



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Remediation
William R. Snodgrass TN Tower
312 Rosa L. Parks Avenue, 14th Floor
Nashville, Tennessee 37243

November 9, 2016

Mr. Kerry Mattox
Egyptian Lacquer Manufacturing Company
113 Fort Granger Drive
Franklin, TN 37064

RE: Final Corrective Action Plan (FCAP) – Approved with Modifications
Egyptian Lacquer Manufacturing Company (ELMCO)
113 Fort Granger Drive
Franklin, Williamson County, Tennessee
Facility ID# SRS -1035

Dear Mr. Mattox:

The Division of Remediation (TDEC-DoR) reviewed the Final Corrective Action Plan (FCAP), dated September 4, 2015, which was prepared and submitted on behalf of the Egyptian Lacquer Manufacturing Company (ELMCO) by TriAD Environmental Consultants, Inc. (TRIAD). After the submittal and initial review of the FCAP, TDEC-DoR held a public information session on December 15, 2015 at the Franklin Police Headquarters. The purpose of the public information session was to provide an opportunity for the public to review, ask questions and provide comments on the FCAP, including current site conditions and planned future response efforts. Public comments on the proposed FCAP were then accepted through January 11, 2016. After the initial review of public comments, TDEC-DoR coordinated with the Division of Water Resources to collect additional data in Liberty Creek. On March 28, 2016, surface water and seep data were collected. The United States Geological Survey had also previously sampled the Harpeth River for TDEC-DoR to provide an independent verification of any impact the site may have had on the Harpeth River. The additional data were considered in our review of the FCAP, as well as all public comments received by this office. TDEC responses to public comments are available on TDEC-DoR's website at the following link: <https://www.tn.gov/environment/article/rem-egyptian-lacquer-manufacturing-company>.

TDEC-DoR approves the FCAP with modifications to the Proposed Monitoring Program presented in Section 6.2 of the FCAP. In addition, the language of the land use restrictions (LURs) proposed in Section 6.3 of the FCAP will have to be developed and recorded according to TDEC-DoR protocols.

The modifications to the Proposed Monitoring Program discussed below are for the purpose of continuing to demonstrate the remedy can proceed with no unacceptable risk to the public. It should be pointed out that we are approving the vast majority of the FCAP without comment and that we are in full agreement with ELMCO and TriAD's statement on Page 85 of the FCAP that, *"the risks posed by the residual contamination are quite limited."*

Based on the data collected, TDEC-DoR has determined that the chemicals, accidentally released from the facility, pose no unacceptable risk to human health. The data collected do not indicate any unacceptable health risks to children playing in Liberty Creek or residents living on Daniels Drive. Data indicate that the release does not impact drinking water or recreational use of the Harpeth River. Also, no significant ecological risk exists in Liberty Creek. The above ground storage tanks and underground piping associated with the release have been removed and ELMCO changed the process it uses in handling chemicals which eliminates the possibility of a similar release occurring in the future. However, because toluene is still being detected in seeps discharging into Liberty Creek, we agree that monitoring should continue in order to, as stated in Page 86 of the FCAP, *"verify that natural mechanisms continue to attenuate contaminant concentrations in groundwater and surface water."*

FCAP Monitoring Plan modifications:

- As described in the FCAP, during each stream sampling event a sample will be collected from a free-flowing, unsubmerged east bank seep to represent the contaminated groundwater flowing into Liberty Creek. As TriAD has brought to our attention, changes in stream conditions have rendered the former LC-MS sampling location no longer viable and it will therefore no longer be sampled. The seep identified and sampled on December 11, 2015 by the Harpeth River Watershed Association (HRWA) will be sampled instead.
- Prior to planned sampling events, ELMCO's sampling personnel will walk the portion of Liberty Creek from the former Watergate location downstream to the first bend below the Main Seep area (i.e., the stream segment where contaminated seeps have historically been identified) to inspect the stream's east bank. Seeps and stream conditions will be observed and observations recorded. The planned seep sampling location will be confirmed. Locations of any new seeps will be noted. If the planned seep sample location is present as expected it will be sampled. If the seep sample location is not present an alternative seep will be selected from seeps observed (if any) by sampling personnel during the pre-sampling east bank inspection. The selection of this alternative sampling location will be based on basic water quality parameters, observations and professional judgement. If no seeps are present there will be no seep samples collected for that event.
- If a new seep is identified during any pre-sampling east bank inspection with conditions (i.e. olfactory, visual, water parameters) indicating that its discharge may have elevated levels of contaminants, TDEC-DoR will be notified within 48 hours. The determination of the need to sample any newly discovered seeps will be based on surface water data and field observations gathered during planned semi-annual sampling events. If surface water concentrations or load calculations (see below) show a spike in conjunction with a newly discovered seep, TDEC-DoR may require that the new seep be sampled. TDEC-DoR does not intend to have every seep entering Liberty Creek sampled, as surface water data and loading conditions are more representative of overall creek water quality.
- It is recognized that toluene is the main chemical of concern (COC) for the site. However, because the following chemicals have historically been detected either in surface water or groundwater and associated with the ELMCO release, the laboratory analysis of surface water and groundwater samples shall consist of the following chemicals: acetone, toluene, benzene, ethylbenzene, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), n-propylbenzene, 1,2,4-trimethylbenzene, 1,2,3-trimethylbenzene, 1,3,5-trimethylbenzene, xylenes, and isopropylbenzene (cumene).

- Flow data shall be collected in Liberty Creek at a location near the Personnel Crossing using standard methodology for such measurements, as described in the current U.S. Environmental Protection Agency or TDEC guidance. Toluene load calculations shall be submitted based on this data. Flow measurements will be collected concurrently with semi-annual stream sampling events.
- MW-3 will continue to be purged at least monthly and sampled in accordance with the current modified sampling procedures due to its low groundwater yield. The purging will continue until TDEC-DoR determines that continuing such effort is not likely to achieve its original goal of generating MW-3 data more representative of actual groundwater conditions.
- MW-4 and MW-5, while approved to be excluded from the sampling plan, will continue to be visually inspected during all groundwater sampling events and acceptable well conditions noted (e.g., well caps being secure and in working order, the seals not being degraded, and all bolts are in place). If any damage is noted it should be reported to TDEC-DoR and efforts to address the damage should be initiated as soon as possible.

At the end of two years after the first modified monitoring event, TDEC-DoR will evaluate all data collected through the modified monitoring program, and data from the supplemental monitoring described below. The data collected will be used to determine whether the residual risks to human health or the environment warrant continuing or modifying the monitoring efforts.

Supplemental Monitoring:

TDEC-DoR believes that the FCAP with the modifications described above is protective of human health and the environment. However, ELMCO has agreed to conduct other monitoring activities as supplemental monitoring to help address concerns raised by the public.

- In addition to the surface water samples proposed in the FCAP, a surface water sample from Liberty Creek will be collected at the mouth of Liberty Creek prior to entering the Harpeth. This sample will be analyzed in the same manner as other surface water samples. This additional monitoring will be performed semi-annually for the next two years.
- ELMCO will voluntarily add an ambient air monitoring component to the monitoring program to provide additional assurances that this exposure scenario, and the release as a whole, does not represent a threat to human health. For the next two years, ambient breathing zone air will be sampled once a year in the Main Seep area during warm weather (i.e., ambient temps greater than 85 degrees), the sample will be analyzed for toluene, and the results will be reported to TDEC-DoR within 45 days of the sampling event. TDEC-DoR recognizes that ambient air data was included in the FCAP risk assessment and was collected in the area of the main seep during conditions approximating worst-case exposure (i.e., warm summer temperatures that facilitate a greater degree of surface water volatilization). The detected ambient air concentration was well below human-health based screening levels for the inhalation pathway indicating no unacceptable risk to human health.

FCAP Land Use Restriction language:

TDEC-DoR accepts the proposed land use restrictions presented in the FCAP as well as the area to be restricted. Pursuant to TCA 68-212-225, TDEC-DoR has an established protocol for reviewing and approving LURs. TDEC-DoR's current approved template language will be used. The final language will have to be reviewed and approved by TDEC-DoR prior to ELMCO recording it with the county clerk.

In the event that site conditions adversely change while monitoring is occurring, a new remedial action plan may be required.

Please notify this office in advance and prior to conducting any field activities. Send any requests, notifications, reports, and submittals to the TDEC-DoR project manager Justin Meredith at Justin.M.Meredith@tn.gov or 615-532-9304. Also, please contact Mr. Meredith if there are questions or concerns regarding this letter.

The Division of Remediation is committed to the quality of life of citizens of Tennessee and to continue to be stewards of our natural environment.

Sincerely,



Steve Goins, Director
TDEC Division of Remediation

CC: Remediation Site File SRS-1035

DIVISION OF REMEDIATION

Egyptian Lacquer Manufacturing Company (ELMCO) Final Corrective Action Plan Public Comments and TDEC Responses to Comments

Comment #1. The proposed final Corrective Action Plan by Egyptian Lacquer Manufacturing Company to let nature take its course to deal with hazardous chemicals that still contaminate the groundwater on their property and are moving under people's homes and into Liberty Creek where children can easily play is unacceptable. Recent lab results of the seeps at Liberty Creek show that concentrations of hazardous chemicals are still well above EPA risk levels and similar to what they have been since the contamination was first discovered. The state needs to pull everyone together to review what has worked and get a treatment plan in motion as soon as possible. Hazardous chemical warning signs and fencing needs to be installed in the area to warn people to stay away for the contaminated area of Liberty Creek until risk levels that protect health and the environment are met.

Comment 1 was essentially submitted 51 times. A public information session was held on December 15, 2015 at the Franklin Police Headquarters in regard to the ELMCO release, current status and FCAP proposal. Posters were presented at this meeting with several experts in attendance to explain them (see <https://tn.gov/environment/article/rem-egyptian-lacquer-manufacturing-company>). The presented posters can be viewed under the public notice tab. Public comments regarding the FCAP were accepted by TDEC until January 11, 2016.

Data have been collected to evaluate whether the released chemicals pose an unacceptable risk to human health. The data collected do not indicate any unacceptable health risks to children playing in Liberty Creek or residences living on Daniels Drive. Data indicate that the release does not impact drinking water or recreational use of the Harpeth River. Also, no significant ecological risk exists in Liberty Creek.

The amount of toluene entering Liberty Creek surface water has decreased over time and studies demonstrate toluene is biodegrading in the ground at the ELMCO site. Comparison of current conditions to conditions when the release was first discovered is best performed by comparing loads of the pollutant in the creek after the stream is mixed. Loads are calculated by multiplying the concentration of the pollutant in surface water by the stream flow with appropriate unit conversion factors. This helps form an "apples to apples" comparison by normalizing dilution and other variables. Utilizing Division of Water Resources measurements in Liberty Creek on January 31, 2007, a toluene pollutant load of about 55 pounds per day was calculated and on March 28, 2016, a toluene pollutant load of about one (1) pound per day was calculated.

Groundwater data collected from monitoring wells on the ELMCO property also demonstrate that natural attenuation of the released solvent is occurring. For example, as shown in the excerpt of well sampling data for onsite well AR-1, on April 18, 2007 13,000 mg/L of acetone and 560 mg/L of toluene were measured. By March 2010 acetone was no longer detected in AR-1. Likewise, measured toluene concentrations at AR-1 decreased from 560 mg/L in 2007 to 0.125 mg/L in 2016. Values in the table below are in mg/L or parts per million (ppm) moving the decimal to the right three places will give values in µg/L or parts per billion (ppb).

				AR-1					
	4/18/07	2/21/08	3/24/09	3/25/10	3/21/12	3/26/13	3/20/14	3/30/15	3/17/16
Acetone	13,000	960	33.8	<0.50	<0.050	<0.5	<0.25	<1.250	<0.025
Ethylbenzene	<1.0	0.42	1.540	0.921	0.079	0.0433	<0.01	0.353	0.0336
Toluene	560	330	188	28.3	0.442	2.95	0.0899	<0.05	0.125
Xylenes	<3.0	2.0	8.450	3.83	4.39	1.990	2.69	7.3	2.56

TDEC also contracted with the United States Geological Survey (USGS) to evaluate bioattenuation in onsite groundwater. The water samples evaluated by USGS from MW-2 and RW-1 contained xylenes, ethylbenzene, and benzene. No toluene was detected in the water samples evaluated by USGS. The wells evaluated were relatively stagnant with poor hydraulic conductivity. However, it was determined that anaerobic biodegradation was occurring.

MW-3 installed in the deeper shaley Hermitage formation still contains toluene concentrations indicative of free product. Soil in this area is tight and water slowly enters the monitoring well. ELMCO periodically removes product from MW-3 to determine if the concentration of toluene will decrease.

Comment #2. Please require that the Egyptian Lacquer Manufacturing Company's CORRECTIVE ACTION PLAN INCLUDE EPA LEVEL clean up of the toxic and hazardous contamination. Please include in migratory toxic materials and setting target levels to protect the public health and our environment. Looking at the data, the concentration levels of toluene are MOST alarming. Natural attenuation should only apply to minor incidents not at these levels, which are still releasing into ground and surface waters. There should be some DANGER signs present now too. I suspect that the Harpeth River Watershed Association and the experts provided TDEC and ELMCO with some viable options that need to be applied.

TDEC shares your concerns. Monitored Natural Attenuation (MNA) is only being accepted after active remediation has occurred in response to this release. A great deal of work has been

conducted which shows that the chemicals of concern are attenuating through natural processes and that no unacceptable risks to human health or the environment are associated with this release.

Comment #3. Please require corrective Action Plan for Egyptian Lacquer Manufacturing Company, it is unacceptable to parents and users of the creek to let nature takes it course to deal with hazardous chemicals that still contaminate the groundwater on their property. Please clean it up - after 9 years it has not gone away - and that is way to long to let it continue to be a public health hazard.

TDEC has been working with ELMCO to clean up the release of chemicals to the environment. Active remediation that has occurred in response to this release include: an interceptor trench along liberty creek; a dual-phase vapor extraction system; and performance of two separate in-situ remediation events by two different environmental companies.

Please see responses to Comments 4-8 below, immediately following Comment 8.

Comment #4. As a homeowner who lives on the banks of the Cumberland River and uses many of our local rivers for kayaking, I beg you to enforce the law, make companies who are putting our health at risk clean their toxic waste messes up, and stop adding more to it!!! Nashville needs and deserves safe, clean waterways!

Comment #5. Please make Egyptian Lacquer clean up their pollution of Liberty Creek. And let's make sure they don't continue to pollute our environment.

Comment #6. Egyptian Lacquer needs to be held accountable for polluting Liberty Creek. They need to clean up their mess and be monitored to prevent further criminal acts. It is unfathomable to me that that company feels no remorse for creating a dangerous situation. Please make sure Egyptian Lacquer is forced to clean up the pollution they caused.

Comment #7. It is unconscionable that we have such a horrendous contamination issue in our fine city. I urge you to make the Egyptian Co. to pay for the immediate clean up.

Comment #8. The government is formed to represent the taxpayers (people). The State of Tennessee should protect its voters/citizens and MAKE big business (Egyptian Laq.) to clean up after themselves and make them accountable to the STATE and its citizens. Clean up the Harpeth! It is too valuable for us in Williamson County.

ELMCO is under a Consent Order with TDEC and is in compliance with that Consent Order. ELMCO is financially responsible for the clean-up of their release.

The original source of the release was a leaking elbow in underground piping. This source has been eliminated. All piping was excavated and removed or drained and capped in place, and the above ground storage tanks containing the leaked solvents have been removed and are no longer used by

ELMCO. ELMCO's process has changed so the release will not happen again. Various remediation technologies have been applied to this site, including two separate in-situ injection remediation activities and a dual phase vapor extraction event in the release area, and an interceptor trench was used to capture released product before it entered Liberty Creek.

Data have been collected to evaluate whether the released chemicals pose an unacceptable risk to human health. The data collected do not indicate any unacceptable health risks to children playing in Liberty Creek or residences living on Daniels Drive. Data indicate the Harpeth River is currently free of any significant contamination associated with this release. No significant ecological risk exists in Liberty Creek.

The United States Geological Survey (USGS) also sampled the Harpeth River for TDEC on October 9, 2014, to provide independent verification as to whether the former ELMCO release impacts the Harpeth River. The State of Tennessee laboratory analyzed the samples utilizing a method detection limit of 0.0001 mg/L (0.1 µg/L) and a method quantification limit of 0.005 mg/L (5 µg/L). Even though a concentration of 0.00045 mg/L (0.45 µg/L) of toluene was estimated by the laboratory in Liberty Creek surface water where Liberty Creek enters the Harpeth River, toluene from the ELMCO release was not detected in the Harpeth River in the USGS sampling event. The water quality standard for toluene in drinking water is 1.0 mg/L (1,000 µg/L), and the water quality standard for toluene for recreational use is 1.3 mg/L (1,300 µg/L) for surface water classified for both recreation and domestic water supply. No drinking water supplies are impacted by the ELMCO release and the ELMCO release does not impact recreational use of the Harpeth River.

Comment #9. As a long time downtown Franklin resident, I am concerned that hazardous chemicals from Egyptian Lacquer Company continue to seep into in Liberty Creek. I remember the original problem nine years ago and am concerned that there has not been a complete clean up of this dangerous pollution. Franklin is known throughout the country as a very desirable place in which to live, and yet we are not ensuring that one of the most important and basic essentials is clean and safe for our community.

I strongly urge you to reject ELMCO's plan to "let nature" takes its course, and have them clean-up the contamination.

TDEC shares your concern. Extensive environmental investigation and remediation has occurred in response to this release. Monitored Natural Attenuation is only being accepted after active remediation has occurred. Data indicate that no unacceptable risk to human health or the environment is associated with this release. Monitored Natural Attenuation is not a walk away remedy and includes continued monitoring to verify conditions do not change and the remedy remains protective.

Comment #10. Egyptian Lacquer should be required to clean up its mess. The fundamental right of clean water and public health is and has been abused at this facility. Thanks for what you and TDEC do to keep or environment clean and best for 2016 a new year for Clean Water !

ELMCO is under a Consent Order with TDEC and is in compliance with that order.

Please see the response to Comments 11-30 below, immediately following Comment 30.

Comment #11. Its time to completely clean up the Harpeth River and stop waiting on nature to do what should have been done years ago by the Egyptian Lacquer Manufacturing Company (ELCMO) to clean-up the contamination near downtown Franklin. I trust you will do what is right for both the environment and the people.

Comment #12. I am a resident of Kingston Springs, TN. My home is downstream from Franklin and my drinking water comes from the Harpeth River. It is frightening to think that the contamination in Liberty Creek could find it's way into my body. Egyptian Lacquer MUST clean up their mess

Comment #13. It's a shocking reality after all these years that Egyptian Lacquer has failed to address their toxic pollution to the local watershed, a beautiful and vital Tennessee resource. Equally, your department has allowed this noxious poison to continue to pollute and contaminate the local watershed. I understand that government resources are in tight supply and regret that, however the toxins that are entering the local ecosystems can cause serious, grave, and long term damage to the living organisms that come into contact with it. I would strongly urge a prompt assessment of the lack of commitment by apparently both parties to get this situation resolved unless this issue requires over sight from a higher government agency.

Comment #14. We know that Egyptian Lacquer Manufacturing Company has released hazardous chemicals that contaminate the groundwater, which then contaminates Liberty Creek. It is unacceptable for this company to do nothing, as the proposed "Corrective Action" plan does not comply with EPA requirements. The risks to human health remain and must be mitigated.

Please help by requiring ELCMO to meet its obligation to clean up Liberty Creek.

Comment #15. I hope that your organization will reject this plan and take actions needed to clean this up.

Comment #16. If the information I'm receiving is correct, that there are hazardous chemicals contaminating groundwater near Liberty Creek in Franklin, then I urge action take place to correct the situation. Nature is amazing, but as humans continue to create problems in the environment, nature needs help from humans to correct the problems if we don't prevent the problems in the first place. It's imperative that a treatment plan is put into place and the contaminated area be protected until it's safe for people to enjoy.

Comment #17. I am a 31 year resident of Franklin, and a former board member of Harpeth Academy (which became the BGA lower school). I am writing to express my opposition to acceptance of the proposed "do nothing" "solution" to the contamination of Liberty Creek from the Egyptian Lacquer plant. Doing nothing for 8 years has NOT resulted in decreased toxic chemical release! Please make them clean up the source and the results, and STOP the contamination!!!

Comment #18. I am requesting that TDEC require ELMCO to initiate a remediation plan in accordance with what has been proposed by the Harpeth River Watershed Association.

Nearly nine years have passed since ELMCO acknowledged that the toxic chemicals contaminating the air, groundwater, Liberty Creek, and the Harpeth River came from their Franklin plant. Although some improvement has been made, leakage continues and toxic levels still exceed EPA risk standards. ELMCO's plan going forward is insufficient.

The toxicity of ELMCO's current and ongoing contamination of our water supply poses a serious public health risk that must be addressed more aggressively than what their plan proposes. For an example of the terrible public health consequences arising from a bad policy decision affecting public water supply, look no further than what is going on right now in Flint, Michigan. Minimizing these kinds of dangers or simply having faith that everything will be okay often lead to catastrophic results.

Comment #19. I'm writing to support the full and complete cleanup of the Harpeth contamination caused by Egyptian Lacquer. As you are most likely aware, research and full studies have found efforts up to this point insufficient. I live along the Harpeth, downstream of the leak. Along with more than 12 of my neighbors, we regularly canoe, swim and fish in the river. Our dogs and children play side by side in the water. Beyond the need for legal enforcement, I'm asking as your fellow man to require ELMCO to follow the law and finish cleaning the mess they made. "Natural attenuation" has proven to be insufficient. Please keep this river clean and safe for all your neighbors and friends who use it. Thank you taking the time to consider my request. Please reply to me at your next opportunity with your actionable decision.

Comment #20. I have been a Williamson County resident for 45 years, 30 of those years I had the great fortune to live on the river at Old Natchez Trace and Moran Road. I am disturbed at the so-called solution to the Egyptian Lacquer solvent leakage which was agreed on under the table 8 years ago (natural attenuation) I was shocked that anyone would sanction this "plan" and would let the polluters get by with it, especially in a residential / recreational / school area of Franklin. MORE MUST BE DONE. Be aware THERE CAN BE NO COMPROMISE in DEFENSE OF MOTHER EARTH.

Comment #21. I am writing to ask that TDEC Reject the proposal to do nothing about the contamination of the Harpeth River, and require Egyptian Lacquer Manufacturing Company (ELMCO) to clean-up that contamination near downtown Franklin. My family wants a clean and safe river to fish, swim and canoe, and no company has the right to spoil the Harpeth and ruin those wholesome activities for us and for other families in Middle Tennessee.

Comment #22. I realize I am past the deadline for submitting comment, but better late than never. As a frequent paddler to the Harpeth River in Franklin, including the stretch that contains the chemical contamination from ELMCO, I am deeply troubled to hear that TDEC is considering letting nature take its course as a way of dealing with the continued seep. Recent lab results from Liberty Creek seeps show that the concentrations are still too high, hazardous, and above EPA risk levels. TDEC's mission is "to enhance the quality of life for citizens of Tennessee and to be stewards of our natural environment by: Protecting and improving the quality of Tennessee's air, land, and water through a responsible regulatory system;

Protecting and promoting human health and safety; Conserving and promoting natural, cultural and historic resources; Providing a variety of quality outdoor recreational experiences. By doing nothing, TDEC will fail to fulfill all 4 components of its mission. Please uphold your state mandated mission by rejecting Egyptian Lacquer Manufacturing Company's Corrective Action Plan.

Comment #23. To "let nature take its course" in the clean up of a chemical spill of several contaminants including toluene, acetone and benzene, a known carcinogen at high levels seems a very inadequate plan to address such an issue.

Consider this: Hypothetically, when your child has been poisoned, would you also just consider to let "nature take its course" or seek treatment and detoxification?

As humans we need to look at nature not just as part of our responsibility is is "US" in the sense that we are part of it, not above or outside. It is imperative to clean up the messes that have been created immediately, not years later if at all, and certainly prevent messes from occurring to begin with.

To continue the analogy: Would you let your child dump trash all over your house without saying anything and let "nature take its course"?

Please work towards a cleanup and future spill prevention for the sake of the nature we are part of.

Furthermore, to put a company's financial well-being and state and county revenue ahead of nature's well-being is only profitable in the short run as the company continues to provide jobs and tax revenue as stated, for the short term, but eventually a poorly and irresponsibly run company will fail eventually. Business is not exempt from ethical responsibility. It has a responsibility towards the environment they are part of, the land, the water, the air, the community. The long term environmental and health cost to the people and the environment downstream as far as the gulf and beyond are far outstripping the short term gain locally. You may say, that is not your responsibility, but polluting our drinking water, the water that feeds the fruits and vegetables as well as animals we eat will come back to us in the long run in many ways, with treatment cost for ever rising cancer patients being just one of them.

Remember, money can neither be eaten, nor does it bring people back from the dead.

The nature we live in is the asset most worthy of protection and that counts for the whole world, and that world begins in front of your doorsteps.

Please take appropriate action to assure the clean up of the mess created by Egyptian Lacquer and work with them to assure their environmentally responsible operation.

Comment #24. Please, on behalf of all who know the wonders of the river and its tributaries, reject the proposal to do nothing and require Egyptian Lacquer Manufacturing Company (ELCMO) to clean-up the contamination near downtown Franklin

Comment #25. Please reject the proposal to do nothing and please require Egyptian Lacquer Manufacturing Company (ELCMO) to clean-up the contamination of the Harpeth River near downtown Franklin.

Comment #26. The stewardship of Liberty Creek appears to be in your hands. On one side of the coin you have the polluter, Egyptian Lacquer On the other hand you have enforcement. You represent enforcement. To act and do otherwise is would be an injustice to the the community. It is very important that the negligent violations of Egyptian Lacquer own up to their clean-up responsibilities. Otherwise you and the state of Tennessee will be sending the wrong signal all across the board.

And that my friend will make your job of enforcing the law that much harder going forward.

Think about it and do the right thing.

Comment #27. Please, on behalf of all who know the wonders of the river and its tributaries, reject the proposal to do nothing and require Egyptian Lacquer Manufacturing Company (ELCMO) to clean-up the contamination near downtown Franklin

Comment #28. I am a Franklin, TN resident and business owner. My family and I love our local river. Recent lab results of the seeps at Liberty Creek show that concentrations of hazardous chemicals are still well above EPA risk levels and similar to what they have been since the contamination was first discovered. I fish the Harpeth River from a kayak 1-2 days a week. In the summer my wife and children also enjoy paddling and fishing this river. In fact there is canoe access 1/2 mile before the spill and 1/4 after!

Comment #29. It is insane to think that ELMCO is more important than the citizens that live, work and play in this area. How this company is still allowed to operate today is baffling. Please do you part in rejecting ELMCO's proposal to not clean-up the contaminated groundwater. Lab results from HRWA's recent sampling at the main seeps of groundwater into Liberty Creek demonstrate that concentrations of the main hazardous chemical, toluene, remain at high levels that have been consistently found since the beginning. These are well above EPA risk limits to protect public health and the environment. The recent result dramatically undermines ELMCO's main argument that the contamination is dissipating to low levels so no treatment is needed. ELMCO's statement that the existing contamination will be "naturally attenuated within a relatively few years to levels that pose no risk" can not be supported. The same statement was made in the first proposed plan back in 2007 to "let nature take its course." Treatment of the contaminated groundwater by stimulating natural processes is a viable and economical option, according to the recent study by the US Geological Survey that was presented at the public information session. Also, a year of such treatment was performed in 2010-2011 at the ELMCO site as part of a settlement agreement with several neighboring land owners who sued the company in federal court. ELMCO paid for one year of groundwater treatment, but chose to not continue for another year even though data showed it was working.

Comment #30. America's Most Endangered Rivers Association has announced that Tennessee's scenic Harpeth River is listed as one of America's Most Endangered Rivers for 2015.

Harpeth River Watershed Association's recent sampling at the main seeps of groundwater into Liberty Creek found concentrations of the main hazardous chemical, toluene, at levels that have been found for the last 8 years. These are well above EPA risk limits to protect public health and the environment. This data dramatically undermines ELMCO's main argument that the contamination is dissipating to low levels.

Please see that this beautiful natural resource is cleaned and restored.

TDEC is committed to protecting and preserving the quality of life for all citizens of Tennessee, and to continue to be stewards of our natural environment. Protecting public water supplies from a hazardous release of chemicals to the environment is of the utmost importance to TDEC. TDEC disagrees that Monitored Natural Attenuation (MNA) is a “do nothing solution.” MNA is only being accepted after active remediation has occurred and requires ongoing monitoring to verify natural attenuation continues to be effective. In fact, data show a decreasing trend in regard to contamination associated with the ELMCO release. While samples from seeps along Liberty Creek continue to have detected levels of toluene above the drinking water standard, levels in Liberty Creek’s main channel are more representative of actual surface water conditions. Extensive environmental investigation and remediation has occurred in response to this release. Additional data were collected by TDEC on March 28, 2016, that included flow measurements, seep and surface water sampling data. These data are consistent with previously collected data and helped to further evaluate the impact of contaminated seeps along Liberty Creek. Air, soil gas, surface and groundwater sampling have been conducted at this site in the past. Evaluation of data does not indicate any unacceptable health risks to children playing in Liberty Creek or residences living on Daniels Drive. No significant ecological risk exists in Liberty Creek. Data also indicate that at this time, no significant contamination from the ELMCO release is entering the Harpeth River. The United States Geological Survey (USGS) also sampled the Harpeth River for TDEC on October 9, 2014, to provide independent verification as to whether the former ELMCO release impacts the Harpeth River. The State of Tennessee laboratory analyzed the samples utilizing a method detection limit of 0.0001 mg/L (0.1 µg/L) and a method quantification limit of 0.005 mg/L (5 µg/L). Even though a concentration of 0.00045 mg/L (0.45 µg/L) of toluene was estimated by the laboratory in Liberty Creek surface water where Liberty Creek enters the Harpeth River, toluene from the ELMCO release was not detected in the Harpeth River in the USGS sampling event. The water quality standard for toluene in drinking water is 1.0 mg/L (1,000 µg/L), and the water quality standard for toluene for recreational use is 1.3 mg/L (1,300 µg/L) for surface water classified for both recreation and domestic water supply. No drinking water supplies are impacted by the ELMCO release and the ELMCO release does not impact recreational use of the Harpeth River. Furthermore, ELMCO is under a Consent Order with TDEC and has been in compliance with that order. Additional air, surface and groundwater sampling will be required as part of the approved FCAP. This additional monitoring will include triggers to be established by TDEC that if met or exceeded would require ELMCO to submit a remediation work plan.

Comment #31. I appreciate the opportunity to comment on the ELMCO FCAP. The City of Franklin has sanitary sewer infrastructure that is within the plume area, adjacent to Liberty Creek and the Harpeth

River. The City's interests include the ability to operate, maintain and replace the infrastructure as necessary, in a safe manner. The FCAP does not address this need. On behalf of the City of Franklin and its customers, it is necessary to evaluate and establish any protocols necessary to safely perform these operations including excavation, spoils disposal, PPE requirements, inspection, and how any efforts associated with these and other activities that are directly related to the solvent release will be funded by ELMCO. The City requests clarification on how this will be accomplished.

This issue is outside the scope of the FCAP however, TDEC will work cooperatively with the City of Franklin and ELMCO to work through this issue.

Comment #32. I live close to the Harpeth River, a citizen of Williamson County, and I am quite concerned, actually dismayed, that lacquer and pollutants are not only allowable in the water, but that it is also not cleaned up. Will you let me know what is being done to address this and where does the accountability fall?

Remediation of the chemicals released from ELMCO has occurred and data indicate that conditions continue to improve. The accountability is with ELMCO. ELMCO is currently under a Consent Order with TDEC and in compliance with that order. Data have been collected to evaluate whether the released chemicals pose an unacceptable risk to human health. The data collected do not indicate any unacceptable health risks to children playing in Liberty Creek or residences living on Daniels Drive. No drinking water supplies are impacted by the ELMCO release and the ELMCO release does not impact recreational use of the Harpeth River. No significant ecological risk exists in Liberty Creek.

Comment #33. I am a Drug and Alcohol abuse counselor. Toluene is a highly damaging drug to the human body. It is so damaging that no government agency will study its' effects on children because it would be unethical. If you would like documented evidence please go to the NIH website to read more. There is over 135 pages on this chemical alone. My understanding of the initial spill contained at least 9 chemicals, 2 of which are know carcinogens. Please take action to force Egyptian Lacquer to clean up these dangerous chemicals. Children in the area are being exposed to dangerous levels with unknown long term damage being done to their health.

Toluene is a well-studied industrial chemical. According to the Draft ATSDR Toxicological Profile for toluene (September, 2015), it may cause damage to the nervous system and may cause other serious health effects at high concentrations, especially at concentrations expected to result from intentional solvent abuse. In fact, the assessment states that "One very dangerous activity is to expose yourself to a large amount of toluene in a short time by deliberately inhaling/sniffing paint or glue." However, it is important to realize that the concentrations of toluene in the air resulting from the ELMCO release would be expected to be much lower than the concentrations people are exposed to through intentional abuse. The air sampling that has occurred since the release was discovered in 2007 helps confirm this. Additionally, the results of the air samples were used in a human health risk assessment that has assessed potential exposure to children and adults. The risk to adults and children was low and was within acceptable levels as determined by the United

States Environmental Protection Agency and the United States Public Health Services' Agency for Toxic Substance Disease Registry (ATSDR).

Comment #34. I'm regretful that I was unable to attend the public information session that was held in December regarding recent revelations about the ELMCO chemical pollution abatement program. But, I have been in contact with other concerned members of the community and have been reading up on the current situation. I hope this letter reaches you in time to be accepted as useful commentary.

I reside on Daniels Drive in Franklin. Before I purchased my home in 2009, I reviewed reports, spoke with neighbors about regular testing's that were on-going and heard news of results showing improvement that satisfied EPA standards. I, like many others became confident that TDEC had successfully managed to get ELMCO to take responsibility for the negligence that resulted in the environmental damage to our properties, river and city.

I have never witnessed much of the day to day activities in the neighborhood. But, after speaking with some of my retired neighbors on Daniels (who aren't accustomed to using e-mail I must add), I've come to understand that the electric meter that was used to monitor readings at the trench was disconnected years ago and that sample collecting appeared to stop even before that. Of note: The testing well in my front yard is completely inaccessible due to the over-growth of a large planting. I would assume that would have been MW-5 (Daniels Drive), but this may have been one of the abandoned wells mentioned in the latest October report.

It's my understanding that the main chemical seep from ELMCO's tanks were first detected flowing under my property, through the cul-du-sac and towards Liberty Creek south of BGA, spreading wider as they approached the river.

It's very concerning that the latest report shows levels increasing closer to the river south west of the cul-du-sac. My elderly neighbors garden is located at much lower elevations than mine but it seems conceivable that all of our soil could be contaminated, as well as septic systems breached with more immediately volatile results. A couple with small children also live in one of these lower sites.

It's also my understanding that although ELMCO switched to latex products, the tanks containing the chemicals were sealed but not disposed of?

I would hope that ELMCO attempting to re-establish a natural abatement program after failing to perform agreed measures in good faith is not acceptable to TDEC. It also does not seem appropriate for the State to condone ELMCO to use the private property of several resident's as the cost saving leach field for their environmental toxins. I will be more observant and participatory regarding this issue moving forward. If you find me in error please feel free to respond with any information you may have.

ELMCO has taken responsibility for their release and has cooperated with TDEC to stop the cause, investigate the impact, and remediate damage to ensure protection of human health and the environment. The investigation process and the working conceptual site model does indicate that a large cutter fracture runs from the area of the release at the ELMCO property, under Daniels Drive

and out of seeps in Liberty Creek. Any contamination that flows or migrates through this cutter and below any overlying houses is expected to be approximately 30 to 40 feet below the ground surface. Therefore the contamination is not expected to contact any gardens or septic systems that may be in the area, or present a vapor intrusion risk. Air monitoring has occurred in order to determine if toluene vapors are present at concentrations that may represent a health risk. All air monitoring has indicated that no unacceptable risk exists that is associated with this release. However, ELMCO has volunteered to collect an additional air sample as part of the modified approval of the FCAP. For the next two years, ambient breathing zone air will be sampled once a year in the Main Seep area during warm weather (i.e., ambient temps greater than 85 degrees), the sample will be analyzed for toluene, and the results will be reported to TDEC-DoR within 45 days of the sampling event. The data show an overall downward trend in contamination in Liberty Creek. An elevated seep sample was collected by the HRWA and was the first sample collected at that location. This new sampling location will continue to have a sample collected, if viable, as part of the final sampling plan. The high concentration from this relatively small seep is a concern for TDEC. However, dissolved oxygen concentrations as well as the overall toluene load on Liberty Creek calculated from flow measurements and surface water concentrations downstream of the seeps are better indicators of overall contamination trends. The above ground storage tanks that were used to store the chemicals have been removed. The release itself occurred from underground piping which has also been removed or drained and capped. Although they still use toluene and other solvents, ELMCO has changed their process to ensure that a release will not occur in the future.

Technical Comments for Proposed Final Corrective Action Plan – Quarles (January 11, 2016)

Comment #35. The source of contamination that is entering Liberty Creek still has not been defined or properly mitigated to allow consideration of a passive Monitored Natural Attenuation (MNA) approach - or any other “active” remedial approach.

The original source of the release was a leaking elbow in underground piping. This source has been eliminated. All piping was excavated and removed or drained and capped in place and the above ground storage tanks containing the leaked solvents have been removed and are no longer used by ELMCO. Various remediation technologies have been applied to this site, including two separate in-situ injection remediation activities and a dual phase vapor extraction event in the release area, and an interceptor trench was used to capture released product before it entered Liberty Creek. The contamination that is entering Liberty Creek has been monitored since the 2007 release. Light, Non-Aqueous Phase Liquid (LNAPL) has not been seen since the fall of 2008. There is no indication of unacceptable risk to human health associated with the contamination from the ELMCO release. While dissolved concentrations of toluene still enter Liberty Creek through seeps along a relatively short distance of stream bank, concentrations in Liberty Creek downstream of the seep area and before Liberty Creek enters the Harpeth River are considered more representative of overall Liberty Creek contaminant levels. These concentrations are also more representative of concentrations that aquatic organisms would be exposed to on a population level. Surface water

samples from Liberty Creek have shown a downward trend with only slight exceedances of conservative ecological screening values. Dissolved oxygen (DO) levels, which can be negatively affected by the presence of toluene and other volatile organic chemicals, have been acceptable in Liberty Creek at very short distances away from the seeps. The conceptual site model (CSM) being used has been determined by TDEC to be adequate for considering monitored natural attenuation (MNA) as a remedial approach. MNA was not the only selected remediation strategy and is being considered only after the installation and decommission of an interceptor trench and dual phase vapor extraction system.

Comment #36. Although Triad recognized the need to calculate light, non-aqueous phase liquid (LNAPL) mass and to determine where “pockets” of that contamination exists in soil, bedrock, and groundwater, no such off-site investigation has ever been attempted.

Off-site investigation has been conducted and a working conceptual site model has been developed and proposed by Triad that is accepted by TDEC. Well placement has been guided by the CSM and the resulting groundwater monitoring system is capable of detecting higher concentrations associated with this release. Indoor air, outdoor air, and soil gas data, in addition to groundwater and surface water monitoring data, have been collected from areas suspected of having the highest potential contamination levels based on the CSM.

Comment #37. The time of remedial completion for the proposed MNA approach cannot be estimated unless and until accurate contaminant mass is calculated based on real data.

It is difficult to predict with any certitude when MNA will result in complete groundwater/surface water remediation. It is also difficult to calculate the remaining mass that is present as a result of the release. Because there has been no indication of unacceptable human health risk or significant ecological risk, the timeframes for the planned MNA can afford to be flexible and supports its selection as a remedy for the release. The estimated time frame is only one aspect to consider when determining whether MNA is appropriate as a remediation strategy for a site. Additional factors that have been considered include:

- **If contaminants present in soil or groundwater can be effectively remediated by natural attenuation processes.**
- **If the contaminant plume is stable, and the potential for the environmental conditions that influence plume stability to change over time.**
- **If human health, drinking water supplies, other groundwaters, surface waters, ecosystems, sediments, air, or other environmental resources could be adversely impacted as a consequence of selecting MNA as the remediation option.**
- **Current and projected demand for the affected resource over the time period that the remedy will remain in effect.**
- **If the contamination, either by itself or as an accumulation with other nearby sources (on-site or off-site), will exert a long-term detrimental impact on available water**

supplies or other environmental resources. The nature and distribution of sources of contamination and whether these sources have been, or can be, adequately controlled.

- **If the resulting transformation products present a greater risk, due to increased toxicity and/or mobility, than the parent contaminants.**
- **If reliable site-specific mechanisms for implementing institutional controls are available.**
- **Whether MNA is consistent with statutory factors listed in TCA § 68-212-206(d).**

Comment #38. EPA guidance for RCRA and Superfund corrective actions and TDEC rules for corrective actions require that several corrective actions be considered and evaluated before a final corrective measure can be selected. EPA and TDEC rules both require an analysis of all reasonably possible corrective measures that are evaluated side-by-side for such performance characteristics: performance, reliability and control of exposures; time required to begin and meet standards; cost of the remedy; and the ability of the proposed measure to reduce or eliminate, to the maximum extent practicable, further releases of constituents.

Various remediation technologies have been applied to this site including two separate in-situ injection remediation activities and a dual phase vapor extraction event. MNA is being considered as a next step in the remediation process only after active remediation has occurred at the site. Interim measures were set forth by TDEC after the 2008 Corrective Action Plan (CAP). TDEC determined that the interim measures were met prior to submittal of the Final Corrective Action Plan (FCAP). ELMCO has excavated and removed all piping associated with the original release and has removed the ASTs that contained the solvents that leaked, therefore eliminating the possibility of further releases.

Comment #39. Triad concluded in the FCAP that soil beneath the old tank farm on ELMCO property is no longer the primary source of the main contamination that is entering Liberty Creek, yet ELMCO has not yet completed any meaningful investigation to locate light, non-aqueous phase liquid (LNAPL), dissolved phase groundwater, or soil contamination off ELMCO's property.

An interceptor trench was constructed in 2007 along the banks of Liberty Creek that captured LNAPL moving off the ELMCO site under Daniels Drive before it exited into Liberty Creek. A total of nine monitoring wells have been installed and approximately thirty groundwater monitoring events have been conducted. Approximately fifty seep sampling events have been conducted on the Harpeth as well as Liberty Creek. An active soil gas survey has also been conducted on Daniels Drive. All are considered components of a meaningful off-site investigation.

Comment #40. Triad concluded in the FCAP that "isolated pockets of free-product solvent" are the principal source of contamination entering Liberty Creek, and that those pockets exist off the ELMCO property beneath the Daniels Drive residential area.

It is agreed that this was stated in the FCAP. TDEC agrees that it is possible that "isolated pockets of free-product solvent" are the principal source of contamination currently entering Liberty Creek.

Comment #41. The continued presence of constituents in the upstream Watergate sampling location and its location away from the former solvent recovery trench indicate that more than one significant groundwater flow pathway exists and that the interceptor trench may have been under-sized.

Multiple seeps along Liberty Creek are to be expected given the local geology. The solvent recovery trench was constructed to intercept free product where the largest free product seep was observed at the time. It was not designed to reduce dissolved concentrations or to capture free product in other areas. Several seeps may enter Liberty Creek. Concentrations in Liberty Creek downstream of the seep area before Liberty Creek enters the Harpeth River are considered more representative of overall Liberty Creek contaminant levels.

Comment #42. Triad cannot conclude within a reasonably accurate timeframe how long contamination will continue to flow from the ELMCO property and into Liberty Creek or the Harpeth River because the extent and mass of the contamination has never been determined. Triad's conclusion that contamination will be "naturally attenuated within a relatively few years" is not based upon meaningful science and offers no timeline of when human and ecological performance standards will be met.

TDEC requested the United States Geological Survey (USGS) to assist in evaluating biological mechanisms for degradation of released chemicals using groundwater near the release site at the ELMCO facility. The groundwater collected for this analysis contained very little toluene, indicating that the combination of previous remedial actions and natural processes have removed significant toluene from the release area. It has also been demonstrated through surface water and seep sampling that contamination no longer impacts the Harpeth River. There has been no indication that unacceptable risk to human health is present related to the release from the ELMCO facility or that significant ecological risk is present. Still, monitoring will continue until TDEC decides that appropriate remedial goals have been met. Also, when selecting MNA as a remediation strategy, time expected to reach monitoring goals is not the only factor to consider. See also response to Comment 37.

Comment #43. Staff with the United States Geological Survey (USGS) Nashville office concluded that an active system of aerobic bioremediation is a good remedial option to degrade volatile organic compounds in the local groundwater, yet the FCAP did not recommend or seemingly seriously consider that approach.

The USGS study showed that site contamination is being degraded under anaerobic conditions and can be degraded under aerobic conditions. This was not unexpected considering that it is known that toluene can degrade under both conditions.

Comment #44. USGS representatives at the December 15, 2015 public information meeting for the proposed FCAP presented a poster that illustrated that under proper design and implementation protocol, contaminants in the groundwater from ELMCO operations can be actively remediated.

See response to Comment 8. The USGS poster specifically stated: "It was beyond the scope of this project to determine if the bioremediation-enhancing supplements could successfully be injected into the aquifer at this site."

Comment #45. The USGS concluded that enhanced aerobic biodegradation with oxygen-releasing peroxide or Vitamin B supplements enhances the existing, very slow anaerobic biodegradation that is occurring. The anaerobic conditions are most likely due to the existing contaminant load on the groundwater.

The chemicals at this site that are associated with the release would be expected to readily biodegrade under aerobic conditions. The addition of oxygen-releasing compounds could possibly create conditions favorable for aerobic biodegradation. The live control was shown to degrade with a half-life of 23 days while the high hydrogen peroxide solution degraded with a half-life of 4.3 days. The anaerobic conditions within the two wells monitored by the USGS may be indicative of the elevated oxygen consumption in conjunction with the toluene. However, it is also possible that the sections of the aquifer intersected by these wells are naturally anaerobic due to the poor hydraulic connectivity, as indicated by the USGS monitoring in the fall and winter of 2014-2015. The key point is that even though aerobic biodegradation of toluene may be faster than anaerobic biodegradation, at the ELMCO site toluene is being destroyed by natural biological processes in the ground.

Comment #46. The USGS concluded that monitoring wells intercept portions of the aquifer with poor hydraulic conductivity and little, if any, dissolved oxygen is added to the groundwater due to rainfall. As a result, additional oxygen is needed to promote accelerated biodegradation.

The USGS study did show that select monitoring wells intercept portions of the aquifer with poor hydraulic conductivity; and that little, if any, dissolved oxygen is added to the groundwater due to rainfall. However, the USGS study also showed that natural biodegradation is currently occurring at the site under anaerobic conditions.

Comment #47. Bioremediation of the on-site groundwater is possible and much faster with the addition of hydrogen peroxide to chemically oxidize the groundwater. Ironically, solid peroxide was a component of the BIOX injectate that Triad used as a soil remediation strategy – a strategy that was not successful for soil remediation, according to Triad. The results of the USGS study suggest that hydrogen peroxide injection into the groundwater at the site – not the soil - is a reasonably good remedial strategy to consider.

TDEC agrees that the BIOX soil remediation strategy was not successful. This was also a remediation attempt that TDEC did not require. TriAD and ELMCO initiated it on their own in an attempt to further improve site conditions. See also response to Comment 42. The USGS poster specifically stated: “It was beyond the scope of this project to determine if the bioremediation-enhancing supplements could successfully be injected into the aquifer at this site.”

Comment #48. The proposed FCAP assumes that constituent concentrations on and off-ELMCO property are decreasing, when in fact there is evidence to suggest that they are not.

Monitoring data show that concentrations have decreased in most groundwater wells and surface water sampling locations. Dissolved concentrations detected at the seeps have plateaued somewhat, however it has been years since free product was observed to enter Liberty Creek

through a seep. Historical groundwater data demonstrate a clear and meaningful trend of decreasing contaminant mass and/or concentration over time at appropriate monitoring or sampling points.

Comment #49. The proposed FCAP concluded that groundwater constituent concentrations in the tank farm source area are decreasing at such a rate that the risks to human health and ecological receptors are acceptable. This conclusion assumes that the groundwater monitoring system is capable of detecting the highest concentrations – which it is not.

The groundwater monitoring system in combination with Liberty Creek sampling is considered adequate for the site. The concentration trends continue to decrease for sampling locations in Liberty Creek which indicate that risks associated with the release are decreasing as well.

Comment #50. The proposed FCAP also concluded that the groundwater constituent concentrations that discharge as seeps into Liberty Creek are decreasing at such a rate that the risks to human health and ecological receptors are acceptable. This assumption relies on Triad sampling data that is no longer being collected quarterly to show seasonal variability (now semi-annual).

See response to Comment 49 regarding human health and ecological risk. Regarding the Triad sampling schedule, the sampling is currently being performed on a semi-annual basis as approved by TDEC, and was justified based on the downward trends shown in the sampling data. TDEC also worked with the United States Geological Survey (USGS) to collect representative Harpeth River and Liberty Creek samples during low flow conditions when there would be the least dilution with clean water. The purpose of this sampling was to identify and sample what should be worst case conditions in the Harpeth River. No ELMCO related pollution was measured in the Harpeth River. The TDEC Division of Water Resources also provided independent verification of Liberty Creek and results have been consistent with past sampling events conducted by TriAD.

Comment #51. Samples collected by HRWA staff at the Main Seep at Liberty Creek by HRWA on December 11, 2015 demonstrates that Triad's most recent results grossly under-report the actual groundwater contamination. Two samples collected of the Main Seep prior to entering Liberty Creek resulted in 173 and 179 mg/L toluene. As a comparison, the most recent two quarters reported by Triad in the FCAP (January and March 2015) were 34.70 and 23.60 mg/L respectively. The HRWA-collected results are comparable to the concentrations reported by Triad in 2008. As a result, there is ample evidence that constituent concentrations are not declining, as concluded by Triad.

Several seeps may enter Liberty Creek. However, it is TDEC's opinion that seep samples are not representative of overall Liberty Creek water quality. Concentrations in Liberty Creek continue to show a decreasing trend. The concentration levels associated with both seeps and surface water in Liberty Creek will continue to be monitored as part of the proposed FCAP. HRWA seep sampling data concentrations are a concern. The sample taken by HRWA was the first seep sample taken at that location. This new seep location will continue to be monitored as part of monitoring outlined

in response to Comment 50. When comparing releases to Liberty Creek over time, loads not concentrations should be considered. Load is calculated by multiplying contaminant concentration by stream flow and applying appropriate unit conversion factors. This allows calculation of pounds per day of contaminants released to Liberty Creek. Where we do not have load measurements in 2008, TDEC Division of Water Resources measured 55 pounds per day of toluene on January 31, 2007 and 1.1 pounds per day of toluene on March 28, 2016. This demonstrates releases to Liberty Creek have decreased over time. Load calculations will continue to be done as part of the modifications in approving the FCAP.

Comment #52. Given the on-site well placement outside of the main contaminant pathway and the fact that there are no hydraulically downgradient wells off-site between the ELMCO site and Liberty Creek seeps, there is adequate reason to believe that substantial contamination has simply moved laterally towards Daniels Drive and / or is present on the ELMCO property in such a manner that is not detectable by the groundwater monitoring system.

RW-1 is an on-site well placed directly in what has been determined to be the main contaminant pathway. The main seep in Liberty Creek is a downgradient monitoring point that showed extensive amounts of free product after the release was discovered. Free product has not been observed entering Liberty Creek since the fall of 2008 but seep samples still exhibit dissolved concentrations of toluene.

Comment #53. The Solvent Constituent Distribution and Potentiometric Map (Figures 9 and 10 in the FCAP) prepared by Triad fails to consider that the main contaminant plume may have simply migrated westward between the on-site source area and Liberty Creek.

The plume map is based on actual collected data and how the plume has moved throughout time. The data show that the contamination has migrated to the west. Free phase product was collected by an interceptor trench along Liberty Creek, until it was approved by TDEC to be closed in 2011 (after conversion to a subsurface solvent recovery system in 2008).

Comment #54. Triad's use of high pressure air and water injections in the on-site tank farm area during early investigations could reasonably be expected to have pushed LNAPL and dissolved-phase contaminants into deeper portions of the bedrock and laterally from the on-site source area. Triad used high-pressure air rotary drilling methods to drill all groundwater monitoring wells. Further, Triad's drilling of well RW-1 resulted in the loss of 600 gallons of potable water into the formation. Also, Triad injected 3,249 gallons of high-pressure BIOX treatment liquids into the soil in the source area. Lastly, dye tracing would have also injected undetermined amounts of water. Any or all of those high-pressure injections could have pushed contamination from its origin.

Water is often needed during drilling and TDEC does not believe that the use of water in this situation was irregular. It is highly unlikely that the drilling fluids used (600 gallons) would be sufficient to "push" free product or dissolved contamination to areas that it would not have otherwise reached due to natural processes. The BIOX treatments were applied to soil from areas

of lower contamination to higher contamination, in an attempt corral the contamination. The negligible amount of water added to the aquifer as a result of a dye study would not be expected to have a significant effect on groundwater conditions. RW-1 was also properly developed after the installation was complete and prior to sampling.

Comment #55. Off-site soil borings advanced in January 2009 near Daniels Drive – borings that were installed for a vapor intrusion breathing hazard study and not to define soil or groundwater conditions per se – demonstrated that significant off-site migration of contamination had in fact already occurred. Triad concluded in the proposed FCAP that “the presence of solvent-impacted soil in the cutter encountered at the deepest of these borings demonstrated that the cutter, or a set of multiple, interconnected cutters, was providing a pathway for solvent migration under Daniels Drive along a zone extending from the soil source area at EMLCO to the seeps along Liberty Creek.”

The purpose of the top of rock study borings was to determine the presence of the cutter below Daniels drive, which was located. This provided evidence for the conceptual site model. These activities were conducted in accordance with a work plan approved by TDEC. This area is underlain by limestone bedrock. In areas with limestone bedrock, water and contamination, if present, can move along the top of bedrock, through fractures or breaks in the limestone, and/or along horizontal planes between layers of limestone. Fractures or breaks and horizontal planes are not uniform and may contain clay or other material that may temporarily trap contaminants. Water and contaminants moving along these possible pathways may eventually enter surface water in seeps or springs.

Comment #56. One soil boring (BP-8) advanced at Daniels Drive exhibited solvent contamination for the last 5 feet of the boring, and the saturated soil conditions of that zone were indicative of groundwater. Triad concluded that the boring was located within a preferential bedrock cutter flow pathway. Although collecting a groundwater sample was possible with Geoprobe technology that Triad used, Triad apparently chose to not collect such a sample. The soil sample however, exhibited substantial contamination: Acetone 85.2 mg/kg; Benzene 0.00713 mg/kg; and toluene 282 mg/kg, as examples.

TriAD was following the protocols outlined in the TDEC approved work plan. The deep soil contamination associated with this sample was expected and supports the CSM. The sample was taken in what was identified as the main cutter fracture, which LNAPL had flowed through, and exited at the main seep in Liberty Creek. Groundwater contamination under Daniels Drive is known to exist as verified by seeps in Liberty Creek and the conceptual site model and has never been disputed.

Comment #57. The proposed groundwater monitoring system continues to rely on a system that is incapable of detecting the highest concentrations; constituents that are perhaps the most toxic at the lowest concentrations; or the concentrations that are migrating towards Liberty Creek and the Harpeth River. Remedial alternatives cannot possibly be considered until an adequate monitoring system is installed on and off-ELMCO property.

The monitoring system has been effective in showing that concentrations have decreased over time in groundwater and surface water and free product no longer is entering Liberty Creek. It has demonstrated that there is no contamination of concern entering the Harpeth River. Indoor air, outdoor air and soil gas data indicate that there is no unacceptable risk to human health related to this release. Continued monitoring of Liberty Creek seeps and surface water is part of the proposed FCAP.

Comment #58. Other than one well (RW-1), the groundwater monitoring system is incapable of detecting LNAPL and the highest concentrations of dissolved-phase constituents due to the depth of the screened intervals into the Hermitage Limestone formation (a shaley-limestone) and the wells not being located within weathered Bigby Cannon bedrock joint / cutters.

LNAPL has been detected at AR-1, MW-3, and at the main seep associated with Liberty Creek. The wells were installed by a licensed TN well driller with oversight by a licensed TN geologist. Based on a review of the field notes, it appears the bedrock aquifer is semi-confined, allowing the water level to rise in a well once the water producing zones are intersected. It can be expected in this situation that the deeper Hermitage Limestone is the water producing zone.

Comment #59. Although the Geoprobe investigation in the on-site source area demonstrated widespread groundwater that was present in the soil at the top of bedrock and within depressions of the Bigby Cannon limestone bedrock surface, Triad instead installed a groundwater monitoring system that included wells that are screened in the deeper shaley Hermitage Formation. Saturated soil and groundwater was found in 10 of the 20 direct-push Geoprobe soil borings (See August 28, 2007 CAP, Attachment 5, Geoprobe Boring Logs). As such, a top-of-bedrock and soil interface groundwater monitoring system was possible and should have been installed.

There are a total of 38 boring locations at the site. Water was encountered at the top of rock in 12 of those soil borings. Of the 12 borings that encountered water, 7 were in or around the cutter fracture which is consistent with the deeper borings. See also response to Comment 58.

Comment #60. Triad has concluded that the groundwater monitoring wells that are primarily screened in the deeper, shaley Hermitage Formation produce little groundwater, yet dye tracing from the tank farm source area demonstrated rapid (600 feet per day) groundwater velocities. As such, the monitoring system is missing the transmissive, highly conductive groundwater flow pathways.

The dye trace used RW-1 for the trace. RW-1 is screened in the zone that is the identified area where the contamination has moved from the release at ELMCO through the highly conductive groundwater flow pathways leading to the seeps at Liberty Creek. This has been part of the active working conceptual site model for the site. Monitoring is being conducted, and will continue to be conducted at monitoring wells and seeps and surface water in Liberty Creek. See also response to Comment 58.

Comment #61. Past samples for groundwater, surface water, and soil have been unable to accurately report benzene, as an example, because the high dilution factors used by the laboratory. The high dilution factors were due to the significant concentrations of other constituents (e.g. toluene and acetone). A “non-detect” or “less than” value reported by Triad can be misleading and can understate actual human and ecological risks, when the dilution factors raise minimum detection limits higher than harmful regulatory standards.

Dilution factors in laboratory analyses occur and are always something to consider and be aware of. Not all samples have had a dilution factor applied during analysis. For example, AR-1 had 11 out of 30 samples analyzed and reported without laboratory dilutions, and the main seep has had 21 out of 50 sampling results without a reported laboratory dilution. In general, “non-detect” or “less than” values are not considered misleading to TDEC employees involved with this site.

Comment #62. Other analytical methods were available that would have accurately reported concentrations of all constituents. For example, soil sampling data reported by Triad during the January 2009 Geoprobe investigation at Daniels Drive used a different extraction method (Method 5035), that enabled detection limits “lower than those typically obtained on samples from the source area, where the 5035 extraction has not been used.” According to Triad, the method used for samples in the on-site ELMCO area “may have prevented” constituent identification because of high concentrations of acetone and toluene. Triad attributed their selection of the enhanced, lower detection limit methods for the single Daniels Drive sample to the “different data quality objectives for the two areas.” Had the more enhanced method with lower detection limits been used, other constituents – such as the human carcinogen benzene – would have likely been more defined.

Method 5035 is only for soil. The soil data collected on-site and analyzed by the lab using other methods still exhibited low enough detection limits for soil risk assessment calculations.

Comment #63. Triad’s conclusion that the contaminant plume has “decreased significantly” since the first year of the investigation ignores the fact that 1.) The highest concentrations may have simply migrated beyond the source area wells and towards the Daniels Drive residential area, and 2.) The well screens for wells other than RW-1 are submerged below what is expected to be the highest concentrations and outside of the migration pathways.

Higher concentrations have migrated beyond the source area wells. Data from monitoring wells and seep locations have shown this to be the case. MW-3 is screened in the deeper/tighter Hermitage formation and has consistently had the highest concentrations of Toluene. In fact, AR-1 and MW-3 have both intercepted LNAPL in the past.

Comment #64. Triad’s request to eliminate some wells from the future monitoring program (MW-4 and MW-5) should be rejected, given that the nature and extent of the contamination still have not yet been defined.

MW-4 has never shown measured concentrations in groundwater above the regulatory level of concern for drinking water. On 6/3/2008, MW-4 had a detection of toluene at 0.022 mg/L, and it has

been below detection limits ever since. MW-5 has been below detection limits since 12/21/2010. The laboratory detection limit has consistently been 0.001 mg/L for Toluene in these wells. The FCAP proposes to maintain these wells in case conditions change that warrant their sampling.

As part of maintaining these wells TDEC will require that:

- Any damage will be reported to TDEC and efforts to address the damage will be enacted as soon as possible.
- The wells will be visually inspected during sampling events. Things to check will include (but will not necessarily be limited to): the well caps being secured and in working order, the seals not being degraded, all bolts are in place, and the overall condition of the well.

Comment #65. Triad's request to only test seep and surface water samples for toluene should be rejected because numerous other constituents have been detected in the water.

TDEC agrees. The seep and surface water samples will continue to be monitored for constituents monitored for in the past using EPA Method 8260B.

Comment #66. The FCAP did not include meaningful, future remedial options other than MNA and was not based upon any detailed technical remedial alternatives analysis, other than providing information on previous attempts for corrective measures.

Typically a corrective action plan would provide several remedial strategies along with the cost effectiveness of each strategy. However, this site has already undergone several different active remediation efforts. Data from these events are presented in various sections of the FCAP. These real attempts at remediation provide extensive data on the effectiveness of the various methods that were attempted. The different remediation efforts are discussed in the FCAP and many reports involving these events have been submitted to TDEC prior to FCAP submittal. Interim measures were also outlined and prescribed by TDEC after the submittal of the 2008 CAP. These measures have been determined to be met by TDEC. MNA is only being accepted as a remediation strategy after active remediation has taken place on the site. In the event that site conditions adversely change while monitoring is occurring, a new remedial action plan may be required.

Comment #67. Triad's argument that additional active remedial actions would be "technically difficult", "costly", "disruptive", and would be "fraught with difficulty and expense" does not meet core EPA requirements for corrective action consideration. The EPA requires that a final remedy achieve all three (3) performance standards:

1. Protect human health and the environment.
2. Achieves media cleanup objectives and includes media cleanup levels (chemical concentrations), points of compliance, and remediation time frames (time to implement the remedy and achieve cleanup levels at the point of compliance).

3. Remediate the sources of releases so as to eliminate or reduce further releases. "Sources" includes both the location of the original release and also where significant mass of contaminants may have migrated away from the original source area.

There is no indication that there is unacceptable human health risk or significant ecological risk associated with the ELMCO release. The source in this case, contributing to the contaminated groundwater entering Liberty Creek through seeps, has been shown to have a decreasing trend through time. The concentration levels in Liberty Creek will continue to be monitored as part of this FCAP.

Comment #68. Triad's recommendation that MNA be selected as the "final" corrective action seems to be based on what remediation techniques that have been employed in the field but were not successful – rather than implementing techniques that laboratory-scale studies demonstrated would work.

See answer to Comment 66.

Comment #69. Triad injected 3,249 gallons of the BIOX liquid treatment reagent into the soil in the source area not into the groundwater. Although it was implemented to chemically oxidize the soil contaminants (with solid peroxide) and to stimulate biodegradation (with dissolved nutrients) in soil, Triad concluded that the effort "was not successful in achieving significant reductions in source-area contaminant concentrations." One would not expect solid chemical oxidant to be transported in the soil beyond the immediate vicinity of the well, or that such a strategy would even be a viable soil remediation measure. The USGS demonstrated that the strategy should work for ELMCO-specific groundwater.

TriAD did inject 3,249 gallons of BIOX. The USGS poster specifically stated: "It was beyond the scope of this project to determine if the bioremediation-enhancing supplements could successfully be injected into the aquifer at this site."

Comment #70. Aquaeter's bio-stimulation activities – which were performed as a result of a Federal lawsuit against ELMCO by neighboring property owners - reportedly reduced constituent concentrations in source area wells; however, ELMCO chose to terminate that remedial action after only one year of operation.

TDEC will refrain from comment on a 3rd party lawsuit.

Comment #71. Dual-phase vacuum extraction efforts apparently had some success removing soil vapors and contaminated groundwater - but attempts to extract LNAPL from wells AR-1, RW-1, and MW-3 led Triad to conclude that the LNAPL was not present in those areas. Given the well construction specifics, no such conclusion should have been made. If the intention is to remove large volumes of contaminated groundwater, LNAPL, and soil vapor, such extraction wells need to be properly constructed like well RW-1 across the soil / bedrock interface and in deeper-lying bedrock areas.

AR-1 and MW-3 have exhibited historic LNAPL. Vacuum extraction was conducted on all three wells. Eleven extraction wells were installed (labeled EV) in the location, with six across the soil/bedrock interface.

Comment #72. Triad concluded in the FCAP that the dual-phase extraction remedial program inaccurately calculated the mass of contaminants that were actually removed, and that the “actual mass removal cannot be accurately calculated.”

ECOVAC estimated mass removal was between 19,413 pounds and 38,826 pounds, or 2,813 to 5,627 equivalent gallons.

Comment #73. The FCAP considered no new active corrective measures to eliminate or reduce further releases of contaminants to the groundwater and surface water that were based upon lessons learned from past remedial attempts.

See response to Comment 66.

Comment #74. The proposed FCAP provided no time estimate for contaminant concentrations to achieve cleanup levels anywhere - on or off the ELMCO site.

See response to Comment 37.

Comment #75. Dye traces performed by Triad or Aquaeter demonstrated rapid groundwater flow where dye was injected into limestone migration pathways. Finding those pathways and using those locations to inject bio-stimulants presents an opportunity to achieve widespread treatability – yet the approach for bio-stimulation was based primarily on slow drip system into wells or high pressure injection into clayey soils above the bedrock migration pathway. A more logical approach would have been to locate the highly transmissive groundwater flow pathways, perform dual-phase extraction of those zones, and to inject treatment chemicals into those transmissive groundwater zones.

Dual phase extraction was performed on those weathered limestone migration pathways via eleven EV wells installed at the site, as well as RW-1. Aquaeter also injected directly into a well that was located in the main cutter fracture, the same well that was utilized for the dye trace study (RW-1). It took approximately 31 hours for the dye to travel from the well, along the cutter fracture, and out of the main seep in the Liberty creek.

Comment #76. The FCAP and the supporting investigative actions do not meet the Rules established by the Division of Remediation.

Considering the current status of the site and Liberty Creek, the FCAP as approved by the Division of Remediation will be consistent with TCA § 68-212-206(d).

Comment #77. According to Steve Goins, Director of the Division of Remediation, rules that establish the investigative and corrective action performance standards for releases of hazardous constituents to the environment are listed in Chapter 0400-15-01, Hazardous Substances Remedial Action.

This is correct.

Comment #78. The nature and extent of the contamination – as required by the Rules - has not been fully determined in order to meet the investigative data objectives or to design a corrective action. As a result, ELMCO is unable to provide a reasonably accurate estimate of the time needed to meet soil, groundwater, and surface water criteria – as required by the Rules.

See response to Comments 37 and 66.

Comment #79. The proposed FCAP is not stamped by a registered Professional Engineer (P.E.) in the State of Tennessee, as required in the Rules. In fact, the only licensed professional that is certifying the FCAP is a Professional Geologist (P.G.), and that certification specifically excludes (on the report certification page) any responsibility for the accuracy and conclusions associated with the solvent capture trench at Liberty Creek, the dual-phase vacuum extraction remedial activities, the air monitoring for human exposure,

ELMCO is under a Consent Order and a P.E. stamp is not required for the FCAP submitted.

Comment #80. The human and ecological risk assessments used to support the proposed MNA corrective measure are substantially flawed and should be rejected.

TDEC disagrees. See responses to Comments 81 – 88 below.

Comment #81. Triad concluded in the FCAP that Liberty Creek is a “poor-quality urban stream”, as an apparent justification to allow ELMCO contaminants to flow into the creek for the foreseeable future. Triad offered no explanation of why Liberty Creek is considered to be “poor quality”, other than describing contamination that is entering the creek from ELMCO and the toxic effects of that waste on the creek.

Liberty creek is on the 303(d) listing for the following reasons: Toluene, low dissolved oxygen, loss of biological integrity due to siltation, and alteration of stream-side or littoral vegetative cover. Loss of biological integrity due to siltation, and alteration of stream-side or littoral vegetative cover are indicators of poor quality streams unrelated to the ELMCO release. Low dissolved oxygen may or may not be related to the release.

Comment #82. Triad concluded in their evaluation of 2008 and 2012 data that “elevated levels” of ELMCO solvents exist in approximately 600 feet of Liberty Creek prior to entering the Harpeth River; low dissolved oxygen levels create eutrophic conditions; and acute and chronic toxicities for acetone and / or toluene were present.

Current data show contaminants entering Liberty Creek are not making it to the Harpeth River. The above-mentioned language used in the FCAP was in the context of conditions that occurred in the past. DO readings conducted in Liberty Creek have more recently shown acceptable or expected low conditions.

Comment #83. The Human Health Risk Assessment (HHRA) and the Ecological Risk Assessment (ERA) performed by Secaps to support the MNA corrective action used outdated regulatory standards and poor quality analytical data in its evaluation of risks. As such, neither assessment can be relied upon to determine relative levels of harm. Secaps used water quality criteria from 2006 to support the ecological risk assessment in the proposed FCAP (2015). The risk assessments should have instead used the most current EPA Region 4 standards (2015) to determine risks. The ecological benchmarks used by Secaps were much greater than what current EPA standards allow. See examples below:

Ecological Risk Assessment Constituent	Secaps Risk Assessment		EPA Region 4 2015		LC-MS	LC-PC	LC Watergate
	Chronic (mg/L)	Acute (mg/L)	Chronic (mg/L)	Acute (mg/L)	March 2015	March 2015	March 2015
1, 2, 4-Trimethylbenzene	0.017	0.31	0.015	0.140	<0.05	<0.005	<0.002
1, 3, 5-Trimethylbenzene	0.045	0.81	0.026	0.230	<0.05	<0.005	<0.002
Acetone	1.7	30	1.7	15	<1.25	<0.125	<0.05
Benzene	0.053	0.53	0.160	0.700	<0.05	<0.005	<0.002
Ethylbenzene	0.453	4.53	0.061	0.550	<0.05	<0.005	<0.002
Toluene	0.175	1.75	0.062	0.560	23.60	0.566	0.233
Xylenes	0.041	0.73	0.027	0.240	<0.25	<0.0150	<0.01

TDEC does not see any basis for the statement that Secaps used poor quality analytical data for its evaluation of risks. Regarding ecological standards or benchmarks, Secaps finalized the initial risk assessment in June 2008 and incorporated the USEPA Region 4 ecological benchmarks available for toluene at that time. USEPA Region 4 updated their ecological benchmark tables in 2015 and the value for toluene decreased from 175 ug/L to 62 ug/L for a chronic freshwater screening value. The conclusions of the 2008 risk assessment have not been invalidated by USEPA Region 4 revising their ecological surface water screening value for toluene. Regarding the detection limits that are above particular screening levels and noted in the table below submitted as part of Comment 42, this is not an uncommon occurrence when dealing with screening levels in the ppb range.

Comment #84. When the most recently reported data (March 2015) that was included in the FCAP are compared to the appropriate EPA Region 4 (2015) ecological standards, both chronic and acute ecological exposures continue for toluene and are exceeded in the Personnel Crossing (LC-PC) and Main Seep (LC-MS) locations for Liberty Creek.

When March 2013 LC-PC and LC-MS data for toluene were compared to Region 4 ecological screening levels, both the acute and chronic screening levels were exceeded. Region 4 ecological screening levels are not standards. The purpose of these screening levels is to allow for rapid determination as to whether there is no or negligible ecological risk, or to identify which contaminants and exposure pathways require further evaluation. Liberty Creek seeps and surface water will continue to be monitored as part of on-going site monitoring.

Comment #85. The most recent March 2015 sample results also illustrate that the analytical method detection limits are too high to determine risks for relevant constituents, due to the extremely high concentrations of other contaminants and the Triad-selected laboratory using variable dilution factors (resulting in high "<" values; see table above as an example). Note that the report limits are sometimes higher than the protective standard itself.

See response to Comment 61.

Comment #86. A summary of the highest detection limits and reported values for the January through May 2008 reporting period used by Secaps, compared to combined human risk (Maximum Contaminant Levels (MCLs) and Regional Screening Levels (RSLs)) and ecological standards, is included as follows:

Ecological and Human Risk Assessments Constituent	EPA MCLs or RSLs		EPA Region 4 2015 (ecological)		LC-MS	LC-PC
	MCL (mg/L)	RSL ⁶ (mg/L)	Chronic (mg/L)	Acute (mg/L)	Jan-May 2008	Jan-May 2008
1, 2, 4-Trimethylbenzene	-	0.015	0.015	0.140	<0.25	<0.05
1, 3, 5-Trimethylbenzene	-	0.12	0.026	0.230	<0.25	<0.05
Acetone	-	14	1.7	15	120	8.8
Benzene	0.005	0.0045	0.160	0.700	<0.25	<0.05
Ethylbenzene	0.7	0.0015	0.061	0.550	<0.25	0.0019
Toluene	1.0	1.1	0.062	0.560	100	8.1
Xylenes	10	0.19	0.027	0.240	<1.5	0.01

The table does appear to make this comparison. However, a point to note is that the selection of the MCL and/or the tapwater RSL as human health criteria is based on treating the creek water as if it were drinking water. This results in very conservative comparison values that are not directly applicable to any realistic potential human health exposure to Liberty Creek surface water. Regarding detection limits, as stated previously, it is not unusual to sometimes have detection limits above conservative screening values. Also, if more recent data were used in the table there most likely would not be as many detection limits above screening levels, because this became less common as concentrations of acetone and toluene attenuated over time and laboratory dilutions became less common.

Comment #87. Secaps excluded all constituents that were "non-detected" from consideration in the risk assessments. The data for non-detected concentrations does not mean that the constituents are not present in harmful amounts – just that the methods used by Triad and the laboratory were incapable of reporting its presence for that sample. The variability of the detection limits varied over time, even though high concentrations of toluene and acetone, for example, remained high. As such, there seems to be no consistent explanation for the high detection limits.

See response to Comment 61. It is recognized that toluene is the main chemical of concern (COC) for the site. However, because the following chemicals have historically been detected either in

surface water or groundwater and associated with the ELMCO release, the laboratory analysis of surface water and groundwater samples shall consist of the following chemicals: acetone, toluene, benzene, ethylbenzene, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), n-propylbenzene, 1,2,4-trimethylbenzene, 1,2,3-trimethylbenzene, 1,3,5-trimethylbenzene, xylenes, and isopropylbenzene (cumene).

Comment #88. The human health risk assessment to determine the risk to a child playing in Liberty Creek was flawed and perhaps understated the risks. The assessment collected only one breathing zone air sample that was stationary on a ladder in the creek. Volatile organic compound vapors are the highest when the water is agitated, like what would occur when a child is walking or playing in the creek. The results of that sample would therefore not be indicative of a child playing in the creek.

There is always uncertainty in sampling and in risk assessments. In order to account for that uncertainty and to ensure that risk assessments are protective and do not conclude that there are no unacceptable risks when in fact there are (false negative), it is common practice to calculate the exposure concentration as a Reasonable Maximum Exposure (RME). In order to achieve an RME the sample was intentionally collected on a hot summer day which would be expected to increase the volatilization of toluene from surface water to air. 170 ug/m³ of toluene were detected in the Summa canister during the 2-hour sampling event. This concentration can be compared to the Acute MRL developed by ATSDR and presented in the Draft Toluene Toxicity Profile (2015). This value is 2 ppm or 7,600 ug/m³. The Acute MRL is derived as a screening value and is intentionally set at a level far below any level that has been seen to result in a negative health endpoint in a scientific study. The lowest concentration that was noted by ATSDR to cause a negative effect was 15 ppm (or 38,000 ug/m³). The sampling that was conducted by Triad resulted in an adequately conservative approximation of toluene concentrations that a receptor could potentially be exposed to, and can be considered an RME. Because the concentration was so much lower than the ATSDR Acute MRL and the lowest observed effect concentration from the scientific literature, there is an adequate margin of safety present should, in the very unlikely event, a child happens to play in the direct vicinity of a seep for any extended period of time and agitates the water. However, we are requiring the inclusion of an ambient air monitoring component to the ongoing monitoring of Liberty Creek.

Using current EPA methods to assess inhalation risk as presented in RAGs Part F, and comparing the detected concentration directly to the RfC for toluene of 5,000 ug/m³ results in a hazard quotient of 0.034. 0.034 is significantly less than one (1) and this clearly does not pose an acceptable noncarcinogenic risk.

Comment #89. Innovative investigative techniques that result in little disruption to the surrounding neighborhood and the ELMCO property could have been used – and can still be used - to determine the nature and extent of contamination.

TDEC is aware of environmental investigation techniques. See also response to Comment 91, below.

Comment #90. Triad investigations determined early in 2007 and 2008 that contaminated groundwater flowed along bedrock joints and bedding planes. Rather than placing groundwater monitoring wells precisely along those pathways, wells were randomly placed. Triad should have instead placed monitoring wells in areas where Geoprobe and other drilling showed bedrock depressions and saturated groundwater conditions. That data can however, still be used to install new wells on-site to accurately determine groundwater constituent concentrations of the uppermost portion of the aquifer where contamination is most likely to be present.

Wells were not randomly placed. See response to Comments 58 and 59. Further, given ongoing biodegradation occurring in the ground, no ELMCO contaminants detected in the Harpeth River, decreased loading to Liberty Creek, and the lack of identified risk, the need for additional characterization is not demonstrated.

Comment #91. Innovative investigative techniques could also be used off-site in the Daniels Drive residential area to determine the nature and extent of contamination – in a manner that would be minimally disruptive to the community. Such techniques should be used to accurately define the nature and extent of contamination, to determine contaminant mass loadings to the groundwater, and to optimally locate monitoring wells. These industry-standard technologies are commonly used for cost-effective, minimally invasive investigations for volatile organic compounds:

- Surface geophysics to locate contaminant migration pathways in soil, bedrock surface depressions, and voids within the bedrock.
- Passive soil gas surveys to identify migration pathways and areas with the highest contamination.
- Direct-push Geoprobe (or equivalent) samplers using low impact, mobile vehicles (e.g. a recreational 4-wheeler) to collect soil, soil gas, and groundwater samples with minimal surface disturbance.

ELMCO has been in compliance with the Consent Order. TDEC has determined that the conceptual site model presented by TriAD is adequate. Interim measures have been met by ELMCO as determined by TDEC. Active soil gas samples have been collected at identified migration pathways with the areas of highest contamination. Indoor air sampling as well as outdoor air sampling has been collected in areas associated with these pathways. There is no indication that unacceptable human health risk or significant ecological risk is associated with this release.