



S.C. Department of Health and
Environmental Control

**Proposed Plan for Site Remediation
Former WestPoint Homes Facility**
679 Edinburgh Way, Seneca, South Carolina

June 2022

ANNOUNCEMENT OF PROPOSED PLAN

The South Carolina Department of Health and Environmental Control (DHEC or the Department) has completed an evaluation of cleanup alternatives to address contamination at the former WestPoint Homes manufacturing site (the Site). This Proposed Plan identifies DHEC's Preferred Alternative for cleanup and provides the reasoning for this preference. In addition, the Proposed Plan includes summaries of the other cleanup alternatives evaluated during the process. These alternatives were identified based on information gathered during environmental investigations conducted at the Site since 2005.

The Department is presenting this Proposed Plan to inform the public of activities conducted at the Site, gain public input, and fulfill the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan or NCP). This Proposed Plan summarizes information that can be found in greater detail in the revised Focused Feasibility Study (December 2021) and other documents contained in the Administrative Record. The Department encourages the public to review these documents to gain an understanding of the Site and the activities that have been completed.

The Department will select a final cleanup remedy after reviewing and considering comments submitted during the 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 Alternative 5: ABC+ Treatment

DHEC's preferred remedial option is:

- Injection of ABC+ into the groundwater to promote biodegradation of contaminants.
- ABC+ is mixture of Anerobic BioChemical (ABC) nutrients combined with zero valent iron to promote enhanced reductive dechlorination in groundwater.

MARK YOUR CALENDAR

□ PUBLIC MEETING:

DHEC will hold an in person public meeting to further explain the Proposed Plan and all the alternatives presented in the Remedial Alternatives Evaluation and answer questions.

Public Meeting will be held on June 21, 2022, at 6:30 p.m. at
The Madren Conference Center
230 Madren Center Drive
Clemson, South Carolina

Link to Site's Webpage:

www.scdhec.gov/WestPointHomes

□ PUBLIC COMMENT PERIOD:

June 22, 2022, through July 22, 2022

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

Kimberly Kuhn, Project Manager
SC DHEC Bureau of Land & Waste Management
2600 Bull Street
Columbia, SC 29201
kuhnm@dhec.sc.gov

□ FOR MORE INFORMATION:

Call: Kimberly Kuhn, Project Manager, 803-898-0722

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

View: The Administrative Record at the following locations:

Seneca Branch Library
300 E South 2nd Street
Seneca, SC 29678
Monday-Friday: 9:00 am-6:00 pm
Saturday 9:00 am-1:00 pm

DHEC Freedom of Information Office
2600 Bull Street, Columbia, SC
(803) 898-3817
Monday - Friday: 8:30 am - 5:00 pm

SITE HISTORY

The WestPoint Homes property is located at 679 Edinburgh Way, Seneca, Oconee County, South Carolina. The Site was originally used a textile production facility in 1951 by the J.P. Stevens Company. In 1989, the facility was acquired by WestPoint Pepperell, later known as WestPoint Stevens. The original construction of the facility was in 1951, with several additional plant expansions occurring in 1955, 1959, 1962, 1974, and 1990. The Clemson manufacturing complex operations include a greige mill, a dyeing and finishing plant, and a fabricating plant. The Site originally encompassed approximately 384 acres. The plant operations consisted of making cloth fabric from cotton and polyester fibers dyeing and printing of the cloth, finishing the cloth, and fabricating bedding from the finished cloth fabrics. The Clemson facility was active for more than 50 years and closed in 2006.

Environmentally assessment has been conducted at this site from 2005 to 2015. A soil removal action was conducted in 2006 in the former tank area and approximately 1,811 tons of volatile organic compound (VOC) affected soil was removed. In May 2015 additional wells were installed that completed the delineation of the plume. The underground process sewer lines of the WestPoint Homes site continue to represent a logical point of release for these observed CoCs. Within each of the two VOC plume areas (now designated as upgradient and down-gradient VOC plumes areas), TRC has been able to identify sections of former process sewer piping that are situated along the upgradient end of these two VOC plume areas.

Approximately 191.7 acres of the property has been subdivided for ongoing redevelopment. The Feasibility study focusses on approximately 16 acres that currently have VOCs (primarily tetrachloroethylene) in the groundwater above the drinking water standards. The Site is surrounded by wooded area, mixed-used apartment housing generally targeted for students and residential housing development. Jacabb Utilities currently owns and conducts wastewater treatment operations on a 7.6-acre parcel that is surrounded by the Site.

A pilot study was conducted at the Site between June 2016 and March 2017, that consisted of an in-situ injection of Anaerobic BioChem Plus (ABC+). A key objective of the pilot study was to evaluate the ability to deliver treatment chemicals to the appropriate depths in the aquifer. During the pilot study, the data revealed evidence of reduction to the VOC plume, but additional study was needed to evaluate the overall effectiveness.

In 2019, WestPoint Home conducted an expanded ABC+ Pilot study that included injections at 80 locations, with 2-foot vertical spacing. These 80 locations comprised an array of seven transects, installed perpendicular to the groundwater flow direction within the upgradient VOC plume. Injections were conducted between May 14 and July 10, 2019. A final performance monitoring event was conducted in March 2021. The data showed significant reductions in tetrachloroethylene (PCE) concentrations throughout the treatment area.

AREAS OF CONCERN

There are four known sources of the volatile organic compounds (VOC), primarily PCE, identified within the Site, that appear to have occurred as result of historical releases from the following source areas:

1. Underground process sewer line near former electrical switchyard area;
2. Underground process sewer line underlying the southern end of the former manufacturing building;
3. Former aboveground Varsol tank and historical USTs located near the southern end of the manufacturing building;
4. Former used oil UST located at the southwest end of the former manufacturing building.

SUMMARY OF SITE RISKS

The Site remains the ongoing focus of property redevelopment activities including construction of various student-related apartment complexes, residential community housing, and multi-use commercial structures have been constructed. Thus, the potentially exposed population at the site would reasonably include Site construction workers and community residents.

The primary concern at the site is contaminants present in groundwater above the maximum contaminant levels (MCL). The VOCs in groundwater present the possibility of two subsequent media pathways to completed or potentially completed exposure routes. They include groundwater migration to surface water and vapor intrusion from groundwater to dwellings constructed on the land surface above the VOC-affected groundwater area. Contamination from operations at the WestPoint Stevens site have been released to soil and groundwater. The latest analytical data indicates volatile organic compounds (VOCs) are present in soil and groundwater above regulatory standards. Site assessments has revealed that the VOC-affected groundwater is present at depths in excess of 20 feet below ground surface and not reasonably accessible to nearby workers and residents.

The primary risk to the public and the environment is from direct ingestion or exposure to contaminated groundwater on-site, and potential discharge from groundwater to surface water. Vapor intrusion of contaminants of concern from groundwater to indoor air is also a pathway of concern. Preferred alternatives identified in this Proposal plan and evaluated in the Feasibility Study are necessary to protect public health and the environment from actual or threatened releases of hazardous substances to the environment.

CLEANUP GOALS

Remedial action objectives (RAOs) are developed 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 remedial alternatives that can be developed. The remedial action objectives for the site are to reduce the mass of chemicals of concern in groundwater and to reduce the potential for off-site migration of chemicals of concern in groundwater to adjacent surface water. Accordingly, the following RAOs were developed for the Site:

- Reduce the potential for soil leaching to groundwater.
- Reduce source area groundwater impacts to further mitigate/control impacts to downgradient groundwater and streams.
- Restore groundwater to maximum contaminant levels.
- Reduce the risk of vapor intrusion of contaminants from groundwater to indoor air.

SCOPE AND ROLE OF THE ACTION

The proposed action in this Proposed Plan will be the final cleanup action for the Site. The injection of ABC+ into the groundwater will reduce the contamination and risk at this site. The remedial action objectives for this proposed action include reducing the potential of the leaching of contamination from the soil to groundwater and to further mitigate and control the migration of contaminants through groundwater and into surface water. As contamination will remain onsite a 5-year review will be required once the remedial action is conducted to evaluate the effectiveness of the remedy.

SUMMARY OF REMEDIAL ALTERNATIVES

Based on information collected during previous investigations, a *Revised Focused Feasibility Study* (TRC, December 2021) was developed to identify, and evaluate cleanup options and to address the contamination at the Site. This evaluation considered the nature and extent of contamination and associated potential human health risks developed during the remedial investigations and pilot studies to determine and evaluate potential remedial alternatives and their overall protection of human health and the environment. Each remedial alternative evaluated by the Department is described briefly below. Note: A final Remedial Design will be developed prior to implementation of any alternative.

Remedial Alternatives	Description
No Action	<ul style="list-style-type: none"> • No action for soil • No action for groundwater • Cost \$0
Monitoring Natural Attenuation	<ul style="list-style-type: none"> • Monitor natural degradation of COCs in groundwater with existing monitoring network • Implement restrictions on land and groundwater use • Cost: Approximately \$959,000
In Situ Chemical Oxidation (ISCO)	<ul style="list-style-type: none"> • Direct injection of a strong and aggressive chemical oxidant using direct push technology into the contaminated groundwater. • Monitor natural degradation of COCs in groundwater to address residual contamination following in situ remediation • Cost: \$4,321,000
Enhanced Reductive Dechlorination (ERD)	<ul style="list-style-type: none"> • Biologically mediated dechlorination process facilitated by soil microbes under anaerobic/low ORP conditions. • Monitor natural degradation of COCs in groundwater to address residual contamination following in situ remediation • Cost: \$2,347,000
Anaerobic BioChem plus (ABC+ Treatment)	<ul style="list-style-type: none"> • This integrated treatment method effectively combines the biological treatment effects of ERD and the physical/chemical treatment of ZVI. • The COCs are mitigated within the treatment area and treatment extends outward beyond the location of the ABC+ injections. • Cost: \$1,793,000

DESCRIPTION OF ALTERNATIVES

Alternative 1 - No Action

The No Action alternative is included as a baseline for comparison with other Alternatives. Under this remedial alternative, there would be no groundwater monitoring nor any further active remedial treatment measures. There is no cost associated with implementing this alternative.

Alternative 2- Monitoring Natural Attenuation

Monitored Natural Attenuation (MNA) is a passive approach that monitors the natural degradation or reduction in contaminant concentrations in groundwater. Groundwater chemistry and contaminants of concern are monitored to continually evaluate and confirm that natural degradation is occurring. A groundwater sampling and analysis plan would be developed to monitor remedy performance. Institutional controls (ICs) would be placed on the property to restrict land use and groundwater use. The existing monitoring well network at the Site would be utilized and maintained to address the monitoring requirements anticipated for an MNA site remedy for 30 years. The estimated total cost for the MNA alternative would be \$959,000.

Alternative 3 – In-Situ Chemical Oxidation

This in-situ treatment alternative involves treatment of the VOC-affected groundwater by direct injection of a chemical oxidant into the aquifer. When introduced into the subsurface, in situ Chemical Oxidation (ISCO) treatment media will aggressively oxidize and degrade the contaminants. The estimated total cost includes an eight-year period of targeted ISCO injections, followed by a four-year period of monitoring the groundwater. The estimated total cost for ISCO would be \$4,321,000.

Alternative 4 – Enhanced Reductive Dechlorination

Enhanced reductive dechlorination (ERD) is a biologically based treatment process in which many chlorinated and non-chlorinated hydrocarbons can be degraded by indigenous and bioaugmented soil microbes. This technology focuses on the growth of the anaerobic microbes to optimize the effectiveness of degrading chlorinated ethenes (i.e., PCE and TCE) to end-products of ethane, ethene and carbon dioxide. ERD typically involves the introduction of a prescribed mix of nutrients and treatment additives suitable for optimizing the growth of these highly specialized, microbes into the VOC-affected groundwater. The total estimated cost for ERD was developed by assuming that there would be a thirteen-year period of active ERD injections, followed by a seven-year period of monitoring the groundwater. The estimated total cost of the ERD alternative would be \$2,347,000.

Alternative 5- ABC+ Treatment

ABC+ is a hybrid between two in situ treatment alternatives, ERD and zero valent iron (ZVI) treatment. The "ABC" designation of this commercial product is an acronym for the term "anaerobic biochem", denoting a standard lactate based ERD formulation. The ERD reaction effectively dechlorinates the target organic contaminant mass, altering its chemical composition and reducing its apparent toxicity. The "+" designation of the ABC+ nomenclature denotes that finely milled ZVI has been included in the treatment formulation as an abiotic treatment component. The presence of ZVI in the treatment mix is innovative and useful, as it can also facilitate the redox reaction responsible for physio-chemical dechlorination of VOCs. This innovative treatment strategy results in a treatment process that embraces both biological and physio-chemical treatment attributes. This remedial alternative will address treatment of the VOC-affected groundwater using in situ treatment in much the same manner as has been previously described for ISCO and ERD. The treatment media will be delivered into the subsurface using direct-push technology. The total estimated cost for implementing Alternative 5 (ABC+) was developed by assuming a seven-year period for the ABC+ treatment injections, followed by an eight-year period of monitoring the groundwater. The estimated total cost of the ABC+ alternative would be \$1,793,000.

EVALUATION OF ALTERNATIVES

The National Contingency Plan requires the Department use specific criteria to evaluate and compare the different remediation alternatives individually and against each other 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. Long-term effectiveness and permanence;
4. Reduction of toxicity, mobility, or volume through treatment
5. Short-term effectiveness;
6. Implementability;
7. Cost; and
8. Community acceptance

The main objective for the preferred remedial action is to be protective of human health and the environment and to comply with State and Federal regulations. These objectives are considered threshold criteria and are requirements that each alternative must meet in order to be eligible for selection.

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 of the cleanup alternative is a *modifying criterion* that will be carefully considered by the Department prior to final remedy selection.

COMPARATIVE ANALYSIS OF ALTERNATIVES

A comparative analysis of each alternative was performed and can be observed in the EPA Performance Criteria table included. The alternatives were evaluated in relation to one another for each of the evaluation criteria. The purpose of the analysis is to identify the relative advantages and disadvantages of each alternative.

Overall Protection of Human Health and the Environment

When evaluating alternatives in terms of overall protection of human health and the environment, consideration is given to the way site-related risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Alternatives ABC+ and enhanced reductive dechlorination received a high score for this criterion because they reduce the potential of exposure to chemical of concerns (CoCs) and control down gradient migration of CoCs. The ABC+ remedy has been successfully pilot tested at the Site and has shown to result in a sustained decrease in contaminant concentration. In-Situ chemical oxidation received a moderate score for providing protection of human health and the environment, but it requires the use of chemical formulations that could present hazards and challenges to handle, inject and monitor. The No Action and MNA alternatives do not provide adequate protection of Human Health and the Environment as they do not control or reduce the groundwater contamination at the Site.

Compliance with ARARs (Applicable or Relevant and Appropriate Requirements)

This evaluation criterion evaluates whether an alternative meets federal and state environmental statutes and regulations that pertain to the site. Each alternative is evaluated with respect to its ability to comply with such requirements.

All of the alternatives listed would require a period of natural attenuation for the groundwater downgradient of the treatment area to reach regulatory limits with all of the alternatives received high to moderate scores for meeting the chemical specific ARARs, with the exception of No Action and MNA. The No Action and MNA alternative received the lowest score because regulatory limits would not be achieved in any portion of the plume during implementation.

Long-Term Effectiveness and Permanence

Each of the various remedial alternatives can be expected to achieve some level of contaminant reduction and effectiveness, but over widely varying timeframes. The anticipated timeframe for No Action and MNA would be significantly greater than for the other active treatment alternatives and does not involve an active treatment component which will have a poor long-term effectiveness. No action and MNA ranked low for long-term effectiveness.

Alternatives ISCO, ERD, and ABC+ each have an active treatment component and would provide for long term effectiveness of the contaminated VOC groundwater. These three alternatives rank higher due to each providing active treatment and would be a provide treatment effectiveness in a shorter timeframe.

Reduction of Toxicity, Mobility, or Volume through Treatment (TMV)

The degree to which an alternative employs treatment to reduce the harmful effects of contaminants, their ability to move in the environment, and the amount of contamination present is evaluated by this criterion.

ABC+ received the highest score due to it effectively treating the VOC contaminated groundwater in the pilot study. ISCO and ERD were given moderate ratings as they both would reduce contaminant concentrations. The No Action and MNA alternatives received lowest ranking because these remedies do not promote active treatment of contamination.

Short-Term Effectiveness

The short-term effectiveness evaluation takes into consideration any risk the alternative poses to on-site workers, the surrounding community, or the environment during implementation, as well as the length of time needed to implement the alternative.

ABC+ received the highest score due to it achieving the Site RAOs in a reduced timeframe relative to ERD. ISCO presents the greatest short term risk or impact to Site workers and nearby residents. Due to the chemical oxidants utilized with ISCO, it is possible that Site workers or nearby residents could experience exposure to the treatment chemicals and therefore it received a lower score. No Action and MNA received low scores due to its inability to protect human health and the environment in the short-term period.

Implementability

The analysis of implementability considers the technical and administrative feasibility of remedy implementation, as well as the availability of required materials and services needed for implementation.

The equipment and resources necessary to implement all of the Remedial Alternatives are readily available from multiple sources. ABC+ received the highest score, since many uncertainties were addressed during the pilot study. ISCO and ERD received moderate scores since an underground injection control permit must be obtained, and additional site information will need to be collected to confirm treatment effectiveness and extent. No Action and MNA received the moderate scores due to being able to implement the alternatives in a short time period.

Cost

The following table presents the probable cost for each alternative:

Alternative	Cost
1. No Action	\$0
2. Monitored Natural Attenuation	\$959,000
3. In-Situ Chemical Oxidation	\$4,321,000
4. Enhanced Reductive Dechlorination	\$2,347,000
5. ABC+	\$1,793,000

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 a preferred alternative to address the contamination in both the soil and groundwater at the Site. The preferred remedial alternative is Alternative 5, ABC+ Treatment.

Alternative 5, ABC+ Treatment is a hybrid between two in situ treatment alternatives, ERD and ZVI. This alternative is predicated upon the VOC-affected groundwater receiving in-situ treatment, delivered into the subsurface using DPT.

This Alternative was thoroughly evaluated for expanded field application during two pilot studies conducted at this site. These pilot studies demonstrated the reduction of VOC concentrations in the shallow and intermediate aquifer zones. This remedy would be implemented by conducting an initial ABC+ treatment event during the first year, followed by an extended period of performance monitoring to observe and document the extent and influence of the applied treatment. Targeted ABC+ treatment events would subsequently occur during ensuing years (i.e. Years 4 and 7), during which the residual VOC mass would receive further ABC+ treatment to address residual area of CoCs. Annual groundwater monitoring would be conducted at the site to ensure the progress of the treatment. This alternative has an estimated 15-year timeframe to achieve remedy completion.

The total estimated net present worth of this alternative combination is approximately \$1,793,000. It is the Department's judgment that the Preferred Alternative identified in this Proposed Plan is necessary to protect public health and the environment.

Alternatives 1-5 are compared against each other for groundwater cleanup. The final remedy will be a combination of remedies to address both medias. The tables below rank the alternatives from 0-5 based off their effectiveness for each category. The remedy with the highest total score is considered the best alternative for each media.

Comparative analysis of Alternatives Table:

Criterion	Alternative 1 No Action	Alternative 2 Monitored Natural Attenuation	Alternative 3 In Situ Chemical Oxidation	Alternative 4 Enhanced Reductive Dechlorination	Alternative 5 ABC+ Treatment
Protection Human Health and the Environment	1	1	3	5	5
Compliance with ARARs	1	1	5	5	5
Short-Term Effectiveness	1	1	4	4	5
Long-Term Effectiveness	1	1	4	4	5
Reduction of toxicity, mobility, & volume through Treatment	1	1	4	4	5
Implementability	3	3	4	5	5
Costs	5	3	1	3	4
Total Score	13	11	25	30	34