S.C. Department of Health and Environmental Control

Proposed Plan for Site Remediation
Wix Dillon Site

1422 Wix Road, Dillon, South Carolina

April 2018

ANNOUNCEMENT OF PROPOSED PLAN

The South Carolina Department of Health and Environmental Control (DHEC or the Department) has evaluated cleanup alternatives to address contamination at the Wix Dillon Site. This Proposed Plan identifies DHEC's Preferred Alternative for cleaning up contaminated soil and groundwater and provides the reasoning for this preference. In addition, the Proposed Plan includes summaries of other cleanup alternatives evaluated. These alternatives were identified based on information gathered during environmental investigations conducted by Wix pursuant to Voluntary Cleanup Contract 13-5996-RP, dated September 5, 2013, between DHEC and Wix Filtration Corp LLC.

The Department is presenting this Proposed Plan to inform the public of our activities, to gain public input, and to fulfill the requirements of CERCLA Section 117(a) and National Contingency Plan Section 300.430(f) (2). This Proposed Plan summarizes information that can be found in greater detail in the Revised Focused Feasibility Study (FFS) report dated June 24, 2016 and other documents contained in the Administrative Record file. The Department encourages the public to review these documents to gain a comprehensive understanding of the Site and activities that have been conducted.

The Department will select a final remedy after reviewing and considering comments submitted during the 30-day public comment period. The Department may modify the Preferred Alternative or select another response action presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

DHEC's Preferred Cleanup Summary

DHEC's preferred remedy is identified in the FFS as Alternative 3. Alternative 3 consists of:

- Excavation of contaminated soils
- Aggressive Fluid/Vapor Recovery (AFVR)
- Monitored Natural Attenuation (MNA)
- Institutional and Engineering Controls

The remaining pages provide additional details of the Proposed Plan.

- **PUBLIC COMMENT PERIOD:**

April 26 through May 26, 2018

DHEC will accept written comments on the Proposed Plan during the public comment period. Submit your written comments to:

Tim Hornosky, Project Manager
DHEC-BLWM
2600 Bull St.
Columbia, SC 29201
Email: hornostr@dhec.sc.gov

- **PUBLIC MEETING:**

If comments are received or there is interest from members of the community, DHEC may hold a public meeting to explain the Proposed Plan, and all of the alternatives presented in the Feasibility Study. After the Proposed Plan presentation, DHEC will respond to your questions. Oral and written comments will also be accepted at this time.

- **FOR MORE INFORMATION:**

Call: Tim Hornosky, DHEC Project Manager, 803-898-0733

See: DHEC's website at:
http://www.scdhec.gov/PublicNotices/

View: The Administrative Record at the following locations:

Dillon County Public Library
600 E Main St,
Dillon, SC
(843) 744-0330

DHEC Freedom of Information Office
2600 Bull Street, Columbia, SC
(803) 898-3817
Hours: Monday - Friday: 8:30a.m. - 5:00p.m.

SITE HISTORY

The Wix Site is located at 1422 Wix Road in Dillon, SC. The property consists of approximately 80 acres and contains a 376,000 square-foot manufacturing building and several smaller structures. The site is bounded by to the north by farmland and the Franco Manufacturing facility, to the west by the CSX transportation railroad line and a residence/small business, to the south by Wix Road and farmland and to the east by cultivated and wooded farmland (Figure 1).

Figure 1

Wix formerly stored the solvent **toluene** in an underground storage tank (UST) located outside the west wall of the manufacturing building. Toluene was dispensed via an underground piping network to various locations in the manufacturing building where it was used to formulate paints. After this tank was closed in the mid-1980s, toluene was stored in drums inside the paint room located in the southwestern portion of the building.

In October 2005, workers detected a paint-like odor in shallow soil excavated during repairs to an underground water line west of the manufacturing building. Soil and groundwater samples were collected and analyzed for volatile organic compounds (VOCs), a class of chemicals including toluene. Upon receipt of the sampling data, Wix notified DHEC that contamination had been detected in December 2005.

Beginning in spring 2006, Wix conducted various activities including:

- 2006 Environmental Site Assessment,
- 2008 Remedial Options Assessment,
- 2008 Remedial Action Plan to select and implement a remedial technology to mitigate environmental impacts,
- 2010-2011 Supplemental assessment activities

An air sparge/soil vapor extraction (AS/SVE) system began operation in December 2009. Based on monitoring data collected during operation of the AS/SVE system, this approach is not effective in removing contamination. In 2013, DHEC invited Wix to enter into a Voluntary Cleanup Contract (VCC) to conduct further assessment and remediation. The VCC required Wix to complete a Remedial Investigation (RI) to determine the nature and extent of contamination, and a Focused Feasibility Study (FFS) to evaluate cleanup options. A Human Health Risk Assessment (HHRA) was completed as part of the RI

An RI Report was submitted on August 21, 2014 and approved by DHEC on September 23, 2014. An RI Addendum was submitted on August 20, 2015. DHEC approved the RI Addendum on October 15, 2015. An FFS was submitted on December 21, 2015. DHEC provided comments to the FFS on April 4, 2016. A Revised FFS was submitted on June 24, 2016 and approved on June 29, 2016.

NATURE AND EXTENT OF CONTAMINATION

The RI confirmed that very high concentrations of toluene remained in soil and groundwater beneath the Site. Additional groundwater monitoring wells were installed to determine the horizontal and vertical extent of the contamination. Trace levels of chlorinated solvent are also present in soil and groundwater at the facility. The RI Addendum was completed in order to evaluate the potential risk to site workers from exposure to chlorinated solvents in indoor air. An engineering evaluation of the existing AS/SVE system was also included in the RI Addendum.

- **Groundwater -** Groundwater contamination has been identified in the shallow water table aquifer. In the vicinity of the former toluene UST, shallow groundwater is contaminated above the 1,000 micrograms per liter (ug/L) maximum contaminant level (MCL) as established by the Safe Drinking Water Act. The horizontal extent of groundwater exceeding the MCL for toluene is estimated to be 42,800 square feet. Benzene was detected above its MCL of 5 ug/L in a small area of the toluene impacted portion of the shallow groundwater. Cis-1,2-dichloroethylene (cis-1,2-DCE) was detected above its MCL of 70 ug/L in one well located inside the manufacturing building.

- **Subsurface Soils** – Subsurface soils are impacted in an area of approximately 22,000 square feet around the location of the former toluene UST. In this area, toluene concentrations exceed the soil screening level for protection of groundwater. This is the level at which soil contamination would be expected to cause groundwater contamination above the MCL.

- **Surface Soil** - Surface soils are not a concern as the release occurred in the subsurface.

- **Indoor Air**–The 2014 RI included collection and analysis of three (3) sub-slab vapor samples. Toluene was not detected above the US Environmental Protection Agency's (EPA's) industrial Regional Screening Level (RSL) for air in any of the sub-slab vapor samples. However, benzene, ethylbenzene, 4-ethyl toluene, 2-hexanone, tetrachloroethylene (PCE), and trichloroethylene (TCE) were detected at concentrations greater than the industrial air RSLs. Ten (10) additional sub-slab vapor samples were collected as part of the RI Addendum in 2015. Analytical results were evaluated in the HHRA. The results of the HHRA are discussed in the Summary of Site Risks section.

- **Surface Water**–Two surface water samples were collected from a drainage ditch west of the area of contamination in May 2006. No VOCs were detected in either of these samples. No surface water investigation was conducted during the 2014 RI or 2015 RI Addendum. The closest natural surface water feature is a small unnamed stream located north of Scotland Road approximately 200 feet from the northwest corner of the Wix property.

- **Sediment**–Two sediment samples were collected from a storm drainage ditch west of the area of contamination in May 2006. Only one compound, p-isopropyltoluene was detected in one sediment sample at trace levels. P-isopropyltoluene is a naturally occurring aromatic compound, and is present in herbs such as thyme and cumin. No regulatory criteria have been established for this compound.

SCOPE AND ROLE OF THE ACTION

The proposed action in this plan is intended to be the final cleanup action for the Site. The proposed actions include removal of soils saturated with toluene. The proposed remedy would prevent exposure to contaminated subsurface soils, groundwater and air; preventing the further migration of contaminants from soil to groundwater; and restoring groundwater quality through the use of active treatment followed by monitored natural attenuation. The proposed remedy will permanently reduce the toxicity, mobility, and volume of contamination at the Site.

SUMMARY OF SITE RISKS

As part of the RI, Wix conducted a baseline human health risk assessment (HHRA) to determine the potential current and future risks to human health. Soil and groundwater contamination are limited to the western portion of the subject property. The current use of this part of the property is industrial. Part of the northeastern portion of the property is leased for agricultural use. With respect to potential receptors, Onsite Facility Worker (Adult), and Onsite Construction and Utility Worker (Adult) exposures were considered.

The 2014 RI assessed the potential effects of exposure to affected soil, groundwater, and sub-slab vapor at the Site. Unacceptable risk was noted for utility/construction workers potentially exposed to toluene and cis-1,2-dichloroethylene (cis-1,2-DCE) in shallow groundwater and to benzene, toluene, TCE, and xylenes in trench air while conducting sub-grade work in the impacted area. In addition, the HHRA identified unacceptable risk for facility workers potentially exposed to the concentrations of PCE and TCE in indoor air as a result of vapor intrusion into the manufacturing building. The evaluation of the vapor intrusion exposure pathway in the 2014 HHRA was based on three sub-slab vapor samples.

Given the limited set of sub-slab vapor samples, further assessment of the potential for worker exposure by vapor intrusion was warranted for the site. As part of the supplemental RI activities, ten additional sub-slab vapor samples were collected to further characterize the extent of VOCs in sub-slab vapor underneath the building and to better define the potential risk from vapor intrusion. Results from both the 2014 and 2015 samples were evaluated using updated vapor intrusion guidance released by USEPA in 2015. The maximum detected concentrations were used to calculate the potential for risks to facility workers from vapor intrusion. Based on this evaluation, the RI Addendum Report concluded that total excess cancer risk due to inhalation was 2.01 $X10^{-6}$. Total excess cancer risks less than 1×10^{-6} are considered to be below the "point of departure" and generally do not require corrective action. Risks greater than 1×10^{-4} are generally considered unacceptable and require corrective action. Risks which fall in between these levels are considered to be within the USEPA's "risk management range." Within this range, risk assessors and project managers utilize professional judgement to ascertain whether these risk pathways are likely to result in actual exposures, and to determine whether response actions could effectively reduce potential risks to acceptable levels.

The calculated excess cancer risk to facility workers from indoor air is based on the maximum concentration detected from 13 samples. Further, the chemical responsible for the majority of the risk (PCE) is not the major chemical of concern at the site. No source or release of PCE has been identified. Wix has indicated that PCE was used historically and is no longer used at the facility. Considering these factors, the Department has determined that sub-slab vapor sampling should be incorporated into the site monitoring program. It is not likely that the preferred remedy will reduce concentrations of PCE in soil beneath the building slab. However the results of future monitoring will be used to determine if additional response actions are necessary to address PCE.

DHEC's current decision is that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to reduce VOC concentrations in soil and groundwater to protect public health and the environment, and ultimately reduce contaminants in groundwater to below the MCLs.

CLEANUP GOALS

Remedial action objectives (RAOs) are developed in order to set goals for protecting human health and the environment. The goals should be as specific as possible but should not unduly limit the range of alternatives that can be developed. Accordingly, the following RAOs were developed for the Site:

1. Reduce toluene concentrations in source area soils to minimize potential migration to shallow groundwater.

2. Mitigate human health risks from the potential exposure of affected media at the site.

3. Demonstrate statistically significant decreasing concentrations of toluene in groundwater indicating the MCL will be met within a reasonable timeframe.

The proposed action will reduce the mass of toluene in soil. The site-specific target level, or remedial goal, for toluene in subsurface soils is 0.69mg/kg. The remedial goals for groundwater contaminants are the MCLs established under the Safe Drinking Water Act.

Remedial Goals

Toluene	Soil	0.69 mg/kg
Toluene	Groundwater	1,000 ug/L
cis-1,2-DCE	Groundwater	70 ug/L
Benzene	Groundwater	5ug/L
Vinyl Chloride	Groundwater	2 ug/L

SUMMARY OF REMEDIAL ALTERNATIVES

Based on information collected during the previous investigations and remedial system operation, a Focused Feasibility Study (FFS) was conducted to identify, develop, and evaluate more effective cleanup options and remedial alternatives. Both soils and groundwater were considered in the FFS. Each remedial alternative evaluated is described briefly below. The table below briefly describes the alternatives that were identified and screened. Three alternatives were carried through to the final detailed analysis. A final Remedial Design will be developed prior to implementation.

Alternative	Description
No Action Alternative:	Evaluated for baseline comparison only, the No Action alternative would not include any remedial or monitoring measures. Note: The No Action Alternative is not numbered herein to maintain consistency with the FFS
Alternative 1 : Modified Air Sparging/Soil Vapor Extraction (AS/SVE); Dual Phase Extraction (DPE)	An existing AS/SVE system could be converted to a dual phase extraction (DPE) system. This modified system would work more effectively by dewatering the impacted area, thus allowing extraction of vapors. Institutional controls and groundwater monitoring would be included in this alternative.
Alternative 2: Excavation with Biosparging and MNA	Excavation would physically remove much of the contamination. The area would be backfilled with more permeable material to allow effective delivery of air and nutrients by injection. This would stimulate biological breakdown of remaining toluene. Institutional controls and groundwater monitoring would be implemented. Monitored Natural Attenuation (MNA) would be used as a polishing technology to reach groundwater standards.
Alternative 3: Soil Excavation with Aggressive Fluid/Vapor Recovery (AFVR) and MNA	Excavation would physically remove much of the contamination. The area would be backfilled with more permeable material and a recovery well or wells would be installed to facilitate Aggressive Fluid/Vapor Recovery. This technology uses a mobile system to extract contaminants from the subsurface. Following AFVR, groundwater and surface water would be monitored to ensure that the natural attenuation processes of biological and physical destruction, dispersion, and dilution were effective in reducing residual concentrations to below remedial action goals. Institutional controls would be implemented. Additional AFVR events could easily be implemented if needed. MNA would be used as a polishing technology to reach groundwater standards.

Remedial Alternatives

No Action Alternative:

The "No Action" alternative is required to be evaluated to establish a baseline for comparison of the other remedial action alternatives. The No-Action remedial alternative would not include any remedial measures to address the soil and groundwater contamination at the site. The No Action alternative would not achieve the Remedial Action Objectives for the site.

Alternative 1: Modified AS/SVE; Dual-Phase Extraction (DPE)

AS/SVE is a treatment method that involves injecting air into the groundwater through drilled wells or driven points. As the VOCs in groundwater partition into the injected air, the VOC-laden air rises to the zone above the water table where it is removed by the SVE system. This process has been in use at the Wix site since 2009, and has not been effective in achieving RAOs. The 2015 Remedial Investigation Report Addendum included an engineering evaluation of the existing system which concluded that this technology was not well suited to site conditions due to a shallow water table and low permeability of the soils. The option of modifying the existing system to a dual phase extraction system was evaluated.

The existing AS/SVE system could be modified to a dual phase extraction (DPE) system. By dewatering the impacted area, this approach would allow for more effective delivery of air, and extraction of contaminant vapors. This remedial approach would involve repair and/or replacement of damaged and malfunctioning AS/SVE equipment, installation of groundwater extraction equipment, including extraction wells, pumps, piping, and construction of a system to treat extracted groundwater prior to discharge. Groundwater would be treated using a carbon filter to remove VOCs. A treatment trailer would be built to house the water treatment equipment. This alternative would include groundwater monitoring and reporting. Recovered vapors would be treated through vapor-phase carbon filters and then discharged to the atmosphere.

Alternative #2: Excavation followed by Biosparging and MNA

This combined technology would begin with excavation and offsite disposal of soils saturated with toluene. The excavated area would be backfilled with gravel (in lieu of native or borrow soil) to create a highly permeable treatment zone for groundwater containing residual toluene concentrations. A biosparge system, which combines bioremediation with AS/SVE, would be installed within the gravel backfill. The biosparge system would inject both air and nutrients in to the saturated backfill, and toluene-laden air will be collected by horizontal well screens placed in the unsaturated backfill. The nutrients would stimulate the indigenous toluene-oxidizing microorganisms and migrate with groundwater flow to areas beyond the biosparge system. The biosparge system would increase the footprint of active remediation. Monitored Natural Attenuation (MNA) would also be implemented to monitor the physical, chemical, or biological reduction of residual toluene mass at the site.

Alternative 3: Excavation followed by AFVR and MNA

This combined technology would begin with excavation and offsite disposal of soils saturated with toluene. The excavated area would be backfilled with gravel (in lieu of native or borrow soil) to create a highly permeable treatment zone for groundwater containing residual toluene concentrations. Stockpiled clean native soil or borrow soil would be used to backfill the upper 2 feet of the excavation area (0 to 2 feet below ground surface). A 4-inch diameter extraction well would be installed within the gravel backfill for AFVR application. AFVR is a physical treatment using a truck or trailer mounted mobile high-pressure vacuum system to extract groundwater and vapors from extraction and/or monitoring wells. The extracted vapors are treated onsite using a catalytic converter on the vacuum truck prior to venting to the atmosphere, while the extracted fluid is managed within a tank and transported offsite for treatment and disposal. The AFVR technology would provide supplemental removal of toluene mass from extracted soil vapor and groundwater. An initial AFVR event would be conducted to determine the effectiveness of the technology in removing residual toluene mass. Following mass removal via excavation and AFVR, MNA would be implemented to monitor the physical, chemical, or biological reduction of residual toluene mass at the site. If monitoring indicates that MNA alone is not effective, additional AFVR events may be required.

EVALUATION OF ALTERNATIVES

The National Contingency Plan requires that the Department use specific criteria to evaluate and compare the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the criteria, noting how it compares to the other options under consideration. The criteria are:

1. Overall protection of human health and the environment;
2. Compliance with applicable or relevant and appropriate requirements (ARARs);
3. Short-term effectiveness;
4. Long-term effectiveness and permanence;
5. Reduction of toxicity, mobility, or volume through treatment;
6. Implementability;
7. Cost; and
8. Community Acceptance

The main objectives for the preferred remedial action are to be protective of human health and the environment and to comply with State and Federal regulations. These two objectives are considered threshold criteria. Threshold criteria are requirements each alternative must meet in order to be eligible for selection. For an alternative to be considered as final, these two threshold criteria must be met. The Department's remedial action must be protective of human health and the environment and comply with State and Federal standards.

The following measures are considered balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; implementability; and cost. These criteria are used to weigh the technical feasibility, strengths and weaknesses, and cost advantages and disadvantages of each alternative.

Community acceptance is a modifying criterion that will be carefully considered by the Department prior to final remedy selection.

COMPARATIVE ANALYSIS OF ALTERNATIVES

Four alternatives were retained for detailed comparative analysis:

No Action Alternative

Alternative 1: Modified AS/SVE (Dual Phase Extraction)

Alternative 2: Excavation followed by Biosparging and MNA

Alternative 3: Excavation followed be AFVR and MNA

Note: Although the No Action Alternative does not meet the threshold criteria, it is retained for discussion because it provides a baseline for comparing the other alternatives to the criteria outlined above.

The three remaining alternatives include:

The addition of institutional/engineering controls including restrictive covenants to prevent installation of any on-site water supply wells, maintenance of fencing and access controls, and; long-term monitoring, with the monitoring scope, frequency and duration to be determined during the remedial design phase.

Overall protection of human health and the environment

The No Action Alternative would not be protective of human health and the environment. Potential for exposure of plant employees and on-site construction workers to contaminants would remain.

Alternative 1 would protect human health and the environment by mitigating exposures to contaminated soil and groundwater through deed restrictions and continued use of municipal water as a water supply source. Restoration of the impacted groundwater would also be achieved over time. Energy consumption and waste generation would be relatively high due to mechanical processes applied over the lifetime of the remedy. Based on the data gathered during operation of the existing AS/SVE system, it is anticipated that the modified system would operate for 15-20 years and have a limited radius of influence. During this time, waste streams generated would include treated groundwater and spent carbon vessels (estimated 4,000 lbs. /year).

Alternative 2 would also protect human health and the environment by mitigating exposures to contaminated soil and groundwater through deed restrictions and continued use of municipal water as a water supply source. Restoration of the impacted groundwater would also be achieved over time. Excavation would initially remove contaminant mass rapidly. Biosparging would provide ongoing active treatment. Excavation would generate about 700 tons of contaminated soil for transportation and disposal as hazardous waste. About 3,000 gallons of waste liquids are anticipated to be generated during excavation, and will require treatment and disposal. Spent carbon vessels would also need to be disposed and replaced during operation of the biosparge system, at about half the rate of the modified AS/SVE system.

Alternative 3 would protect human health and the environment by mitigating exposures to contaminated soil and groundwater through deed restrictions and continued use of municipal water as a supply source. Restoration of the impacted groundwater would also be achieved over time. Excavation would rapidly remove contaminant mass. Additional protection would be attained through AFVR events which would remove additional contaminant mass quickly. Waste generation would include 700 tons of grossly contaminated soil to be disposed as hazardous waste, 3,000 gallons of waste liquids to be generated during excavation, and any fluids removed during AFVR events. Although significant volumes of fluids would be removed by AFVR, events would be infrequent and of limited duration. Waste materials would be transferred directly to the mobile equipment for disposal eliminating regular handling and long-term accumulation of waste materials associated with the biosparging or AS/SVE.

Overall protection of human health and the environment is highest for Alternative 3.

Compliance with applicable or relevant and appropriate requirements (ARARs)

ARAR's to be addressed by the selected remedy include compliance with South Carolina Groundwater Classifications and Standards. This means that all groundwaters of the state are considered Class GB or potential sources of drinking water. Therefore, the USEPA maximum contaminant levels, or MCLs are applicable.

The No Action Alternative would not achieve compliance with MCLs in a reasonable time frame because no action would be taken.

Alternative 1 would address this requirement through active treatment, but would require significant time to reach MCLs even within the radius of influence of the extraction system. Concentrations in the distal portions of the plume will eventually decrease, but contaminant mass would remain in the source area for some time. Additional ARARs to be addressed include permitting for construction of the DPE system, and for discharge of treated water, and potentially for treated vapors.

Alternatives 2 would achieve groundwater quality standards more quickly by removing a significant amount of contaminant mass through excavation. This would be followed by in-situ active treatment. Passive remediation by indigenous microbes would be necessary to meet MCLs in the distal portions of the contaminant plume. Monitoring would be conducted to ensure that MNA is effective in meeting MCLs. Permitting for injection of nutrients and other amendments would be required, and a permit for discharge of treated vapor may be required.

Alternative 3 would address the groundwater quality standards through the initial removal event followed by additional fluid recovery events as needed to ensure that source area contamination does not serve as a long-term source of contaminants to the distal portions of the contaminant plume. Passive remediation by indigenous microbes would be necessary to meet MCLs in the distal portions of the contaminant plume. Monitoring would be conducted to ensure that MNA is effective in meeting MCLs. Well construction standards and regulations would apply to installation of recovery wells. Transportation and disposal requirements would have to comply with applicable regulations. Compliance with ARARs is roughly equivalent for alternatives 1, 2, & 3.

Long-term effectiveness and permanence

This criterion considers the magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities, as well as the adequacy and reliability of controls such as containment systems and institutional controls.

The No Action Alternative is ineffective in that no reduction in contaminant mass would be effected, and no institutional controls would be implemented. Alternatives 1, 2 & 3 are rated "Moderate" for Long-term effectiveness and permanence.

Alternatives 1, 2 & 3 would utilize institutional and engineering controls to reduce long-term risk from exposure to residual contamination.

Alternatives 2 & 3 would further reduce risks by initially removing a significant amount of contaminant mass through excavation. Alternatives 1 & 2 utilize active treatment systems that could breakdown and require repair or replacement of components during the life of the remedy.

Alternative 3 also utilizes active treatment, but through mobile systems that are contracted as needed. This ensures that remediation equipment will function as intended. Recovery wells may require replacement, but the likelihood of this can be reduced through proper construction materials and techniques.

Reduction of toxicity, mobility, or volume through treatment

The No Action Alternative would not reduce contaminant toxicity, mobility or volume.

Alternative 1 would provide moderate reduction in contaminant toxicity, mobility and volume through active treatment. DPE mobilizes VOCs by stripping them from formation materials and capturing them. Captured vapors would be treated through an activated carbon filter, thus immobilizing contaminants for later disposal.

Alternatives 2 & 3 would provide greater reduction of contaminant volume through direct physical removal of toluene saturated soil and groundwater. Toxicity of the material itself would not be reduced, however it would be transported to an appropriately engineered and permitted disposal facility, thus reducing mobility and the potential for exposure to human or ecological receptors.

Alternative 2 would reduce the toxicity of residual toluene by providing nutrients that would facilitate biological breakdown. The associated SVE system would capture mobilized VOCs and treat them through an activated carbon filter, thus immobilizing them. Contaminant volume would be reduced over time.

Alternative 3 would treat extracted vapors catalytically, reducing toxicity. Captured liquids would be transported to a permitted treatment and disposal facility. This technology can reduce contaminant volume permanently by physical removal from the site.

MNA associated with alternatives 2 & 3 would further reduce contaminant toxicity, mobility and volume through metabolic breakdown. Alternatives 2 & 3 are rated "high" for this criterion.

Short-term effectiveness

Short-term effectiveness considers potential impacts to human health and the environment during implementation, and time required to reach remedial action objectives.

The No Action Alternative would not involve any construction or remedial action, and so would not create any new risks. However, the potential for site worker exposure to contaminants would remain. The No Action alternative would not be expected to achieve RAOs.

Alternatives 1, 2 & 3 would present some risk to workers through potential incidental ingestion, dermal contact, and inhalation of VOCs during construction, remediation and monitoring activities. Noise from the treatment units could present some limited adverse impacts to onsite workers and nearby businesses. Risks could be minimized by following appropriate health and safety protocols, exercising sound engineering practices and utilizing proper PPE.

Alternatives 2 & 3 would present some risk to workers through potential incidental ingestion, dermal contact, and inhalation of VOCs during excavation and transportation of contaminated media. Alternative 2 would also involve additional risk from excavation shoring and construction of the biosparging system. These risks could be minimized by following appropriate health and safety protocols, exercising sound engineering practices and utilizing proper PPE.

Alternative 3 would present less short-term risk as operation of AFVR would only be conducted periodically as needed.

Achievement of RAOs would require 15- 20 years for Alternative 1, based on permeability of soils. Alternative 2 is estimated to require 5-10 years to reach RAOs. Alternative 3 is estimated to require 7-10 years to achieve RAOs.

The short-term effectiveness of the No Action Alternative is low. Short- term effectiveness is moderate for Alternatives 1, 2 & 3.

Implementability

The No Action Alternative is easily implementable.

Alternatives 1 would require a pre-design study to calculate system requirements. Malfunctioning components of the existing SVE system would need to be replaced. Installation of associated transfer pipelines and wells, and new water treatment equipment would be required. Long-term operation, maintenance and monitoring would be required. This alternative was rated "moderate" for implementability.

Alternative 2 would also require a pre-design study to design an excavation and shoring system, selection of appropriate nutrients for the biosparge system, replacement of malfunctioning components of the existing system, and installation of associated transfer pipelines and wells. Long-term operation, maintenance and monitoring would be required. This alternative was rated "low" for implementability.

Alternative 3 would require excavation and installation of an appropriately designed extraction well. Because the extraction well can be installed after the excavation is backfilled, no work would be conducted in the excavation. Therefore shoring would not be needed. Equipment used for AFVR events is mobile and readily available. Implementability for Alternative 3 is rated as "high."

Cost

The cost criterion includes estimated initial capital costs and annual Operation and Maintenance (O&M) costs, as well as a net present value cost evaluation. Net present value cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of -30% to +50%. Estimates were calculated for the expected minimum and maximum number of years of O&M.

Costs were not calculated for the No Action Alternative, as no response actions are associated with this alternative.

Alternative 1, modified AS/SVE has the lowest capital cost, at $206,000. Annual O&M costs are estimated at $107,000, with a range of 15-20 years. The maximum net present value is $1,940,000

Alternative 2, excavation with biosparging and MNA has the highest capital cost at $545,000. Annual O&M costs are $102,000, with a range of 5-10 years of anticipated operation. The maximum net present value is $1,449,000.

Alternative 3, excavation followed by AFVR has a capital cost of $398,000. Annual O&M costs are $45,000, with a range of 7-10 years of anticipated operation. The maximum net present value of this alternative is $797,000.

Community Acceptance

Community acceptance of the preferred remedy will be evaluated after the public comment period. Public comments will be summarized and responses provided in the Responsiveness Summary Section of the Record of Decision document that will present the Department's final alternative selection. The Department may choose to modify the preferred alternative or select another remedy based on public comments or new information.

SUMMARY OF THE DEPARTMENT'S PREFERRED ALTERNATIVE

The Department has identified Alternative 3 as the preferred alternative to address soil and groundwater contamination at the Site. The preferred alternative consists of the following components:

- Excavation of source area soils to remove the principal source of contamination;
- Backfilling of the excavation with more permeable fill material that will allow contaminated groundwater to flow back into to the excavated area;
- Installation of a large diameter recovery well to facilitate aggressive fluid/vapor recovery (AFVR);
- Implementation of AFVR to remove additional contaminant mass;
- Natural attenuation monitoring to ensure that remaining contaminant mass is permanently destroyed and that groundwater will reach remedial goals in a reasonable time frame;

The total estimated net present value of this alternative is approximately $797,000.

The Department expects the Preferred Remedy to satisfy the following statutory requirements: 1) be protective of human health and the environment; 2) comply with applicable or relevant and appropriate requirements; 3) be cost-effective; 4) utilize permanent solutions to the maximum extent practicable; and 5) satisfy the preference for treatment as a principle element of the remedy.

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for the Wix Filtration Corp (Wix) Site is important. Comments provided by the public are valuable in helping DHEC select a final cleanup remedy.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by **May 26, 2018**. If you have any questions, please contact Tim Hornosky, at 803-898-0733. You may also submit your questions and/or comments electronically to: hornostr@dhec.sc.gov.

Name ______________________________ Telephone ______________________

Address ____________________________ Email _________________________

City _______________State ___ Zip _______