



AMENDMENT NO. 2
TO THE 1995 RECORD OF DECISION FOR THE
STANDARD CHLORINE OF DELAWARE INC. SUPERFUND SITE
OPERABLE UNIT TWO

NEW CASTLE COUNTY, DELAWARE

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Date

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LIST OF ACRONYMS

ARAR	applicable or relevant and appropriate requirement
AST	above ground storage tank
CERCLA	Comprehensive Environmental Recovery and Compensation Act
CFR	Code of Federal Regulations
DNREC	Department of Natural Resources and Environmental Control
DRGHW	Delaware Regulations Govern
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
LTDD	low temperature thermal desorption
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	operation and maintenance
OU	operable unit
PRAP	Proposed Remedial Action Plan
RAO	Remedial Action Objective
RI	remedial investigation
ROD	Record of Decision
SCD	Standard Chlorine of Delaware
TBC	to be considered
TSSA	Temporary Soil Storage Area
USC	United States Code

**Amendment No. 2 to the 1995 Record of Decision
Operable Unit Two
Standard Chlorine of Delaware Inc. Superfund Site**

I. INTRODUCTION

Site Name: Standard Chlorine of Delaware Inc. Superfund Site

Site Location: New Castle County, Delaware (see Figure 1)

Lead Agency: United States Environmental Protection Agency, Region III (EPA)

Support Agency: Delaware Department of Natural Resources and Environmental Control (DNREC)

Statement of Purpose

EPA issued a Record of Decision (ROD) for the Standard Chlorine of Delaware, Inc. Superfund Site (Site) on March 9, 1995. This Amendment No. 2 to the ROD (Amendment) identifies containment, with soil gas collection and treatment, as the Selected Remedy for the Operable Unit 2 (OU-2) Waste Piles, now referred to as the OU-2 Waste Pile Soils. The Selected Remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 USC §§9601 *et seq.*, and with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300.

This Amendment is issued in accordance with Section 117 of CERCLA, 42 USC §9617, and Section 300.435(c)(2)(ii) of the NCP, 40 CFR §300.435(c)(2)(ii). This Amendment has been prepared to document the nature of the modification to the selected remedy identified in the 1995 ROD; to summarize the information that led to the Amendment; and to affirm that the Amendment complies with the statutory requirements of CERCLA §121 and with the NCP. This Amendment fundamentally alters the remedy selected in the 1995 ROD with respect to scope, performance, and cost.

The OU-2 Waste Pile Soils that are the subject of this Amendment were one of several elements that were originally addressed in the 1995 ROD. The remedy selected in the 1995 ROD, with respect to the OU-2 Waste Pile Soils, was bioremediation, with a contingent remedy of low temperature thermal desorption (LTTD). In 2006, EPA relocated the OU-2 Waste Pile Soils from their original location next to the wetlands to the Temporary Soil Staging Area (TSSA) until a final remedy could be implemented (see Figure 2). This Amendment changes the remedy selected in the 1995 ROD from treatment of the OU-2 Waste Pile Soils, via either bioremediation or LTTD, to containment, with soil gas collection and treatment, within the multi-layer soil and geosynthetic materials cap that is part of the OU-3 remedial action at the Site.

This Amendment, and all documents relied upon to make the decision to amend the remedy selected in the 1995 ROD, is incorporated into the Administrative Record for the Site. The

Administrative Record is available for public review online at www.epa.gov/arweb and at the following locations:

EPA Administrative Records Room
Administrative Coordinator
1650 Arch Street
Philadelphia, PA 19103
Phone: (215) 814-3157
Hours: Monday- Friday 8:30 am to 4:30 pm
(by appointment only)

Delaware Department of Natural Resources &
Environmental Control
Site Investigation and Restoration Branch
391 Lukens Drive
New Castle, DE 19720-2774
(302) 395-2600

II. SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

Site History and Contamination

The Standard Chlorine of Delaware, Inc. Superfund Site (Site) is located in a heavily industrialized area in New Castle County, Delaware. The Site is located approximately three miles northwest of Delaware City, Delaware, west of Route 9 (River Road) and south of Red Lion Creek. The Site is approximately 65 acres, and contains a fenced area that is the former location of a chlorobenzene manufacturing plant (Plant) that was owned and operated by Standard Chlorine of Delaware, Inc. (SCD) until December 1998, and then by Metachem Products, LLC (Metachem) until 2002. Figure 2 shows former and current features of the Site.

The Plant manufactured chlorobenzenes from 1966 to 2002 by combining chlorine and benzene, reacting and then distilling them at high temperature, and preparing and storing them onsite prior to sale. Some of the chlorobenzenes were stored in heated steel aboveground storage tanks (ASTs). Leakage from pipes and ASTs throughout the Plant drained to Catch Basin #1. A crack in the concrete base of Catch Basin #1 was discovered and repaired in March 1976. The crack resulted in chlorobenzenes leaking into the subsurface soil for an unknown period of time.

Bulk liquid chlorobenzenes were often transported offsite by rail for commercial sale. An uncontrolled release of over 5,000 gallons of monochlorobenzene occurred in September 1981 in the rail car loading area on the west side of the Plant. In 1986, an AST collapsed and the resulting release of chlorobenzenes caused other tanks to fail. The 1986 release totaled over 569,000 gallons of di- and trichlorobenzenes. Together, these two major releases of chlorobenzene compounds and the resulting contamination of soils, sediments and groundwater led to the listing of the Site on the National Priorities List (NPL) in 1987.

Following the 1986 spill, which impacted soil and sediment in adjacent stream valleys and wetlands, SCD used heavy equipment to collect as much of the spilled chlorobenzene as was practicable. Initial recovery efforts included the use of wet dredging and a flexible hose to direct contaminated dredge spoils into a lined sedimentation basin constructed on SCD's property just north of the Plant fence. Contaminated soils were also stockpiled in waste piles (the OU-2 Waste Pile Soils) next to the wetlands. The OU-2 Waste Pile Soils were then covered with high density polyethylene plastic sheeting, and earthen berms were constructed around them. The average concentration of total chlorobenzenes in samples collected from the OU-2 Waste Pile

Soils was 50,000 parts per million. The OU-2 Waste Pile Soils remained in place until 2006, at which time EPA relocated the soils to an area just north of the former Plant to accommodate construction of the subsurface barrier wall required by the OU-1 interim groundwater remedy discussed below.

Scope and Role of Selected Remedy

The 1995 ROD did not reference OUs. In the 1995 ROD, EPA selected an interim action for groundwater and a final remedy for soils and sediment that included treatment by bioremediation, or LTDD, a contingent remedy, in the event EPA determined bioremediation was not effective.

This document amends the 1995 ROD to place the OU-2 Waste Pile Soils, as well as the encompassing TSSA soils, underneath the multi-layer impermeable cap that is currently being constructed as part of the OU-3 remedial action at the Site. EPA is not modifying the remedy for the remaining components of the final action for soils and sediments specified in the 1995 ROD, which include the western drainage gully, the eastern ditch, and the unnamed tributary to Red Lion Creek.

Response Actions

EPA has organized the cleanup work at the Site into four OUs:

- OU-1. Implementation of the Interim Groundwater Remedy specified in the 1995 ROD.
- OU-2. Spill soils and sediments, as described in the 1995 ROD.
- OU-3. The former Plant area, as described in the 2010 ROD.
- OU-4. Future final remedy for groundwater.

In December of 1998, the Site was sold to Metachem, who resumed the manufacture of chlorobenzenes. Metachem continued remedial design activities for what became known as OU-1 and OU-2. Part of the design activities included conducting a bioremediation pilot test to evaluate the effectiveness of bioremediation to remediate the OU-2 soils and sediments, described in the 1995 ROD. Metachem submitted the results of a bioremediation study in March 2001. EPA evaluated the results of the bioremediation pilot test and determined that bioremediation would not be effective at remediating the most highly contaminated OU-2 soils and sediments and that the contingent remedy of LTDD should be implemented.

Metachem filed a bankruptcy petition on May 10, 2002, and abandoned the Site on May 14, 2002 to the custody and control of EPA and DNREC. All remedial response actions from that time until the present have been conducted by EPA and DNREC with the use of Federal and State funds.

From 2002 through 2006, EPA and DNREC conducted a time critical emergency removal action at the Site that included the stabilization of hazardous chemicals; operation of the Plant to return the bulk of hazardous chemicals to the stream of commerce and minimize disposal costs; and decontamination of the Plant equipment. Following decontamination of the equipment, EPA and DNREC oversaw the dismantling and removal of equipment by a third party salvage operation. None of the former Plant equipment remains at the Site.

In 2003, EPA completed a preliminary remedial design to use LTDD to implement the OU-2 contingent remedy at the Site. For comparison purposes, the preliminary remedial design also evaluated off-site LTDD. The volume of soil and sediment requiring remediation was estimated to be 132,000 cubic yards. This estimate included the OU-2 Waste Pile Soils, which were estimated to contain 5,900 cubic yards of contaminated soil. The estimated cost for conducting LTDD on-site was \$56,500,000, while the estimated cost for the off-site alternative was \$125,400,000.

The remedy for OU-2 has not yet been fully implemented. Currently, EPA is characterizing the nature and extent of contamination to the environment in the adjacent wetlands and water bodies. EPA and DNREC are currently revising the human health and ecological risk assessment based on data from a recent large-scale characterization effort to determine the extent of soil and sediment to be remediated. EPA is working with the U.S. Geological Survey to evaluate various innovative in-situ and ex-situ bioremediation techniques for lesser-contaminated areas of the wetlands.

EPA issued an amendment to the 1995 ROD in 2004 (2004 ROD Amendment). This amendment selected offsite disposal (incineration) for the bulk liquid wastes left onsite following Metachem's bankruptcy in 2002. Removal of the bulk liquid wastes was completed by December 31, 2009.

Physical onsite construction of the OU-1 interim groundwater remedy was initiated in July, 2006 and completed in 2007. Construction of the interim groundwater remedy included a subsurface soil-bentonite barrier wall (barrier wall) and a groundwater extraction and treatment system. The barrier wall, which has an average depth of 65 feet below ground surface, is 5,290 feet long and surrounds a large portion of the Site, including the former Plant area. The barrier wall extends down to a naturally occurring clay layer, called the Merchantville formation, which is about 65 feet beneath ground surface. The Merchantville formation separates the overlying Columbia aquifer from the underlying Potomac aquifer. A network of six extraction wells that were drilled within the area of the barrier wall pump contaminated groundwater from the overlying Columbia aquifer. Contaminants in the groundwater are treated on Site using a combination of technologies, including air stripping, vapor and liquid phase carbon adsorption, bag filters and sand filters. The groundwater is treated to potable standards. The interim groundwater remedy has been effective at containing contaminated Columbia aquifer groundwater within the barrier wall and preventing it from migrating offsite. EPA will continue operating the interim groundwater remedy until a final remedy for groundwater is selected.

From June 2006 through May 2007, EPA constructed the subsurface barrier wall. To construct the subsurface barrier wall, EPA excavated soil from a 3-foot wide by 65-foot deep trench, mixed the excavated soil with bentonite slurry on the surface, and returned the mixture to the trench. This mixture created an impermeable barrier wall to contain contaminated groundwater in the Columbia Aquifer. Since the OU-2 waste piles were located directly where the subsurface barrier wall was to be constructed, EPA constructed a lined basin in an area inside of the subsurface barrier wall to temporarily store the OU-2 waste piles. EPA refers to this area as the Temporary Soil Storage Area, or TSSA. The bottom of the TSSA was lined with a coated polyester geomembrane.

In addition, EPA added approximately 7,000 cubic yards of contaminated soil that was generated during the barrier wall excavation to the TSSA. This soil came from the former railyard area,

which was significantly impacted by historical spills and was contaminated with high concentrations of chlorobenzenes. Concentrations of total chlorobenzenes within this area were as high as 12,000 parts per million.

Once the 5,900 cubic yards of soil contained in the OU-2 waste piles and the 7,000 cubic yards of soil generated during excavation of a portion of the barrier wall were consolidated in the TSSA, the contaminated soils were covered with 12 to 18 inches of imported compacted clay and topsoil. Passive vertical vents were installed to prevent the accumulation of volatile organic vapors. The TSSA was intended as a temporary measure to contain the contaminated soil until the selected remedy was implemented.

EPA issued an Explanation of Significant Differences (ESD) on March 6, 2008 that modified the 2004 ROD Amendment. The 2004 ROD Amendment established off-site incineration as the Selected Remedy for 1.3 million gallons of bulk liquid chemicals, but did not address any other excess bulk materials that remained on-site. The 2008 ESD significantly expanded the volume and associated treatment cost of excess bulk chemicals addressed under the 2004 ROD Amendment to include all excess bulk chemicals remaining on the Site.

The September 2010 ROD for OU-3 addresses the contamination in the vadose zone soils (soils above the water table) (OU-3 Soils) and soil gas in the former Plant area through capping, active soil gas collection and treatment, and institutional controls. EPA modified the 2010 ROD in 2011 to include the sedimentation basin with the OU-3 remedial action. Construction of the OU-3 selected remedy is currently underway. A 23-acre multi-layer soil and geosynthetic material cap (OU-3 Cap) is being constructed over the former Plant area and sedimentation basin. The active soil gas collection and treatment system will capture soil gas volatilizing from the soil and will treat it using granular activated carbon prior to venting it to the atmosphere. The objectives of the OU-3 remedial action are to prevent exposure to contaminated soil and soil gas, through inhalation, ingestion, or dermal contact; prevent risks to ecological communities exposed directly to the contaminated soil and indirectly via bioaccumulation of contaminated soil in plants and animals; and minimize the further spread of contamination to groundwater, surface water, sediment, and air. The impermeable cap and soil gas collection system will prevent vapors from emitting into the atmosphere, and will prevent rain water from infiltrating through the contaminated soil.

The final remedy for groundwater will be selected in the future as part of OU-4. EPA is currently completing a Remedial Investigation (RI) and Feasibility Study (FS) for the final remedy for groundwater. Once the RI/FS is completed, EPA will issue a Proposed Plan describing EPA's preferred alternative for groundwater.

III. REASONS FOR ISSUING AMENDMENT NO. 2

The TSSA was constructed as a temporary measure to contain the OU-2 Waste Pile Soils and the soil generated during the excavation of a small portion of the barrier wall. EPA has determined the most expeditious and cost-effective way to permanently address the soils within the TSSA is to place them under the OU-3 Cap. Construction of the OU-3 Cap is currently taking place, so the additional cost of placing the soils that are in the TSSA under the OU-3 Cap will be minimal. Furthermore, because the contamination present in the OU-2 Waste Pile Soils is similar to the

contamination in the OU-3 Soils, consolidating them does not significantly alter the OU-3 remedial action with respect to scope, performance, or cost.

The remedy selected in the 1995 ROD for the OU-2 Waste Pile Soils was bioremediation, or, if it was determined that bioremediation was not feasible, a contingent remedy of LTTD was selected. EPA evaluated a bioremediation study completed by Metachem in 2001, determined bioremediation was not a feasible treatment option for the most highly contaminated soil and sediments present in OU-2 soils and sediments, including the OU-2 Waste Pile Soils, and initiated a remedial design for LTTD. However, to treat the OU-2 Waste Pile Soils using LTTD, EPA must first complete the remedial design and secure adequate funding. The modification described in this Amendment will allow the OU-2 Waste Pile Soils to be addressed within the coming months. Additionally, the cost of placing the OU-2 Waste Pile Soils under the OU-3 Cap is a more cost effective approach than LTTD.

In accordance with Section 117 of CERCLA, 42 USC §9617, and Section 300.435(c)(2)(ii) of the NCP, EPA developed and issued a Proposed Remedial Action Plan (PRAP) in January 2016. The PRAP proposed placing the OU-2 Waste Pile Soils underneath the OU-3 Cap. The PRAP was released for public comment on January 3, 2016. A public meeting was held at the Delaware City Fire Hall on January 12, 2016. The comment period ended on February 4, 2016. EPA's responses to the substantive comments are included in the Responsiveness Summary Section of this Amendment.

IV. DESCRIPTION OF THE MODIFICATION TO THE REMEDY

The remedy selected in the 1995 ROD specified an interim action for groundwater and a final action for soils and sediments. This Amendment addresses only the OU-2 Waste Pile Soils component of the final action for soils and sediments. The original remedy selected in the 1995 ROD, with respect to the soils and sediments, is as follows:

Final Action of Soils/Sediments

The preferred final action for soils and sediments is biological treatment. This innovative technology has the potential for substantial risk reduction at a much lower cost than thermal treatment. The major steps of biological treatment are as follows:

- *Conduct biological treatability/pilot-scale studies to determine the ability of biological treatment to reduce the concentration of contaminants in the soils and sediments to cleanup criteria; and*
- *Bioremediate the soils/sediments along the western drainage gully, the eastern drainage ditch, the soils adjacent to Catch Basin #1, those along the railroad tracks and along the unnamed tributary to Red Lion Creek, in addition to those soils in the waste piles [ie the OU-2 Waste Pile Soils] and in the sedimentation basin using in-situ (in place) or ex-situ (excavated) treatment.*

Contingency Action for Soils/Sediments

If based on the results of the treatability studies or further testing during the remedial design phase, it is determined that bioremediation is not feasible for this Site, the preferred contingency remedy is Low Temperature Thermal Desorption (LTTD). The contingency remedy (LTTD) includes the following steps:

- *Excavate and treat the soils/sediments along the western drainage gully, the eastern drainage ditch, the soils adjacent to Catch Basin #1, those in the waste piles [ie the OU-2 Waste Pile Soils] and in the sedimentation basin, as well as the soils along the unnamed tributary to Red Lion Creek;*
- *Construct a low permeability asphalt cap along the railroad tracks and adjacent to Catch Basin #1; and*
- *Restore the wetlands damaged by the remedial action.*

Following review and consideration of the information in the Administrative Record, the requirements of CERCLA, the NCP, and public comment, EPA has selected the following remedial response action to be implemented at this Site with respect to the OU-2 Waste Pile Soils:

The OU-2 Waste Pile Soils will be excavated from the TSSA and placed on top of the subgrade soil within the bounds of the OU-3 Cap. The excavated soil will then be covered with a 12-inch gas collection layer of gravel; a geosynthetic clay liner; an impermeable geomembrane; 18 inches of imported soil; 6 inches of topsoil; and seeded with grass. Stainless steel piping placed in the 12 inch gas collection layer of gravel will convey soil gas to one of two granular activated carbon filters on the surface. The granular activated carbon filters will capture and remove contaminants from the soil gas. Through the use of an impermeable, multi-layer soil and geosynthetic material cap and the capture and treatment of contaminated soil gas, this remedy will permanently eliminate the potential for exposure to contaminated soil and related soil gas.

Remedial Action Objectives

The 1995 ROD identified Remedial Action Objectives (RAOs) to protect the public from potential current and potential future health risks, and to protect the environment from contaminants present in the soils and sediment. The 1995 ROD RAOs with respect to the OU-2 Waste Pile Soils included:

- Remediate soils and sediments to levels that are protective of human health and the environment.
- Minimize infiltration, run-on, and run-off of precipitation to areas containing subsurface contaminated soils and sediments.
- Reduce bioaccumulation of contaminants.

The remedy selected in this Amendment modifies one RAO from the 1995 ROD with respect to the OU-2 Waste Pile Soils, as identified in the table below:

1995 ROD RAO	Modified RAO
Remediate soils and sediments to levels that are protective of human health and the environment.	Prevent exposure to contaminants in the soil and soil gas via the potential exposure routes of inhalation, ingestion, and dermal contact.

Additionally, the following RAOs from the 1995 ROD will be met by the remedy selected in this Amendment for the OU-2 Waste Pile Soils:

- Minimize infiltration, run-on, and run-off of precipitation to areas containing subsurface contaminated soils and sediments.
- Reduce bioaccumulation of contaminants (the accumulation of contaminants in organisms).

V. SUMMARY OF ALTERNATIVES

A. Alternatives

Remedial alternatives for addressing the OU-2 Waste Pile Soils are presented below. The alternatives include the contingent remedy (LTTD) presented in the 1995 ROD, along with the remedy selected in this Amendment.

Alternative 1: Contingent Remedy, per the 1995 ROD - Low Temperature Thermal Desorption

Under this alternative, the OU-2 Waste Pile Soils would be remediated using LTTD to a level safe enough to allow the soil to be returned to the wetlands. LTTD is a technology in which the contaminated soil and sediment would be excavated and heated at temperatures ranging from 200 degrees to 1,000 degrees Fahrenheit, driving off water and volatile contaminants. The recovered liquid would be treated, and the recovery vapors would be either further heated in an afterburner to destroy the contaminants, or captured by carbon filtration units. The OU-2 Waste Pile Soils currently being stored in the TSSA would be remediated at the same time as the rest of the contaminated soil and sediment that are part of OU-2, and remediation would not occur until a final remedial design is completed and sufficient funding is received. The cost figures shown below apply only to remediation of the estimated 16,000 cubic yards comprising the TSSA. Costs are based on determinations made in the 2003 Preliminary Design, and have been adjusted for 2015 dollars. Under this alternative, the soil would be remediated to unrestricted use so there would be no operation and maintenance (O&M) costs.

<i>Estimated Capital Cost:</i>	<i>\$5,800,000</i>
<i>Estimated Annual O&M Cost:</i>	<i>\$0</i>
<i>Estimated Present Worth Cost:</i>	<i>\$5,800,000</i>

Alternative 2: Containment

Under this alternative, the OU-2 Waste Pile Soils would be placed underneath the cap during construction of the remedy for OU-3. Vapors from beneath the OU-3 Cap will be collected and treated with granular activated carbon prior to venting to the atmosphere. Potential exposure pathways to human health and the environment would be eliminated via capping and the collection and treatment of gas vapors. Because the OU-3 Cap is currently under construction, this alternative could be completed within the coming months. The addition of the estimated 16,000 cubic yards of soil from the TSSA (13,000 cubic yards of contaminated soil and 3,000 cubic yards of cover soil) would not have a significant impact on the scope, performance, or cost of the OU-3 remedy, because:

- The total volume of soils in the TSSA (approximately 16,000 cubic yards) is low compared to the total volume of soil already being capped within OU-3 (approximately 900,000 cubic yards);
- Contaminants present in the OU-2 Waste Pile Soils are consistent with the contaminants present in OU-3 Soils;
- The cost of placing the OU-2 Waste Pile Soils under the OU-3 Cap (\$300,000) is low compared to the estimated total cost for the OU-3 remedy (\$17.1 Million); and
- Placement of the OU-2 Waste Pile Soils under the OU-3 Cap would not have a significant increase in O&M labor or material costs because O&M will be conducted regardless of whether the OU-2 Waste Pile Soils are placed under the OU-3 Cap or not.

<i>Estimated Capital Cost:</i>	<i>\$300,000</i>
<i>Estimated Annual O&M Cost:</i>	<i>\$0</i>
<i>Estimated Present Worth Cost:</i>	<i>\$300,000</i>

B. Explanation of ARARs

Section 121(d) of CERCLA requires that remedial actions at Superfund sites at least attain legally applicable or relevant and appropriate cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law. These standards are collectively referred to as "ARARs" and they must be met unless such ARARs are waived under CERCLA § 121(d)(4).

"Applicable" requirements are those cleanup standards, standards of control, and other substantive environmental requirements, criteria or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a Superfund site. "Relevant and appropriate" requirements are those requirements that, while not legally "applicable," address problems or situations sufficiently similar to those encountered at a site that their use is well suited to the particular site. Only those State standards that are promulgated, are identified by the State in a timely manner, and are more stringent than Federal requirements may be applicable or relevant and appropriate. ARARs may relate to the substances addressed by the remedial action (chemical-specific), to the location of the site (location-specific), and/or to the manner in which the remedial action is implemented (action-specific).

In addition to applicable or relevant and appropriate requirement, the lead agency may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular remedial action. The “to be considered” (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other Federal agencies, or states that may be useful in developing CERCLA remedies. EPA did not identify any TBCs for this remedial action.

The identification of ARARs in this Amendment supplements the discussion of ARARs developed in the 1995 ROD, as well as the 2010 ROD for OU-3. Because the containment alternative presented in this Amendment involves placement of the OU-2 Waste Pile Soils within the OU-3 Cap area, only those ARARs related to handling and moving the OU-2 Waste Pile Soils to the OU-3 Cap area are presented in this Amendment. Once the OU-2 Waste Pile Soils have been placed in the area to be capped, the ARARs identified for the OU-3 Cap will be met, as specified in the 2010 ROD for OU-3. A complete description of the ARARs for OU-3 can be found in Section 12.2 and Table 17 of the 2010 ROD for OU-3.

The ARARs listed in the table in Attachment 2 have been identified for the Containment Alternative, which includes excavation of the TSSA and placement of the excavated soil, including the OU-2 Waste Pile Soils, within the OU-3 Cap area. As stated in the 2010 ROD for OU-3, one ARAR was waived pursuant to 40 CFR §300.430(f)(1)(ii)(C)(4). The ARAR that was waived is Delaware Regulations Governing Hazardous Waste (DRGHW) Part 264 Subpart N (§§264.300 through 264.317) and 40 CFR Part 264 Subpart N (§§264.300 through 264.317), which pertains to construction of an impermeable liner system for a hazardous waste landfill. The method of construction will attain a standard of performance equivalent to what would be attained through the construction of a liner system. The standard of performance equivalence is based on the presence of the Merchantville clay formation underlying the OU-3 area, as well as the thick clays of the upper part of the Potomac formation, which separate the overlying Columbia aquifer from the underlying Potomac aquifer. These naturally occurring clays serve as an impermeable barrier separating the contaminated groundwater in the upper aquifer from the deeper parts of the Potomac aquifer. The bottom of the barrier wall is keyed into these clays, which therefore allows for containment of the groundwater within the barrier wall.

VI. EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. The criteria are categorized into three groups.

- A. Threshold criteria.** Overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold criteria that each alternative must meet in order to be eligible for selection;
- B. Primary balancing criteria.** The five primary balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.

C. Modifying criteria. State and community acceptance are modifying criteria that shall be considered in remedy selection.

The nine criteria are discussed below.

Evaluation Criteria for Superfund Remedial Alternatives
1. Overall Protection of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment. While some alternatives may present better scenarios for overall protection, this criterion is not measured by degree. Each alternative is considered to be either protective or not protective. Only protective alternatives can be carried forward for detailed comparison.
2. Compliance with ARARs evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
3. Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
6. Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
7. Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total of an alternative over time in today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
8. State/ Support Agency Acceptance considers whether the State agrees with EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.
9. Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

This section of the Amendment profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration.

1. Overall Protection of Human Health and the Environment

Alternative 2, Containment, will protect human health and the environment by eliminating or mitigating exposure or the potential for exposure to Site-related contaminants by placing the OU-2 Waste Pile Soils underneath the OU-3 Cap which will include a soil gas collection and treatment system. This Alternative would provide protection of the environment for all areas of ecological concern within OU-3 by eliminating the exposure pathway.

Alternative 1, LTDD, would also protect human health and the environment by remediating the OU-2 Waste Pile Soils to the performance standards listed in the 1995 ROD so the soils can be returned to the wetlands.

2. Compliance with ARARs

The Containment Alternative will attain all ARARs related to handling and moving the OU-2 Waste Pile Soils to the OU-3 Cap area. Once the OU-2 Waste Pile Soils have been placed in the area to be capped, the ARARs identified for the OU-3 Cap, as well as an equivalent standard of protection relating to the liner system, will be met, as specified in the 2010 ROD for OU-3.

The LTDD remedy would attain ARARs by treating the OU-2 Waste Pile Soils to health-based clean-up levels.

3. Long-Term Effectiveness and Permanence

The long-term effectiveness criterion evaluates the protection of human health and the environment over time, once the remedial action goals have been achieved. It focuses on the magnitude of residual risk and the adequacy and reliability of controls.

The Containment Alternative will provide effective containment of all contaminants present in the OU-2 Waste Pile Soils by placing them underneath the OU-3 Cap. The soils will be covered by a 12-inch gas collection layer; a geosynthetic clay liner; an impermeable geomembrane; 18 inches of imported soil; 6 inches of topsoil; and seeded with grass. The soil gas capture system that is part of the OU-3 remedial action, along with the institutional control prohibiting the construction of any building on Site without prior written approval from EPA, are together expected to satisfactorily address the long-term effectiveness concerns associated with soil gas. Hydraulic containment will be achieved because the subsurface barrier wall surrounds OU-3, and extraction and treatment of contaminated groundwater within the barrier wall will continue. Containment will substantially reduce the risks related to, and the potential spread of, Site contaminants. To remain effective over the long term, operations and maintenance activities, including management of vegetation and burrowing animals and repairs of cracks and erosional features, are a long-term component of the OU-3 remedial action and the Containment Alternative. Because wastes will be left in place, reassessment of the effectiveness of this Alternative would be necessary at five-year intervals as required by CERCLA §121(c).

Alternative 1, LTDD, would result in the near-complete removal of contaminants from the OU-2 Waste Pile Soils and allow the soil to be re-used on the Site. The remedy would effectively and permanently remove the contamination once all of the soil is remediated.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Section 121(b) of CERCLA, 42 USC §9621(b), establishes a preference for remedial actions that include treatment that permanently and significantly reduces the toxicity, mobility, or volume of contaminants. High concentrations of chlorobenzenes (up to 50,000 parts per million) are

present in the OU-2 Waste Pile Soils that are within the TSSA, and are considered to be Principal Threat Waste. The chlorobenzenes present in the OU-2 Waste Pile Soils are not liquid, and therefore are not highly mobile, but are considered highly toxic due to the high concentrations of the contaminants. A definition of Principal Threat Waste is provided in Section VII of this Amendment.

The Containment Alternative will use a combination of permanent containment and soil gas collection and treatment within OU-3 to prevent the OU-2 Waste Pile Soils from impacting human health or the environment. This gas collection and treatment system will satisfy the preference for treatment of the soil gas. This Alternative will reduce the mobility of the contaminants through the use of a surface cap to reduce infiltration (reducing the soil to groundwater pathway), eliminate contact of contaminated materials with stormwater (eliminating the soil to sediment pathway), and capture and treat soil gas (eliminating the soil to air pathway). The OU-3 remedial action that is being constructed includes a gas collection and treatment system to meet the substantive provisions of air discharge permit requirements for off-gas from the cap's soil gas collection system because of the expected rate of discharge of contamination in soil gas that would be emitted if such gasses were directly vented. EPA expects that the soil gas capture and treatment component of the OU-3 remedial action will also reduce the toxicity or volume of the OU-3 organic contaminants, including the OU-2 Waste Pile Soils that are the subject of this ROD Amendment, to some degree, but it will not reduce the toxicity or volume of inorganic or semi-volatile organic compounds.

The LTTD remedy would use treatment to address the threats posed by contaminants present in the OU-2 Waste Pile Soils. The preference for treatment as a principal element is satisfied since treatment of contaminants using LTTD is the principal element of the contingent remedy.

5. Short-term Effectiveness

Short-term risks to construction workers and the environment are expected to occur from the implementation of the Containment Alternative. These risks include exposure to dust and vapors during construction activities, as well as continued risks from the current Site conditions before the alternatives are fully implemented. Short-term risks associated with this Alternative can be managed by a combination of personal protective equipment, and vapor and dust suppression measures to be employed during construction activities. Conducting the work in the winter months when ambient temperatures are low will reduce the vapors present. When the OU-2 Waste Pile Soils are being uncovered and the soils relocated, additional measures can be taken to address potential organic vapors including temporarily covering contaminated soil with foam and ensuring cover soil is placed over the material as soon as practicable once it is staged within the OU-3 area to be capped.

The same short-term risks to construction workers and the environment can be expected to occur during implementation of the LTTD remedy. The same risks to workers that are described above would apply to the LTTD remedy. However, the time taken to batch-treat the OU-2 Waste Pile Soils would be longer than the relatively short length of time to move and place the OU-2 Waste Pile Soils under the Containment Alternative.

6. Implementability

The Containment Alternative will be straightforward to implement, using conventional construction equipment and practices. Since it does not significantly impact the scope, performance, or cost of the OU-3 remedial action, relocation of the OU-2 Waste Pile Soils and remainder of soils within the TSSA to within the OU-3 area to be capped could be completed within three months of issuance of this ROD Amendment. Construction crews are already onsite for the OU-3 cap construction. No significant changes are necessary to the overall design of the OU-3 Cap because the volume of soil comprising the TSSA (approximately 16,000 cubic yards) will not impact the overall design.

Implementation of the LTTD remedy would require completing a remedial design and securing adequate funding. As stated earlier, remediation of the OU-2 Waste Pile Soils would be conducted at the same time as remediation of the remainder of OU-2, which includes sediment in the contaminated wetlands. It would likely be several more years before the OU-2 Waste Pile Soils could be addressed, because of the complexity of the remedial design and availability of remedial funding. Commercial LTTD units are available and therefore implementation of the LTTD remedy is technically practicable with respect to treating the OU-2 Waste Pile Soils.

7. Cost

The estimated present worth cost for the Containment Alternative is \$300,000. These costs include the labor and equipment costs to transport the OU-2 Waste Pile Soils and remainder of soils within the TSSA to the OU-3 Cap area. Placement of these soils within the OU-3 Cap area would not increase the area to be capped, so there are no additional costs. Since the Containment Alternative will not have a significant impact on the OU-3 remedial action, O&M costs are not being considered. O&M costs and efforts related to the Containment Alternative will be absorbed by the O&M that will be conducted as part of the OU-3 remedial action.

As a point of comparison, EPA completed a 15% Preliminary Design in 2003 to use LTTD to remediate all contaminated soil and sediment associated with OU-2, including the OU-2 Waste Pile Soils, which at that time had not yet been placed in the TSSA. The total volume of soil to be remediated was estimated at 130,000 cubic yards. The cost estimate for thermal oxidation was \$32.6 million, or \$251 per cubic yard. This estimate does not include site work, sampling, or restoration, which would be minimal when considering just the TSSA. Adjusted for inflation, the estimate is \$48.0 million, or \$369 per cubic yard. Therefore, the cost to remediate the OU-2 Waste Pile Soils and remaining soils within the TSSA using LTTD is estimated to be \$5.9 million.

8. State Acceptance

The State has expressed its support for the Selected Remedy – Containment. A letter of concurrence from the State to EPA is provided in Attachment 5.

9. Community Acceptance

EPA and DNREC encouraged the public to review and comment on each of the alternatives evaluated in the Proposed Plan, and other documents in the Administrative Record, during the public comment period which began on January 3, 2016 and ended on February 4, 2016. On Tuesday, January 12, 2016 at 6:30 p.m., EPA held a public meeting to discuss the Proposed Plan at the Delaware City Fire Hall located in Delaware City, Delaware.

Comments received during the comment period for the Proposed Plan were generally in support of EPA's Preferred Alternative. Questions and comments were related to the location and nature of contamination in the OU-2 Waste Pile Soils, and the steps that would be taken to limit dust, vapors, and worker exposure. A more detailed summary of relevant comments and questions received at the public meeting and during the public comment period is included in the Responsiveness Summary section in Attachment 3 to this Amendment.

VII. PRINCIPAL THREAT WASTE

EPA characterizes waste on-site as either principal threat waste or low-level threat waste. The concept of principal threat waste and low-level threat waste, as developed by EPA in the NCP, is applied on a site-specific basis when characterizing source material. "Source material" is defined as material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, to surface water, to air, or that act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile, which would present a significant risk to human health or the environment should exposure occur. The chlorobenzenes present in the OU-2 Waste Pile Soils are not liquid, and therefore are not highly mobile, but are considered highly toxic due to the high concentrations of the contaminants. The soils in the TSSA, with levels of chlorobenzenes as high as 50,000 parts per million, are considered Principal Threat Wastes at the Site.

The Selected Remedy does not include treatment as a primary component of the remedy. Rather, the contaminants will be contained. The Selected Remedy (Containment) will reduce the mobility of the contaminants through the use of a surface cap to reduce infiltration (reducing the soil to groundwater pathway), eliminate contact of contaminated materials with stormwater (eliminating the soil to sediment pathway), and capture and treat soil gas (eliminating the soil to air pathway). The OU-3 remedial action that is being constructed includes a gas collection and treatment system to meet the substantive provisions of the air discharge permit requirements for off-gas from the cap's soil gas collection system because of the expected rate of discharge of contamination in soil gas that would be emitted if such gasses were directly vented.

EPA expects that the soil gas capture and treatment component of the OU-3 remedial action will also reduce the toxicity or volume of the OU-3 organic contaminants, including the OU-2 Waste Pile Soils that are the subject of this ROD Amendment, to some degree, but it will not reduce the toxicity or volume of inorganic or semi-volatile organic compounds. This gas collection and treatment system will satisfy the preference for treatment of the soil gas.

VIII. SUPPORT AGENCY COMMENTS

The State has expressed its support for the Selected Remedy – Containment. A letter of concurrence from the State to EPA is provided in Attachment 5.

IX. SELECTED REMEDY

Following review and consideration of the information in the Administrative Record, the requirements of CERCLA and the NCP, and public comments, EPA has selected the following as the remedy for the OU-2 Waste Pile Soils: Alternative 2, Containment.

X. STATUTORY DETERMINATIONS

Under Section 121 of CERCLA, 42 USC §9621, the lead agency must select remedies that protect human health and the environment, comply with ARARs (unless a statutory waiver is justified), be cost-effective and use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Additionally, CERCLA includes a preference for remedies that use treatment to significantly and permanently reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the Selected Remedy for the OU-2 Waste Pile Soils meets these statutory requirements.

A. Protection of Human Health and the Environment

The Selected Remedy will protect human health and the environment by eliminating or mitigating exposure or the potential for exposure to Site-related contaminants by placing the OU-2 Waste Pile Soils within the OU-3 Cap area, where they will be covered with an impermeable surface cap including a soil gas collection and treatment system. The Selected Remedy will provide protection of the environment by eliminating the exposure pathway to contaminated soil. OU-3 Cap operation and maintenance requirements will ensure long-term protection of human health and the environment.

B. Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy will attain all ARARs identified in Attachment 2 to this Amendment. Once the OU-2 Waste Pile Soils have been placed in the area to be capped, the ARARs identified for the OU-3 Cap will be met, as specified in the 2010 ROD for OU-3.

C. Cost Effectiveness

According to the NCP, 40 CFR §300.430(f)(1)(ii)(D), “[a] remedy shall be cost-effective if its costs are proportional to its overall effectiveness.” EPA has determined that the Selected Remedy for the OU-2 Waste Pile Soils is cost-effective and represents a reasonable value for the money spent. The Selected Remedy meets the threshold criteria of protectiveness and ARAR compliance; it will be effective in both the short and long-term; it is implementable; and it is acceptable to the State and to the public.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The Selected Remedy utilizes permanent solutions and alternative treatment technologies to the extent practicable. When compared to the LTTD alternative, EPA has determined the Selected Remedy provides the best balance in terms of the five balancing criteria and State and community acceptance.

The Selected Remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. Rather, the contaminants will be contained. The Selected Remedy will reduce the mobility of the contaminants through the use of a surface cap to reduce infiltration (reducing the soil to groundwater pathway), eliminate contact of contaminated materials with stormwater (eliminating the soil to sediment pathway), and capture and treat soil gas (eliminating the soil to air pathway). The OU-3 remedial action that is being constructed includes a gas collection and treatment system to meet the substantive provisions of the air discharge permit requirements for off-gas from the cap's soil gas collection system because of the expected rate of discharge of contamination in soil gas that would be emitted if such gasses were directly vented.

Although the LTTD alternative was given careful consideration, EPA determined that the Selected Remedy is the most efficient and cost-effective alternative to permanently address the OU-2 Waste Pile Soils. Further, contaminated soil gas that collects underneath the OU-3 Cap will be captured and treated, which over time will reduce the toxicity and volume of contaminants present in the OU-2 Waste Pile Soils.

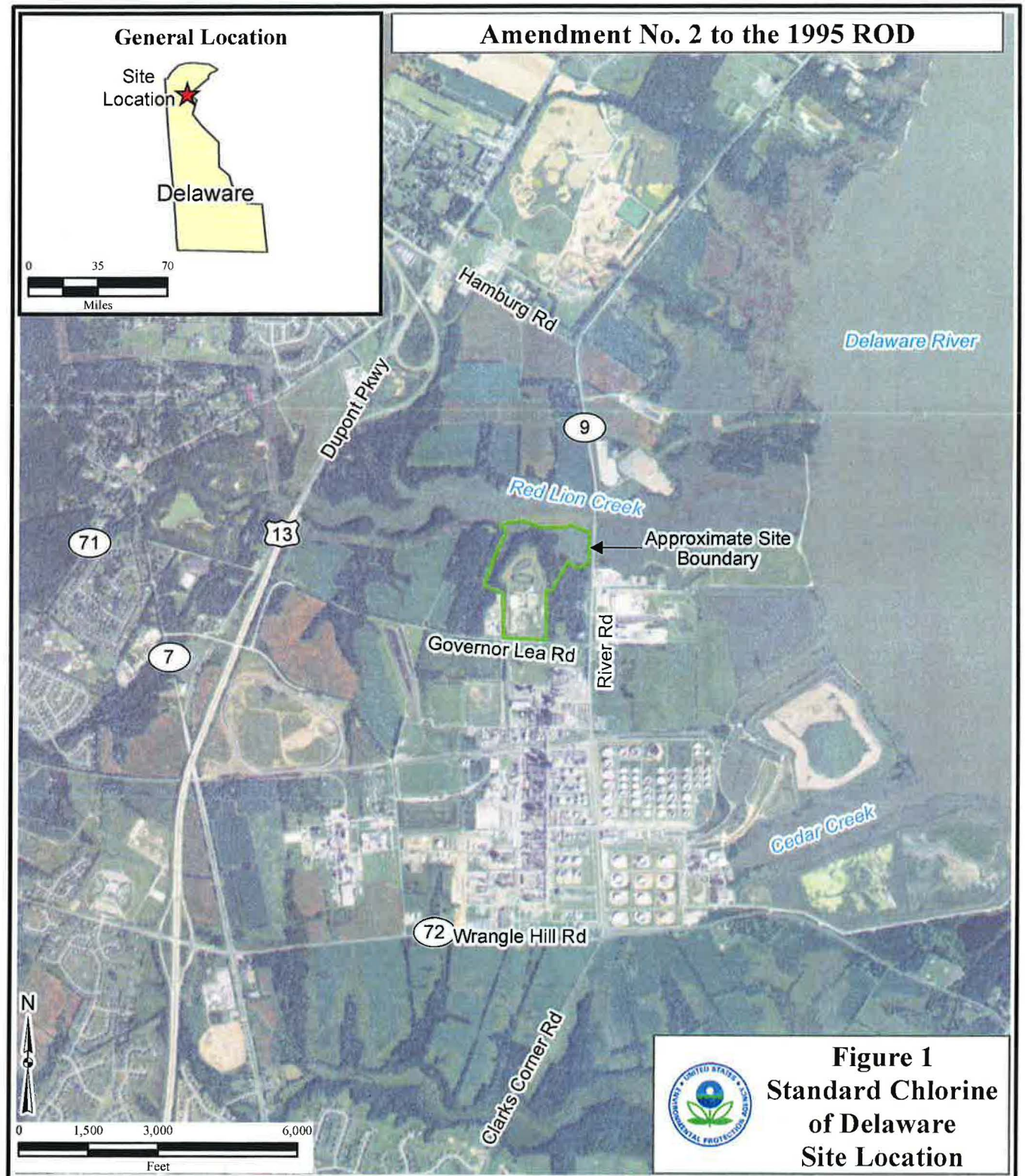
E. Five-Year Review Requirements

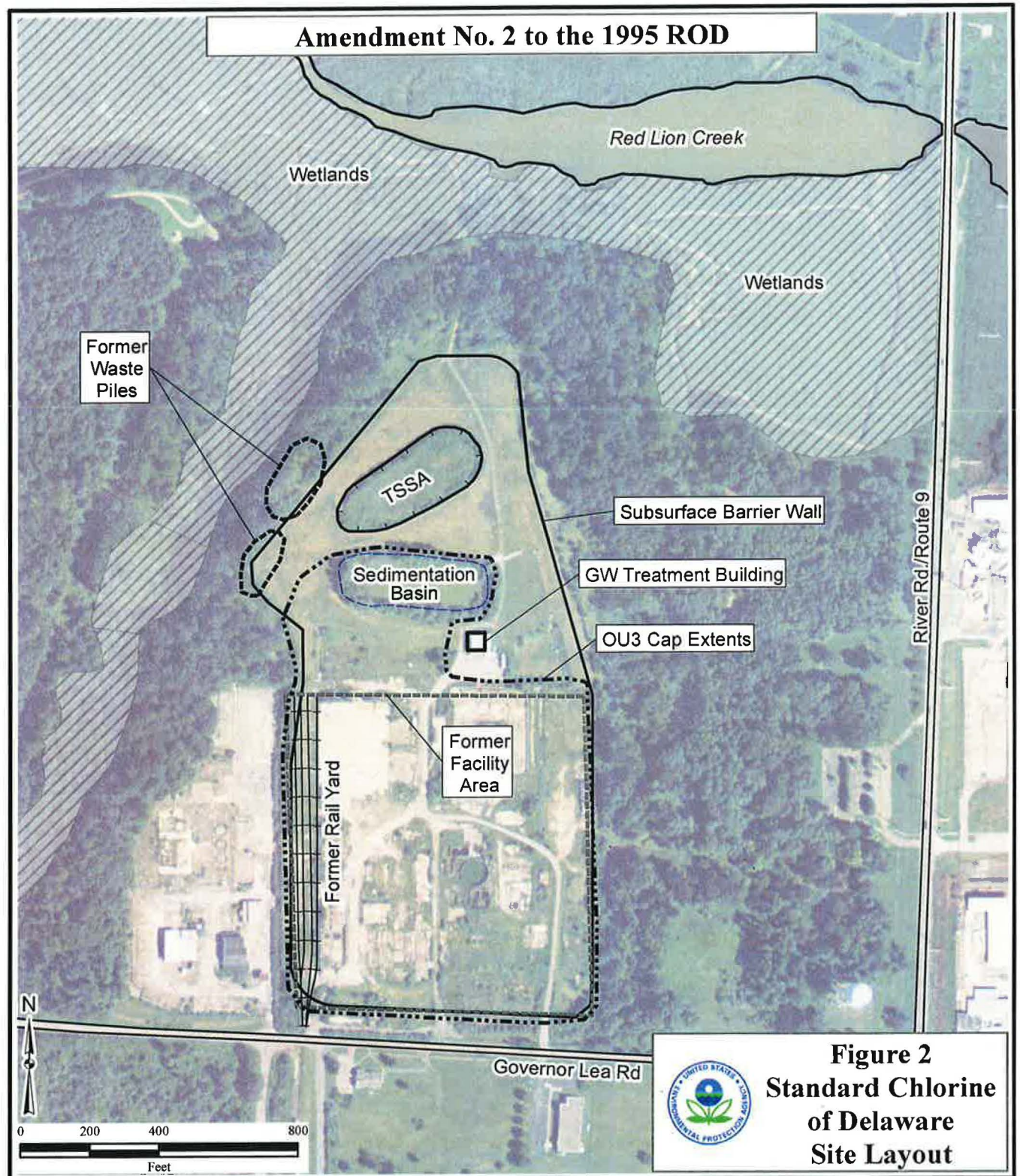
Because the Selected Remedy will result in hazardous substances remaining on Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years to ensure that the remedy is, or will be, protective of human health and the environment pursuant to CERCLA Section 121(c) and the NCP, 40 CFR §300.430(f)(4)(ii) and 300.430(f)(5)(iii)(C). The first review for the Site was conducted in 2011. The next five-year review is scheduled to be completed in 2016 and additional reviews will be conducted every five years thereafter.

XI. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan was released for public comment in January 2016. The Proposed Plan identified Alternative 2 – Containment, as the Preferred Alternative for the OU-2 Waste Pile Soils. EPA reviewed all written and verbal comments submitted during the public comment period. The comments received were supportive of the Preferred Alternative, and therefore the Selected Remedy has not changed from the Preferred Alternative described in the Proposed Plan.

ATTACHMENT 1 – FIGURES





ATTACHMENT 2 – ARARs

Attachment 2

Applicable or Relevant and Appropriate Requirements (ARARs)

for the Selected Remedy for OU-2 Waste Pile Soils

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Alternative
Coastal Zone Management Act of 1972; Coastal Zone Act Reauthorization Amendments of 1990.	16 USC 1451, 1452, 1453, 1456	Applicable	Requires that Federal agencies conducting activities in or affecting the coastal zone, conduct those activities in a manner that, to the maximum extent practicable, is consistent with the enforceable policies of the appropriate approved State coastal zone management program.	The substantive requirements are applicable to this remedial action, which is being conducted by EPA at a facility that is located in the Delaware coastal zone.

Attachment 2

Applicable or Relevant and Appropriate Requirements (ARARs)

for the Selected Remedy for OU-2 Waste Pile Soils

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Alternative
Delaware Coastal Zone Act; Delaware Regulations Governing the Coastal Zone	7 Delaware Code, Chapter 70, at Sections 7002-7003; Delaware Coastal Zone Act Regulations of May 11, 1999, amended on October 1, 2001, Sections A-E	Applicable	Govern permissible activities and land uses for properties located in Delaware's Coastal Zone. Section 7003 of the Act sets forth the uses that are absolutely prohibited in the Coastal Zone. Section E of the regulations specifically allows the, "installation and modification of pollution control and safety equipment for nonconforming uses within their designated footprint providing such installation and modification does not result in any negative environmental impact over and above impacts associated with the present use."	The Site is located in the Coastal Zone. As a result, the substantive standards of the statute and regulations apply to this remedy.

Attachment 2

Applicable or Relevant and Appropriate Requirements (ARARs)

for the Selected Remedy for OU-2 Waste Pile Soils

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Remedies
Delaware Regulations Governing Hazardous Waste (DRGHW)	SEE ITEMS 1 AND 2 BELOW The DRGHW provisions that are a part of Delaware's Federally authorized program would apply instead of the Federal RCRA regulations. Additionally, any provision that is not a part of the authorized program, but that is more stringent than the Federal requirement, would also be applicable.	Applicable	Regulate the transportation, management, treatment, and disposal of hazardous wastes.	SEE ITEMS 1 AND 2 BELOW

Attachment 2

Applicable or Relevant and Appropriate Requirements (ARARs)

for the Selected Remedy for OU-2 Waste Pile Soils

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Remedies
Regulations promulgated pursuant to the Resource Conservation and Recovery Act of 1976; Hazardous and Solid Waste Amendments of 1984	SEE ITEMS 1 AND 2 BELOW Federal RCRA regulations would not apply for those regulations where Delaware has the authority from EPA to administer. Federal citations are also included in items 2 through 6 below because any Federal regulations that are imposed under the Hazardous and Solid Waste Amendments of 1984, which are not a part of Delaware's authorized program, and which are immediately effective, would apply.	Applicable	Regulates the management of hazardous waste, to ensure the safe disposal of wastes, and to provide for resource recovery from the environment by controlling hazardous wastes "from cradle to grave."	SEE ITEMS 1 AND 2 BELOW

Attachment 2

Applicable or Relevant and Appropriate Requirements (ARARs)

for the Selected Remedy for OU-2 Waste Pile Soils.

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Remedies
1. Identification and Listing of Hazardous Wastes	DRGHW Part 261	Applicable	Identifies solid wastes which are regulated as hazardous wastes.	This part of the regulations will be used to determine which materials must be managed as hazardous wastes.
2. Standards Applicable to Generators of Hazardous Waste	DRGHW Part 262 subpart A (sections 262.10-262.12) and § 262.34; 40 CFR Part 262. subpart A (§§ 262.10-262.12 and § 262.34)	Applicable	Establishes standards for generators of hazardous wastes including waste determination and requirements regarding accumulation time.	The substantive standards of the listed sections would be applicable to excavated soils placed under the OU-3 cap.
Delaware Regulations Governing Hazardous Substance Cleanup, 9/96, as amended 07/11/2015	Subsections 1.1 – 1.3, and 11.2	Applicable	Establishes surface water cleanup levels.	Applicable to the cleanup of soils where there may be a discharge to surface water from the Site.
Delaware Sediment and Stormwater Regulations, 01/23/1991, as amended 11/01/2014	Delaware Administrative Code Title 7, Section 5101, subsections 1-6	Applicable	Establishes a statewide sediment and stormwater management program.	The substantive provisions of this regulation are applicable to stormwater from the construction area. No permits or plans will be obtained or prepared.

Attachment 2

Applicable or Relevant and Appropriate Requirements (ARARs) for the Selected Remedy for OU-2 Waste Pile Soils

ARAR	Legal Citation	ARAR Class	Requirement Synopsis	Applicability to Proposed Remedies
Delaware Air Quality Management Regulations	Air Quality Management Regulations Number 1102 (Section 11.6), 1103 (Sections 3 and 11), 1106, 1119, 1124	Applicable	Regulation No. 1102 sets forth the permitting requirements for equipment and construction activities that may discharge air contaminants into the atmosphere. Regulation No. 1103, sections 3 and 11, establish ambient air quality standards for particulates. Regulation No. 1106 limits particulate emissions from excavation/ construction operations. Regulation No. 1119 requires that odorous air contaminants be controlled. Regulation No. 1124 requires the control of emissions of the volatile organic compounds.	Applicable to potential releases from soil gas capture systems, excavation work, or other remedial actions. If soil gas system emissions exceed the appropriate regulatory limit, the substantive requirements of regulation No. 1124 must be met. In addition, the emissions must meet the Ambient Air Quality Standards set forth in Regulation No. 1103. Dust suppression measures must also be in place to ensure that excavation and construction activities meet the regulation requirements. Furthermore, the substantive requirements of Regulation No. 1102 must be met.

ATTACHMENT 3 RESPONSIVENESS SUMMARY

**RESPONSIVENESS SUMMARY
STANDARD CHLORINE OF DELAWARE, INC. SUPERFUND SITE
OPERABLE UNIT 2
NEW CASTLE COUNTY, DE**

This responsiveness summary addresses public comments received during the public comment period, which EPA has determined to be relevant to the selection of a cleanup method for the Operable Unit (OU) 2 Waste Pile Soils. Immediately below is a brief overview, followed by a summary of public comments and EPA's responses.

OVERVIEW

On January 3, 2016, EPA published the Proposed Remedial Action Plan (PRAP) for amending the 1995 Record of Decision (ROD) with respect to the OU-2 Waste Pile Soils. The PRAP summarized EPA's proposal to modify the remedy selected in the 1995 ROD, specifically as it related to the OU-2 Waste Pile Soils. EPA's public comment period ran from January 3 through February 4, 2016. EPA held a public meeting on January 12, 2016 to discuss the PRAP with the public and to solicit public comments.

EPA received comments on the PRAP at the public meeting and through email. EPA carefully considered all comments received prior to reaching a final decision regarding the remedy for OU-2 Waste Pile Soils. Amendment No. 2 to the 1995 ROD details EPA's final remedy decision.

The comments received were in support of EPA's proposed remedy, therefore, it was not necessary to make any changes to the proposed remedy. Containment of the OU-2 Waste Pile Soils represents the best balance with respect to the nine criteria EPA uses to evaluate remedial alternatives (See ROD Amendment No. 2 Section VI).

SUMMARY OF COMMENTS FROM THE PUBLIC MEETING

This section provides a summary of the public comments from the public meeting held on January 12, 2016.

Comment 1: How many cubic yards of contaminated soil are contained within the Operable Unit 3 area that is being capped, compared to the volume of contaminated soil in the OU-2 Waste Piles and remainder of soil EPA is proposing to place under the cap?

EPA Response: There are approximately 900,000 cubic yards of contaminated soil in OU-3. The volume of soil EPA is proposing to place under the cap, including the OU-2 Waste Pile Soil and remainder of soil within the TSSA, is approximately 16,000 cubic yards.

Comment 2: Does very much of the OU-3 soil have the same high levels of contamination as the Waste Pile Soils?

EPA Response: EPA determined the soil within OU-3 is contaminated with Site-related contaminants at concentrations that would pose a threat to human health and the environment if no remedial action were implemented. The final remedy selected for OU-3 is placement of a multi-layer soil and geosynthetic cap over the OU-3 Soils, along with the collection and treatment of contaminated soil gas. The contaminants present in the OU-3 Soils are similar to those in the OU-2 Waste Pile Soils. Some of the OU-3 Soils, including those found near the former rail yard and former Catch Basin 1, contain levels of contamination similar to the soil that is within the Temporary Soil Staging Area, including the OU-2 Waste Pile Soils.

Comment 3: Having had experience with these chemicals myself, one of the main means of contact is through the skin. And so there can be a sort of sense that you're getting protection by wearing a respirator, but if there are too many fumes, or if there is material getting through your clothes, you really have to be careful. You probably already went through this, but you might have different people coming in and they have to be very careful about that.

EPA Response: Workers at the Site will wear appropriate levels of personal protection, including chemical protective suits and gloves, in addition to respiratory protection when required. Air monitoring will be conducted to ensure a safe work area and to determine if it is necessary to upgrade to respiratory protection. While Site work is conducted, daily health and safety meetings will be held to discuss chemical hazards and proper personal protection.

Comment 4: One follow-up is that the rubbery materials can be penetrated by the oils, so you might be throwing the gloves out every day.

EPA Response: Protective suits and gloves will be selected based on their resistance to Site contaminants. Personal protective equipment, including respirator cartridges, protective suits, and gloves will be replaced on a daily basis, or sooner if necessary, and be disposed of in accordance with the Site Pollution Control and Mitigation Plan and Applicable or Relevant and Appropriate Requirements.

Comment 5: My other comment, and this is for the record: My name is Seth Ross, representing Delaware Nature Society. I followed this for years and I think I can say that I think this is a good approach. I'm confident that it's an effective approach provided there is long-term surveillance of the Site, which I think you've assured me there will be.

EPA Response: EPA appreciates the supporting comment. Ultimately, the State of Delaware will be responsible for the long term operation and maintenance of the Site. EPA will, however, continue to monitor Site conditions for as long as waste remains at the Site, and conduct a review of the Site to verify the remedy remains protective of human health and the environment every five years.

COMMENTS FROM OTHER SOURCES (EMAIL)

Comment 6: I saw the new plan to bring the OU-2 soils back to the site to place under the cap. We are concerned with your soil disturbing activities making odor and contaminated dust. Where exactly are these soils now?

EPA Response: The soils in question (referred to in the Proposed Plan as the OU-2 Waste Pile Soils) are currently being stored in the Temporary Soil Storage Area (or TSSA), which is located to the north of the groundwater treatment building. If the soils are relocated to the OU-3 Cap area, EPA will ensure there are adequate engineering controls in place to prevent dust or volatile organic compound vapors (VOCs) from migrating offsite. Those engineering controls will include the use of water to suppress dust, and spray foam and cover soil to suppress vapors, as necessary. Additionally, EPA will continue to conduct both interior and perimeter air monitoring to ensure there are not unsafe levels of dust or VOCs being generated. If necessary, EPA will also conduct air monitoring at adjacent properties to verify elevated levels of dust or VOCs are not being emitted the from the Site.

ATTACHMENT 4 ADMINISTRATIVE RECORD INDEX

STANDARD CHLORINE OF DELAWARE, INC. SITE *

OU 2 REMEDIAL ADMINISTRATIVE RECORD FILE

INDEX OF DOCUMENTS

III. REMEDIAL RESPONSE PLANNING

1. Record of Decision, Standard Chlorine of Delaware Site, 3/9/95, P. 308666-308803. The following are attached: **
 - a) a Site Location Map;
 - b) Figure 2 - 1981 Release Flow Pathways;
 - c) Figure 3 - 1986 Release Flow Pathways;
 - d) Figure 4 - RI/FS Areas Evaluated;
 - e) Figure 5 - 1981 Release;
 - f) Figure 6 - 1986 Release Pathway, Soil Analytical results;
 - g) Figure 7 - Wetland Sediment Sample Analytical Results;
 - h) Figure 8 - Red Lion Creek and Unnamed Tributary, Sediment Analytical Results;

* Administrative Record File available 12/29/15, **updated** //.

** Document is incorporated by reference from the Standard Chlorine (OU 1) Administrative Record File.

- i) Figure 9 - Concentration Map of Total Concentrations of SCD Analyzed Parameters in Columbia Formation;
- j) Figure 10 - Wetland Delineation;
- k) Figure 11 - Alternative 2, Conceptual Layout of Proposed Remedial Actions;
- l) Figure 12 - Proposed Remedial Actions in Wetlands;
- m) Figure 13 - Alternatives 3, 4A, 4B, 5A, 6, Conceptual Interceptor Trench/Physical Barrier Location;
- n) Figure 14 - Alternative 3, Conceptual Layout of Proposed Remedial Actions;
- o) Figure 15 - Alternatives 4A, 4B, 5A, Proposed Remedial Actions;
- p) Figure 16 - Proposed Remedial Actions;
- q) Table 1 - Descriptive Statistics for Chemicals of Concern in On-Site Surface Soils;
- r) Table 2 - Descriptive Statistics for Chemicals of Concern in Off-Site Surface Soils;
- s) Table 2 - Descriptive Statistics for Chemicals of Concern in Off-Site Sediments;
- t) Table 4 - Exposure Scenarios and Potential Exposure Routes;

- u) Table 5 - Summary of Carcinogenic Risks, and Table 6 - Summary of Non-Carcinogenic Hazard Indices;
 - v) Table 7 - Summary of Analytical Results, Fish Sampling;
 - w) Table 8 - EPA Analytical Data, March 1990 Fish sampling Event, Red Lion Creek;
 - x) Table 9 - Summary of Alternatives;
 - y) Table 10 - ARARs and "To Be Considered Material;"
 - z) the Responsiveness Summary;
 - aa) a letter dated February 23, 1995 concerning DNREC's concurrence with the ROD.
2. Report: Biodegradation Treatability Study Report, Biotreatability Soil Pile Studies, Metachem Products, New Castle, Delaware, prepared by Conestoga-Rovers & Associates (CRA), 3/23/01. P. 300001-300109.
 3. Letter to Mr. Kenneth Hannon, Metachem Products, LLC, from Mr. Hilary Thornton, U.S. EPA, re: EPA Review of Bioremediation Treatability Study Report, 8/23/01. P. 300110-300115. A May 3, 2001, memorandum to Mr. Hilary Thornton, U.S. EPA, from Dr. Mary Gonsoulin, U.S. EPA, regarding Review of the *Biodegradation Treatability Study Report, Biotreatability Soil Pile Studies*, is attached.
 4. Report: Soil/Sediment Design Comparison (15%) Study, Standard Chlorine of Delaware Site, New Castle ^{1***}

Document is incorporated by reference from the Standard Chlorine OU 3 Remedial Administrative Record File.

County, Delaware, prepared by Black & Veatch Special Projects Corp., 6/03.

5. Record of Decision (ROD) Amendment No. 1, Standard Chlorine of Delaware Inc. Superfund Site, New Castle County, Delaware, 9/23/04. **
6. Explanation of Significant Differences, Standard Chlorine Site, New Castle County, Delaware, 3/6/08. A SCD site location map, undated, is attached. **
7. Record of Decision, Operable Unit 3 (Former Area), Standard Chlorine of Delaware, Inc. Superfund Site, 9/29/10. *** Plant
8. Memorandum to Site File from Hilary M. Thornton, EPA, re: Incorporation of Sedimentation Basin under OU3 Cap, 08/11/11. *** U.S.
9. Report: Final Remedial Design, Standard Chlorine ^{ΔΔ} of Delaware: Operable Unit 3, prepared by HydroGeoLogic, Inc. (HGL) and CH2MHill, 6/12. P. 300116-300915.
10. Report: Remedial Action Report, Operable Unit 1 ^{ΔΔ} Interim Groundwater Remedy, Standard Chlorine of Delaware Site, New Castle, Delaware, prepared by HGL, 12/18/13. P. 300916-300974.
11. Proposed Plan for Record of Decision Amendment, Operable Unit 2, Standard Chlorine of Delaware Superfund Site, 1/16. P. 300975-300997.

^{ΔΔ} Document has been redacted due to potential confidential business information. Redactions are evident from the face of the document.

V. COMMUNITY INVOLVEMENT/CONGRESSIONAL CORRESPONDENCE/IMAGERY

1. Transcript of Public Hearing, Standard Chlorine Superfund Site, 1/12/16. P. 2199358.

ATTACHMENT 5 STATE CONCURRENCE LETTER



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
& ENVIRONMENTAL CONTROL
DIVISION OF WASTE AND HAZARDOUS SUBSTANCES
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

OFFICE OF THE
DIRECTOR

TELEPHONE: (302) 739-9400
FAX: (302) 739-1894

February 18, 2016

Mr. Brad White
Remedial Project Manager
US EPA Region III
1650 Arch Street (3HS23)
Philadelphia, PA 19103-2029

**RE: State of Delaware Concurrence for Standard Chlorine of Delaware /
Metachem (OU-2) Record of Decision (DE-0053)**

Dear Mr. White:

Thank you for the opportunity of reviewing and commenting on the US EPA's selected remedy and Record of Decision for the Standard Chlorine of Delaware / Metachem Superfund site near Delaware City, Delaware. The State of Delaware hereby concurs with Amendment No 2 to the 1995 Record of Decision for the Standard Chlorine of Delaware Inc. Superfund Site Operable Unit 2.

Please call if you have any questions or concerns about this concurrence.

Sincerely,

A handwritten signature in blue ink, appearing to read "Marjorie A. Crofts".

Marjorie A. Crofts
Director, Division of Waste and Hazardous Substances

TAK/MAC:tlw
TAK16000.doc
DE 0053 II H 3

pc: Timothy T. Ratsep, Environmental Program Administrator, DNREC-SIRS
Paul W. Will, Program Manager II, DNREC-SIRS

DELAWARE'S GOOD NATURE DEPENDS ON YOU!

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