

PUBLIC NOTICE

Arnold Engineering Development Complex (AEDC) has applied to the Tennessee Department of Environment and Conservation, Division of Air Pollution Control for modification of their existing major source (Title V) operating permit subject to the provisions of Tennessee Air Pollution Control Regulations 1200-03-09-.02(11) (Title V regulations). A major source operating permit is required by both the Federal Clean Air Act and Tennessee's air pollution control regulations.

The applicant is **Arnold Engineering Development Complex** with a site address of 100 Kindel Drive, Arnold AFB, TN. They have applied for a significant modification to their major source operating permit (570221). The proposed modification would consist of reclassifying heaters at Emission Source Reference Nos. 16-0010-06, 07, 08, and 28 as "limited use" units. This would limit use of the heaters to 10% of their annual capacity and increase the length of time allowed between required tune-ups. This significant modification is conducted pursuant to Tennessee Air Pollution Control Regulations 1200-03-09-.02(11)(f)5(iv). Only the portions of the major source operating permit affected by the significant modification are open to comment during the notice period.

EPA has agreed to treat this draft Part 70 permit as a proposed Part 70 permit and to perform its 45-day review provided by the law concurrently with the public notice period. If any substantive comments are received, EPA's 45-day review period will cease to be performed concurrently with the public notice period. In this case, EPA's 45-day review period will start once the public notice period has been completed and EPA receives notification from the Tennessee Air Pollution Control Division that comments have been received and resolved. The status regarding EPA's 45-day review of these permits and the deadline for submitting a citizen's petition can be found at the following website address:

<https://www.epa.gov/caa-permitting/tennessee-proposed-title-v-permits>

Copies of the application materials and draft permits are available for public inspection during normal business hours at the following locations:

Tennessee Department of Environment and Conservation
Columbia Environmental Field Office
Division of Air Pollution Control
1421 Hampshire Pike
Columbia, TN 38401

and

Tennessee Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower, 15th Floor
312 Rosa L. Parks Avenue
Nashville, TN 37243

At this time, visitors are seen at the Environmental Field Office by appointment only. You should contact the Environmental Field Office for an appointment to review the documents by calling (931) 380-3371.

An electronic copy of the draft permit is available by accessing the TDEC internet site located at:

<http://www.tn.gov/environment/topic/ppo-air>

Questions concerning the source(s) may be addressed to Mr. Justin Dolzen at (615) 532-0575 or by e-mail at justin.dolzen@tn.gov.

Interested parties are invited to review these materials and comment. In addition, a public hearing may be requested at which written or oral presentations may be made. To be considered, written comments or requests for a public hearing must be received no later than 4:30 PM within 30 days of the date of this notice. To assure that written comments are received and addressed in a timely manner, written comments must be submitted using one of the following methods:

1. **Mail, private carrier, or hand delivery:** Address written comments to Ms. Michelle W. Owenby, Director, Division of Air Pollution Control, William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue 15th Floor, Nashville, Tennessee 37243.
2. **E-mail:** Submit electronic comments to air.pollution.control@tn.gov.

A final determination will be made after weighing all relevant comments.

Individuals with disabilities who wish to review information maintained at the above-mentioned depositories should contact the Tennessee Department of Environment and Conservation to discuss any auxiliary aids or services needed to facilitate such review. Such contact may be in person, by writing, telephone, or other means, and should be made no less than ten days prior to the end of the public comment period to allow time to provide such aid or services. Contact the Tennessee Department of Environment and Conservation ADA Coordinator, William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue 22nd Floor, Nashville, TN 37243, 1-(866)-253-5827. Hearing impaired callers may use the Tennessee Relay Service, 1-(800)-848-0298.

STATE OF TENNESSEE
AIR POLLUTION CONTROL BOARD
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243



SIGNIFICANT MODIFICATION #1 To

OPERATING PERMIT (TITLE V) Issued Pursuant to Tennessee Air Quality Act

This permit fulfills the requirements of Title V of the Federal Clean Air Act (42 U.S.C. 7661a-7661e) and the federal regulations promulgated thereunder at 40 CFR Part 70 (FR Vol. 57, No. 140, Tuesday, July 21, 1992 p.32295-32312). This permit is issued in accordance with the provisions of paragraph 1200-03-09-.02(11) of the Tennessee Air Pollution Control Regulations (TAPCR). The permittee has been granted permission to operate an air contaminant source in accordance with emissions limitations and monitoring requirements set forth herein.

Date Issued: June 22, 2017

Date of Significant Modification #1: Draft

Date Expires: June 21, 2022

Permit Number:

570221

Issued To:

Arnold Engineering Development Complex

Installation Address:

100 Kindel Drive
Arnold Air Force Base

Installation Description:

Flight simulation test facilities with aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environment chambers, arc heaters, ballistic ranges and other specialized units. (See next page for details)

Facility ID: 16-0010

Renewal Application Due Date:

Between September 24, 2021 and December 23, 2021

Primary SIC: 97

Information Relied Upon:

Application dated: April 22, 2015 and revision application updated September 13, 2016.

Minor Modification Application Dated: August 25, 2017

Significant Modification Applications Dated: April 5, 2019, and July 23, 2019

(continued on the next page)

TECHNICAL SECRETARY

No Authority is Granted by this Permit to Operate, Construct, or Maintain any Installation in Violation of any Law, Statute, Code, Ordinance, Rule, or Regulation of the State of Tennessee or any of its Political Subdivisions.

POST AT INSTALLATION ADDRESS

Installation Description (cont.):

Source Number:	Description:
01 & 02:	Steam Plant A (MACT) Boilers 01, 02, 03, 04
06:	ETF Heaters (MACT) North and South Heaters
07:	VKF Heaters (MACT) Heater W15, Heater W16, Heater W17, Heater W18, Process Heater
08:	PWT Air Dryer (MACT)
14:	APTU Test Facility Iso-butane fired heaters for Testing Solid and Liquid Rocket Motors as well as Aircraft Engines.
17:	Liquid Rocket Testing This testing may be conducted either in 16-0010-17 Liquid Rocket Test Cell Facility, 16-0010-18 Solid Rocket Test Cell Facility, 16-0010-19 ETF Test Cells, or 16-0010-31 ASTF Test Cells
18:	Solid Rocket Testing (MACT). This testing may be conducted either in 16-0010-18 Solid Rocket Test Cell Facility, 16-0010-19 ETF Test Cells, or 16-0010-31 ASTF Test Cells, as well as enclosed chambers, such as the J6 dehumidification chamber, within the Solid Rocket Test Complex.
19:	ETF Test Cells
28:	HB1 Heaters 1A & 1B (MACT)
30:	ASTF Heaters (MACT)
31:	ASTF Test Cells and Glycol Reboilers EG-A & EG-B
35:	VKF Auxiliary Heater (MACT)
40:	Chemical Cleaning Facility
42:	ARC Heaters (3)
43:	Steam Plant C (MACT)
46:	T-3 Air Heater (MACT)
52:	PWT Engine Testing
53:	SL1 Test Cell
56:	SL2/SL3 Test Cells
70:	Engines for Emergency Generators (NSPS/MACT)
72:	Desiccant Dryers (MACT)

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ATTACHMENT 1	Opacity Matrix Decision Tree for Visible Emission Evaluation Methods 2, 3, & 9, dated June 18, 1996 (amended September 11, 2013)	4 pages
ATTACHMENT 2	Emission Factors for Various Aircraft Engines, Rocket Motors, and Arc Heaters	9 pages
ATTACHMENT 3	Title V Fee Selection Form – APC 36 (CN-1583)	2 pages
ATTACHMENT 4	Agreement Letters	26 pages

SECTION A

GENERAL PERMIT CONDITIONS

A permit issued under the provisions of paragraph 1200-03-09-.02(11) is a permit issued pursuant to the requirements of Title V of the Federal Act and its implementing Federal regulations promulgated at 40 CFR, Part 70.

- A1. Definitions.** Terms not otherwise defined in the permit shall have the meaning assigned to such terms in the referenced regulation.

TAPCR 1200-03

- A2. Compliance requirement.** All terms and conditions in a permit issued pursuant to paragraph 1200-03-09-.02(11) including any provisions designed to limit a source's potential to emit, are enforceable by the Administrator and citizens under the Federal Act.

The permittee shall comply with all conditions of its permit. Except for requirements specifically designated herein as not being federally enforceable (State Only), non-compliance with the permit requirements is a violation of the Federal Act and the Tennessee Air Quality Act and is grounds for enforcement action; for a permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. Non-compliance with permit conditions specifically designated herein as not being federally enforceable (State Only) is a violation of the Tennessee Air Quality Act and may be grounds for these actions.

TAPCR 1200-03-09-.02(11)(e)2(i) and 1200-03-09-.02(11)(e)1(vi)(I)

- A3. Need to halt or reduce activity.** The need to halt or reduce activity is not a defense for noncompliance. It shall not be a defense for a 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 the permit. However, nothing in this item shall be construed as precluding consideration of a need to halt or reduce activity as a mitigating factor in assessing penalties for noncompliance if the health, safety or environmental impacts of halting or reducing operations would be more serious than the impacts of continuing operations.

TAPCR 1200-03-09-.02(11)(e)1(vi)(II)

- A4. The permit.** The permit may be modified, revoked, reopened, and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

TAPCR 1200-03-09-.02(11)(e)1(vi)(III)

- A5. Property rights.** The permit does not convey any property rights of any sort, or any exclusive privilege.

TAPCR 1200-03-09-.02(11)(e)1(vi)(IV)

- A6. Submittal of requested information.** The permittee shall furnish to the Technical Secretary, within a reasonable time, any information that the Technical Secretary may request in writing to determine whether cause exists for modifying, revoking and reissuing, or termination of the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Technical Secretary copies of records required to be kept by the permit. If the permittee claims that such information is confidential, the Technical Secretary may review that claim and hold the information in protected status until such time that the Board can hear any contested proceedings regarding confidentiality disputes. If the information is desired by EPA, the permittee may mail the information directly to EPA. Any claims of confidentiality for federal purposes will be determined by EPA.

TAPCR 1200-03-09-.02(11)(e)1(vi)(V)

- A7. Severability clause.** The requirements of this permit are severable. A dispute regarding one or more requirements of this permit does not invalidate or otherwise excuse the permittee from their duty to comply with the remaining portion of the permit.

TAPCR 1200-03-09.02(11)(e)1(v)

- A8. Fee payment.**

(a) The permittee shall pay an annual Title V emission fee based upon the responsible official's choice of actual emissions, allowable emissions, or a combination of actual and allowable emissions; and on the responsible official's choice of annual accounting period. An emission cap of 4,000 tons per year per regulated pollutant per major source SIC Code shall apply to actual or allowable based emission fees. A Title V annual emission fee will not be charged for emissions in excess of the cap. Title V annual emission fees will not be charged for carbon monoxide or for greenhouse gas pollutants solely because they are greenhouse gases.

(b) Title V sources shall pay allowable based emission fees until the beginning of the next annual accounting period following receipt of their initial Title V operating permit. At that time, the permittee shall begin paying their Title V fee based upon their choice of actual or allowable based fees, or mixed actual and allowable based fees. Once permitted, the Responsible Official may revise their existing fee choice by submitting a written request to the Division no later than December 31 of the annual accounting period for which the fee is due.

(c) When paying annual Title V emission fees, the permittee shall comply with all provisions of 1200-03-26-.02 and 1200-03-09-.02(11) applicable to such fees.

(d) Where more than one (1) allowable emission limit is applicable to a regulated pollutant, the allowable emissions for the regulated pollutants shall not be double counted. Major sources subject to the provisions of paragraph 1200-03-26-.02(9) shall apportion their emissions as follows to ensure that their fees are not double counted.

1. Sources that are subject to federally promulgated hazardous air pollutant under 40 CFR 60, 61, or 63 will place such regulated emissions in the regulated hazardous air pollutant (HAP) category.

2. A category of miscellaneous HAPs shall be used for hazardous air pollutants listed at part 1200-03-26-.02(2)(i)12 that are not subject to federally promulgated hazardous air pollutant standards under 40 CFR 60, 61, or 63.

3. HAPs that are also in the family of volatile organic compounds, particulate matter, or PM₁₀ shall not be placed in either the regulated HAP category or miscellaneous HAP category.

4. Sources that are subject to a provision of chapter 1200-03-16 New Source Performance Standards (NSPS) or chapter 0400-30-39 Standards of Performance for New Stationary Sources for pollutants that are neither particulate matter, PM₁₀, sulfur dioxide (SO₂), volatile organic compounds (VOC), nitrogen oxides (NO_x), or hazardous air pollutants (HAPs) will place such regulated emissions in an NSPS pollutant category.

5. The regulated HAP category, the miscellaneous HAP category, and the NSPS pollutant category are each subject to the 4,000 ton cap provisions of subparagraph 1200-03-26-.02(2)(i).

6. Major sources that wish to pay annual emission fees for PM₁₀ on an allowable emission basis may do so if they have a specific PM₁₀ allowable emission standard. If a major source has a total particulate emission standard, but wishes to pay annual emission fees on an actual PM₁₀ emission basis, it may do so if the PM₁₀ actual emission levels are proven to the satisfaction of the Technical Secretary. The method to demonstrate the actual PM₁₀ emission levels must be made as part of the source's major source operating permit in advance in order to exercise this option. The PM₁₀ emissions reported under these options shall not be subject to fees under the family of particulate emissions. The 4,000 ton cap provisions of subparagraph 1200-03-26-.02(2)(i) shall also apply to PM₁₀ emissions.

TAPCR 1200-03-26-.02 and 1200-03-09-.02(11)(e)1(vii)

A9. Permit revision not required. A permit revision will not be required under any approved economic incentives, marketable permits, emissions trading and other similar programs or process for changes that are provided for in the permit.

TAPCR 1200-03-09-.02(11)(e)1(viii)

A10. Inspection and entry. Upon presentation of credentials and other documents as may be required by law, the permittee shall allow the Technical Secretary or an authorized representative to perform the following for the purposes of determining compliance with the permit applicable requirements:

(a) Enter upon, at reasonable times, the permittee's premises where a source is located or emissions-related activity is 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 the permit;

(c) Inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and

(d) As authorized by the Clean Air Act and Chapter 1200-03-10 of TAPCR, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the permit or applicable requirements.

(e) "Reasonable times" shall be considered to be customary business hours unless reasonable cause exists to suspect noncompliance with the Act, Division 1200-03 or any permit issued pursuant thereto and the Technical Secretary specifically authorizes an inspector to inspect a facility at any other time.

TAPCR 1200-03-09-.02(11)(e)3.(ii)

A11. Permit shield.

- (a) Compliance with the conditions of this permit shall be deemed compliance with all applicable requirements as of the date of permit issuance, provided that:
1. Such applicable requirements are included and are specifically identified in the permit; or
 2. The Technical Secretary, in acting on the permit application or revision, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or a concise summary thereof.
- (b) Nothing in this permit shall alter or affect the following:
1. The provisions of section 303 of the Federal Act (emergency orders), including the authority of the Administrator under that section. Similarly, the provisions of T.C.A. §68-201-109 (emergency orders) including the authority of the Governor under the section;
 2. The liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;
 3. The applicable requirements of the acid rain program, consistent with section 408(a) of the Federal Act; or
 4. The ability of EPA to obtain information from a source pursuant to section 114 of the Federal Act.
- (c) Permit shield is granted to the permittee.

TAPCR 1200-03-09-.02(11)(e)6

A12. Permit renewal and expiration.

- (a) An application for permit renewal must be submitted at least 180 days, but no more than 270 days prior to the expiration of this permit. Permit expiration terminates the source's right to operate unless a timely and complete renewal application has been submitted.
- (b) If the permittee submits a timely and complete application for permit renewal the source will not be considered to be operating without a permit until the Technical Secretary takes final action on the permit application, except as otherwise noted in paragraph 1200-03-09-.02(11).
- (c) This permit, its shield provided in Condition A11, and its conditions will be extended and effective after its expiration date provided that the source has submitted a timely, complete renewal application to the Technical Secretary.

TAPCR 1200-03-09-.02(11)(f)2 and 3, 1200-03-09-.02(11)(d)1(i)(III), and 1200-03-09-.02(11)(a)2

A13. Reopening for cause.

- (a) A permit shall be reopened and revised prior to the expiration of the permit under any of the circumstances listed below:
1. Additional applicable requirements under the Federal Act become applicable to the sources contained in this permit provided the permit has a remaining term of 3 or more years. Such a reopening shall be completed not later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the permit expiration date of this permit, unless the original has been extended pursuant to 1200-03-09-.02(11)(a)2.
 2. Additional requirements become applicable to an affected source under the acid rain program.
 3. The Technical Secretary or EPA determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.
 4. The Technical Secretary or EPA determines that the permit must be revised or revoked to assure compliance with the applicable requirements.
- (b) Proceedings to reopen and issue a permit shall follow the same proceedings as apply to initial permit issuance and shall affect only those parts of the permit for which cause to reopen exists, and not the entire permit. Such reopening shall be made as expeditiously as practicable.
- (c) Reopenings for cause shall not be initiated before a notice of such intent is provided to the permittee by the Technical Secretary at least 30 days in advance of the date that the permit is to be reopened except that the Technical Secretary may provide a shorter time period in the case of an emergency. An emergency shall be established by the criteria of T.C.A. 68-201-109 or other compelling reasons that public welfare is being adversely affected by the operation of a source that is in compliance with its permit requirements.
- (d) If the Administrator finds that cause exists to terminate, modify, or revoke and reissue a permit as identified in A13, he is required under federal rules to notify the Technical Secretary and the permittee of such findings in writing. Upon receipt of such notification, the Technical Secretary shall investigate the matter in order to determine if he agrees or disagrees with the Administrator's findings. If he agrees with the Administrator's findings, the Technical Secretary shall conduct the reopening in the following manner:

1. The Technical Secretary shall, within 90 days after receipt of such notification, forward to EPA a proposed determination of termination, modification, or revocation and reissuance, as appropriate. If the Administrator grants additional time to secure permit applications or additional information from the permittee, the Technical Secretary shall have the additional time period added to the standard 90 day time period.
2. EPA will evaluate the Technical Secretary's proposed revisions and respond as to their evaluation.
3. If EPA agrees with the proposed revisions, the Technical Secretary shall proceed with the reopening in the same manner prescribed under Condition A13 (b) and Condition A13 (c).
4. If the Technical Secretary disagrees with either the findings or the Administrator that a permit should be reopened or an objection of the Administrator to a proposed revision to a permit submitted pursuant to Condition A13(d), he shall bring the matter to the Board at its next regularly scheduled meeting for instructions as to how he should proceed. The permittee shall be required to file a written brief expressing their position relative to the Administrator's objection and have a responsible official present at the meeting to answer questions for the Board. If the Board agrees that EPA is wrong in their demand for a permit revision, they shall instruct the Technical Secretary to conform to EPA's demand, but to issue the permit under protest preserving all rights available for litigation against EPA.

TAPCR. 1200-03-09-.02(11)(f)6 and 7.

- A14. Permit transference.** An administrative permit amendment allows for a change of ownership or operational control of a source where the Technical Secretary determines that no other change in the permit is necessary, provided that the following requirements are met:

- (a) Transfer of ownership permit application is filed consistent with the provisions of 1200-03-09-.03(6), and
- (b) written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittee has been submitted to the Technical Secretary.

TAPCR 1200-03-09-.02(11)(f)4(i)(IV) and 1200-03-09-.03(6)

- A15. Air pollution alert.** When the Technical Secretary has declared that an air pollution alert, an air pollution warning, or an air pollution emergency exists, the permittee must follow the requirements for that episode level as outlined in TAPCR 1200-03-09-.03(1) and TAPCR 1200-03-15-.03.

- A16. Construction permit required.** Except as exempted in TAPCR 1200-03-09-.04, or excluded in subparagraph TAPCR 1200-03-02-.01(1)(aa) or subparagraph TAPCR 1200-03-02-.01(1)(cc), this facility shall not begin the construction of a new air contaminant source or the modification of an air contaminant source which may result in the discharge of air contaminants without first having applied for and received from the Technical Secretary a construction permit for the construction or modification of such air contaminant source.

TAPCR 1200-03-09-.01(1)(a)

- A17. Notification of changes.** The permittee shall notify the Technical Secretary 30 days prior to commencement of any of the following changes to an air contaminant source which would not be a modification requiring a construction permit.

- (a) change in air pollution control equipment
- (b) change in stack height or diameter
- (c) change in exit velocity of more than 25 percent or exit temperature of more than 15 percent based on absolute temperature.

TAPCR 1200-03-09-.02(7)

- A18. Schedule of compliance.** The permittee will comply with any applicable requirement that becomes effective during the permit term on a timely basis. If the permittee is not in compliance the permittee must submit a schedule for coming into compliance which must include a schedule of remedial measure(s), including an enforceable set of deadlines for specific actions.

TAPCR 1200-03-09-.02(11)(d)3 and 40 CFR Part 70.5(c)

A19. Title VI.

(a) The permittee shall comply with the standards for recycling and emissions reduction pursuant to 40 CFR, Part 82, Subpart F, except as provided for motor vehicle air conditioners (MVACs) in Subpart B:

1. Persons opening appliances for maintenance, service, repair, or disposal must comply with the required practices pursuant to Section 82.156.
2. Equipment used during the maintenance, service, repair, or disposal of appliances must comply with the standards for recycling and recovery equipment pursuant to Section 82.158.
3. Persons performing maintenance, service, repair, or disposal of appliances must be certified by an approved technician certification program pursuant to Section 82.161.

(b) If the permittee performs a service on motor (fleet) vehicles when this service involves ozone depleting substance refrigerant in the motor vehicle air conditioner (MVAC), the permittee is subject to all the applicable requirements as specified in 40 CFR, Part 82, Subpart B, Servicing of Motor Vehicle Air Conditioners.

(c) The permittee shall be allowed to switch from any ozone-depleting substance to any alternative that is listed in the Significant New Alternatives Program (SNAP) promulgated pursuant to 40 CFR, Part 82, Subpart G, Significant New Alternatives Policy Program.

A20. 112 (r). Sources which are subject to the provisions of Section 112(r) of the federal Clean Air Act or any federal regulations promulgated thereunder, shall annually certify in writing to the Technical Secretary that they are properly following their accidental release plan. The annual certification is due in the office of the Technical Secretary no later than January 31 of each year. Said certification will be for the preceding calendar year.

TAPCR 1200-03-32-.03(3)

SECTION B

**GENERAL CONDITIONS for MONITORING,
REPORTING, and ENFORCEMENT**

B1. Recordkeeping. Monitoring and related record keeping shall be performed in accordance with the requirements specified in the permit conditions for each individual permit unit. In no case shall reports of any required monitoring and record keeping be submitted less frequently than every six months.

- (a) Where applicable, records of required monitoring information include the following:
1. The date, place as defined in the permit, and time of sampling or measurements;
 2. The date(s) analyses were performed;
 3. The company or entity that performed the analysis;
 4. The analytical techniques or methods used;
 5. The results of such analyses; and
 6. The operating conditions as existing at the time of sampling or measurement.

(b) Digital data accumulation which utilizes valid data compression techniques shall be acceptable for compliance determination as long as such compression does not violate an applicable requirement and its use has been approved in advance by the Technical Secretary.

TAPCR 1200-03-09-.02(11)(e)1(iii)

B2. Retention of monitoring data. The permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.

TAPCR 1200-03-09-.02(11)(e)1(iii)(II)II

B3. Reporting. Reports of any required monitoring and record keeping shall be submitted to the Technical Secretary in accordance with the frequencies specified in the permit conditions for each individual permit unit. Reports shall be submitted within 60 days of the close of the reporting period unless otherwise noted. All instances of deviations from permit requirements must be clearly identified in such reports. All required reports must be certified by a responsible official. Reports required under "State only requirements" are not required to be certified by a responsible official.

TAPCR 1200-03-09-.02(11)(e)1(iii)

B4. Certification. Except for reports required under "State Only" requirements, any application form, report or compliance certification submitted pursuant to the requirements of this permit shall contain certification by a responsible official of truth, accuracy and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

TAPCR 1200-03-09-.02(11)(d)4

B5. Annual compliance certification. The permittee shall submit annually compliance certifications with terms and conditions contained in Sections A, B, D and E of this permit, including emission limitations, standards, or work practices. This compliance certification shall include all of the following (provided that the identification of applicable information may cross-reference the permit or previous reports, as applicable):

- (a) The identification of each term or condition of the permit that is the basis of the certification;
- (b) The identification of the method(s) or other means used by the owner or operator for determining the compliance status with each term and condition during the certification period; such methods and other means shall include, at a minimum, the methods and means required by this permit. If necessary, the owner or operator also shall identify any other material information that must be included in the certification to comply with section 113(c)(2) of the Federal Act, which prohibits knowingly making a false certification or omitting material information;
- (c) The status of compliance with the terms and conditions of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification shall be based on the method or means designated in B5(b) above. The certification shall identify each deviation and take it into account in the compliance certification. The certification shall also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion* or exceedance** as defined below occurred; and
- (d) Such other facts as the Technical Secretary may require to determine the compliance status of the source.

* "Excursion" shall mean a departure from an indicator range established for monitoring under this paragraph, consistent with any averaging period specified for averaging the results of the monitoring.

** "Exceedance" shall mean a condition that is detected by monitoring that provides data in terms of an emission limitation or standard and that indicates that emissions (or opacity) are greater than the applicable emission limitation or standard (or

less than the applicable standard in the case of a percent reduction requirement) consistent with any averaging period specified for averaging the results of the monitoring.

40 CFR Part 70.6(c)(5)(iii) as amended in the Federal Register Vol. 79, No.144, July 28, 2014, pages 43661 through 43667

B6. Submission of compliance certification. The compliance certification shall be submitted to:

The Tennessee Department of Environment and Conservation Environmental Field Office specified in Section E of this permit	and	Air Enforcement Branch US EPA Region IV 61 Forsyth Street, SW Atlanta, Georgia 30303
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TAPCR 1200-03-09-.02(11)(e)3(v)(IV)

B7. Emergency provisions. An emergency constitutes an affirmative defense to an enforcement action brought against this source for noncompliance with a technology based emission limitation due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

(a) The affirmative defense of the emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

1. An emergency occurred and that the permittee can identify the probable cause(s) of the emergency. "Probable" must be supported by a credible investigation into the incident that seeks to identify the causes and results in an explanation supported by generally accepted engineering or scientific principles.
2. The permitted source was at the time being properly operated. In determining whether or not a source was being properly operated, the Technical Secretary shall examine the source's written standard operating procedures which were in effect at the time of the noncompliance and any other code as detailed below that would be relevant to preventing the noncompliance. Adherence to the source's standard operating procedures will be the test of adequate preventative maintenance, careless operation, improper operation or operator error to the extent that such adherence would prevent noncompliance. The source's failure to follow recognized standards of practice to the extent that adherence to such a standard would have prevented noncompliance will disqualify the source from any claim of an emergency and an affirmative defense.
3. During the period of the emergency, the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit.
4. The permittee submitted notice of the emergency to the Technical Secretary according to the notification criteria for malfunctions in rule 1200-03-20-.03. For the purposes of this condition, "emergency" shall be substituted for "malfunction(s)" in rule 1200-03-20-.03 to determine the relevant notification threshold. The notice shall include a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.

(b) In any enforcement proceeding the permittee seeking to establish the occurrence of an emergency has the burden of proof.

(c) The provisions of this condition are in addition to any emergency, malfunction or upset requirement contained in Division 1200-03 or other applicable requirement.

TAPCR 1200-03-09-.02(11)(e)7

B8. Excess emissions reporting.

(a) The permittee shall promptly notify the Technical Secretary when any emission source, air pollution control equipment, or related facility breaks down in such a manner to cause the emission of air contaminants in excess of the applicable emission standards contained in Division 1200-03 or any permit issued thereto, or of sufficient duration to cause damage to property or public health. The permittee must provide the Technical Secretary with a statement giving all pertinent facts, including the estimated duration of the breakdown. Violations of the visible emission standard which occur for less than 20 minutes in one day (midnight to midnight) need not be reported. Prompt notification will be within 24 hours of the malfunction and shall be provided by telephone to the Division's Nashville office. The Technical Secretary shall be notified when the condition causing the failure or breakdown has been corrected. In attainment and unclassified areas if emissions other than from sources designated as significantly impacting on a nonattainment area in excess of the standards will not and do not occur over more than a 24-hour period (or will not recur over more than a 24-hour period) and no damage to property and or public health is anticipated, notification is not required.

(b) Any malfunction that creates an imminent hazard to health must be reported by telephone immediately to the Division's Nashville office at (615) 532-0554 and to the State Civil Defense.

(c) A log of all malfunctions, startups, and shutdowns resulting in emissions in excess of the standards in Division 1200-03 or any permit issued thereto must be kept at the plant. All information shall be entered in the log no later than twenty-four (24) hours after the startup or shutdown is complete, or the malfunction has ceased or has been corrected. Any later discovered corrections can be added in the log as footnotes with the reason given for the change. This log must record at least the following:

1. Stack or emission point involved
2. Time malfunction, startup, or shutdown began and/or when first noticed
3. Type of malfunction and/or reason for shutdown
4. Time startup or shutdown was complete or time the air contaminant source returned to normal operation
5. The company employee making entry on the log must sign, date, and indicate the time of each log entry

The information under items 1. and 2. must be entered into the log by the end of the shift during which the malfunction or startup began. For any source utilizing continuous emission(s) monitoring, continuous emission(s) monitoring collection satisfies the above log keeping requirement.

TAPCR 1200-03-20-.03 and .04

- B9. Malfunctions, startups and shutdowns - reasonable measures required.** The permittee must take all reasonable measures to keep emissions to a minimum during startups, shutdowns, and malfunctions. These measures may include installation and use of alternate control systems, changes in operating methods or procedures, cessation of operation until the process equipment and/or air pollution control equipment is repaired, maintaining sufficient spare parts, use of overtime labor, use of outside consultants and contractors, and other appropriate means. Failures that are caused by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions. This provision does not apply to standards found in 40 CFR, Parts 60(Standards of performance for new stationary sources), 61(National emission standards for hazardous air pollutants) and 63(National emission standards for hazardous air pollutants for source categories).

TAPCR 1200-03-20-.02

- B10.** Reserved.

- B11. Report required upon the issuance of a notice of violation for excess emissions.** The permittee must submit within twenty (20) days after receipt of the notice of violation, the data required below. If this data has previously been available to the Technical Secretary prior to the issuance of the notice of violation no further action is required of the violating source. However, if the source desires to submit additional information, then this must be submitted within the same twenty (20) day time period. The minimum data requirements are:
- (a) The identity of the stack and/or other emission point where the excess emission(s) occurred;
 - (b) The magnitude of the excess emissions expressed in pounds per hour and the units of the applicable emission limitation and the operating data and calculations used in determining the magnitude of the excess emissions;
 - (c) The time and duration of the emissions;
 - (d) The nature and cause of such emissions;
 - (e) For malfunctions, the steps taken to correct the situation and the action taken or planned to prevent the recurrence of such malfunctions;
 - (f) The steps taken to limit the excess emissions during the occurrence reported, and
 - (g) If applicable, documentation that the air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good operating practices for minimizing emissions.

Failure to submit the required report within the twenty (20) day period specified shall preclude the admissibility of the data for determination of potential enforcement action.

TAPCR 1200-03-20-.06(2), (3) and (4)

SECTION C

PERMIT CHANGES

- C1. Operational flexibility changes.** The source may make operational flexibility changes that are not addressed or prohibited by the permit without a permit revision subject to the following requirements:
- (a) The change cannot be subject to a requirement of Title IV of the Federal Act or Chapter 1200-03-30.
 - (b) The change cannot be a modification under any provision of Title I of the federal Act or Division 1200-03.
 - (c) Each change shall meet all applicable requirements and shall not violate any existing permit term or condition.
 - (d) The source must provide contemporaneous written notice to the Technical Secretary and EPA of each such change, except for changes that are below the threshold of levels that are specified in Rule 1200-03-09-.04.
 - (e) Each change shall be described in the notice including the date, any change in emissions, pollutants emitted, and any applicable requirements that would apply as a result of the change.
 - (f) The change shall not qualify for a permit shield under the provisions of part 1200-03-09-.02(11)(e)6.
 - (g) The permittee shall keep a record describing the changes made at the source that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under the permit, and the emissions resulting from those changes. The records shall be retained until the changes are incorporated into subsequently issued permits.

TAPCR 1200-03-09-.02(11)(a)4 (ii)

- C2. Section 502(b)(10) changes.**
- (a) The permittee can make certain changes without requiring a permit revision, if the changes are not modifications under Title I of the Federal Act or Division 1200-03 and the changes do not exceed the emissions allowable under the permit. The permittee must, however, provide the Administrator and Technical Secretary with written notification within a minimum of 7 days in advance of the proposed changes. The Technical Secretary may waive the 7 day advance notice in instances where the source demonstrates in writing that an emergency necessitates the change. Emergency shall be demonstrated by the criteria of TAPCR 1200-03-09-.02(11)(e)7 and in no way shall it include changes solely to take advantages of an unforeseen business opportunity. The Technical Secretary and EPA shall attach each such notice to their copy of the relevant permit.
 - (b) The written notification must be signed by a facility Title V responsible official and include the following:
 - 1. a brief description of the change within the permitted facility;
 - 2. the date on which the change will occur;
 - 3. a declaration and quantification of any change in emissions;
 - 4. a declaration of any permit term or condition that is no longer applicable as a result of the change; and
 - 5. a declaration that the requested change is not a Title I modification and will not exceed allowable emissions under the permit.
 - (c) The permit shield provisions of TAPCR 1200-03-09-.02(11)(e)6 shall not apply to Section 502(b)(10) changes.

TAPCR 1200-03-09-.02(11)(a)4 (i)

- C3. Administrative amendment.**
- (a) Administrative permit amendments to this permit shall be in accordance with 1200-03-09-.02(11)(f)4. The source may implement the changes addressed in the request for an administrative amendment immediately upon submittal of the request.
 - (b) The permit shield shall be extended as part of an administrative permit amendment revision consistent with the provisions of TAPCR 1200-03-09-.02(11)(e)6 for such revisions made pursuant to item (c) of this condition which meet the relevant requirements of TAPCR 1200-03-09-.02(11)(e), TAPCR 1200-03-09-.02(11)(f) and TAPCR 1200-03-09-.02(11)(g) for significant permit modifications.
 - (c) Proceedings to review and grant administrative permit amendments shall be limited to only those parts of the permit for which cause to amend exists, and not the entire permit.

TAPCR 1200-03-09-.02(11)(f)4

- C4. Minor permit modifications.**
- (a) The permittee may submit an application for a minor permit modification in accordance with TAPCR 1200-03-09-.02(11)(f)5(ii).
 - (b) The permittee may make the change proposed in its minor permit modification immediately after an application is filed with the Technical Secretary.
 - (c) Proceedings to review and modify permits shall be limited to only those parts of the permit for which cause to modify exists, and not the entire permit.
 - (d) Minor permit modifications do not qualify for a permit shield.

TAPCR 1200-03-09-.02(11)(f)5(ii)

C5. Significant permit modifications.

- (a) The permittee may submit an application for a significant modification in accordance with TAPCR 1200-03-09-.02(11)(f)5(iv).
- (b) Proceedings to review and modify permits shall be limited to only those parts of the permit for which cause to modify exists, and not the entire permit.

TAPCR 1200-03-09-.02(11)(f)5(iv)

C6. New construction or modifications.

Future construction at this facility that is subject to the provisions of TAPCR 1200-03-09-.01 shall be governed by the following:

- (a) The permittee shall designate in their construction permit application the route that they desire to follow for the purposes of incorporating the newly constructed or modified sources into their existing operating permit. The Technical Secretary shall use that information to prepare the operating permit application submittal deadlines in their construction permit.
- (b) Sources desiring the permit shield shall choose the administrative amendment route of TAPCR 1200-03-09-.02(11)(f)4 or the significant modification route of TAPCR 1200-03-09-.02(11)(f)5(iv).
- (c) Sources desiring expediency instead of the permit shield shall choose the minor permit modification procedure route of TAPCR 1200-03-09-.02(11)(f)5(ii) or group processing of minor modifications under the provisions of TAPCR 1200-03-09-.02(11)(f)5(iii) as applicable to the magnitude of their construction.

TAPCR 1200-03-09-.02(11)(d) 1(i)(V)

SECTION D

GENERAL APPLICABLE REQUIREMENTS

- D1. Visible emissions.** With the exception of air emission sources exempt from the requirements of TAPCR Chapter 1200-03-05 and air emission sources for which a different opacity standard is specifically provided elsewhere in this permit, the permittee shall not cause, suffer, allow or permit discharge of a visible emission from any air contaminant source with an opacity in excess of twenty (20) percent for an aggregate of more than five (5) minutes in any one (1) hour or more than twenty (20) minutes in any twenty-four (24) hour period; provided, however, that for fuel burning installations with fuel burning equipment of input capacity greater than 600 million btu per hour, the permittee shall not cause, suffer, allow, or permit discharge of a visible emission from any fuel burning installation with an opacity in excess of twenty (20) percent (6-minute average) except for one six minute period per one (1) hour of not more than forty (40) percent opacity. Sources constructed or modified after July 7, 1992 shall utilize 6-minute averaging.
- Consistent with the requirements of TAPCR Chapter 1200-03-20, due allowance may be made for visible emissions in excess of that permitted under TAPCR 1200-03-05 which are necessary or unavoidable due to routine startup and shutdown conditions. The facility shall maintain a continuous, current log of all excess visible emissions showing the time at which such conditions began and ended and that such record shall be available to the Technical Secretary or an authorized representative upon request.
- TAPCR 1200-03-05-.01(1), TAPCR 1200-03-05-.03(6) and TAPCR 1200-03-05-.02(1)
- D2. General provisions and applicability for non-process gaseous emissions.** Any person constructing or otherwise establishing a non-portable air contaminant source emitting gaseous air contaminants after April 3, 1972, or relocating an air contaminant source more than 1.0 km from the previous position after November 6, 1988, shall install and utilize the best equipment and technology currently available for controlling such gaseous emissions.
- TAPCR 1200-03-06-.03(2)
- D3. Non-process emission standards.** The permittee shall not cause, suffer, allow, or permit particulate emissions from non-process sources in excess of the standards in TAPCR 1200-03-06.
- D4. General provisions and applicability for process gaseous emissions.** Any person constructing or otherwise establishing an air contaminant source emitting gaseous air contaminants after April 3, 1972, or relocating an air contaminant source more than 1.0 km from the previous position after November 6, 1988, shall install and utilize equipment and technology which is deemed reasonable and proper by the Technical Secretary.
- TAPCR 1200-03-07-.07(2)
- D5. Particulate emissions from process emission sources.** The permittee shall not cause, suffer, allow, or permit particulate emissions from process sources in excess of the standards in TAPCR 1200-03-07.
- D6. Sulfur dioxide emission standards.** The permittee shall not cause, suffer, allow, or permit Sulfur dioxide emissions from process and non-process sources in excess of the standards in TAPCR 1200-03-14. Regardless of the specific emission standard, new process sources shall utilize the best available control technology as deemed appropriate by the Technical Secretary of the Tennessee Air Pollution Control Board.
- D7. Fugitive Dust.**
- (a) The permittee shall not cause, suffer, allow, or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired, or demolished without taking reasonable precautions to prevent particulate matter from becoming airborne. Such reasonable precautions shall include, but not be limited to, the following:
1. Use, where possible, of water or chemicals for control of dust in demolition of existing buildings or structures, construction operations, grading of roads, or the clearing of land;
 2. Application of asphalt, water, or suitable chemicals on dirt roads, material stock piles, and other surfaces which can create airborne dusts;

3. Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. Adequate containment methods shall be employed during sandblasting or other similar operations.

(b) The permittee shall not cause, suffer, allow, or permit fugitive dust to be emitted in such manner to exceed five (5) minutes per hour or twenty (20) minutes per day as to produce a visible emission beyond the property line of the property on which the emission originates, excluding malfunction of equipment as provided in Chapter 1200-03-20.

TAPCR 1200-03-08

D8. Open burning. The permittee shall comply with the TAPCR 1200-03-04 for all open burning activities at the facility.

TAPCR 1200-03-04

D9. Asbestos. Where applicable, the permittee shall comply with the requirements of TAPCR 1200-03-11-.02(2)(d) when conducting any renovation or demolition activities at the facility.

TAPCR 1200-03-11-.02(2)(d) and 40 CFR, Part 61

D10. Annual certification of compliance. The generally applicable requirements set forth in Section D of this permit are intended to apply to activities and sources that are not subject to source-specific applicable requirements contained in State of Tennessee and U.S. EPA regulations. By annual certification of compliance, the permittee shall be considered to meet the monitoring and related record keeping and reporting requirements of TAPCR 1200-03-09-.02(11)(e)1.(iii) and 1200-03-10-.04(2)(b)1 and compliance requirements of TAPCR 1200-03-09-.02(11)(e)3.(i). The permittee shall submit compliance certification for these conditions annually.

D11. Emission Standards for Hazardous Air Pollutants. When applicable, the permittee shall comply with the TAPCR 0400-30-38 for all emission sources subject to a requirement contained therein.

TAPCR 0400-30-38

D12. Standards of Performance for New Stationary Sources. When applicable, the permittee shall comply with the TAPCR 0400-30-39 for all emission sources subject to a requirement contained therein.

TAPCR 0400-30-39

D13. Gasoline Dispensing Facilities. When applicable, the permittee shall comply with the TAPCR 1200-03-18-.24 for all emission sources subject to a requirement contained therein.

D14. Internal Combustion Engines.

(a) All stationary reciprocating internal combustion engines, including engines deemed insignificant activities and insignificant emission units, shall comply with the applicable provisions of TAPCR 0400-30-38-.01.

(b) All stationary compression ignition internal combustion engines, including engines deemed insignificant activities and insignificant emission units, shall comply with the applicable provisions of TAPCR 0400-30-39-.01.

(c) All stationary spark ignition internal combustion engines, including engines deemed insignificant activities and insignificant emission units, shall comply with the applicable provisions of TAPCR 0400-30-39-.02.

TAPCR 0400-30-38 and 39

SECTION E

SOURCE SPECIFIC EMISSION STANDARDS, OPERATING LIMITATIONS, and MONITORING, RECORDKEEPING and REPORTING REQUIREMENTS

16-0010	Facility Description:	Arnold Engineering Development Complex is a complex of flight simulation test facilities with aerodynamic and propulsion wind tunnels, rocket and aircraft engine test cells, space environmental chambers, arc heaters, ballistic ranges and other specialized units.
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Conditions E1, E2, and E4-1 through E4-8 apply to all sources in Section E of the permit unless otherwise noted

E1. Fee payment:

FEE EMISSIONS SUMMARY TABLE FOR MAJOR SOURCE 16-0010

REGULATED POLLUTANTS	ALLOWABLE EMISSIONS (tons per AAP)	ACTUAL EMISSIONS (tons per AAP)	COMMENTS
PARTICULATE MATTER (PM)	176.4	AEAR	Includes all fee emissions.
PM ₁₀	N/A	N/A	Included with PM fee emissions
SO ₂	390.16	AEAR	Includes all fee emissions.
VOC	343.7	AEAR	Includes all fee emissions.
NO _x	1,290.3	AEAR	Includes all fee emissions.
CATEGORY OF MISCELLANEOUS HAZARDOUS AIR POLLUTANTS (HAP WITHOUT A STANDARD)*			
VOC FAMILY GROUP	N/A	AEAR	Included in VOC above.
NON-VOC GASEOUS GROUP	6.12	AEAR	HCl and HF, not included above
PM FAMILY GROUP	N/A	AEAR	Included in PM above.
CATEGORY OF SPECIFIC HAZARDOUS AIR POLLUTANTS (HAP WITH A STANDARD)**			
VOC FAMILY GROUP	N/A	N/A	Not applicable.
NON-VOC GASEOUS GROUP	N/A	N/A	Not applicable.
PM FAMILY GROUP	N/A	N/A	Not applicable.
CATEGORY OF NSPS POLLUTANTS NOT LISTED ABOVE***			
EACH NSPS POLLUTANT NOT LISTED ABOVE	N/A	N/A	Not applicable.

NOTES

AAP The **Annual Accounting Period (AAP)** is a 12 consecutive month period that **either (a) begins each July 1st and ends June 30th of the following year when fees are paid on a fiscal year basis, or (b) begins January 1st and ends December 31st of the same year when paying on a calendar year basis.** The **Annual Accounting Period** at the time of permit renewal issuance began **July 1, 2016 and ends June 30, 2017**. The next Annual Accounting Period begins **begins July 1, 2017 and ends June 30, 2018** unless a request to change the annual accounting period is submitted by the responsible official as required by subparagraph 1200-03-26-.02(9)(b) and approved by the Technical Secretary. If the permittee wishes to revise their annual accounting period or their annual emission fee basis as allowed by subparagraph 1200-03-26-.02(9)(b), the responsible official must submit the request to the Division in writing on or before December 31 of the annual accounting period for which the fee is due. If a change in fee basis from allowable emissions to actual emissions for any pollutant is requested, the request from the responsible official must include the methods that will be used to determine actual emissions. Changes in fee bases must be made using the Title V Fee Selection form, form number APC 36 (CN-1583), included as an attachment to this permit and available on the Division of Air Pollution Control’s website.

N/A N/A indicates that no emissions are specified for fee computation.

AEAR If the permittee is paying annual emission fees on an actual emissions basis, **AEAR** indicates that an **Actual Emissions Analysis** is **Required** to determine the actual emissions of:

- (1) **each regulated pollutant** (Particulate matter, SO₂, VOC, NO_x and so forth. See TAPCR 1200-03-26-.02(2)(i) for the definition of a regulated pollutant.),

- (2) **each pollutant group** (VOC Family, Non-VOC Gaseous, and Particulate Family),
- (3) the **Miscellaneous HAP Category**,
- (4) the **Specific HAP Category**, and
- (5) the **NSPS Category**

under consideration during the **Annual Accounting Period**.

* **Category Of Miscellaneous HAP (HAP Without A Standard):** This category is made-up of hazardous air pollutants that do not have a federal or state standard. Each HAP is classified into one of three groups, the **VOC Family** group, the **Non-VOC Gaseous** group, or the **Particulate (PM) Family** group. **For fee computation**, the **Miscellaneous HAP Category** is subject to the 4,000 ton cap provisions of subparagraph 1200-03-26-.02(2)(i) of the TAPCR.

** **Category Of Specific HAP (HAP With A Standard):** This category is made-up of hazardous air pollutants (HAP) that are subject to Federally promulgated Hazardous Air Pollutant Standards that can be imposed under Chapter 1200-03-11 or Chapter 1200-03-31. Each individual hazardous air pollutant is classified into one of three groups, the **VOC Family** group, the **Non-VOC Gaseous** group, or the **Particulate (PM) Family** group. **For fee computation**, each individual hazardous air pollutant of the **Specific HAP Category** is subject to the 4,000 ton cap provisions of subparagraph 1200-03-26-.02(2)(i) of the TAPCR.

*** **Category Of NSPS Pollutants Not Listed Above:** This category is made-up of each New Source Performance Standard (NSPS) pollutant whose emissions are not included in the **PM, SO₂, VOC** or **NO_x** emissions from each source in this permit. **For fee computation**, each **NSPS pollutant not listed above** is subject to the 4,000 ton cap provisions of subparagraph 1200-03-26-.02(2)(i) of the TAPCR.

END NOTES

- The permittee shall:**
- (1) Pay Title V **annual emission fees**, on the emissions and year bases requested by the responsible official and approved by the Technical Secretary, for each annual accounting period (AAP) by the payment deadline(s) established in TAPCR 1200-03-26-.02(9)(g). Fees may be paid on an **actual, allowable, or mixed** emissions basis; and on either a **state fiscal year** or a **calendar year**, provided the requirements of TAPCR 1200-03-26-.02(9)(b) are met. If any part of any fee imposed under TAPCR 1200-03-26-.02 is not paid within 15 days of the due date, penalties shall at once accrue as specified in TAPCR 1200-03-26-.02(8).
 - (2) Sources paying annual emissions fees on an allowable emissions basis: pay annual allowable based emission fees for each annual accounting period no later than April 1 of each year pursuant to TAPCR 1200-03-26-.02(9)(d).
 - (3) Sources paying annual emissions fees on an actual emissions basis: prepare an **actual emissions analysis** for each AAP and pay **actual based emission fees** pursuant to TAPCR 1200-03-26-.02(9)(d). The **actual emissions analysis** shall include:
 - (a) the completed **Fee Emissions Summary Table**,
 - (b) each **actual emissions analysis** required, and
 - (c) the actual emission records for each pollutant and each source as required for actual emission fee determination, or a summary of the actual emission records required for fee determination, as specified by the Technical Secretary or the Technical Secretary's representative. The summary must include sufficient information for the Technical Secretary to determine the accuracy of the calculations. These calculations must be based on the annual fee basis approved by the Technical Secretary (a state fiscal year [July 1 through June 30] or a calendar year [January 1 through December 31]). These records shall be used to complete the **actual emissions analyses** required by the above **Fee Emissions Summary Table**.
 - (4) Sources paying annual emissions fees on a mixed emissions basis: for all pollutants and all sources for which the permittee has chosen an actual emissions basis, prepare an **actual emissions analysis** for each AAP and pay **actual based emission fees** pursuant to TAPCR 1200-03-26-.02(9)(d). The **actual emissions analysis** shall include:
 - (a) the completed **Fee Emissions Summary Table**,
 - (b) each **actual emissions analysis** required, and
 - (c) the actual emission records for each pollutant and each source as required for actual emission fee determination, or a summary of the actual emission records required for fee determination, as specified by the Technical Secretary or the Technical Secretary's representative. The summary must include sufficient information for the Technical

Secretary to determine the accuracy of the calculations. These calculations must be based on the fee bases approved by the Technical Secretary (payment on an actual or mixed emissions basis) and payment on a state fiscal year (July 1 through June 30) or a calendar year (January 1 through December 31). These records shall be used to complete the **actual emissions analysis**.

For all pollutants and all sources for which the permittee has chosen an allowable emissions basis, pay allowable based emission fees pursuant to TAPCR 1200-03-26-.02(9)(d).

- (5) When paying on an actual or mixed emissions basis, submit the **actual emissions analyses** at the time the fees are paid in full.

The annual emission fee due dates are specified in TAPCR 1200-03-26-.02(9)(g) and are dependent on the Responsible Official’s choice of fee bases as described above. If any part of any fee imposed under TAPCR 1200-03-26-.02 is not paid within 15 days of the due date, penalties shall at once accrue as specified in TAPCR 1200-03-26-.02(8). Emissions for regulated pollutants shall not be double counted as specified in Condition A8(d) of this permit.

Payment of the fee due and the actual emissions analysis (if required) shall be submitted to The Technical Secretary at the following address:

Payment of Fee to: The Tennessee Department of Environment and Conservation Division of Fiscal Services Consolidated Fee Section – APC William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 10th Floor Nashville, Tennessee 37243	and	Actual Emissions Analyses to: The Tennessee Department of Environment and Conservation Division of Air Pollution Control Emission Inventory Program William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243 or An electronic copy (PDF) of actual emissions analysis can also be submitted to: apc.inventory@tn.gov
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E2. Reporting requirements.

- (a) **Semiannual reports.** In order to maintain the same reporting schedule established in the original Title V permit, the first report for this renewal shall cover the following permits and time periods:

Permit	Report period begins	Report period ends
560453 (original)	January 1, 2017	June 30, 2017
570221 (renewal)	July 1, 2017	December 31, 2017

The report covering the full 6 month period shall be submitted within 60 days after **June 30, 2017**. Subsequent reports revert fully to permit #570221 and shall be submitted within 60 days after the end of each 6-month period following the first report.

The semiannual reports for Title V permit #570221 shall include:

- (1) Any monitoring and recordkeeping required by Conditions **E5-6, E5-7, E5-9, E6-6(SM1), E7-6(SM1), E8-6(SM1), E9-4, E9-6, E9-8, E11-3, E12-2, E12-3, E12-4, E12-5, E12-6, E13-3(SM1), E14-3, E14-4, E15-1, E15-2, E15-3, E16-5, E18-1, E21-3, E22-1, E22-2, E22-3, E22-4, E23-2, E23-3, E23-4, E23-5, E23-6, E23-7, E24-3, E24-4, E24-5, E24-6, E24-7, E24-9, E26-6(e), and E28-3** of this permit.
- (2) The visible emission evaluation readings from Conditions **E4-1 and E4-2** of this permit, if required. However, a summary report of this data is acceptable provided there is sufficient information to enable the Technical Secretary to evaluate compliance.
- (3) Identification of all instances of deviations from **ALL PERMIT REQUIREMENTS**.

These reports must be certified by a responsible official consistent with condition B4 of this permit and shall be submitted to The Technical Secretary at the address in Condition E2(b) of this permit.

TAPCR 1200-03-09-.02(11)(e)1.(iii)

- (b) **Annual compliance certification.** The permittee shall submit annually compliance certifications with terms and conditions contained in Sections A, B, D, and E of this permit, including emission limitations, standards, or work practices. This compliance certification shall include all of the following (provided that the identification of applicable information may cross-reference the permit or previous reports, as applicable):

- (1) The identification of each term or condition of the permit that is the basis of the certification;
- (2) The identification of the method(s) or other means used by the owner or operator for determining the compliance status with each term and condition during the certification period; Such methods and other means shall include, at a minimum, the methods and means required by this permit. If necessary, the owner or operator also shall identify any other material information that must be included in the certification to comply with section 113(c)(2) of the Federal Act, which prohibits knowingly making a false certification or omitting material information;
- (3) The status of compliance with each term or condition of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification shall be based on the method or means designated in E2(b)2 above. The certification shall identify each deviation and take it into account in the compliance certification. The certification shall also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion* or exceedance** as defined below occurred; and
- (4) Such other facts as the Technical Secretary may require to determine the compliance status of the source.

* “Excursion” shall mean a departure from an indicator range established for monitoring under this paragraph, consistent with any averaging period specified for averaging the results of the monitoring.

** “Exceedance” shall mean a condition that is detected by monitoring that provides data in terms of an emission limitation or standard and that indicates that emissions (or opacity) are greater than the applicable emission limitation or standard (or less than the applicable standard in the case of a percent reduction requirement) consistent with any averaging period specified for averaging the results of the monitoring.

In order to maintain the same reporting schedule established in the original Title V permit, the first certification for this renewal shall cover the following permits and time periods:

Permit	Report period begins	Report period ends
560453 (previous)	July 1, 2016	June 30, 2017
570221 (renewal)	July 1, 2017	June 30, 2018

The certification covering the full 12 month period shall be submitted within 60 days after **June 30, 2017**. Subsequent certifications revert fully to permit #570221 and shall be submitted within 60 days after the end of each 12-month period following the first certification.

These certifications shall be submitted to:

<p>Columbia Environmental Field Office Division of Air Pollution Control 1421 Hampshire Pike Columbia, TN 38401 Or by email to: APC.ColuEFO@tn.gov</p>	<p>and</p>	<p>Air Enforcement Branch US EPA Region IV 61 Forsyth Street, SW Atlanta, Georgia 30303</p>
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40 CFR Part 70.6(c)(5)(iii) as amended in the Federal Register Vol.79, No.144, July 28, 2014, pages 43661 through 43667
 TAPCR 1200-03-09-.02(11)(e)3.(v)

- (c) **Retention of Records.** All records required by any condition in Section E of this permit must be retained for a period of not less than five years. Additionally, these records shall be kept available for inspection by the Technical Secretary or Division representative.

TAPCR 1200-03-09-.02(11)(e)1.(iii)(II)II

- (d) **NSPS annual report.** The 40 CFR, Part 60, Subpart IIII report, if required to be submitted per **Condition E26-3(k)** must contain the following information:

- (1) Company name and address where each affected engine is located.
- (2) Date of the report and beginning and ending dates of the reporting period.
- (3) Engine site rating and model year.
- (4) Latitude and longitude of each engine in decimal degrees reported to the fifth decimal place.
- (5) Hours operated for the purposes specified in **Condition E26-3(h)(3)(i)** including the date, start time, and end time for engine operation for the purposes specified in **Condition E26-3(h)(3)(i)**. The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

The reporting schedule is synchronized with the Title V reporting schedule, covering each twelve month period of July 1 – June 30, and must be submitted no later than August 29 of each year. The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (www.epa.gov/cdx). However, if the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the written report must be submitted to the Technical Secretary at one of the addresses listed in below:

By mail:
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243

Or By email:
Air.Pollution.Control@tn.gov

40 CFR §60.4214(d) & 40 CFR §63.6650(h)

E3. 40 CFR Part 63, Subpart DDDDD Requirements.

E3-1. Boilers and process heaters located at a major source of hazardous air pollutants are subject to 40 CFR Part 63, Subpart DDDDD, **NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR MAJOR SOURCES: INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL BOILERS AND PROCESS HEATERS**, including any and/or all applicable emission limitations, notifications, compliance options, records, reports, etc. as summarized, but not limited to the following in this condition.

- (a) The permittee must meet each applicable emission limit and work practice standard in Tables 1 through 3, and 11 through 13 to subpart DDDDD for each affected unit in accordance with 40 CFR §63.7500.
- (b) Pursuant to 40 CFR §63.7530(f) and 63.7545(a), the permittee must submit all of the notifications in §63.7(b) and (c), §63.8(e), (f)(4) and (6), and §63.9(b) through (h), including the Notification of Compliance Status containing the results of the initial compliance demonstration.
- (c) Pursuant to 40 CFR §63.7550, the permittee must submit annual, biennial, and/or 5-year, 40 CFR 63, Subpart DDDDD compliance reports, whichever are applicable.
- (d) Pursuant to 40 CFR §63.7555 and §63.7560, the permittee must keep records pertaining to 40 CFR 63, Subpart DDDDD in a form suitable and readily available for expeditious review, according to §63.10(b)(1). The permittee must keep each record for five years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. Each record must be kept on site, or they must be accessible from on site (for example, through a computer network), for at least two years after the date of each occurrence, measurement, maintenance, corrective action, report, or record, according to § 63.10(b)(1). Records may be kept off site for the remaining three years.

E4. General Permit Requirements.

E4-1. Visible emissions for sources 02, 06, 07, 18, 28, 30, 40, 43, and 46 shall not exhibit greater than 20% opacity, except for an aggregate of no more than five minutes in any one hour period, and no more than 20 minutes in any 24 hour period. Visible emissions from these sources shall be determined by Tennessee Visible Emission Evaluation Method 2, (aggregate count).

TAPCR 1200-03-05-.01(1)

Compliance Method: The permittee shall assure compliance with the opacity standard by utilizing the opacity matrix dated June 18, 1996 (amended on September 11, 2013) that is enclosed as Attachment 1. Reports and certifications shall be submitted in accordance with **Condition E2** of this permit.

If the magnitude and frequency of excursions reported by the permittee in the periodic monitoring for emissions is unsatisfactory to the Technical Secretary, this permit may be reopened to impose additional opacity monitoring requirements.

E4-2. Visible emissions for sources 01, 08, 14, 17, 19, 31, 35, 42, 52, 53, 56, 70, and 72 shall not exhibit greater than 20% opacity, except for one six-minute period in any one hour period, and for no more than four six-minute periods in any 24 hour period. Visible emissions from these sources shall be determined by EPA Method 9, as published in the current 40 CFR 60, Appendix A (six-minute average).

TAPCR 1200-03-05-.01(1) and 1200-03-05-.03(6)

Compliance Method: The permittee shall assure compliance with the opacity standard by utilizing the opacity matrix dated June 18, 1996 (amended on September 11, 2013) that is enclosed as Attachment 1. Reports and certifications shall be submitted in accordance with **Condition E2** of this permit.

If the magnitude and frequency of excursions reported by the permittee in the periodic monitoring for emissions is unsatisfactory to the Technical Secretary, this permit may be reopened to impose additional opacity monitoring requirements.

- E4-3.** This Title V Operating Permit No. 570221 represents the second renewal of the original Title V Operating Permit No. 546264 issued May 9, 2002, and subsequent renewal permit No. 560453 issued December 1, 2010. The requirements of Title V Operating Permit No. 560453 will remain in effect through June 30, 2017. The requirements of this Title V Operating Permit No. 570221 will take effect on July 1, 2017.
- E4-4.** The permittee is not required to file an accidental release plan pursuant to Section 112(r) of the Clean Air Act and 1200-03-32 of TAPCR.
- E4-5.** **CAM Plan.** This facility is not currently subject to regulations under 40 CFR part 64 (Compliance Assurance Monitoring).
- E4-6.** Regarding recordkeeping of logs, the following is applicable:
- For monthly recordkeeping, all data, including the results of all calculations, must be entered into the log no later than 30 days from the end of the month for which the data is required.
 - For weekly recordkeeping, all data, including the results of all calculations, must be entered into the log no later than seven days from the end of the week for which the data is required.
 - For daily recordkeeping, all data, including the results of all calculations, must be entered into the log no later than seven days from the end of the day for which the data is required. TAPCR 1200-03-09
- E4-7.** Recordkeeping, data collection, monitoring and reporting for any new requirement(s) not previously specified in the original Title V permit or any of its revisions, shall commence on the first day of the month no later than 45 days from the issuance date of this Title V permit renewal unless stipulated otherwise. TAPCR 1200-03-09
- E4-8.** Logs and records specified in this permit shall be made available upon request by the Technical Secretary or his representative and shall be retained for a period of not less than five years unless otherwise noted. Logs and records contained in this permit may -be based on a recommended format. Any logs that have an alternative format may be utilized provided such logs contain the same information that is required. Computer-generated logs are also acceptable. Logs and records are not required to be submitted semiannually unless specified in **Condition E2(a)(1)**.
- E4-9. Insignificant activities.**
Insignificant activities as identified in the Title V Application dated April 22, 2015 per Rule 1200-3-9-.04(5) are listed in the approved application. Additional insignificant activities may be added and operated at any time with the provision that a written notification shall be submitted to the Technical Secretary including an updated APC 2 Application Form along with a Truth, Accuracy, and Completeness Statement signed by a responsible official. The permit may be updated to include additional insignificant sources by means of an Administrative Amendment, if necessary.
- E4-10. Identification of Responsible Official, Technical Contact, and Billing Contact**
- The application that was utilized in the preparation of this permit is dated April 22, 2015 and signed by Rodney F. Todaro, Colonel, USAF, Commander of the permitted facility. Notification was received July 17, 2019 that Jeffrey T. Geraghty, Colonel, USAF Commander is now the Responsible Official. If this person terminates employment or is assigned different duties and is no longer a Responsible Official for this facility as defined in part 1200-03-09-.02(11)(b)21 of the Tennessee Air Pollution Control Regulations, the owner or operator of this air contaminant source shall notify the Technical Secretary of the change. Said notification must be in writing and must be submitted within 30 days of the change. The notification shall include the name and title of the new Responsible Official and certification of truth and accuracy. All representations, agreement to terms and conditions, and covenants made by the former Responsible Official that were used in the establishment of the permit terms and conditions will continue to be binding on the facility until such time that a revision to this permit is obtained that would change said representations, agreements, and/or covenants.

- (b) The application that was utilized in the preparation of this permit is dated April 22, 2015 and identifies Nicole E. Tracey, as the Principal Technical Contact for the permitted facility. A notification was received by the Division on April 22, 2019, that David L. Carlon, Chief, Installation Management Section, is the new Technical Contact for this facility. If this person terminates employment or is assigned different duties and no longer the Principal Technical Contact for this facility, the owner or operator of this air contaminant source shall notify the Technical Secretary of the change. Said notification must be in writing and must be submitted within 30 days of the change. The notification shall include the name and title of the new Principal Technical Contact and certification of truth and accuracy.
- (c) The application that was utilized in the preparation of this permit is dated April 22, 2015 and identifies Nicole E. Tracey, as the Billing Contact for the permitted facility. A notification was received by the Division on April 22, 2019, that David L. Carlon, Chief, Installation Management Section, is the new Billing Contact for this facility. If this person terminates employment or is assigned different duties and is no longer the Billing Contact for this facility, the owner or operator of this air contaminant source shall notify the Technical Secretary of the change. Said notification must be in writing and must be submitted within 30 days of the change. The notification shall include the name and title of the new Billing Contact and certification of truth and accuracy.

Source Specific Emission Standards:

16-0010-01 and 02	Steam Plant A	Boilers 01, 02, 03, and 04 used for plant operations. Unit designated to burn gas 1 subcategory as given in 40 CFR Part 63 Subpart DDDDD (§63.7500(a)(3)(c))
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Conditions E5-1 through E5-10 apply to sources 16-0010-01 and 02.

- E5-1.** The total stated design heat input capacity of boiler 01 is 42 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the boiler as stated in the application dated November 15, 1996. These boilers are equipped with continuous O₂-trim.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).
- E5-2.** The total stated design heat input capacity of boilers 02, 03, and 04 is 229.2 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the boilers as stated in the application dated November 15, 1996.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).
- E5-3.** Natural gas is the primary fuel source for these boilers. The company also agrees to limit the use of liquid fuel to 48 hours per year per boiler for periodic testing, maintenance and operator training as specified in 40 CFR Part 63 Subpart DDDDD (§63.75750) defined as “Unit designated to burn gas 1 subcategory” and the information contained in the agreement letter dated September 13, 2016 of the revised APC 1 Form of the revision application.
- E5-4.** Particulate matter emitted from boiler 01 shall not exceed 0.27 pound per MMBtu (11.4 lb/hr maximum and 5.0 tons/year (TPY)). This limitation is established pursuant to TAPCR 1200-03-06-.02(2)(a) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Condition E5-3**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.3, Fuel Oil Combustion.
- E5-5.** Particulate matter emitted from boilers 02, 03, and 04 shall not exceed 5.5 pounds per hour and 25.0 TPY. This limitation is established pursuant to TAPCR 1200-03-06-.01(7) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Condition E5-3**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.3, Fuel Oil Combustion.

E5-6. In the event of gas curtailment emergency, if liquid fuel oil / other various combinations of fuels are used (JP fuels, aviation fuels and/or #2 fuel oil), the sulfur content of the fuel oil shall not exceed 0.3 percent by weight. This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated October 21, 1998.

Compliance Method: The permittee shall EITHER, annually provide a written statement from each fuel vendor guaranteeing in advance that the sulfur content limit will not be exceeded OR, provide a sulfur content analysis semi-annually along with the Semi-annual report (SAR) for the period when the liquid fuel is used (gas curtailment emergency). These records shall be kept available for inspection by the Technical Secretary or his representative and be retained for a period of not less than five years. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These records must be used for annual compliance certification.

E5-7. Sulfur dioxide emitted from boiler 01 shall not exceed 0.5 pound per MMBtu (21 lb/hr maximum), nor 39 tons during any 12-consecutive month period. These limitations are established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated May 2, 1990.

Compliance Method: Compliance with the hourly emission limit is assured by compliance with **Conditions E5-3 and E5-6**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.3, Fuel Oil Combustion. The permittee shall calculate the actual 12-consecutive month SO₂ emission rate to show compliance with the 12-consecutive month emission limit using emission factors from AP-42, and the fuel usage records required by **Condition E5-9**.

E5-8. Sulfur dioxide emitted from boilers 02, 03 and 04 shall not exceed 72 pounds per hour (and 12.0 TPY), combined. This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance with this emission limit is assured by compliance with **Conditions E5-3 and E5-6**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.3, Fuel Oil Combustion.

E5-9. The permittee shall maintain records of liquid fuel usage in boiler 01 and calculate the monthly SO₂ emission rate in a format (see example below) that readily shows compliance with annual SO₂ emission limit in **Condition E5-7**. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

MONTHLY LIQUID FUEL USAGE LOG AND SO₂ emissions for boiler 01 (16-0010-01)

Month	Liquid fuel usage (gallon/month)	Emission Factor	SO ₂ emissions (Tons per Month)	SO ₂ emissions (Tons per 12-Consecutive Months)

E5-10. For fee purposes, the permittee shall keep a log of the amount of natural gas burned (in standard cubic feet, scf) per month by this source, and calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using current AP-42 uncontrolled emission factors, in conjunction with fuel usage. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from Boilers 01, 02, 03, & 04 (16-0010-01 & 02)

Month _____ Year _____

Emissions from Combustion of Liquid Fuels				
Pollutant	Usage (gal)	Emission Factor (lb/10 ³ gal of fuel)	AP-42 Reference	Emissions (tons)
NO _x			Table 1.3-1, September 1998	
SO ₂			Table 1.3-1, September 1998	
PM			Table 1.3-1 & 2, Sept. 1998	
VOC			Table 1.3-3, September 1998	

Month _____ Year _____

Emissions from Natural Gas Combustion				
Pollutant	Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		100	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from Boilers 01, 02, 03, & 04 (16-0010-01 & 02)

July 1, _____ to June 30, _____

Pollutant	Emissions from NG (tons)	Emissions from liquid fuels (tons)	Total Emissions (tons)
NO _x			
SO ₂			
PM			
VOC			

16-0010-06	ETF Heaters	Provide heated air for testing operations at the engine testing facility (ETF): North Heater and South Heater MACT, Subpart DDDDD (“limited use unit”) (SM1)
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Conditions E6-1 through E6-6 apply to source 16-0010-06.

E6-1. The total stated design heat input capacity of this source is 670 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the application dated November 15, 1996.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E6-2(SM1). Natural gas shall be the only fuel used for these heaters.

TAPCR 1200-03-09-.03(8)

Compliance Method: Compliance with this operating restriction shall be assured through the recordkeeping required by **Condition E6-6**.

E6-3(SM1). Particulate matter (PM) emitted from this source shall not exceed 5.1 pounds per hour, on a daily average basis. This limitation is established pursuant to TAPCR 1200-03-06-.01(7) and the information contained in the agreement letter dated September 6, 2002.

Compliance Method: Compliance shall be assured by compliance with **Conditions E6-1 and E6-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E6-4(SM1). Sulfur dioxide (SO₂) emitted from this source shall not exceed 0.4 pound per hour, on a daily average basis. This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated April 3, 1982.

Compliance Method: Compliance shall be assured by compliance with **Conditions E6-1 and E6-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E6-5(SM1). For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source

using AP-42 uncontrolled emission factors, in conjunction with the fuel usage records required by **Condition E6-6**. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from ETF heaters (16-0010-06)

Month _____ Year _____

Emissions from Natural Gas Combustion				
Pollutant	Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		280	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from ETF heaters (16-0010-06)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

E6-6(SM1). The actual heat input for the North Heater and the South Heater shall not exceed 10% of the maximum potential heat input for each heater on a calendar year basis. The maximum annual natural gas usage, for each heater, shall not exceed 287.7 million standard cubic feet based on the stated design heat input capacity of 335 MMBtu/hr for each unit. This limitation is established pursuant to Rule 1200-03-09-.03(8) of the Tennessee Air Pollution Control Regulations and the information contained in the significant modification applications dated April 5, 2019, and July 23, 2019. The permittee has requested this federally enforceable 10% annual capacity factor limit be placed on these heaters so that they meet the definition of *Limited-use boiler or process heater*, as defined in 40 CFR §63.7575.

40 CFR §63.7555(a)(3), TAPCR 1200-03-09-.03(8), and 1200-03-10-.02(2)(a)

Compliance Method: A record of the natural gas combusted in each heater on the days these units are operating must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with **Condition E2** of this permit and be retained for a period of not less than five years.

16-0010-07	VKF Heaters	Dryer Reactivation Heaters: Process Heater (175 MMBtu/hr) Heater #1 (19.1 MMBtu/hr) and Heater #2 (12.7 MMBtu/hr), used for heating air for testing operations at the Von Karmán Gas Dynamics Facility (VKF). MACT, Subpart DDDDD (“limited use unit”) (SM1)
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Conditions E7-1 through E7-6 apply to source 16-0010-07.

E7-1(MM1). The total stated design heat input capacity of this modified source is 206.8 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the applications dated August 25, 2017, November 15, 1996 and September 6, 2002.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPC R 1200-03-09-.01(1).

E7-2(SM1). Natural gas shall be the only fuel used at this source.

TAPCR 1200-03-09-.03(8)

Compliance Method: Compliance with this operating restriction shall be assured through the recordkeeping required by **Condition E7-6**.

E7-3(SM1). Particulate matter (PM) emitted from this modified source shall not exceed 0.11 lb/MMBtu (22.75 pounds per hour), on a daily average basis. This limitation is established pursuant to TAPCR 1200-03-06-.02(2)(a).

Compliance Method: Compliance shall be assured by compliance with **Conditions E7-1 and E7-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E7-4(SM1). Sulfur dioxide (SO₂) emitted from this source shall not exceed 0.2 pound per hour, on a daily average basis. This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated June 8, 2010.

Compliance Method: Compliance shall be assured by compliance with **Conditions E7-1 and E7-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E7-5(SM1). For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using AP-42 uncontrolled emission factors, in conjunction with the fuel usage records required by **Condition E7-6**. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from VKF heaters (16-0010-07)

Month _____ Year _____

Emissions from Natural Gas Combustion				
Pollutant	Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		100	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from VKF heaters (16-0010-07)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

E7-6(SM1). The actual heat input for VKF Heater 1 and 2 shall not exceed 10% of the maximum potential heat input for each heater on a calendar year basis. The maximum annual natural gas usage for VKF Heater 1 and 2 shall not exceed 16.4 and 10.9 million standard cubic feet, respectively, based on the stated design heat input capacity of 19.1 MMBtu/hr for VKF Heater 1 and 12.7 MMBtu/hr for VKF Heater 2. This limitation is established pursuant to Rule 1200-03-09-.03(8) of the Tennessee Air Pollution Control Regulations and the information contained in the significant modification applications dated April 5, 2019, and July 23, 2019. The permittee has requested this federally enforceable 10% annual capacity factor limit be placed on these heaters so that they meet the definition of *Limited-use boiler or process heater*, as defined in 40 CFR §63.7575.

40 CFR §63.7555(a)(3), TAPCR 1200-03-09-.03(8), and 1200-03-10-.02(2)(a)

Compliance Method: A record of the natural gas combusted in each heater on the days these units are operating must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with **Condition E2** of this permit and be retained for a period of not less than five years.

16-0010-08	PWT Air Dryers	Two atmospheric air dryers (AAD-1: 51 MMBtu/hour and AAD-2: 60 MMBtu/hour) used to re-activate desiccant beds that condition the supply air for testing operations at the propulsion wind tunnel (PWT) facility. MACT, Subpart DDDDD (“limited use unit”) (SM1)
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Conditions E8-1 through E8-5 apply to source 16-0010-08.

E8-1. The total stated design heat input capacity of this source is 111 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the application dated June 10, 1999.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E8-2(SM1). Natural gas shall be the only fuel used for this source.

TAPCR 1200-03-09-.03(8)

Compliance Method: Compliance with this operating restriction shall be assured through the recordkeeping required by **Condition E8-6**.

E8-3(SM1). Particulate matter (PM) emitted from this source shall not exceed 2.0 pounds per hour, on a daily average basis. This limitation is established pursuant to TAPCR 1200-03-06-.01(7) and the information contained in the agreement letter dated April 3, 1982.

Compliance Method: Compliance shall be assured by compliance with **Conditions E8-1 and E8-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E8-4(SM1). Sulfur dioxide (SO₂) emitted from this source shall not exceed 1.0 pound per hour, on a daily average basis. This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated April 3, 1982.

Compliance Method: Compliance shall be assured by compliance with **Conditions E8-1 and E8-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E8-5(SM1). For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using updated AP-42 uncontrolled emission factors, in conjunction with the fuel usage records required by **Condition E8-6**. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from PWT Air Dryers (16-0010-08)

Month _____ Year _____

Emissions from Natural Gas Combustion				
Pollutant	Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		100	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from PWT Air Dryers (16-0010-08)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	

SO ₂	
PM	
VOC	

E8-6(SM1). The actual heat input for atmospheric air dryers AAD-1 and AAD-2 shall not exceed 10% of the maximum potential heat input for each heater on a calendar year basis. The maximum natural gas usage for the atmospheric air dryers AAD-1 and AAD-2 shall not exceed 43.8 and 51.5 million standard cubic feet, respectively, based on the stated heat input capacity of 51 MMBtu/hr for AAD-1 and 60 MMBtu/hr for AAD-2. This limitation is established pursuant to Rule 1200-03-09-.03(8) of the Tennessee Air Pollution Control Regulations and the information contained in the significant modification applications dated April 5, 2019, and July 23, 2019. The permittee has requested this federally enforceable 10% annual capacity factor limit be placed on these dryers so that they meet the definition of *Limited-use boiler or process heater*, as defined in 40 CFR §63.7575.

Compliance Method: A record of the natural gas usage for these dryers on the days these units are operating must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with **Condition E2** of this permit and be retained for a period of not less than five years.

16-0010-14	APTU Test Facility	Vitiated Air Heaters (VAH), Sudden Expansion Heater (SUE), or Gas Generator with hydrocarbon fuel cracking and silane flare for Testing Solid and Liquid Rocket Motors and Aircraft Engines, and ELRAY Heaters for Testing Flammable Gas Mixtures. Water sprays are primarily used as a safety measure to lower the temperature of the exhaust.
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Conditions E9-1 through E9-10 apply to source 16-0010-14.

E9-1. The heat input capacities of the heaters at this source as stated in the applications dated March 1, 2000, May 6, 2013, and August 9, 2013 are as follows:

Unit	Heat input (MMBtu/hr)
Vitiated air heater	167.00
Sudden expansion heater	167.00
ELRAY isobutane & propane heaters	6.53 combined (5.53 and 1.0, respectively)

The maximum total heat capacity of this source is 167 MMBtu/hr based on the physical operational constraint that only one heater at the APTU facility can be used at one time. TAPCR 1200-03-09

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of the heaters, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E9-2. Isobutane, propane, or equivalent grade fuels only shall be used for the heaters. TAPCR 1200-03-09

E9-3. Fuels (for rockets and aircraft engines) shall not contain beryllium. TAPCR 1200-03-09

E9-4. Each rocket shall not contain more than 150 pounds of solid rocket propellants or 1,700 pounds of liquid rocket propellants. Aircraft engine testing shall not exceed 5,520 pounds per hour of hydrocarbon fuel. TAPCR 1200-03-09

Compliance Method: A record of each test and weight of fuel and propellant used for this testing must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. This record must be retained for a period of not less than five years.

E9-5. Particulate matter emitted from this source shall not exceed 48.3 pounds per hour, nor 4.2 tons per year. These limitations are established pursuant to 1200-03-06-.02(2) and 1200-03-06-.01(7) of the Tennessee Air Pollution Control regulations, and the information contained in the agreement letter dated January 2, 2013 from the permittee.

Compliance Method: Compliance with these emission limits is assured based on calculations utilizing emission factors from AP-42, Chapter 1.5, Liquefied Petroleum Gas Combustion and the Aircraft Engine Emission Estimator (see Attachment #2), compliance with **Conditions E9-4 and E9-6**, and, when testing solid rocket motors, compliance with **Condition E9-9**.

E9-6. Silane (SiH₄) usage shall not exceed 25 pounds per hour, nor 2,500 pounds per year. TAPCR 1200-03-09

Compliance Method: A record of each test and weight of silane used for this testing that readily demonstrates compliance with these limits must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E9-7. Sulfur dioxide emitted from this source shall not exceed 4.0 pounds per hour (and 1.0 TPY). This limitation is established pursuant to TAPCR 1200-03-14-.03(5) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Conditions E9-2 and E9-4**, and calculations utilizing emission factors from AP-42, Chapter 1.5, Liquefied Petroleum Gas Combustion and Aircraft Engine Emission Estimator, Attachment #2 of this permit.

E9-8. The total VOC emitted from this source during all testing modes (isobutane and propane combustion in heaters and flare, aircraft engine testing, liquid and solid rocket testing, fuel cracking and fuel overboard tests, and silane combustion) shall not exceed 10.1 tons per State FY (July-June). TAPCR 1200-03-06-.03(2) and 1200-03-07-.07(2)

Compliance Method: The permittee shall calculate the VOC emissions from all testing conducted at this source and record the results in a log that readily demonstrates compliance with this condition. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E9-9. During solid rocket motor testing, this source shall not operate without its water spray system. TAPCR 1200-03-09

E9-10. For fee purposes, the permittee shall keep a log of the amounts of isobutane, propane, solid rocket propellants, liquid rocket propellants, and fuels for aircraft engine testing per month by this source and calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using appropriate emission factors, in conjunction with fuel usage. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from isobutane fired heaters (16-0010-14)

Month _____ Year _____

Emissions from Combustion of Isobutane				
Pollutant	Usage (gal)	Emission Factor (lb/10 ³ gal of fuel)	Emission Factor Reference	Emissions (tons)
NO _x		15	Table 1.5-1, July 2008	
SO ₂			Table 1.5-1, July 2008	
PM		0.8	Table 1.5-1, July 2008	
VOC		0.9	Table 1.5-1, July 2008	

Monthly log of emissions from propane fired heater (16-0010-14)

Month _____ Year _____

Emissions from Combustion of Propane				
Pollutant	Usage (gal)	Emission Factor (lb/10 ³ gal of fuel)	Emission Factor Reference	Emissions (tons)
NO _x		13	Table 1.5-1, July 2008	
SO ₂			Table 1.5-1, July 2008	
PM		0.7	Table 1.5-1, July 2008	
VOC		0.8	Table 1.5-1, July 2008	

Monthly log of emissions from testing aircraft engines (16-0010-14)

Month _____ Year _____

Emissions from Aircraft Engine Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/10 ³ lb of fuel)	Emission Factor Reference	Emissions* (tons)
NO _x				

SO ₂				
PM				
VOC				

*include emissions from fuel cracking, silane combustion, fuel overboard, and flare, if applicable

Monthly log of emissions from testing solid rocket motors (16-0010-14)

Month _____ Year _____

Emissions from Solid Rocket Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/lb of fuel)	Emission Factor Reference	Emissions* (tons)
NO _x				
SO ₂				
PM				
VOC				

*include emissions from silane combustion and flare, if applicable

Monthly log of emissions from testing liquid rocket motors (16-0010-14)

Month _____ Year _____

Emissions from Liquid Rocket Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/lb of fuel)	Emission Factor Reference	Emissions* (tons)
NO _x				
SO ₂				
PM				
VOC				

*include emissions from silane combustion and flare, if applicable

Fiscal Year log of total emissions from APTU Test Facility (16-0010-14)

July 1, _____ to June 30, _____

Pollutant	Emissions from isobutane heaters (tons)	Emissions from propane heater (tons)	Emissions from aircraft engine testing (tons)	Emissions from liquid and solid rocket testing (tons)	Total Emissions (tons)
NO _x					
SO ₂					
PM					
VOC					

16-0010-17	Liquid Rocket Testing	This testing may be conducted either in 16-0010-17 Liquid Rocket Test Cell Facility, 16-0010-18 Solid Rocket Test Cell Facility, 16-0010-19 ETF Test Cells, or 16-0010-31 ASTF Test Cells
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Condition E10-1 applies to Liquid Rocket Testing.

E10-1. Propellant usage for this testing shall not exceed the following:

<u>Propellant</u>	<u>Usage [pounds / State FY (July-June)].</u>
Hydrazine fuels	327,000
Nitrogen Tetroxide (N ₂ O ₄)	585,000

This is the capacity of this source as stated in the application dated November 15, 1996.

Compliance Method: A record of the pounds of hydrazine fuel and tetroxide used for liquid rocket testing must be maintained at the source location and kept available for inspection by the Technical Secretary or his representative. This record must be retained for a period of not less than five years.

16-0010-18	Solid Rocket Testing:	Solid rocket testing may be conducted either in 16-0010-18 Solid Rocket Test Cell Facility, 16-0010-19 ETF Test Cells, or 16-0010-31 ASTF Test Cells as well as enclosed chambers, such as the J6 dehumidification chamber, within the Solid Rocket Test Complex. Tests with radionuclide emissions will be subject 40 CFR 61, Subpart I. Water sprays are primarily used as a safety measure to lower the temperature of the exhaust.
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Conditions E11-1 through E11-6 apply to Solid Rocket Testing.

E11-1. Propellant burned shall not exceed 120,000 pounds per engine tested. This is equivalent to the capacity of this source as stated in the application dated November 15, 1996 since physically engines cannot be tested at a frequency of more than one per hour. TAPCR 1200-03-09

Compliance Method: A record of each solid rocket test and propellant weight used for this testing must be maintained at the source location and kept available for inspection by the Technical Secretary or his representative. This record must be retained for a period of not less than five years.

E11-2. Particulate matter emitted from solid rocket testing shall not exceed 0.02 grain per dry standard cubic foot of exhaust gas (531.7 lb/hr (and 10.0 TPY)). TAPCR 1200-03-07-.04(1) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance with this emission standard is assured by compliance with **Conditions E11-1 and E11-4**, and the emission factors developed by the facility through engineering estimates found in Attachment #2 of this permit.

E11-3. Carbon monoxide (CO) emitted from this testing shall not exceed 23,040 lb/hr and 168 tons per State FY (July-June). The hourly limitation is established pursuant to TAPCR 1200-03-07-.07(2), and the annual limitation is established pursuant to TAPCR 1200-03-07-.01(5) and the information contained in the agreement letter dated February 29, 1988.

Compliance Method: Compliance with the hourly emission standard is assured by compliance with **Condition E11-1**, and the emission factor developed by the facility through engineering estimates found in Attachment #2 of this permit. The permittee shall calculate the monthly CO emission rate utilizing the same engineering estimates and the logs required by **Condition E11-1** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or his representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five (5) years.

E11-4. Whenever test conditions allow, this source shall not operate without its water spray system.

E11-5. For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this source using appropriate emission factors, in conjunction with fuel usage records (**Conditions E11-1**). The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from testing solid rocket motors (16-0010-18) Month _____ Year _____

Emissions from Solid Rocket Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/lb of fuel)	Emission Factor Reference	Emissions (tons)
NO _x				
SO ₂				
PM				
VOC				

Fiscal Year log of emissions from Solid Rocket Testing (16-0010-18) July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	

PM	
VOC	

E11-6. Solid rocket tests that have the potential for radionuclide emissions are subject to the following regulations under 40 CFR Part 61, Subpart I, **NATIONAL EMISSION STANDARDS FOR RADIONUCLIDE EMISSIONS FROM FEDERAL FACILITIES OTHER THAN NUCLEAR REGULATORY COMMISSION LICENSEES AND NOT COVERED BY SUBPART H.**

- (a) Emissions of radionuclides, including iodine, to the ambient air from a facility regulated under this subpart shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.

40 CFR 61.102(a)

Compliance Method: Compliance with the emission standard in this subpart shall be determined through the use of either the EPA computer code COMPLY or the alternative requirements of 40 CFR 61, appendix E. The source terms to be used for input into COMPLY shall be determined through the use of the measurement procedures listed in 40 CFR 61.107 or the emission factors in 40 CFR 61, appendix D, or through alternative procedures for which EPA has granted prior approval.

40 CFR 61.103(a)

- (b) Facilities emitting radionuclides in an amount that would cause less than 10% of the dose standard in **Condition E11-6(a)**, as determined by the compliance method, are exempt from the reporting requirements of 40 CFR 61.104(a). Facilities shall annually make a new determination whether they are exempt from reporting.

40 CFR 61.104(b)

- (c) The permittee must maintain records documenting the source of input parameters including the results of all measurements upon which they are based, the calculations and/or analytical methods used to derive values for input parameters, and the procedure used to determine compliance. This documentation should be sufficient to allow an independent auditor to verify the accuracy of the determination made concerning the facility's compliance with the standard, and, if claimed, qualification for exemption from reporting. These records must be kept at the site of the facility for at least five years and upon request be made available for inspection by the Technical Secretary or a Division representative.

40 CFR 61.105

16-0010-19	ETF Test Cells	Engine Test Facility (ETF) for development and evaluation of propulsion systems with water spray.
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Conditions E12-1 through E12-9, apply to source 16-0010-19.

- E12-1.** Aviation fuel input rate for air-breathing propulsion engine testing shall not exceed 80,000 pounds per hour. This is the capacity of this source as stated in the application dated November 15, 1996. TAPCR 1200-03-09

Compliance Method: A record of the aviation fuel used for this testing must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. This record must be retained for a period of not less than five years.

- E12-2.** Particulate matter emitted shall not exceed 12.0 lb/hr during air-breathing propulsion engine testing. Total particulate matter emitted from aircraft engine testing using ETF Test Cells (Source 19), and the ASTF Test Cells (Source 31) shall not exceed 21.6 tons per State FY (July - June). This limitation is established pursuant to TAPCR 1200-03-26-.02(9)(g) and the information contained in the agreement letters dated April 12, 1995 and May 26, 1999.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly PM emission rate utilizing the same engineering estimates and the logs required by **Condition E12-1**, and record the results in the logs required by **Condition E12-7** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

- E12-3.** Sulfur dioxide (SO₂) emitted from air-breathing propulsion engine testing shall not exceed 97.0 lb/hr during air-breathing propulsion engine testing. Total sulfur dioxide emitted from aircraft engine testing using ETF Test Cells (Source 19), and the ASTF Test Cells (Source 31) shall not exceed 174.6 tons per State FY (July - June). This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letters dated April 3, 1992 and May 26, 1999.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly SO₂ emission rate utilizing the same engineering estimates and the logs required by **Condition E12-1**, and record the results in the logs required by **Condition E12-7** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

- E12-4.** Nitrogen oxides (NO_x) emitted from air-breathing propulsion engine testing shall not exceed 483.0 lb/hr. The total nitrogen oxides emitted from this source during all air-breathing propulsion engine testing modes shall not exceed 176.0 tons per State FY (July-June). This limitation is established pursuant to TAPCR 1200-03-26-.02(9)(g) and the information contained in the agreement letter dated April 12, 1995.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly NO_x emission rate utilizing the same engineering estimates and the logs required by **Condition E12-1**, and record the results in the logs required by **Condition E12-7** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

- E12-5.** Carbon monoxide (CO) emitted from air-breathing propulsion engine testing shall not exceed 320.0 lb/hr. The total CO emitted from air-breathing propulsion engine testing during all testing modes shall not exceed 83.0 tons per State FY (July-June).

TAPCR 1200-03-07-.07(2)

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly CO emission rate utilizing the same engineering estimates and the logs required by **Condition E12-1**, and record the results to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

- E12-6.** Volatile organic compounds (VOC) emitted from air-breathing propulsion engine testing, excluding the glycol reboiler emissions, shall not exceed 9.9 lb/hr. The total VOC emitted from air-breathing propulsion engine during all testing modes, excluding the glycol reboiler emissions, shall not exceed 7.0 tons per State FY (July-June).

TAPCR 1200-03-07-.07(2)

Compliance Method: Compliance with the hourly emission standard is based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly VOC emission rate utilizing the same engineering estimates and the logs required by **Condition E12-1**, and record the results in the logs required by **Condition E12-7** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

- E12-7.** Hydrogen fluoride emitted from this source shall not exceed 2.9 tons during any 12-consecutive month period.

TAPCR 1200-03-07-.07(2)

Compliance Method: During tests that generate acid gases, this source shall not operate without the use of its water spray system.

- E12-8.** During tests that generate acid gases, the exhaust gases from the test cells shall be discharged unobstructed vertically upwards to the ambient air from stack E1 with an exit diameter of 7 feet, not less than 65 feet above ground level, stack E2M with an exit diameter of 3.3 feet, not less than 70 feet above ground level, and stack E2H with an exit diameter of 2.5 feet, not less than 70 feet above ground level.

TAPCR 1200-03-03-.03

E12-9. For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, volatile organic compound (VOC) emissions, and hydrogen fluoride (HF) emissions from this fuel-burning source using appropriate emission factors and engineering judgment, in conjunction with fuel usage records (**Conditions E12-1**). The permittee shall calculate its annual actual ethylene glycol emissions from this source using a material balance that assumes the quantity of ethylene glycol purchased to replenish the system is equal to the emissions to the air, minus losses related to liquid spills or disposal as waste. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

TAPCR 1200-03-09

Monthly log of emissions from testing aircraft engines (16-0010-19) Month _____ Year _____

Emissions from Aircraft Engine Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/10 ³ lb of fuel)	Emission Factor Reference	Emissions (tons)
NO _x				
SO ₂				
PM				
VOC				
HF				

Fiscal Year log of total emissions from ETF Test Cells (16-0010-19) July 1, ____ to June 30, ____

Pollutant	Emissions from aircraft engine testing (tons)	Emissions from glycol reboilers (tons)	*Total Emissions (tons)
NO _x			
SO ₂			
PM			
VOC			
HF			

*Do not double count emissions associated with the ASTF Test Cells (Source 31)

16-0010-28	HB Heaters 1A & 1B	Two 54 MMBtu/hr heaters to provide heated air for testing operations at the Von Karmán Gas Dynamics Facility (VKF). MACT, Subpart DDDDD (“limited use unit”) (SM1)
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Conditions E13-1 through E13-6 apply to source 16-0010-28.

E13-1. The total stated design heat input capacity of this source is 108 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the application dated November 15, 1996.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E13-2(SM1). Natural gas or propane shall be the only fuels used for this source.

TAPCR 1200-03-09-.03(8)

Compliance Method: Compliance with this operating restriction shall be assured through the recordkeeping required by **Condition E13-3**.

E13-3(SM1). The actual heat input for all fuels combusted by the VKF Heaters HB-1A and HB-1B combined shall not exceed 10% of the maximum potential heat input for each heater on a calendar year basis. The actual heat input to each heater shall be calculated on a monthly basis using Equation 1 below, and shall not exceed 47,304 MMBtu per heater per calendar year. These limitations are established pursuant to Rule 1200-03-09-.03(8) of the Tennessee Air Pollution Control Regulations and the information contained in the significant modification applications dated April 5, 2019, and July 23, 2019. The permittee has requested this federally enforceable 10% annual capacity factor limit be placed on these heaters so that they meet the definition of *Limited-use boiler or process heater*, as defined in 40 CFR §63.7575.

$$\text{Btu/month} = \text{NG} * 1,020 \text{ Btu/scf} + \text{P} * 90,500 \text{ Btu/gal} \quad \text{Equation 1}$$

Where:

NG = standard cubic feet of natural gas combusted, per month

P= gallons of propane combusted, per month

This operating restriction replaces the previous operating hour restriction of 3,000 hours per year. The operating hour restriction was requested in order to avoid PSD applicability.

Compliance Method: A record of the natural gas and/or propane usage for these heaters on the days these units are operating and the results of the monthly heat input calculations shall be recorded and maintained in a tabular form onsite. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years. If the permittee needs to increase the design or maximum capacity of these units, the permittee shall pursue the appropriate Title V procedure in accordance with 1200-03-09-.02(11) of TAPCR.

E13-4(SM1). Particulate matter (PM) emitted from this source shall not exceed 0.16 lb/MMBtu (17.23 pounds per hour, on a daily average basis). TAPCR 1200-03-06-.02(2)(a).

Compliance Method: Compliance with this emission limitation is assured by compliance with **Conditions E13-1 and E13-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.5, Liquefied Petroleum Gas Combustion.

E13-5(SM1). Sulfur dioxide (SO₂) emitted from this source shall not exceed 5 lb/MMBtu (540 pounds per hour, on a daily average basis). TAPCR 1200-03-14-.02(2)(a)

Compliance Method: Compliance with this emission limitation is assured by compliance with **Conditions E13-1 and E13-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.5, Liquefied Petroleum Gas Combustion.

E13-6(SM1). For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using AP-42 emission factors, in conjunction with the fuel usage records required by **Condition E13-3**. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from HB Heaters 1A & 1B (16-0010-28) Month _____ Year _____

Emissions from Combustion of Propane				
Pollutant	Usage (gal)	Emission Factor (lb/10 ³ gal of fuel)	AP-42 Reference	Emissions (tons)
NO _x		13	Table 1.5-1, July 2008	
SO ₂			Table 1.5-1, July 2008	
PM		0.7	Table 1.5-1, July 2008	
VOC		0.8	Table 1.5-1, July 2008	

Month _____ Year _____

Emissions from Natural Gas Combustion				
Pollutant	Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		100	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from HB Heaters 1A & 1B (16-0010-28) July 1, _____ to June 30, _____

Pollutant	Emissions from NG (tons)	Emissions from propane (tons)	Total Emissions (tons)
NO _x			
SO ₂			
PM			
VOC			

16-0010-30	ASTF Heaters	Aero propulsion System Test Facility (ASTF) heaters C1-1, C1-2, C2-1, and C2-2 (504 MMBtu/hr, each) used for aero propulsion testing. Subpart DDDDD The permittee (AEDC) has agreed to limit the usage of the amount of fuel to be used, thus qualifying this to be a limited use heaters as defined in Subpart DDDDD .
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Conditions E14-1 through E14-8 apply to source 16-0010-30.

E14-1. The total stated design heat input capacity of this source is 2,016 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the application dated March 1, 2000.

Compliance Method: None. This condition is a statement of design input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with 1200-03-09-.02(11) of TAPCR. If a construction permit is applied for, this shall be done in accordance with 1200-03-09-.01(1) of TAPCR.

E14-2. Commingled fuel consisting of various combinations of fuels such as JP fuels, aviation fuels, and/or #2 fuel oil shall be the only fuel used for these heaters.

E14-3. The maximum fuel usage for this source shall not exceed 1,500,000 gallons of aircraft fuel (limited use heaters) per State FY (July-June). This limitation is established by the information contained in the agreement letter dated May 10, 1999 from the permittee for fee purposes and to avoid PSD, pursuant to Rules 1200-03-26-.02(6)(b), 1200-03-07-.01(5), 1200-03-06-.01(7), and 1200-03-14-.01(3) of the TAPCR.

Limited use Heater (as defined in Subpart DDDDD): Limited-use boiler or process heater means any boiler or process heater that burns any amount of solid, liquid, or gaseous fuels and has a federally enforceable annual capacity factor of no more than 10 percent.

Compliance Method: A record of the fuel usage must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E14-4. The sulfur content of the fuel oil shall not exceed 0.3 percent by weight. This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated April 3, 1992.

Compliance Method: The permittee shall EITHER, annually provide a written statement from each fuel vendor guaranteeing in advance that the sulfur content limit will not be exceeded OR, provide a sulfur content analysis semi-annually along with the Semi-annual report (SAR). These records shall be kept available for inspection by the Technical Secretary or a Division representative and be retained for a period of not less than five years. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These records must also be reported in accordance with condition **E2** of this permit.

E14-5. Particulate matter emitted from this source shall not exceed 47.5 pounds per hour (and 3.0 TPY). This limitation is established pursuant to Rule 1200-03-06-.01(7) of the Tennessee Air Pollution Control Regulations, and the information contained in the agreement letter dated November 22, 2016 from the permittee.

Compliance Method: Compliance with this emission standard is assured by compliance with **Condition E14-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.3, Fuel Oil Combustion.

E14-6. Sulfur dioxide emitted from this source shall not exceed 690 pounds per hour (and 36.0 TPY). This limitation is established pursuant to Rule 1200-03-14-.01(3) of the Tennessee Air Pollution Control Regulations and the information contained in the agreement letter dated November 22, 2016 from the permittee.

Compliance Method: Compliance with this emission standard is assured by compliance with **Conditions E14-2 and E14-4**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.3, Fuel Oil Combustion.

E14-7. Nitrogen oxide emitted from this source shall not exceed 324 pounds per hour (and 18.0 TPY). This limitation is established pursuant to Rule 1200-03-06-.01(7) of the Tennessee Air Pollution Control Regulations and the information contained in the agreement letter dated November 22, 2016 from the permittee.

Compliance Method: Compliance with this emission standard is assured by compliance with **Condition E14-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.3, Fuel Oil Combustion.

E14-8. For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using uncontrolled AP-42 emission factors, in conjunction with fuel usage records. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from ASTF heaters (16-0010-30) Month _____ Year _____

Emissions from Combustion of Liquid Fuels				
Pollutant	Usage (gal)	Emission Factor (lb/10 ³ gal of fuel)	AP-42 Reference	Emissions (tons)
NO _x			Table 1.3-1, September 1998	
SO ₂			Table 1.3-1, September 1998	
PM			Table 1.3-1 & 2, Sept. 1998	
VOC			Table 1.3-3, September 1998	

Fiscal Year log of emissions from ASTF heaters (16-0010-30)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

16-0010-31	ASTF Test Cells	Aero Propulsion System Test Facility (ASTF) used to evaluate aircraft engines under various conditions (Including Glycol Reboilers EG-A & EG-B) with water spray and vapor condenser control
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Conditions E15-1 through E15-4 apply to source 16-0010-31.

E15-1. Input capacity for aircraft engine testing shall not exceed 80,000 pounds per hour of aircraft fuels, and 90,000 pounds per hour of Liquid Hydrogen. This is the capacity of this source as stated in the application dated November 15, 1996. TAPCR 1200-03-09

Compliance Method: A record of the fuel used for this testing must be maintained at the source location and kept available for inspection by the Technical Secretary or his representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E15-2. Particulate matter emitted shall not exceed 12.0 lb/hr during air-breathing propulsion engine testing. Total particulate matter emitted from aircraft engine testing using ETF Test Cells (Source 19), and the ASTF Test Cells (Source 31) shall not exceed 21.6 tons per State FY (July - June). This limitation is established pursuant to TAPCR 1200-03-26-.02(9)(g) and the information contained in the agreement letters dated April 3, 1992 and May 26, 1999.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly PM emission

rate utilizing the same engineering estimates and the logs required by **Condition E15-1**, and record the results in the logs required by **Condition E15-4** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E15-3. Sulfur dioxide (SO₂) emitted from air-breathing propulsion engine testing shall not exceed 97.0 lb/hr during air-breathing propulsion engine testing. Total sulfur dioxide emitted from aircraft engine testing using ETF Test Cells (Source 19), and the ASTF Test Cells (Source 31) shall not exceed 174.6 tons per State FY (July - June). This limitation is established pursuant to TAPCR 1200-03-26-.02(9)(g) and the information contained in the agreement letters dated April 3, 1992 and May 26, 1999.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly SO₂ emission rate utilizing the same engineering estimates and the logs required by **Condition E15-1**, and record the results in the logs required by **Condition E15-4** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E15-4. For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using appropriate emission factors, in conjunction with fuel usage records (**Conditions E15-1**). The permittee shall calculate its annual actual ethylene glycol emissions from this source using a material balance that assumes the quantity of ethylene glycol purchased to replenish the system is equal to the emissions to the air, minus losses related to liquid spills or disposal as waste. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from testing aircraft engines (16-0010-31)

Month _____ Year _____

Emissions from Aircraft Engine Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/10 ³ lb of fuel)	Emission Factor Reference	Emissions (tons)
NO _x				
SO ₂				
PM				
VOC				

Fiscal Year log of total emissions from ASTF Test Cells (16-0010-31)

July 1, _____ to June 30, _____

Pollutant	Emissions from aircraft engine testing (tons)	Emissions from glycol reboilers (tons)	*Total Emissions (tons)
NO _x			
SO ₂			
PM			
VOC			

*Do not double count emissions associated with the ETF Test Cells (Source 19)

16-0010-35	VKF Auxiliary Heater	Von Karmán Gas Dynamics Facility (VKF) auxiliary heater (16 MMBtu/hr) to provided heated air to the VKF wind tunnels. MACT, Subpart DDDDD ("limited use unit")
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Conditions E16-1 through E16-6 apply to source 16-0010-35.

E16-1. The total stated design heat input capacity of this source is 16 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the application dated November 15, 1996.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E16-2. Natural gas shall be the only fuel used for this heater.

E16-3. Particulate matter emitted from this source shall not exceed 0.5 pound per hour (and 1.0 TPY). This limitation is established pursuant to TAPCR 1200-03-06-.01(7) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Conditions E16-1 and E16-2** and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E16-4. Sulfur dioxide emitted from this source shall not exceed 0.5 pound per hour (and 1.0 TPY). This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Conditions E16-1 and E16-2** and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E16-5. Operating time of this heater shall not exceed 876 hours per State FY (July-June). This limitation is established pursuant to TAPCR 1200-03-06-.01(3) and the information contained in the agreement letter dated September 30, 2013 from the permittee. The permittee requested this limit to establish this unit as a "limited use" unit under 40 CFR 63, Subpart DDDDD.

Compliance Method: A record of the hours of operation for this source must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E16-6. For fee purposes, the permittee shall keep a log of the amount of natural gas burned (in standard cubic feet, scf) per month by this source and calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using uncontrolled AP-42 emission factors, in conjunction with fuel usage. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from VKF auxiliary heater (16-0010-35)

Month _____ Year _____

Emissions from Natural Gas Combustion				
Pollutant	Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		100	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from VKF auxiliary heater (16-0010-35)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

Conditions E17-1 and E17-2 apply to source 16-0010-40.

E17-1. A log of all VOC-containing materials used shall be maintained at the source location. For fee purposes, the permittee shall calculate the total amount of VOC emitted from this source during each calendar month and maintain records of these emissions (see example below). These records shall be reported in accordance with condition **E1** of this permit.

Monthly Usage and VOC Emission Log Month _____ Year _____

Process Materials	Usage (gal/month)	VOC Content (lb/gal)	VOC Emitted (ton/month)
Material #1			
Material #2			
etc.			
Total:			

Total VOC emissions for **Fiscal Year** July 1, _____ to June 30, _____ is _____ Tons

E17-2. A construction permit will be required prior to usage of any halogenated solvents subject to MACT (Maximum Achievable Control Technology) Standards.

16-0010-42 ARC Heaters (3) HR, H1, and H2 arc heaters that supply high temperature air for materials research and development

Conditions E18-1 through E18-3 apply to source 16-0010-42.

E18-1. Operating time shall not exceed 27 hours per State FY (July-June) for all three (3) heaters combined. This limitation is established pursuant to TAPCR 1200-03-26-.02(9)(g) and the information contained in the agreement letter dated September 17, 1996 from the permittee.

Compliance Method: A record of the hours of operation for this source must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E18-2. Nitrogen oxides (NO_x) emitted from this source shall not exceed 20.4 tons per State FY (June - July). This limitation is established pursuant to TAPCR 1200-03-07-.01(5) and the information contained in the agreement letter dated September 17, 1996.

Compliance Method: Compliance shall be assured by compliance with **Condition E18-1**, and the emission factor of 0.42 lb/second NO_x generation developed by the facility through engineering estimates found in Attachment #2 of this permit.

E18-3. For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions from this source. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log and Fiscal Year log of emissions from ARC Heaters (16-0010-42)

Month _____ Year _____

Pollutant	Hours of Operation	Emission Factor (lb NO _x /sec)	Emissions (tons)
NO _x		0.42	

Total emissions for fiscal year July 1, _____ to June 30, _____ tons

16-0010-43 Steam Plant C One 50 MMBtu/hr natural gas fired boiler **MACT, Subpart DDDDD**

Conditions E19-1 through E19-5 apply to source 16-0010-43.

E19-1. The total stated design heat input capacity of this source is 50 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the application dated November 15, 1996. This boiler is equipped with continuous O₂-trim.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E19-2. Natural gas shall be the only fuel used for this source.

E19-3. Particulate matter emitted from this source shall not exceed 0.24 lb/MMBtu (12.3 pounds per hour, maximum and 2.0 TPY). This limitation is established pursuant to TAPCR 1200-03-06-.02(2) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Condition E19-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E19-4. Sulfur dioxide emitted from this source shall not exceed 0.1 pound per hour (and 1.0 TPY) . This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Condition E19-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E19-5. For fee purposes, the permittee shall keep a log of the amount of natural gas burned (in standard cubic feet, scf) per month by this source and calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using uncontrolled AP-42 emission factors, in conjunction with fuel usage. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from Steam Plant C (16-0010-43)

Month _____ Year _____

Pollutant	NG Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		100	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from Steam Plant C (16-0010-43)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

16-0010-46	T-3 Air Heater	One 188 MMBtu/hr natural gas fired air heater	MACT, Subpart DDDDD
("limited use unit")			

Conditions E21-1 through E21-6 apply to source 16-0010-46.

E21-1. The total stated design heat input capacity of this source is 188 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the application dated November 15, 1996.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E21-2. Natural gas shall be the only fuel used for this source. This condition is established pursuant to Rule 1200-03-06-.01(7) of the Tennessee Air Pollution Control Regulations and the information contained in the agreement letter dated December 21, 1989 from the permittee to avoid PSD.

E21-3. Operating time shall not exceed four hundred sixteen (416) hours per State FY (July-June). This limitation is established pursuant to Rule 1200-03-06-.01(7) of the Tennessee Air Pollution Control Regulations and the information contained in the agreement letter dated December 21, 1989 from the permittee to avoid PSD.

Limited use Heater (as defined in Subpart DDDDD): Limited-use boiler or process heater means any boiler or process heater that burns any amount of solid, liquid, or gaseous fuels and has a federally enforceable annual capacity factor of no more than 10 percent.

Compliance Method: A record of the hours of operation for this source must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E21-4. Particulate matter emitted from this source shall not exceed 0.12 lb/MMBtu (22.03 pounds per hour maximum and 1.0 TPY). This limitation is established pursuant to TAPCR 1200-03-06-.02(2)(a) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Condition E21-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E21-5. Sulfur dioxide emitted from this source shall not exceed 0.2 pound per hour (and 1.0 TPY). This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance shall be assured by compliance with **Condition E21-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E21-6. For fee purposes, the permittee shall keep a log of the amount of natural gas burned (in standard cubic feet, scf) per month by this source and calculate its annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using uncontrolled AP-42 emission factors, in conjunction with fuel usage. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from T-3 Air Heater (16-0010-46)

Month _____ Year _____

Emissions from Natural Gas Combustion				
Pollutant	Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		280	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from T-3 Air Heater (16-0010-46)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

16-0010-52	PWT Engine Testing	Engine testing conducted in the propulsion wind tunnel (PWT) to simulate various flight conditions during engine operation with water spray control
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Conditions E22-1 through E22-5 apply to source 16-0010-52.

E22-1. The fuel input rate shall not exceed the following:

- i) Aircraft engines: 80,000 lbs/hour.
- ii) Small liquid rocket motors: 30,000 lbs / State FY (July-June)
- iii) Small solid rocket motors: 30,300 lbs / State FY (July-June)

This is the capacity of this source as stated in the application dated November 15, 1996.

Compliance Method: A record of the test article fuel type, fuel usage rate (aircraft engine), and fuel quantity (rocket) must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E22-2. Particulate matter emitted from this source shall not exceed 3.8 lb/hr for aircraft engine testing, 6.5 lb/second for solid rocket testing and 1.0 ton per State FY (July-June) for all types of testing. This limitation is established pursuant to TAPCR 1200-03-07-.01(5) and the information contained in the agreement letter dated April 6, 1995 from the permittee.

Compliance Method: Compliance with the hourly emission standards is assured based on calculations utilizing the emission factors developed by the facility through engineering estimates found in Attachment #2 of this permit. The permittee shall calculate the monthly PM emission rate utilizing the same engineering estimates and the logs required by **Condition E22-1**, and record the results in the logs required by **Condition E22-5** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E22-3. Sulfur dioxide emitted from this source during testing of engines shall not exceed 0.6 lb/hr during idle mode, 12.0 lb/hr during military mode, and 81 lb/hr during afterburner mode of the aircraft engines being tested and the annual emissions shall not exceed 1.4 tons per State FY (July-June).

TAPCR 1200-03-14-.03(5)

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing the emission factors developed by the facility through engineering estimates found in Attachment #2 of this permit. The permittee shall calculate the monthly SO₂ emission rate utilizing the same engineering estimates and the logs required by **Condition E22-1**, and record the results in the logs required by **Condition E22-5** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E22-4. Hydrogen chloride (HCl) emitted from this source shall not exceed 12.7 lb/second during boost and 2.4 lb/second during sustain mode of testing for solid rocket motor testing and the total annual emissions shall not exceed 3.22 tons per State FY (July-June).

TAPCR 1200-03-07-.07(2)

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing the emission factors developed by the facility through engineering estimates found in Attachment #2 of this permit. The permittee shall calculate the monthly HCl emission rate utilizing the same engineering estimates and the logs required by **Condition E22-1**, and record the results in the logs required by **Condition E22-5** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E22-5. For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, volatile organic compound (VOC) emissions, and hydrogen chloride (HCl) emissions from this source using appropriate emission factors, in conjunction with fuel usage records (**Conditions E22-1**). The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from testing aircraft engines (16-0010-52)

Month _____ Year _____

Emissions from Aircraft Engine Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/10 ³ lb of fuel)	Emission Factor Reference	Emissions (tons)
NO _x				
SO ₂				
PM				
VOC				

Monthly log of emissions from testing solid rocket motors (16-0010-52)

Month _____ Year _____

Emissions from Solid Rocket Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/lb of fuel)	Emission Factor Reference	Emissions (tons)
NO _x				
SO ₂				
PM				
VOC				
HCl				

Monthly log of emissions from testing liquid rocket motors (16-0010-52)

Month _____ Year _____

Emissions from Liquid Rocket Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/lb of fuel)	Emission Factor Reference	Emissions (tons)
NO _x				
SO ₂				
PM				
VOC				

Fiscal Year log of total emissions from PWT engine testing (16-0010-52)

July 1, _____ to June 30, _____

Pollutant	Emissions from aircraft engine testing (tons)	Emissions from liquid and solid rocket testing (tons)	Total Emissions (tons)
NO _x			
SO ₂			
PM			
VOC			

16-0010-53	SL1 Test Cell	Testing of aircraft engines under various load conditions
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Conditions E23-1 through E23-8 apply to source 16-0010-53.
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E23-1. Aircraft fuel usage rate shall not exceed 1,220,000 gallons per State FY (July-June).

Compliance Method: Compliance shall be determined from the record keeping requirement of **Condition E23-7**.

E23-2. Particulate matter emitted from this source shall not exceed 13.3 lb/hr and 0.9 tons per State FY (July-June). This limitation is established pursuant to TAPCR 1200-03-07-.01(5) and the information contained in the agreement letter dated May 17, 1993.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly PM

emission rate utilizing the same engineering estimates and the logs required by **Condition E23-7**, and record the results in the logs required by **Condition E23-8** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E23-3. Sulfur dioxide (SO₂) emitted from this source shall not exceed 108 lb/hr and 7.5 tons per State FY (July-June). This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated May 17, 1993.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly SO₂ emission rate utilizing the same engineering estimates and the logs required by **Condition E23-7**, and record the results in the logs required by **Condition E23-8** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E23-4. Nitrogen oxides (NO_x) emitted from this source shall not exceed 544 lb/hr and 37.9 tons per State FY (July-June). This limitation is established pursuant to TAPCR 1200-03-07-.07(2) and the information contained in the agreement letter dated May 17, 1993.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly NO_x emission rate utilizing the same engineering estimates and the logs required by **Condition E23-7**, and record the results in the logs required by **Condition E23-8** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E23-5. Carbon monoxide (CO) emitted from this source shall not exceed 360 lbs/hr and 17.9 tons per State FY (July-June). This limitation is established pursuant to TAPCR 1200-03-07-.07(2) and the information contained in the agreement letter dated May 17, 1993.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly CO emission rate utilizing the same engineering estimates and the logs required by **Condition E23-7**, and record the results in the logs required by **Condition E23-8** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E23-6. Volatile organic compounds (VOC) emitted from this source shall not exceed 11.2 lb/hr and 1.6 tons per State FY (July-June). This limitation is established pursuant to TAPCR 1200-03-07-.07(2) and the information contained in the agreement letter dated May 17, 1993.

Compliance Method: Compliance with the hourly emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit. The permittee shall calculate the monthly VOC emission rate utilizing the same engineering estimates and the logs required by **Condition E23-7**, and record the results in the logs required by **Condition E23-8** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E23-7. A record of the fuel usage rate that readily shows compliance with **Condition E23-1** must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E23-8. For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using appropriate emission factors, in conjunction with fuel usage records (**Conditions E23-7**). The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from testing aircraft engines (16-0010-53)

Month _____ Year _____

Emissions from Aircraft Engine Testing
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Pollutant	Fuel Usage (lbs)	Emission Factor (lb/10 ³ lb of fuel)	Emission Factor Reference	Emissions (tons)
NO _x				
SO ₂				
PM				
VOC				

Fiscal Year log of total emissions from SL1 Test Cell (16-0010-53)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

16-0010-56	SL2/SL3 Test Cells (Large Engine Test Facility) PSD/BACT	Testing of aircraft engines under various load conditions
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Conditions E24-1 through E24-11 apply to source 16-0010-56.

E24-1. Maximum fuel input rate shall not exceed 90,000 pounds per hour per cell, and 180,000 pounds per hour for both cells combined. This is the capacity of this source as stated in the application dated October 14, 1999.

Compliance Method: Compliance shall be assured by the record keeping requirements of **Condition E24-9**.

E24-2. Only aircraft fuels shall be used as fuel(s) at this source.

E24-3. Particulate matter emitted from this source during all engine testing modes shall not exceed 0.01 grain per dry standard cubic foot of exhaust airflow and 91 tons during all consecutive twelve month periods. TAPCR 1200-03-09-.01(4)

Compliance Method: Compliance with this emission standard is assured based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2, of this permit along with engineering calculations using pounds per hour rate and airflow from existing engine test data and records required by **Condition E24-9**.

E24-4. Sulfur dioxide (SO₂) emitted from this source during all engine testing modes shall not exceed 114 tons during all intervals of twelve consecutive months. TAPCR 1200-03-09-.01(4)

Compliance Method: The permittee shall calculate the monthly SO₂ emission rate based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit, and the logs required by **Condition E24-9**. The results shall be recorded in the logs required by **Condition E24-11** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E24-5. Nitrogen oxides (NO_x) emitted from this source during all engine testing modes shall not exceed 1,038 tons during all intervals of twelve consecutive months. This limitation is established pursuant to TAPCR 1200-03-09-.01(4).

Compliance Method: The permittee shall calculate the monthly NO_x emission rate based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit, and the logs required by **Condition E24-9**. The results shall be recorded in the logs required by **Condition E24-11** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E24-6. Volatile organic compounds (VOC) emitted from this source during all engine testing modes shall not exceed 325 tons during all intervals of twelve consecutive months. This limitation is established pursuant to TAPCR 1200-03-09-.01(4).

Compliance Method: The permittee shall calculate the monthly VOC emission rate based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit, and the logs required by **Condition E24-9**. The results shall be recorded in the logs required by **Condition E24-11** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E24-7. Carbon monoxide (CO) emitted from this source during all engine testing modes shall not exceed 1,890 tons during all intervals of twelve consecutive months. This limitation is established pursuant to TAPCR 1200-03-09-.01(4).

Compliance Method: The permittee shall calculate the monthly CO emission rate based on calculations utilizing emission factors from Aircraft Engine Emission Estimator, Attachment #2 of this permit, and the logs required by **Condition E24-9**. The results shall be recorded in the logs required by **Condition E24-11** to show compliance with the annual emission standard. These records must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E24-8. The exhaust gases from the SL2/SL3 test facility shall be discharged unobstructed vertically upwards to the ambient air from a stack with an equivalent exit diameter of 29.85 feet (not more than 700 square feet cross sectional) and not less than 47 feet above ground level. This condition is established pursuant to Rule 1200-03-09-.01(4) of the Tennessee Air Pollution Control Regulations and the information contained in the PSD dispersion modeling results for the source dated August 1, 2002.

E24-9. A log of the fuel usage rate, operating time, type of fuel used, and type of aircraft engine tested in a form that readily show compliance with **conditions E24-1 through E24-7** must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. This record must be retained for a period of not less than five years.

E24-10. The Arnold Engineering Development Center (AEDC) shall continually seek new technology to include, but not be limited to, control for NO_x, SO₂, CO, and VOC emissions from aircraft engine test cells when technically and economically acceptable and available to the engine test cell facilities. Status reports shall be submitted to the Technical Secretary addressing each emerging technology, when available.

E24-11. For fee purposes, the permittee shall calculate the annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using appropriate emission factors, in conjunction with fuel usage records (**Conditions E24-9**). The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from testing aircraft engines (16-0010-56)

Month _____ Year _____

Emissions from Aircraft Engine Testing				
Pollutant	Fuel Usage (lbs)	Emission Factor (lb/10 ³ lb of fuel)	Emission Factor Reference	Emissions (tons)
NO _x				
SO ₂				
PM				
VOC				

Fiscal Year log of total emissions from SL2/SL3 Test Cells (16-0010-56)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

16-0010-70	Emergency Engines	Engines for emergency generators used in the event of electrical power failure (NSPS, Subparts IIII and JJJJ, & MACT, Subpart ZZZZ, as indicated)
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Conditions E26-1 through E26-7 applies to source 16-0010-70.

On the permit application, the permittee stated that these emergency engines each with generator are used for emergency purposes. Therefore, based on EPA policy, the allowable emissions were calculated using 500 hours per year. This condition is for fee and informational purposes only and is not a limitation.

E26-1. The total heat input capacity of this source is 64,663,742 British Thermal Units per hour. TAPCR 1200-03-09

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E26-2. Sulfur dioxide (SO₂) emitted from this source shall not exceed 26.0 pounds per hour. TAPCR 1200-03-14-.03(5)

Compliance Method: Compliance with the emission limit is assured based on compliance with **Conditions E26-1 and E26-3c** of this permit, and the emission factors in AP-42, Chapter 3.3, Gasoline and Diesel Industrial Engines, and Chapter 3.4, Large Stationary Diesel and All Stationary Dual-fuel Engines.

E26-3. The following engines driving emergency generators are subject to regulations under 40 CFR, Part 60, Subpart IIII, **STANDARDS OF PERFORMANCE FOR STATIONARY COMPRESSION IGNITION INTERNAL COMBUSTION ENGINES.**

Engine Manufacturer/Model #	Engine Model YR	Engine input (br-hp)	EPA Certified
Cummins 450DFEJ	2008	755	Tier 2
Cummins 300DQHAB	2008	470	Tier 3
Cummins 200DGFC	2006	352	Tier 1
Cummins 50DGHE	2007	82	Tier 2
John Deere 4024HF285	2010	80	Tier 3
Cummins 25DSKCA	2008	48.9	Tier 4
Volvo Penta TAD1641GE	2006	758*	Tier 1
John Deere 4024HF285B	2010	80	Tier 3
Cummins QSB5-G3 NR3	2010	145	Tier 3
John Deere 6068HF485T	2010	315	Tier 3
Caterpillar C32	2011	1,474	Tier 2
Kubota V2203-M	2011	36.1	Tier 4
John Deere 5030HF285G	2011	97	Tier 3
Cummins QSB5-G3 NR3	2013	145	Tier 3
Caterpillar C7.1	2017	279	Tier 3

* Approximate horsepower converted from 565 kW

a) Pursuant to 40 CFR §60.4205(a) and 40 CFR §60.4205(b), emissions from the subject units shall meet the following emissions standards, in grams per kilowatt-hour:

Engine Model	450DFEJ, C32	300DQHAB, 6068HF485T	200DGFC, TAD1641GE	50DGHE	4024HF285, 4024HF285B, 5030HF285G	25DSKCA, V2203-M	QSB5-G3 NR3
Pollutant	Limits (g/kW-hr)						
NMHC + NO _x	6.4	4.0		7.5	4.7	7.5	4.0
CO	3.5	3.5	11.4	5.0	5.0	5.5	5.0
PM	0.2	0.2	0.54	0.4	0.4	0.30	0.30
HC			1.3				
NO _x			9.2				

b) Pursuant to 40 CFR §60.4206, the permittee must operate and maintain each stationary CI ICE that achieves the emission standards in (a) **above** over the entire life of each engine.

c) Pursuant to 40 CFR §60.4207(b), the permittee must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may

be used until depleted. Except as otherwise specifically provided, the diesel fuel is subject to the following per-gallon standards:

- (1) Sulfur content of 15 ppm maximum.
- (2) Cetane index or aromatic content, as follows:
 - (i) A minimum cetane index of 40; or
 - (ii) A maximum aromatic content of 35 volume percent.

The permittee shall maintain purchase receipts, vendor certifications, material safety data sheets, or other records to demonstrate that all fuel purchased for this source meets the requirements of 40 CFR §60.4207(b) (any fuel labeled as ultra-low sulfur non-highway diesel fuel or ultra-low sulfur highway diesel fuel meets these requirements). These records shall be made available to the Technical Secretary for inspection upon request and be maintained for a period of at least five (5) years from the purchase date.

- d) Monitoring for the subject units shall meet all applicable monitoring requirements specified in section §60.4209, including the installation of a non-resettable hour meter prior to startup of each engine, if applicable.
- e) Pursuant to 40 CFR §60.4211(a), the permittee must do all of the following, except as permitted in **(g) below**:
 - (1) Operate and maintain each affected stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions;
 - (2) Change only those emission-related settings that are permitted by the manufacturer; and
 - (3) Meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply.
- f) Pursuant to 40 CFR §60.4211(b) & (c), for each pre-2007 model year stationary CI internal combustion engine, the permittee must demonstrate compliance according to one of the methods specified in (1) through (5) below:
 - (1) Purchasing an engine certified according to 40 CFR part 89 or 40 CFR part 94, as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's specifications.
 - (2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in subpart IIII and these methods must have been followed correctly.
 - (3) Keeping records of engine manufacturer data indicating compliance with the standards.
 - (4) Keeping records of control device vendor data indicating compliance with the standards.
 - (5) Conducting an initial performance test to demonstrate compliance with the emission standards according to the requirements specified in §60.4212, as applicable.

For each 2007 model year and later stationary CI internal combustion engine, the permittee must comply by purchasing an engine certified to the emission standards in § 60.4204(b), or § 60.4205(b) or (c), as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in **(g) below**.

- g) Pursuant to 40 CFR §60.4211(g), if any engine and control device is not installed, configured, operated, and maintained engine according to the manufacturer's emission-related written instructions, or an emission-related setting is changed in a way that is not permitted by the manufacturer, the permittee must demonstrate compliance as follows:
 - (1) For stationary CI internal combustion engines with maximum engine power less than 100 HP, the permittee must keep a maintenance plan and records of conducted maintenance to demonstrate compliance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, if the engine and control device are not installed and configured according to the manufacturer's emission-related written instructions, or an emission-related setting is changed in a way that is not permitted by the manufacturer, the permittee must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of such action.
 - (2) For stationary CI internal combustion engines greater than or equal to 100 HP and less than or equal to 500 HP, the permittee must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, the permittee must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after changing an emission-related settings in a way that is not permitted by the manufacturer.

- (3) For stationary CI internal combustion engines greater than 500 HP, the permittee must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, the permittee must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after changing an emission-related settings in a way that is not permitted by the manufacturer. The permittee must conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter to demonstrate compliance with the applicable emission standards.
- h) Pursuant to 40 CFR §60.4211(f), the permittee must operate the emergency stationary ICE according to the requirements in (1) through (3) below. In order for an engine to be considered an emergency stationary ICE under this subpart, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as described in (1) through (3) below, is prohibited. If an engine is not operated according to the requirements in (1) through (3) below, the engine will not be considered an emergency engine under subpart IIII, and must meet all requirements for non-emergency engines.
- (1) There is no time limit on the use of emergency stationary ICE in emergency situations.
 - (2) The permittee may operate an emergency stationary ICE for any combination of the purposes specified in (i) below for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by (3) below counts as part of the 100 hours per calendar year.
 - (i) Emergency stationary ICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The permittee may petition the Technical Secretary for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the permittee maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.
 - (3) Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing provided in (2) above. Except as provided in (i) below, the 50 hours per calendar year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.
 - (i) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:
 - (A) The engine is dispatched by the local balancing authority or local transmission and distribution system operator;
 - (B) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.
 - (C) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.
 - (D) The power is provided only to the facility itself or to support the local transmission and distribution system.
 - (E) The permittee identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the permittee.
- i) Pursuant to 40 CFR §60.4214(b), if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the permittee must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The permittee must record the time of operation of the engine and the reason the engine was in operation during that time.

- j) Pursuant to 40 CFR §60.4214(c), if a stationary CI internal combustion engine is equipped with a diesel particulate filter, the permittee must keep records of any corrective action taken after the backpressure monitor has notified the permittee that the high backpressure limit of the engine is approached.
- k) Pursuant to 40 CFR §60.4214(d), if an emergency stationary CI ICE with a maximum engine power more than 100 HP operates for the purposes specified in (h)(3)(i) above, the permittee must submit an annual report according to the requirements in Condition E2(d).

E26-4. The following engines driving emergency generators are subject to regulations under 40 CFR, Part 63, Subpart ZZZZ, **NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES.**

Engine Manufacturer/Model #	Engine Model YR	Engine input (br-hp)	EPA Certified
Cummins 450DFEJ	2008	755	Tier 2
Cummins 300DQHAB	2008	470	Tier 3
Cummins 200DGFC	2006	352	Tier 1
Cummins 50DGHE	2007	82	Tier 2
John Deere 4024HF285	2010	80	Tier 3
Cummins 25DSKCA	2008	48.9	Tier 4
Hercules D3400X298	1989	110	n/a
Cummins 4BTA3.9G3	2004	130	n/a
Cummins 4BT3.9-G2	1997	102	n/a
Unknown Volvo*	1989	168	n/a
Cummins 6BT5.9-G6	1989	166	n/a
Allis Chalmers DG-516	1959	101	n/a
Volvo TID718GP868451	1989	252	n/a
Caterpillar 3408	1997	520	n/a
Volvo Penta TAD1641GE	2006	758^	Tier 1
Cummins 6CTAB.36	1998	277	n/a
Caterpillar SR4	1991	1,600	n/a
Cummins 6CTA-B.3-G	1989	277	n/a
Unknown Cummins**	1999	20	n/a
Detroit Diesel 6063MK35	2001	415	n/a
Cummins 4B3.3-G1	2006	42	n/a
John Deere 4024HF285B	2010	80	Tier 3
Cummins QSB5-G3 NR3	2010	145	Tier 3
John Deere 6068HF485T	2010	315	Tier 3
Caterpillar C32	2011	1,474	Tier 2
Kubota V2203-M	2011	36.1	Tier 4
John Deere 5030HF285G	2011	97	Tier 3
Cummins QSB5-G3 NR3	2013	145	Tier 3
Caterpillar C7.1	2017	279	Tier 3

* 100 KW generator set, DLC 100V Pow'rGard, serving VKF facility

** 11.5 KW generator set, DNAD Onan, serving the Main Sewage Treatment Plant

^ Approximate horsepower converted from 565 kW

- a) Pursuant to 40 CFR §63.6605, the permittee must be in compliance with the emission limitations, operating limitations, and other requirements of subpart ZZZZ applicable to each engine at all times. Also at all times, the permittee must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require the permittee to make any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Technical Secretary which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.
- b) Pursuant to 40 CFR §63.6640(f), the permittee must operate each emergency stationary RICE according to the requirements in (1) through (3) below in order for the engines to be considered emergency stationary RICE under subpart ZZZZ. Any operation other than emergency operation, maintenance and testing, and operation in nonemergency situations for 50 hours per year, as described in (1) through (3) below, is prohibited. If any engine is not operated according to the

requirements in (1) through (3) below, the engine will not be considered an emergency engine under subpart ZZZZ and must meet all requirements for non-emergency engines.

- (1) There is no time limit on the use of emergency stationary RICE in emergency situations.
 - (2) The permittee may operate each emergency stationary RICE for any combination of the purposes specified in (i) below for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by (3) below counts as part of the 100 hours per calendar year.
 - (i) Emergency stationary RICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The permittee may petition the Technical Secretary for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the permittee maintains records indicating that federal, state, or local standards require maintenance and testing of emergency RICE beyond 100 hours per calendar year.
 - (3) Emergency stationary RICE located at major sources of HAP may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing provided in (2) above. The 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity.
- c) Reserved.
- d) Reserved.
- e) Pursuant to 40 CFR §63.6625(h), the permittee must minimize each engine's time spent at idle during startup and minimize each engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup apply.

E26-5. Pursuant to 40 CFR §63.6590(c), for the emergency engine model numbers 300DQHAB, 200DGFC, 50DGHE, 4024HF285, 25DSKCA, 4024HF285B, QSB5-G3 NR3, 6068HF485T, V2203-M, and 5030HF285G (emergency NSPS engines less than 500 brake horsepower), the permittee shall meet the requirements of 40 CFR Part 63, Subpart ZZZZ, by meeting the requirements of 40 CFR Part 60, Subpart IIII. No further requirements apply for these emergency engines under 40 CFR Part 63, Subpart ZZZZ.

E26-6. Pursuant to 40 CFR §63.6602, for the emergency engine model numbers D3400X298, 4BTA3.9G3, 4BT3.9-G2, unknown Volvo driving the 100 KW DLC 100V Pow'rGard generator set serving VKF facility, 6BT5.9-G6, DG-516, TID718GP868451, 6CTAB.36, 6CTA-B.3-G, unknown Cummins driving the 11.5 KW DNAD Onan generator set serving the Main Sewage Treatment Plant, 6063MK35, and 4B3.3-G1 (non-NSPS emergency engines less than 500 brake horsepower), the permittee shall meet the following requirements (a) through (g):

- (a) Change oil and filter every 500 hours of operation or annually, whichever comes first; however, the permittee has the option to utilize an oil analysis program as described in §63.6625(i) in order to extend the specified oil change requirement.
- (b) Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first; and
- (c) Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.

If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements as described in (a), (b), and (c) above, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under Federal, State, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under Federal, State, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under Federal, State, or local law has abated. The permittee must report any failure to perform the management practice on the schedule required and the Federal, State or local law under which the risk was deemed unacceptable.

- (d) The permittee must install a non-resettable hour meter to each existing engine if one is not already installed in accordance with 40 CFR §63.6625(f).
- (e) Pursuant to 40 CFR §63.6655(f), the permittee must keep records of the hours of operation of each engine that is recorded through the non-resettable hour meter. The permittee must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. These logs must be maintained at the facility and kept available for inspection by the Technical Secretary or his representative.

These logs must also be reported in accordance with **Condition E2(a)** of this permit and be retained for a period of not less than five (5) years.

- (f) Pursuant to 40 CFR §63.6625(e)(2), the permittee must operate and maintain the stationary RICE and after-treatment control device (if any) according to the manufacturer's emission-related written instructions or develop your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions.
- (g) Pursuant to 40 CFR §63.6655(e), the permittee must keep records of the maintenance conducted on the stationary RICE in order to demonstrate that the engine and after-treatment control device (if any) were operated and maintained according to the maintenance plan.

E26-7. For fee purposes, the permittee shall calculate its annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using appropriate emission factors supplied by the equipment vendor, or those found in EPA AP-42, in conjunction with hours of operation of each engine. If a vendor provided emission factor for individual pollutants NO_x and VOC are combined into one value, i.e. NMHC + NO_x, the permittee may separate the amounts of each pollutant using the ratio predicted by EPA, AP-42. This ratio is approximately 92.5% NO_x and 7.5% VOC for engines less than 600 brake horsepower, and 97.3% NO_x and 2.7% VOC for engines 600 brake horsepower and greater. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with **Condition E1** of this permit.

Fiscal Year log of total emissions from emergency diesel engines (16-0010-70)

Engine _____ July 1, _____ to June 30, _____

Emissions from emergency diesel engines			
Pollutant	Operating time (hr)	Emission Factor (gm/hp-hr)	Emissions (tons)
NO _x			
SO ₂			
PM			
VOC (NMHC)			

16-0010-72	Desiccant Drying Units	Eight desiccant drying units, each with two 1.5 MMBtu/hr burners (16 identical burners with 24 MMBtu/hr, total), to condition and dehumidify air supplied to testing operations. MACT, Subpart DDDDD
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Conditions E28-1 through E28-6 apply to source 16-0010-72.

E28-1. The total stated design heat input capacity of this source is 24 million British thermal units per hour (MMBtu/hr), on a daily average basis. This is the capacity of the source as stated in the application dated September 14, 2009.

Compliance Method: This condition is a statement of the design heat input capacity for this source. If the permittee needs to increase the design or maximum capacity of this source, the permittee shall pursue the appropriate Title V procedure in accordance with TAPCR 1200-03-09-.02(11). If a construction permit is applied for, this shall be done in accordance with TAPCR 1200-03-09-.01(1).

E28-2. Natural gas shall be the only fuel used for this source.

E28-3. The combined operating time of all the burners shall not exceed 64,000 hours per State FY (July-June). This limitation is established pursuant to TAPCR 1200-03-06-.01(7) and the information contained in the agreement letter dated September 14, 2009.

Compliance Method: A record of the hours of operation of this source must be maintained at the source location and kept available for inspection by the Technical Secretary or a Division representative. These logs must also be reported in accordance with condition **E2** of this permit and be retained for a period of not less than five years.

E28-4. Particulate matter emitted from this source shall not exceed 0.37 lbs/MM Btu (8.85 pounds per hour and 1.0 TPY). This limitation is established pursuant to TAPCR 1200-03-06-.02(2) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance with this emission standard is assured by compliance with **Condition E28-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E28-5. Sulfur dioxide emitted from this source shall not exceed 1.0 lbs/hr (and 1.0 TPY). This limitation is established pursuant to TAPCR 1200-03-14-.01(3) and the information contained in the agreement letter dated November 22, 2016.

Compliance Method: Compliance with this emission standard is assured by compliance with **Condition E28-2**, and the appropriate uncontrolled emission factors from AP-42, Chapter 1.4, Natural Gas Combustion.

E28-6. For fee purposes, the permittee shall keep a log of the amount of natural gas burned (in standard cubic feet, scf) per month by this source and calculate its annual actual oxides of nitrogen (NO_x) emissions, particulate matter (PM) emissions, sulfur dioxide (SO₂) emissions, and volatile organic compound (VOC) emissions from this fuel-burning source using uncontrolled AP-42 emission factors, in conjunction with fuel usage. The results of these calculations shall be recorded and maintained in tabular form (see example below) and shall be retained for a period of not less than five years. These records shall be reported in accordance with condition **E1** of this permit.

Monthly log of emissions from Desiccant Drying Units (16-0010-72)

Month _____ Year _____

Emissions from Natural Gas Combustion				
Pollutant	Usage (scf)	Emission Factor (lb/10 ⁶ scf of NG)	AP-42 Reference	Emissions (tons)
NO _x		100	Table 1.4-1, July 1998	
SO ₂		0.6	Table 1.4-2, July 1998	
PM		7.6	Table 1.4-2, July 1998	
VOC		5.5	Table 1.4-2, July 1998	

Fiscal Year log of emissions from Desiccant Drying Units (16-0010-72)

July 1, _____ to June 30, _____

Pollutant	Total Emissions (tons)
NO _x	
SO ₂	
PM	
VOC	

END OF SIGNIFICANT MODIFICATION #1 TO PERMIT NUMBER: 570221

ATTACHMENT 1

**OPACITY MATRIX DECISION TREE for
VISIBLE EMISSION EVALUATION METHODS 2, 3 & 9
dated JUNE 18, 1996 and amended September 11, 2013**

**Decision Tree PM for Opacity for
Sources Subject to Rule 1200-03-05-.01
Utilizing TVEE Method 2**

Notes:

PM = Periodic Monitoring required by 1200-03-09-.02(11)(e)(iii).

This Decision Tree outlines the criteria by which major sources can meet the periodic monitoring and testing requirements of Title V for demonstrating compliance with the visible emission standard in Rule 1200-03-05-.01. It is not intended to determine compliance requirements for EPA's Compliance Assurance Monitoring (CAM) Rule (formerly referred to as Enhanced Monitoring - Proposed 40 CFR 64).

Examine each emission unit using this Decision Tree to determine the PMT required.

Use of continuous emission monitoring systems eliminates the need to do any additional periodic monitoring.

Visible Emission Evaluations (VEEs) are to be conducted utilizing Tennessee Visible Emission Evaluation Method 2. The observer must be properly certified according to the criteria specified in EPA Method 9 to conduct TVEE Method 2 evaluations.

Typical Pollutants
Particulates, VOC, CO, SO₂, NO_x, HCl, HF, HBr, Ammonia, and Methane.

Initial observations are to be repeated within 90 days of startup of a modified source, if a new construction permit is issued for modification of the source.

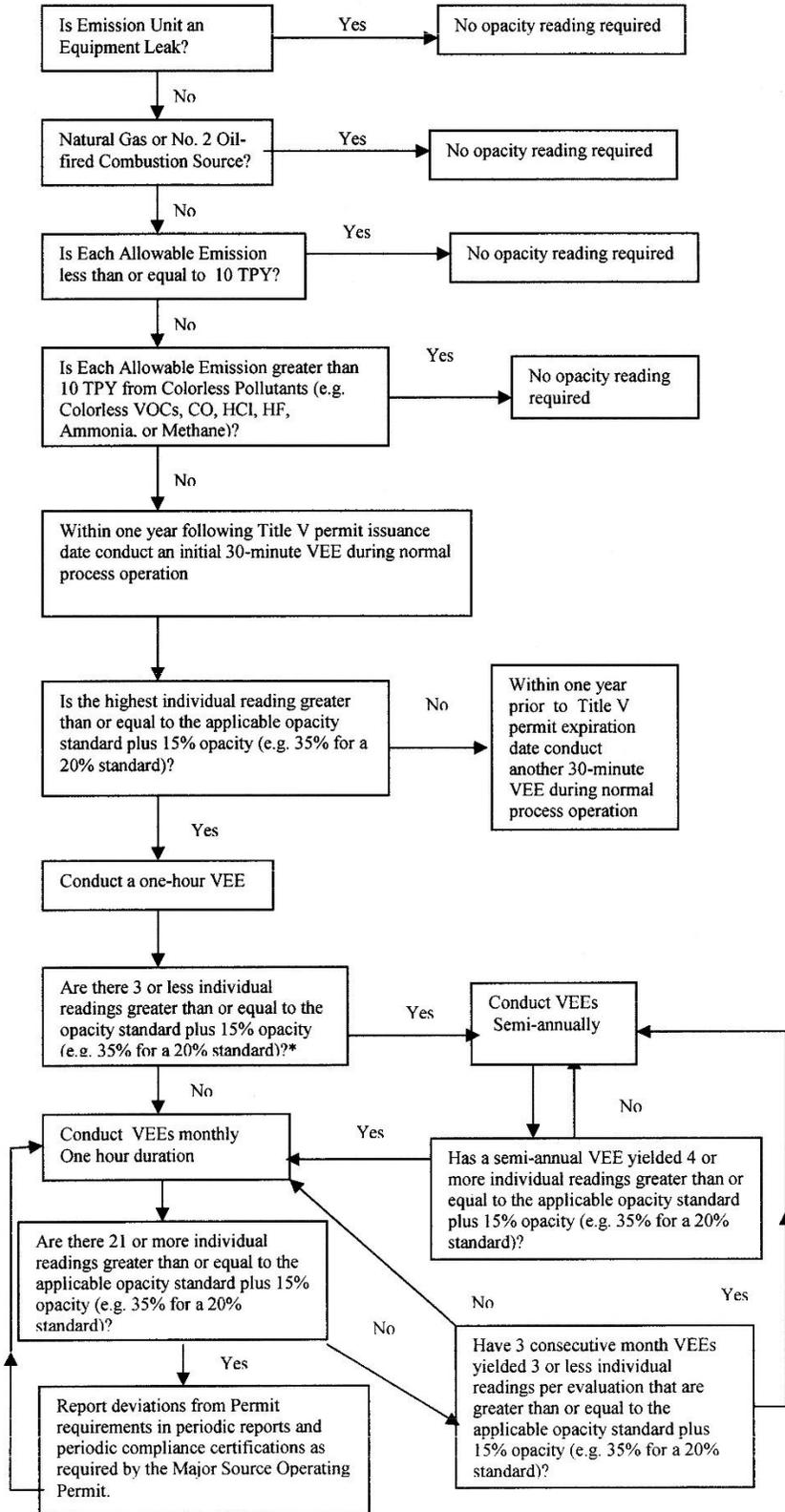
A VEE conducted by TAPCD personnel after the Title V permit is issued will also constitute an initial reading.

Reader Error
TVEE Method 2: The TAPCD declares non-compliance when 21 observations are read at the standard plus 15% opacity (e.g. 35% for a 20% standard).

*The rationale for this is the fact that Rule 1200-03-05-.01 allows for an exemption of 5 minutes (20 readings) per hour and up to 20 minutes (80 readings) per day. With 4 or more excessive individual readings per hour the possibility of a daily exceedance exists.

Note: A company could mutually agree to have all of its sources regulated by EPA Method 9. Caution: Agreement to use Method 9 could potentially place some sources in non-compliance with visible emission standards. Please be sure before you agree.

Dated June 18, 1996
Amended September 11, 2013



**Decision Tree PM for Opacity where
The Opacity Standard is Zero Percent Opacity
Utilizing TVEE Method 3**

Notes:

The use of Tennessee Visible Emission Evaluation (TVEE) Method 3 is only applicable where the use of the method is specified as a permit condition.

PM = Periodic Monitoring required by 1200-03-09-.02(11)(e)(1)(iii).

This Decision Tree outlines the criteria by which major sources can meet the PM requirements of Title V for demonstrating compliance with the visible emissions standards of zero percent opacity where the use of TVEE Method 3 is specified as a permit condition. It is not intended to determine compliance requirements for EPA's Compliance Assurance Monitoring (CAM) Rule (formerly referred to as Enhanced Monitoring – Proposed 40 CFR 64).

Examine each emission source using this Decision Tree to determine PM required.

Use of continuous emission monitoring systems eliminates the need to do any additional periodic monitoring.

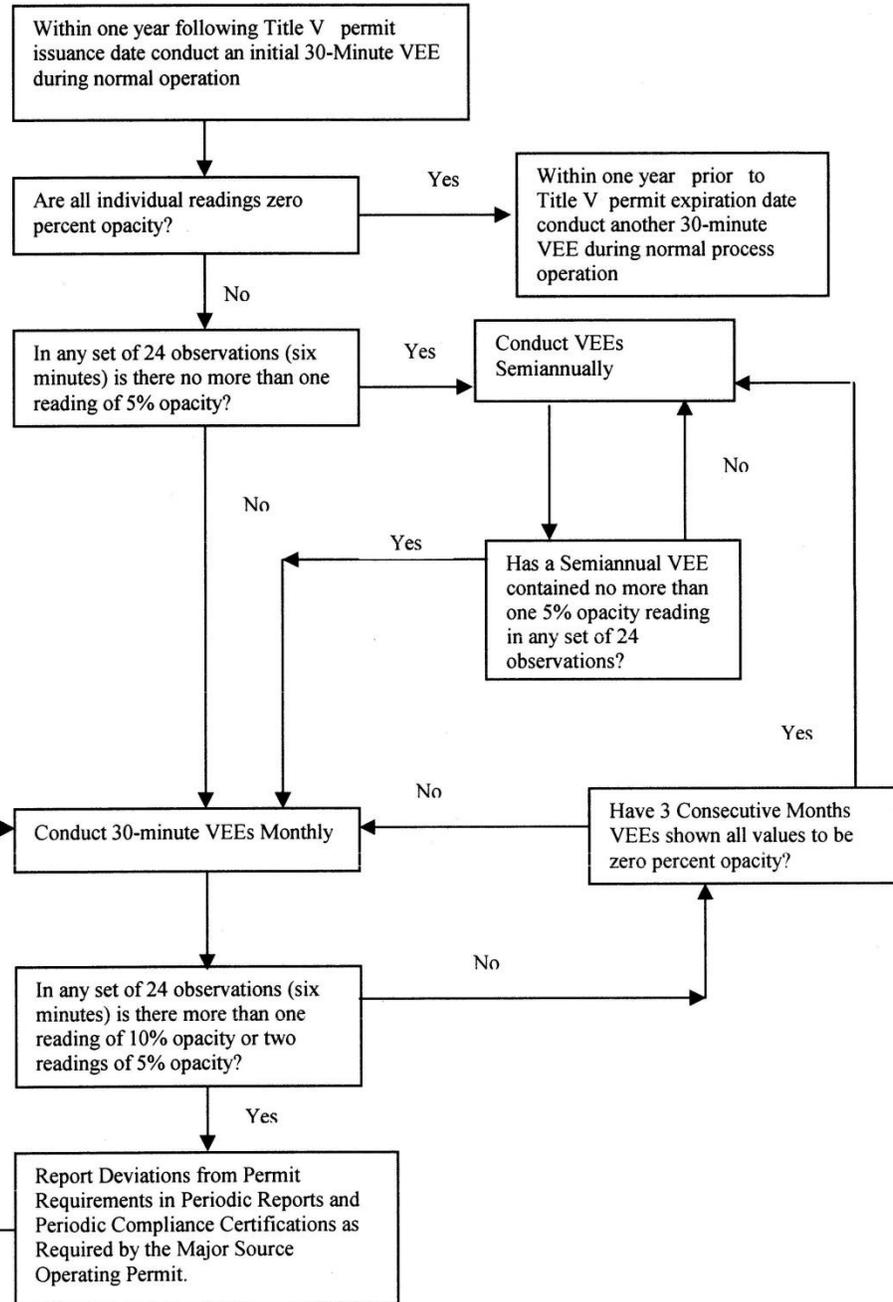
Visible Emissions Evaluations (VEEs) are to be conducted utilizing TVEE Method 3. The observer must be properly certified according to criteria specified in TVEE Method 3 to conduct Method 3 evaluations.

Initial observations are to be repeated within 90 days of startup of a modified source if a new construction permit is issued for modification of the source.

A VEE conducted by TDAPC personnel after the Title V permit is issued will also constitute an initial reading.

Reader Error

For TVEE Method 3, the TDAPC declares non-compliance when during any set of 24 observations any combination of readings exceed 10% opacity (e.g. one reading of 10% opacity or two readings of 5% opacity).



Dated June 18, 1996

Amended September 11, 2013

Decision Tree PM for Opacity for Sources Utilizing EPA Method 9*

Notes:

PM = Periodic Monitoring required by 1200-03-09-.02(11)(e)(iii).

This Decision Tree outlines the criteria by which major sources can meet the periodic monitoring and testing requirements of Title V for demonstrating compliance with the visible emission standards set forth in the permit. It is not intended to determine compliance requirements for EPA's Compliance Assurance Monitoring (CAM) Rule (formerly referred to as Enhanced Monitoring – Proposed 40 CFR 64).

Examine each emission unit using this Decision Tree to determine the PM required.*

Use of continuous emission monitoring systems eliminates the need to do any additional periodic monitoring.

Visible Emission Evaluations (VEEs) are to be conducted utilizing EPA Method 9. The observer must be properly certified to conduct valid evaluations.

Typical Pollutants
Particulates, VOC, CO, SO₂, NO_x, HCl, HF, HBr, Ammonia, and Methane.

Initial observations are to be repeated within 90 days of startup of a modified source, if a new construction permit is issued for modification of the source.

A VEE conducted by TAPCD personnel after the Title V permit is issued will also constitute an initial reading.

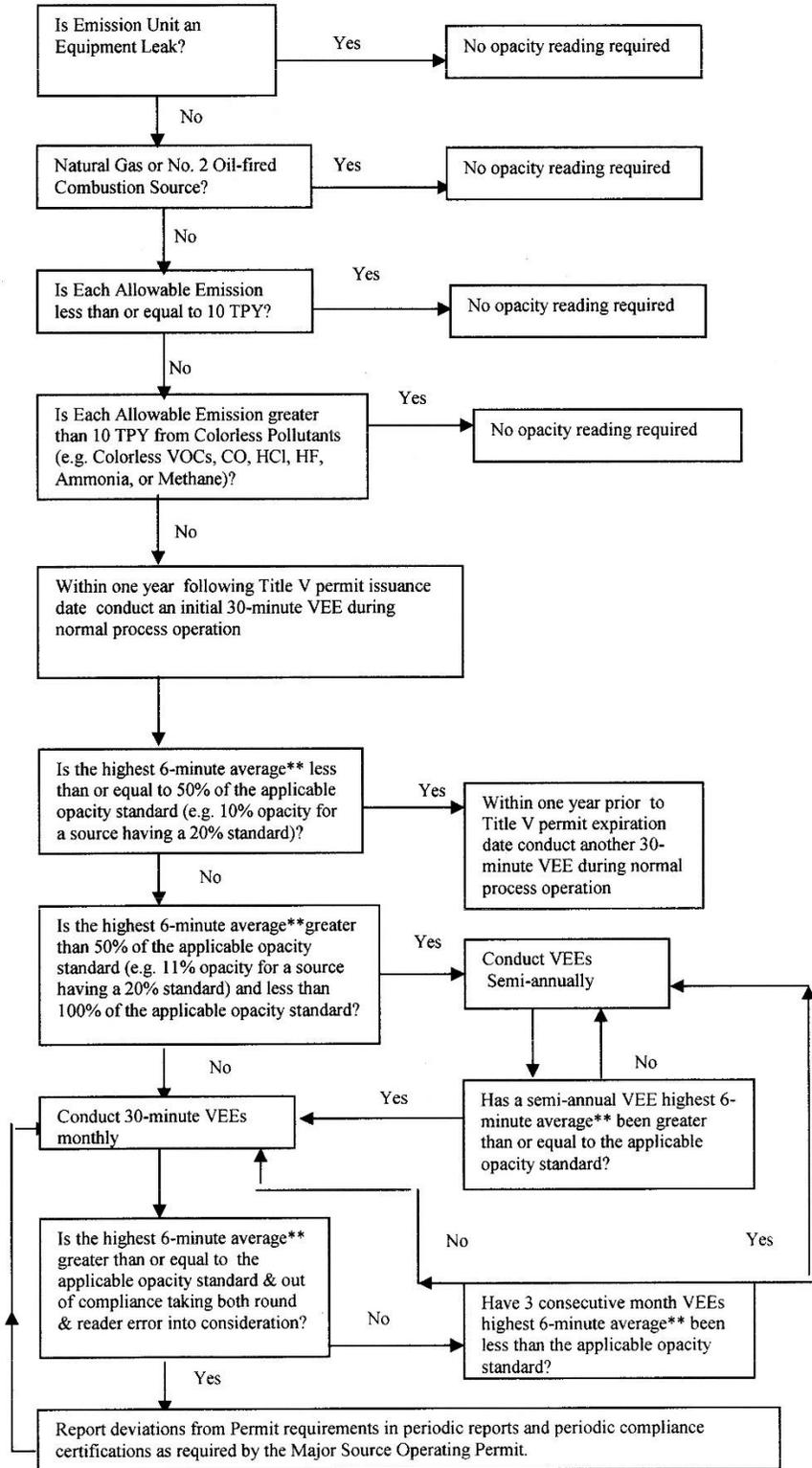
Reader Error
EPA Method 9, Non-NSPS or NESHAPS stipulated opacity standards:
The TAPCD guidance is to declare non-compliance when the highest six-minute average** exceeds the standard plus 6.8% opacity (e.g. 26.8% for a 20% standard).

EPA Method 9, NSPS or NESHAPS stipulate opacity standards:
EPA guidance is to allow only engineering round. No allowance for reader error is given.

*Not applicable to Asbestos manufacturing subject to 40 CFR 61.142

**Or second highest six-minute average, if the source has an exemption period stipulated in either the regulations or in the permit.

Dated June 18, 1996
Amended September 11, 2013



ATTACHMENT 2

Emission Factors for Various Aircraft Engines, Rocket Motors, and Arc Heaters

TABLE

EMISSION FACTORS FOR J-33-35 TURBINE ENGINE

	Idle	Approach	Intermediate	Military	Units	Reference
CO	127	84.6	49.1	31.3	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-14
NOx	1.5	1.9	2.7	3.6	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-15
SOx	0.30	0.38	0.54	0.72	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-16
TSP	0.73	0.57	0.02	0.02	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-17
VOC	19.5	6.5	1.3	0.5	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-18

Note: Sources using these factors include: 14.

EMISSION FACTORS FOR F100-100 TURBINE ENGINE

	Idle	Approach	Intermediate	Military	Afterburne	Reference
CO	24	5.8	1.6	0.9	4	Aircraft Engine Emissions Estimator, ESL-TR-85-14
NOx	3.3	6.7	9.8	27	3.1	Aircraft Engine Emissions Estimator, ESL-TR-85-15
SOx	0.66	1.34	1.96	5.40	0.62	Aircraft Engine Emissions Estimator, ESL-TR-85-16
TSP	0.12	0.27	0.47	0.34	0.15	Aircraft Engine Emissions Estimator, ESL-TR-85-17
VOC	3.2	1.9	0.1	0.1	0.01	Aircraft Engine Emissions Estimator, ESL-TR-85-18

Note: All emission factors are in lb/1000 lb fuel.
 Sources using these factors include: 19, 31, & 53.

EMISSION FACTORS FOR F101-100 TURBINE ENGINE

	Idle	Military	Afterburner	Units	Reference
CO	120.1	7.6	16.7	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-14
NOx	7.3	2.3	4.6	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-15
SOx	1.2	1.2	1.2	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-16
TSP	0.09	0.02	0.05	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-17
VOC	25.2	0.4	0.1	lb/1000 lb fuel	Aircraft Engine Emissions Estimator, ESL-TR-85-18

Note: Sources using these factors include: 52.

EMISSION FACTORS FOR A PROFILE OF TURBINE ENGINES

	Idle	Approach	Int/Mil	Afterburner	Reference
CO	25.4	10.5	17.5	1289	Eng. Est. based upon combination of engines
CO	101	13.7	9	843	Eng. Est. based upon combination of engines
CO				3.15	Eng. Est. based upon combination of engines
NOx	7	23	352	255	Eng. Est. based upon combination of engines
NOx	0.72	16.2	198	241	Eng. Est. based upon combination of engines
NOx				12.1	Eng. Est. based upon combination of engines
SO2	1.1	2.5	10.5	15.5	Eng. Est. based upon combination of engines
SO2	1.1	2.5	10.5	15.5	Eng. Est. based upon combination of engines
SO2				1.8	Eng. Est. based upon combination of engines
TSP	0.15	8.1	8.1	5.7	Eng. Est. based upon combination of engines
TSP	10.3	16	23.5	24.1	Eng. Est. based upon combination of engines
TSP				1.78	Eng. Est. based upon combination of engines
TSP				0.108	Eng. Est. based upon combination of engines
TSP				23.79558385	Eng. Est. based upon combination of engines
VOC	1.1	1.4	2.6	1213	Eng. Est. based upon combination of engines
VOC	36.3	1.55	2.6	71.5	Eng. Est. based upon combination of engines
VOC				1.7	Eng. Est. based upon combination of engines

Note: All emission factors are in lb/hr. Factors were determined based upon consideration of several engines of each type expected to be tested. Sources using these factors include: 56.

The engineering estimate was derived from a cross-section of various engines expected to be evaluated in this facility using various established references such as the "Aircraft Engine Emissions Estimator," ESL-TR-85-14

EMISSION FACTORS FOR HAPs FROM TURBINE ENGINES

	Factor	Units	Reference
Acetaldehyde	0.0483	lb/lb VOC	SPECIATE, Profile 1097
Acrolein	0.0238	lb/lb VOC	SPECIATE, Profile 1097
Benzene	0.0202	lb/lb VOC	SPECIATE, Profile 1097
1,3-Butadiene	0.0189	lb/lb VOC	SPECIATE, Profile 1097
Ethylbenzene	0.0018	lb/lb VOC	SPECIATE, Profile 1097
Formaldehyde	0.1548	lb/lb VOC	SPECIATE, Profile 1097
Naphthalene	0.0060	lb/lb VOC	SPECIATE, Profile 1097
Phenol	0.0026	lb/lb VOC	SPECIATE, Profile 1097
Propionaldehyde	0.0098	lb/lb VOC	SPECIATE, Profile 1097
Styrene	0.0041	lb/lb VOC	SPECIATE, Profile 1097
Toluene	0.0055	lb/lb VOC	SPECIATE, Profile 1097
o-Xylene	0.0020	lb/lb VOC	SPECIATE, Profile 1097
As	0.0053	lb/lb TSP	CARB (1991), Profile 110 for SCCs 2-04-001-01 & -02
Cd	0.0005	lb/lb TSP	CARB (1991), Profile 110 for SCCs 2-04-001-01 & -02
Cr	0.0053	lb/lb TSP	CARB (1991), Profile 110 for SCCs 2-04-001-01 & -02
Pb	0.0055	lb/lb TSP	CARB (1991), Profile 110 for SCCs 2-04-001-01 & -02
Se	0.0005	lb/lb TSP	CARB (1991), Profile 110 for SCCs 2-04-001-01 & -02

Note: All turbine engines are assumed to be speciated according to these factors.

Sources using these factors include: 14, 19, 31, 53, & 56.

EMISSION FACTORS FOR SOLID ROCKET MOTORS

	Factor	Units	Reference
CO	0.1920	lb/lb propellant	Engineering Estimate
TSP	0.29	lb/lb propellant	Engineering Estimate
HCl	0.208	lb/lb propellant	Engineering Estimate
HCN	0.0006	lb/lb propellant	Engineering Estimate

Note: Sources using these factors include: 14 & 18.

EMISSION FACTORS FOR LIQUID ROCKET MOTORS

	All	Units	Reference
CO	0.135	lb/lb propellant	Engineering Estimate
CH4	0.012	lb/lb propellant	Engineering Estimate
NH3	0.015	lb/lb propellant	Engineering Estimate

Note: Sources using these factors include: 14 & 17.

EMISSION FACTORS FOR ARC HEATERS

	Source	Factor	Unit	Reference
NOx	#42	0.42	lb/sec	Engineering Estimate
NOx	#50	1.00	lb/min	Engineering Estimate

Note: Sources these factors include: 42 & 50.

ATTACHMENT 3

Title V Fee Selection Form

APC 36 (CN-1583)

DRAFT



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
 DIVISION OF AIR POLLUTION CONTROL
 William R. Snodgrass Tennessee Tower
 312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
 Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 36

TITLE V FEE SELECTION

Type or print and submit to the email address above.

FACILITY INFORMATION

1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)]	
2. Site name (if different from legal name)	
3. Site address (St./Rd./Hwy.)	County name
City	Zip code
4. Emission source reference number	5. Title V permit number

FEE SELECTION

This fee selection is effective beginning January 1, _____. When approved, this selection will be effective until a new Fee Selection form is submitted. Fee Selection forms must be submitted on or before December 31 of the annual accounting period.

6. Payment Schedule (choose one):

Calendar Year Basis (January 1 – December 31) Fiscal Year Basis (July 1 – June 30)

7. Payment Basis (choose one):

Actual Emissions Basis Allowable Emissions Basis Combination of Actual and Allowable Emissions Basis

8. If Payment Basis is "Actual Emissions" or "Combination of Actual and Allowable Emissions", complete the following table for each permitted source and each pollutant for which fees are due for that source. See instructions for further details.

Source ID	Pollutant	Allowable or Actual Emissions	If allowable emissions: Specify condition number and limit.
			If actual emissions: Describe calculation method and provide example. Provide condition number that specifies method, if applicable.

ATTACHMENT 4

Agreement Letters

DRAFT



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

NOV 22 2016

Colonel Rodney F. Todaro
Commander, Arnold Air Force Base
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389-1303

16-0010

DEC 9 2016 AM 9:57

Ms. Michelle W. Owenby
Tennessee Department of Environment and Conservation
Division of Air Pollution Control
312 Rosa L. Parks Avenue, 15th Floor
Nashville TN 37243

Dear Ms. Owenby

Arnold Engineering Development Complex (AEDC), Permit No. 560453 requests maximum emission limits for the following sources as indicated below:

- a. 16-0010-01: Steam Plant A, Boiler 01 (Condition E5-4)–Particulate Matter limited to 5.0 tons per year.
- b. 16-0010-02: Steam Plant A, Boiler 02, 03, and 04 (Condition E5-5)–Particulate Matter limited to 25.0 tons per year and (Condition E5-8)–Sulfur Dioxide limited to 12.0 tons per year.
- c. 16-0010-06: ETF Heaters (Condition E6-3)–Particulate Matter limited to 23.0 tons per year and (Condition E6-4)–Sulfur Dioxide limited to 2.0 tons per year.
- d. 16-0010-07: VKF Heaters (Condition E7-3)–Particulate Matter limited to 7.0 tons per year.
- e. 16-0010-08: PWT Air Dryers (Condition E8-3)–Particulate Matter limited to 4.0 tons per year and (Condition E8-4)–Sulfur Dioxide limited to 1.0 ton per year.
- f. 16-0010-14: APTU Test Facility (Condition E9-7)–Sulfur Dioxide limited to 1.0 ton per year.
- g. 16-0010-18: Solid Rocket Testing (Condition E11-2)–Particulate Matter limited to 10.0 tons per year.
- h. 16-0010-28: HB Heaters 1A & 1B (Condition E13-4)–Particulate Matter limited to 4.0 tons per year and (Condition E13-5) – Sulfur Dioxide limited to 1.0 ton per year.



TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

RECEIVED
DATE 1-25-90
DO NO.
ID. A123413
612345
US
OTHER

DEC 21 1989

CERTIFIED MAIL P 307 583 421
RETURN RECEIPT REQUESTED

Stephen P. Condon, Col., USAF
Commander, Arnold Engineering
Development Center
Arnold Airforce Base, TN 37389

Re: 16-0010-46

Dear Mr. Condon:

Your application for a permit from the Division of Air Pollution Control has been favorably reviewed. The permit is included with this letter.

In order to alleviate the administrative and technical requirements involved in a Prevention of Significant Deterioration review, you may choose to agree to the following limitation(s) concerning your 188 MM Btu/hour, high pressure air, free standing indirect gas-fired heater system pursuant to Rule 1200-3-6-.01(7) of the Tennessee Air Pollution Control Regulations:

The operating hours shall not exceed four hundred and sixteen (416) hours/year.

Natural gas shall only be used as fuels.

Agreement to the above condition(s) will mean that you will need a construction permit if you wish to exceed the limitation(s). The source will also be subject to any restrictions which apply to new sources at the time the new construction permit is issued.

If you have any questions concerning this letter, please contact Manir Ahmed at 615-741-3651.

To signify your agreement, please sign below and return this letter to Manir Ahmed, Air Pollution Control Division, New Source Review Section, Customs House, 701 Broadway, Nashville, Tennessee 37219-5403.

Since we have already received your verbal agreement to the above limitation(s), the enclosed permit will be valid as of the issue date, provided your signed agreement is received by the Tennessee Division of Air Pollution Control within (10) days of its receipt.

Thank you for your cooperation in this matter.

Very truly yours,

Arthur W. Walton

Tennessee Air Pollution Control Board

HEH/MA/F1209212 APC-7A

cc: Field Office

Warren L. Riles hereby agrees to the above limitation(s), in behalf of
Arnold Engineering Development Center.

Signature: Warren L. Riles
Title: WARREN L. RILES, Colonel, USAF
Vice Commander
Date: 22 Jan 98



Cleland

01 MAR 1988

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

FEB 29 1988

CERTIFIED MAIL P907583164
RETURN RECEIPT REQUESTED

Col. Stephen P. Condon, USAF
Commander
Arnold Engineering Development Center
Arnold Air Force Base, TN 37389

524-88

Re: 16-0010-18

Dear Col. Condon:

We have received your application for a permit dated January 20, 1988. In order to expedite your permit and alleviate the administrative and technical requirements involved in a Prevention of Significant Deterioration review, you may choose to agree to the following limitation(s) concerning your solid rocket test facility pursuant to Rule 1200-3-7-.01(5) of the Tennessee Air Pollution Control Regulations:

1. Carbon monoxide emitted from this facility shall not exceed 168 TPY total.
2. Total operating time for this facility shall not exceed 30 hours per year.

Agreement to the above condition(s) will mean that you will need a construction permit if you wish to exceed the limitation(s). The source will also be subject to any restrictions which apply to new sources at the time the new construction permit is issued.

If you have any questions concerning this letter, please contact Bill Cleland at 615-741-3651.

To signify your agreement, please sign below and return this letter within thirty days of its receipt to Bill Cleland, Air Pollution Control Division, New Source Review Section, Customs House, 701 Broadway, Nashville, Tennessee 37219-5403.

Thank you for your cooperation in this matter.

Very truly yours,

for John W. Walton
Harold E. Hodges, P.E.
Technical Secretary
Tennessee Air Pollution Control Board

HEH/F3018048 APC-132-PSD singular

Colonel Roger L. Jacks USAF hereby agrees to the above limitation(s), in behalf of Arnold Engineering Development Center.

Signature:  _____

Title: Vice Commander, AEDC

Date: 27 April 1988



APR 08 REC'D

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF AIR POLLUTION CONTROL
701 BROADWAY, CUSTOMS HOUSE, NASHVILLE, TN 37243-1531

APR 03 1992

CERTIFIED MAIL P 878 226 981
RETURN RECEIPT REQUESTED

Mr. William M. Dunne
Director of Environmental Planning
Arnold Engineering & Development Center
Arnold Air Force Base, TN 37389-5000

RE: 16-0010-CL

ANNUAL EMISSION FEE - REASSESSMENT AGREEMENT

Dear Mr. Dunne:

Your annual emission fee has been reassessed in accordance with the provisions of Division Rule 1200-3-26-.02(6)(b), per our discussion on January 27, 1992 with Mr. Ruel Burns of your staff. This reassessment will remain in effect providing that you comply with the following limitations at your facility. The following limitation(s) are included in your operating permit(s):

16-0010-02,03,04 Steam Plant 'A'-(3) Boilers

1. Operating time shall not exceed 6,000 hours per year per boiler.
2. Sulfur dioxide emitted from this source shall not exceed 53.7 pounds per hour.
3. Particulate emitted from this source shall not exceed 5.0 pounds per hour.
4. The sulfur content of the fuel shall not exceed 0.3 percent.

16-0010-05 Steam Plant 'B'- Boiler

1. Operating time shall not exceed 2,000 hours per year.
2. Sulfur dioxide emitted from this source shall not exceed 21.2 pounds per hour.
3. Particulate emitted from this source shall not exceed 2.0 pounds per hour.
4. The sulfur content of the fuel shall not exceed 0.3 percent.

APR 03 1992

CERTIFIED MAIL P 878 226 981
Arnold Engineering & Development Center
Page 2

16-0010-06 ETF Continuous Air Heaters

1. Sulfur dioxide emitted from this source shall not exceed 0.4 pounds per hour.
2. The maximum fuel usage for this source shall not exceed 100 million cubic feet of gas per year.
3. Particulate emitted from this source shall not exceed 3.4 pounds per hour.
4. Nitrogen oxides emitted from this source shall not exceed 368.5 pounds per hour.

16-0010-08 PWT Atmospheric Air Dryer

1. Operating time shall not exceed 780 hours per year.
2. Sulfur dioxide emitted from this source shall not exceed 0.5 pounds per hour.
3. Particulate emitted from this source shall not exceed 0.5 pounds per hour.

16-0010-19 Turbine Engine Testing Facility (Bldg. 878)

1. Sulfur dioxide emitted from this source shall not exceed 97.0 pounds per hour.
 2. The sulfur content of the fuel shall not exceed 0.3 percent.
 3. Operating time shall not exceed 2,500 hours per year.
-

APR 03 1992

CERTIFIED MAIL P 878 226 981
Arnold Engineering & Development Center
Page 3

16-0010-30 (4) ASTF Air Heaters

1. The maximum fuel usage for this source shall not exceed 200,000 gallons of jet fuel per year.
2. The sulfur content of the fuel shall not exceed 0.3 percent.
3. Particulate emitted from this source shall not exceed 32.4 pounds per hour.
4. Sulfur dioxide emitted from this source shall not exceed 690.0 pounds per hour.
5. Nitrogen oxides emitted from this source shall not exceed 324.0 pounds per hour.
6. Carbon monoxide emitted from this source shall not exceed 81.0 pounds per hour.

16-0010-31 ASTF Test Cells-NASP Test with Liquid Hydrogen

- ~~1. Operating time shall not exceed 832 hours per year.~~
2. Sulfur dioxide emitted from this source shall not exceed 97.0 pounds per hour.
3. Particulate emitted from this source shall not exceed 12.0 pounds per hour.

16-0010-35 VKF Auxiliary Mass Flow Heater I.

1. Sulfur dioxide emitted from this source shall not exceed 0.5 pounds per hour.
2. Particulate emitted from this source shall not exceed 0.5 pounds per hour.
3. Visible emissions emitted from this source shall not exceed 20 percent or greater opacity as determined by EPA Method 9, as published in the Federal Register, Volume 39, No. 219 on November 12, 1974. (6 Minute Average)

16-0010-41 Process Air Heater Research Cell (Bldg. 878)

1. Operating time shall not exceed 416 hours per year.
2. Sulfur dioxide emitted from this source shall not exceed 0.5 pounds per hour.
3. Particulate emitted from this source shall not exceed 0.5 pounds per hour.

APR 03 1992

CERTIFIED MAIL P 878 226 981
Arnold Engineering & Development Center
Page 4

Your annual emission fee has been recalculated on 1,374 tons per year of regulated pollutants. The adjusted fee is \$4,180.00 based on the recalculation of allowable emissions for your facility. Your adjusted allowable ton per year emission totals are as follows:

PART	VOC	SO2	NOX	CO	MISC	EXEMPT	TPY TOTALS
155	125	282	478	327	5	2	1,374

RECALCULATED ANNUAL EMISSION FEE

$$1374 - (327(\text{CO}) + 2(\text{EX})) = 1045 \times \$4.00 / \text{ton rate} = \$4,180.00$$

The \$4,180.00 adjusted annual emission fee is due March 15, 1992. Please include your company name and reference number (RE), or a copy of this letter with your payment.

In the future, if you wish to increase or change any of the above limitations a construction permit will be required, and your annual emission fee will be reassessed accordingly. All construction permits issued will be subject to any restrictions which apply to new sources at the time.

To signify your agreement to the above limitations, please sign below and return this letter to Vicki L. Lowe, Tennessee Division of Air Pollution Control, Customs House, 701 Broadway, Nashville, TN 37243-1531.

Since we have already received your verbal agreement to the above limitations, the enclosed permit(s) will be valid as of the issue date, provided your signed agreement is received by the Tennessee Division of Air Pollution Control within ten(10) days of its receipt.

APR 03 1992

CERTIFIED MAIL P 878 226 981
Arnold Engineering & Development Center
Page 5

If you have any questions concerning this agreement or your annual emission fee, please contact Vicki L. Lowe at 615-741-3931. Your cooperation in this matter is greatly appreciated.

Sincerely,

Vicki Lowe
for Harold E. Hodges, P.E.
Technical Secretary
Tennessee Air Pollution Control Board

Enclosures

cc: Columbia Field Office

Mr. William M. Dunne hereby agrees to the above limitations, in behalf of Arnold Engineering & Development Center, and represents that he has the necessary corporate authority to enter into such an agreement.

Signature: _____

Title: _____

Date: _____



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMCC)
ARNOLD AIR FORCE BASE, TENNESSEE

RECEIVED

DATE MAY 19 1993
CO. NO. 16-0010-53
I. D. A 1 2 3 4 5 6
B 1 2 3 4 5
CS
OTHER _____

MAY 17 1993

FROM: AEDC CEV
100 Kindel Drive Suite B-314
Arnold AFB TN 37389-2314

SUBJ: Air Quality Construction Permit Request, Emission Source Reference No.
16-0010-53, T9 Test Cell

TO: Tennessee Department of Environment & Conservation
Air Pollution Control Division
ATTN: Joe Aisien
9th Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1531

1. We agree that the total operating time for the referenced facility will not exceed 480 hours per year and the following yearly and hourly emission ceilings will apply:

	<u>Tons/Year</u>	<u>Pounds/Hour</u>
Total Suspended Particulates	0.9	13.3
NO _x	37.8	542
SO ₂	7.5	108
Hydrocarbons	1.5	8.8
Carbon Monoxide	17.8	358

2. Please contact Capt Dan Taylor at (615) 454-6089 or myself at (615) 454-4345 if we can be of further assistance.

William M Dunne
WILLIAM M. DUNNE
Chief, Environmental Mgmt Division
Facilities Directorate



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMC)
ARNOLD AIR STATION, TENNESSEE

16-0010-52
Construction
file

AEDC CEV

100 Kindel Drive, Suite B-314
Arnold Air Station, TN 37389-2314

6 April 1995

Tennessee Department of Environment and Conservation
Attn: Dr Richard Beckwith
Air Pollution Control Division
9th Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1531

05 APR 11 02:53

Dear Dr Beckwith,

We agree to limit the particulate emissions from the operation of the Test Model Combustor (Emission Source #16-0010-52) per your request. The particulate emissions from this source will not exceed the following limits:

- 6.5 lbm/sec for rocket motor testing
- 3.8 lbm/hr for engine testing
- 1 ton/yr for all testing at the source

We appreciate your help in finalizing this permit. If you have additional questions, please call me at (615)-454-7115.

Sincerely,

CLARK BRANDON
Deputy Director
Environmental Management Division
Facilities Directorate

Agreement letter



55 APR 13 410 14

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMC)
ARNOLD AIR STATION, TENNESSEE

AEDC CEV
100 Kindel Drive, Suite B-314
Arnold Air Station, TN 37389-2314

12 April 1995

Tennessee Department of Environment and Conservation
Dr. Richard Beckwith
Air Pollution Control Division
9th Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1531

Dear Dr. Beckwith,

As requested, I am forwarding information regarding AEDC's Turbine Engine Testing Facility, Emission Source Reference No. 16-0010-19. We do not believe that our recently requested modification represents an increase in emissions from this source. Our emissions from this source are in agreement with information submitted to TDEC in 1992 to establish permit fees, based on our potential to emit (see attachments 1 and 2). This same information was discussed with TDEC and used in establishing a new permit emission limit of 97 lb/hr for SO₂ and an annual operating limit of 2500 hours (see attachment 3) in 1992. AEDC's calculations and TDEC's Annual Emission Fee letter are in exact agreement concerning annual operating hours in each engine mode and the maximum SO₂ emission rates. This data was used in preparation for our recently submitted modification.

Prior to 1992, this permit contained no hourly or emission limits (see attachment 4). In addition, our permit applications contained emission estimates which were based upon actual emissions and not upon potential emissions. Prior to 1992, we believe that our 'potential to emit' would be based upon continuous operation (8760 hours per year) and would be substantially higher than the emissions listed in the most recent permit modification application.

We appreciate your help in finalizing this permit. If you have additional questions, please call me at (615) 454-7115.

Sincerely,

A handwritten signature in black ink, appearing to read "Clark Brandon". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

CLARK BRANDON
Deputy Director
Environmental Management Division
Facilities Directorate

Attachments:

1. Potential to Emit Calculations
2. TDEC's Emission Fee Assessment
3. 1992 Operating Permit
4. 1989 Operating Permit

P. 1/4

AEDC Air Permit Emissions + Fee Calcul., 3m, 1/19/92

Source #19 Turbine Engine Test Facility, Bldgs. 878, 880.

- A) Use F100-100 Engine for Emission Calculation Under All Operational Modes.
- B) Use Emission Factors from Document ESL-TR-85-14 "Aircre, Engine Emission Estimator", Table 3. For
- C) For SO_2 Emission Factor, Use 20% of Value for NO_x Emission Factor Given in Table 3. Basis: Table A-13, P. 67 of Reference Doc. Shows $\frac{SO_2}{NO_x}$ Factor of 0.2 for LTO & TGO Cycles for F100-100 engine.
- D) Multiply Fuel Flow Values by Factor of 1.74 to Reflect Maximum Fuel Use Rate of 80,000 $\frac{\text{Pounds}}{\text{Hr.}}$ Basis: $\frac{80,000 \text{ #/hr}}{46000 \text{ #/hr AB Mode F100-100}} = 1.74$
- E) Engine Mode Proportions:
- | | |
|--------------|-----|
| Idle | 40% |
| Approach | 20 |
| Intermediate | 10 |
| Military | 20 |
| Afterburner | 10 |
- F) Annual Ceiling on Air On Hours = 2500 Hrs/yr \equiv Engine Run t.

Continued 

Source # 19 Turbine Engine Test Facility, Bldg. 878, 880

Sample Calculation for NO_x Tons/Yr, Approach Mode.

$$W = N F t e$$

$W = \text{Pounds Pollutants} = P$
 $N = \text{Number of Engine} = 1$
 $F = \text{Fuel Flow} = 3000 \frac{\#}{\text{Hr}} \times 1.74 = 5220 \frac{\#}{\text{Hr}}$
 $t = \text{Time in Mode} = 0.2 (2500 \frac{\text{Hrs}}{\text{Yr}}) = 500 \frac{\text{Hrs}}{\text{Yr}}$
 $e = \text{NO}_x \text{ Emission Factor} = \frac{6.7 \# \text{ NO}_x}{1000 \# \text{ Fuel}}$

$$W = (1)(5220)(500) \left(\frac{6.7}{10^3} \right) \times \frac{\text{Tons}}{2000 \#}$$

$$= 8.7^* \text{ Tons/Year}$$

Engine Mode	Fuel Flow #/Hr	Time in Mode Hrs./Yr.	TSP		SO ₂		NO _x		HC		CO	
			e #/10 ³ # fuel	Tons/Yr	e (0.2)(NO _x)	TPY	e	TPY	e	TPY	e	TPY
Idle	2470	1000	0.12	0.15	0.66	0.81	3.3	4.1	3.2	3.9	24	29.6
Approach	5220	500	0.27	0.35	1.34	1.7	6.7	8.7*	1.9	2.5	5.8	7.6
Intermediate	8890	250	0.47	0.52	1.9	2.1	9.8	10.9	0.1	0.11	1.6	1.8
Military	17950	500	0.34	1.5	5.4	24.0	27	121.0	0.1	0.45	0.9	4.0
A.B	80000	250	0.15	1.5	0.62	6.2	3.1	31.0	0.01	0.1	4.0	40.0
			4 TPY TSP		34.8 TPY SO ₂		175.7 TPY NO _x		7.1 TPY HC		83 TPY CO	

P. 3/4

Source 19 Turbine Engine Test Facility, Bldgs. 878, 880.

Fuel Use Rate: Approach: For fuel flow rates under each engine mode, calculate the emission rate (in pounds per hour). The highest emission rate for the exhaust product and the corresponding fuel flow rate are selected for permit limit calculation. Emission Factors Used Are Same As Before.

Engine Mode	Fuel Flow #/hr	TSP #/hr	SO ₂ #/hr	NO _x #/hr	HC #/hr	CO #/hr
Idle	2470	0.3	1.6	8.1	7.9	59
Approach	5220	1.41	7	34.9	9.9	30
Intermediate	8890	4.2	16.9	87	0.9	14
Military	17950	6.1	97	483	1.8	16
Afterburner	80000	12	50	248	0.8	320

Set Fuel Use Rate At:

- 80,000 Pounds/hr for TSP Calculation
- 17,950 Pounds/hr for SO₂ Calculation
- 17,950 Pounds/hr for NO_x Calculation
- 5,220 Pounds/hr for HC Calculation
- 80,000 Pounds/hr for CO Calculation

Set TSP Emission Rate at $12 \frac{\text{Pounds}}{\text{hr}}$

Set SO₂ Emission Rate at $97 \frac{\text{Pounds}}{\text{hr}}$



P. 4/4

SOURCE 19 Turbine Engine Test Facility, Bldg. 878, 880

PROPOSE

- ① LIMIT OPERATING HOURS TO 2500 HOURS PER YEAR.
- ② LIMIT SO₂ EMISSION RATE TO 97 POUNDS PER HOUR (SAME AS SOURCE 31)
- ③ LIMIT TSP EMISSION RATE TO 12 POUNDS PER HOUR (SAME AS SOURCE)
- ④ MAINTAIN A LOG OF OPERATION HOURS.
- ⑤ TPY FOR FEE ASSESSMENT:

<u>MISC.</u>	<u>TSP</u>	<u>SO₂</u>	<u>NO_x</u>	<u>HC</u>	<u>CO</u>
∅	4	35	176	7	83 ✓



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMC)
ARNOLD AIR FORCE BASE, TENNESSEE

17 Sep 96

AEDC SDE
1100 Kindel Drive
Arnold AFB TN 37389-1806

Mr. Manir Ahmed
Tennessee Department of Environment and Conservation
Air Pollution Control Division
9th Floor, L&C Annex
401 Church Street
Nashville TN 37243-1531

Dear Mr. Ahmed

Please review and approve our request for a Construction/Operating permit for the Arc Heaters (H1, H2 & HR), Emission Reference No. 16-0010-42. We are requesting that the annual operating hours be increased to 27, and the allowable No_x emissions be increased to 20.412 tons/year for this source.

Please contact Mr. Clark Brandon of my staff at (615) 454-7115 for additional information.

Sincerely

Original Signed
CHARLES H. KING
Chief, Environmental Management Division
Support Directorate

Attachments:

1. Permit Application
2. Arc Heater Schematic
3. Existing Permit

AIR
0211012641C



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMC)
ARNOLD AIR FORCE BASE, TENNESSEE

26 May 1999

AEDC/SDE
1100 Kindel Drive
Arnold AFB TN 37389-1806

Mr. Stan Lodi
Tennessee Department of Environment and Conservation
Air Pollution Control Division
9th Floor, L&C Annex
401 Church Street
Nashville TN 37243-1531

Dear Mr. Lodi

Please review and approve our request to modify the annual operating times for the ETF Turbine Engine Test Cells (Emission Source Reference #16-0010-19) and the ASTF Test Cells (Emission Source Reference #16-0010-31) to reflect a combined operating time for both sources. Currently ETF and ASTF are permitted for 2,500 and 1,100 hours per year, respectively, and we request that these two sources be limited to a combined 3,600 hours per year. Combining the operating hours of these two sources do not result in any emission increase, as demonstrated in the attachment.

A timely decision on your part will be greatly appreciated. If you have any questions, please contact Mr. Trung Le at (931) 454-5873.

Sincerely

CHARLES H. KING
Chief, Environmental Mgmt Division
Support Directorate

Atch:
Emission Calculations



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMC)
ARNOLD AIR FORCE BASE, TENNESSEE

2010 JUN 10 PM 12:55

JEP

8 June 2010

704 CES/CEA
100 Kindel Drive, Ste B-305
Arnold AFB TN 37389-2307

Mr. Barry Stephens, P.E.
Technical Secretary
TN Division of Air Pollution Control
9th Floor, L&C Tower
401 Church Street
Nashville TN 37243-1531

Dear Mr. Stephens

Arnold Engineering Development Center (AEDC), Permit No. 546264, requests restriction of sulfur dioxide emissions from the following sources to less than that allowed by Tennessee regulation as indicated below:

1. Sources 02, 03, and 04: Combined sulfur dioxide emissions be limited to 72 pounds per hour
2. Source 7: Sulfur dioxide emissions be limited to 0.2 pounds per hour
3. Source 43: Sulfur dioxide emissions be limited to 0.1 pounds per hour
4. Source 46: Sulfur dioxide emissions be limited to 0.2 pounds per hour
5. Source 71: Sulfur dioxide emissions from the boiler be limited to 72 pounds per hour

If you have any questions concerning this information, please contact Mr. Trung Le at (931) 454-5873.

Sincerely

PAMELA F. KING
Chief, Asset Management Flight
704th Civil Engineering Squadron

cc:
ATA (Mr. J. Holt)



TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
 CUSTOMS HOUSE
 701 BROADWAY
 NASHVILLE, TENNESSEE 37219-5403

CERTIFIED MAIL P 465 405 996
 RETURN RECEIPT REQUESTED

MAY 02 1990

Stephen P. Condon, Colonel USAF
 Commander
 Arnold Engineering Development Center
 Arnold Air Force Base, TN 37389

Re: 16-0010-~~AT~~ 48

Dear Colonel Condon:

Your application for a permit from the Division of Air Pollution Control has been favorably reviewed. The permit is included with this letter.

In order to alleviate the administrative and technical requirements involved in a Prevention of Significant Deterioration review, you may choose to agree to the following limitation(s) concerning your new steam boiler (42 MM Btu/hr) to replace the existing boiler #1 (25.6 MM Btu/hr) at Steam Plant A, Building 1411 pursuant to Rules 1200-3-6-.01(7) and 1200-3-14-.01(3) of the Tennessee Air Pollution Control Regulations:

- a. SO₂ emissions shall not exceed 39 TPY.
- b. NO_x emissions shall not exceed 39 TPY.

This source is also subject to proposed Federal New Source Performance Standards (NSPS) that have not as yet been promulgated. In order for Tennessee Air Pollution Control Division to continue to function as the primary regulator, you may choose to agree to the following limitations and conditions pursuant to rule 1200-3-6-.01(7) and 1200-3-14-.01(3) of the Tennessee Air Pollution Control Regulations:

- a. SO₂ emissions shall not exceed 0.5 lb/MM Btu of heat input (21 lb/hour).
- b. NO_x emission shall not exceed 1.0 lb/MM Btu of heat input (42 lb/hr.)
- c. Visible emissions shall not exceed 20 percent or greater opacity as determined by EPA Method 9, as published in the Federal Register, Volume 39, No. 219 on November 12, 1974. (6 minute average)

Agreement to the above condition(s) will mean that you will need a construction permit if you wish to exceed the limitation(s). The source will also be subject to any restrictions which apply to new sources at the time the new construction permit is issued.

If you have any questions concerning this letter, please contact Manir Ahmed at 615-741-3651.

To signify your agreement, please sign below and return this letter to Manir Ahmed, Air Pollution Control Division, New Source Review Section, Customs House, 701 Broadway, Nashville, Tennessee 37219-5403.

Since we have already received your verbal agreement to the above limitation(s), the enclosed permit will be valid as of the issue date, provided your signed agreement is received by the Tennessee Division of Air Pollution Control within (10) days of its receipt.

RECEIVED
 DATE JUN 07 1990
 CO. NO. _____
 I.D. A 1 2 3 4 5 6
 B 1 2 3 4 5
 CS
 OTHER _____

MAY 02 1990

Stephen P. Condon, Colonel USAF
Page Two

Thank you for your cooperation in this matter.

Very truly yours,

for John W. Walton
Harold E. Hodges, P.E.
Technical Secretary
Tennessee Air Pollution Control Board

HEH/MA/F5020095 APC-7A

cc: Field Office

Warren L. Riles
Stephen P. Condon, Colonel USAF, ^{Vice} Commander hereby agrees to the above
limitation(s), in behalf of Arnold Engineering Development Center.

Signature: *Warren L. Riles*

Title: WARREN L. RILES, Colonel, USAF
Vice Commander

Date: JUN 5 1990



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

2009 SEP 21 AM 10:26

SEP 14 2009

AEDC/CC
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389-1303

Mr. Barry Stephens, P.E.
Technical Secretary
Tennessee Air Pollution Control Division
9th Floor, L&C Annex
401 Church Street
Nashville TN 37243-1531

Dear Mr. Stephens

Arnold Engineering Development Center (AEDC) is planning to install eight Desiccant Drying Units (DDUs) to condition and dehumidify air supplied to test cell facilities. As the DDUs become saturated with moisture, heated air shall be used to regenerate the desiccant beds. Heated air will be obtained by passing ambient air through heat exchangers. A total of sixteen identical natural gas-fired burners (two per DDU) will be used as the energy source for the heat exchangers.

The operating permit application and proposed permit conditions are attached for your review. The proposed changes at this facility meet the criteria for use of minor permit modification procedures and I request that such procedures be used. The modification does not violate any applicable requirement. The change is not a modification under Title I of the Federal Act.

To the best of my knowledge and based on the information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate, and complete.

Sincerely

MICHAEL T. PANARISI, Colonel, USAF
Commander

Attachments:

1. Permit Modification Application
2. Proposed Permit Conditions

Attachment 2
Proposed Permit Conditions
Desiccant Drying Unit Burners

AEDC suggests the following permit conditions for determining compliance certification for operation of the Desiccant Drying Unit Burners.

- E36-1.** The combined total heat input to these sixteen (16) heaters shall not exceed 24 million Btu per hour.
- E36-2.** Natural gas shall be the only fuel used for these heaters.
- E36-3.** The combined total operating time for all sixteen (16) heaters shall not exceed 64,000 hours per State FY (July-June).
- E36-4.** Particulate matter emitted from this source shall not exceed 8.85 pounds per hour.
- E36-5.** Sulfur dioxide emitted from this source shall not exceed 1.0 pounds per hour.
- E36-6.** Nitrogen oxides emitted from this source shall not exceed 5.0 tons per year.



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT CENTER (AFMC)
ARNOLD AIR FORCE BASE, TENNESSEE

6 SEP 2002

AEDC/CV
100 Kindel Drive, Suite A303
Arnold AFB TN 37389-1303

Mr. Eric Flowers
Tennessee Department of Environment and Conservation
Air Pollution Control Division
9th Floor, L&C Annex
401 Church Street
Nashville TN 37243-1531

16-0010

2002 SEP 11 PM 14:22

Dear Mr. Flowers

Arnold Engineering Development Center (AEDC) holds Title V Permit Number 546264. This letter is an application for a minor modification under TN Rule 1200-3-9-.02 (11)(f)4. The requested modifications involve the following sources:

<u>Source</u>	<u>Source Number</u>
Steam Plant A, Boiler #2	16-0010-02
Steam Plant A, Boiler #3	16-0010-03
Steam Plant A, Boiler #4	16-0010-04
ETF Heaters	16-0010-06
ASTF Heaters	16-0010-30

The air pollutant emission rates from many of AEDC's sources are calculated using EPA's AP-42 emission factors. During the time period between when AEDC applied for the Title V permit and when the TDEC issued the permit, EPA made revisions to these published factors. The new factors for natural gas and oil combustion are shown in Tables 1 and 2.

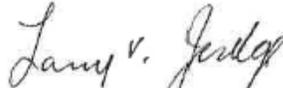
AEDC has identified three (3) Title V permit conditions that require changing as a result of the new factors. TDEC has suggested that these changes can be accommodated in AEDC's Title V permit through a Minor Permit modification. Specifically, AEDC requests that the following permit conditions be changed:

E4-6	Change allowable particulate emission rate from 5.0 lb/hr to 5.5 lb/hr
E6-3	Change allowable particulate emission rate from 3.4 lb/hr to 5.1 lb/hr
E16-5	Change allowable particulate emission rate from 32.4 lb/hr to 47.5 lb/hr

This modification does not violate any applicable requirements. No new applicable requirements will apply as a result of these modifications. AEDC is a major source for PSD purposes.

To the best of my knowledge, and based on the information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate, and complete. Furthermore, the modifications meet the criteria for use of minor permit modification procedures. Therefore, please use the minor permit modification procedures to effect these modifications.

Sincerely

A handwritten signature in cursive script that reads "Larry V. Judge".

LARRY V. JUDGE, CAPT, USN
Vice Commander

Attachment:
Permit Modification Application

cc:
TDEC (Mr. A. Payne) w/o Atchs
AEDC/SDE (Mr. C. King) w/Atchs
ACS (Mr. J. Holt) w/Atchs
SvT (Mr. B. Partin) w/o Atchs



STATE OF TENNESSEE
DEPARTMENT OF PUBLIC HEALTH
CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219
130 9th Avenue, North

May 5, 1982

Mr. Charles R. Smith
Air Force Regional Civil Engineer
Eastern Region
526 Title Building
30 Pryor Street, S.W.
Atlanta, GA 30303

Re: 16-0010

Dear Mr. Smith:

We have received your application for a construction permit dated March 18, 1982. In order to expedite your permit and alleviate the administrative and technical requirements involved in a Prevention of Significant Deterioration review, you may choose to agree to the following limitations concerning your two (2) natural gas heaters pursuant to Rule 1200-3-7-.01(5) of the Tennessee Air Pollution Control Regulations:

- (a.) Limiting the operating time to 3000 hours per year.

Agreement to the above conditions will mean that you will need another construction permit if you wish to exceed these limitations. The source will also be subject to any restrictions which apply to new sources at the time the new construction permit is issued.

If you have any questions concerning this letter, please contact Al Lewis at 615-741-3651.

To signify your agreement, please sign below and return this letter to Al Lewis Air Pollution Control, New Source Review Section, 150 Ninth Avenue North, Nashville, Tennessee 37203

Thank you for your cooperation in this matter.

Very truly yours,

Harold E. Hodges 5/7

Harold E. Hodges
Technical Secretary
Tennessee Air Pollution Control Board

HEH/AJL:bec APC 132

cc: Regional Office

U. S. Air Force hereby agrees to the above limitations.

Signature: *Charles R. Smith*

Title: Regional Civil Engineer

Date: 13 May 1982

TITLE V PERMIT STATEMENT

Facility Name: Arnold Engineering Development Complex (AEDC)

City: Arnold Air Force Base (Tullahoma)

County: Coffee

Date Renewal Application Received: April 22, 2015 and September 13, 2016

Date Application Deemed Complete: September 13, 2016

Emission Source Reference No.: 16-0010

Permit No.: 570221

INTRODUCTION

This narrative is being provided to assist the reader in understanding the content of the attached Title V operating permit. This Title V Permit Statement is written pursuant to Tennessee Air Pollution Control Rule 1200-03-09-.02(11)(f)1.(v). The primary purpose of the Title V operating permit is to consolidate and identify existing state and federal air requirements applicable to *Arnold Engineering Development Complex* and to provide practical methods for assuring compliance with these requirements. The following narrative is designed to accompany the renewal Title V Operating Permit. It initially describes the facility receiving the permit, then the applicable requirements and their significance, and finally the compliance status with those applicable requirements. This narrative is intended only as an adjunct for the reviewer and has no legal standing. Any revisions made to the permit in response to comments received during the public participation process will be described in an addendum to this narrative.

Acronyms

PSD - Prevention of Significant Deterioration
NESHAP - National Emission Standards for Hazardous Air Pollutants
NSPS - New Source Performance Standards
MACT - Maximum Achievable Control Technology
NSR - New Source Review
GHGs - Greenhouse Gasses

I. Identification Information

A. Source Description

AEDC is a military installation with a primary function as a flight simulation test facility. The site consists of numerous propulsion wind tunnels, rocket and turbine engine test cells, and other specialized testing units engaged in the testing and development of aircraft, missiles, aircraft engines, rocket motors, and satellites. The aero propulsion test facilities consist of the Engine Test Facility (ETF, Sources 06 and 19), Aero propulsion Systems Test Facility (ASTF, Sources 30, 31, and 46), and the Sea Level Test Facilities (SL-1, SL-2, and SL-3, Sources 53 and 56). The aerodynamic test facilities consist of the Propulsion Wind Tunnel (PWT, Sources 08 and 52) facility and the Aerodynamic and Propulsion Test Unit (APTU, Source 14). The rocket testing facilities consist of the Liquid and Solid Rocket Engine Test Facilities (Sources 17 and 18, respectively). Hypersonic testing facilities include the ASTF and the Von Karmen Gas Dynamics (VKF, Sources 07, 28, 35, 42, and 50) facility. Other miscellaneous emission sources at the facility are steam plant A (Sources 01, 02, 03, and 04), steam plant C (Source 43), emergency engines (Source 70), and desiccant drying units (Source 72).

B. Facility Classification

1. Attainment or Non-Attainment Area Location

Area is designated as an attainment area for all criteria pollutants.

2. Company is located in a Class II area (this means that the facility is not located within a national park or national wilderness area; see 40 CFR 52.21(e) for complete definition.)

C. Regulatory Status

1. PSD/NSR

This facility is a major source under PSD.

2. Title V Major Source Status by Pollutant (Emission rates following Significant Modification 1)

Pollutant	Is the pollutant emitted?		
		Emissions (tpy)	Major Source?
PM	Yes	176.4	Yes
PM ₁₀	Yes	<i>included in PM</i>	Yes
SO ₂	Yes	390.16	Yes
VOC	Yes	343.7	Yes
NO _x	Yes	1290.3	Yes
CO	Yes	2158.90	Yes
Individual HAP	Yes	>10	Yes
Total HAPs	Yes	>25	Yes
CO ₂ e	Yes	> 100,000	Yes

3. MACT Standards

This facility is a major source for HAPs.

This facility is subject to final MACT Standards: 40 CFR Part 63, Subpart ZZZZ, 40 CFR Part 63, Subpart DDDDD, and 40 CFR Part 61, Subpart I

4. Program Applicability

Are the following programs applicable to the facility?

PSD *yes*

NESHAP *Yes*

NSPS *Yes*

II. Compliance Information

A. Compliance Status

Is the facility currently in compliance with all applicable requirements? *Yes*

Are there any applicable requirements that will become effective during the permit term? *Yes*

III. Other Requirements

A. Emissions Trading

The facility is not involved in an emission trading program.

B. Acid Rain Requirements

This facility is not subject to any requirements in Title IV of the Clean Air Act.

C. Prevention of Accidental Releases

Not applicable

D. Greenhouse Gas Emissions

This facility's potential to emit greenhouse gases is greater than the major source threshold

IV. Public Participation Procedures

Notification of this draft permit was emailed to the following environmental agencies:

1. EPA Region IV
2. State of Alabama
3. State of Georgia
4. Metro Nashville

V. Permit History (First Renewal):

Title V Operating Permit No. 560453 represents the first renewal of the original Title V Permit No. 546264 issued May 9, 2002.

Permit Modification and Changes since last permit: The following changes have occurred under the last Title V Permit No. 560453:

- A. The first Title V Permit Renewal (560453) issued on December 1, 2010.
- B. Administrative Amendment #1, December 1, 2010: Correction of typographical error to the reporting periods in Conditions E2(a) and E2(b).
- C. Minor Modification #1, May 20, 2011: Certain existing emergency engines previously deemed insignificant activities are now subject to the RICE MACT (subpart ZZZZ). This permit action incorporates these engines into the Title V permit. Also, 4 new emergency engines are going to be installed, replacing 4 older emergency engines. These new engines are subject to the CI RICE NSPS (subpart IIII).
- D. Significant Modification #1, October 10, 2011: Some solid rocket test articles at Source 18 will contain radiological materials, and testing of these articles will be subject to 40 CFR 61, Subpart I.
- E. Minor Modification #2, March 9, 2012: Emergency engine was installed at the Commissary, replacing an existing emergency engine. The new engine is subject to the CI RICE NSPS (subpart IIII).
- F. Minor Modification #2, March 9, 2012: Emergency engine was installed at the Dispensary, replacing an existing emergency engine. The new engine is subject to the CI RICE NSPS (subpart IIII).
- G. Minor Modification #2, March 9, 2012: Removed sources 67 and 71 (AC&T Air Stripper and SWMU10 Thermal Treatment Project) as both activities have ceased operation. Also corrected typographical error in Condition E26-4.
- H. Administrative Amendment #2, September 28, 2012: Changed facility name to Arnold Engineering Development Complex, and responsible official to Raymond G. Toth.
- I. Minor Modification #3, October 22, 2012: Emergency engine was removed from the Mark I area.
- J. Minor Modification #4, April 1, 2013: Silane usage was increased (and thereby, allowable PM emissions) at the APTU Test Facility.
- K. Minor Modification #5, April 29, 2013: A hydrogen fluoride emission limit was established for the ETF Test Cells (source 19).
- L. Minor Modification #6, September 9, 2013: Emergency engine to be installed at the Main Gate
- M. Addition of new test rig with isobutane heater and small propane burner (Minor Modification #7, October 14, 2013)
- N. Established a permit limit on operating hours of the VKF auxiliary heater (source 35) to classify the unit as "limited use" under the major source boiler MACT. Also, each source at the facility that is affected by the boiler MACT was identified and noted as such. Opacity matrix decision tree was updated. The permit modification incorporated all previous changes that have occurred at the facility to date (Significant Modification #2, May 20, 2014)
- O. Emergency engine was removed from the Propulsion Wind Tunnel area. (Minor Modification #8, May 20, 2014)
- P. A VOC emission limit was established for the Aerodynamic Propulsion Test Unit (source 14) (Minor Modification #9, May 20, 2014)
- Q. Minor Permit Modification #10 requests the removal of the Aero-Propulsion System Test Facility (ASTF) Air Stripper (16-0010-45) from the permit, in a letter dated December 5, 2014. Conditions E20-1 through E20-4 are being removed. Conditions E1 and E2 are being modified accordingly, to remove references to Conditions E20-1 through E20-4.

VI. Permit History (Second Renewal):

Title V Operating Permit No. 570221 represents the second renewal of the original Title V Permit No. 546264 issued May 9, 2002 and subsequent renewal permit No. 560453 issued December 1, 2010.

Permit Modification and Changes since last permit: The following changes have occurred under the last Title V Permit No. 570221:

- A. The second Title V Permit Renewal (570221) issued on June 22, 2017.
- B. Minor Permit Modification #1 was issued January 28, 2018. In an application dated August 25, 2017, AEDC requested a minor permit modification for the following changes for source 16-0010-07:
 - (1) Replacing four existing heaters (W15, W16, W17, & W18; total heat input 29.6 MMBtu/hr) with two (2) new heaters (Heater #1: 19.1 MMBtu/hr and Heater #2: 12.7 MMBtu/hr; total 31.8 MMBtu/hr).
 - (2) Conditions E7-1(MM1) for design input rate and E7-3(MM1) for TSP emission rate, have been modified to account for the new heaters.
- C. Significant Permit Modification #1 was issued DRAFT. In applications dated April 5, 2019, and July 23, 2019, AEDC requested a significant permit modification for the following changes for source 16-0010-06, 07, 08, and 28:
 - (1) Application of a 10% annual capacity factor limit to each source. This will reclassify these heaters as “limited use” units, which only require tune-ups once every five years according to 40 CFR 63 Subpart DDDDD. The annual emissions for each source are now limited by the new annual capacity factor instead of by agreement letter and fuel usage restrictions. See supporting calculations in item 13.
 - (2) Conditions E6-6, E7-6, and E8-8 have been added to apply the 10% annual capacity factor limit to source 06, 07, and 08.
 - (3) Condition E13-3 was modified to change the 3000 hour operating limit to a more restrictive 10% annual capacity factor. The 3000 hour operating limit was taken for PSD avoidance purposes, therefore if the 10% annual capacity factor is removed the operating hours for this source must remain restricted to no more than 3000 hours per year. The letter agreeing to the operating hour limitation dated May 5, 1982, has been added to Attachment 4 of the permit.
 - (4) Condition E2 was modified to include the new recordkeeping required by E6-6, E7-6, and E8-8, as well as the modified recordkeeping requirement of E13-3.
 - (5) Permit shell conditions were updated.
 - (6) Responsible/Technical/Billing contacts were updated.
 - (7) Compliance with Condition E16-5 was added to the compliance method for E16-3 and E16-4.
 - (8) A reference to the agreement letter dated May 17, 1993, which established the existing emission limits contained in E23-4, E23-5, and E23-6 was added.
 - (9) E1 Fee summary table was updated based on this significant modification and existing permit limits.
 - (10) APC Fee Selection form was added as Attachment 3.
 - (11) Agreement letters were added as Attachment 4.
 - (12) Compliance methods were added to Conditions E6-2, E7-2, E8-2, and E13-3.
 - (13) AP 42 Factors for Natural Gas Combustion

Pollutant	Factor (lb/10 ⁶ ft ³)	Emissions (lb/hr)	Emissions (tpy)	Source
PM	7.6	4.99	2.19	16-0010-06
SO ₂	0.6	0.39	0.17	
PM	7.6	1.54	5.81	16-0010-07*
SO ₂	0.6	0.12	0.46	
PM	7.6	0.38	0.17	16-0010-08
SO ₂	0.6	0.03	0.01	

* This source is made up of 3 heating units, 2 with an annual capacity factor and 1 with no limit

AP 42 Factors for Propane Combustion

Pollutant	Factor (lb/10 ³ gal)	Emissions (lb/hr)	Emissions (tpy)	Source
PM	0.7	0.83	0.36	16-0010-28
SO ₂	0.10(S)	0.02	0.01	