a requirement to provide alternative drinking water supplies in order to prevent exposures to releases to an aquifer used for drinking water purposes. Therefore, the permittee must provide a discussion of any short-term remedies necessary to meet this standard, as well as discuss how the corrective measures alternative(s) meet this standard.

B. Attain Media Cleanup Standards

Remedies will be required to attain media cleanup standards. As part of the necessary information for satisfying this requirement, the permittee must address whether the potential remedy will achieve the remediation objectives. An estimate of the time frame necessary to achieve the goals must be included. Contingent

remedies may be proposed if there is doubt if the initial remedy will be successful (e.g., contingent remedies to innovative technologies).

C. Control of Sources of Releases

The permittee must address the issue of whether source control measures are necessary, and if so, the type of actions that would be appropriate. Any source control measure proposed must include a discussion on how well the method is anticipated to work given the particular situation at the facility and the known track record of the specific technology.

D. Comply with any Applicable Standards for Management of Wastes

The permittee must include a discussion of how the specific waste management activities will be conducted in compliance with all applicable state and federal regulations [e.g., closure requirements, Land Disposal Restrictions (LDRs)].

E. Other Factors

There are six general factors that will be considered as appropriate by TDEC in selecting/approving a remedy that meets the four standards listed above. The six decision factors and examples of the types of information to include in the CMS alternative evaluation are:

1. Long-term reliability and effectiveness: The permittee may consider whether the technology, or combination of technologies, have been used effectively under analogous site conditions, whether failure of any one technology in the alternative would have any immediate impact on receptors, and whether the alternative would have the flexibility to deal with uncontrollable changes at the site. Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. In addition, each corrective measure alternative must be evaluated in terms of the projected useful life of the overall alternative and of its component technologies. Useful life is defined as the length of time the level of effectiveness can be maintained.

2. Reduction in the toxicity, mobility, or volume of wastes: As a general goal, remedies will be preferred that employ techniques that can eliminate or substantially reduce the potential for the wastes in SWMUs or contaminated media at the facility to cause future environmental releases. Estimates of how the corrective measure alternative will reduce toxicity, mobility, and or volume of the waste is required and may be accomplished through a comparison of initial site conditions to expected post-corrective measures conditions.

3. Short-term effectiveness: The permittee must evaluate each corrective measure alternative for short-term effectiveness. Possible factors to consider are fire, explosion, exposure to hazardous constituents and potential threats associated with the treatment, excavation, transportation and re-disposal or containment of the waste material.

4. Implementability: Information to consider when assessing implementability include:

   (a) The administrative activities needed to implement the corrective measure alternative (e.g. permits, rights of way, etc.) and the length of time these activities will take;

   (b) The constructability, time for implementation, and time for beneficial results;

   (c) The availability of adequate off-site treatment, storage capacity, disposal services, needed technical services and materials; and

   (d) The availability of prospective technologies for each corrective measure alternative.

5. Cost: The permittee must develop an estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate must include both capital and operation and maintenance costs. The capital costs must include, but are not limited to, costs for: engineering, site preparation, construction, materials, labor, sampling and analysis, waste management and disposal, permitting, health and safety measures, etc. The operation and maintenance costs must include labor, training, sampling and analysis, site security, inspections, maintenance materials, utilities, waste disposal or treatment, etc. The corrective action cost estimate must be based on the costs to the permittee of hiring a third party to conduct corrective action activities and must include all direct costs and also all indirect costs, including contingencies. A third party is a party who is neither a parent nor a subsidiary of the permittee. Costs must be calculated as the net present value of the capital and operation and maintenance costs.

6. Community Acceptance: Keep interested members of the public informed of all corrective action activities taking place at the facility. Evaluate remedies based on the degree to which they are acceptable to the interested community.

VI. CORRECTIVE MEASURES JUSTIFICATION AND RECOMMENDATION

The permittee must justify and recommend in the CMS Report a corrective measure alternative for consideration by TDEC. Such a recommendation must include a description and supporting rationale for the preferred alternative that is consistent with the corrective action standards and remedy selection decision factors discussed above. In addition, this recommendation must include summary tables which allow the alternative or alternatives to be understood easily. Trade-offs among health risks, environmental effects, and other pertinent factors must be highlighted. The Commissioner will select the corrective measure alternative or alternatives to be implemented based on the results presented in the CMS Report.

VII. REPORTS

A. Corrective Measures Report

Permittee must prepare a draft and final Corrective Measures Study Report presenting the results of the study and recommending a corrective measures remedy and alternative(s) as required in Subsection VI.G in Section VI: Specific Conditions for Corrective Action.

B. Progress Reports

Permittee will submit bimonthly (60 day) progress reports as required in Paragraph VI.G.3 in Section VI: Specific Conditions for Corrective Action. The bimonthly (60 day) reports must, at a minimum contain the following information:

1. Description and estimate of the percentage of the CMS completed;
2. Summaries of all findings;
3. Summaries of all changes made in the CMS during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups, or state government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

ATTACHMENT 10.4. CORRECTIVE ACTION COMPLIANCE SCHEDULE

Compliance Schedule	Due Date
Notification of Newly Identified SWMUs and AOCs: *Paragraphs VI.B.1 and VI.B.2*	Within 15 calendar days of discovery
SWMU Assessment Report: *Paragraph VI.B.3*	Within 90 calendar days of notification
Notification for Newly Discovered Releases from SWMUs or AOCs: *Paragraph VI.C.1*	Within 15 calendar days of discovery
Confirmatory Sampling Work Plan for suspected AOCs identified under Paragraph VI.B.1 or SWMUs identified under Paragraph VI.B.4: *Paragraph VI.D.1*	Within 45 calendar days of notification by the Commissioner
Implementation of Confirmatory Sampling: *Paragraph VI.D.2*	As specified by Commissioner in the CS Work Plan approval letter
Confirmatory Sampling Report: *Paragraph VI.D.4*	In accordance with the schedule in the approved CS Work Plan
RFI Work Plan for SWMU(s) and AOC(s) identified under Paragraph VI.B.4, VI.C.2, or VI.D.5: *Subparagraph VI.E.1(a)*	Within 90 calendar days after receipt of notification by the Commissioner which SWMUs or AOCs require a RFI
Notify to implement RFI Sampling: *Paragraph VI.E.2*	Twenty days prior to any RFI sampling activity
Draft RFI Report: *Subparagraph VI.E.3(a)*	In accordance with the schedule in the approved RFI Work Plan
Final RFI Report: *Subparagraph VI.E.3(a)*	Within 30 calendar days after receipt of Commissioner's final comments on Draft RFI Report
RFI Progress Reports: *Subparagraph VI.E.3(d)*	*Quarterly, beginning 90 calendar days from the start date specified by the Commissioner
Interim Measures Work Plan: *Subparagraph VI.F.1(a) and VI.F.1(b)*	Within 30 calendar days of notification by the Commissioner

Compliance Schedule	Due Date
Interim Measures Progress Reports: *Subparagraph VI.F.3(a)*	In accordance with the approved Interim Measures Work Plan ** or semi-annually for permittee-initiated IM
CMS Work Plan: *Paragraph VI.G.1*	Within 90 calendar days of notification by the Commissioner that a CMS is required
Implementation of CMS Work Plan: *Paragraph VI.G.2*	No later than 15 calendar days after receipt of the Commissioner's approval of Plan
Draft CMS Report: *Paragraph VI.G.3*	In accordance with the schedule in the approved CMS Work Plan
Final CMS Report: Paragraph VI.G.4	Within 30 calendar days of the Commissioner's final comments on Draft CMS Report
Noncompliance / Imminent Hazard Report: *Subparagraph I.D.12(f)*	Oral within 24 hours and written within 5 calendar days of becoming aware of the hazardous circumstances

The above reports must be signed and certified in accordance with Tennessee Hazardous Waste Management Rules 0400-12-01-.07(2)(a)7 through 10.

* This applies to Work Plan execution that requires more than one hundred eighty (180) calendar days.

** This applies to Work Plan execution that requires more than one year.

ATTACHMENT 10.5. CORRECTIVE ACTION REMEDIES

This attachment provides the corrective action remedies to be implemented by the permittee for the solid waste management units (SWMUs) and areas of concern (AOCs) listed in Table 10.1-6 of Attachment 10.1. Currently there are no units at the facility that require implementation of a corrective action final remedy

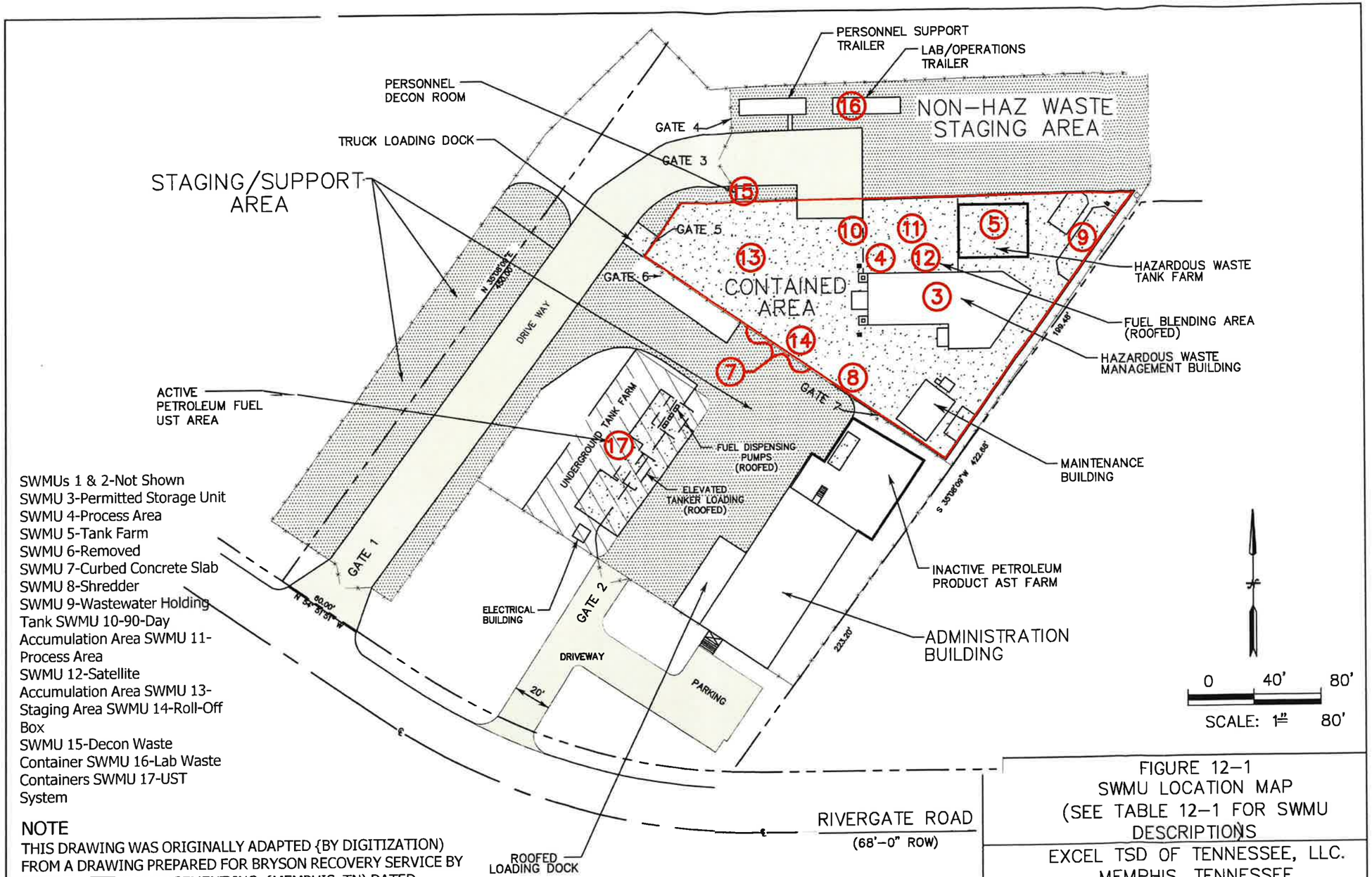
Figure 10-1

SWMU Location Map

TriAD Environmental Consultants, Inc.

"Figure 12-1 SWMU LOCATION MAP (SEE TABLE 12-1 FOR SWMU DESCRIPTIONS)"

Project Number: 07-EXC01-01
Date: 07/20/2020



SWMUs 1 & 2-Not Shown
SWMU 3-Permitted Storage Unit
SWMU 4-Process Area
SWMU 5-Tank Farm
SWMU 6-Removed
SWMU 7-Curbed Concrete Slab
SWMU 8-Shredder
SWMU 9-Wastewater Holding Tank SWMU 10-90-Day Accumulation Area SWMU 11-Process Area
SWMU 12-Satellite Accumulation Area SWMU 13-Staging Area SWMU 14-Roll-Off Box
SWMU 15-Decon Waste Container SWMU 16-Lab Waste Containers SWMU 17-UST System

NOTE

THIS DRAWING WAS ORIGINALLY ADAPTED {BY DIGITIZATION) FROM A DRAWING PREPARED FOR BRYSON RECOVERY SERVICE BY DELTA PROCESS MANAGEMENT INC. {MEMPHIS, TN) DATED 06/21/91, TITLED "FACILITY PLOT PLAN", AND NUMBERED EPA-1; AND HAS BEEN MODIFIED TO SHOW DETAILS OF THE LEASED PROPERTY BASED ON A PHOTOCOPY OF A DRAWING BY BDK & ASSOCIATES {MEMPHIS, TN) DATED 01/04/89 {REV. 02/05/99) AND TITLED "SURVEY OF LOT 1, PHASE 1, RIVERPORT SUBDIVISION".

LEGEND

- FIRE HYDRANT
- CHAIN-LINK FENCE
- PROPERTY BOUNDARY
- CONTAINMENT BERM/WALL
- GRAVEL
- ASPHALT
- CONCRETE
- (1) SWMU

SCALE: 1" = 80'

FIGURE 12-1
SWMU LOCATION MAP
(SEE TABLE 12-1 FOR SWMU DESCRIPTIONS)

EXCEL TSD OF TENNESSEE, LLC.
MEMPHIS, TENNESSEE

DR ALW CHK VJB REV CMS

PREPARED BY:

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615-889-6888 fax 615-889-4004

PROJ: 07-EXC01-01 DATE: 07/20/20 SHEET 1 OF 1

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ATTACHMENT 11. CLOSURE PLAN

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A. GENERAL

This Section is intended to comply with the Closure Plan requirements of Tennessee Rule 0400-12-01-.06(7)(c)2 [equivalent to 40 CFR § 264.112(b)]. It describes the steps necessary to perform partial and/or final closure of the permitted hazardous waste management units, including their secondary containment systems, at the Excel TSD of Tennessee, L.L.C., hazardous waste management facility ("ETSD" or "Facility"), at any point during the Facility's active life. The Facility is located at 550 Rivergate Road in Memphis, Shelby County, Tennessee, and holds EPA ID No. TND 980 847 024. The only types of hazardous waste management units employed at this Facility are container areas and tank systems.

This plan is written to describe final closure of all hazardous waste management units. However, the procedures for partial closure (i.e., one or more units) should be the same except that (1) the waste inventory and decontamination residues may be managed through ongoing operations on-site, and (2) secondary containment systems still in use will not be closed.

B. CLOSURE PERFORMANCE STANDARD

This Closure Plan describes procedures designed to achieve "clean" closure of the permitted hazardous waste management units at the facility by first processing or removing all hazardous wastes in inventory and then by removal or decontamination of all hazardous waste residues, and contaminated containment system components, equipment, structures, and soils. These activities will close the facility in a manner that meets the closure performance standard of Tennessee Rule 0400-12-01-.06(7)(b) [equivalent to 40 CFR § 264.111] by:

1. Minimizing the need for further maintenance; and

2. Controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

3. Complying with the closure requirements of Tennessee Rule 0400-12-01-.06(7)(d), (7)(e), (7)(f), (9)(i), and (10)(h) [equivalent to 40 CFR §§ 264.113, 264.114, 264.115, 264.178, and 264.197].

If "clean" closure cannot be achieved, then the portions of the ETSD facility where hazardous wastes or hazardous waste constituents will remain in place will be closed as a landfill pursuant to the requirements of Tennessee Rule 0400-12-01-.06(14)(k) [equivalent to 40 CFR § 264.310]. ETSD will promptly notify the Tennessee Division of Solid Waste Management of the determination that "clean" closure cannot be achieved and will pursue with the Tennessee Division of Solid Waste Management either a permit or some other enforceable document that addresses applicable closure and post-closure care requirements.

C. MAXIMUM INVENTORY OF HAZARDOUS WASTES

The maximum hazardous waste inventory for the Facility will be the sum of the maximum hazardous waste inventory in tanks and the maximum hazardous waste inventory in containers. The maximum hazardous waste inventory in permitted tanks F1 and F2 is the same as their design capacity – 6,000 gallons each for a total of 12,000 gallons. The maximum hazardous waste inventory in containers will be the sum of the Facility-wide maximum operating capacity of received hazardous wastes in containers and the anticipated maximum inventory of Facility-generated hazardous wastes that might be at the facility at any one time.

As described in Section III "Specific Conditions for Storage and Treatment in Containers", the Facility-wide maximum operating capacity of received hazardous waste in containers (total considering all three container management units) is 61,720 gallons. This volume may be present in any combination of container sizes ranging from tanker trucks and roll-off boxes to 1-gallon (or even smaller) cans. As stated in Section III, this limit is not based on unit design or secondary containment capacity limitations but is instead an arbitrary limit established for business reasons.

The anticipated maximum inventory of Facility-generated hazardous wastes is established as follows:

- One 6,000-gallon tanker truck of blended fuel = 6,000 gallons
- 18 tons of hazardous waste solids in a rolloff box destined for landfill disposal = 18 x 2000 lbs. = 36,000 lbs. x (1 cu. yd / 2700 lbs.) = 13.33 cy x (202 gal / cy) = 2,692 ≈ 2,700 gallons

  [Note: Regardless of the rolloff box volume, the amount is limited by the weight per load by U.S. DOT regulations.]
- 275 gallons (five 55G drums or equivalent) of contaminated PPE and/or used sorbent booms, pads, etc.
- 110 gallons (two 55G drums or equivalent) of lab wastes
- Total = 9,085 gallons

The maximum inventory of hazardous waste in containers is thus 52,635 + 9,085 = 61,720 gallons. Adding the maximum tank inventory of 12,000 gallons to this maximum container inventory yields a Facility maximum hazardous waste inventory of 73,720 gallons. It is expected that this maximum inventory of hazardous waste will reflect the "business mix" of hazardous waste types set forth in Table 11-1 below.

Table 11-1. Anticipated 'Business Mix' of Maximum Hazardous Waste Inventory	
WASTE TYPE	MAXIMUM QUANTITY
Marketable fuel in tanker truck or totes	6,000 gallons (facility-generated)
Fuel-candidate wastes in tanks F1 and F2	12,000 gallons
Fuel-candidate wastes in containers (50% solids, 50% liquids)	29,975 gallons (545 drums or equiv.)
Corrosive Liquids	4,565 (83 drums or equiv.)
Solids for landfill disposal	13,860 gallons (252 drums or equiv.) (includes 5 drums facility-generated)
Bulk solids for landfill disposal	2,700 gallons (in rolloff box) (facility-generated)
Miscellaneous for incineration (50% solids, 50% liquids)	4,620 gallons (84 drums or equiv.) (includes 2 drums facility-generated)

D. GENERAL CLOSURE PROCEDURES

1. General Sequence of Closure Activities

The Facility will be closed by the following sequence of activities:

(1) Engaging a qualified Professional Engineer to oversee all closure efforts and provide the required certification;

(2) Removal of remaining inventory of hazardous wastes;

(3) Decontamination of Tank Systems F1 and F2 in Tank Farm, with the subsequent use of Tank System F1 to accumulate decontamination fluids;

(4) Decontamination of portable equipment;

(5) Decontamination of equipment and structures, including secondary containment surfaces, within the Hazardous Waste Management Building;

(6) Decontamination of equipment and structures, including secondary containment surfaces, in the Outside Hazardous Waste Container Management Area;

(7) Decontamination of other equipment and structures, including secondary containment surfaces, within the Tank Farm;

(8) Proper disposal of accumulated decontamination fluids and re-decontamination of tank System F1;

(9) Inspection of secondary containment surfaces for potential release points;

(10) Investigation of underlying and/or adjacent soils at potential release points;

(11) Removal and proper disposal of contaminated soils and confirmatory sampling and analysis of residual soils; and

(12) Preparation and submission of certifications of closure

Each of these activities is described further in Subsection E. Closure Steps. All of these closure activities will be performed in compliance with applicable federal Occupational Safety and Health Administration ("OSHA") standards.

2. Decontamination Standards

Typically, only hard surfaces (e.g., concrete, asphalt, hard plastic, steel or other metal) will be decontaminated; other contaminated surfaces will simply be removed and containerized for disposal off-site as waste or debris. The extent to which a hard surface has to be decontaminated will depend upon its characteristics and intended fate, as set forth below. For tanks, piping, pumps, valves, containers, and other components or equipment with interior surfaces exposed to hazardous wastes, both exterior and interior surfaces will be considered.

(a) Contaminated Surfaces to be Removed

A contaminated hard surface (e.g., structural or equipment component) that is to be removed from the facility at closure must meet one of the following decontamination standards:

(i) *Decon Standard 1A* – If it is to be disposed of as a hazardous waste (e.g., shipped off-site for macroencapsulation and disposal in a hazardous waste landfill), it need not be decontaminated at all.

(ii) *Decon Standard 1B* – Contaminated metal (e.g., structural or equipment components) that will be reclaimed as scrap metal will be considered sufficiently decontaminated when loosely adhered materials have been removed (e.g., by Decon Method A and/or Decon Method B).

(iii) *Decon Standard 1C* – The surfaces of components and equipment that will be taken off-site and re-used for similar industrial/commercial purposes will be considered sufficiently decontaminated when loosely adhered materials have been removed by Decon Method A and/or Decon Method B and other decontamination steps required by the re-user have been met.

(iv) *Decon Standard 1D* – Except for RCRA-empty containers, a contaminated hard surface (e.g., structural or equipment component) that is to be disposed of at a nonhazardous solid waste landfill must be decontaminated as required by Tennessee Rule 0400-12-01-.10(3)(f)1(i) to a "clean debris surface", as defined in Table 1 of Tennessee Rule 0400-12-01-.10(3)(f). Pursuant to this rule, a "clean debris surface" means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

(b) Contaminated Surfaces to Remain

A contaminated hard surface (e.g., structural or equipment component) that is to be left at the clean-closed facility will be considered sufficiently decontaminated if it meets one of the following decontamination standards:

(i) *Decon Standard 2A* – The surface has been decontaminated as required by Tennessee Rule 0400-12-01-.10(3)(f)1(i) to meet the definition of "clean debris surface" found in Table 1 of Tennessee Rule 0400-12-01-.10(3)(f). Pursuant to this rule, a "clean debris surface" means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

(ii) *Decon Standard 2B* – The surface has been decontaminated by Decon Method B (pressure washing) and both of the following criteria have been achieved:

(A) All visible contamination (not including any applied protective coating) has been removed except for staining and/or minor residues in cracks, crevices, and pits; and

(B) Analysis of a representative sample of the final Decon Method B (pressure washing) rinsate for the parameters set forth in Table 11- 2. "Clean" Rinsate Criteria, by the most recent version of the specified USEPA analytical methods, shows concentrations less than or equal to the specified criteria. The final rinse from which such representative samples are to be collected must be performed using only clean potable water (i.e., unamended with detergents or other cleaning agents).".

TABLE 11-2. "CLEAN" RINSATE CRITERIA

PARAMETER	METHOD	CRITERION	ALTERNATE CRITERION*
Arsenic	6010B	MCL**	BGD + MCL**
Barium	6010B	MCL**	BGD + MCL**
Cadmium	6010B	MCL**	BGD + MCL**
Chromium	6010B	MCL**	BGD + MCL**
Lead	6010B	MCL**	BGD + MCL**
Mercury	7470A	MCL**	BGD + MCL**
Selenium	6010B	MCL**	BGD + MCL**
Silver	6010B	MCL**	BGD + MCL**
Volatile Organic Compounds (VOC)	8260B	MCL** if available, or RSL***	BGD + MCL**/RSL***
Semi-Volatile Organic Compounds (SVOC)	8270C	MCL** if available, or RSL***	BGD + MCL**/RSL***

* - The Alternate Criterion is based on a comparison to the background levels ("BGD") of the parameter in the potable decontamination water utilized. Background sample potable water source must be approved by DSWM prior to utilizing as a BGD.

** - MCL refers to the contaminant's drinking water Maximum Contaminant Limit at the time of closure. This will be the criterion if such is available for the contaminant.

*** - RSL refers to the contaminant's EPA Regional Screening Level for tap water at the time of closure. This will be the criterion if no MCL is available.

(iii) *Decon Standard 2C* – Visible residues (not including any applied protective coating but more than staining and/or minor residues in cracks, crevices, and pits) still remain on the surface, but the surface has been decontaminated by Decon Method B (pressure washing) and both of the following criteria have been achieved:

(A) Testing of a representative sample of the final Decon Method B (pressure washing) rinsate demonstrates that it meets the criteria in Table 11-2 above; and

(B) Analysis of representative sample(s) of the still-visible residues demonstrates that the residues do not exhibit the Hazardous Waste Toxicity Characteristic set forth at Tennessee Rule 0400-12-01-.02(3)(e). This will require that the samples first be subjected to the Toxicity Characteristic Leaching Procedure ("TCLP", USEPA Method 1311), and then that the resulting leachate be tested for the contaminants listed in the rule by USEPA-approved methods. The resulting measured contaminant concentrations must then be compared to the regulatory levels specified in the rule. For purposes of this determination, samples of the residues must be destructively obtained by drilling, scraping, scarification, grinding, spalling, or similar techniques. However, the depth of the removed samples may not exceed the diameter of the area sampled to ensure that the samples are representative of the actual surface.

3. Decontamination Methods

Contaminated hard surfaces (e.g., concrete, asphalt, hard plastic, steel or other metal) will be decontaminated using the methods below:

(a) Decon Method A

Hard surfaces will be initially decontaminated of gross contamination by manually removing – by scraping, shoveling, or sweeping – and placing into containers all loose and readily removable (by these methods) residues.

(b) Decon Method B

The contaminated hard surfaces will then be cleaned using a pressure washer capable of generating hot water and steam. Repeated cleaning passes and

increasing pressure and heat will be used until either the appropriate decontamination standard above is achieved or it is determined that more physically aggressive Decon Method C measures are needed. Potable water, amended as needed with detergents or other cleaning agents, will be utilized in this pressure washing. The pressure washer will be used to wash removed residues into sumps. The decontamination fluids and solid residues will be pumped from the sumps into containers or Tank F1. Alternatively, the fluids may be pumped from the sumps leaving the settled solid residues to be manually removed by shoveling them into containers. Solidification agents may be used to assist in such solids removal.

(c) Decon Method C

If the Decon Method B pressure washing proves to be inadequate to remove a residue from a contaminated hard surface, then more physically aggressive methods will be used to decontaminate the surface to the appropriate decontamination standard. This may include abrasive blasting (i.e., using water and/or air pressure to propel a solid media such as dry ice, steel shot, aluminum oxide grit, or plastic beads), mechanical scarifiers, or grinders to remove the surface layers of contamination. If abrasive blasting is utilized, shrouding will be constructed (e.g., with wooden framing and plastic sheeting or tarps) and utilized as appropriate to confine such operations to the smallest practicable area. Dry residues from a Decon Method C decontamination effort may be removed by sweeping and shoveling them into a container. However, unless the "clean debris surface" criterion of Decon Standards 1D or 2A above is met, a Decon Method C decontamination effort must always be followed by a Decon Method B (pressure washing) wash to ensure removal of loose residues and to enable the confirmation sampling required in the decontamination standards above.

4. Management of Decontamination Fluids and Solid Residues

The fluids and solid residues generated from decontamination efforts will be removed from the facility's containment units and placed into containers or Tank F1 for storage and characterization prior to off-site management. The generated decontamination fluids and solids may be bulked into larger containers (e.g., totes) or into Tank F1 for more cost- effective characterization and subsequent off-site management.

It is expected that the collected decontamination fluids (after settling of solids) will be disposed by discharge to the City of Memphis sanitary sewer system. All such discharge will be in accordance with permits or approvals granted by the City of Memphis Public Works Division. Representative samples of decontamination fluids will be collected and analyzed as required under such permits or approvals. If the testing results demonstrate that the decontamination fluids meet the discharge criteria,

then the fluids will be disposed of by discharge to the sanitary sewer system via the facility's on-site connection.

Fluids that cannot be discharged to the sanitary sewer and solid residues will be characterized, including sampling and analysis as needed, as either a hazardous waste or non-hazardous solid waste as set forth in Tennessee Rule 0400-12-01-.03(1)(b). Hazardous wastes will then be shipped to properly authorized hazardous waste management facilities for proper recycling, treatment, or disposal, with ETSD complying with applicable generator standards set forth in Tennessee Rule 0400-12-01-.03. Non- hazardous wastes will be shipped to properly authorized non-hazardous waste management facilities for proper recycling, treatment, or disposal, with ETSD complying with applicable "special waste" requirements pursuant to Tennessee Rule 0400-11-01-.01(4).

5. Management of Emptied Containers

At closure, containers holding hazardous wastes will be either rendered "RCRA-empty" as defined at Tennessee Rule 0400-12-01-.02(1)(g)2 or managed as part of the hazardous waste inventory as described below. RCRA-empty containers will be evaluated and sorted for either (1) off-site shipment to a drum reclamation facility with no further decontamination, (2) crushing and off-site shipment to a local nonhazardous solid waste landfill for disposal, (3) decontamination and crushing – as necessary – and off- site shipment as recyclable scrap metal, or (4) decontamination and shipment off-site for similar re-use as a container at a commercial or industrial facility. Crushing will be performed using the on-site portable drum crusher or using heavy equipment such as a backhoe or trackhoe. RCRA-empty containers to be reclaimed will be accumulated for subsequent off-site transport, while crushed containers destined for landfill disposal or metals reclamation will be accumulated in separate rolloff boxes or dumpsters. All such container crushing and decontamination activities will be performed within a permitted container management unit and the resulting decontamination fluids and solid residues will be managed as described in Subsection D.4 above.

E. CLOSURE STEPS

1. Engaging a Qualified Professional Engineer to Oversee and Certify Closure

Tennessee Rule 0400-12-01-.06(7)(f) requires that a qualified Professional Engineer must ultimately certify that a facility or unit "has been closed in accordance with the specifications in the approved closure plan. Therefore, prior to initiating closure activities, ETSD will acquire the services of a qualified Professional Engineer to provide this oversight and ultimately the required certification.

2. Removal of Hazardous Wastes in Inventory

At closure, the first step is to remove all hazardous wastes in inventory at the facility or unit. Already blended waste-derived fuels in inventory will be shipped off-site to properly authorized burners of such fuels. Fuel-candidate wastes will be either (1) processed into hazardous waste derived fuel on-site and shipped off-site to properly authorized burners of such fuels, or (2) directly shipped off-site to other properly authorized fuel-blending facilities. Corrosive liquid wastes will be either (1) processed on-site into non-hazardous wastewaters that will be discharged to the municipal sanitary sewer, (2) processed on- site into non-hazardous stabilized solids that will be disposed of at a local nonhazardous solid waste landfill, or (3) shipped off-site to other properly authorized hazardous waste treatment, storage, or disposal facilities for proper management. Non-fuel-candidate hazardous wastes will be shipped off-site to properly authorized hazardous waste treatment/disposal facilities for either treatment to meet land disposal restriction treatment standards followed by land disposal, or for incineration. The various types of other hazardous wastes on-site will be shipped off-site to properly authorized hazardous waste treatment, storage, or disposal facilities for proper management. All of these off-site shipping efforts may or may not involve on-site processing, to consolidate the wastes into larger containers/shipments for more cost-effective management. All on-site processing will be performed in accordance with applicable permit requirements, and all off-site shipping of hazardous wastes will be performed in accordance with the applicable generator standards of Tennessee Rules 0400-12-01-.03 and 0400-12-01-.10(g). This shall include the use of only transporters which hold valid hazardous waste transporter permits issued by the Tennessee Division of Solid Waste Management.

3. Decontamination of Tank Systems F1 and F2 in Tank Farm

After the facility's hazardous waste inventory has been removed, Tank Systems F1 and F2 in the Tank Farm will be decontaminated first. [Note: Following decontamination, Tank F1 will be used to hold Decon Method B (pressure washing) decontamination fluids (i.e., wash water) that will be generated from surface decontamination efforts until such fluids can be tested to confirm that the municipal sanitary sewer discharge criteria, if available, are met and then discharged to the sanitary sewer.] The contaminated external and internal surfaces of Tanks F1 and F2 and their associated piping, connectors, and valves will be decontaminated to the appropriate decontamination standard as described above using the decontamination methods as described above. It is expected that piping, connectors, and valves may only be decontaminated to Decon Standards 1A or 1B, but that Decon Method B (pressure washing) will readily achieve Decon Standard 2B or Decon Standard 2C on the external and internal surfaces of Tanks F1 and F2 themselves.

These decontamination efforts will be performed within the Tank Farm secondary containment, and the sump in the Tank Farm will collect the decontamination fluids and residues. Upon the completion of decontamination of Tank F1, the collected decontamination fluids may be pumped from the Tank Farm secondary containment into the decontaminated and re-assembled Tank F1 for holding, testing, and

discharge. Alternatively, the decontamination fluids may continue to be held in the Tank Farm secondary containment area for the few additional days necessary for completion of sampling and analysis to confirm compliance with sewer discharge criteria. The fluids will then be discharged to the sanitary sewer via the on-site connection.

The external surfaces of the tanks and ancillary equipment will first be decontaminated, and then the piping, connectors, and valves will be disconnected from the tanks and disassembled as necessary to enable decontamination of their internal surfaces. The decontaminated equipment necessary for further use of Tank F1 in holding decontamination fluids will be re-assembled (following decontamination of the tank interiors), while other equipment will be removed from the Tank Farm once appropriately decontaminated. The manways into Tanks F1 and F2 will then be opened to enable entry and decontamination of the interior surfaces, with the decontamination fluids and residues draining through the open bottom piping connection into the Tank Farm secondary containment. If possible, Tank F2 will be decontaminated without removal of the internal mixing blade, but the top-mounted motor and blade will be removed if necessary. All entry into Tanks F1 and F2 for decontamination purposes will be performed in compliance with the permit-required confined space entry provisions of 29 CFR § 1910.146.

Following each application or "pass" of Decon Method B (pressure washing), the surfaces will be inspected and any areas where visible residues still remain will be identified for further efforts. If it is determined that further efforts using Decon Method B (pressure washing) will be ineffective, any such areas will be marked and numbered to target them for either Decon Standard 2C residue testing or further decontamination using Decon Method C techniques. The identifying number will include either "F1" or "F2 to identify the tank involved and a sequential number (e.g., "F1-1", "F2-3"). For tracking purposes, any residue samples collected for Decon Standard 2C testing will also be identified by this number and the sampling date. Any areas where testing demonstrates that Decon Standard 2C has been achieved will be additionally marked or labeled with the identifier "2C" to indicate same, with such labeling to be maintained until certification of closure.

4. Decontamination of Portable Equipment

Following the processing and removal of hazardous wastes in inventory, contaminated portable equipment (e.g., forklifts, drum grapplers, drum crusher, drum dollies, process containers, pumps, hoses, piping, blended fuel strainers, hand tools) will be decontaminated to the appropriate decontamination standard as described above and using the decontamination methods as described above. To ensure maximum control over fluids and residues, the equipment will be moved into either Area A or Area B of the Hazardous Waste Management Building for the performance of the decontamination efforts, and the decontamination fluids and residues will be collected in the secondary containment sump. Contaminated non-portable equipment may also be disassembled and decontaminated in this manner.

Following decontamination, the equipment will be marked, labeled, or tagged to identify the decontamination standard targeted (i.e., 1A, 1B, 2B, etc.) and the date decontamination was performed. This marking, label, or tag must be maintained until the equipment is removed from the facility. No equipment targeted for Decon Standard 1D may be shipped off-site until approved by the certifying engineer.

5. Decontamination of Hazardous Waste Management Building

Once the portable equipment has been decontaminated, any contaminated permanent equipment, structural surfaces, and secondary containment surfaces within the Hazardous Waste Management Building will be decontaminated. The decontamination methods as described above will be used to decontaminate the contaminated surfaces to the appropriate decontamination standard as described above. It is expected that Decon Method B (pressure washing) will readily achieve Decon Standard 2B or Decon Standard 2C on such surfaces. The sumps in each secondarily contained area (Area A and Area B) will collect the decontamination fluids and residues. The vertical surfaces will be decontaminated first, followed then by the floor surface and finally the sump itself.

Following each application or "pass" of Decon Method B (pressure washing), the surfaces will be inspected and any areas where visible residues still remain (not including applied protective coating but more than staining and/or minor residues in cracks, crevices, and pits) will be identified for further efforts. If it is determined that further efforts using Decon Method B (pressure washing) will be ineffective, any such areas will be marked and numbered to target them for either Decon Standard 2C residue testing or further decontamination using Decon Method C techniques. The identifying number will include either "A" or "B to identify the building portion involved and a sequential number (e.g., "A-1", "B-2"). For tracking purposes, any residue samples collected for Decon Standard 2C testing will also be identified by this number and the sampling date. Any areas where testing demonstrates that Decon Standard 2C has been achieved will be additionally marked or labeled with the identifier "2C" to indicate same, with such labeling to be maintained until certification of closure.

6. Decontamination of Outside Hazardous Waste Container Management Area

The contaminated permanent equipment (such as the Disperser), structural surfaces (including the outside walls of the Hazardous Waste Management Building), and secondary containment surfaces within the Outside Hazardous Waste Container Management Area will be decontaminated to the appropriate decontamination standard as described above using the decontamination methods as described above. It is expected that Decon Method B (pressure washing) will readily achieve Decon Standard 2B (or perhaps Decon Standard 2C) on such surfaces. The decontamination fluids and residues will be collected in the sumps located off the northwest and southwest corners of the Hazardous Waste Management Building. Particular

attention will be given to the Disperser and to the nearby portions of the north exterior wall of the Hazardous Waste Management Building and the structural supports for the canopy over the Fuel Blending Area. Again, the internal surfaces of the collection sumps will be decontaminated last.

Following each application or "pass" of Decon Method B (pressure washing), the surfaces will be inspected and any areas where visible residues still remain (not including applied protective coating but more than staining and/or minor residues in cracks, crevices, and pits) will be identified for further efforts. If it is determined that further efforts using Decon Method B (pressure washing) will be ineffective, any such areas will be marked and numbered to target them for either Decon Standard 2C residue testing or further decontamination using Decon Method C techniques. The identifying number will include "O" to identify the unit involved and a sequential number (e.g., "O-1", "O-2"). For tracking purposes, any residue samples collected for Decon Standard 2C testing will also be identified by this number and the sampling date. Any areas where testing demonstrate that Decon Standard 2C has been achieved will be additionally marked or labeled with the identifier "2C" to indicate same, with such labeling to be maintained until certification of closure.

7. **Decontamination of Tank Farm Secondary Containment**

The interior surfaces of the Tank Farm secondary containment, along with contaminated portions of the concrete and steel tanks supports, will be decontaminated to the appropriate decontamination standard as described above using the decontamination methods as described above. It is expected that Decon Method B (pressure washing) will readily achieve Decon Standard 2B (or perhaps Decon Standard 2C) on such surfaces. The decontamination fluids and residues will be collected in the Tank Farm sump. Again, the internal surfaces of the collection sump will be decontaminated last.

Following each application or "pass" of Decon Method B (pressure washing), the surfaces will be inspected and any areas where visible residues still remain (not including applied protective coating but more than staining and/or minor residues in cracks, crevices, and pits) will be identified for further efforts. If it is determined that further efforts using Decon Method B (pressure washing) will be ineffective, any such areas will be marked and numbered to target them for either Decon Standard 2C residue testing or further decontamination using Decon Method C techniques. The identifying number will include "TF" to identify the containment area involved and a sequential number (e.g., "TF-1", "TF- 2"). For tracking purposes, any residue samples collected for Decon Standard 2C testing will also be identified by this number and the sampling date. Any areas where testing demonstrates that Decon Standard 2C has been achieved will be additionally marked or labeled with the identifier "2C" to indicate same, with such labeling to be maintained until certification of closure.

8. Proper Disposal of Accumulated Decontamination Fluids and Re-Decontamination of Tank System F1

Once decontamination of the Tank Farm secondary containment surfaces has been completed, the decontamination fluids that have been accumulated in Tank F1 will be disposed of as described in Paragraph 11.D.4 (Management of Decontamination Fluids and Solid Residues) above. The interior surfaces of Tank System F1 will then be re- decontaminated. It is expected that this can be done by application of Decon Method B (pressure washing) and without disassembly of the discharge piping, which will be used to drain decontamination fluids and minor accumulated solids into a container. The containerized decontamination fluids will then be disposed of as described in Paragraph 11.D.4 above.

9. Inspection of Secondary Containment Surfaces for Potential Release Points

Once the secondary containment surfaces of the Hazardous Waste Management Building, Outside Hazardous Waste Container Management Area, and Tank Farm have been appropriately decontaminated, those surfaces will be visually inspected for cracks, holes, or deterioration that could have allowed the passage of hazardous wastes or hazardous waste constituents into subsurface soils or onto adjacent surface soils. Particular attention will be paid to the collection sumps, whose grates will be removed to facilitate visual inspection. The outside perimeter of the Outside Hazardous Waste Container Management Area will be similarly visually inspected for cracks, holes, or deterioration, and for staining, stressed vegetation, or other evidence that hazardous waste or hazardous waste constituents may have penetrated or overflowed the containment barriers. Surface cracks will be further investigated using a probe (e.g., an ice pick) to evaluate their depth or by opening them up (e.g., with hammer and chisel or jackhammer) to remove surface materials and enable further visual inspection. These inspections will be performed by a qualified Professional Engineer or by a person directly supervised by such engineer. Potential release points will be identified in field notes, photographed, and marked in the field as appropriate. The TDSWM will be contacted at least 3 working days in advance of such inspections and provided an opportunity to participate.

10. Investigation of Underlying and/or Adjacent Soils at Potential Release Points

Using the potential release points – if any – identified in Step 9 above, the historically identified cracks and joints identified on Drawings C.1-1 and C.1-2 of the *Concrete Repair and Rehabilitation Plan for the Contained Area* in Attachment 8.6, and the results from the subsurface investigations performed as part of the implementation of concrete panel replacement efforts described in Attachment 8.6, a plan will be developed for investigating the soils underlying (and perhaps adjacent to) the secondary containment surfaces to determine if such soils have been significantly impacted by releases of hazardous wastes or hazardous waste constituents. This Subsurface Soil Investigation Plan will include soil sampling and analysis and data

evaluation as described in subparagraphs (a) through (d) below, and it will be developed by a qualified Tennessee-registered Professional Engineer or Tennessee-licensed Professional Geologist and implemented by the Engineer/Geologist or by a person directly supervised by the Engineer/Geologist. In developing the plan, the Engineer/Geologist will consult with appropriate Tennessee Division of Solid Waste Management staff in selecting the number and locations of sampling points. The procedure for establishing background soil concentrations of metals set forth in Attachment 11.1 will be implemented contemporaneously with this Subsurface Soil Investigation Plan.

(a) Sampling of Underlying Soils

Underlying soils must first be accessed for sampling, which may be accomplished in two ways depending upon accessibility and equipment availability or limitations. One way is to use a concrete saw, jackhammer, and/or backhoe equipped with a hoe-ram to cut or break up the concrete surface around the potential release point so that it can be removed to expose the underlying soil surface. Typically, an opening of at least two feet square (centered around the potential release point) will be created to allow easy access to the underlying soil surface for the collection of soil samples by hand. The second way is to use a truck-mounted boring rig –such as a hammer-capable direct-push rig (i.e., GeoProbe®) – to bore holes in the overlying concrete and then collect hollow-tube soil samples through the bored holes. Any concrete rubble removed and any excess cuttings from borings will be either containerized or staged on and under plastic sheeting for subsequent disposal following completion of soil sampling and analysis. Such materials will typically be characterized for disposal in the same manner as the underlying soils.

(i) *Sampling Via Concrete Removal*

If the concrete is removed to enable sampling, then the exposed underlying gravel (if any) and/or soil surface will be screened for organic vapors using the PID and visually inspected for residues or discoloration indicating a release. If any such indication of a release is observed, then a sample or samples of soil for VOC, SVOC, and Metals analysis will be obtained using the appropriate Field Procedures as described in the most recent version of the *Quality System and Technical Procedures for LSASD Field Branches* ("QSTP") maintained by the Laboratory Services and Applied Sciences Division of the U. S. Environmental Protection Agency Region 4 at https://www.epa.gov/quality/quality-system-and-technical-procedures- lsasd-field-branches.

Soil samples will be collected as described in applicable portions of the QSTP's "Soil Sampling Operating Procedure" and managed as described in applicable portions of the QSTP's "Sample and Evidence Management Operating Procedure".

The sampling tools to be utilized must have been cleaned and decontaminated before use as described in applicable portions of the QSTP's "Field Equipment Cleaning and Decontamination Operating Procedure". Wastes generated during the soil sampling activities will be managed as described in applicable portions of the QSTP's "Management of Investigation Derived Waste Operating Procedure".

Field notes will be maintained as described in applicable portions of the QSTP's "Logbooks Operating Procedure".

(ii) *Sampling Via Boreholes*

If soil samples are retrieved by boring, then at least three locations will be selected and marked at and closely around each identified potential release point. The boring rig will then be used to bore a hole through the concrete and any underlying gravel. Alternatively, a special concrete cutting saw or drill may be used to open such a hole. Each created hole will be screened for the presence of organic vapors using the PID. A decontaminated, hollow, stainless steel sampling tube, equipped with a new, removable acetate liner, will then be fixed to the end of the boring stem and pushed into the underlying soil, forcing a column of soil into the sampling tube. The sampling tube will then be retrieved and the soil-filled acetate liner will be removed and both ends will be capped to prevent loss of sample. The top of the soil column in each acetate tube will then be visually inspected for non-soil residues or discoloration and such observations noted. The top end of each sleeve will also be briefly uncapped and tested for VOC emissions using the PID.

If PID readings, visible residues, or discoloration indicative of a release are observed, then a sample or samples of soil for VOC, SVOC, and Metals analysis will be obtained following the same QSTP field operating procedures identified in Part 11.E.10(a)(i) above.

(b) Sampling of Adjacent Surface Soils

If the inside or outside inspection of the perimeter of the Outside Hazardous Waste Container Management Area indicate a potential release to the adjacent surface soils, then samples will be collected from the impacted soil surface.

If visible residues or discoloration exists, then a sample or samples of soil for VOC, SVOC, and Metals analysis will be obtained following the same QSTP field operating procedures identified in Part 11.E.10(a)(i) above.

(c) Analysis of Collected Soil Samples

All collected samples will be transported or shipped, using proper chain-of-custody procedures, to a qualified commercial analytical laboratory for analysis. The soil samples will be analyzed for the analytical parameters and by the latest USEPA methods set forth in Table 11-3 below.

TABLE 11-3. SOIL SAMPLE ANALYTICAL PARAMETERS

SAMPLE GROUP	PARAMETERS	METHOD
Group B – RCRA Metals	Arsenic	6010B
	Barium	6010B
	Cadmium	6010B
	Chromium	6010B
	Lead	6010B
	Mercury	7471A
	Selenium	6010B
	Silver	6010B
Group C – Volatile Organic Compounds	Full Suite	8260B
Group D – Semi-volatile Organic Compounds	Full Suite	8270C

(d) Evaluation of Soil Sampling and Analysis Results

The soil sampling and analysis results must be evaluated to determine if hazardous wastes or hazardous waste constituents are present in the soils at levels which pose a significant threat to human health or the environment. This will be accomplished by comparing the analytical results for potential release point soil samples to the results for background soil samples and to the Regional Screening Levels ("RSL") values for the analytes established. These RSL values, found at the "Regional Screening Levels For Chemical Contaminants at Superfund Sites" screening level/preliminary remediation

goal website https://www.epa.gov/risk/ regional-screening-levels-rsls, are risk-based levels that serve as very protective guidelines for initially screening soil sampling and analytical results for the threat the contaminants might pose to humans.
To determine if any further action is necessary: (1) analytical results for the RCRA Metal parameters will be compared both to background levels and to the RSLs, and (2) analytical results for the other constituents (VOCs and SVOCs) will be compared to their RSLs. The RSLs to be utilized for this initial soil removal determination are those for the constituent's "Resident Soil" RSL calculated for a target cancer risk (TR) of 1E-06 (for carcinogens) or a target hazard quotient (THQ) of 1.0 (for systemic toxins). As appropriate, statistical methods such as those set forth in the U.S EPA statistical program *ProUCL Version 5.1* will be utilized in evaluating the data.

11. Contaminated Soil Removal and Confirmation Sampling and Analysis

If the investigations as described above find soils that contain RCRA Metals at concentrations greater than the higher of the metal's established soil background level or the metal's Resident Soil RSL (at TR=1E-06 or THQ=1.0), or VOCs or SVOCs at concentrations greater than the constituent's Resident Soil RSL (at TR=1E-06 or THQ=1.0), then an attempt shall be made to remove such soils and confirmation sampling and analysis of the newly exposed soil surface must then be performed to determine if the removal effort was successful. It is expected that these efforts will be planned by a qualified Tennessee-registered Professional Engineer and overseen and/or performed by the Engineer or someone under his/her direct supervision. These soil removal actions will focus on removing all such contaminated soils through over-excavation, which may require the removal of larger portions of the concrete secondary containment surface. Depending upon the amount of soil to be removed, accessibility, equipment availability, and health and safety concerns, the soil removal will be accomplished using hand shovels and/or a backhoe or trackhoe and the removed soils will be containerized in either 55- gallon steel drums or rolloff boxes (both U.S. DOT-approved) for characterization, storage, and off-site transport for disposal. A PID will be used both for screening soils for removal and for monitoring of organic vapors in the breathing zone as described above. The personnel involved in the removal efforts must all have completed OSHA HAZWOPER training, and proper protective personal equipment ("PPE") must be utilized. A Site Safety and Health Plan will be developed and followed for this effort.

Following the initial soil removal effort, additional samples will be collected from the newly exposed soil surface and tested to confirm whether the contamination has been adequately removed. Depending upon the size and shape of the excavation, three or more soil samples will be collected as described in Subparagraph 11.E.10.(a) above, with the objectives of evaluating both the bottom and the sides of the excavation to confirm that all significant contamination has been removed. The collected samples

will be analyzed for the parameters from Table 11-3 above, except that a parameter group can be excluded if none of the parameters within the group were found in the initial samples. Laboratory results will again be evaluated as described in Subparagraph 11.E.10.(d) above.

If determined to be necessary (based on the confirmation sampling and analysis results), additional soil will be removed and the confirmation sampling and analysis and data evaluation will be repeated. At some point in this iterative process, the data evaluation will compare the confirmation soil sampling and analysis results not only with the identified constituents' RSL for "Resident Soil" (at TR=1E-06 or THQ=1.0) but also with the constituents' RSL for "Industrial Soil" (at TR=1E-06 or THQ=1.0). This will continue until the evaluation of the confirmation sampling and analysis data determines that either:

- The concentrations of RCRA Metals in the residual soils do not exceed the higher of the established background levels or the "Resident Soil" RSLs for such metals, and the concentrations of VOCs or SVOCs in the residual soils do not exceed the "Resident Soil" RSLs for such organic constituents – Upon such occurrence, Excel will collaborate with the TDSWM to determine whether the concentrations of VOCs in the residual soils are sufficient – without use of mitigation measures – to pose a potentially significant risk to human health via the vapor migration pathway.

    - If it is determined that there is also no significant risk via the vapor intrusion pathway, then the desired "clean closure" shall have been achieved and no further soil removal/decontamination and testing or other action to address soil contamination is required.

    - If it is determined that the concentrations in the residual soils do pose a significant potential risk via the vapor intrusion pathway, then a less desirable form of "clean closure" shall have been achieved that requires no further soil removal and testing but will likely require the addition of a notation on the property deed describing the vapor migration threat and requiring that appropriate measures to mitigate the vapor intrusion threat be utilized in the design and construction of any future structures intended for human occupancy over or near the VOC-contaminated soils.

- The concentrations of RCRA Metals in the residual soils do not exceed the higher of the established background levels or the "Industrial Soil" RSLs for such metals, and the concentrations of VOCs or SVOCs in the residual soils do not exceed the "Industrial Soil" RSLs for such organic constituents – Upon such occurrence, a less desirable form of "clean closure" shall have been achieved that requires no further soil removal and testing but will likely require the addition of a notation on the property deed that restricts the use of the property for residential and other more sensitive uses. Further, if VOCs remain present in the residual soils, another notation on the property deed will likely be required that restricts the construction

of any future structures intended for human occupancy over or near the VOC-contaminated soils unless and until either (1) it has been demonstrated that the VOC concentrations in the residual soils are not sufficient to pose a significant threat of vapor intrusion into such structures or (2) the design and construction of such structures have incorporated appropriate measures to mitigate the vapor intrusion threat.

- It is not feasible to remove all of the contamination by soil removal and thus achieve either form of "clean closure" – Upon such determination, ETSD is required to submit an alternate Closure Plan for closing the remaining area with contaminated soils as a landfill as described in Subsection B of this Plan.

The removed soils, along with the associated concrete removal residues and excess cuttings (if any) from the investigation efforts must be characterized for proper off-site disposal as either a hazardous or nonhazardous waste. Additional sampling and analysis may be required to make the hazardous waste determination as set forth in Tennessee Rule 0400-12-01-.02(1)(b). Hazardous wastes will then be shipped to properly authorized hazardous waste management facilities for proper treatment and/or disposal, with ETSD complying with applicable generator standards set forth in Tennessee Rule 0400-12-01-.03. Non-hazardous wastes will be shipped to properly authorized non-hazardous waste management facilities for proper disposal, with ETSD complying with applicable "special waste" requirements pursuant to Tennessee Rule 0400-11-01-.01(4).

12. Preparation and Submission of Certifications of Closure

If "clean closure" by removal and decontamination is achieved as desired and expected, within 60 days of completion of the above-described closure activities, a Closure Report will be prepared and submitted to the Tennessee Division of Solid Waste Management which describes the closure activities performed and includes copies of pertinent documentation such as manifests, laboratory analysis reports, site plans with soil sampling locations, etc. Accompanying the Closure Report will be a letter(s) signed both by ETSD and a qualified Professional Engineer certifying that the facility has been closed in accordance with the specifications of the approved closure plan.

F. SCHEDULE FOR CLOSURE IMPLEMENTATION

Unless longer time periods are requested and approved as set forth in Tennessee Rule 1200-1-11-.06(7)(d), ETSD will implement final closure in accordance with the following schedule:

DAY	EVENT
0	Receive final shipment of hazardous waste.

30	Hire a qualified Professional Engineer.
90	Complete removal of hazardous waste inventory.
110	Complete decontamination of Tank Systems F1 and F2.
145	Complete decontamination of portable equipment, Hazardous Waste Management Building, Outside Hazardous Waste Container Management Area, and Tank Farm Secondary Containment.
155	Complete inspection of secondary containment surfaces for potential release points and initial soil sampling.
180	Complete (if necessary) removal of contaminated soils and confirmation sampling and analysis.
240	Submit Closure Report and certifications of closure

Attachment 11.1

PROCEDURE FOR ESTABLISHING BACKGROUND SOIL CONCENTRATIONS FOR METALS AT CLOSURE

PROCEDURE FOR ESTABLISHING BACKGROUND SOIL CONCENTRATIONS FOR METALS AT CLOSURE

I. Purpose/Scope

This document describes how background soil concentrations will be established for use in evaluating the results from soil investigations performed at potential release points during closure of the Excel TSD of Tennessee, L.L.C. ("ETSD") facility located at 550 Rivergate Road in Memphis, Shelby County Tennessee. The efforts described in this procedure will be implemented contemporaneously with such soil investigations to establish statistically meaningful Background Threshold Levels ("BTVs") for the eight metals identified as soil sample analytical parameters (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) in the *Closure Plan* for the ETSD facility. The metal concentrations found in soils at the potential release points will be compared to these BTVs to determine if potentially significant releases have occurred.

II. Background Soil Sampling Locations

Five soil sampling locations will be randomly selected from the inactive portions of the ETSD site north and east of the ETSD Active Area and the adjacent industrial property currently occupied by Stericycle, Inc. (see the "Full Facility Layout" drawing of the facility). These portions of the site are undeveloped and mostly wooded and swamply. The specific sampling locations will be selected by the sampling team to avoid storm water drainage ways from the two industrial properties and to try to minimize likely encounters with large tree roots. Each specific sampling location will be visibly marked with a pin flag or stake and then photographed from a distance of 10-20 feet to show the characteristics of the sampling location. The approximate locations of the sampling locations will also be marked on an aerial photograph or sketch of the area. The sketch or aerial photo, and the photos of the sampling locations, will be provided in the work plan for prior approval by DSWM before sampling takes place. These maps will also be included in the final report.

III. Collection of Soil Samples

At each sampling location, a decontaminated hand auger will be used to collect two soil samples, one from the approximately 6-inch depth and one from the approximately 12-inch depth. A total of 10 samples will thus be collected and submitted for laboratory analysis. The samples will be collected and handled using the protocols for such methodology established (for metals testing) in the
U.S. EPA, Region 4, SESD, Athens, Georgia, *Field Branches Quality System and Technical Procedures, Soil Sampling Document* (or successor guidance required by the overseeing agency at the time of facility closure).

IV. Analysis of Collected Soil Samples

All of the collected soil samples will be transported or shipped, using proper chain-of-custody procedures, to a qualified commercial analytical laboratory for analysis. Each sample will be analyzed for its total concentrations of Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, and Silver by U.S. EPA Method 6010B and for its total concentration of Mercury

by U.S. EPA Method 7471A (or by successor analytical methods required by the overseeing agency at the time of facility closure).

V. Establishment of BTVs

The laboratory results will be processed using the U.S EPA statistical program *ProUCL Version 5.1* (or by a successor statistical program required by the overseeing agency at the time of closure) to identify and eliminate outlier data and then calculate the Upper Tolerance Limit ("UTL") and the Upper Simultaneous Limit ("USL") for each of the eight metals using either parametric or non-parametric tests. The greater of either the 95 percent TL with 95 percent coverage (UTL95-95) or the 95 percent USL with 95 percent coverage for each metal will be identified as the Background Threshold Value ("BTV").

ATTACHMENT 12. SOIL SAMPLING PLAN

Excel TSD of Tennessee, LLC
Memphis, Tennessee

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I. SOIL MONITORING PROGRAM

This plan describes the soil monitoring program for the Excel TSD of Tennessee LLC's (ETSD) facility located in Memphis, Tennessee. The main objective of the soil sampling program is to sample the soils located immediately below the concrete secondary containment structure(s) to determine whether historical Site operations have contaminated the soils and/or groundwater at the Site. This monitoring program will be implemented for establishing background concentrations of RCRA Metals in the soil(s) at the Facility, for any concrete secondary containment repair(s), if applicable, and during closure of the facility.

The Soil Monitoring Program includes a Soil Sampling Plan (SSP) for establishing Site-specific background concentrations of RCRA Metals and for use in evaluating the results from soil investigations performed at potential release points discovered during concrete containment structure repairs and/or during closure of the Facility.

Site-specific sampling rational and objectives, sampling procedures and techniques, sampling locations and depths, constituents of concern, analytical test methods, field documentation, sample packaging and shipping, chain-of-custody, quality assurance/quality control, data evaluation and validation, and reporting requirements are included in this soil monitoring program and SSP.

ETSD will notify the Tennessee Division of Solid Waste Management (DSWM) 5 business days prior to a sampling event.

II. SAMPLING RATIONALE AND OBJECTIVES

ETSD is an existing commercial hazardous waste storage and treatment facility thar receives various hazardous wastes from multiple commercial, industrial, institutional, and governmental hazardous waste generators in the mid-south region. ETDS is considered a "first tier" commercial facility that typically receives wastes in containers directly from generators, performs limited or no processing of such wastes, and then ships the wastes back out in containers (generally larger) to other properly authorized facilities for recycling, treatment, or disposal. The only hazardous waste management operations performed at the Facility are storage and treatment in containers and aboveground tanks. No incineration or disposal occurs at the Facility.

ETSD's primary operation is blending of hazardous waste-derived fuels from various wastes received and then shipping the blended fuels to cement kilns or other properly authorized burners of such hazardous waste-derived fuels. ETSD also consolidates various compatible wastes into larger U.S. DOT-approved containers for economical transportation and/or off-site recycling, treatment, or disposal at other authorized hazardous waste management facilities. ETSD performs emptying of pressurized containers and manual shredding of containers that cannot otherwise be emptied. ETSD also performs some neutralization and stabilization of corrosives in containers, with the treated residues shipped as solid waste to a non-hazardous landfill.

The potential exists for the hazardous wastes stored in containers to have been spilled or to have leaked from containers onto the ground surface and infiltrate the concrete secondary containment

below through cracks or other preferential pathways and means to contaminate the underlying soils and/or groundwater.

The objective of the Soil Sampling Plan (SSP) is to investigate and identify Site-specific background concentration of RCRA Metals and to investigate any areas of potential contamination underlying the concrete secondary containment structure(s) in the soils due to a release or spill migrating from the concrete containment structure (i.e., joints, cracks, etc.) from historical site operations. This objective will be obtained by conducting a soil sampling event(s) during any concrete secondary containment repair project(s) and/or during future site closure operations.

Soil sampling will be conducted in phases. The phased approach will allow ETSD to determine the horizontal and vertical extent of contamination, if any is discovered. Once the extent of contamination is determined, the contaminated soil will be removed to prevent contamination from potentially reaching the groundwater table. Phase 1 involves determining Site-specific background threshold values (BTVs) for metals at the Facility. Phases 2, 3, 4, etc. involve investigating the soil(s) underlying the concrete containment structure and will be implemented during any repair work(s).

A. Phase 1

Phase 1 will focus on determining Site-specific background concentrations of eight RCRA Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), hereinafter referred to as Background Threshold Values (BTVs). These BTVs will be used in subsequent sampling phases (Phase 2, 3, 4, etc.), if applicable, for evaluating the results from soil investigations performed at potential release/spill points during closure and concrete containment repair work at ETSD to determine if a significant release(s) have occurred.

B. Phase 2

Phase 2 involves field screening the underlying soil(s) for organic vapors and visually for staining or other indicators that waste materials may have migrated onto the surface or subsurface; it involves sampling and analysis of at least one soil sample per defined area (i.e., every 3' x 3' square grid) at 0-6 inches below ground surface (bgs) immediately underlying the excavated or repaired concrete containment area(s) (i.e., joints, seals, cracks, fractures, edges, corners, etc.). Soil samples will be analyzed for the RCRA Metals,for volatile organic compounds (VOCs), and for semi-volatile organic compounds, which are referred to as constituents of concern (COCs). If a Phase 2 soil sample has a concentration of a COC above its respective protective level, additional sampling will be conducted in that same location. If a Phase 2 soil sample location does not have any COC exceeded its respective protective level, no further sampling will be needed at that location.

C. Phase 3

Phase 3 involves sampling and analysis of soil samples collected from the same Phase 2 soil sample locations/grid which had concentrations of COCs above protective levels. Phase 3 samples will be collected from the 6–12-inch bgs interval. If a Phase 3 soil sample has a concentration of a COC above its respective protective level, additional sampling will be conducted in that same location/grid. If a Phase 3 soil sample location does not have any COC exceeded its respective protective level, no further sampling will be needed at that location.

D. Additional Phases

Additional phases (i.e., Phase 4, Phase 5, etc.,) of soil sampling will occur if the Phase 3 soil samples have concentrations of COCs that exceed their respective protective levels. Additional phases of soil sampling will continue at 6-inch depth intervals (or an alternative depth interval with prior written approval from the Commissioner) until either soil is reached where concentrations of COCs do not exceed their respective protective levels, or until groundwater is reached.

If the analytical results of soil samples collected during concrete containment repairs indicates that COCs are present in the top 0-6 inches of soil (Phase 2) directly underlying the concrete containment structure, the subsurface soil from 6-12 inches in depth below the ground surface (bgs) will be collected and sampled. If the subsurface soil sample(s) collected from 6-12 inches bgs do not exceed protective levels then only the top 6 inches of soils will be removed, and no further sampling will be conducted. If the subsurface soil samples collected from 6-12 inches bgs show contamination above protective levels, then the subsurface soils from 12-18 inches bgs and will be collected and sampled following the same logic. This phased approach will continue until either soil is reached where concentrations of metals do not exceed protective levels, or until groundwater is reached.

If soil contamination is found to have reached the groundwater table, ETSD will notify the Commissioner in writing (within 5 calendar days of discovery) that there is a potential for groundwater impacts and immediately implement interim controls in accordance with the Corrective Action requirements of the ETSD Permit No. TNHW-____, and develop, implement, and submit to the Commissioner for approval, a groundwater monitoring program (and associated Permit Modification request) that complies with the groundwater monitoring requirements of Tennessee Rule 0400-12-01-.06(6), and the permit modification requirements of Tennessee Rule 0400-12-01-.07(9).

[Note: Since each sampling location associated with the concrete containment repair(s) could have highly variable concentrations of COCs, if present, and areas with variable depths of soil/depths to groundwater, there is no set limit to how many sampling phases there will be. Soil sampling will continue in 6-inch intervals (or other depth interval approved in writing by the Commissioner) until either soil is reached with concentrations of metals below applicable U.S. EPA Residential and Industrial Regional Screening Levels (RSLs) and/or BTVs for metals, or until groundwater is

reached. If contamination has reached the groundwater, additional actions will immediately be taken as required by Section IV. Specific Conditions for Corrective Action.]

III. SAMPLE LOCATIONS

A. Background Soil Sampling Locations

Five soil sampling locations will be randomly selected from the inactive portions of the ETSD Facility (i.e., north and east of ETSD's Active Area and adjacent to the industrial property currently occupied by Stericycle, Inc. (see the "Full Facility Layout" drawing of the facility) that are known, or reasonably suspected to be free from contamination. These portions of the Facility are undeveloped, and mainly contains woods and swamplands. The specific sampling locations will be selected by the sampling team to avoid storm water drainage pathways from the two adjacent industrial properties and to minimize likely encounters with large tree roots. Each specific sampling location will be visible marked with a pin flag or stake, GPS coordinates will be collected, and the location will be photographed from a distance of 10-20 feet to show the characteristics of the sampling location. The approximate sampling locations will be marked on an aerial photograph/map of the Facility and will be included in the Final Report.

B. Concrete Containment Repair Soil Sampling Locations

The area of soil exposed by the removal and repair of the existing concrete containment structure during each phase of implementation of ETSD's Concrete Repair and Rehabilitation Plan (CRR Plan) will be investigated for potential contamination. The repair work will be performed in a series of "Work Areas" that will be isolated from on-going facility operations, and each planned phased of the work may involve more than one such "Work Area". Each specific sampling location will be visible marked with a pin flag or stake (or other means of permanent marking), GPS coordinates will be collected, and the location will be photographed from a distance of 10-20 feet to show the characteristics of the sampling location. The approximate sampling locations will be marked on an aerial photograph/map of the Facility and will be included in the Final Report.

IV. SAMPLING PROCEDURES AND TECHNIQUES

Samples and measurements taken for the purpose of monitoring will be representative of the monitored activity. The methods used to obtain, pack, mark, label, and ship a representative waste or media sample to be analyzed will be the appropriate methods from Appendix I of Rule 0400-12-01-.02(30) and the EPA Region 4 Science and Ecosystem Support Division's Field Branches Quality System and Technical Procedures (most recent version), or an equivalent method approved by the Commissioner. The type and size of containers for each constituent/parameter, the methods of preservation, holding times, and other sample preparation requirements used to prepare and preserve representative samples to be analyzed, will be the appropriate methods from EPA Region 4 Science and Ecosystem Support Division's Laboratory Operations and Quality Assurance Manual (most recent version). The methods used to handle and manage samples and other types of evidence after their collection and during delivery to the laboratory will be the appropriate

methods from EPA Region 4 Science and Ecosystem Support Division's Field Branches Quality System and Technical Procedures Sample and Evidence Management Operating Procedure (most recent version), or an equivalent method approved by the Commissioner. Methods for the collection and handling of air, gas, or vapor samples must receive prior approval by the Commissioner. The laboratory methods will be those specified in the most recent edition of Test Methods for Evaluating Solid Waste: Physical/ Chemical Methods, SW-846, or an equivalent method approved by the Commissioner.

Each sampling phase will involve site preparation prior to sampling, including any utility clearance and clearing/grubbing/trimming vegetation (if applicable), sample collection tasks, quality control tasks, equipment decontamination, investigative derived waste tasks, land surveying, analytical tasks, data management and review tasks, and potentially corrective actions in the event that field conditions are different than expected. Samples for VOC (volatile organic compounds) analysis will not be homogenized.

A. Phase 1

1. Site Preparation

Phase 1 will involve site preparation prior to sampling, including any utility clearance and clearing/grubbing of vegetation. Mobilization efforts will include, but are not limited to, obtaining supplies and equipment, conducting a field kickoff meeting covering sampling activities, and designating laydown and decontamination areas. The field kickoff meeting may be held prior to mobilization to discuss project scope, health and safety requirements, drilling procedures, sampling procedures, status of submittals and procurements, and quality control (QC) protocols. A project stating area and an investigation-derived waste (IDW) storage area will be designated in an area known to be free from contamination.

2. Utility Clearance

Underground utility clearance will be performed in areas known or thought to contain either underground or aboveground utilities by a third-party utility locator prior to conducting any samplings.

3. Soil Sampling

At each of the five proposed background soil sampling locations, a decontaminated hand auger will be used to collect two composite soil samples, one from 0-6 inches below ground surface (bgs) and another from 6-12 inches bgs. At least 11 soil samples will be collected which includes at least one field duplicate as required per quality assurance and quality control standards. Table 12-1 Background Soil Sampling Locations and Type lists example background sampling locations, notations, and type of samples.

Soil sampling will follow these general procedures:

(1) If collecting or handling soil samples, wear disposable nitrile gloves to prevent cross-contamination and provide personal protection. New gloves will be donned for sample collection at teach sampling location (i.e., at each new vertical or horizontal position), or whenever gloves are torn or otherwise compromised.

(2) Collect the shallow soil sample within the depth interval from 0-6 inches bgs in a stainless-steel hand auger. The sampler, wearing clean disposable nitrile gloves, will remove pebbles, roots, etc. from the sample and composite it.

(3) Collect the shallow soil sample within the depth interval from 6-12 inches bgs in a stainless-steel hand auger. The sampler, wearing clean disposable nitrile gloves, will remove pebbles, roots, etc. from the sample and composite it.

(4) Record the location (i.e., GPS coordinates) of scooped soils on a map/figure with a description on the Soil Sampling Field Log and take photograph to include in the Soil Sampling Report.

(5) Place soil directly into the laboratory-provided (or other EPA approved sample container) sample containers from the sampling equipment.

(6) Label the sample with a unique identification number, sample date and time, and other relevant sample data.

(7) Place the samples on ice in an insulated cooler under chain-of-custody protocols for transportation to the laboratory.

Table 12-1 Background Soil Sampling Locations and Type

Sample ID[1]	Matrix	Depth (inches bgs[2])	Type	Analyte / Analytical Group	Comments
BG-S-MET-001A	Soil	0-6	Hand Auger	RCRA Metals	
BG-S-MET-001B	Soil	6-12	Hand Auger	RCRA Metals	
BG-S-MET-001FD[3]	Soil	6-12	Field Duplicate[3]	RCRA Metals	
BG-S-MET-002A	Soil	0-6	Hang Auger	RCRA Metals	
BG-S-MET-002B	Soil	6-12	Hang Auger	RCRA Metals	

BG-S-MET-003A	Soil	0-6	Hang Auger	RCRA Metals	
BG-S-MET-003B	Soil	6-12	Hand Auger	RCRA Metals	
BG-S-MET-004A	Soil	0-6	Hand Auger	RCRA Metals	
BG-S-MET-004B	Soil	6-12	Hand Auger	RCRA Metals	
BG-S-MET-004FD[3]	Soil	6-12	Field Duplicate[3]	RCRA Metals	
BG-S-MET-005A	Soil	0-6	Hand Auger	RCRA Metals	
BG-S-MET-005B	Soil	6-12	Hand Auger	RCRA Metals	

Note [1]: Example Sample ID. BG – Background; S – Soil; MET – Metals; 001A – Sample location 1, depth A (0-6 inches bgs) or B (6-12 inches bgs).
Note [2]: bgs – below ground surface.
Note [3]: FD – Field Duplicate. QA/QC requires field duplicate samples be collected on 10% of samples.

B. Phase 2

1. Site Preparation

Phase 2 will involve site preparation prior to sampling, including any utility clearance and clearing/grubbing of vegetation. Mobilization efforts will include, but are not limited to, obtaining supplies and equipment, conducting a field kickoff meeting covering sampling activities, and designating laydown and decontamination areas. The field kickoff meeting may be held prior to mobilization to discuss project scope, health and safety requirements, drilling procedures, sampling procedures, status of submittals and procurements, and quality control (QC) protocols. A project stating area and an investigation-derived waste (IDW) storage area will be designated in an area known to be free from contamination. Table 12-2 Concrete Containment Repair – Phase 2 Soil Sampling Locations and Type lists example background sampling locations, notations, and type of samples.

2. Utility Clearance

Underground utility clearance will be performed in areas known or thought to contain either underground or aboveground utilities by a third-party utility locator prior to conducting any samplings.

3. Field Screening

During the concrete containment repair work(s), areas with concrete removal will be field screened for organic vapors using photoionization detection and visual observations of the soil. At least one soil sample will be collected per concrete repair area (i.e., 3 foot x 3 foot).

A properly calibrated Organic Vapor Monitor (OVM) that utilizes photoionization detection (PID), such as a portable handheld VOC (volatile organic compounds) monitor, will be used to detect and measure emissions of VOCs from the surface and subsurface soil(s). The OVM/PID will be used first to detect whether VOC vapor emissions are occurring. If VOC emissions are detected, the portable instrument will then be used to identify the specific areas of the exposed soils/subsurface soils where VOC emissions are the highest to denote any "hot spots". During the breaking up and removal of concrete, an experienced ETSD staffer/representative will stand down-wind from the excavation and monitor the breathing zone for VOCs. Once large pieces of concrete have been removed, the ETSD staffer will immediately enter the shallow excavation and use the OVM/PID over the exposed soils to identify any areas where VOC emissions are detected. Every area with VOC detections using the PID will be marked/flagged, and the measured VOC readings will be recorded in the Soil Sampling Field Log and Soil Sampling Report.

In addition to the organic vapor screening, the ETSD staffer will also visually inspect the exposed soils for staining or other indicators that waste materials may have migrated into the soils/subsurface soils. Such persons will observe and note the approximate locations of joints and cracks (i.e., provide GPS coordinates) in the concrete surface before concrete excavation begins and will particularly inspect the areas of the soils beneath those former joints and cracks. Any areas of visibly contaminated soils will be marked/flagged, and the locations will be recorded in the Soil Sampling Field Log and Soil Sampling Report.

4. Soil Sampling

At each of the concrete containment repair locations any exposed soils will be field screened (OVM/PID and visually) and a decontaminated hand auger will be used to collect at least one composite soil sample from 0-6 inches below ground surface (bgs). At least one random soil sample will be collected per concrete repair area (i.e., 3' x 3' grid). The Phase 2 sample(s) will be submitted to the laboratory for analysis. If the Phase 2 soil sample results are below protective levels, then no further sampling is needed. If the Phase 2 sample results are above action levels, Phase 3 soil sampling will commence. Due to this sampling approach, there is no set number of samples to be collected or sampling locations. Per QA/QC requirements, at least one field duplicate will be collected per 10% of samples (1 duplicate per 10 samples).

Soil sampling will follow these general procedures:

(1) If collecting or handling soil samples, wear disposable nitrile gloves to prevent cross-contamination and provide personal protection. New gloves will be donned for sample collection at teach sampling location (i.e., at each new vertical or horizontal position), or whenever gloves are torn or otherwise compromised.

(2) Collect the shallow soil sample within the depth interval from 0-6 inches bgs in a stainless-steel hand auger. The sampler, wearing clean disposable nitrile gloves, will remove pebbles, roots, etc. from the sample.

(3) Record the location (i.e., GPS coordinates) of scooped soils on a map/figure with a description on the Soil Sampling Field Log and take photograph to include in the Soil Sampling Report.

(4) Place soil directly into the laboratory-provided (or other EPA approved sample container) sample containers from the sampling equipment. Samples for VOC (volatile organic compounds) analysis will not be homogenized.

(5) Label the sample with a unique identification number, sample date and time, and other relevant sample data.

(6) Place the samples on ice in an insulated cooler under chain-of-custody protocols for transportation to the laboratory.

Table 12-2 Concrete Containment Repair – Phase 2 Soil Sampling Locations and Type

Sample ID[1]	Matrix	Depth (inches bgs[2])	Type	Analyte / Analytical Group	Comments[7]
CCR-S-OVM/PID[8]-001A	Air	NA	PID[8]	VOCs[4]	
CCR-S-MET/VOC-001A	Soil	0-6	Hand Auger	RCRA Metals and VOCs[4]	
CCR-S-OVM/PID[8]-002A	Air	NA	PID[8]	VOCs[4]	
CCR-S-MET/VOC-002A	Soil	0-6	Hand Auger	RCRA Metals and VOCs[4]	

CCR-S-OVM/PID[8]-003A	Air	NA	PID[8]	VOCs[4]	
CCR-S-MET/VOC-003A	Soil	0-6	Hand Auger	RCRA Metals and VOCs[4]	
CCR-S-OVM/PID[8]-004A	Air	NA	PID[8]	VOCs[4]	
CCR-S-MET/VOC-004A	Soil	0-6	Hand Auger	RCRA Metals and VOCs[4]	
CCR-S-MET/VOC-004A-FD[3]	Soil	0-6	Field Duplicate[3]	RCRA Metals and VOCs[4]	
CCR-S-MET/VOC-005A[6]	Soil	0-6	Hand Auger	RCRA Metals and VOCs[4]	

Note [1]: Example Sample ID. BG – Background; S – Soil; MET – Metals; 001A – Sample location 1, depth A (0-6 inches bgs) or B (6-12 inches bgs).
Note [2]: bgs – below ground surface.
Note [3]: FD – Field Duplicate. QA/QC requires field duplicate samples be collected on 10% of samples.
Note [4]: VOCs – Volatile Organic Compounds
Note [5]: Soil samples will continue to be collected in 6-inch intervals at each individual sampling location until either soil is reached with concentration(s) of constituents below applicable protection standards, or until groundwater is reached.
Note [6]: There is no set number of samples to be collected due to the high variability in the concrete repair work plan(s) and locations of repairs. The total amount of soil samples collected will be specified in each Report.
Note [7]: Comments will include visual observations made during field screening event(s).
Note [8]: OVM/PID – Organic Vapor Monitor / Photoionization Detection. OVM/PID and visual observations are used for field screening purposes.

C. Phase 3

1. Site Preparation

Phase 3 will involve site preparation prior to sampling, including any utility clearance and clearing/grubbing of vegetation. Mobilization efforts will include, but are not limited to, obtaining supplies and equipment, conducting a field kickoff, and designating laydown and decontamination areas. The field kickoff meeting may be held prior to mobilization to discuss project scope, health and safety requirements, drilling procedures, sampling procedures, status of submittals and procurements, and quality control (QC) protocols. A project staging area and an investigation-derived waste (IDW) storage area will be designated in an area known

to be free from contamination. Table 12-3 Concrete Containment Repair – Phase 3 Soil Sampling Locations and Type lists example background sampling locations, notations, and type of samples.

2. Utility Clearance

Underground utility clearance will be performed in areas known or thought to contain either underground or aboveground utilities by a third-party utility locator prior to conducting any samplings.

3. Soil Sampling

At each of the concrete containment repair locations, any exposed soils will be field screened (OVM/PID and visually) and a decontaminated hand auger will be used to collect at least one composite soil sample from 0-6 inches below ground surface (bgs) (Phase 2). The Phase 2 sample(s) will be submitted to the laboratory for analysis. If the Phase 2 soil sample results are below protective levels, then no further sampling is needed. If the Phase 2 sample results are above protective levels, then Phase 3 soil sampling will begin, and this same sample location will be resampled from 6-12 inches bgs and the sample will be sent for analysis for the same constituents that exceeded protective standards in the 0–6-inch interval (Phase 2) sample. If the Phase 3 sample results are below applicable protective levels, then no further sampling is needed. If the Phase 3 samples results are above protective levels, then another 6-inch interval of soils (Phase 4 etc.) will be sampled and analyzed. This phased sampling approach will continue until either soil is reached with concentrations of constituents below applicable protective levels or until groundwater is reached. Due to this sampling approach, there is no set number of samples to be collected or sampling locations. Per QA/QC requirements, at least one field duplicate will be collected per 10% of samples (1 duplicate per 10 samples).

Soil sampling will follow these general procedures:

(1) If collecting or handling soil samples, wear disposable nitrile gloves to prevent cross-contamination and provide personal protection. New gloves will be donned for sample collection at teach sampling location (i.e., at each new vertical or horizontal position), or whenever gloves are torn or otherwise compromised.

(2) Collect the shallow soil sample within the depth interval from 6-12 inches bgs in a stainless-steel hand auger. The sampler, wearing clean disposable nitrile gloves, will remove pebbles, roots, etc. from the sample.

(3) Record the location (i.e., GPS coordinates) of scooped soils on a map/figure with a description on the Soil Sampling Field Log and take photograph to include in the Soil Sampling Report.

(4) Place soil directly into the laboratory-provided (or other EPA approved sample container) sample containers from the sampling equipment. Samples for VOC (volatile organic compounds) analysis will not be homogenized.

(5) Label the sample with a unique identification number, sample date and time, and other relevant sample data.

(6) Place the samples on ice in an insulated cooler under chain-of-custody protocols for transportation to the laboratory.

Table 12-3 Concrete Containment Repair – Phase 3 Soil Sampling Locations and Methods

Sample ID[1]	Matrix	Depth (inches bgs[2])	Type	Analyte / Analytical Group	Comments
CCR-S-MET/VOC-001B	Soil	6-12	Hand Auger	RCRA Metals and VOCs[4]	
CCR-S-MET/VOC-002B	Soil	6-12	Hand Auger	RCRA Metals and VOCs[4]	
CCR-S-MET/VOC-003B	Soil	6-12	Hand Auger	RCRA Metals and VOCs[4]	
CCR-S-MET/VOC-004B	Soil	6-12	Hand Auger	RCRA Metals and VOCs[4]	
CCR-S-MET/VOC-004B-FD[3]	Soil	6-12	Field Duplicate[3]	RCRA Metals and VOCs[4]	
CCR-S-MET/VOC-005B[5, 6]	Soil	6-12	Hand Auger	RCRA Metals and VOCs[4]	

Note [1]: Example Sample ID. BG – Background; S – Soil; MET – Metals; 001A – Sample location 1, depth A (0-6 inches bgs) or B (6-12 inches bgs).
Note [2]: bgs – below ground surface.
Note [3]: FD – Field Duplicate. QA/QC requires field duplicate samples be collected on 10% of samples.
Note [4]: VOCs – Volatile Organic Compounds

Note [5]: Soil samples will continue to be collected in 6-inch intervals at each individual sampling location until either soil is reached with concentration(s) of constituents below applicable protection standards, or until groundwater is reached.
Note [6]: There is no set number of samples to be collected due to the high variability in the concrete repair work plan(s) and locations of repairs. The total amount of soil samples collected will be specified in each Report.

D. Additional Phases

If the Phase 3 sample results are below applicable protective levels, then no further sampling is needed. If the Phase 3 samples results are above protective levels, then another 6-inch interval of soils (Phase 4 etc.) will be sampled and analyzed. This phased sampling approach will continue until either soil is reached with concentrations of constituents below applicable protective levels or until groundwater is reached. Due to this sampling approach, there is no set number of samples to be collected or sampling locations. Per QA/QC requirements, at least one field duplicate will be collected per 10% of samples (1 duplicate per 10 samples).

Soil sampling will follow these general procedures:

(1) If collecting or handling soil samples, wear disposable nitrile gloves to prevent cross-contamination and provide personal protection. New gloves will be donned for sample collection at teach sampling location (i.e., at each new vertical or horizontal position), or whenever gloves are torn or otherwise compromised.

(2) Collect the shallow soil sample within the next 6-inch bgs depth interval in a stainless-steel hand auger. The sampler, wearing clean disposable nitrile gloves, will remove pebbles, roots, etc. from the sample.

(3) Record the location (i.e., GPS coordinates) of scooped soils on a map/figure with a description on the Soil Sampling Field Log and take photograph to include in the Soil Sampling Report.

(4) Place soil directly into the laboratory-provided (or other EPA approved sample container) sample containers from the sampling equipment. Samples for VOC (volatile organic compounds) analysis will not be homogenized.

(5) Label the sample with a unique identification number, sample date and time, and other relevant sample data.

(6) Place the samples on ice in an insulated cooler under chain-of-custody protocols for transportation to the laboratory.

E. Additional Operating Procedures

1. Global Positioning System (GPS)

GPS coordinates will be collected for each sampling location. Mapping grade receivers capable of achieving an accuracy of at least 3 meters; however, a GPS system capable of achieving an accuracy of 1 meter or better will be used to identify "hot spots". The collected GPS coordinate sampling locations will be identified on a map/figure and included within each Soil Sampling Report.

If a particular sample location cannot be safely accessed in order to obtain GPS coordinates with an accuracy of 3 meters, alternative means of obtaining a representative sampling location (i.e., using a GPS system that is less accurate or using multiple photographs from different directions) will be used and the rationale/justification will be discussed in the Soil Sampling Report and document on the Soil Sampling Field Log.

2. Field Equipment Cleaning and Decontamination

(a) Sample Collection Equipment Contaminated with Concentrated Materials

Equipment used to collect sample of concentrated materials from investigation sites must be field cleaned before returning from the study. At a minimum, this should consist of washing with detergent and rinsing with tap water. When the above procedure cannot be followed, field personnel can leave the equipment with the facility for proper disposal or containerize (aka seal and secure) the equipment and leave on-site for later disposal. It is the project leader's responsibility to evaluate the nature of the sampled material and determine the most appropriate cleaning procedures for the equipment used to sample that material.

(b) Sample Collection Equipment Contaminated with Environmental Media

Equipment used to collect samples of environmental media from investigation sites should be field cleaned before returning from the study. Based on the condition of the sampling equipment, the following options must be used for field cleaning:

- Wipe the equipment clean;
- Water-rinse the equipment;
- Wash the equipment in detergent and water followed by a tap water rinse; and
- For grossly contaminated equipment, the procedures set forth in Subparagraph (b)I above must be followed.

(c) Handling of Decontaminated Equipment

After decontamination, equipment should be handled only by personnel wearing clean gloves to prevent re-contamination. In addition, the equipment should be moved away (preferably upwind) from the decontamination area to prevent re-contamination. If the equipment is not to be immediately re-used, it should be covered with plastic sheeting or wrapped in aluminum foil to prevent re-contamination. The area where the equipment is kept prior to re-use must be free from contaminants.

(d) Specification for Decontamination Pads

Decontamination pads constructed for field cleaning of sampling and drilling equipment should meet the following minimum specifications:

- The pad should be constructed in an area known or believed to be free of surface contamination.
- The pad must not leak.
- If possible, the pad should be constructed on a level, paved surface and should facilitate the removal of wastewater. This may be accomplished by either constructing the pad with one corner lower than the rest, or by creating a sump or put in one corner or along one side. Any sump or pit must also be lined.
- Sawhorses or racks constructed to hold equipment while being cleaned should be high enough above ground to prevent equipment from being splashed.
- Water should be removed from the decontamination pad frequently.
- A temporary pad must be lined with a water impermeable material with no seams within the pad. This material should be either easily replaced (disposable) or repairable.

At the completion of site activities, the decontamination pad should be deactivated. The pit or sump should be backfilled with the appropriate material designated by the site project leader, but one after all waste/rinse water has been pumped into containers for disposal.

(e) Sampling Equipment used for the Collection of Trace Organic and Inorganic Compounds

For samples undergoing trace organic or inorganic constituent analyses, the following procedures are to be used for all sampling equipment or components of equipment that come in contact with the sample:

- An optional Liquinox® detergent wash step may be useful to remove gross dirt and soil.
- Clean with tap water and Luminox® detergent using a brush, if necessary, to remove particulate matter and surface films.
- Rinse thoroughly with tap water.
- Rinse thoroughly with organic-free water and place on a clean foil-wrapped surface to air-dry.
- Wrap the dry equipment with aluminum foil or bag in clean plastic. If the equipment is to be stored overnight before it is wrapped in foil, it should be covered and secured with clean, unused plastic sheeting.

The historical solvent rinse method of cleaning equipment for trace contaminant sampling remains an acceptable method. However, an alternative solvent rinse method may be used:

- Clean with tap water and Liquinox® detergent using a brush, if necessary, to remove particulate matter and surface films. Equipment may be steam cleaned (Liquinox® detergent and high-pressure hot water) as an alternative to brushing. Sampling equipment that is steam cleaned should be placed on racks or saw horses at least two feet above the floor of the decontamination pad. PVC or plastic items should not be steam cleaned.
- Rinse thoroughly with tap water.
- Rinse thoroughly with deionized water.
- Rinse with an appropriate solvent (generally isopropanol).
- Rinse with organic-free water and place on a clean foil-wrapped surface to air-dry.
- Wrap the dry equipment with aluminum foil or plastic. If the equipment is to be stored overnight before it is wrapped, it should be covered and secured with clean, unused plastic sheeting.

(f) Field Decontamination Procedure for Drilling Equipment

The following is the standard procedure for field cleaning augers, drill stems, rods, tools, and associated equipment. This procedure does not apply to well casings, well screens, or split-spoon samplers.

- Wash with tap water and detergent, using a brush, if necessary, to remove particulate matter and surface films. Steam cleaning (high pressure hot water with detergent) may be necessary to remove matter that is difficult to remove with the brush. Drilling equipment that is steam cleaned should be placed on racks or saw horses at least two feet above the floor of the decontamination pad. Hollow-stem augers, drill rods, etc. that are hollow or have holes

that transmit water or drilling fluids, should be cleaned on the inside with vigorous brushing.
- Rinse thoroughly with tap water.
- Remove from the decontamination pad and cover with clean, unused plastic if not used immediately. If stored overnight, the plastic should be secured to ensure that it stays in place.

3. Management of Investigative Derived Waste (IDW)

Due to time limitations and restrictions posed by RCRA regulations on storage of hazardous waste, accumulation start dates must be identified on all drums, buckets, or other containers used to hold IDW so that it can be managed in a timely manner. During generation of both non-hazardous and hazardous IDW, field personnel will keep hazardous, or suspected to be hazardous, IDW segregated from non-hazardous IDW to minimize the volume of hazardous IDW that must be properly managed.

Materials which may become IDW include, but are not limited to:

- Large and small slabs of the removed concrete from the concrete containment system.
- Personal protective equipment (PPE) – This includes disposable coveralls, gloves, booties, respirator canisters, splash suits, etc.
- Disposable equipment and items – This includes plastic ground and equipment covers, aluminum foil, conduit pipe, composite liquid waste samplers, Teflon® tubing, broken or unused sample containers, sample container boxes, tape, etc.
- Soil cuttings from drilling or hand augering.
- Drilling mud or water used for mud or water rotary drilling.
- Groundwater obtained through well development or well purging.
- Cleaning fluids such as spent solvents and wash water.
- Packing and shipping materials.

For the purpose of determining the ultimate disposition of IDW, it is typically distinguished as being either hazardous or non-hazardous. This determination is based on either clear regulatory guidance or by subsequent analysis. This determination and subsequent management is the responsibility of the Site manager.

(a) Management of Non-Hazardous IDW

Non-hazardous liquid and soil/sediment IDW may be placed on the ground or returned to the source if doing so does not endanger human health or the environment or violate federal or state regulations. Under no circumstances, however, should monitoring well purge water be placed back into the wells from which it came.

Soap and water decontamination fluids and rinses of such cannot be placed in any water bodies and must be collected and disposed of. Permission should be sought from the operator of the facility to place non-hazardous PPE, disposable equipment, and/or paper/cardboard into the facility's dumpsters, or into municipal dumpsters with the permission of the owner. Disposal of non-hazardous IDW such as drill cuttings, drill mud, purge or development water, decontamination wash water, etc., should be placed into a unit with an environmental permit, such as a landfill or sanitary sewer. These materials must not be placed into dumpsters.

(b) Management of Hazardous IDW

Hazardous IDW must be disposed of as specified in federal and state regulations. If appropriate, these wastes may be placed back in an active facility waste treatment system. These wastes may also be disposed in the source area from which they originated if doing so does not endanger human health or the environment.

If on-site disposal if not feasible, and if the wastes are suspected to be hazardous, appropriate tests will be conducted to make that disposal determination. If they are determined to be hazardous wastes, they must be properly contained and labeled. They may be stored on-site for a maximum of 90 calendar days before they must be manifested and shipped to a permitted treatment or disposal facility. Generation of hazardous IDW must be anticipated, if possible, to allow arrangement for proper containerization, labeling, transportation, and disposal/treatment in accordance with federal and state regulations.

At a minimum, the requirements of the management of hazardous IDW are as follows:

- Spent solvents must be left on-site with the permission of site operator and proper disposal arranged.
- All hazardous IDW must be containerized. Proper handling and disposal should be arranged prior to commencement of field activities.

4. Packing, Marking, Labeling and Shipping of Environmental and Waste Samples

Packaging requirements for shipment of samples is dependent on the nature of the sample (type of sample, contaminants, and preservatives) and the mode of transportation. It is the responsibility of the individual in charge of

field sampling operations to use the proper requirements for shipping in accordance with the Hazardous Materials Table, 49 CFR 172.101.

A Chain-of-Custody form will accompany all samples. When transferring the possession of samples, the individuals receiving the samples will sign, date, and note the time that they received the samples on the form.

Samples will be properly packaged for shipment and delivery or shipped to the contract laboratory for analysis. Shipping containers will be secured by using nylon strapping tape and custody seal. The strapping tape will be placed on the outside of the container so that all joints of the tape are secured by the seal (the seal will be placed under the joint and wrapped over the top of it). Thus, the tape cannot be removed without breaking the seal or cutting the tape. The seal will be signed, dated, and the time recorded by the field supervisor.

All samples shipped will be accompanied by the Chain-of-Custody form(s). The original and one copy of the form will be placed in a plastic bag inside the secured shipping container. The field supervisor or project manager will retain one copy of the Chain-of-Custody form. The original of the Chain-of-Custody form will be transmitted to the field supervisor or project manager after the laboratory accepts the samples.

If sent by mail, the package will be registered with return receipt requested. If sent by common carrier, a bill or lading or air bill shall be used. Receipts from post-office, copies of bills of lading and air bills will be retained as part of the documentation of the chain-of-custody.

After collection, sample handling should be minimized. Field investigators should use extreme care to ensure that samples are not contaminated during storage. Environmental and waste samples are typically stored in coolers. To reduce the risk of cross contamination, smaller sample containers such as 8-ounce glass jars, 40 milliliter volatile organic analyses (VOA) vials, and one-liter amber bottles should be placed inside of sealed, plastic bags before being placed in the cooler. If ice is required for preservation of the samples, the ice should be contained in a plastic bag or some equivalent container to prevent the potential for cross contamination of the samples by water produced from melting ice. If ice is used, the cooler should be checked regularly, and water should be drained as needed. Custody of the samples will be maintained in accordance with federal and state regulations.

Samples will either be transported to the analytical laboratory by field personnel or shipped by common carrier. Environmental samples should be packed prior to shipment using the following procedures:

- Allow sufficient headspace (ullage) in all bottles (except VOA containers with a septum seal) to compensate for any pressure and temperature changes (approximately 10 percent of the volume of the container).
- Ensure the lids on all bottles are tight (will not leak).
- Place bottles in separate and appropriately sized polyethylene bags and seal the bag. If available, the use of Whirl-Pak bags is preferable; if unavailable, seal regular bags with tape (plastic electrical tape).
- Select a sturdy cooler in good repair. Secure and tape the drain plug with fiber or duct tape inside and outside. Line the cooler with a large heavy duty plastic bag.
- Place cushioning/absorbent material in the bottom of the cooler and then place the containers in the cooler with sufficient space to allow for the addition of cushioning between the containers.
- If required by the method for preservation, put "blue ice" (or ice that has been "double bagged" in heavy duty polyethylene bags and properly sealed) on top of and/or between the containers. Fill all remaining space between the containers with absorbent materials.
- If the samples are preserved with ice, include a temperature blank for the laboratory to verify that the samples are received at the appropriate temperature.
- Securely fasten the top of the large garbage bag with tape (preferably plastic electrical tape).
- Place the Chain-of-Custody Record into a plastic bag and tape the bag to the inner side of the cooler lid.
- Close the cooler and securely tape (preferably with fiber tape) the top of the cooler shut. Chain-of-custody seals must be affixed to the top and sides of the cooler within the securing tape so that the cooler cannot be opened without breaking the seal.

(a) Sample Label

Each sample will have a unique identification name or number. Sample labels will be affixed to all sample containers at the time of sampling. Sample labels will be waterproof paper with gummed backs. Labels will be completed with black indelible, waterproof ink and will include the following information:

- Unique sample name(s) or number(s);
- Laboratory name, address, and phone number;
- Client name;
- Unique field study or sampling activity name and/or number;
- Sample location or appropriate identification as identified in the sampling program;

- Sample collection date and time;
- Name of personnel who collected the sample;
- Sample preservative used, if applicable;
- Media sampled and sample type;
- Analyses required; and
- Comments and special precautions as needed.

(b) Sample Seal

Sample seals are used to detect tampering of samples, following sample collection prior to the time of analysis. The seal will be attached in such a way that it is necessary to break the seal in order to open the sample container. Here, "sample container" may refer to either individual sample containers or a shipping container such as an ice chest. Seals will be affixed to the containers before they leave the custody of the sampling personnel.

Sample seals will be waterproof paper or plastic with gummed backs. All samples designated for shipment which leaves the sampler's custody will have a sample seal affixed which includes the unique sample identification, name(s) of collector(s), date and time of sampling, and sample location or identification.

(c) Sample Request for Analysis Sheet

A request for analysis will be submitted to the laboratory with the collected samples. A copy of the chain-of-custody will provide the following information:

- Unique sample name and/or number;
- Laboratory sample number (assigned by lab personnel);
- Unique field study or sampling activity name and/or number;
- Contact person and phone number to whom data is to be reported;
- Date and time of sample collection;
- Type(s) of analysis requested;
- Signatures of person receiving the sample(s);
- Date and time of sample receipt; and
- Sample destination.

An example Sample Request for Analysis Form is included in this attachment as Figure 12-3.

(d) Laboratory Sample Custody Procedures

The sample will be delivered to the laboratory for analysis as soon as practicable so that the tests are completed within appropriate holding times. The sample must be accompanied by the chain-of-custody record and a request-sheet for sample analysis. An example Sample Request for Analysis Form is included in this attachment as Figure 12-3. The sample must be delivered to the laboratory sample custodian.

After the sample custodian signs the receipt of chain-of-custody for a sample, the custodian will inspect the condition of the sample and the sample seal, reconcile the information on the sample label and seal against that on the chain-of-custody record, assign a laboratory number, log in the sample in the laboratory logbook, and store the sample in a secured sample storage room or cabinet until assigned to an analyst for analysis.

The sample custodian will inspect the sample for any signs of leakage or other damage to the container and ensure the sample seal in intact. Any discrepancies between the information on the sample label and seal and the information on the chain-of-custody record and the sample analysis request sheet shall be resolved before analysis and documented on the sample request sheet and on the laboratory sample logbook.

After the sample has been received in the laboratory, the supervisor or assignee is responsible for its care and custody. He or she will be prepared to testify that the sample was in his or her possession or secured in the laboratory at all times from the moment it was received from the custodian until the analyses were performed.

5. Chain-of-Custody Records

The chain-of-custody record will be completed by the sampling personnel at the end of the sampling event. The record(s) will be signed as relinquished or received each time the sample changes possession, from collection to final shipment for analysis. The laboratory chain-of-custody form will be completed by the laboratory personnel receiving custody of the field samples. The laboratory chain-of-custody form will be part of a multicopy form used for both field and laboratory activity(s). Laboratory personnel will verify the information on the appropriate form is complete and accurate, the sample was received with all pertinent information, and the integrity of the sample(s) have been maintained.

Two copies of the record will be sent to the lab, and one copy will be retained at the Site. The chain-of-custody record will include, at minimum, the following information:

- Unique sample(s) name(s) and/or number(s);
- Unique field study or sampling event activity name and/or number;
- Laboratory name, address, and phone number;
- Client name, phone, and fax numbers;
- Sample collection date and time;
- Sample type (grab/composite);
- Container(s) type(s);
- Analysis requested;
- Condition of sample on receipt;
- Chain-of-custody control number;
- Name(s) of sampling personnel;
- Relinquished by (signature, date, and time); and
- Received by (signature, date, and time).

The laboratory chain-of-custody form(s) will include additional information such as the unique laboratory log-in number(s), verification of the presence of all appropriate forms and their completions, inspection comments of the samples by the receiving personnel, sample allocation, and final sample disposition.

An example Chain-of-Custody form is included in this attachment and Figure 12-2.

6. Personnel Training

All ETSD and contractor personnel will be required to have appropriate OSHA HAZWOPER training and to have and utilize appropriate monitoring equipment and personal protective equipment to perform the work safely and effectively.

V. SAMPLE CONTAINERS, HOLDING TIMES, CONSTITUENTS OF CONCERN, AND ANALYTICAL TEST METHODS

Table 12-4
Sample Containers, Holding Times, Constituents of Concern, and Analytical Test Methods

Parameter	Recommended Container[1]	Preservative	Maximum Holding Time	Minimum Volume Required[3]	Analytical Method[2]
Total Arsenic	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010B[4]

Total Barium	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010B[4]
Total Cadmium	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010B[4]
Total Chromium	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010B[4]
Hexavalent Chromium	T, P, G	None	6 months	10 g	U.S. EPA Method 7196A[4]
Total Copper	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010B[4]
Total Lead	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010B[4]
Total Mercury	T, G	$KMnO_4$	28 days	1 g	U.S. EPA Method 7471A[4]
Total Nickel	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010C[4]
Total Selenium	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010B[4]
Total Silver	T, P, G	Field Activated to pH<2 with HNO_3	6 months	2 g	U.S. EPA Method 6010B[4]
VOC[5]s	G	Ice to 4° C	14 days (EnCore Samplers – 48 hours)	10 g	U.S. EPA Method 8260B[4]
SVOC[6]s	G	Ice to 4° C	14	20 g	U.S. EPA Method 8270C[4]

Note [1]: T – Teflon P – Polyethylene G – Glass

Note [2]: Test Method for Evaluating Solid Waste, SW-846 (most recent edition)
Note [3]: ml – milliliter; mg – milligram – kg – kilogram.
Note [4]: The most recent EPA SW-846 Method may be used in place of the approved analytical test methods listed above.
Note [5]: VOC – Volatile Organic Compounds
Note [6]: SVOC – Semi-volatile Organic Compounds

VI. ANALTICAL TEST METHODS AND DATA EVALUATION

A. Background Soil Samples

All of the soil samples for establishing background threshold values will be transported or shipped, using appropriate chain-of-custody procedures, to a licensed commercial analytical laboratory for analysis. Each sample will be analyzed for its total concentrations of Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, and Silver by U.S. EPA Method 6010B and for its total concentration of Mercury by U.S. EPA Method 7471A (or by an alternative method that has prior approval from the Commissioner before implementation).

1. Establishment of Background Threshold Values

The laboratory results will be processed using the U.S. EPA statistical program *ProUCL Version 5.1* (or by a successor statistical program required by the Commissioner at the time of closure) to identify and eliminate outlier data and then calculate the Upper Tolerance Limit (UTL) and the Upper Simultaneous Limit (USL) for each of the eight metals using either parametric or non-parametric tests. The greater of either the 95 percent UTL with 95 percent coverage (UTL95-95) or the 95 percent USL with 95 percent coverage for each metal will be identified as the Background Threshold Value (BTV).

B. Concrete Containment Repair Soil Samples

The collected surface and subsurface soil samples will be delivered under appropriate chain-of-custody procedures to the analytical laboratory where they will be submitted for RUSH analysis of select RCRA Metals by U.S. EPA Method 6010B (U.S. EPA Method 7471A for Mercury), for volatile organic compounds (VOCs) by U.S. EPA Method 8260B, and for semi-volatile organic compounds (SVOCs) by U.S. EPA Method 8270C (or by an alternative method that has prior approval from the Commissioner before implementation).

1. Data Evaluation, Soil Removal, and Re-Sampling

The results from the soil investigations will be rapidly evaluated by ETSD and its hired consultant/contractor personnel, in consultation with appropriate personnel from the Tennessee Division of Solid Waste Management (TDSWM), to determine if some rapid and minor removal of contaminated soils is necessary or

appropriate. ETSD does not anticipate encountering and significant contamination of the underlying surface soils except possibly some limited areas of contamination of shallow surface soils where hazardous wastes or hazardous waste constituents may have leaked through a crack or unsealed joint(s). ETSD's intent is to simply remove any such areas of soil contamination by over-excavation, using organic vapor screening and visual observations in combinations with soil sampling to help define the limits of soil removal. Following each removal, the newly exposed soil surface would then be re-sampled and re-analyzed for the same constituents that exceeded protective levels in the first sample. If necessary, additional rounds of soil sampling could possibly be performed. When soil removal is deemed complete, the excavations will be backfilled to grade with clean soil and the concrete replacement work will continue.

The soil removal will be performed by a remediation contractor that ETSD will arrange to be available to rapidly mobilize to the Facility upon the decision to remove soil. Any removed soil and debris will be placed in containers (e.g., 55-gallon drums or roll-off boxes) which will then be labeled, secured, and transported to a portion of the Facility for accumulation and appropriate waste characterization efforts. Once the soil(s) are appropriately characterized and a hazardous waste determination made, the determination will be documented on the Report, and arrangements made and implemented to properly disposed of the waste.

VII. QUALITY ASSURANCE/QUALITY CONTROL

Sample Quality Assurance/Quality Control procedures must be those from the most recent edition of the EPA, Region 4, Science and Ecosystem Support Division's (SESD) Field Branches Quality System and Technical Procedures; or an equivalent procedure that has been approved by the Commissioner.

A. Field Sample QA/QC:

- Trip Blank – A trip blank should be supplied by the lab. Fill one of each type of sample container with Type II reagent grade water, transport it to facility, handle it in the same method as a sample, then return the trip blank to the laboratory for analysis. One trip blank per sampling event is required.

- Replicate Sample - One duplicate sample per 10 percent (%) of samples. At least one duplicate sample per sampling event is required.

B. Laboratory Sample QA/QC:

- Replicate Sample – Replicate samples are analyzed as required per method.

- Spiked Sample – Spiked samples are analyzed as required per method.

- Reagent Sample – May be one or a combination of the following: "ACS" grade, analytical grade, pesticide grade, or a grade specified in an analytical method. Some chemical reagents alter slowly because of chemical or biological changes. For these chemical reagents, the practical life is indicated on the container label or stated in the analytical method. Outdated reagents shall not be used in any analysis. With every set of samples, deionized water, or an appropriate solvent, is analyzed to determine if the reagents contain interfering substances. All reagents (containers) should be shelf dated upon receipt and upon opening.

- Calibration Standards – Calibration standards are analyzed with each set of samples in order to verify the accuracy of the calibration curve.

- Calibration Curve – Calibration curves are generated to determine and document the linear working-range for each analyte for a particular method or instrument. New curves are generated when new reagents are prepared, or when there is a modification, repair, or replacement of the detector.

- Precision – Precision is based on the results of replicate analyses and is expressed in terms of standard deviation (SD). Upper and lower control limits are established by values from 20 or more replicate pairs. Precision must be within 3.27 relative standard deviation (RSD) for the data to be acceptable.

- Accuracy – Accuracy is a measure of the difference between the mean of 20 determinations, which were used to establish the upper and lower control limits, and the known amount of chemical added to a sample. Accuracy is expressed as percent recovery of the amount of chemical added to the sample.

- Surrogate Standards – Surrogate standards are either deuterated analogs of priority pollutants or compounds that have similar chemical characteristics to the analytes of interest but do not interfere with their analysis. Samples are spiked with a surrogate spiking solution. Recovery of the surrogate is used to determine accuracy of the analytical procedure.

C. Specific Routine Procedures used to Assess Data Precision, Accuracy, and Completeness

Two types of Quality Control charts for precision and accuracy are used to assess the internal Quality Assurance. Charts are constructed for each analytical instrument, analytical procedure (method), and matrices.

i. Quality Control Charts for Precision

When most samples have measurable levels of the constituent being determined, analysis of duplicate samples is effective for assessing precision. Standard Deviation (SD) is obtained from the average range of duplicate analyses. Construct a center line and warning and control limits.

$$CV = SD/Mean$$
$$RSD = CV \times 100\%$$

S = Standard Deviation
CV = Coefficient of Variance
RSD = Relative Standard Deviation

ii. Range Control Charts

The average value for the range (R) is calculated from K sets of duplicate measurements.

$$R = (R_1 + R_2 + \ldots + R_K) = K$$

As many duplicate measurements as feasible, at least 15 or more, are made to calculate R.

iii. Quality Control Charts for Accuracy

Recovery of spike samples, spike blanks, or surrogate samples will be used to calculate the percent recovery depending on the stage at which the spike or surrogate is added, information of the efficiency, stability, and variability of recovery can be evaluated.

Mean % recovery (x) is used to calculate standard deviation (σ). Control charts are constructed accordingly.

iv. Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions.

$$\% \text{ Completeness} = 100 \times \frac{\text{(Data Generated – Unusable Data)}}{\text{Expected Data}}$$

D. Corrective Action for Unacceptable Quality Control Data

When results from spiked samples and replicate samples are outside the statistical control limits, or if values of either or both of these samples are on the same side of their respective mean value for seven successive analyses, the system is considered out-of-control. When an out-of-control situation occurs, the analyses will stop until the problem is resolved, and its solution documented. All analyses since the last in-control point must be repeated.

The analyst and/or the supervisor initiate corrective action. The quality control supervisor will approve any action after the reanalysis confirms a problem. The problem and its solution must be documented. If the problem is sample related, the laboratory supervisor will notify the field operators so that a new sampling schedule can be implemented allowing for the additional time for analyzing each sample with modifications.

Corrective action will also be initiated after receiving unacceptable results from QA activities including, but not limited to performance and system audits, interlaboratory comparison studies, performance and certification tests, and other evaluations required by Federal, local, or private agencies.

E. Data Quality Objectives

The Data Quality Objectives (DQO) Process is used to establish performance or acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of a study. The DQO Process consists of seven iterative steps. While the interaction of these steps is portrayed a sequential fashion, the iterative nature of the DQO Process allows one or more of these steps to be revisited as more information on the problem is obtained.

The seven steps of the DQO Process include:

- Stating the problem;
- Identifying the decision;
- Identifying inputs to the decision;
- Defining the boundaries of the study;
- Developing a decision rule;
- Specifying limits on decision errors; and
- Optimizing the design for obtaining data.

The decision rules for the major monitoring activities based on the environmental media and investigation goals are provided below.

1. Soil Sampling

Problem and Decision

The purpose of the soil monitoring is to: (1) determine current background concentrations of metals in soil(s); (2) evaluate soils underneath the concrete containment structure (during repair(s)) to assess if historical waste handling activities have contaminated the underlying soils; (3) if applicable, prevent exposures to contaminated soils via removal of any contaminated soils.

The Sampling and Analysis Plan was developed to address these 3 purposes by prescribing the process for collecting, handling, and analyzing soil samples and

associated data in a manner that will produce an adequately representative, documentable, and defensible sample results.

Any remediation/removal/corrective actions to be taken by ETSD to address any soil contamination that is discovered but cannot readily be removed will be first discussed with TDSWM personnel to ensure that such actions are consistent with applicable federal and state regulations.

Inputs to Decision

Inputs to the decision will include the historical waste handling documentation, data generated during concrete containment repair(s) and sampling event(s), Site-specific background concentrations of metals in soils, and both the U.S. EPA's Residential and Industrial Regional Screening Levels (RSLs) for site-related contaminants.

Specific inputs will include:

- Field data - organic vapor monitoring and visual observations of exposed soils, and any other information gained during soil sampling; and
- Laboratory data – results from soil samples.

Boundaries of Study

The boundaries of the study are defined by the extent of the concrete containment structure. Should an area of contamination originating from the concrete containment be detected in the future, the boundaries of the study will be adjusted as necessary to include the extent of the contamination/concrete containment. The temporal boundary will be limited to each concrete containment repair event, such that each event is a record of site conditions at the time of sampling. Constraints for the investigation include inclement weather and sampling location access.

Decision Rules

The objectives for soil monitoring are to determine current background concentrations of metals in soils; evaluate soils underneath the concrete containment structure (during repair(s)) to assess if historical waste handling activities have contaminated the underlying soils; and if applicable, prevent exposures to contaminated soils. The analytic approach will use soil samples collected during concrete repair work and the detected concentrations of the target analytes (metals, VOCs, and SVOCs) identified in Sampling and Analysis Plan.

Specifically, the decision rules for the monitoring include:

- If the concentration of COCs detected indicates that the area of COCs is below protective levels, then no additional sampling will be needed.

- If the concentration of COCs detected indicates that the area of impact(s) is above protective levels, additional sampling, exploration and/or remediation efforts may be required.

This approach will be applied to assist in deciding whether additional (or fewer) monitoring points and data are required to understand the nature and extent of soil contamination at the Site and the efficacy of the concrete containment structure.

Performance and Acceptance Criteria

Performance criteria for soil monitoring data will be used to determine the usability of the collected information to satisfy the decision rules discussed above. The sources of potential error in the soil sampling program include field sampling procedures, sample handling variability, variability during the analysis of the samples during laboratory sample handling, laboratory preparation, and laboratory analysis. The determination of the potential error for each sampling event will include an evaluation of the field sampling documentation including chain-of-custody documents and soil sampling forms, as well as the collection and analysis of field and laboratory quality control samples.

Chain-of-custody and field sampling documents will be reviewed to confirm the sampling locations and the condition of the soil samples at the time of sample collection. Laboratory documentation and sample preparation and analysis documentation will be reviewed to confirm the precision and accuracy of the reported results.

Obtaining Data

Soil samples will be collected from Site in accordance with the Sample and Analysis Plan. The Sampling and Analysis Plan was designed to produce data of the quality necessary to achieve project objectives and meet or exceed the minimum standard requirements for field and analytical methods.

VIII. REPORTING OF RESULTS

A. Soil Sampling Report

A Soil Sampling Report (Report) entry will be made for each sampling event; the Soil Sampling Field Log (Figure 12-1) will be completed at the same time the samples are collected. The Report will be summarized and submitted to the Commission for approval and in accordance with this Paragraph (Paragraph XII. Reporting of Results) to this attachment and within the timeframes specified. The Report will include, at minimum, the following information:

- Unique field study or sampling event activity name and/or number and the sample(s) identification information;

- Soil sample identification information (i.e., sample name or number and location, depths, etc.);
- Name(s) of collector(s);
- Date and time of sample collection;
- Sample collection depth or interval;
- Suspected sample composition based on previous sampling event results;
- Analytical parameter(s) to be measured;
- Preservative;
- Designation of QC samples (e.g., blanks, splits, or duplicates);
- Sampling methodology;
- Observations during sampling (e.g., organic vapor monitoring data and visual observations);
- References such as maps and/or photographs (this includes, but is not limited to, sample location(s), "Work Areas", IDW staging/storage areas, decontamination staging/storage areas, solid waste management units and areas of concern, property boundaries, etc.);
- Any waste determinations (i.e., from IDW sampling) and the justification;
- Any waste (i.e., IDW) dispositional information (transported off-site, disposed on on-site, etc.);
- Chain-of-custody control number and sample request documentation;
- Sample distribution and how it will be transported;
- The Soil Sampling Field Log will be completely filled out for each sampling event and will be included in each Report. A copy of the Soil Sampling Field Log form is included in this attachment as Figure 12-1.;
- General notes, field observations and measurements, and any/all deviations or challenges encountered, corrective actions made, and any effect the deviation(s) had or will have on the outcome of the sampling event; information on specific environmental conditions that may have affected a field measurement or sample;

- Where appropriate and needed, opinions and interpretations, which will be clearly identified as such, and will include a statement that identifies the basis upon which the opinions and interpretations have been made;

- Reference to the U.S. EPA, Region 4, Laboratory Services and Applied Science Division (LSASD) Field Services Branch (FSB) operating procedures used during the event; reference to the SAP or other LSASD planning document that the event was based upon;

- The Report will contain all sample analytical results, inclusive of all Quality Assurance/Quality Control sampling data evaluation(s) and a copy of the Laboratory Analytical Report(s). Analytical data presentation(s) must be tabular or otherwise presented in an organized manner; and

- A table or multiple tables, or other method(s) of sample analytical data presentation, must include the analyte(s), the analytical test method(s), the practical quantification limit(s) (PQLs) and/or method detection limits (MDLs), container type, preservative, maximum and true holding times, minimum and true volumes of media collected, and the sample results.

Any supporting information using in the preparation of the field investigation report will be included in each Report. The Report(s) will contain the following sections, as applicable based on project objectives, scope and scale, in the suggested order:

1. Cover Page
2. Table of Contents
3. Introduction
4. Summary
5. Site Location and Background
6. Methods
7. Results
8. Discussion
9. Quality Control
10. Conclusions
11. References
12. Appendices

ETSD is allowed to change the presentation and content within the Soil Sampling Field Log (Figure 12-1), the Chain-of-Custody (Figure 12-2), and the Request for Analysis Sheet (Figure 12-3) without prior approval from the Commissioner only if the said modification/change does not delete or remove any of the content. ETSD is allowed to add additional details and content to each of the sheets only if those details are relevant and applicable.

B. Schedule for Submittal of Soil Sampling Report(s)

The performance and results of the soil investigation and removal efforts described in this document will be documented on a "Work Area" by "Work Area" basis and reported to the TDSWM within 45 calendar days following the date of the last soil removal or the date of the last sampling effort; within at least 90-calendar days following receipt of the last laboratory analytical report.

Figure 12-1
Example Soil Sampling Field Log

SOIL SAMPLING FIELD LOG

Excel TSD of Tennessee, LLC **Memphis, Tennessee**	**Project Name and/or No.**

Sampler Name: _____ Sampler Signature: _____

Project Leader Name: _____ PL Signature: _____

Sampling Information

Sample ID	Time	Preservative	Type (Grab or Composite)	Depth / Interval (inches)	OVM-PID (ppm) and Visual Observations	Analytes	Analytical Method

Chan-of-Custody No.: _____

Transportation to Lab: _____

Notes and Corrective Actions: _____

Figure 12-2
Example Chain-of-Custody

Microbac

Chain of Custody Record

Microbac Laboratories, Inc.

Kentucky Testing Laboratory Division
3323 Gilmore Industrial Blvd., Louisville, KY 40213
(502) 962-6400 fax (502) 962-6411

Certificate of Analysis No.

Report To: Name: Address: Phone: Fax: PO#:	**Microbac Information:** Customer # Template Name Additional Labor:_____	

Permit #	WWTP	Frequency	Project or Subject Reference	Samplers (signature):

Sample ID	Sample Description	Collected Date	Collected Time	Analysis Requested	Grab/ Comp.	No. of Cont.	Cont. Type	Preservative

Relinquished By: Date/Time:	**Field Parameters:** pH: _____ Temperature: _____ Flow: _____ GPD
Received By: Date/Time:	**Field Limits:** **Type of Flow:**
Relinquished By: Date/Time:	pH: Temperature:
Received at Lab By: Date/Time:	

Figure 12-3
Sample Request for Analysis Form

Excel TSD of Tennessee, LLC
REQUEST FOR SAMPLING & ANALYSIS

Sample Site: _____ Project ID. _____
Person Requesting Sampling: _____ Phone No. _____
Date to be Sampled: _____ Sampler(s) Requested: _____
Date(s) Results Due: _____
Comments/Special Instructions: _____
_____
_____
_____
_____

No. Samples	Sample Location	Sample Code	Rush Analysis
_____	Soils: _____	_____	Y / N
_____	Trip & Field Blank & Equipment Blank: _____	_____	Y / N

Sample Codes
A. Soils (As, Ba Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag)
B. Soils (As, Ba Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag) + (VOCs and SVOCs)

Expected Laboratory Turn-Around Time: _____
Project Manager Signature: _____ Date: _____
Sampling Manager Signature: _____ Date: _____
Laboratory Manager Signature: _____ Date: _____