

SUPERFUND PRELIMINARY CLOSE OUT REPORT
Occidental Chemical Superfund Site
Pottstown, Montgomery County, Pennsylvania
EPA ID# PAD980229298

I. INTRODUCTION

This Preliminary Close Out Report (PCOR) documents that the construction activities for the Occidental Chemical Superfund Site (Site) have been completed. This determination was conducted in accordance with the *Close-Out Procedures for National Priorities List Sites* (OSWER Directive 9320.2-09A-P, January 2000).

The U.S. Environmental Protection Agency (EPA) and the Pennsylvania Department of Environmental Protection (PADEP), conducted a pre-final inspection on September 26, 2008 and determined that the potentially responsible parties (PRPs) constructed the remedy in accordance with approved design plans and specifications. No additional construction activities are anticipated. The PRPs have initiated activities necessary to achieve performance standards and site completion.

II. SUMMARY OF SITE CONDITIONS

Background

The Site is located on Armand Hammer Boulevard in Lower Pottsgrove, Montgomery County, Pennsylvania. The Site property is bound on three sides by the Schuylkill River. Past manufacturing operations at the Site led to releases of hazardous substances into the environment.

Prior to the second World War, the Site was operated by Jacobs Aircraft Engine Company, who manufactured aircraft engines. The Defense Plant Corporation purchased the Site from JAEC in 1942. JAEC continued to operate and manufacture aircraft engines for DPC until late 1944. In 1945, DPC leased the Site to Firestone Tire and Rubber Company (FTR), which subsequently purchased the Site in 1950. FTR manufactured tires and PVC resins at the Site. In 1980, FTR sold the Site to Hooker Chemicals and Plastics Corporation, which later became Occidental Chemical Corporation (OxyChem). OxyChem manufactured PVC resins at the Site until January 2005.

Four unlined earthen lagoons (approximately 3 acres, total) present on the Site were utilized for

storage of PVC sludge waste generated from the PVC manufacturing process. Throughout the operation of the earthen lagoons, sludge was first allowed to settle in the concrete holding basins located behind the wastewater treatment plant prior to being sent to the lagoons. Un-polymerized PVC solids settled to the bottom of the basins. The supernatant water was skimmed off and sent directly to the Pottstown publicly owned treatment works (POTW). When a basin neared capacity the PVC sludge was diverted to the northernmost lagoon. Sludge from the earthen lagoons was periodically removed and placed in the 17-acre landfill. Firestone discontinued the use of the lagoons in 1974 when two lined lagoons were constructed to handle the wastes. The earthen lagoons and their PVC contents were left in place.

Until 1990, the PVC sludge held in the lagoons was not a listed hazardous substance. On September 25, 1990, EPA expanded its list of hazardous waste to include some organic compounds. This list included vinyl chloride monomer. Therefore, due to the change in waste classification, the PVC sludge lagoons required closure.

In addition to the above disposal areas, trichloroethylene (TCE) was used in the manufacturing process from the late 1940s until 1987. TCE was brought to the Site in railroad tank cars and unloaded to a holding tank. The holding tank was located above ground and situated in a bermed retention basin where TCE was stored before its use in the PVC manufacturing process. TCE was added to the plant process water used in the PVC reactors. The bulk of PVC combined with PVC resin. The spent reactor waste waters were then sent to an on-site industrial pretreatment system before being pumped to the Pottstown POTW. Over the years, the TCE transfer process from tank car to holding tank resulted in release of TCE into the soils (i.e. spills).

From 1979 to 1983, FTR and OxyChem sampled and analyzed process water wells to determine if TCE had migrated from the unloading area through the overburden soils and into the groundwater via fractures in the underlying bedrock. Analytical results revealed the presence of TCE in these wells at concentrations that exceeded the maximum allowed (5 ppb TCE) by the Safe Drinking Water Act. The highest concentrations were detected in the TCE handling area of the Site where concentrations ranged from 10 to 295 ppb. In early 1984, approximately 898 tons of soil contaminated with TCE was removed from the TCE handling area and disposed off-Site. The removal of the contaminated soil reduced the movement of TCE from the soil to the groundwater.

In 1985, EPA Region 3 investigated the Site to characterize existing Site conditions. Groundwater and sediment samples were collected and analyzed. The Site was evaluated by EPA in 1988 using the Hazard Ranking System. The score was 45.91 and the Site was placed on the National Priorities List (NPL) on October 4, 1989. EPA's evaluation identified the primary concern at the Site as the presence of several volatile organic compounds (VOCs) in the

groundwater. The EPA investigation identified TCE, trans-1,2-dichloroethene (1,2-DCE), and vinyl chloride monomer (VCM) as primary chemicals of concern.

Remedial Construction Activities

EPA signed a Record of Decision (ROD) on June 30, 1993 which selected a remedy for OU-1 (the contaminated groundwater plume) and OU-2 (the earthen lagoons).

Groundwater (OU-1)

The ROD stated that the principal threat posed by the Site is the groundwater contamination which resulted from former disposal practices and TCE handling operations. EPA's selected remedy for OU-1, the contaminated groundwater plume, consists of the following:

- Installation, operation and maintenance (O&M) of groundwater extraction wells to remove contaminated groundwater from beneath the Site and to prevent contaminants from migrating further;
- Installation and O&M of an air stripper to treat groundwater to the required levels;
- Installation and O&M of vapor phase carbon unit on the air stripper; and
- Periodic sampling of groundwater and treated water to ensure that treatment components are effective and that groundwater remediation is progressing towards the cleanup goals

The specific groundwater remedial action objectives are to:

1. Restore groundwater in the bedrock aquifer to Federal and State Applicable or Relevant and Appropriate Requirements, including drinking water standards, and to a level that is protective of human health and the environment.
2. Protect non-impacted groundwater and surface water for current and future use.

Pursuant to the Unilateral Administrative Order for Remedial Design/Remedial Action, signed on June 23, 1994, Occidental Chemical Corporation initiated OU-1 cleanup activities on August 5, 1997. The groundwater treatment plant is a metal braced frame building that sits atop a concrete slab floor with secondary containment. The building houses the treatment system equipment, including the equalization tank, air stripper, carbon adsorption tanks, and all associated mechanical and electrical equipment. The system was initially started in August 1998 and went through an approximate 4-month "shakedown period" whereby repairs and optimization measures were implemented. The treatment system was considered ready to go on-line permanently in January 1999. A walkthrough inspection of the completed treatment building was conducted by EPA on January 27, 1999.

The system has been in operation since January 1999 and has treated over 1.5 billion gallons of groundwater. Originally, discharge of the treated groundwater was sent to the local publicly

owned treatment works. This was changed in April 2007 when discharge of effluent water on-Site was allowed under a NDPEs permit. Currently, the PRP is attempting to optimize the groundwater treatment system performance. A 2005 – 2006 bedrock hydraulic testing program indicated that modifications to the treatment system pumping program could reduce potential vertical and horizontal migration of COCs from known source areas and improve mass removal. These modifications are currently being implemented.

Earthen Lagoons (OU-2)

A Remedial Investigation (RI) conducted by OxyChem in 1993 showed that the four (4) earthen lagoons contained volatile and semi-volatile organic compounds as a result of past disposal practices resulting from the PVC-manufacturing operations at the Site. Some of the chemicals detected in the earthen lagoons include TCE, 1,2-DCE, vinyl chloride, benzoic acid, and bis(2-ethylhexyl) phthalate. These chemicals are all associated with the manufacture of PVC and are hazardous substances, as defined by Section 101(14) of CERCLA, and are listed at 40 C.F.R. Part 302 in accordance with Section 102(a) of CERCLA.

EPA selected a remedy for OU-2 that included (1) on-site drying and recycling of the PVC material, (2) land-filling of residual PVC material, coal fines, and contaminated soils from the earthen lagoons, and (3) restoration of the earthen lagoon area to original grade. The remedy consists of the following components:

- Construction of an access road to the earthen lagoons;
- Excavation of PVC material (which includes all PVC sludge), coal fine layers and contaminated soil;
- Storage hopper for excavated materials;
- On-site drying of PVC material with air pollution controls;
- Dried PVC material shall be bagged, stored, and recycled;
- Sampling and analysis as approved by EPA for transportation and disposal of bottom coal fines layer of lagoons, including PVC residuals;
- Sampling and analysis of underlying soils as approved by EPA to document removal of chemicals of concern to background concentrations;
- Restoration of the area to original grade which includes backfilling excavations with clean fill; and
- Institutional Controls.

On June 29, 1995, EPA issued an Explanation of Significant Difference (“ESD”) changing the method selected in the ROD for disposal of certain material generated during the implementation of the remedy for OU-2. Originally, the ROD provided that such material would be disposed of in an off-site landfill. Pursuant to the 1995 ESD, EPA allowed the disposal of this material in an on-site, seven-acre residual waste landfill. The material proposed for such disposal included (1)

recycling residuals that did not exhibit RCRA hazardous characteristics, (2) treated materials that no longer exhibited RCRA hazardous characteristics and met all applicable land disposal restrictions, (3) non-hazardous coal fines underlying the PVC material, and (4) treated coal fines that no longer exhibited RCRA hazardous characteristic and met all applicable land disposal restrictions.

The remedy selected for OU-2 was not implemented for several reasons, as follows: (1) difficulties encountered by OxyChem during remedial design pilot studies of the technology to be used for drying the potentially recyclable PVC material, (2) the feasibility of ultimately drying the PVC material in a cost-effective manner, and (3) market fluctuations for recycled PVC material.

In addition to the difficulties encountered in the remedial design for OU-2, on February 5, 1999, OxyChem requested that EPA issue an ESD to revise the clean-up criteria that were selected in the ROD for the soil underlying the earthen lagoons. Occidental raised the issue that arsenic in the earthen lagoons was not related to the PVC sludge in the lagoons, but to natural background conditions at the Site. Since arsenic was a contributor to risk, according to a risk assessment developed during the 1993 Remedial Investigation ("RI"), EPA determined that it was necessary to conduct additional sampling of the earthen lagoons and prepare a Human Health Risk Assessment ("HHRA").

OxyChem conducted additional sampling in the lagoons in August 2001 to better characterize the PVC material in the lagoons and to determine risks. Sampling was conducted at the surface of the lagoons and at varying depth intervals to bedrock. Results of this sampling showed that contamination had migrated to the soils beneath the PVC material.

EPA then determined that it was necessary to conduct a Focused Feasibility Study (FFS) to re-evaluate the remediation options for the earthen lagoons. On September 29, 2005, EPA and Occidental entered into an administrative settlement agreement and order on consent for performance of the FFS. On March 21, 2008 EPA approved Occidental's FFS Final Report, which evaluated various clean-up options for OU-2. The FFS also included sampling of an area outside of the lagoons, where PVC sludge was discovered in 2006. After an evaluation of the alternatives proposed in the FFS report, EPA determined that the remedy selected for OU-2 in the 1993 ROD and the 1995 ESD would be modified.

An April 2008 ESD proposed two significant changes to the 1993 ROD and the 1995 ESD. The first change modified the remedial action for OU-2 by selecting excavation and disposal, in a Canadian landfill, of the PVC sludge and any material associated with the earthen lagoons. The second change modified the clean-up levels for OU-2 from background levels to standards established pursuant to the Commonwealth of Pennsylvania's Land Recycling and Remediation Standards Act, 35 Pa. Con. Stat. § 6026.303.

The 1993 ROD (at page 88) established that the earthen lagoons would be remediated to background levels, based on the applicable Commonwealth of Pennsylvania regulations at the time. Subsequent to the issuance of the ROD, the Commonwealth of Pennsylvania signed into law the Land Recycling and Remediation Standards Act (Act 2), 35 Pa. Con. Stat. §§ 6026.101-6026.908. Pursuant to 35 Pa. Con. Stat. § 6026.303, the Commonwealth has promulgated standards for regulated substances for each environmental medium, including, but not limited to, soil. According to Act 2, remediation standards can be selected using; 1) Background standards, 2) State-wide health standards, 3) Site-specific standards, or a combination of these (35 Pa. Con. Stat. § 6026.301(3)). For this Site, a combination of site-specific and State-wide health standards was used to determine the cleanup levels for OU-2. The site-specific standards were determined by using an EPA Soil Screening and Remediation Goals (SSRG) Tool. The EPA SSRG tool is consistent with the methodology outlined in Act 2 for developing site-specific standards. The soil-to-groundwater numbers developed by EPA were then compared to Act 2 statewide direct contact standards (found in Table 3A of Act 2) and the more stringent value was selected as the cleanup level. Because the EPA SSRG tool did not have parameters for developing standards for inorganic compounds (and some organic compounds) the more stringent standards from Tables 3A and 3B (for organic compounds) and 4A and 4B (for inorganic compounds) were selected. The statewide standards are found in 25 Pa. Code Chapter 25, Appendix A.

The April 2008 ESD included the following modifications to the selected remedy:

- The PVC material will be excavated, solidified (as needed), and exported to Canada for disposal in an off-site landfill. The export of the PVC material and any other waste from the Site shall be in accordance with Section 3017 of the Solid Waste Disposal Act, 42 U.S.C. § 6938, and 40 C.F.R. Part 262, Subpart E.
- The cleanup standards in the earthen lagoon area will be the standards established pursuant to Pennsylvania's Land Recycling and Environmental Remediation Standards Act, 35 Pa. Con. Stat. § 6026.303 set forth in 25 Pa. Code Chapter 250.
- Soils underneath or surrounding (i.e., berms) the PVC material and the coal fine layer will be sampled after the removal of the PVC material. Any soils underneath or surrounding the PVC material, as well as any coal fines, that contain chemicals of concern in excess of the cleanup standards will be excavated and disposed of off-site in a landfill. This material may be disposed of in an off-Site landfill in the United States in accordance with Section 121(d)(3) of CERCLA and Section 300.440 of the NCP. Otherwise, this material will be disposed of in an approved Canadian landfill in the same manner as the PVC material, as described above.
- Soils from the berms surrounding the PVC material that contain chemicals of concern at levels below the cleanup standards will be used to re-grade the lagoons after all PVC material, and contaminated coal fines and soils are removed.

- Sampling of the area in the floodplain, outside of the earthen lagoons, showed no levels of contamination above the cleanup standards. However, OxyChem will remove any PVC material from the floodplain and export it to Canada in the same manner as the PVC sludge in the earthen lagoons. Upon removal of the PVC material, the area will be replanted utilizing a shade-tolerant wet meadow seed mix and appropriate tree and shrub species.
- After excavation and removal of any contaminated soils underneath and surrounding the PVC material and any contaminated coal fines, sampling and analysis of the remaining soils in the earthen lagoons will be conducted to determine whether the cleanup standards have been achieved.
- Since all material from OU-2 which exceeds the cleanup standards will be removed and disposed off-Site, no institutional controls will be required for OU-2.”

Pursuant to the second amendment (signed on April 24, 2008) of the original 1994 Administrative Order, that required the Site remedial design and remedial action, the OU-2 remedial action was initiated on June 11, 2008 with the mobilization of the construction contractor to the Site. The earthen lagoons excavation commenced on June 25, 2008. Excavation began in the southeast lagoon and proceeded to the southwest and northwest lagoons, finishing with the northeast lagoon. On September 15, 2008, the final truck was loaded with contaminated lagoon sludges. In total, 42,863 tons of soil/sludges were loaded into 1,874 trucks, and disposed of at Horizon Environment Landfill in Grandes Piles, Quebec.

Confirmation (grab) soil samples were collected from the lagoon bottoms and sidewalls from within 50' X 50' grids, assembled within each individual lagoon. If any sample results did not meet the Site clean-up criteria, the individual (non-compliant) grid was re-excavated to a depth of 6" - 12" and re-sampled. This process repeated itself until compliance was met.

The September 26, 2008 pre-final inspection yielded the following “punch list” items:

1. Establish vegetation over the disturbed area, including the former lagoon and floodplain areas.
2. Re-plant the floodplain area with appropriate tree and shrub species.
3. Remove erosion controls items, when appropriate.

Institutional Controls

Earthen Lagoons

Because all materials associated with the earthen lagoons that exceed the established cleanup standards have been excavated and disposed off-Site, no ICs are required for OU-2.

Groundwater

As stated in Section IX of the ROD, the Selected Remedy and Performance Standards: “Institutional controls, in the form of deed restrictions, will be placed on the deeds to the properties that comprise the on-site groundwater where contaminants remain above performance standards. The institutional controls are needed to prevent the use of on-site groundwater for a drinking water source. Additional deed restrictions will be implemented to limit the use of the Site to industrial use only. In addition, continued monitoring of specified wells and periodic reevaluation of remedial technologies for groundwater restoration is also required.”

In 1994, Occidental personnel attached a copy of the June 23, 1994 Administrative Order, for RD/RA, and a copy of the 1993 Record of Decision to the property deed document and filed it with the Montgomery County recorder of deeds.

Redevelopment Potential

There are no known current redevelopment plans for the Site.

III. DEMONSTRATION OF CLEANUP ACTIVITY QUALITY ASSURANCE AND QUALITY CONTROL

The installation of the groundwater recovery and treatment system was performed under the requirements within the *Construction Quality Assurance Project Plan (CQAP) for Bedrock Groundwater Remedial Action* which was approved by EPA in June 1997. Construction oversight was performed by EPA’s oversight contractor, Tetra Tech, who visited the Site at least twice a week during construction.

EPA reviewed the activities associated with the work performed in the earthen lagoons for compliance with the quality assurance and quality control (QA/QC) protocols. Construction activities at the Site were determined to be consistent with the ROD, ESDs, RD plans and specifications, and RD/RA statement of work issued to the RACs contractor, Tetra Tech.

The earthen lagoons CQAP and the Quality Assurance Project Plan (QAPP), both approved on May 19, 2008, incorporated all appropriate EPA and State procedures and protocols. EPA analytical methods were used for all confirmation and monitoring samples during RA activities.

Tetra Tech collected split samples at a frequency of 10% of the total earthen lagoons confirmation samples and utilized a laboratory under contract to the Contract Laboratory Program to perform the analysis.

Construction QA was performed by Tetra Tech, which maintained a presence on-Site adequate for the type and complexity of work performed. The EPA RPM visited the Site at least one time

a week and the State regulator visited the Site one time during the excavation of the lagoon sludges. During these visits, construction activities, QA/QC procedures, and Site progress were reviewed for compliance. Deviations or non-adherence to QA/QC protocols, drawings or specifications were properly documented and resolved.

IV. ACTIVITIES AND SCHEDULE FOR SITE COMPLETION

Construction completion at the Site shall be documented by the signature of this Preliminary Close-Out Report. All preliminary construction completion requirements for the Site have been met as specified in OSWER Directive 9320.2-09A-P. The following activities will be completed according to the following schedule:

Schedule for Site Completion

Task	Estimated Completion	Responsible Organization
Complete Punch List Items	11/30/2008	PRP
Complete the Final Inspection	12/15/2008	EPA/PADEP
First Five-Year Review Report	9/30/2013	EPA
Complete GW Pump and Treat	12/30/2030	PRP
Approve Final Remedial Action Report	6/30/2031	EPA
Approve Final Closeout Report	12/31/2031	EPA
Deletion from NPL	3/30/2032	EPA

V. SUMMARY OF REMEDIATION COSTS

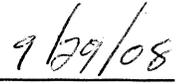
The original cost estimate to implement the remedial actions described in the ROD for the groundwater and earthen lagoons remedies was \$7,100,000 and \$5,300,000, respectively. More detailed cost estimate documentation can be found in the Feasibility Studies for each OU. Actual RA construction and O&M costs are unknown at this time because the PRP has declined to share cost information with the EPA.

VI. FIVE-YEAR REVIEW

Pursuant to CERCLA section 121 (c) and as provided in the current guidance on Five Year Reviews [*Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P, June 2001*], EPA must conduct a policy Five-Year Review (because the groundwater cleanup is expected to take more than five years). Therefore, the Five-Year Review will be completed prior to September 30, 2013 (five years after the construction completion date).



James J. Burke, Director
Hazardous Site Cleanup Division



Date