

EXPLANATION OF SIGNIFICANT DIFFERENCES

A. O. POLYMER SUPERFUND SITE

Site Name and Location

A. O. Polymer Superfund Site
Township of Sparta
Sussex County, New Jersey

Introduction

The purpose of this Explanation of Significant Differences (ESD) is to explain the modifications to the soil vapor extraction (SVE) and groundwater treatment remedy selected in the June 28, 1991 Record of Decision (ROD) for the A. O. Polymer Superfund Site (Site). The major components of the ROD include the use of a soil vapor extraction system to remove volatile and semi-volatile organic compounds (SVOCs) from the soils that act as the source of groundwater contamination, and the extraction and treatment of groundwater contaminated with volatile organic compounds (VOCs).

This ESD addresses modifications to the selected remedy's SVE and groundwater treatment system, as well as the addition of a discrete interim groundwater cleanup goal for trichloroethene (TCE), a groundwater contamination indicator compound. The groundwater treatment system at the Site has been in operation for over 17 years, and as a result of the declining VOC concentrations, the mass removal rate has also declined and is exhibiting asymptotic characteristics. The groundwater treatment system has become less effective as the mass removal rate has decreased, and is therefore not likely to achieve the groundwater cleanup goals within a reasonable time period. The enhancement of the SVE and groundwater treatment systems using *In-Situ* Thermal Remediation (ISTR), as well as the use of a discrete interim groundwater cleanup goal of 300 µg/L for TCE within the thermal treatment area, is estimated to result in approximately 99% mass removal of TCE across the Site.

EPA issues this ESD in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9617(c), and Sections 300.435(c)(2)(i) and 300.825(a)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. 300.435(c)(2)(i) and 300.825(a)(2). EPA is required to publish an ESD if the remedy is modified in a way that differs significantly, but not fundamentally, in either scope, performance, or cost from the remedy selected in the ROD for the Site. This ESD serves to document and explain the modifications to the performance of the remedy.



This ESD, and documents that provide the basis of the ESD decision, will be incorporated into the Administrative Record for the Site in accordance with Section 300.825(a)(2) of the NCP. The Administrative Record is available for public review at the locations listed below:

U.S. EPA, Region 2
290 Broadway 18th Floor
New York, New York 10007

Sparta Township Library
22 Woodport Road
Sparta, New Jersey 07871
(201) 729-3101

Site History, Contamination, and Selected Remedy

The A. O. Polymer Superfund Site, located at 44 Station Road in the Township of Sparta, Sussex County, New Jersey, is the location of a former manufacturing facility. The Site occupies approximately 4.18 acres near the Sparta Rail Road Station, along the New York, Susquehanna and Western Railway. The Site is bounded to the north and east by Station Park, a municipal recreation area, and to the southeast by Station Road. Several small businesses and three houses are located on Station Road near the Site, and the Wallkill River flows 500 feet to the southeast. The Site is located on two lots delineated by a Sussex County tax map as Block 19, Lot 45-B (3.22 acres) and Lot 45-C (0.96 acres).

The Site was operated as a specialty polymer and resin manufacturing facility for approximately 30 years. Mohawk Industries began operation at the Site in the early 1960s, and was involved in the production of various resins using a polymerization process until 1978, when A.O. Polymer purchased the facility. Mohawk also engaged in the reclamation of cleaning fluids for electronic components, which contained various Freon compounds in alcohol. The Site was composed of a 3.76-acre Facility Area and a 0.42-acre Disposal Area. The Facility Area consisted of office and laboratory facilities, a main reactor building, assorted storage buildings and tanks, and a non-contact water cooling pond. The office, reactor building, lab, and tanks were used by A.O. Polymer in its manufacturing processes from 1978 until the Site was abandoned in 1994. The Disposal Area is located in the northern area of the Site, and consisted of unlined pits into which chemical wastes, primarily solvents containing volatile and semi-volatile organic compounds were discarded.

In 1973, the first complaints of odors emanating from well water and air near the Site were registered by citizens living or working near the Site. Complaints intensified in 1978, which initiated formal investigations by the Sparta Health Department and the New Jersey Department of Environmental Protection (NJDEP). In 1978, NJDEP began investigating reports of drum stockpiling at the Site. These investigations identified on-site waste disposal and storage practices as the source of groundwater contamination in residential wells. Waste handling practices included the disposal of liquid chemical waste into unlined disposal pits, improper storage of over 800 deteriorating drums, and burial of crushed and opened drums containing waste materials, including VOCs and SVOCs.

In December 1978, NJDEP inspectors and Sparta Health Department officials collected samples from potable wells surrounding the Site. Analysis of these samples revealed VOCs in three domestic wells located on Station Road. In June 1979, the owners of the three affected wells filed damage claims with the New Jersey Hazardous Spill Fund, and in January 1980, these homes were connected to a municipal water supply. In 1980 and 1981, surficial cleanup at the Site was initiated by NJDEP, including the removal of surface drums and the excavation and removal of contaminated soil located in the Disposal Area. The Disposal Area of the Site was reportedly excavated to a depth of approximately 10 feet, and backfilled with clean soil. This cleanup resulted in the removal of 1,150 drums, 1,700 cubic yards of contaminated soil, and 120 cubic yards of crushed drums and debris.

Concern regarding the extent of groundwater contamination resulted in additional investigations by NJDEP. In January 1982, NJDEP's Division of Water Resources installed 11 monitoring wells on and adjacent to the Site to determine the extent of groundwater contamination. Sampling confirmed that contamination had reached the fractured bedrock aquifer known as the Allentown formation (a dolostone) which is a source of potable water in the area. Sampling also indicated that shallow overburden groundwater contamination had migrated to Station Park, 300 yards north of the Site. On September 1, 1983, the Site was placed on the National Priorities List (NPL), and in 1984, a remedial investigation and feasibility study (RI/FS) was initiated by NJDEP. Soil samples taken during the RI in the Disposal Area indicated residual VOC contamination, located from approximately 10 feet below ground surface down to the water table, at a depth of approximately 25 feet. At the time of the RI, the volume of contaminated soil beneath the disposal pits was estimated to be 7,500 cubic yards.

After initial indications of groundwater contamination were confirmed, NJDEP expanded the RI monitoring well network to a total of 29 monitoring wells. Of the 29 monitoring wells, 15 were screened in the overburden and 14 were screened in the bedrock. Groundwater contamination in the overburden aquifer consists primarily of VOCs,

including TCE, cis-1,2-dichloroethene (cis-1,2-DCE), 1,1-dichloroethane (1,1-DCA), and 1,1,1-trichloroethane (1,1,1-TCA). The compounds were detected at levels above the Federal Maximum Contaminant Levels (MCLs) and New Jersey Groundwater Quality Standards (NJGWQS). Of the 14 bedrock monitoring wells sampled, 13 had no elevated levels of contaminants. Only one bedrock monitoring well indicated the presence of contaminants, but at significantly lower concentrations than those found in the overburden. This bedrock well is located in the top ten feet of a bedrock subsurface wall oriented southeast, with a vertical relief of over 100 feet, and groundwater flow in this area is moving from the bedrock to the overburden. Samples from bedrock monitoring wells upgradient, downgradient, and sidegradient from this position showed no detection of contaminants.

At the time of the RI, residual subsurface soil contaminants that entered the groundwater eventually discharged to the wetland area and the Wallkill River, as evidenced by detections of 1,1-dichloroethene (1,1-DCE) and total 1,2-dichloroethene (1,2-DCE) in surface water samples from the wetland and river. Eight surface water samples were taken during the RI from four points in the river and wetland area. Samples taken upstream from the contaminant discharge plume were consistent with background levels. It is believed that VOCs entering the Wallkill River from the contaminated groundwater were quickly attenuated by dilution, volatilization, and degradation, as reflected by the low levels detected in the downstream samples.

In 1993, manufacturing operations ceased at the Site, and the Site was abandoned by its owner in 1994, leaving behind unsecured hazardous waste. In April of 1994, EPA initiated a removal action to address the immediate environmental hazards posed by the abandoned facility. During EPA's removal activities, 121 cubic yards of soil, 91 cubic yards of asbestos-containing materials, 34,000 pounds of hazardous wastes, 37,600 pounds of non-hazardous wastes, and 3,491 gallons of bulked hazardous liquids were removed from the Site. After removal activities were completed, EPA collected confirmatory soil samples to determine if any remaining areas of the Site were in need of remediation. An analysis of earlier RI/FS soil samples, and the post-removal action soil samples taken from within the Facility Area, indicated that soil in the Facility Area did not exceed New Jersey Residential Direct Contact Soil Cleanup Criteria.

Based on the results of the RI/FS, EPA issued a ROD on June 28, 1991. The ROD did not have remedial action objectives, however, the ROD stated that the selected remedy would not result in hazardous substances remaining on site above health-based levels. Therefore, the soil and groundwater remedies have goals that support unlimited use and unrestricted exposure (UU/UE).

The selected remedy called for an SVE system to remove VOC contamination from sub surface soil in the Disposal Area, as well as a groundwater extraction and treatment system to address contaminated groundwater through a system of extraction wells and treatment utilizing powdered activated carbon treatment system (PACT). The soil cleanup levels in the ROD are based on State soil action levels, including total VOCs at one milligram/kilogram (1 mg/kg) and total SVOCs at 10 mg/kg. Groundwater cleanup levels in the ROD are the more restrictive of MCLs or NJGWQS.

After the 1991 ROD was signed, EPA became the lead agency in charge of response activities at the Site. EPA identified potentially responsible parties (PRPs) and issued a unilateral administrative order (UAO) to one PRP to conduct the remedial design and remedial action (RD/RA). Design of the SVE system started on April 2, 1992, and was completed on May 11, 1994. By October 1994, construction of the SVE system was completed, and the system was operational and functional in January of 1995. The groundwater treatment component of the selected remedy called for pumping the contaminated groundwater from the aquifer, treating it with a PACT system, and then returning the treated groundwater to the aquifer. Results from pump tests and groundwater modeling during design indicated that the remedy objectives would be met by installing two extraction wells, RW-1, with an expected extraction rate of approximately 40 gallons per minute (40 gpm), and RW-2, with an expected extraction rate of approximately 30 gpm. Treatability studies conducted on the PACT system showed that this treatment system could not meet the discharge limitations, and therefore, an ESD was issued on September 17, 1996. The ESD called for modifying the ROD to allow the use of an air stripper to remove contaminants from groundwater and allow surface water discharge to be implemented, instead of using groundwater reinjection. In addition, the ESD called for only the most contaminated part of the plume to be treated via the extraction and treatment system, thereby allowing the remaining low-level contaminant concentrations outside the capture zone to naturally attenuate. Construction of the groundwater pump and treatment system was completed in March 1998.

On April 30, 1998, NJDEP approved a Classification Exception Area (CEA) and a Well Restriction Area (WRA) for a portion of the Site. The CEA and WRA were established because groundwater quality standards were not being met at the Site. The original CEA/WRA expired, and on March 26, 2013, NJDEP established a revised CEA/WRA for groundwater contamination, which will continue for an indeterminate period of time until post-remediation monitoring indicates that contaminants of concern are below standards.

To improve treatment efficiencies of the two systems, the PRP diverted condensate captured by the SVE system to the groundwater treatment system, beginning in September 2001. Prior to these systems being combined, the SVE system removed

approximately 7,995 gallons of product. In total, 11,743 gallons of product have been removed from the soil and groundwater. In response to the data trends found in monitoring well MW-3S, located within the capture zone, the PRP converted MW-3S into a recovery well in February 2012. In January 2017, recovery well RW-4 was installed immediately adjacent to MW-3S, and was designed to replace MW-3S due to its low flow rate and inability to pump continuously throughout the year.

Description of Significant Differences

This ESD modifies the performance of the selected remedy – specifically through the implementation of ISTR technology to enhance the SVE and groundwater treatment systems – in order to achieve approximately 99% mass removal of TCE across the Site and achieve groundwater cleanup goals in a reasonable timeframe.

The groundwater treatment system at the Site has been in operation for over 17 years, and as a result of the declining VOC concentrations in groundwater, the mass removal rate has declined and is exhibiting asymptotic characteristics. The groundwater treatment system has become less effective as the mass removal rate has decreased, and is therefore not likely to achieve the groundwater cleanup goals within a reasonable time period. The enhancement of the SVE and groundwater treatment systems using ISTR, as well as the use of a discrete interim groundwater cleanup goal of 300 µg/L for TCE within the thermal treatment area, would result in approximately 99% mass removal of TCE across the Site and achieve groundwater cleanup goals within a reasonable timeframe.

The soil cleanup goals selected in the ROD of 1 ppm total VOCs and 10 ppm total SVOCs are to be attained by the ISTR enhancement of the SVE system, as well as current NJDEP Residential Direct Contact Soil Remediation Standards. The high cost of ISTR implementation for groundwater, however, supports the adoption of a discrete interim groundwater cleanup goal within the thermal treatment zone, in order to target the largest amount of contaminant mass in a cost efficient manner. The 1996 ESD allowed for a capture zone that was focused on the extraction of the most contaminated part of the plume, and allowed for a large portion of the remaining plume and contaminants to naturally attenuate. The ISTR enhanced groundwater treatment system would focus on a treatment area within the pumping capture zone where groundwater exceeds 300 µg/L TCE. TCE is the primary contaminant at the Site, and is the only compound that exceeds the MCL outside the capture zone. This value was chosen as the discrete interim groundwater cleanup goal due to the fact that negligible contaminant mass is gained when treating beyond this concentration. Once the ISTR-enhanced groundwater treatment system has met the interim groundwater cleanup goal, the pump and treat system at the Site will continue for one year. Following this year, pump and treat operations will be permitted to cease, and long-term groundwater monitoring will be required to continue

until groundwater cleanup goals are attained. The more restrictive of MCLs or NJGWQS remain as the ultimate groundwater cleanup goals for the Site, but will be attained through attenuation, as is currently the case for groundwater outside the capture zone.

Support Agency Comments

EPA is the Lead Agency for the A. O. Polymer Superfund Site, and NJDEP is the Support Agency. The State of New Jersey supports this ESD, which modifies and enhances the performance of the remedy and the decision to issue this ESD.

Affirmation of Statutory Determinations

EPA is issuing this ESD after consultation with NJDEP, and NJDEP concurs with the presented approach. This ESD modifies the performance of the selected remedy. When implemented, the remedy, as modified by this ESD, will continue to be protective of human health and the environment, and will comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action.

The remedy is technically feasible, cost-effective, and satisfies the statutory requirements of CERCLA by providing for a remedial action that has a preference for treatment as a principal element and, therefore, permanently and significantly reduces the toxicity, mobility and volume of hazardous substances.

The remedy does not alter the need for a statutory review to be conducted at five-year intervals starting after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

Public Participation Activities

In accordance with Section 300.435(c)(2)(i) of the NCP, a formal public comment period is not required when issuing an ESD. Pursuant to Section 300.825(a)(2) of the NCP, the ESD has been placed in the Administrative Record for the Site and the information repository at Sparta Township Library, 22 Woodport Road, Sparta, New Jersey 07871.



John Prince, Acting Director
Emergency and Remedial Response Division

July 30, 2018
Date