RECORD OF DECISION

CPS Madison Superfund Site
Operable Units One and Two
Old Bridge Township, Middlesex County, New Jersey

United States Environmental Protection Agency
Region 2
New York, New York
September 2019

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

CPS Madison Superfund Site

Old Bridge Township, Middlesex County, New Jersey

Superfund Site Identification Number: NJD002141190

Operable Unit(s): 01 and 02

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of a remedy for Operable Units One and Two (OU1 and OU2) of the CPS Madison Superfund Site (Site) located in Old Bridge Township, Middlesex County, New Jersey. OU1 consists of contaminated groundwater and OU2 addresses contaminated soil on the property formerly operated by CPS Chemical Company, Inc. (the CPS property). The remedy has been chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. § 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the OU1 and OU2 remedy. The attached index (see Appendix I) identifies the items that comprise the administrative record upon which the selected remedy is based.

The New Jersey Department of Environmental Protection (NJDEP) was consulted, in accordance with Section 121(f) of CERCLA, 42 U.S.C. § 9621(f), and concurs with the selected remedy (see Appendix II).

ASSESSMENT OF SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by the implementation of the response action selected in this ROD, may present an imminent and substantial endangerment to public health and welfare and to the environment.

DESCRIPTION OF SELECTED REMEDY

<u>OU1 - Groundwater</u>

The selected remedy for organic contaminants in groundwater includes the following remedial activities:

- Treatability study and pilot testing to ensure remediation goals for the organic Site contaminants will be achieved.
- Installation and operation of an In-Situ Chemical Oxidation (ISCO) Permeable Reactive Barrier (PRB) well system.
- Installation and operation of groundwater and vadose zone monitoring systems.

- Continued operation of the existing CPS Interim Remedial Measure (IRM) pump and treatment system until the PRB system has been shown to be effective.
- Long-Term Monitoring (LTM) to monitor the low-level organic plume between the PRB and the Perth Amboy wells.
- Continuation of institutional controls - Classification Exception Area (CEA) and Well Restriction Area (WRA).
- Placement of institutional controls in the form of a deed notice to address potential vapor intrusion issues in the event that buildings are constructed in the future above the organic plume.

Because the selected remedy for organic contamination in groundwater will need to be proven under Site conditions, an upgraded version of the CPS IRM Pump and Treat System is selected as the contingency remedy should the contaminant concentrations in effluent of the ISCO Barrier increase (exceeding the variability of the existing IRM results) over four consecutive monitoring periods.

The selected remedy for metal contaminants in groundwater includes the following remedial activities:

- Continued operation of the Madison IRM pump and treatment system.
- Groundwater monitoring.
- Continuation of institutional controls - CEA and WRA.

<u>OU2 – Soils on CPS Property</u>

The selected remedy for soil on the CPS property is ISCO with limited excavation. The major components of the selected soil alternative include:

- Excavation of soils contaminated with 1,4-dioxane from the Repackaging Area and placement in the Tank Farm Area for treatment.
- In-situ chemical oxidation.
- In-situ soil mixing of the oxidant in accessible areas (~20,000 cubic yards).
- In-situ injection of the oxidant in inaccessible areas (~ 1,500 cubic yards).
- Post-Remediation Monitoring.
- Institutional controls.

This remedy will use ISCO to break down organic chemicals in soils to carbon dioxide and water. By this method, organic chemicals in the soil that contribute to groundwater contamination will be permanently removed.

The total present worth cost for the groundwater and soil selected remedy is $22,308,000.

STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in Section 121 of CERCLA, 42 U.S.C. § 9621, because it 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains the legally applicable or relevant and appropriate requirements under federal and state laws unless a statutory waiver is justified; 3) is cost-effective; and 4) utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. In addition, the selected remedy satisfies the Section 121 of CERCLA, 42 U.S.C. § 9621 preference for the use of treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances as a principal element.

Because the selected remedy will result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the administrative record file for this action.

- A discussion of the current nature and extent of contamination is included in the "Summary of Site Characteristics" section.
- The Site Chemicals of Concern (COCs) are presented in the "Summary of Site Characteristics" section.
- A discussion of the potential adverse effects associated with exposure to Site COCs is included in the "Summary of Site Risks" section.
- The remediation goals for the Site COCs are presented in the "Remedial Action Objectives" section and in Tables 7 and 8.
- A discussion of principle threat waste is included in the "Principal Threat Wastes" section.
- A discussion of the current and reasonably anticipated future land use assumptions is included in the "Current and Potential Future Land and Resources Uses" section.
- The estimated capital, operation and maintenance, and total present-worth costs are presented in the "Description of Remedial Alternatives" section.
- A discussion of the key factors that led to the selection of the remedy is included in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

AUTHORIZING SIGNATURE

Pat Evangelista, Acting Director
Superfund and Emergency Management Division

9/30/19
Date

DECISION SUMMARY

CPS Madison Superfund Site
Operable Units One and Two
Old Bridge Township, Middlesex County, New Jersey

SITE NAME, LOCATION, AND DESCRIPTION

SITE DESCRIPTION

The two facilities which make up the Site are adjacent properties located along Water Works Road in Old Bridge Township, Middlesex County, New Jersey (Figure 1). The Site acts as a source area for groundwater contamination that flows southwest, into the Runyon Watershed (Figure 2).

CPS Chemical Corporation, Inc. (CPS) Property: The CPS property is approximately 30 acres, located at 570 Water Works Road. The former CPS facility is located within the western portion of the property and is approximately 6.7 acres. From 1967, until operations ended in 2001, the facility processed organic chemicals used in the production of water treatment agents, lubricants, oil field chemicals, and anti-corrosive agents, and engaged in solvent recovery. While the main office and a storage building remain on the property, the process equipment and storage tanks that were located at the south end of the property were demolished and removed from the Site in 2005. This portion of the Site is now inactive.

Madison Industries, Inc. (Madison) Property: The Madison property is 15 acres, located at 554 Water Works Road. The Madison property is bordered to the east by the CPS property and to the west by the Perth Amboy wellfield. Madison has operated the facility (formerly known as "Food Additives") in the northern half of this property since 1967, producing inorganic chemicals used in fertilizer, pharmaceuticals and food additives. On the southern portion of the property, Madison's sister company, Old Bridge Chemical, operates a plant that produces mostly zinc salts and copper sulfate. Both companies continue to operate on the property today.

Runyon Watershed: The Runyon Watershed is mostly undeveloped land which borders the Madison property to the southwest. The watershed contains the Perth Amboy wellfield which lies approximately 3,000 feet southwest (downgradient) of the CPS and Madison facilities. The wellfield supplies over 5,000 gallons per minute (gpm) to the City of Perth Amboy. The extracted water is treated to remove solids and metals using an on-site clarification and filtration system. Site-related contaminants have entered the watershed via groundwater, and to a lesser extent, via surface water.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

In the early 1970s, releases of organic compounds and metals from the CPS and Madison properties resulted in the closing of 32 wells in the Perth Amboy wellfield. In 1979, a state court ordered the companies to perform a remedial investigation under the supervision of NJDEP. The investigation led to a 1981 court order for the companies to implement a remediation program to address groundwater contamination emanating from each of the properties. On September 1, 1983, the Site was placed on the National Priorities List (NPL) with New Jersey as the lead agency. In 1991 and 1992, an off-property groundwater collection system consisting of six recovery wells (three wells operated by CPS, and three by Madison) was installed to protect the Perth Amboy wellfield from contamination emanating from the CPS and Madison properties. Between 1993 and 2000 the groundwater surrounding these recovery wells achieved the cleanup goals in place at that time; the recovery wells were shut down and replaced by the pump and treatment system wells on each of the company's properties, which are collectively known as the Interim Remedial Measure (IRM) wells.

In 1998, NJDEP established a Classification Exception Area (CEA) and a Well Restriction Area (WRA) encompassing the area of the volatile organic plume emanating from the CPS property, covering approximately 32 acres, to a depth of 80 feet. A CEA/WRA is an institutional control established under New Jersey law documenting an area where water quality standards cannot be met and which limits installation of groundwater extraction wells. In 1999, NJDEP established CEAs and WRAs encompassing the areas of two metals plumes emanating from the Madison facility, which are approximately 20.7 acres, and 3.3 acres, to a depth of 80 feet.

In 1998, Ciba Specialty Chemicals (Ciba) acquired responsibility for the CPS Chemical Company facility as part of its acquisition of Allied Colloids, Inc. Ciba continued production of water treatment chemicals until 2001, when Ciba ended operations at the facility. In 2003, Madison Industries, Inc. entered bankruptcy, and NJDEP requested that EPA take the lead role in overseeing the Superfund cleanup. In 2005, EPA entered an administrative order on consent (AOC) with Ciba. The AOC required Ciba to perform a remedial investigation and feasibility study (RI/FS) to determine the extent of contamination in groundwater and soil, determine if an action was needed to address the contamination, and identify potential alternatives to address the contamination. In 2008, BASF Corporation (BASF) acquired Ciba and assumed responsibility for completing the requirements of the AOC as Ciba's corporate successor. The RI/FS was completed in August 2018. Madison entered into an AOC with EPA in 2015 and is currently working on an RI/FS to address soil contamination on its property and sediment contaminated with metals in the watershed. This will be the subject of a future remedy selection process.

COMMUNITY PARTICIPATION

On April 24, 2019, EPA released the Proposed Plan for OU1 and OU2 to the public for comment. Supporting documentation comprising the administrative record file was made available to the public at the information repositories maintained at the Old Bridge Public Library, 1 Old Bridge Plaza, Old Bridge, New Jersey 08857, the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York 10007, and EPA's website for the Site at https://www.epa.gov/superfund/cps-madison.

EPA published notice of the start of the public comment period, which ran from April 24, to May 24, 2019, and the availability of the above-referenced documents in the *Home News Tribune* on April 24, 2019. A news release announcing the Proposed Plan, which included the public meeting date, time, and location, was issued to various media outlets and posted on EPA's Region 2 website on April 24, 2019.

A public meeting was held on May 8, 2019, at the Old Bridge Municipal Court, 1 Old Bridge Plaza, Old Bridge, New Jersey, to discuss the alternatives presented in the RI/FS, and to present EPA's proposed alternatives for OU1 and OU2 to the community. Approximately 25 people attended the public meeting, including residents, media, local business people and local government officials. Public comments were related to remedy details, the performance of the work at the Site, and public health concerns.

A copy of the public notice published in the *Home News Tribune,* along with responses to the questions and comments received at the public meeting and in writing during the public comment period can be found in the attached Responsiveness Summary (See Appendix III).

At the request of the Perth Amboy City Administrator, on May 22, 2019, EPA attended a city council meeting with members of the public in attendance. EPA gave a presentation of the Proposed Plan to 39 attendees and answered questions. These questions and EPA's responses are summarized in the attached Responsiveness Summary.

SCOPE AND ROLE OF OPERABLE UNITS

The NCP, at 40 CFR Section 300.5, defines an operable unit as a discrete action that comprises an incremental step toward comprehensively addressing site problems. A discrete portion of a remedial response eliminates or mitigates a release, threat of a release, or pathway of exposure.

Due to the complexity of working with two facilities and varying land uses, EPA is addressing the cleanup of the Site in three operable units. Operable Unit 1 (OU1) addresses groundwater contamination emanating from both properties that impacts the Perth Amboy wellfield. Operable Unit 2 (OU2) addresses contaminated soil on the CPS property that is a direct contact hazard and acts as a contaminant source to groundwater. Operable Unit 3 (OU3) will address sediment and contaminated soil on the Madison property that is a direct contact hazard and acts as a contaminant source to groundwater.

This ROD addresses OU1 and OU2. OU3 contamination will be evaluated separately and will be addressed in a future remedy selection process.

SUMMARY OF SITE CHARACTERISTICS

The Site is relatively flat, ranging from 20 to 25 feet above mean sea level (AMSL). Most of the Site lies within a 100-year flood hazard area, except for a small area in the northeast corner of the CPS Property that is 28 feet AMSL. The facilities are mostly surfaced with asphalt or concrete, except for the three-acre area of the Former Tank Farm that was demolished by Ciba in 2005. The Magothy Formation, which underlies the Site, is used as a drinking water aquifer. Two of the geologic units of the Magothy lie directly under the Site, the Old Bridge sand, and the Perth Amboy fire clay. The Old Bridge sand is between 60 and 70 feet thick beneath the Site and readily conducts water. The fire clay is discontinuous under the Site but acts as a confining unit in some areas. Below the Magothy is the Raritan Formation, which is also a drinking water aquifer. Groundwater under the Site generally flows southwest towards the Perth Amboy supply wells which are approximately half a mile downgradient.

Prickett's Brook, an intermittent stream on the Site, flows west along the southern border of the CPS property (Figure 2). The brook turns north along the border between the CPS and Madison properties until it turns west again and bisects the Madison property. From the Madison property, it enters the Runyon Watershed and travels southwest through Prickett's Pond, and eventually reaches Tennent Pond. The ponds both act as recharge basins for the Perth Amboy wellfield. Prickett's Brook and the downgradient ponds are not currently used for recreational purposes.

SUMMARY OF SITE INVESTIGATIONS

Performance Monitoring Program

Beginning in 1991, under the direction of NJDEP, CPS and Madison installed the IRM wells downgradient of the Madison property, to intercept Site groundwater contamination entering the Runyon Watershed. A Performance Monitoring Program (PMP) was initiated to evaluate the effectiveness of the IRM pump and treatment systems. Pursuant to the PMP, BASF and Madison continue to monitor the IRM wells, which have been reconfigured several times to adjust to reduced contaminant levels in the plumes. The IRM system for the CPS property has been operating since 1996, and was upgraded by BASF in 2015. Madison's IRM system has been operating since 1997, with occasional configuration adjustments.

The Remedial Investigation

In October 1992, NJDEP executed separate Administrative Consent Orders (ACOs) with CPS and Madison to each perform an RI/FS to address the contamination associated with their property. CPS conducted its RI/FS in three phases, documented in three reports submitted in 1993, 1994, and 1996.

In 2003, NJDEP requested that EPA take the lead for the Site. As noted above, EPA entered an AOC with Ciba in 2005 to perform an RI/FS. Ciba submitted an RI/FS Summary Report related to investigations at the CPS property in 2005, pursuant to an AOC with EPA.

Ciba initiated a Supplemental Remedial Investigation (SRI) in 2008, to address data gaps in the previous RI and provide more current data on the status of Site contamination. Also in 2008, BASF acquired Ciba. In 2009, BASF assumed responsibility for compliance with the AOC as corporate successor to Ciba.

The main focus of the SRI was site-wide groundwater and soil on the CPS property. The SRI also investigated surface water contamination, which will be addressed as part of OU3 in a future remedy selection process. BASF submitted the final SRI Report in 2015.

As described above, Madison entered into an AOC with EPA in 2015, and is currently working on an RI/FS to address soil contamination on its property and sediment contaminated with metals in the watershed. This will be the subject of a future remedy selection process.

Groundwater

Groundwater contamination at the Site originates from source areas on both the CPS and Madison properties.

Volatile organic compounds (VOCs) predominantly originate from soils in the former process area on the southern half of the CPS property. These compounds include: 1,2,4-trichlorobenzene; chlorobenzene; benzene; methylene chloride; 1,1,2,2-tetrachloroethane; 1,4-dichlorobenzene; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; cis-

1,2-dichloroethene; and vinyl chloride. A full list of organic COCs in groundwater can be found in Table 7.

A second source area on the CPS property is soils at the former truck and rail car loading area, which was used to repackage 1,4-dioxane for redistribution. That area is located near the southwest corner of the storage building along the border between the CPS and Madison properties, and appears to be the primary source of 1,4-dioxane in groundwater.

The organic groundwater plume extends from the water table to approximately 40 feet below ground surface (bgs) beneath the CPS and Madison properties (Figure 3). The plume dips downward as it travels southwest toward the Perth Amboy wells where it can be found between 60 and 80 feet bgs, which is the depth at which the supply wells are screened.

The IRM system that was initiated in 1991, under a State order, has greatly reduced the size and concentration of the organic plume that reaches the Perth Amboy wellfield. Most of the organic contaminants that are found southwest of the CPS and Madison properties are near or below both the New Jersey Groundwater Quality Standards (NJGWQS) and Federal and State Maximum Contaminant Levels (MCLs), and attenuate prior to reaching the Perth Amboy wells. Currently the only organic contaminant reaching any of the Perth Amboy wells above the NJGWQS is 1,4-dioxane. Prior to November 2015, the 1,4-dioxane standard was 10 parts per billion (ppb) and there were no exceedances of this level at the Perth Amboy wells. In November 2015, the NJGWQS for 1,4-dioxane was changed to 0.4 ppb, resulting in an exceedance of the new standard at three Perth Amboy wells. However, due to well-head treatment and mixing with non-impacted wells, the finished water supplied to Perth Amboy continues to meet all drinking water standards including the standard for 1,4-dioxane.

In April 2016, NJDEP designated the 1,4-dioxane contamination in the Runyon Watershed an Immediate Environmental Concern (IEC). An IEC condition is identified when a New Jersey Drinking Water/Ground Water Remediation Standard or a Rapid Action Indoor Air Screening Level is exceeded, or a Direct Contact threat exists and a completed pathway between a hazardous substance release and a receptor exists. Designation as an IEC required BASF to evaluate and mitigate this condition in accordance with the New Jersey Site Remediation Reform Act N.J.S.A. 58:10C-1 et seq. (SRRA), the Technical Requirements for Site Remediation N.J.A.C. 7:26E (Technical Rules), and Administrative Requirement for the Remediation of Contaminated Sites N.J.A.C. 7:26C (ARRCS). BASF has evaluated the extent of the 1,4-dioxane contamination and intends to place a reactive barrier near the impacted supply wells that will destroy the 1,4 dioxane prior to reaching the Perth Amboy wells. While this action is being performed under NJDEP authority and oversight separately from the remedy being chosen in this decision document, it is an integral part of the overall protectiveness of the Site's remedial program. NJDEP and EPA will monitor the progress of this action to ensure that this contamination is mitigated. If BASF's reactive barrier proves ineffective at meeting NJGWQS and MCLs, EPA may consider other response actions under CERCLA. The CEA/WRA was expanded in 2017 to include the 1,4-dioxane contamination area, and now encompasses 103 acres.

Inorganic contamination (metals) predominantly originates from the Madison property, with the larger contribution from the northern half of the property. A metals plume, consisting of zinc, cadmium, copper, and lead above the NJGWQS extends approximately 600 feet into the Runyon Watershed. A less concentrated plume containing zinc, cadmium and lead originates from the area of the sludge treatment piles associated with the Perth Amboy water treatment plant. The zinc distribution is the most widespread. Both zinc plumes are approximately 1,400 feet long, and 800 feet apart. The metals concentrations in the Madison plume are currently stable or decreasing. The plume stability is due in part to the ongoing pumping of the recovery wells that make up the Madison IRM. A list of metals COCs in groundwater can be found in Table 7.

CPS On-Site Soils

The CPS property contains contaminated soils that act as a contaminant source to groundwater and pose potential contact hazards. The SRI Report divided the CPS property into three areas based on general use (Figure 2). Area 1, the Former Tank Farm, contained chemical tanks (where the main chemical processing took place), as well as fuel oil storage tanks, and hazardous waste storage. Area 1 also includes the former truck and railroad car loading areas. Area 2, the Former Plant Operations Area, is associated with support activities, including office and laboratory buildings, storage facilities, and parking lots. Area 3, the Side Lot Area, makes up the eastern two thirds of the property, and is largely undeveloped. RI sampling confirmed that Area 3 was not significantly impacted by facility operations and therefore this area was not further evaluated in the RI/FS. Contaminant releases occurred in Area 1 and in the adjacent southwest corner of Area 2. A list of COCs in soil can be found in Table 8.

<u>Volatile Organic Compounds (VOCs)</u> The SRI Report identified multiple VOCs in soils that exceeded the Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) at several locations within Areas 1 and 2. The VOCs identified in the RI include: 1,1,2,2-tetrachloroethane; 1,2,4-trichlorobenzene; 1,2-dichloroethane; 1,2-dichloropropane; 1,4-dichlorobenzene; 1,2-dichlorobenzene; benzene; methylene chloride; tetrachloroethene; trichloroethene and vinyl chloride. Table 8 includes the NRDCSRS for these VOCs. VOCs with concentrations exceeding NRDCSRS were found in Areas 1 and 2 at depths up to 26 feet. Elevated VOC concentrations have also been detected at some locations within the silts and clays at the Site, however, these low-permeability units have limited the vertical migration of the contaminant mass. Residual non-aqueous phase liquid (NAPL) has also been observed in a few shallow soil borings (< 25 feet) installed within the source areas. While a vapor intrusion sampling event completed in 2009 determined that vapor intrusion did not affect existing buildings on the CPS and Madison properties at that time, VOCs found in the groundwater on these properties exceed EPA vapor intrusion screening levels in groundwater.

<u>Semi-Volatile Organic Compounds (SVOCs)</u> SVOCs were detected in surface soil (0-2 ft.) samples at concentrations exceeding the NRDCSRS at two locations within Area 2. The SVOCs are polycyclic aromatic hydrocarbon (PAH) compounds, and include: benzo(a)anthracene; indeno(1,2,3-CD)pyrene; benzo(a)pyrene; benzo(g)fluoranthene; and dibenzo(a,h)anthracene. The samples were collected from low-lying portions of the CPS property that receive storm water runoff from the asphalt parking lot/covered areas. PAH detections are likely attributable to parking lot runoff related to either motor vehicles or components of asphalt, as there are no

known or suspected operation-related sources of PAHs in this area.

Inorganic Contamination (metals) Surface soil sampling did not identify any areas on the CPS property with metal concentrations exceeding the NRDCSRS. Arsenic was detected in subsurface soils above the NRDCSRS at one location and exceeded the NRDCSRS by a factor of less than two. Arsenic at the CPS property can be attributed to the natural background conditions, as there are no known or suspected sources of arsenic associated with past operations at the CPS property. Glauconitic sediment, associated with elevated metals concentrations reflecting natural background, is also present in the areas where arsenic exceeded the NRDCSRS. The SRI Report also indicates that several metals were detected at concentrations slightly above default NJ Impact to Groundwater Screening Levels (IGWSLs) at four surface soil sample locations. The metals with concentrations exceeding the IGWSLs include cadmium, lead, and zinc, as well as beryllium, manganese, mercury, nickel, and silver. Of these metals, only beryllium and manganese, which are not site-related, have been detected in groundwater at the Site at concentrations above NJGWQS or MCLs. The IGWSLs are generic screening levels that are used to determine whether site-specific SRS for unsaturated soils need to be developed to protect groundwater. The IGWSLs are not soil remediation goals by default.

1,4-Dioxane Supplemental source characterization sampling was conducted in April 2017. Sampling was conducted to investigate whether the presence of residual 1,4-dioxane in shallow unsaturated soils is posing a risk to groundwater. Figure 4 shows an area of contamination straddling the north-west border of Area 1. The unsaturated soil in this area contained the highest concentrations of 1,4-dioxane found on the Site, and generally corresponds with the area of highest 1,4-dioxane concentrations (> 100 µg/L to 650 µg/L) in shallow groundwater (< 10 feet).

CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Land Use

The two properties that comprise the Site together include 45 acres of developed and undeveloped land, currently zoned for commercial/industrial use. The Site is bordered to the southwest by the Runyon Watershed. EPA does not anticipate that the land use will change in the foreseeable future.

Groundwater Use

The Magothy and Raritan Formations constitute the regional aquifer system supplying water resources to the surrounding area. The Perth Amboy municipal water supply wells are located approximately 3,000 feet downgradient from the CPS and Madison facilities.

SUMMARY OF SITE RISKS

As part of the RI/FS, a baseline risk assessment was performed to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land uses. The baseline risk assessment includes a human health risk assessment and an ecological risk assessment. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The risks and hazards for the Site are presented in the baseline risk assessment and will be summarized in this section.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification – uses the analytical data collected to identify the contaminants of potential concern at the site for each medium, with consideration of a number of factors explained below; Exposure Assessment - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated surface soil) by which humans are potentially exposed; Toxicity Assessment - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and Risk Characterization - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the National Contingency Plan (NCP) as an excess lifetime cancer risk greater than $1 \times 10^{-6} – 1 \times 10^{-4}$, an excess of lifetime cancer risk greater than 1×10^{-6} (i.e., point of departure) combined with site-specific circumstances, or a Hazard Index greater than 1.0; contaminants at these concentrations are considered chemicals of concern (COCs) and are typically those that will require remediation at the Site. Also included in this section is a discussion of the uncertainties associated with these risks.

Hazard Identification

In this step, the chemicals of potential concern (COPCs) in each medium were identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations, mobility, persistence, and bioaccumulation. The risk assessment focused on surface soil, subsurface soil, groundwater and indoor air associated with the Site which may pose significant risk to human health. Analytical information that was collected to determine the nature and extent of contamination found site-related contaminants in surface soil (Area 1, Area 2 and Area 3), subsurface soil, groundwater and indoor air at concentrations of potential concern.

A comprehensive list of all COPCs that were investigated can be found in the BHHRA, entitled "Final Baseline Human Health Risk Assessment CPS/Madison Superfund Site Old Bridge Township, Middlesex County, New Jersey" – April 2015. This document is available in the Administrative Record file. The list of COCs identified in surface soil, subsurface soil, surface water, groundwater and indoor air and calculated exposure point concentrations for each media are presented in Table 1.

Exposure Assessment

As noted previously, consistent with Superfund policy and guidance, the BHHRA assumes no actions have been taken or institutional controls established to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the Site. The RME is defined as the highest exposure that is reasonably expected to occur at a site. For those contaminants for which the risk or hazard exceeded the acceptable levels, the central tendency estimate (CTE), or the average exposure, was also evaluated.

The BHHRA for the Site quantified risks and hazards to human health associated with exposure to media present in OU1 and OU2. OU1 addresses contaminated groundwater beneath the Site, while OU2 addresses soils at the CPS property. For purposes of evaluating risks and hazards from exposure to soils in the BHHRA, OU2 was further subdivided into 3 subareas representing geographically different portions of the CPS property. The subareas, referred to as Areas 1 through 3, encompass soils at: the former tank farm area (Area 1); the former plant area (Area 2); and the side lot (Area 3). Because the Madison soils remedial investigation has not been completed, it was not considered in the BHHRA for the CPS property.

Current use of the CPS property consists of operation and maintenance of the IRM groundwater pump and treatment system. There are currently no full-time employees on the property. The CPS property, as well as most of the surrounding area, is zoned SD3, Specialized Development for industrial land use as part of the Township's long-term development plan. Based on the current zoning and past industrial use of the Site, it is expected that future use would remain unchanged. However, for overall completeness and because BASF has expressed interest in redevelopment or reuse of the CPS property, a hypothetical future resident (child and adult) was evaluated in the BHHRA. In addition, the potential for vapor intrusion from subsurface sources into indoor air was also evaluated even though there are currently no occupied buildings on the CPS property.

Exposure pathways were identified for each potentially exposed population and each potential exposure scenario for exposure to surface soil, subsurface soil, groundwater and indoor air. Exposure pathways that were qualitatively or quantitatively assessed in the BHHRA are presented in Table 2. Additional pathways that were investigated, but not evaluated further can be found in the BHHRA. The current and future land use scenarios included the following exposure pathways and populations:

- Trespassers (adolescent and adult) current/future ingestion and dermal contact with surface soil in Areas 1, 2 and 3.
- Indoor Worker (adult): future ingestion and dermal contact with surface soil in Areas 1, 2 and 3 and ingestion of groundwater.
- Outdoor Worker (adult): future ingestion, dermal contact and inhalation of soil particles associated with surface soil in Areas 1, 2 and 3 and ingestion of groundwater.
- Construction and Utility Worker (adult): future ingestion, dermal contact and inhalation of soil particles and vapors for surface and subsurface and inhalation of vapors from trenches.
- On-site Residents (child and adult): future ingestion and dermal contact with surface soil

and ingestion, dermal contact and inhalation from groundwater exposure.

In this assessment, exposure point concentrations were estimated using either the maximum detected concentration of a contaminant or the 95% upper-confidence limit (UCL) of the average concentration. Chronic daily intakes were calculated based on the RME. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures.

Toxicity Assessment

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the human health risk assessment were obtained from the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. The toxicity values for the contaminants identified as COCs are presented in Table 3 (noncancer) and Table 4 (cancer). The toxicity information for all COPCs is presented in the BHHRA.

Risk Characterization

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient

Intake = estimated intake for a chemical (mg/kg-day)

RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (i.e., chronic, subchronic, or acute).

As previously stated, the HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

$$\text{Risk} = \text{LADD} \times \text{SF}$$

Where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

These risks are probabilities that are usually expressed in scientific notation (such as 1×10^{-4}). An excess lifetime cancer risk of 1×10^{-4} indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the assessment. Again, as stated in the NCP, the point of departure is 1×10^{-6} and the target risk range for site-related exposure is 1×10^{-6} to 1×10^{-4}.

The HI that exceed EPA's acceptable value of 1 for noncancer effects are presented in Table 5 and the cancer risks that exceed EPA's risk range of 1×10^{-6} to 1×10^{-4} are presented in Table 6.

Summary of the comprehensive cancer risk and noncancer hazard estimates for each receptor population evaluated in the BHHRA are provided in Tables 5 and 6, below. These numeric estimates are reflective of the sum of all risk stemming from exposure to Site-related groundwater contamination and the soils at the CPS property. In summary, exposure to site-related groundwater contamination through dermal, ingestion and the inhalation pathways posed unacceptable risk to human health. Exposure to soils through ingestion, present in Exposure Area 1 exceeded EPA's noncancer benchmark value of 1 based on a future child's exposure to TCE and 1,2,3-trichlorobenzene contaminated soils. The contaminated soil also acts as a contaminant source to the groundwater. Based on concentrations of VOCs in groundwater, there is potential for vapor intrusion issues in future site buildings.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. More specific information concerning uncertainty in the health risks is presented in the BHHRA report. In general, the main sources of uncertainty include:

- Uncertainties in the nature and extent of the release of COPC.
- Uncertainties associated with the identification of future land uses and potential receptors.
- Uncertainties in estimating the frequency, duration and magnitude of possible exposures.
- Uncertainties associated with assigning exposure parameters to a heterogeneous population that includes both men and women and the young and old.
- Uncertainties in estimating cancer slope factors and unit risks and/or non-carcinogenic measures of toxicity.
- Uncertainties in the assumption of additivity of risk across multiple COPCs and exposure pathways.

Ecological Risk Assessment

In 2015, BASF completed a Screening Level Ecological Risk Assessment (SLERA), to determine if Site contaminants had the potential to affect ecological receptors in the OU1 and OU2 areas. The SLERA concluded the following:

- There were no completed exposure pathways in Areas 1 and 2 on the CPS property due to absence of habitat.
- Risk due to ecological receptor exposure to soils in Area 3 is negligible based on the screening level exposure estimate.
- Risk due to ecological receptor exposure to CPS-related contaminants in groundwater are negligible based on concentrations found in groundwater discharge locations.

Overall the SLERA did not identify any unacceptable risks to ecological receptors exposed to Site contaminants in environmental media in the OU1 and OU2 areas.

Basis for Taking Action

Based on the results of the RI/FS, including the risk assessments, EPA has determined that the response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), requirements to-be-considered

(TBCs) ,[1] and Site-specific, risk-based levels.

The RAOs identified for OU1, groundwater contamination, are:

- Prevent exposure to groundwater contaminated by site-related contaminants.
- Prevent the potential for further migration of site-related contaminants.
- Restore groundwater impacted by Site contaminants to applicable State and Federal standards within a reasonable time frame.
- Prevent/minimize contaminated groundwater from serving as a source of current and future vapor intrusion.

The RAOs identified for OU2, soil contamination at the CPS property, are:

- Mitigate the on-going sources of CPS property-related contaminants to groundwater.
- Prevent exposure to soils contaminated by CPS property-related contaminants.
- Prevent/minimize contaminated soil from serving as a source of current and future vapor intrusion.

EPA and NJDEP have promulgated MCLs, and NJDEP has promulgated groundwater quality standards (NJGWQS) which are enforceable, health-based, protective standards for drinking water contaminants. In the Proposed Plan, EPA selected the more stringent of the MCLs and GWQS as the preliminary remediation goals (PRGs) for the COCs in the Site groundwater. EPA used the more stringent of the NJDEP NRDCSRSs and the NJDEP impact to groundwater soil screening levels as the PRGs for the unsaturated soils. The NJDEP NRDCSRSs were used as the PRGs for the saturated soils and, when no NRDCSRS was available, the EPA Regional Screening Level (RSL) for industrial soil was used. The default NJ Impact to Groundwater Screening levels in the Proposed Plan were replaced with site-specific values based on NJ impact to groundwater guidance and approved by NJDEP. PRGs become final remediation goals when EPA selects a remedy after taking into consideration all public comments. EPA's final remediation goals for the Site can be found in Tables 7 and 8.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives, to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. § 9621(d)(4). Detailed descriptions of the remedial

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[1] TBCs are advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies.

alternatives for addressing the contamination associated with OU1 and OU2 at the Site and associated ARARs can be found in the Feasibility Study (FS) report, dated November 2018.

The OU1/OU2 remedial alternatives are summarized below. The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction. The "no-action" alternative was evaluated for soil and groundwater because the NCP requires that the "no-action" alternative be considered as a baseline for comparison against other alternatives.

Groundwater Alternatives

Each active groundwater alternative contains the following elements:

- Groundwater performance monitoring.
- Long-Term Monitoring (LTM) of the downgradient plume, between the CPS and Madison properties and the Perth Amboy wells.
- Institutional controls (i.e., CEA/WRA).

The groundwater alternatives assume NJDEP's IEC program will address 1,4-dioxane near the Perth Amboy wells as an integral part of the overall protectiveness of the Site's remedial program. EPA and NJDEP will monitor the progress of this action to ensure that this contamination is mitigated.

In order to reduce the number of alternatives and simplify the process of selecting them, EPA has grouped the groundwater alternatives into alternatives that address organic contaminants (1A, 2A, and 3A), and alternatives that address metal contaminants (1B, 2B, and 3B). One alternative will be selected from each group.

Organic Alternative 1A - No Action

Capital Cost:	$0
Annual Operation and Maintenance (O&M) Cost:	$0
Present Worth Cost:	$0
Construction Timeframe: 0 years	

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the organic contamination in groundwater at the CPS/Madison Site. Additionally, the existing CPS IRM pump and treatment system would be shut down.

Organic Alternative 2A – Upgraded CPS Site IRM Pump and Treat System

Capital Cost:	$8,008,000
Annual O&M Cost:	$401,000
Present Worth Cost:	$10,573,000
Construction Time Frame:	19-22 months

Alternative 2A involves upgrading the existing CPS IRM pump and treatment system with additional recovery well(s) to fully capture the migration of organic contaminants from the source areas and additional treatment to address 1,4-dioxane. It includes the following elements:

- A Groundwater Treatment Plant (GWTP) treatability study would be performed to evaluate and design the treatment process train.
- The CPS IRM recovery well system would be expanded to fully cover the 1,4-dioxane source area (one additional well is assumed for cost estimating purposes).
- The existing three IRM wells would be relocated further downgradient of the source area to accommodate implementation of the OU2 source soil remedial alternative.
- A new GWTP will be constructed to meet the new project requirements which would include treatment of 1,4-dioxane, as well as the other organic site contaminants. To ensure that the effluent from the pump and treatment system consistently achieves discharge limits, the new treatment system would address the organic contaminants using chemical oxidation or adsorptive media. The existing GWTP would remain in service until the new GWTP is fully operational and tested.
- The treated effluent would continue to be discharged to the current on-site surface water location.
- A LTM program to monitor concentrations in the downgradient plume of groundwater contamination, between the CPS and Madison properties and the Perth Amboy wellfield, would ensure that the pump and treatment system continues to reduce concentrations in the downgradient plume until remediation goals are achieved.
- Placement of institutional controls in the form of a deed notice to address potential vapor intrusion issues in the event that buildings are constructed in the future above the organic plume.

The existing CEA/WRA would be maintained as an institutional control under this alternative.

Organic Alternative 3A – In-Situ Chemical Oxidation Permeable Reactive Barrier

Capital Cost:	$3,828,000
Annual O&M Cost:	$283,000
Present Worth Cost:	$5,589,000
Construction Time Frame:	7-8 months

Alternative 3A involves placement of a series of closely spaced wells forming a permeable reactive barrier perpendicular to the groundwater flow and downgradient of the organic contaminant source areas located on the CPS property. These wells would inject an oxidant (ozone or peroxide) into the subsurface, which would destroy dissolved-phase organic contaminants that pass through the oxidant. It includes the following elements:

- Treatability study and pilot testing of the ISCO Permeable Reactive Barrier (PRB) to ensure remediation can be achieved.
- Installation and operation of an ISCO PRB well system.
- Installation of groundwater and vadose zone monitoring systems.
- Continued operation of the existing CPS IRM pump and treatment system until the PRB system proves it can achieve remediation goals.
- A LTM program to monitor concentrations in the downgradient plume of groundwater contamination, between the CPS and Madison properties and the Perth Amboy wellfield, would ensure that the PRB continues to reduce concentrations in the downgradient plume until remediation goals are achieved.
- Placement of institutional controls in the form of a deed notice to address potential vapor intrusion issues in the event that buildings are constructed in the future above the organic plume.

The existing CEA/WRA would be maintained as an institutional control under this alternative.

Metals Alternative 1B – No Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present Worth Cost:	$0
Construction Timeframe:	0 months

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the metals contamination in groundwater at the Site. Under this alternative the Madison IRM would be discontinued.

Metals Alternative 2B – Continued Operation of the Madison IRM

Capital Cost:	$0
Annual O&M:	$1,344,000
Present Worth Cost:	$12,183,000
Construction Timeframe:	0 months

Alternative 2B involves continued operation of the Madison IRM pump and treatment wells. The Madison IRM pump and treatment system has been in operation since 1991 and has effectively reduced and controlled the metal contaminant plume containing elevated levels of lead, cadmium, copper and zinc, over time. When Madison completes the OU3 RI/FS, a separate remedy selection process that addresses the source areas on the Madison property will also evaluate the need for the continuing operation of the Madison IRM.

Metals Alternative 3B – Permeable Reactive Barrier

Capital Cost:	$2,661,000
Annual O&M:	$153,000
Present Worth Cost:	$3,355,000
Construction Timeframe:	4-5 months

Alternative 3B involves placing a PRB downgradient of the Madison source areas to precipitate out metal contaminants (lead, cadmium, copper and zinc) in groundwater as they pass through the barrier. The barrier would need to be placed at a depth of approximately 30 feet. Zero valent iron and apatite are two possible reactants that would require treatability testing to determine their viability.

Soil Alternatives

Each active soil alternative contains the following elements:

- Institutional controls in the form of a deed notice restricting the future use of the CPS property to prohibit residential use.
- Groundwater and soil sampling to verify that performance goals are achieved.
- All soil alternatives would meet substantive requirements for flood zones and wetlands.

Alternative 1 – No Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present Worth Cost:	$0
Timeframe:	0 years

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the contaminated soil on the CPS property.

Alternative 2 – Capping

Capital Cost:	$1,565,000
Annual O&M Cost:	$73,000
Present Worth Cost:	$1,846,000
Construction Timeframe:	6-8 months

Alternative 2 consists of construction of a low-permeability cap of approximately 56,000 square feet to protect against direct contact hazards to human health and to reduce, to the extent possible, storm water infiltration through the unsaturated source soils that would impact the groundwater. The cap would not treat or destroy the contaminants, it would eliminate the pathways to human exposure. Long-term monitoring and maintenance are essential to maintain the integrity of this engineering control.

Alternative 3 – Excavation, Ex-situ Soil Vapor Extraction, and In-situ Chemical Oxidation

Capital Cost: $11,338,000
Annual O&M Cost: $2,100
Present Worth Cost: $10,684,000
Construction Timeframe: 40-41 months

Alternative 3 employs excavation and on-site ex-situ soil vapor extraction (SVE) of contaminated soils accessible to excavation, and in-situ chemical oxidation for contaminated source soils inaccessible to excavation (i.e., adjacent/beneath the sewer line). Excavated areas would be backfilled with treated soils. Due to excavation below the water table, this alternative would employ steel sheeting (for sidewall support and groundwater infiltration control) and includes a dewatering and treatment system. This alternative would provide immediate removal of contaminated soil in the source area that presents contact hazards and would reduce contaminant concentrations that impact groundwater. An active groundwater remedy for organics (2A or 3A) must be in place before this alternative could be implemented since it is likely to mobilize contaminants and the current IRM does not have complete capture.

Alternative 4 – Excavation, Off-site Disposal, and In-situ Chemical Oxidation

Capital Cost: $13,975,000
Annual O&M Cost: $2,100
Present Worth Cost: $14,004,000
Construction Timeframe: 12-15 months

Alternative 4 employs excavation and off-site disposal of contaminated soils accessible to excavation, backfill of excavated areas with certified clean fill, and in-situ chemical oxidation for contaminated source soils not accessible to excavation. Due to excavation below the water table, this alternative would employ steel sheeting (for sidewall support and groundwater infiltration control) and includes a dewatering and water treatment system. This alternative would provide immediate removal of contaminated soil in the source area that presents a contact hazard and would reduce contaminants that impact groundwater. An active groundwater remedy (2A or 3A) must be in place before this alternative could be implemented since it is likely to mobilize contaminants and the current IRM does not have complete capture.

Alternative 5 – In-Situ Chemical Oxidation (ISCO) with limited excavation

Capital Cost: $4,507,000
Annual O&M: $2,100
Present Worth Cost: $4,536,000
Construction Timeframe: 14-16 months

Alternative 5 uses chemical oxidants (such as peroxide, Fenton's Reagent, and/or persulfate) to destroy contaminants by converting them into simple molecules such as carbon dioxide and water. The critical aspect of ISCO is to achieve contact between the oxidant and the contaminant. This alternative would address the adsorbed contaminant mass in the soils found in the Former Tank Farm Area, particularly in the discontinuous low permeability layers, by in-situ mixing of the soil while injecting oxidant to achieve contact with the contaminants. The soil contaminated with 1,4-dioxane from the Repackaging Area would be excavated and placed in the Former Tank Farm Area to undergo treatment with the soils in that area. A third area, near the on-site sewer main, will be evaluated during design to determine if the contaminated soils are accessible for in-situ mixing or would require injection without mixing. An active groundwater remedy (2A or 3A) must be in place before this alternative could be implemented since it is likely to mobilize contaminants and the current IRM does not have complete capture.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy for a site, EPA considers the factors set forth in Section 121 of CERCLA 42 U.S.C. § 9621, and conducts a detailed analysis of the viable remedial alternatives pursuant to Section 300.430(e)(9) of the NCP, 40 C.F.R § 300.430(e)(9), EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies, OSWER Directive 9355.3-01, and EPA's A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, OSWER 9200.1-23.P. The detailed analysis consists of an assessment of the individual alternatives against each of the nine evaluation criteria at 40 C.F.R. § 300.430(e)(9)(iii) and a comparative analysis focusing upon the relative performance of each alternative against those criteria. The evaluation criteria are described below.

Threshold Criteria – The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet to be eligible for selection as a remedy.

- Overall protection of human health and the environment addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether a remedy will meet all the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

Primary Balancing Criteria – The next five criteria are known as "primary balancing criteria." These criteria are factors by which tradeoffs between response measures are assessed so that the best options will be chosen, given site-specific data and conditions.

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, which a remedy may employ.
- Short-term effectiveness addresses the period needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- Cost includes estimated capital, O&M, and present-worth costs.

Modifying Criteria – The final two evaluation criteria are called "modifying criteria" because new information or comments from the State or the community on the Proposed Plan may modify the selected response measure or cause another response measure to be considered.

- State acceptance indicates if, based on its review of the FS report and Proposed Plan, the State concurs with the selected remedy.
- Community acceptance refers to the public's general response to the alternatives described in the FS report and Proposed Plan.

EVALUATION OF GROUNDWATER ALTERNATIVES FOR ORGANIC CONTAMINANTS

1. **Overall Protection of Human Health and the Environment**

Alternative 1A, No Action, would not be protective of human health or the environment since it does not include measures to prevent exposure to contaminated groundwater. Because the "no action" alternative is not protective of human health and the environment it was eliminated from consideration under the remaining criteria.

Alternatives 2A and 3A would protect human health by preventing off-site migration of organic contaminants and restoring groundwater to meet remediation goals, which are the lower of NJGWQS and MCLs. Institutional controls (CEA and WRA), that are already in place, would maintain protectiveness in the interim. In addition, institutional controls will be required in the form of a deed notice to address potential vapor intrusion issues in the event that buildings are constructed in the future above the organic plume.

2. **Compliance with Applicable or Relevant and Appropriate Requirements**

Actions taken at any Superfund site must meet all applicable or relevant and appropriate requirements under federal and state laws or provide grounds for invoking a waiver of those requirements.

Alternatives 2A and 3A are both expected to meet NJGWQS and MCLs (which are chemical-specific ARARs) for organic contaminants in groundwater migrating from the source areas. The downgradient plume (outside the area captured and addressed by the action) would be monitored to ensure it meets NJGWQS and MCLs through attenuation over time. Any concentrations above NJGWQS and MCLs are expected to be addressed by the IEC actions that are being overseen by NJDEP under state statutory authorities. Both alternatives would meet action- and location-specific ARARs.

3. **Long-Term Effectiveness and Permanence**

Alternatives 2A and 3A would provide long-term effectiveness and permanent protection to human receptors, provided they are properly constructed, operated and maintained until remediation goals are met. Alternative 3A would require a treatability study to determine which reactants are most effective and if all the chemical-specific objectives can be achieved. Alternative 2A would require upgrades to the existing groundwater pump and treatment plant, and then regular oversight to maintain pumping wells and the treatment plant.

While Alternative 3A would also require regular oversight, it would require less equipment maintenance than 2A because it does not require extraction, treatment and discharge to groundwater. Both remedial alternatives would achieve groundwater standards in the same timeframe.

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

Alternative 2A reduces the toxicity and volume of groundwater contaminants by treatment and removal. Treated water would be reintroduced to the surface water if it meets discharge standards. Alternative 3A would reduce the groundwater contaminant toxicity and volume by in-situ treatment as contaminants pass through the reactive barrier.

5. **Short-Term Effectiveness**

Although the estimated time to construct Alternative 2A is expected to be longer than 3A, both alternatives would be protective in the short-term. The CPS IRM wells, which have reduced and controlled the majority of the contaminant plume, would remain in operation until the selected remedy is ready to be turned on. Both alternatives would present risks to on-site workers due to handling caustic chemicals, but the risks can be controlled with sound engineering practices. For both alternatives, risks to the community and environment would be negligible because the IRM wells would be operating until a new remedy is constructed.

6**. Implementability**

While Alternative 2A is an augmented version of what is already in place, it would require more infrastructure and O&M than 3A because it involves modifying the extraction, reinjection, as well as treatment element of the pump and treatment system. For this reason, Alternative 2A would also require more time to construct than 3A. Both alternatives are technically and administratively feasible. Alternative 3A has fewer reporting requirements. Both Alternative 2A and 3A would be implementable and would require materials and equipment that are readily available.

7. **Cost**

The total estimated present worth costs calculated using a discount rate of 7 percent are:

• Alternative 1A - $0.
• Alternative 2A - $10,573,000.
• Alternative 3A - $5,589,000.

EVALUATION OF GROUNDWATER ALTERNATIVES FOR METAL CONTAMINANTS

1. **Overall Protection of Human Health and the Environment**

Alternative 1B, No Action, would not be protective of human health since it does not include measures to prevent exposure to contaminated groundwater. Because the "no action" alternative is not protective of human health and the environment it was eliminated from further consideration.

Alternatives 2B and 3B would both protect human health by preventing off-site migration of metal contaminants and restoring groundwater to meet remediation goals, which are the lower of NJGWQS and MCLs. Institutional controls (CEA and WRA), that are already in place, would maintain protectiveness in the interim.

2. **Compliance with Applicable or Relevant and Appropriate Requirements**

Actions taken at any Superfund site must meet all applicable or relevant and appropriate requirements under federal and state laws or provide grounds for invoking a waiver of those requirements.

Alternative 2B has demonstrated that it controls the migration of metals contamination in groundwater from the source areas, and therefore would continue to meet chemical specific ARARs such as NJGWQS and MCLs. Alternative 3B is expected to capture metals contamination migrating from the source areas but would require treatability testing to ensure complete capture of all the chemicals of concern. With both alternatives, remedial action objectives would be met in groundwater downgradient of the treatment system through attenuation. Both alternatives would meet both action- and location-specific ARARs.

3**. Long-Term Effectiveness and Permanence**

Alternative 2B is already in place and would provide long-term effectiveness and permanent protection to human and ecological receptors. Alternative 3B would require a treatability study to determine which reactants are most effective, if the reactants are compatible with the upgradient organic alternative, and if all the chemical specific objectives can be achieved. Alternative 2B would require operation and maintenance of the pumping wells and the treatment plant. Alternative 3B may require change out of reactive media over time to remain effective.

Alternative 3B may be slightly less permanent because the contaminants remain trapped in the media of the barrier wall and could potentially desorb under changing conditions. This concern could be mitigated by removal of the media when remediation goals have been achieved. Both alternatives require technically feasible maintenance tasks. Both alternatives would achieve groundwater standards in the same timeframe.

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

Alternative 2B would reduce the volume of groundwater contaminants by treatment and removal in a treatment plant. Alternative 3B would reduce the groundwater contaminant mobility by treatment and capture of the contaminants as the groundwater passes through the barrier.

5. **Short-Term Effectiveness**

Both Alternatives would be protective in the short-term. Alternative 2B is already in place and functioning, and therefore presents no short-term risks to on-site workers, the community, or the environment. Alternative 3B would require 4 - 5 months to construct. During that time, the Madison IRM wells, which have reduced and controlled the contaminant plume, would remain in operation until Alternative 3B is functional. Risk to on-site workers would be posed by construction tools and equipment, but these risks are easily controlled by sound engineering practices.

6. **Implementability**

Both alternatives are implementable. Alternative 2B has been constructed and requires only continued operation and maintenance. Alternative 3B would require construction materials and equipment that are readily available. If combined with Organic Alternative 3A, the choice of reactants for Alternative 3B would be limited by compatibility with the upgradient alternative. This would require sequencing of the treatability testing and add to the implementation time and complexity for Alternative 3B.

7. **Cost**

The total estimated present worth costs calculated using a discount rate of 7 percent are:

• Alternative 1B - $0.
• Alternative 2B - $12,183,000.
• Alternative 3B - $3,355,000.

EVALUATION OF SOIL ALTERNATIVES

1. **Overall Protection of Human Health and the Environment**

Alternative 1 is not protective of human health or the environment because no action would be taken to address soil contamination. Because the "no action' alternative is not protective of human health and the environment it was eliminated from further consideration under the remaining eight criteria.

Alternative 2 would use capping and institutional controls to protect human health by eliminating contact with the contaminated soil. However, this alternative would not effectively mitigate the sources of organic contamination to the groundwater below the water table.

Alternatives 3, 4, and 5 would protect human health and the environment by treating the soil contaminants that pose a contact risk and act as a source of groundwater contamination.

2. **Compliance with Applicable or Relevant and Appropriate Requirements**

Alternative 2 would quickly address direct contact chemical-specific ARARs for soil by the physical barrier of a cap. However, because Alternative 2 would leave soil contamination below the water table that acts as a groundwater source, it would take a longer period of time for groundwater ARARs to be achieved, and the groundwater remedies to be completed.

Alternatives 3, 4, and 5 would all meet chemical-specific ARARs/soil remediation goals by removing or treating the organic contaminants. Because some contamination would remain in place above NJRDCSRS, institutional controls in the form of a deed notice would be required to prohibit future residential use of the CPS property.

All the alternatives would comply with action-specific ARARs, and all will be able to meet substantive requirements of location-specific ARARs for flood hazard areas and wetlands.

3. **Long-Term Effectiveness and Permanence**

Alternatives 3, 4, and 5 all achieve a similar high degree of long-term effectiveness and permanence by either removal or destruction of the on-site soil contamination. Alternatives 4 and 5 will achieve soil remediation goals in 12–16 months, while Alternative 3 requires 40-41 months. Each of these alternatives would include bench testing of the ISCO component. Alternative 2 has a lesser degree of long-term effectiveness and permanence than Alternatives 3, 4, and 5 because the organic contaminants would remain on-site and the cap would require maintenance for the foreseeable future, but the cap would achieve protection in 6-8 months.

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

Alternative 2 would reduce mobility of the contaminants above the water table by capping, not treatment, and would not reduce toxicity or volume. Contaminants below the water table would still act a source of groundwater contamination, prolonging the time needed for the groundwater remedies to reach remediation goals.

Alternatives 3 and 5 use treatment exclusively to reduce contaminant toxicity, mobility and volume.

Alternative 4 relies on removal and off-site disposal for most of the soil contamination and does not reduce toxicity or volume for most of the contaminant mass. However, ISCO treatment would be used to reduce contaminant toxicity and volume in areas not accessible to excavation.

5. **Short-Term Effectiveness**

Alternative 2 presents very minimal short-term risks to the community and site workers or the

environment because none of the contaminated soil would be disturbed during placement of the cap.

Alternatives 3 and 4 involve excavation and thus have potential for short-term adverse effects. Potential risks posed to site workers, the community and the environment during implementation of each of the soil alternatives could be due to wind-blown or surface water transport of contaminated soil. Any potential impacts associated with dust and runoff would be minimized through proper installation and implementation of dust and erosion control measures. The areas would be monitored throughout the construction of the ISCO system. Alternatives 3, 4, and 5 would all involve use of ISCO chemicals which can be caustic. These hazards can be controlled with proper handling and protective clothing.

Alternative 5 employs in-situ mixing during ISCO injections and would involve a minor amount of open excavation, which would minimize dust.

6. **Implementability**

Alternative 2, capping, has the least technical challenges and would be easily implemented.

Alternatives 3 and 4 require excavation, sheet piling, dewatering, water treatment, and discharge of the effluent, which are technically more complex, but still employ readily available equipment and expertise.

Alternative 5 is more easily implemented compared to Alternatives 3 and 4 because it involves less excavation than Alternatives 3 and 4. ISCO injection and mixing of soil also employs less infrastructure and would pose fewer technical complexities compared to Alternatives 3 and 4. Materials for all the alternatives are readily available.

7. **Cost**

The total estimated present worth costs calculated using a discount rate of 7 percent are:

• Alternative 1 - $0.
• Alternative 2 - $1,846,000.
• Alternative 3 - $10,684,000.
• Alternative 4 - $14,004,000.
• Alternative 5 - $4,536,000.

State Acceptance

NJDEP concurs with the selected remedy for groundwater and soil. A letter of concurrence is attached in Appendix II.

Community Acceptance

Comments received during the public comment period indicate that the public generally supports the selected remedy for groundwater and soil. These comments are summarized and addressed in the Responsiveness Summary, which is attached as Appendix III to this document.

PRINCIPAL THREAT WASTES

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a Site whenever practicable (NCP Section 300.430(a)(1)(iii)(A)). Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment in the event exposure should occur. Non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The decision to treat principal threat wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria which are described above. The manner in which principal threat wastes are addressed provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

The high concentrations of VOCs in the CPS property soils are an on-going source of contamination to the groundwater and are therefore considered to be principal threat wastes. By utilizing treatment as a significant component of the remedy for soil, the statutory preference for remedies that employ treatment as a principal element is satisfied.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA has determined that Alternative 3A – ISCO Permeable Reactive Barrier, Alternative 2B – Continued Operation of the Madison IRM, and Alternative 5 – In-Situ Chemical Oxidation with limited excavation, best satisfy the requirements of CERCLA Section 121, 42 U.S.C. §9621, to respectively address the soil, and groundwater at the Site, and provide the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR § 300.430(e)(9).

For organics in groundwater, Alternative 3A which was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction by substantially reducing contaminant levels in the groundwater as they begin to migrate off the CPS property and before reaching the Perth Amboy wellfield. The selected alternative for organics in groundwater reduces risk by destroying organic contaminants migrating from the CPS property, at a lower cost, compared to the other active alternative (2A), and will be reliable over the long-term.

Because Alternative 3A still needs to be proven under existing Site conditions, Alternative 2A, Upgraded CPS Site IRM Pump and Treat System, is selected as the contingency remedy should the contaminant concentrations in effluent of the ISCO Barrier increase (exceeding the variability of the existing IRM results) over four consecutive monitoring periods. Although the cost of Alternative 2A is higher, and requires discharge of treated effluent to surface water, it is a proven technology and would be protective.

Because of the potential for vapor intrusion, institutional controls will be required in the form of a deed notice to address potential vapor intrusion issues in the event that buildings are constructed in the future above the organic plume.

For metals in groundwater, Alternative 2B, was selected over other alternatives because it is in place and has been proven effective. It is expected to control the metals contamination coming from the Site until the sources on the Madison property are addressed by a remedy as part of a future remedy selection process. While Alternative 3B is potentially viable, it was not chosen due to limitations imposed by potential incompatibility of the reactants with the alternative selected for organic contaminants in groundwater, which could require sequencing that would lead to delays in implementation.

For contaminated soil on the CPS property, Alternative 5 was selected. This alternative uses ISCO to break down organic chemicals to carbon dioxide and water. By this method, organic chemicals in the soil that contribute to groundwater contamination will be permanently removed.

Alternative 5 was selected over other soil alternatives because it is expected to achieve substantial and long-term risk reduction through chemical treatment and is expected to allow the CPS property to be used for its reasonably anticipated future land use, which is commercial. It is also easier to implement than the other alternatives, while still reducing soil concentrations to a level that will not impact groundwater. The selected soil alternative will reduce the risk within 16 months, at a cost comparable to other alternatives and should be reliable over the long-term.

Though the selected remedy for soil will be protective, it will not achieve levels that would allow for unrestricted use. Therefore, institutional controls, such as deed notices restricting the future use of the CPS property, will be required. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Based on information currently available, the selected alternatives meet the threshold criteria and provide the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. EPA expects the selected alternatives to satisfy the following statutory requirements of Section 121(b) of CERCLA: (1) be protective of human health and the environment; (2) be cost-effective; (3) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (4) satisfy the preference for treatment as a principle element, or explain why the preference for treatment will not be met. Section 121(d) of CERCLA further specifies that an action must comply with ARARs unless a waiver can be justified.

Description of the Selected Remedy

Based upon an evaluation of the alternatives, EPA, in consultation with NJDEP, has selected Alternative 3A, Alternative 2B and Alternative 5 to address the contaminated groundwater at the

Site and soil at the CPS property. Figures 5 and 6 depict the groundwater remedies for organic and metals contamination respectively. Figure 7 depicts the conceptual layout of the selected remedy for soil on the CPS property. Well head protection of the Perth Amboy public water supply wells, to address 1,4-dioxane, will be implemented concurrently under NJDEP direction. While well head protection is not part of the EPA selected remedy, it is an important part of the overall remediation strategy for the Site.

The selected alternative for organic contaminants in groundwater (OU1), Alternative 3A, includes the following remedial activities:

- Treatability study and/or pilot testing to ensure remediation goals for the organic site contaminants will be achieved.
- Installation and operation of an ISCO PRB well system.
- Installation and operation of groundwater and vadose zone monitoring systems.
- Continued operation of the existing CPS IRM pump and treatment system until the PRB system has been shown to be effective.
- LTM to monitor the low-level organic plume between the PRB and the Perth Amboy wells.
- Continuation of institutional controls - CEA and WRA.
- Placement of institutional controls in the form of a deed notice to address potential vapor intrusion issues in the event that buildings are constructed above the organic plume.

After treatability and/or pilot testing, and prior to the source removal on the CPS property, a series of injection wells will be installed to deliver the ISCO reactants into the area intended to act as a barrier to organic contamination. While the reactants are being injected, groundwater in and around the barrier will be monitored to ensure adequate distribution of ISCO reactants, and reduction of the organic contaminants. The soil gas above the groundwater table will also be monitored to determine the need for vapor mitigation systems in the buildings on the CPS Chemical or Madison properties. The existing CPS IRM groundwater pump and treat system will remain in operation during ISCO injections. The groundwater pump and treat system will only begin to be phased out as data from the monitoring system confirms that groundwater remediation goals are being achieved by the ISCO barrier. The ISCO barrier will remain in operation until the upgradient source removal is complete and remediation goals are achieved upgradient of the barrier.

Because the selected remedy for organic contamination in groundwater will need to be proven under Site conditions, an upgraded version of the CPS IRM Pump and Treat System is selected as the contingency remedy should the contaminant concentrations in effluent of the ISCO Barrier increase (exceeding the variability of the existing IRM results) over four consecutive monitoring periods.

The selected alternative for metal contaminants in groundwater, Alternative 2B, includes the following remedial activities:

- Continued operation of the Madison IRM pump and treatment system.
- Groundwater monitoring.
- Continuation of Institutional controls - CEA/WRA.

The selected alternative for OU2 soil is Alternative 5, in-situ chemical oxidation with limited excavation. The major components of the selected soil alternative include:

- Excavation of soils contaminated with 1,4-dioxane from the Repackaging Area and placement in the Tank Farm Area for treatment.
- In-situ chemical oxidation.
- In-situ soil mixing of the oxidant in accessible areas (~20,000 cubic yards).
- In-situ injection of the oxidant in inaccessible areas (~ 1,500 cubic yards).
- Post-Remediation Monitoring.
- Institutional Controls.

The CPS property soil remedy (Alternative 5) will begin upon completion of the installation and testing of the down-gradient organic groundwater remedy described above. The soil remedy will involve excavation of approximately 900 cubic yards of soil from the Repackaging Area to be placed in the Former Tank Farm Area for treatment. The contaminated soil in the Former Tank Farm Area will be injected with ISCO reactant and mixed by auger, excavator or other method, to ensure the reactant makes contact with the soil contaminants. The soil will be sampled after treatment to ensure that the remediation goals are met.

There is a small area surrounding the sewer line, containing approximately 1,500 cubic yards of contaminated soil, that may not be accessible to the mixing or excavation equipment. This may require injection of the ISCO reactant without mixing. During the remedy design, EPA intends to eliminate or minimize the volume of material that is not subjected to mixing.

Summary of the Estimated Selected Remedy Costs

The estimated total present-worth costs for the three components of the selected remedy is $22,308,000. The cost estimates are based on available information and are order-of-magnitude engineering cost estimates that are expected to be between +50 to -30 percent of the actual project cost. Changes to the cost estimate can occur as a result of new information and data collected during the design of the remedy.

Cost estimates for the components of the selected remedy are presented in Tables 9, 10 and 11. Individual cost estimates for each remedial alternative evaluated are provided in Tables 9 through 16 of the FS Report.

Expected Outcomes of the Selected Remedy

The three components of the selected remedy actively address organic and metals contamination in groundwater and soil at the Site. The results of the risk assessment indicate excess cancer risk from ingestion of groundwater containing Site contaminants. The response actions selected in this ROD will address groundwater leaving the Site, as well as contaminated Site soils that are considered principal threat waste and act as a source to groundwater and, thereby, will eliminate the risks associated with these exposure pathways while allowing the commercial/industrial use of the CPS property, and reduce contamination in groundwater to levels that meet state and federal standards within a reasonable time frame.

Remediation goals for the OU1/OU2 COCs are presented in Tables 7 and 8.

STATUTORY DETERMINATIONS

EPA has determined that the selected remedy complies with the CERCLA and NCP provisions for remedy selection, meets the threshold criteria, and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. These provisions require the selection of remedies that are protective of human health and the environment, comply with ARARs (or justify a waiver from such requirements), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the toxicity, mobility and volume of hazardous substances as a principal element (or justifies not satisfying the preference). The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy will protect human health and the environment because it will prevent human exposure to contaminated groundwater and soil. Over the long term, the selected remedy will restore groundwater to levels that meet state and federal standards within a reasonable time frame. In addition, institutional controls will protect human health over both the short and long term by preventing groundwater use within the area of the contaminant plume, and exposure to vapor intrusion. This action will result in the reduction of exposure risk to levels within EPA's risk range of 1×10^{-4} to 1×10^{-6} for carcinogens and below a HI of 1.0 for noncarcinogens. Implementation of the selected remedy will not pose unacceptable short-term risks.

Compliance with ARARs

The selected remedy is expected to achieve the remediation goals for COCs in the soils. These remediation goals are based on NJDEP's NRDCSRSs (chemical-specific ARARs) for the COCs in the soils, and federal MCLs or more stringent NJGWQS (chemical-specific ARARs) for the COCs in the groundwater. NJDEP RDCSRS will be addressed by institutional controls in the form of a deed notice that prohibits future residential use of the CPS property. The remedy will comply with location and action-specific ARARs.

A full list of the ARARs, TBCs, and other guidance related to implementation of the selected remedy is presented in Tables 12, 13 and 14.

Cost Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (40 C.F.R. § 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of long-term effectiveness and permanence, reduction in toxicity, mobility, and volume through treatment, and short-term effectiveness. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to cost to determine cost-effectiveness.

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of each alternative. The total estimated present worth cost for implementing the selected remedy is $22,308,000.

Based on the comparison of overall effectiveness to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost effective (40 C.F.R. § 300.430(f)(1)(ii)(D)) and is the lowest-cost action which will achieve remediation goals in the Site soils and restore groundwater to levels that meet state and federal standards within a reasonable time frame.

Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to Maximum Extent Practicable

The selected remedy complies with the statutory mandate to utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable because it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner to remediate the OU1 and OU2 areas. The selected remedy satisfies the criteria for long-term effectiveness and permanence by permanently reducing the mass of contaminants in the Site soils and groundwater, thereby reducing the toxicity, mobility and volume of contamination.

Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for remedies that employ treatment as a principal element by using ISCO for soils and groundwater.

Five-Year Review Requirements

Because the selected remedy results in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for OU1 and OU2 was released to the public on April 24, 2019. The Proposed Plan identified Alternative 3A, Alternative 2B, and Alternative 5 as the preferred alternatives for remediating the groundwater contaminated with organic compounds, groundwater contaminated with metals, and soil contamination at the CPS property, respectively, which comprise OU1 and OU2 of the Site. Based upon review of the written and verbal comments submitted during the public comment period, EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

Figure 1 - Site Location

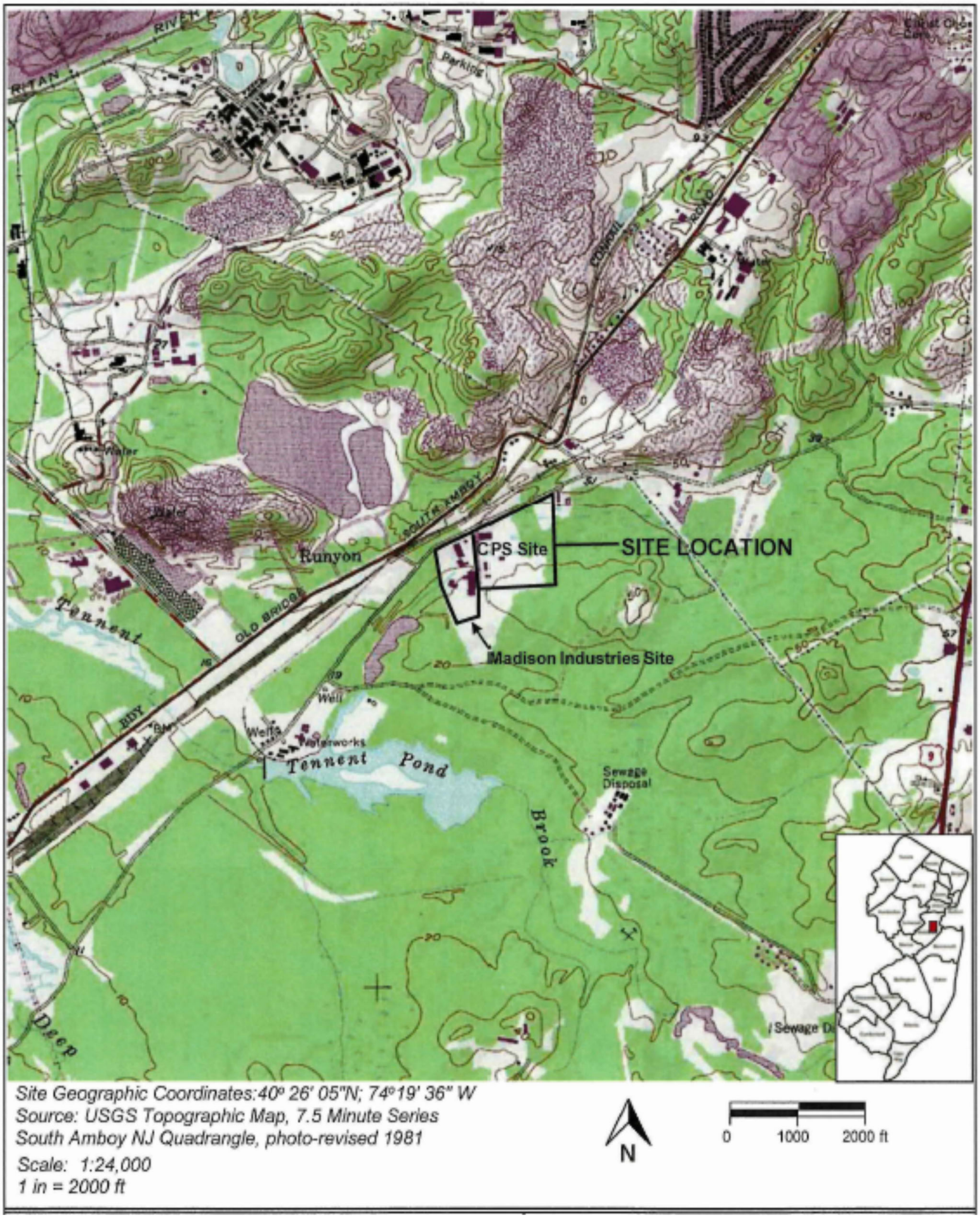
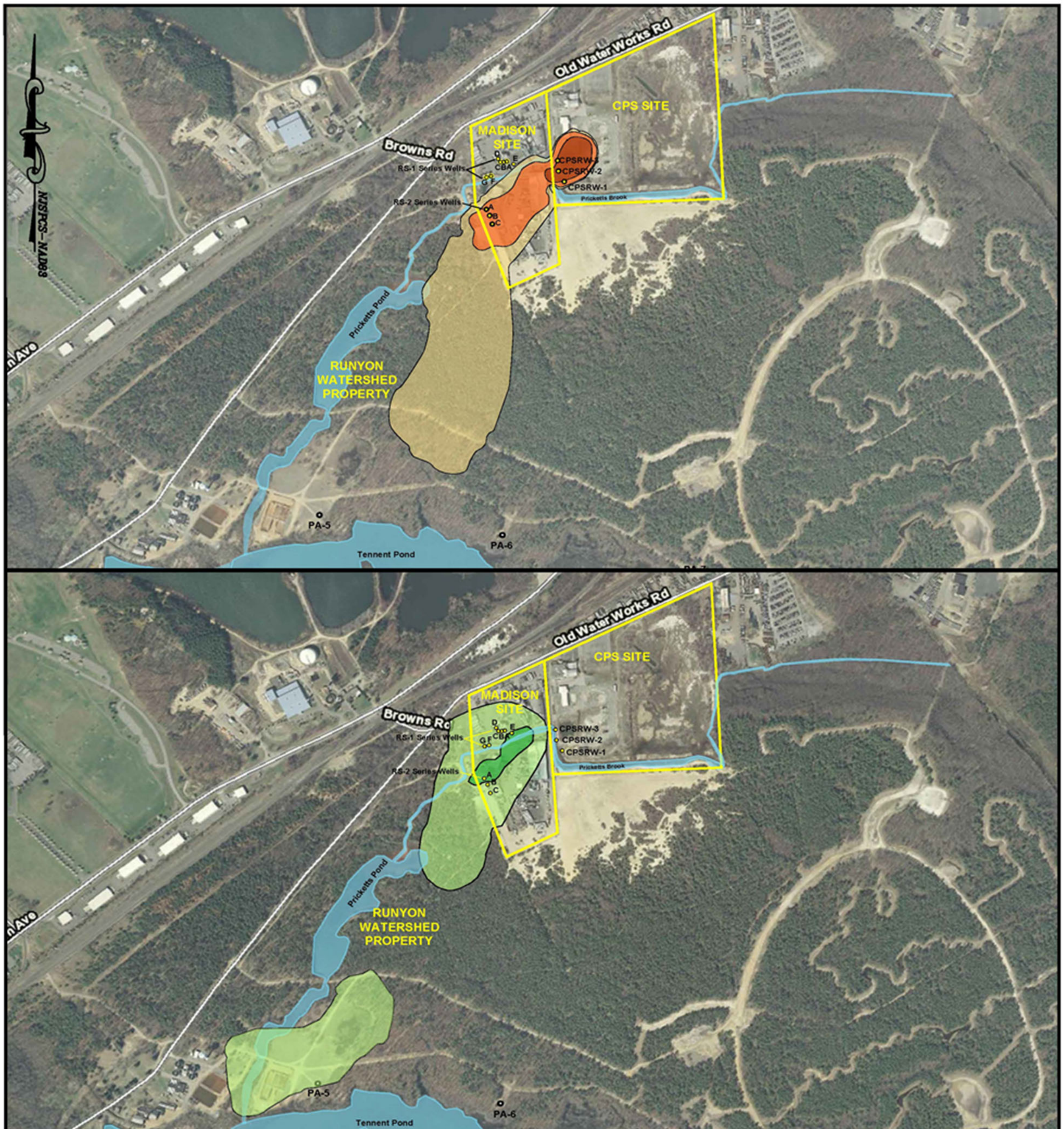


Figure 2
Site Map with Soil Exposure Areas



Groundwater Concentrations

- Benzene > 100 ug/L
- Benzene 10 - 100 ug/L
- Benzene 1 (GWQS) - 10 ug/L
- Zinc > 20,000 ug/L
- Zinc 2,000 (GWQS) - 20,000 ug/L

(ug/L = micrograms per liter)

0 500 1000
APPROXIMATE SCALE (FEET)

Figure 3
Groundwater Contamination

CPS/Madison Superfund Site
Old Bridge Twp., Middlesex County, NJ

CAD FILE: CPS-FS-01R-10-2018.DWG | DATE: 10/5/2018

Figure 4

Soil Contamination

CPS/Madison Superfund Site
Old Bridge Twp., Middlesex County, NJ

File: CPS-FS-07-10-8-2018.dwg

DATE: 10/8/2018

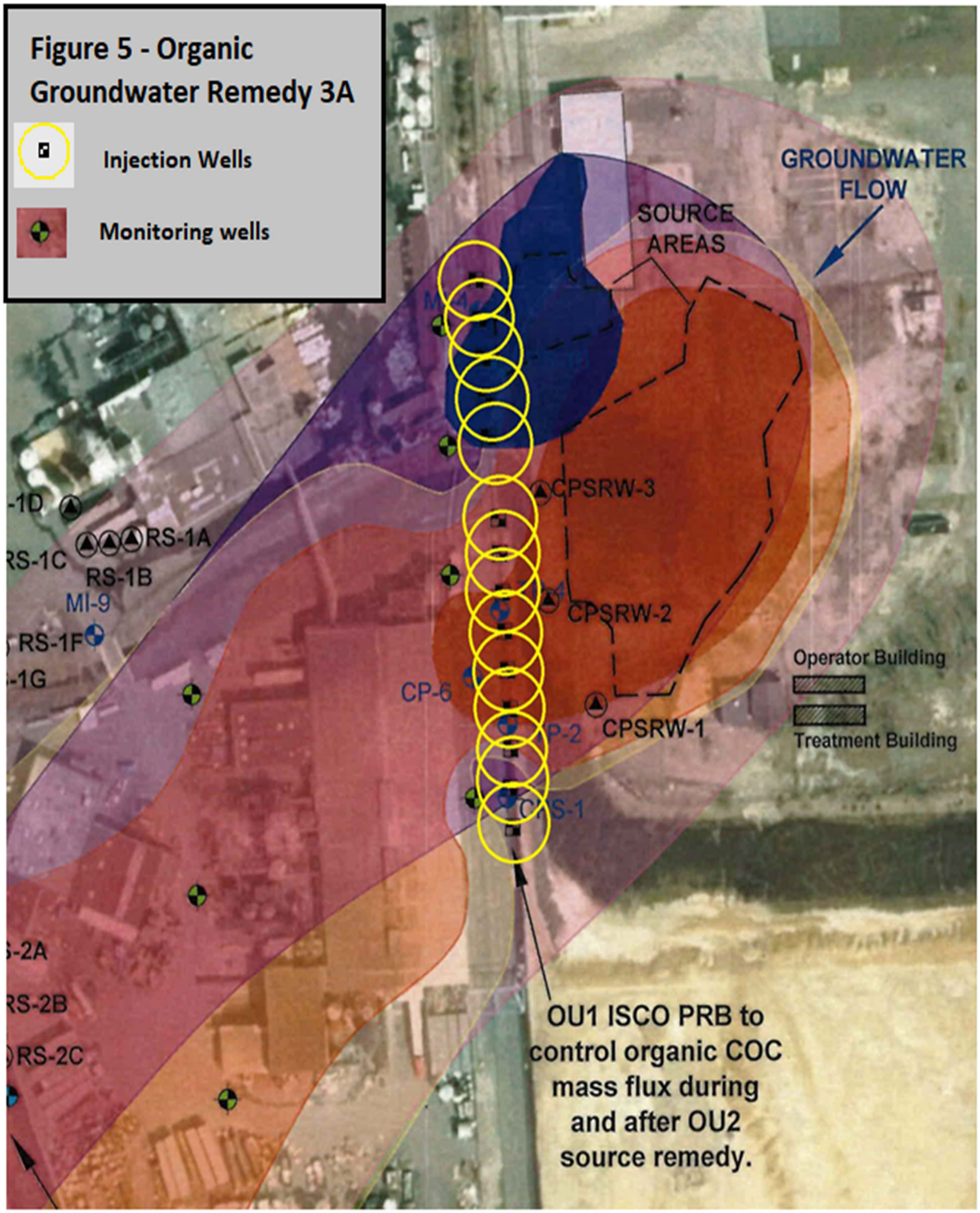


Figure 5 - Organic Groundwater Remedy 3A
Injection Wells
Monitoring wells
GROUNDWATER FLOW
SOURCE AREAS
CPSRW-3
CPSRW-2
CPSRW-1
RS-1A
RS-1B
RS-1C
MI-9
RS-1F
CP-6
Operator Building
Treatment Building
RS-2B
RS-2C
OU1 ISCO PRB to control organic COC mass flux during and after OU2 source remedy.

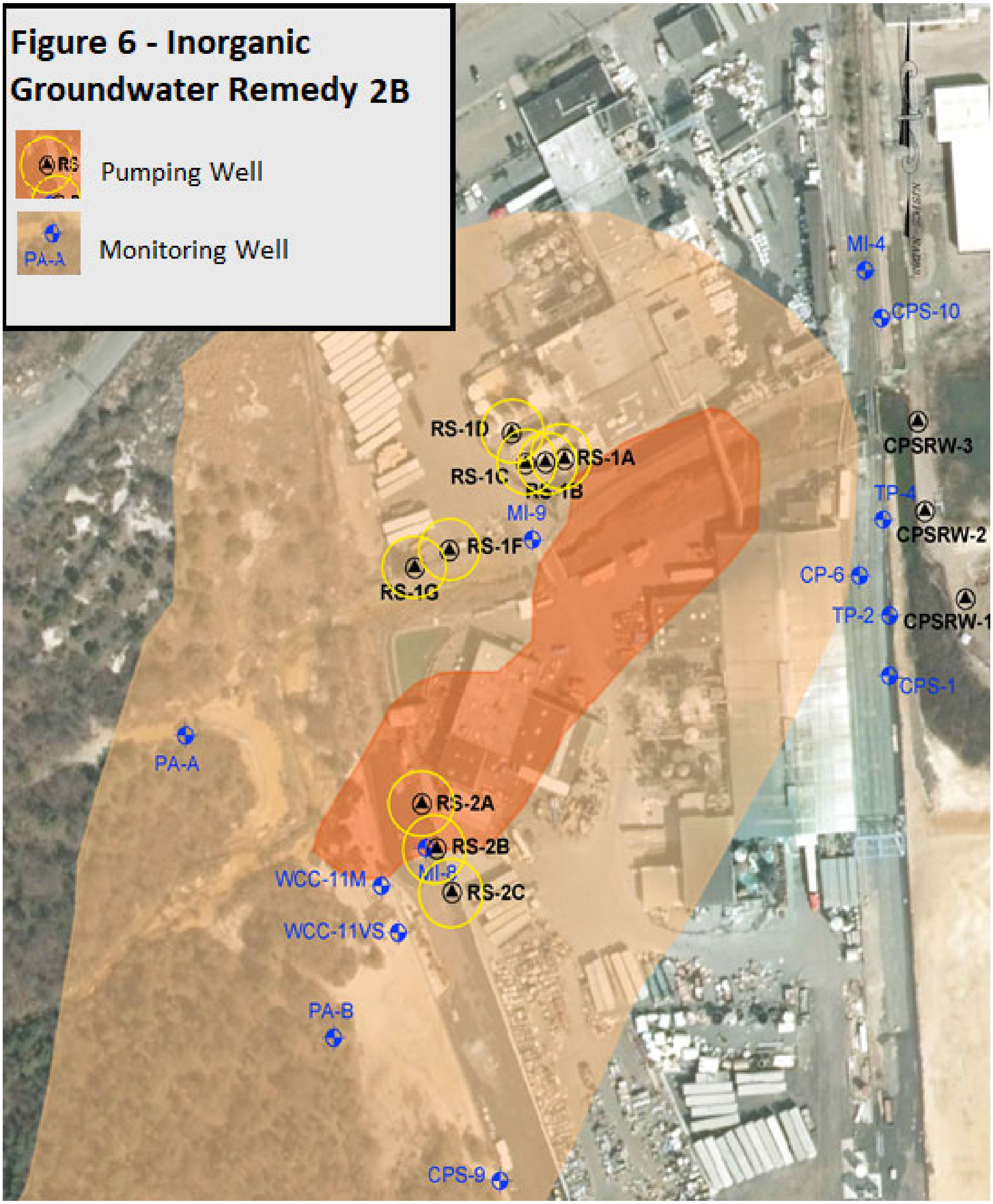


Figure 6 - Inorganic Groundwater Remedy 2B

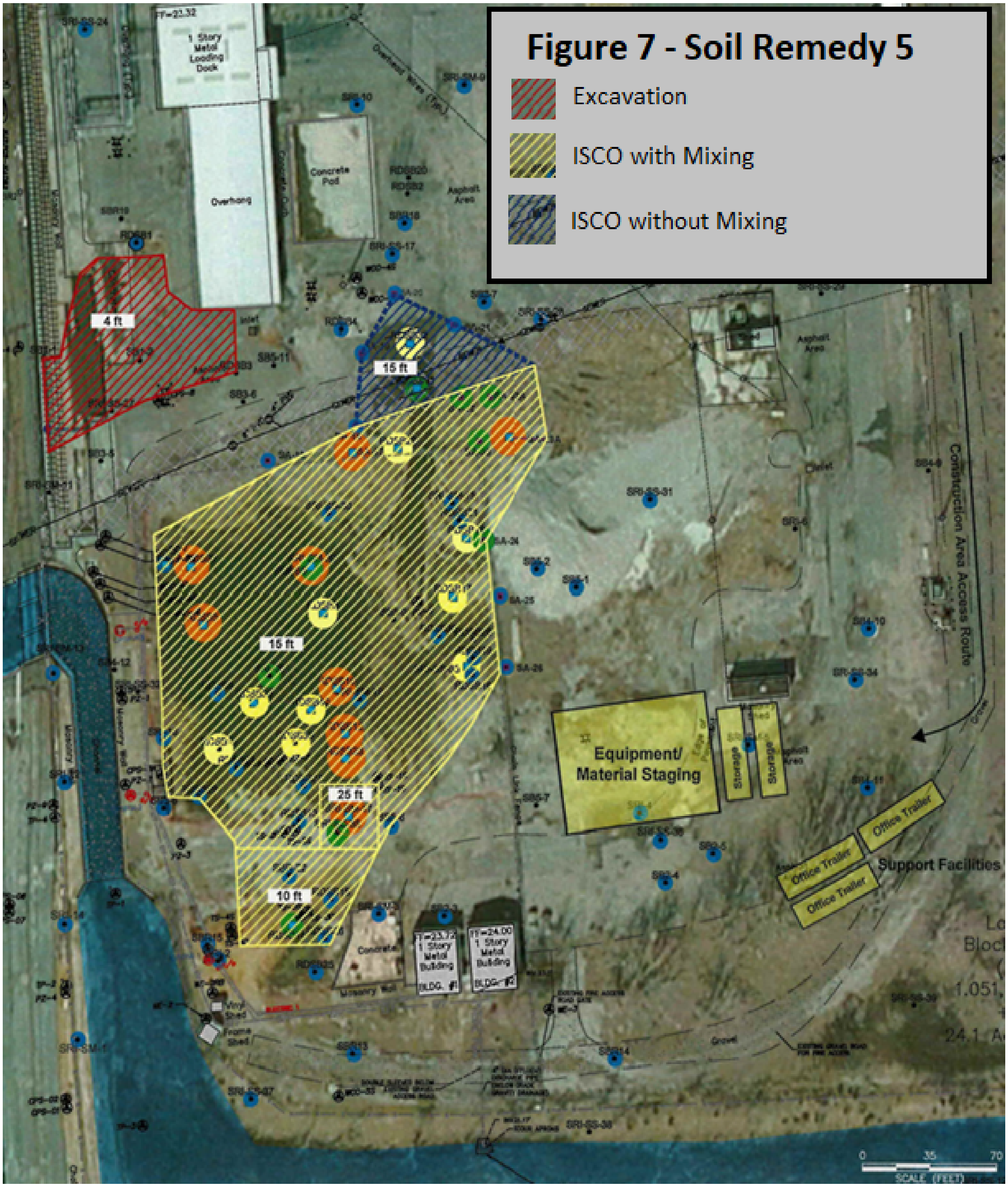


Figure 7 - Soil Remedy 5
Excavation
ISCO with Mixing
ISCO without Mixing
4 ft
15 ft
15 ft
25 ft
10 ft
Equipment/
Material Staging
Storage
Storage
Office Trailer
Office Trailer
Office Trailer
Support Facilities
Construction Area Access Route

TABLE 1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	EPC Units	Statistical Measure
		Min	Max					
Surface soil – Area 1	1,2,3-Trichlorobenzene	0.08	450	mg/kg	20/44	145.8	mg/kg	95% Appx Gamma UCL
	Thallium	0.461	1.32	mg/kg	6/41	0.662	mg/kg	95% KM(t) UCL

Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern	Min	Max	Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	EPC Units	Statistical Measure
Sitewide Groundwater	1,1,2-Trichloroethane	0.0001	0.0075	mg/l	11/66	0.0005934	mg/l	95% KM (BCA) UCL NP
	1,2,3-Trichlorobenzene	0.00056	0.40593	mg/l	13/20	0.314	mg/l	99% KM Cheb UCL NP
	1,2,4-Trichlorobenzene	0.0001	1.9796	mg/l	39/58	0.509	mg/l	99% KM Cheb UCL NP
	1,2,4-Trimethylbenzene	0.00028	0.07274	mg/l	19/21	0.0303	mg/l	95% GROS Adj Gamma UCL
	1,2-Dichlorobenzene	0.0001	1.254	mg/l	46/63	0.502	mg/l	99% KM Cheb UCL NP
	1,2-cis-dichloroethene	0.0001	1.1163	mg/l	49/63	0.221	mg/l	99% KM Cheb UCL NP
	1,2-Dichloroethane	0.0001	0.1946	mg/l	50/68	0.0231	mg/l	95% Appx Gamma UCL
	1,2-Dichloropropane	0.02048	0.02048	mg/l	1/66	0.02048	mg/l	Maximum
	1,2-trans-dichloroethane	0.0002	0.2703	mg/l	28/66	0.0265	mg/l	95% KM (Cheb) UCL NP
	1,3-Dichlorobenzene	0.0001	0.2369	mg/l	39/63	0.0325	mg/l	95% Appx Gamma UCL
	1,4-Dichlorobenzene	0.0001	0.8657	mg/l	47/63	0.264	mg/l	99% KM Cheb UCL NP
	Benzene	0.0001	2.0598	mg/l	52/69	0.364	mg/l	97.5% KM Cheb UCL NP
	Chlorobenzene	0.0001	8.1	mg/l	52/69	8.1	mg/l	97.5% KM Cheb UCL NP
	Methylene chloride	0.0004	0.0004	mg/l	1/66	0.341	mg/l	97.5% KM Cheb UCL NP
	Napthalene	0.0001	0.036	mg/l	26/52	0.0102	mg/l	95% GROS Adj Gamma UCL
	O-Xylene	0.0005	1.2796	mg/l	23/51	0.32	mg/l	99% KM Cheb UCL NP
	Toluene	0.0001	13.8097	mg/l	28/66	3.656	mg/l	99% KM Cheb UCL NP j
	Trichlorethylene	0.0002	0.018	mg/l	45/68	0.00641	mg/l	95% GROS Appx Gamma UCL
	Vinyl chloride	0.0001	0.3397	mg/l	36/66	0.0466	mg/l	97.5% KM Cheb UCL NP
	Xylene	0.0001	3.2943	mg/l	29/65	0.354	mg/l	95% Appx Gamma UCL

TABLE 1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

	Mercury	0.00066	0.01	mg/l	4/39	0.0008698	mg/l	95% KM (t) UCL
	Aniline	0.00378	0.4701	mg/l	3/3	0.4701	mg/l	Maximum
	Aluminum	0.25	189	mg/l	39/39	55.28	mg/l	95% Cheb (Mean, SD) UCL
	Antimony	0.0059	0.018	mg/l	5/35	0.00832	mg/l	95% KM (% bootstrap) UCL
	Arsenic	0.0065	0.138	mg/l	14/39	0.0251	mg/l	95% KM (% bootstrap) UCL
	Cadmium	0.00055	0.613	mg/l	22/49	0.0808	mg/l	95% KM (Cheb) UCL NP
	Cobalt	0.0051	0.0745	mg/l	30/39	0.0745	mg/l	Maximum
	Copper	0.0034	123	mg/l	31/42	52.99	mg/l	99% KM Cheb UCL NP
	Iron	0.05262	770	mg/l	38/40	342.6	mg/l	99% KM Cheb UCL NP
	Thallium	0.0104	0.0206	mg/l	4/39	0.00788	mg/l	95% KM (t) UCL
	Vanadium	0.0026	2.03	mg/l	21/39	0.397	mg/l	95% Adj Gamma UCL
	Zinc	0.148	914	mg/l	46/47	223.1	mg/l	99% KM Cheb UCL

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

This table presents the chemicals of concern (COCs) and exposure point concentrations (EPCs) for each of the COCs in surface soil, subsurface soil and groundwater for the CPS/Madison site, including Area1, Area 2 and Area 3. The table includes the range of concentrations detected for each COC, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPC and how it was derived. Note that soil concentrations of several compounds are above the concentrations that are associated with an adverse impact to groundwater; thus, there is a need to address the soil through a remedial action.

TABLE 2
SELECTION OF EXPOSURE PATHWAYS
CPS/Madison Superfund Site

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis
Current/Future	Soil	Surface Soil	Areas 1, 2 and 3	Trespasser	Adult	Ingestion	Quant
						Dermal	Quant
					Adolescent	Ingestion	Quant
						Dermal	Quant
Future	Soil	Surface Soil	Areas 1, 2 and 3	Outdoor Worker	Adult	Ingestion	Quant
						Dermal	Quant
						Inhalation	Quant
				Indoor Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Resident	Adult	Ingestion	Quant
						Dermal	Quant
					Child	Ingestion	Quant
						Dermal	Quant
		Combined Soil (0-10 feet)	Areas 1, 2 and 3	Trespasser	Adult	Ingestion	Quant
						Dermal	Quant
					Adolescent	Ingestion	Quant
						Dermal	Quant
				Outdoor Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Indoor Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Construction Worker	Adult	Ingestion	Quant
						Dermal	Quant
						Inhalation	Quant
				Resident	Adult	Ingestion	Quant
						Dermal	Quant
					Child	Ingestion	Quant
						Dermal	Quant
	Groundwater	Groundwater	Areas 1, 2 and 3	Outdoor Worker	Adult	Ingestion	Quant
				Indoor Worker	Adult	Ingestion	Quant
				Construction Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Resident	Adult	Ingestion	Quant
						Dermal	Quant
						Inhalation	Quant
					Child	Ingestion	Quant
						Dermal	Quant
						Inhalation	Quant
	Indoor Air	Indoor Air	On-site Area 2	Indoor Worker	Adult	Inhalation	Quant

Quant: will be quantitatively evaluated
Qual: will be qualitatively evaluated
Child = 0-6 years

TABLE 3 Non-Cancer Toxicity Data Summary										
Pathway: Oral/Dermal										
Chemical of Concern	**Chronic/ Subchronic**	**Oral RfD Value**	**Oral RfD Units**	**% Absor. Effic. (Dermal)**	**Adjusted RfD (Dermal)**	**Adj. Dermal RfD Units**	**Primary Target Organ**	**Combined Uncertainty /Modifying Factors**	**Sources of RfD: Target Organ**	**Dates of RfD:**
1,1,2-Trichloroethane	Chronic	4.0E-03	mg/kg-day	100	4.0E-03	mg/kg-day	Hematological	1000/1	IRIS	2013
1,2,3-Trichlorobenzene	Chronic	8.0E-04	mg/kg-day	100	8.0E-04	mg/kg-day	NOAEL	10,000	PPRTV SL	2013
1,2,4-Trichlorobenzene	Chronic	1.0E-02	mg/kg-day	100	1.0E-02	mg/kg-day	Endocrine	1000/1	IRIS	2013
1,2-Dichloroethane	Chronic	6.0E-03	mg/kg-day	100	6.0E-03	mg/kg-day	Renal	300	PPRTV	2013
1,2-cis-dichloroethene	Chronic	2.0E-03	mg/kg-day	100	2.0E-03	mg/kg-day	Kidney	3,000	IRIS	2013
1,2-trans-dichloroethene	Chronic	2.0E-02	mg/kg-day	100	2.0E-02	mg/kg-day	Liver	1000/1	IRIS	2013
1,2-dichloropropane	Chronic	9.0E-02	mg/kg-day	100	9.0E-02	mg/kg-day	Liver	1000	MRL	2014
1,3-Dichlorbenzen	Chronic	3.0E-03	mg/kg-day	100	3.0E-03	mg/kg-day	Liver	-----	NCEA	2013
1,4-Dichlorobenzene	Chronic	7.0E-02	mg/kg-day	100	7.0E-02	mg/kg-day	Hepatic	100	MRL	2013
Benzene	Chronic	4.0E-03	mg/kg-day	100	4.0E-03	mg/kg-day	Immune	300	IRIS	2013
Chlorobenzene	Chronic	2.0E-02	mg/kg-day	100	2.0E-02	mg/kg-day	Liver	1000/1	IRIS	2013
Methylene chloride	Chronic	6.0E-03	mg/kg-day	100	6.0E-03	mg/kg-day	Liver	100/1	IRIS	2013
Toluene	Chronic	8.0E-02	mg/kg-day	100	8.0E-02	mg/kg-day	Kidney	3000/1	IRIS	2013
Trichloroethene	Chronic	5.0E-04	mg/kg-day	100	5.0E-04	mg/kg-day	Heart malformation	1000/100/10	IRIS	2013
Vinyl chloride	Chronic	3.0E-03	mg/kg-day	100	3.0E-03	mg/kg-day	Liver	30/1	IRIS	2013
O-Xylene	Chronic	2.0E-01	mg/kg-day	100	2.0E-01	mg/kg-day	General toxicity	1000/1	Surrogate	2013
Xylene	Chronic	2.0E-01	mg/kg-day	100	2.0E-01	mg/kg-day	General toxicity	1000/1	IRIS	2013
Analine	Chronic	7.0E-03	mg/kg-day	1000	7.0E-03	mg/kg-day	Blood	1000	PPRTV	2013
Napthalene	Chronic	2.0E-02	mg/kg-day	100	2.0E-02	mg/kg-day	Body weight	3000/1	IRIS	2013
Aluminum	Chronic	1.0E+00	mg/kg-day	100	1.0E+00	mg/kg-day	Nervous system	100	PPRTV	2013
Antimony	Chronic	4.0-04	mg/kg-day	100	4.0E-04	mg/kg-day	Hematological	1000/1	IRIS	2013
Arsenic	Chronic	3.0E-04	mg/kg-day	100	3.0E-04	mg/kg-day	Skin	3/1	IRIS	2013
Cadmium	Chronic	5.0E-04	mg/kg-day	100	5.0E-04	mg/kg-day	Kidney	10/1	IRIS	2013
Cobalt	Chronic	3.0E-04	mg/kg-day	100	3.0E-04	mg/kg-day	Thyroid	3000	PPRTV	2013
Copper	Chronic	4.0E-02	mg/kg-day	100	4.0E-02	mg/kg-day	-----	-----	HEAST	2013
Iron	Chronic	7.0E-01	mg/kg-day	100	7.0E-01	mg/kg-day	GI	3	MRL	2013
Mercury	Chronic	3.0E-04	mg/kg-day	100	3.0E-04	mg/kg-day	Immune	1000/1	IRIS	2013

TABLE 3

Non-Cancer Toxicity Data Summary

Thallium	Chronic	1.0E-05	mg/kg-day	100	1.0E-05	mg/kg-day	NOAEL	3000	PPRTV SL	2013
Vanadium	Chronic	5.0E-03	mg/kg-day	100	5.0E-03	mg/kg-day	Kidney	3000	RSL	2013
Zinc	Chronic	3.0E-01	mg/kg-day	100	3.0E-01	mg/kg-day	Liver	3	IRIS	2013

Pathway: Inhalation

Chemical of Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ or System	Combined Uncertainty /Modifying Factors	Sources of RfC Target Organ	Date of RfC
		Value	Units				
1,1,2-Trichloroethane	Chronic	**2.0E-04**	mg/m^3	NOAEL	1000	PPRTV	2013
1,2,4-Trichlorobenzene	Chronic	**2.0E-03**	mg/m^3	Urinary	3000	PPRTV	2013
1,2-Dichloroethane	Chronic	**7.0E-03**	mg/m^3	Nervous system	3000	PPRTV	2013
1,2-cis-dichloroethene	-----	**-----**	-----	-----	-----	-----	-----
1,2-trans-dichloroethene	Chronic	**6.0E-02**	mg/m^3	Lung/liver	3000	PPRTV	2013
1,2-Dichloropropane	Chronic	**4.0E-03**	mg/m^3	Respiratory	300/1	IRIS	2014
1,3-Dichlorobenzene	-----	**-----**	-----	-----	-----	-----	-----
1,4-Dichlorobenzene	Chronic	**8.0E-01**	mg/m^3	Developmental	100/1	IRIS	2013
Benzene	Chronic	**3.0E-02**	mg/m^3	Immune system	300/1	IRIS	2013
Chlorobenzene	Chronic	**5.0E-02**	mg/m^3	Liver	1000	PPRTV	2013
Methylene chloride	Chronic	**6.0E-01**	mg/m^3	Hepatic	30	IRIS	2013
Toluene	Chronic	**5.0E+00**	mg/m^3	Nervous system	10/1	IRIS	2013
Trichloroethene	Chronic	**2.0E-03**	mg/m^3	Heart malformations	100/10	IRIS	2013
Vinyl chloride	Chronic	**1.0E-01**	mg/m^3	Liver	30/1	IRIS	2013
O-Xylene	Chronic	**1.0E-01**	mg/m^3	Nervous system	300/1	Surrogate	2013
Xylene	Chronic	**1.0E-01**	mg/m^3	Nervous system	300/1	IRIS	2013
Analine	Chronic	**1.0E-03**	mg/m^3	Spleen	3000/1	IRIS	2013
Napthalene	Chronic	**3.0E-03**	mg/m^3	Lung	3000/1	IRIS	2013
Aluminum	Chronic	**5.0E-03**	mg/m^3	LOAEL	300	PPRTV	2013
Antimony	-----	**-----**	-----	-----	-----	-----	-----
Arsenic	Chronic	**1.5E-05**	mg/m^3	Developmental	-----	CalEPA	2013
Cadmium	Chronic	**1.0E-05**	mg/m^3	Renal	9	MRL	2013
Cobalt	Chronic	**6.0E-06**	mg/m^3	Respiratory	300	PPRTV	2013
Copper	-----	**-----**	-----	-----	-----	-----	-----
Iron	-----	**-----**	-----	-----	-----	-----	-----
Mercury	Chronic	**3.0E-04**	mg/m^3	Respiratory	30/1	IRIS	2013

TABLE 3

Non-Cancer Toxicity Data Summary

Thallium	-----	-----	-----	-----	-----	-----	-----
Zinc	-----	-----	-----	-----	-----	-----	----

Key

GI – Gastrointestinal System
IRIS: Integrated Risk Information System, USEPA
PPRTV SL: Provisional Peer Review Toxicity Value Screening Level, USEPA
HEAST: Health Effect Assessment Summary Table, USEPA
MRL: Minimum Risk Level, Agency for Toxic Substances and Disease Registry (ATSDR)
CalEPA: California Environmental Protection Agency

NOAEL: No observable adverse effect level
LOAEL: Lowest observable adverse effect level

Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in surface soil, subsurface soil, groundwater and indoor air. When available, the chronic toxicity data have been used to develop oral reference doses (RfDs) and inhalation reference doses (RfDi).

TABLE 4

Cancer Toxicity Data Summary

Pathway: Oral/Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,2-Dichloroethane	9.1E-02	$(mg/kg/day)^{-1}$	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	2013
1,4-Dichlorobenzene	5.4E-03	$(mg/kg/day)^{-1}$	5.4E-03	$(mg/kg/day)^{-1}$	Possible carcinogen	CalEPA	2013
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	5.5E-02	$(mg/kg/day)^{-1}$	Known carcinogen	IRIS	2013
Vinyl chloride (adult)	7.2E-01	$(mg/kg/day)^{-1}$	7.2E-01	$(mg/kg/day)^{-1}$	Known carcinogen	IRIS	2013
Vinyl chloride (adult/child)	1.4E+00	$(mg/kg/day)^{-1}$	1.4E+00	$(mg/kg/day)^{-1}$	Known carcinogen	IRIS	2013
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1.5E+00	$(mg/kg/day)^{-1}$	Known carcinogen	IRIS	2013

Pathway: Inhalation

Chemical of Concern	Unit Risk	Units	Inhalation Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,2-Dichloroethane	2.6E-05	$1(ug/m^3)$	-----	-----	B2	IRIS	2013
1,4-Dichlorobenzene	1.0E-05	$1(ug/m^3)$	-----	-----	Possible carcinogen	CalEPA	2013
Benzene	7.8E-06	$1(ug/m^3)$	-----	-----	Known carcinogen	IRIS	2013
Vinyl chloride (adult)	4.4E-06	$1(ug/m^3)$	-----	-----	Known carcinogen	IRIS	2013
Vinyl chloride (adult/child)	8.8E-06	$1(ug/m^3)$	-----	-----	Known carcinogen	IRIS	2013
Arsenic	4.3E-03	$1(ug/m^3)$	-----	-----	Known carcinogen	IRIS	2013

Key:

IRIS: Integrated Risk Information System. U.S. EPA
B2: Probable Human Carcinogen
CalEPA: California Environmental Protection Agency

Summary of Toxicity Assessment

This table provides carcinogenic risk information which is relevant to the contaminants of concern in surface soil, subsurface soil, groundwater and indoor air. Toxicity data are provided for both the oral and inhalation routes of exposure.

TABLE 5

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 year)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Surface soil	Surface soil	Surface soil within Area 1	1,2,3-Trichlorobenzene	Kidney	**1.7**	-----	-----	**1.7**
			Thallium	-----	**1.5**	-----	-----	**1.5**
Hazard Index Total= (Note that thallium was determined to be related to background and was not identified as a COC, therefore the hazard index total is 2, not 4)								**4**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 years)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Subsurface soil	Subsurface soil	Subsurface soil within Area 2	Thallium	-----	**1.6**	-----	-----	**1.6**
Hazard Index Total= (Note that thallium was determined to be related to background and was not identified as a COC, therefore the hazard index total is less than 1, not 2)								**2**

Scenario Timeframe: Future
Receptor Population: Outdoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Sitewide Groundwater	1,2,3-Trichlorobenzene	Kidney	**3.8**	**-----**	-----	**3.8**
			1,2-cis-dichloroethylene	-----	**1.1**	**-----**	-----	**1.1**
			Cobalt	Endocrine	**2.4**	**-----**	-----	**2.4**
			Copper	-----	**13**	**-----**	-----	**13**
			Iron	-----	**4.8**	**-----**	-----	**4.8**
			Thallium	-----	**7.7**	**-----**	-----	**7.7**
			Zinc	Liver	**7.3**	**-----**	-----	**7.3**
Hazard Index Total = 48								

TABLE 5
Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Future
Receptor Population: Indoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Sitewide Groundwater	1,2,3-Trichlorobenzene	Kidney	**3.8**	-----	-----	**3.8**
			1,2-cis-dichloroethylene	-----	**1.1**	-----	-----	**1.1**
			Cobalt	Endocrine	**2.4**	-----	-----	**2.4**
			Copper	-----	**13**	-----	-----	**13**
			Iron	-----	**4.8**	-----	-----	**4.8**
			Thallium	-----	**7.7**	-----	-----	**7.7**
			Zinc	Liver	**7.3**	-----	-----	**7.3**
							Hazard Index Total=	**48**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 years)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Sitewide Groundwater	1,2,3-Trichlorobenzene	Kidney	**25**	-----	-----	**25**
			1,2,4-Trichlorobenzene	Endocrine	**3.3**	**4.1**	**520**	**527.3**
			1,2-cis-dichloroethylene	-----	**7.1**	-----	-----	**7.1**
			1,3-Dichlorobenzene	Liver	0.69	0.62	-----	**1.3**
			Benzene	Immune	**5.8**	0.89	**29**	**35.7**
			Chlorobenzene	Liver	**4.8**	1.7	**67**	**73.5**
			Toluene	Liver	**2.9**	1.0	**1.6**	**5.5**
			Vinyl Chloride	Liver	0.99	0.052	**1.2**	**2.2**
			Aniline	-----	**4.3**	-----	-----	**4.3**
			Aluminum	Nervous system	**3.5**	-----	-----	**3.5**
			Arsenic	Skin	**5.3**	0.035	-----	**5.4**
			Antimony	General toxicity	**1.3**	0.059	-----	**1.4**
			Cadmium	Kidney	**5.2**	**1.4**	-----	**6.5**
			Cobalt	Endocrine	**16**		-----	**16**
			Copper	-----	**85**	0.56	-----	**85**

TABLE 5

Risk Characterization Summary - Noncarcinogens

			Iron	-----	**31**		-----	**31**
			Thallium	-----	**50**		-----	**50**
			Vanadium	Kidney	**5.1**	**1.3**	-----	**6.4**
			Zinc	Liver	**48**	0.19	-----	**48**
			1,1,2-Trichloroethane	-----	0.0093	0.0086	**6.7**	**6.7**
			1,2,4-Trimethylbenzene	-----	**-----**	**-----**	**8.6**	**8.6**
			1,2-Trichlorobenzene	General toxicity	**-----**	**-----**	**5.4**	**5.4**
			1.2-Dichloroethane	Nervous system	0.25	0.012	**8.1**	**8.3**
			1,2-Dichloroproane	Respiratory	0.015	0.0014	**12**	**12**
			1,2-Trans-dichloroethylene	-----	0.085	-----	**1.1**	**1.1**
			Methylene Chloride	Liver	**3.6**	0.14	**1.5**	**5.3**
			Napthalene	Respiratory	0.033	0.021	**6.7**	**6.7**
			O-Xylene	Nervous system	0.1	-----	**6.7**	**6.8**
			Trichloroethylene	Nervous system	-----	-----	**7.6**	**7.6**
			Xylene	Nervous system	0.11	-----	**8.2**	**8.3**
			Mercury	-----	0.19	0.017	**5**	**5.2**
							Hazard Index Total=	**1023**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	**Exposure Medium**	**Exposure Point**	**Chemical of Concern**	**Primary Target Organ**	**Non-Carcinogenic Risk**			
					Ingestion	**Dermal**	**Inhalation**	**Exposure Routes Total**
Groundwater	Groundwater	Sitewide Groundwater	1,2,3-Trichlorobenzene	Kidney	**11**	**-----**	-----	**11**
			1,2,4-Trichlorobenzene	Endocrine	**1.4**	**1.8**	**120**	**123.2**
			1,2-cis-dichloroethylene	-----	**3.0**	**-----**	**-----**	**3.0**
			Benzene	Immune system	**2.5**	0.38	**6.6**	**9.5**
			Chlorobenzene	Liver	**2.1**	0.74	**16**	**18.8**
			Methylene Chloride	Liver	**1.6**	0.059	0.35	**2.0**
			Toluene	Kidney	**1.3**	0.44	0.37	**2.1**
			Analine	-----	**1.8**	-----	-----	**1.8**
			Aluminium	Nervous system	**1.5**	-----	-----	**1.5**

TABLE 5
Risk Characterization Summary - Noncarcinogens

			Arsenic	Skin	**2.3**	0.012	-----	**2.3**
			Cadmium	Kidney	**2.2**	0.46	-----	**2.6**
			Cobalt	Endocrine	**6.8**	----	-----	**6.8**
			Copper	-----	**36**	0.19	-----	**36.2**
			Iron	-----	**13**	-----	-----	**13**
			Thallium	-----	**22**	0.11	-----	**22.1**
			Vanadium	Kidney	**2.2**	0.44	-----	**2.6**
			Zinc	Liver	**20**	0.064	-----	**20.1**
			1,1,2-Trichloroethane	-----	0.0041	0.00038	**1.6**	**1.6**
			1,2,4-Trimethylbenzene	-----	-----	-----	**2.0**	**2.0**
			1,2-Dichlorobenzene	General toxicity	0.15	0.1	**1.2**	**1.5**
			1,2-Dichloroethane	Nervous system	0.11	0.0052	**1.9**	**2.0**
			1,2-Dichloropropane	Respiratory	0.0062	0.00062	**2.7**	**2.7**
			Napthalene	Respiratory	0.014	0.0092	**1.5**	**1.5**
			O-Xylene	Nervous system	0.044	-----	**1.5**	**1.5**
			Trichloroethylene	Nervous system	0.35	0.059	**1.8**	**2.2**
			Xylene	Nervous system	0.048	-----	**1.9**	**1.9**
			Mercury	-----	0.079	0.0059	**1.1**	**1.1**
							Hazard Index Total=	**301**

Scenario Timeframe: Future
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater – Area 1	1,2,4-Trichlorobenzene	Endocrine	0.00002	0.0076	**11**	**11**
			1,4-Dichlorobenzene	Endocrine	0.000015	0.00035	**1.5**	**1.5**
			Benzene	Immune system	0.0011	0.085	**140**	**140**
			Chlorobenzene	Liver	0.00068	0.1	**45**	**45.1**
			Napthalene	Respiratory	0.0000004	0.00009	**4.2**	**4.2**

TABLE 5

Risk Characterization Summary - Noncarcinogens

			Toluene	Nervous system	0.000029	0.0048	**5.1**	**5.1**
			Vinyl Chloride	Liver	0.000029	-----	**7.1**	**7.1**
			Xylene	Nervous system	0.000018	-----	**16**	**16**
							Hazard Index Total=	**230**

Summary of Risk Characterization - Non-Carcinogens

The table presents hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for exposure to surface soil, subsurface soil, and groundwater for all routes of exposure. The Risk Assessment Guidance for Superfund states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse non-cancer effects. A qualitative assessment of the vapor intrusion pathway indicated that exposure to site-related volatiles (e.g., benzene chloroform, ethylbenzene and tetrachloroethylene) in on-site buildings at the former CPS facility is a potentially complete exposure pathway for the future timeframe.

TABLE 6

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Outdoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Sitewide Groundwater	Vinyl Chloride	**1.2E-04**	-----	-----	**1.2E-04**
			Arsenic	**1.3E-04**	-----	-----	**1.3E-04**
						Total Risk =	**4E-04**

Scenario Timeframe: Future
Receptor Population: Indoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Sitewide Groundwater	Vinyl Chloride	**1.2E-04**	-----	-----	**1.2E-04**
			Arsenic	**1.3E-04**	-----	-----	**1.3E-04**
						Total Risk =	**4-E04**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Sitewide Groundwater	Benzene	**1E-04**	1.7E-05	**5.8E-04**	**7.1E-04**
			Vinyl Chloride	**3.6E-04**	1.9E-05	9.0E-05	**3.8E-04**
			Arsenic	**2.1E-04**	1.4E-06	-----	**2.1E-04**
			1,2-Dichloroethane	1.2E-05	5.6E-07	**1.3E-04**	**1.4E-04**
			1,4-Dichlorobenzene	7.8E-06	5.0E-06	**5.8E-04**	**6.0E-04**
						Total Child Risk =	**2E-03**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Sitewide Groundwater	Benzene	**1.9E-04**	2.9E-05	**5.3E-04**	**7.5E-04**
			Vinyl Chloride	**3.2E-04**	-----	4.3E-05	**3.6E-04**
			Arsenic	**3.5E-04**	1.8E-06	-----	**3.5E-04**
			1,2-Dichloroethane	2.0E-05	9.7E-07	**1.2E-04**	**1.4E-04**
			1,4-Dichlorobenzene	1.3E-05	9.0E-06	**4.8E-04**	**5.0E-04**
						Total Adult Risk =	**2E-03**
						Total Adult/Child Risk =	**4E-03**

Scenario Timeframe: Future
Receptor Population: Construction/Utility
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater – Area 1	Benzene	8.3E-09	6.7E-07	**1.2E-03**	**1.2E-03**
						Total Adult Risk =	**1E-03**

Summary of Risk Characterization - Carcinogens

The table presents cancer risks for sitewide groundwater and groundwater in Area 1 for all routes of exposure. A qualitative assessment of the vapor intrusion pathway indicated that exposure to site-related volatiles (e.g., benzene chloroform, ethylbenzene and tetrachloroethylene) in on-site buildings at the former CPS facility is a potentially complete exposure pathway for the future timeframe. As stated in the National Contingency Plan, the point of departure is 10^{-6} and the acceptable risk range for site-related exposure is 10^{-6} to 10^{-4}.

Table 7 - Remediation Goals for Groundwater Contaminants				
	State GW Quality Criteria (ppb)	State MCLs (ppb)	Federal MCLS (ppb)	**Groundwater Remediation Goals (ppb)***
Organic Contaminants				
aniline	6			**6**
benzene	1	1	5	**1**
chlorobenzene	50	50	100	**50**
1,2-dichlorobenzene	600	600	600	**600**
1,3-dichlorobenzene	600	600		**600**
1,4-dichlorobenzene	75		75	**75**
cis-1,2-dichloroethene	70		70	**70**
trans-1,2-DCE	100		100	**100**
1,2-dichloroethane	2	2	5	**2**
1,1-dichloroethene	1	2	7	**1**
1,2-dichloropropane	1		5	**1**
1,4-Dioxane	0.4			**0.4**
ethylbenzene	700		700	**700**
methylene chloride	3	3		**3**
naphthalene	300	300		**300**
1,1,2,2-tetrachloroethane	1	1		**1**
tetrachloroethene(PCE)	1	1	5	**1**
toluene	600		1,000	**600**
1,2,3-trichlorobenzene	Not found			**TBD**
1,2,4-trichlorobenzene	9	9	70	**9**
1,1,2-trichloroethane	3	3	5	**3**
trichloroethene (TCE)	1	1	5	**1**
vinyl chloride	1		2	**1**
xylenes, total	1,000	1,000	10,000	**1,000**
Metal Contaminants				
aluminum	200		200 Secondary	**200**
antimony	6		6	**6**
arsenic	3	5	10	**3**
cadmium	4		5	**4**
copper	1,300		1,300	**1,300**
iron	300		300 Secondary	**300**
lead	5		15+	**5**
mercury	2		2	**2**
thallium	2		2	**2**
zinc	2,000		5,000 Secondary	**2,000**

* Preliminary Remediation Goals are the lesser of the preceding groundwater standards.

+ Federal Action Level

Table 8: Remediation Goals for Soil		
Contaminants of Concern	**NJ Non-Res Direct Contact Soil Remediation Standard (mg/kg)**	**Site Specific Impact to GW Screening Levels* (mg/kg) (Above the Water Table)**
benzene	5	0.005
chlorobenzene	7,400	3
1,2-dichlorobenzene	59,000	89
1,3-dichlorobenzene	59,000	100
1,4-dichlorobenzene	13	11
cis-1,2-dichloroethene (DCE)	560	0.9
trans-1,2-DCE	720	2
1,2-dichloroethane	3	0.005
1,1-dichloroethene	150	0.02
1,2-dichloropropane	5	0.007
1,4-Dioxane		0.02
ethylbenzene	110,000	63
methylene chloride	230	0.02
1,1,2,2-tetrachloroethane	3	0.03
Tetrachloroethene (PCE)	1,500	0.02
toluene	91,000	28
1,2,4-trichlorobenzene	820	4
1,1,2-trichloroethane	6	0.05
trichloroethene (TCE)	10	0.04
vinyl chloride	2	0.005
xylenes, total	170,000	95

* The default NJ Impact to Groundwater Screening levels in the Proposed Plan were replaced with site-specific values based on NJ impact to groundwater guidance and approved by NJDEP.

Table 9
OU1 Alternative 3A Present Value Cost Estimate
CPS/Madison Superfund Site, Old Bridge New Jersey

OU1 Remedial Alternative
Organic CoCs

Alternative 3A: ISCO Permeable Reactive Barrier

Includes:
a. Pre-Design Investigation
b. Remedial Action Work Plan
c. Permitting
d. PRB (ozone/perozone) treatment
e. Groundwater Monitoring
f. Institutional Controls: CEA/WRA

Design Criteria

Aquifer Conditions
- Fine to coarse sands with silt/day lenses/discontinuous layers.
- Depth of impact at IRM location: ~10 to 40 ft
- Seepage velocity 1 ft/day

Plume Characteristics
- VOC plume:
  - length = ~2,600 ft
  - width = 400 to 700 ft
  - depth = 35 feet at CPS Site; 60 ft on the Runyon Watershed Prop.
- 1,4-Dioxane plume:
  - length = ~3,500 ft
  - width = 600 to 3,000 ft
  - depth = 35 feet at CPS Site; 90 ft at the Runyon Well Field

ISCO PRB
- 400-ft ISCO PRB using ozone/peroxide injected into 14 wells spaced at 30-ft intervals.
- Use of MNA to address remainder of the OCoC plume

ISCO PRB Operation
- Operation of existing IRM for 2 years. while ISCO PRB is designed and constructed.
- Operation of the PRB for 4 years for OU2 Alternatives 3, 4 and 5, and for 28 years for OU2 Alternative 2 (net of 30-year evaluation period).

Groundwater Monitoring
- Install 7 new wells
- Quarterly performance monitoring of 8 monitoring wells for 5 years.
- Semi-annual MNA sampling of 20 wells for 30 years.

Notes:

1. The cost estimates shown have been prepared for guidance in project evaluation and implementation from information available at the time of the estimate. The actual costs will depend on actual labor, equipment and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors.

2.* Costs rounded to the nearest thousands.

A. Remedial Engineering Design and Permitting

Description	Unit	Rate	Quantity	Subtotal	Cost*	Notes
1. Site Surveying	LS	$ 9,000	1	$ 9,000	$ 9,000	Locate 48 locations/supervision/CAD
2. Remedial Design Investigation					$ 160,000	Assumes 18 borings to 40 feet with 5 discrete groundwater samples per boring collected between 10 and 40 ft. Five days to complete the sampling. Costs include subsurface utility clearance (GPR/EM) and surveying of sample locations.
a. Remedial Design Work Plan	LS	$ 41,500	1	$ 41,500		
b. Field Personnel/Equipment/Materials	LS	$ 28,500	1	$ 28,500		
c. Subcontractors (Driller, Surveyor, Utility Clearing)	LS	$ 36,700	1	$ 36,700		
d. Analytical (VOCs, 1,4-Dioxane, QA Samples)	LS	$ 10,500	1	$ 10,500		
e. Data Validation/Evacuation/Report	LS	$ 35,500	1	$ 35,500		
f. Management (5%)	LS	$ 7,600	1	$ 7,600		
3. Pilot test					$ 385,000	4 month pilot test for both ozone and perozone, 2 injection points
a. 4 month test (setup, operation, sampling, report)	LS	$ 384,612				
4. Design and Remedial Action Work Plan					$ 249,000	Includes treatability study to for oxidant type/dosage, ISCO design, remedial action work plans (ISCO injection, waste management, air monitoring plans etc.)
a. Treatability Study	LS	37,000	1	$ 37,000		
b. Engineering Design Package	LS	$ 130,000	1	$ 130,000		
c. Remedial Work Plans (RAWP/QAPP/H&S Plan)	LS	$ 82,100	1	$ 82,100		
5. Construction Specifications	LS	$ 15,000	1	$ 15,000	$ 15,000	
6. Permitting					$ 43,000	Permit equivalents based on remedial action components and presence of freshwater wetlands within the locations of the injection areas.
a. Well Construction Permits	LS	$ 250	14	$ 3,500		
b. NJ Freshwater Wetlands Permit Equivalent	LS	$ 18,000	1	$ 18,000		
c. NJ Flood Hazard Area Individual Permit Equivalent	LS	$ 9,000	1	$ 9,000		
d. NJ Permit-by-Rule Discharge Authorization (ISCO)	LS	$ 6,000	2	$ 12,000		
				Subtotal	$ 861,000	
				Contingency (15%)	$ 129,000	
				Total Engineering, Design and Permitting	$ 990,000	

B. Construction/Capital Costs

Description	Unit	Rate	Quantity	Subtotal	Cost*	Notes
1. Preparation					$ 129,000	Includes Contractor cost to setup work and support areas, temporary utilities, trailer, SESC controls, and subsurface utility investigation
a. Site Preparation and Utilities	LS	$ 70,745	1	$ 70,745		
b. Construction Support Areas	LS	$ 58,660	1	$ 58,660		
2. PRB Monitoring System Installation					$ 109,000	Installation of 9 wells including supervision/surveying, IDW disposal
a. Groundwater Performance Wells	well	$ 4,200	7	$ 29,400		
b. Infrastructure Wells	well	$ 5,100	8	$ 40,800		
c. Soil Gas Wells	well	$ 4,900	8	$ 39,200		
3. PRB System					$ 1,585,000	
a. Oxidant Supply Facility and Startup of System	LS	$ 1,201,300	1	$ 1,201,300		14 dual injection wells
b. Oxidant Conveyance System	LS	$ 180,800	1	$ 180,800		12 ft x 60 ft oxidant supply facility
c. PRB Wells	LS	$ 14,500	14	$ 203,000		12 ft x 40 ft operator facility
4. Site Restoration/Demobilization					$ 27,000	Includes restoration of area disturbed per SESC plan and DEP permits
a. Site Restoration/Demobilization	LS	$ 27,300	1	$ 27,300		
5. Management and QA/QC					$ 618,000	Contractor QC, H&S (including perimeter air monitoring), and Construction Oversight for project duration. Includes final surveying, and remedial action report.
a. Construction Oversight/QA/As-Builts	LS	$ 318,760	1	$ 318,760		
b. Contractor QC, Admin, and Meetings	LS	$ 220,000	1	$ 220,000		
c. Contractor H&S	LS	$ 79,000	1	$ 79,000		
				Subtotal	$ 2,468,000	
				Contingency (15%)	$ 370,000	
				Total Construction and Capital Cost	$ 2,838,000	

C. Operations and Maintenance (Annual Costs)

Description	Unit	Rate	Quantity	Subtotal	Cost*	Notes
1. Existing IRM P&T System Operation					$ 246,000	2-year operation until new GWTP is designed, constructed, and tested. Amount based on current annual O&M.
a. O&M/Sampling/Permit Reporting	Year	$ 205,000	1	$ 205,000		
b. Contingency (15%) + Management (5%)	year	$ 41,000	1	$ 41,000		
2. Existing IRM Performance Monitoring Program					$ 41,000	Annual amount based on current semi-annual sampling and reporting for the PMP Program.
a. Fieldwork/Sampling Equipment	year	$ 18,000	1	$ 18,000		
b. Analytical (VOCs, Blanks, QC Samples)	year	$ 9,000	1	$ 9,000		
c. Data Evaluation, Validation and Reporting (Annual)	year	$ 7,000	1	$ 7,000		
d. Contingency (15%) + Management (5%)	year	$ 7,000	1	$ 7,000		
3. PRB Operation						
4-year of PRB Operations					$ 202,400	
a. O&M/Sampling/Permit Reporting	Year	$ 176,000	1	$ 176,000		
b. Contingency (10%) + Management (5%)		$ 26,400	1	$ 26,400		
30-Year PRB Operation					$ 202,400	
a. O&M/Sampling/Permit Reporting	Year	$ 176,000	1	$ 176,000		
b. Contingency (10%) + Management (5%)		$ 26,400	1	$ 26,400		
4. Quarterly Groundwater Monitoring (per event)					$ 50,000	Includes the quarterly sampling of monitoring wells for VOCs and 1,4-dioxane and preparation of semi-annual reports.
b. Fieldwork/Equipment Per Sampling Event	event	$ 3,900	4	$ 15,600		
b. Analytical (VOCs, Blanks, QC Samples)	event	$ 3,160	4	$ 12,640		
c. Data Validation/evaluation/Report (semi-annual)	report	$ 7,000	2	$ 14,000		
d. Contingency (15%) + Management (5%)	-	$ 8,000	1	$ 8,000		
5. Semi-Annual MNA Groundwater Monitoring (per event)					$ 50,000	Includes the semi-annual sampling of monitoring wells for VOCs, 1,4-dioxane, and natural attenuation parameters and preparation of semi-annual reports.
a. Fieldwork/Equipment Per Sampling Event	event	$ 6,700	2	$ 13,400		
b. Analytical (VOCs, Blanks, QC Samples)	event	$ 5,800	2	$ 11,600		
c. Reporting (semi-annual)	report	$ 8,300	2	$ 16,600		
d. Contingency (15%) + Management (5%)	-	$ 8,000	1	$ 8,000		
6. Institutional Controls / Certification						2-year annual prorated cost
a. Biennial Certification	Year	$ 4,000	1	$ 4,000	$ 4,000	

D. Present Value Analysis

Cost Type	Year	Cost per Year	Total Cost	Discount Factor (7%)	Present Value*	Notes
A. Remedial Engineering Design and Permitting	0	$ 990,000	$ 990,000	1.000	$ 990,000	
B. Construction/Capital Costs	0	$ 2,838,000	$ 2,838,000	1.000	$ 2,838,000	
C. Operations and Maintenance						
2-Year Existing IRM Operation						
• Pump and Treatment O&M (2 Years)	1-2	$ 246,000	$ 738,000	1.808	$ 445,000	2 years
• Performance Monitoring Program	1-2	$ 41,000	$ 82,000	1.808	$ 74,000	2 years
4-Year PRB Operations (OU2 Alts. 3, 4, and 5)						
• PRB O&M (4 Years)	3-6	$ 202,400	$ 809,600	2.957	$ 598,000	4 years
• Quarterly Groundwater Sampling	3-7	$ 50,000	$ 250,000	3.579	$ 179,000	5 years
• Semi-Annual Runyon GW Sampling (5 years)	3-7	$ 25,000	$ 125,000	3.579	$ 89,000	5 years
• Semi-Annual MNA and Groundwater Sampling	8-30	$ 50,000	$ 1,150,000	7.019	$ 351,000	23 years
• Biennial Certification	1-30	$ 2,000	$ 60,000	12.409	$ 25,000	30 years
Total Present Value of Alternative 3A (2 Years Operation of Existing IRM and 4 Years of PRB O&M):					**$ 5,589,000**	
2-Year Existing IRM Operation						
• Pump and Treatment O&M (2 Years)	1-2	$ 246,000	$ 492,000	1.808	$ 445,000	2 years
• Performance Monitoring Program	1-2	$ 41,000	$ 82,000	1.808	$ 74,000	2 years
28-year PRB Operation (OU2 Alt. 2)						
• PRB O&M (28 Years)	3-30	$ 202,400	$ 6,072,000	10.596	$ 2,145,000	28 years
• Quarterly Groundwater Sampling	3-4	$ 50,000	$ 100,000	1.578	$ 79,000	2 years
• Semi-Annual Runyon GW Sampling (2 years)	3-4	$ 25,000	$ 50,000	1.578	$ 39,000	2 years
• Semi-Annual MNA and Groundwater Sampling	3-30	$ 50,000	$ 1,400,000	10.596	$ 530,000	28 years
• Biennial Certification	1-30	$ 2,000	$ 60,000	12.409	$ 25,000	30 years
Total Present Value of Alternative 3A (2 Years Operation of Existing IRM and 28 Years of PRB O&M):					**$ 7,165,000**	

Table 10
OU1 Alternative 2B Present Value Cost Estimate
CPS/Madison Superfund Site, Old Bridge New Jersey

OU1 Remedial Alternative Metal CoCs	Design Criteria
Alternative 2B - Limited Action - Continued IRM Operation Includes: a. Operation of the Madison Site IRM Pump and Treatment System b. Continuation of the Madison Site Performance Monitoring Program c. Continued maintenance of the Madison Site CEA Notes: 1. The cost estimates shown have been prepared for guidance in project evaluation and implementation from information available at the time of the estimate. The actual costs will depend on actual labor, equipment and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors. 2. * Costs rounded to the nearest thousands.	**Madison On-site Existing P&T System** • Operation of 8 existing recovery wells: RS-1A, RS-1B, RS-1D, RS-1F, RS-1G, RS-2A, RS-2B, and RS-2C. • Total average recovery rate = 75 gpm • Operation of the existing treatment system: pH adjustment and metals treatment, discharge to sanitary sewer. • Maintenance of equipment • 15 and 30 years of operation depending on the extent of the OU3 source metals remedy. **Performance Monitoring Program** • Quarterly sampling of 9 monitoring wells, 8 recovery wells, and 4 surface water samples for Metals analysis (above sampling required by the MCUA). • Quarterly reporting. **Institutional Control** • Update of the horizontal and vertical extent of the Madison CEA limits based on current groundwater quality data. • Maintenance of the CEA/WRA for 30 years.

A. Operations and Maintenance (Annual Costs)

Description	Unit	Rate	Quantity	Subtotal	Cost	Notes
1. Pump and Treatment System Operation					$ 1,255,000	Estimated amount based on current O&M costs plus contingency /management on O&M. Discharge cost includes both conveyance and treatment by the POTW.
a. O&M/Sampling/Permit Reporting	Year	$ 405,000	1	$ 405,000		
b. Discharge Cost to Sanitary Sewer System	Year	$ 768,700	1	$ 768,700		
c. Contingency (15%) + Management (5%) on O&M	-	$ 81,000	1	$ 81,000		
2. Performance Monitoring Program	year				$ 78,000	Annual amount based on current sampling and reporting for the PMP Program.
a. Fieldwork/Sampling Equipment	quarter	$ 6,220	4	$ 24,880		
b. Analytical (VOCs, Blanks, QC Samples)	quarter	$ 2,400	4	$ 9,600		
c. Data Evaluation, Validation and Reporting (Annual)	quarter	$ 7,680	4	$ 30,720		
d. Contingency (15%) + Management (5%)	-	$ 13,000	1	$ 13,000		
3. Institutional Controls (Groundwater) / Certification						
a. CEA Revision	LS	$ 6,500	1	$ 6,500	$ 6,500	Initial one time cost
b. Biennial Certification (per year)	Year	$ 4,000	1	$ 4,000	$ 4,000	2-year annual prorated cost

D. Present Value Analysis

Cost Type	Year	Cost per Year	Total Cost	Discount Factor (7%)	Present Value*	Notes
A. Operations and Maintenance						
• Pump and Treatment O&M (15 Years)	1-15	$ 1,255,000	$ 18,825,000	9.108	$ 11,430,000	15 years
• Performance Monitoring Program	1-15	$ 78,000	$ 1,170,000	9.108	$ 710,000	15 years
• CEA Revision	1	$ 6,500	$ 6,500	1.000	$ 7,000	1 year
• Biennial Certification	1-15	$ 4,000	$ 60,000	9.108	$ 36,000	15 years
Total Present Value of Alternative 2B for 15 Years:					$ 12,183,000	
A. Operations and Maintenance						
• Pump and Treatment O&M (30 Years)	1-30	$ 1,255,000	$ 37,650,000	12.409	$ 15,573,000	30 years
• Performance Monitoring Program	1-30	$ 78,000	$ 2,340,000	12.409	$ 968,000	30 years
• CEA Revision	1	$ 6,500	$ 6,500	1.000	$ 7,000	1 year
• Biennial Certification	1-30	$ 4,000	$ 120,000	12.409	$ 50,000	30 years
Total Present Value of Alternative 2B for 30 Years:					$ 16,598,000	

Table 11
OU2 Alternative 5 Present Value Cost Estimate
CPS/Madison Superfund Site, Old Bridge New Jersey

OU2 Remedial Alternative

Alternative 5: In-Situ Chemical Oxidation

Includes:
a. Pre-Design Investigation
b. Remedial Action Work Plan
c. Permitting
d. ISCO Treatment
e. Institutional Controls: Non-Residential Use /
f. Groundwater Monitoring

Design Criteria

Site Conditions
- Water table: 1 to 3 feet
- Fine to medium sands with silt/clay lenses.

ISCO
- Excavation/backfill of 1,4-Dioxane area (900 cy)
- Persulfate, peroxide, and Zvi treatment
- In-situ soil mixing - 20,000 cy
- Direct push injection - 1,500 cy
- Supplemental direct push injection - 5,000 cy
- Post-remediation soil sampling at one sample per 70 cy

Post-Remediation Groundwater Monitoring
- covered under OU1 Alternatives

Notes:

1. The cost estimates shown have been prepared for guidance in project evaluation and implementation from information available at the time of the estimate. The actual costs will depend on actual labor, equipment and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors.

2.* Costs rounded to the nearest thousands.

A. Remedial Engineering Design and Permitting

Description	Unit	Rate	Quantity	Subtotal	Cost*	Notes
1. Site Surveying	LS	$ 21,000	1	$ 21,000	$ 21,000	
2. Remedial Design Work Plan		$ 58,000	1	$ 58,000	$ 58,000	
3. ISCO Bench Testing		$ 35,000	1	$ 35,000	$ 35,000	Includes sample collection
3. Remedial Design Investigation	LS				$ 72,000	Investigations related to the delineation of impacted soil limits and facility foundation design
a. Field Personnel/Equipment/Materials)	LS	$ 23,000	1	$ 23,000		
b. Subcontractors (Driller, Surveyor, Utility Clearing)	LS	$ 33,000	1	$ 33,000		
c. Analytical	LS	$ 9,000	1	$ 9,000		
d. Data Validation/Evaluation/Report	LS	$ 7,000	1	$ 7,000		
4. Design and Remedial Action Work Plan					$ 130,000	Includes RD report, the preparation of the Remedial Action Work Plan, CQAPP, and Construction H&S plans
a. Engineering Design Package	LS	$ 71,000	1	$ 71,000		
b. Remedial Work Plans (RD report/RAWP)	LS	$ 59,000	1	$ 59,000		
5. Construction Specifications	LS	$ 21,000	1	$ 21,000	$ 21,000	
6. Permitting					$ 45,000	Permit equivalents based on remedial action components and presence of freshwater wetlands and flood hazard area within the construction area.
a. NJ Flood Hazard Area Permit Equivalent	LS	$ 19,000	1	$ 19,000		
b. NJ Freshwater Wetlands Permit Equivalent	LS	$ 13,000	1	$ 13,000		
c. Soil Erosion & Sediment Control Plan	LS	$ 8,000	1	$ 8,000		
d. NJ Permit-by-Rule Discharge Authorization (ISCO)	LS	$ 5,000	1	$ 5,000		
				Subtotal	$ 382,000	
				Contingency (15%)	$ 57,000	
				Total Engineering Design and Permitting	$ 439,000	

B. Construction/Capital Costs

Description	Unit	Rate	Quantity	Subtotal	Cost*	Notes
1. Preparation					$ 493,000	
a. Site Preparation/Trailers Setup, removal U/G lines	LS	$ 306,000	1	$ 306,000		
b. Monitoring Well Abandonment, Move IRM Wells	LS	$ 11,000	1	$ 11,000		Abandon 11 wells in the construction area.
c. Repackaging Area (asphalt removal and soil exc.)	LS	$ 176,000	1	$ 176,000		Excavation of 900 cy and backfill
2. ISCO Treatment					$ 1,861,000	Includes estimated oxidant material amounts, soil mixing (majority of area up to 15 ft), and supplemental ISCO of 5,000 cy yards using injection.
a. Mobilize/Demobilize Equipment	LS	$ 18,000	1	$ 18,000		
b. ISCO Chemicals						
• ZVI	lb.	$ 4.00	20,000	$ 80,000		
• Persulfate	lb.	$ 2.50	408,000	$ 1,020,000		
• Hydrogen Peroxide (32%)	gal	$ 20.00	8,000	$ 160,000		
c. Soil Mixing	cy	$ 20	19,500	$ 390,000		
d. Injection	Day	$ 28,000	3	$ 84,000		
e. Lime	LS	$ 1	9000	$ 9,000		
f. Supplemental Injection	Day	$ 10,000	10	$ 100,000		
3. Post Remediation Soil Sampling					$ 116,000	Assumes 50 borings in the treatment areas during initial treatment plus 15 additional borings after the supplemental treatment.
a. Drilling/Sample Collection	LS	$ 97,000	1	$ 97,000		
b. Data Evaluation/Report	LS	$ 19,000	1	$ 19,000		
4. Site Restoration/Demobilization					$ 265,000	Includes the installation of 8 monitoring wells: 4 shallow (15 ft) and 4 deep (30 ft) for post-remediation performance monitoring, includes supervision and surveying.
a. Monitoring Well Installation	LS	$ 4,500	8	$ 36,000		
b. Site Restoration	LS	$ 192,000	1	$ 192,000		
c. Demobilization	LS	$ 37,000	1	$ 37,000		
5. Management and QA/QC					$ 802,000	Contractor QC, H&S (including perimeter air monitoring), and Construction Oversight for project duration. Includes final surveying, and remedial action report.
a. Construction Oversight/QA/As-Builts	LS	$ 395,000	1	$ 395,000		
b. Contractor QC, Admin, and Meetings	LS	$ 225,000	1	$ 225,000		
c. Contractor H&S	LS	$ 182,000	1	$ 182,000		
				Subtotal	$ 3,537,000	
				Contingency (15%)	$ 531,000	
				Total Construction and Capital Cost	$ 4,068,000	

C. Operations and Maintenance (Annual Costs)

Description	Unit	Rate	Quantity	Subtotal	Cost*	Notes
1. Institutional Controls (Land) / Certification						
a. Deed Notice (Yr. 1)	LS	$ 4,000	1	$ 4,000	$ 4,000	
b. Biennial Certification (30 Yrs.)	Year	$ 2,000	1	$ 2,000	$ 2,000	

D. Present Value Analysis

Cost Type	Year	Cost per Year	Total Cost	Discount Factor (7%)	Present Value*	Notes
A. Remedial Engineering Design, and Permitting	0	$ 439,000	$ 439,000	1.000	$ 439,000	
B. Construction/Capital Costs	0	$ 4,068,000	$ 4,068,000	1.000	$ 4,068,000	
C. Operations and Maintenance						
• Deed Notice	1	$ 4,000	$ 4,000	0.935	$ 4,000	
• Biennial Certification	1-30	$ 2,000	$ 60,000	12.409	$ 25,000	30 years
				Total Present Value of Alternative 5:	$ 4,536,000	

Table 12 Chemical-Specific ARARs for OU1 and OU2
CPS/Madison Superfund Site

Regulatory Level	ARAR	Description	Status	Comment
State	Ground Water Quality Standards (N.J.A.C. 7:9C)	Establishes designated uses of the State's groundwater and specifies groundwater quality standards (GWQS) for protection of groundwater and for groundwater remediation.	Applicable	GWQS are identified as remedial goals for Site related COCs.
State	NJ Soil Remediation Standards (N.J.A.C. 7:26D)	Establishes the minimum standards for the remediation of contaminated soil.	Applicable	Per USEPA May 12, 2010 letter to NJDEP the ingestion/dermal exposure pathway SRS are ARARs, but SRS for the inhalation pathway are not an ARAR.[1]
State	NJ - Safe Drinking Water Act Rules (N.J.A.C 7:10)	Establishes allowable contaminant levels in public drinking water including Primary Maximum Contaminant Levels (MCLs) and Secondary MCLs for contaminants that impact aesthetic qualities of drinking water.	Applicable	Contains MCLs that are generally equal to or more stringent than the Federal Safe Drinking Water Act MCLs. Applicable to determine whether groundwater if used from the Site for drinking would require treatment to meet the MCLs.
Federal	Safe Drinking Water Act (40 CFR 141.50-52)	Establishes federal MCLs - maximum permissible levels of contaminants in water that is delivered to any user of a public water system	Applicable	Applicable to determine whether groundwater if used from the Site for drinking would require treatment to meet the MCLs.

1 - Letter dated May 12, 2010, USEPA Region 2 to NJDEP Site Remediation Program regarding Application of New Jersey's Soil Remediation Standards at Federal-Lead Superfund Sites.

Table 13 Action-Specific ARARs for OU1 and OU2
CPS/Madison Superfund Site

Regulatory Level	ARAR	Description	Status	Comment
State	NJ - Technical Requirements for Site Remediation and Administrative (N.J.A.C. 7:26E) Requirements for the Remediation of Contaminated Sites (N.J.A.C. 7:26B)	Specifies requirements for remedial activities under New Jersey cleanup programs, including requirements for institutional and engineering controls for contaminated soils left in place and for contaminated groundwater in excess of standards.	Applicable	Substantive requirements applicable if contaminated soils remain at levels above NJ soil remediation standards and applicable to a groundwater Classification Exception Area/Well Restriction Area (established for the CPS property) and monitored natural attenuation if implemented.
State	NJ - Pollutant Discharge Elimination System Rules (N.J.A.C. 7:14A)	Establishes standards for groundwater and surface water discharge for site remediation projects.	Applicable	The CPS IRM pump and treatment system discharges to surface water under a NJ Discharge to Surface Water Permit. Under CERCLA, permits are not required for on-site work.
State	NJ – Water Pollution Control Act Rules (N.J.A.C. 7:14)	Established rules governing the construction of wastewater treatment facilities.	Applicable	Applicable to the CPS and Madison IRM pump and treatment systems.
State	NJ – Air Pollution Rules (N.J.A.C. 7:27)	Establishes air quality standards for discharge of pollutants to air for protection of public health and preservation of ambient air quality.	Applicable	Substantive requirements applicable to remedial activities that result in air emissions.
State	NJ – Well Construction and Maintenance Rules (N.J.A.C. 7:9D)	Establishes requirements for installation and decommissioning of wells.	Applicable	Substantive requirements applicable to a remedial action that involves construction or abandonment of wells.
State	NJ - Soil Erosion and Sediment Control Act (N.J.S.A. 4:24-43 and N.J.A.C. 2:90-1)	Establishes soil erosion and sediment control standards for construction projects that result in soil erosion.	Potentially Applicable	Applicable to remedial construction activities that result in total land disturbance greater than or equal to 5000 sf^2..
State	NJ - Hazardous Waste Regulations (N.J.A.C. 7:26G)	Describes methods for identifying hazardous wastes and lists known hazardous wastes.	Applicable	Applicable to determine if hazardous waste is identified and managed during site remediation.
State	NJ – Noise Control Rules (N.J.A.C. 7:29)	Sets forth regulations relating to the control and abatement of noise from industrial, commercial, public service or community service facilities.	Relevant and Appropriate	Applicable to establishing limits on the noise that can be generated during remedial activities.
State	NJ – Storm Water Management (N.J.A.C. 7:8)	Establishes requirements for managing and controlling storm water from construction.	Potentially Applicable	Applicable if remedial activities include total land disturbance exceeding regulatory threshold.
Federal	Federal - Clean Air Act (42 USC 7401)	Establishes limits on emissions to atmosphere from industrial and commercial activities to reduce pollution and preserve air quality	Potentially Applicable	Applicable to remedial activities that emit pollutants to the air.
Federal	Federal - National Ambient Air Quality Standards (40 CFR 50)	Establishes emissions limits for primary and secondary National Ambient Air Quality Standards	Potentially Applicable	Applicable to remedial activities that may emit pollutants to the air.
Federal	Federal - National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61, 63)	Establishes limits on hazardous emissions to the atmosphere such as benzene and PCE. Sets requirements for public exposure to hazardous airborne emissions.	Applicable	Applicable to remedial activities that may emit pollutants to the air.

Table 13 Action-Specific ARARs (Continued) CPS/Madison Superfund Site Feasibility for OU1 and OU2				
Regulatory Level	**ARAR**	**Description**	**Status**	**Comment**
Federal	Federal - Resource Conservation and Recovery Act (40 CFR 260-270)	Establishes responsibilities and standards for the management of hazardous and non-hazardous waste	Applicable	Applicable for management of hazardous and non-hazardous waste generated by remedial activities.
Federal	Identification and Listing of Hazardous Waste (40 CFR Part 261)	Defines remediation wastes that may be subject to regulation as hazardous wastes and lists specific chemical and industry-source wastes.	Potentially Applicable	Applicable if any hazardous waste will be generated as part of the remedy.
Federal	Resource Conservation and Recovery Act (40 CFR 264)	Establishes procedures for hazardous waste treatment, storage, and disposal facilities and includes regulations for land disposal units.	Potentially Applicable	Applicable for management of hazardous waste during remediation.
Federal	Federal – Hazardous Materials Transportation (49 CFR 107, 171-180)	Established standards for the transportation of hazardous wastes and/or materials.	Potentially Applicable	Applicable to remedial activities that involve the off-site transportation of hazardous waste.
Federal	Federal - Ambient Water Quality Criteria (40 CFR 131, 401)	Provides criteria developed for the protection of freshwater and marine aquatic life and for the protection of human health from the ingestion of water and/or organisms.	Applicable	Applicable if remedy results in surface water discharge.
Federal	Federal – General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR 403)	Prohibits discharge of pollutants to a Publicly Operated Treatment Works (POTW) that cause or may cause pass through or interference with operation of a publicly owned treatment works.	Applicable	Applicable if remedy results in discharge of water to the publicly owned treatment works.

Table 14 Location-Specific ARARs for OU1 and OU2
CPS/Madison Superfund Site

Regulatory Level	ARAR	Description	Status	Comment
State	NJ – Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A)	Establishes requirements for the protection of freshwater wetlands and regulates activities disturbing freshwater wetlands.	Applicable	Freshwater wetlands have been identified on or adjacent to the Site and substantive requirements are applicable to remedial actions that affect the wetlands. Best management practices will be used during implementation to avoid or minimize impacts on aquatic habitat.
State	NJ Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)	Sets forth requirements governing human disturbance to the land and vegetation in a flood hazard area and riparian zone.	Applicable	A flood hazard area has been identified on or adjacent to the Site. Substantive requirements are applicable to remedial actions that are within the flood hazard area or riparian zone.
State	NJ – Endangered and Non- Games Species Conservation Act (N.J.S.A. 23:2A-1)	Standards for the protection of NJ and Federal threatened and endangered species.	Potentially Applicable.	Although one endangered species (Indiana bat) is potentially occurring in the vicinity of the Site, it has not been identified on site.
State	NJ – Endangered Plant Species Program Rules (N.J.A.C. 7:5C)/Endangered Plant Species List Act (N.J.S.A. 13:1B)	Identifies endangered plant species native to the State and establishes the requirement to protect threatened and endangered plant species.	Potentially Applicable	Although one threatened plant species (Swamp Pink) is potentially occurring in the vicinity of the Site, the plant has not been identified on site.
Federal	Federal - National Environmental Policy Act (40 CFR 6, Appendix A)	Requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.	To be considered	Freshwater wetlands/floodplain have been identified on or adjacent to the Site. .
Federal	Federal – Fish and Wildlife Conservation Act (16 USC 2901 et seq.)	Establishes guidance and policy to promote conservation of non-game fish and wildlife and habit.	Potentially Applicable	Applicable if remedy impacts non-game fish and wildlife and habitat.

APPENDIX I

ADMINISTRATIVE RECORD INDEX

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

09/12/2019

REGION ID: 02

Site Name: CPS/MADISON INDUSTRIES
CERCLIS ID: NJD002141190
OUID: 01/02
SSID: 0283
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
564980	09/12/2019	ADMINISTRATIVE RECORD INDEX FOR OU1 AND OU2 FOR THE CPS/MADISON INDUSTRIES SITE	2	Administrative Record Index		(US ENVIRONMENTAL PROTECTION AGENCY)
471841	04/13/2015	FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR THE CPS/MADISON INDUSTRIES SITE	2646	Report	(BASF CORPORATION)	(AMEC ENVIRONMENT & INFRASTRUCTURE INCORPORATED)
471842	04/13/2015	TRANSMITTAL OF THE FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR THE CPS/MADISON INDUSTRIES SITE	1	Letter	OSOLIN,JOHN (US ENVIRONMENTAL PROTECTION AGENCY)	(AMEC ENVIRONMENT & INFRASTRUCTURE INCORPORATED)
395860	07/10/2015	REMEDIAL INVESTIGATION REPORT - TEXT, FIGURES, AND TABLES FOR THE CPS/MADISON INDUSTRIES SITE	518	Report	(BASF CORPORATION)|(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|(US ENVIRONMENTAL PROTECTION AGENCY)	(PRINCETON GEOSCIENCE INCORPORATED)
395861	07/10/2015	REMEDIAL INVESTIGATION REPORT - APPENDIX A, B, AND C FOR THE CPS/MADISON INDUSTRIES SITE	249	Report	(BASF CORPORATION)|(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|(US ENVIRONMENTAL PROTECTION AGENCY)	(PRINCETON GEOSCIENCE INCORPORATED)
395862	07/10/2015	REMEDIAL INVESTIGATION REPORT - APPENDIX D FOR THE CPS/MADISON INDUSTRIES SITE	101	Report	(BASF CORPORATION)|(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|(US ENVIRONMENTAL PROTECTION AGENCY)	(PRINCETON GEOSCIENCE INCORPORATED)
395863	07/10/2015	REMEDIAL INVESTIGATION REPORT - APPENDIX E FOR THE CPS/MADISON INDUSTRIES SITE	1173	Report	(BASF CORPORATION)|(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|(US ENVIRONMENTAL PROTECTION AGENCY)	(PRINCETON GEOSCIENCE INCORPORATED)

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/23/2019

REGION ID: 02

Site Name: CPS/MADISON INDUSTRIES
CERCLIS ID: NJD002141190
OUID: 01/02
SSID: 0283
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
395864	07/10/2015	REMEDIAL INVESTIGATION REPORT - APPENDIX F THROUGH K FOR THE CPS/MADISON INDUSTRIES SITE	760	Report	(BASF CORPORATION)|(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|(US ENVIRONMENTAL PROTECTION AGENCY)	(PRINCETON GEOSCIENCE INCORPORATED)
395865	07/10/2015	REMEDIAL INVESTIGATION REPORT - APPENDIX L THROUGH P FOR THE CPS/MADISON INDUSTRIES SITE	1292	Report	(BASF CORPORATION)|(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|(US ENVIRONMENTAL PROTECTION AGENCY)	(PRINCETON GEOSCIENCE INCORPORATED)
565212	08/27/2015	FINAL SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT FOR OU1 AND OU2 FOR THE CPS/MADISON INDUSTRIES SITE	171	Report		
376340	11/02/2015	ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMEDIAL INVESTIGATION / FEASIBILITY STUDY FOR THE CPS/MADISON INDUSTRIES SITE	49	Agreement		BZURA,BRUCE (MADISON INDUSTRIES)|MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY)
560546	11/01/2018	FINAL FEASIBILITY STUDY FOR OU1 AND OU2 FOR THE CPS/MADISON INDUSTRIES SITE	7510	Report	(BASF CORPORATION)	(FREY ENGINEERING, LLC)
565211	03/26/2019	NJDEP'S APPROVAL OF THE PROPOSED PLAN FOR OU1 AND OU2 FOR THE CPS/MADISON INDUSTRIES SITE	2	Letter	CARPENTER,ANGELA (US ENVIRONMENTAL PROTECTION AGENCY)	PEDERSEN,MARK,J (NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)
562817	04/18/2019	PROPOSED PLAN FOR OU1/OU2 FOR THE CPS/MADISON INDUSTRIES SITE	24	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/23/2019

REGION ID: 02

Site Name: CPS/MADISON INDUSTRIES
CERCLIS ID: NJD002141190
OUID: 01/02
SSID: 0283
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
411100	09/30/2005	US EPA REGION II ADMINISTRATIVE ORDER ON CONSENT FOR REMEDIAL INVESTIGATION AND FEASIBILITY STUDY - INDEX NO. II-CERCLA-02-2004-2027 FOR THE CPS/MADISON INDUSTRIES SITE	86	Legal Instrument		PAVLOU,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)
565591	05/01/2017	IEC SOURCE CONTROL REPORT FOR THE CPS/MADISON INDUSTRIES SITE	37	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(PRINCETON GEOSCIENCE INCORPORATED)

APPENDIX II

STATE LETTER OF CONCURRENCE

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Site Remediation and Waste Management Program
Mail Code 401-06
P.O. Box 420
Trenton, New Jersey 08625-0420
Telephone: 609-292-1250

CATHERINE R. McCABE
Commissioner

September 11, 2019

Pat Evangelista, Acting Director
Superfund and Emergency Management Division
U.S. Environmental Protection Agency Region II
290 Broadway
New York, NY 10007-1866

RE: CPS/Madison Superfund Site
Old Bridge Township, Middlesex County, New Jersey
Program Interest Number 008178
Activity Number RPC000001

Dear Mr. Envangelista:

The New Jersey Department of Environmental Protection (Department) has reviewed the Record of Decision, dated September 2019 for the CPS/Madison Superfund Site, Operable Unit (OU) 1 and 2, prepared by the U.S. Environmental Protection Agency (EPA) Region II, which addresses groundwater contamination emanating from both facilities and soil contamination on the CPS property.

The Selected Remedy for Groundwater (OU1) includes:

- Organics, Alternative 3A, In-Situ Chemical Oxidation (ISCO) Permeable Reactive Barrier (PRB) with long-term monitoring, and
- Metals, Alternative 2B, Continued operation of the Madison Interim Remedial Measure (IRM) groundwater extraction and treatment system

The Selected Remedy for Soil for the CPS property (OU2) includes:

- Alternative 5 – In-Situ Chemical Oxidation with limited excavation

The Department concurs with the selected remedy for groundwater for both facilities and the selected remedy for soil for the CPS property. The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and uses permanent solutions and treatment technologies to the maximum extent practicable. In-situ chemical oxidation of the volatile organic compound contamination satisfies the statutory preference for treatment as a principal element of the remedy. The Department acknowledges that contaminated soils at the Madison property will be addressed in the future under OU3.

DEP appreciates the opportunity to participate in the decision making process to select an appropriate remedy. If you have any questions, please call me at 609-292-1250.

Sincerely,

Mark J. Pedersen, Assistant Commissioner
Site Remediation and Waste Management Program

CC: Lynn Vogel, NJDEP, BCM

APPENDIX III

RESPONSIVENESS SUMMARY

APPENDIX III

RESPONSIVENESS SUMMARY

Operable Units 1 and 2 of the CPS/Madison Site

Old Bridge, New Jersey

INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns regarding the Proposed Plan for Operable Units 1 and 2 of the CPS/Madison Site ("Site") and EPA's responses to those comments.

All comments summarized in this document have been considered in EPA's final decision for the selection of the cleanup response for the Site. This Responsiveness Summary is divided into the following sections:

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

This section provides the history of the community involvement and interests regarding the Site.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES

This section contains summaries of oral and written comments received by EPA at the public meeting and during the public comment period, and EPA's responses to these comments.

The last section of this Responsiveness Summary includes attachments, which document public participation in the remedy selection process for this Site. They are as follows:

Attachment A contains the Proposed Plan that was distributed to the public for review and comments.

Attachment B contains the public notices that appeared in the Home News Tribune.

Attachment C contains the transcripts of the public meeting.

Attachment D contains the public comments received during the public comment period. Note: personal information, such as email addresses, home addresses, and phone numbers contained in the letters and emails were redacted to protect the privacy of the commenters.

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The subject of this Record of Decision and Responsiveness Summary is the First and Second Operable Units (OU1 and OU2) of the CPS/Madison Site in Old Bridge, New Jersey

On April 24, 2019, EPA released the Proposed Plan for OU1 and OU2 to the public for comment. Supporting documentation comprising the administrative record was made available to the public at the information repositories maintained at the Old Bridge Public Library, 1 Old Bridge Plaza, Old Bridge, New Jersey 08857, the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York 10007, and EPA's website for the Site at https://www.epa.gov/superfund/cps-madison.

EPA published notice of the start of the public comment period, which ran from April 24, to May 24, 2019, and the availability of the above-referenced documents in the Home News Tribune on April 24, 2019. A news release announcing the Proposed Plan, which included the public meeting date, time, and location, was issued to media outlets and posted on EPA's Region 2 website on April 24, 2019.

A public meeting was held on May 8, 2019, at the Old Bridge Municipal Court, 1 Old Bridge Plaza, Old Bridge, New Jersey. The purpose of this meeting was to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for the Site and to respond to questions. At the meeting, EPA reviewed the history of the Site, the results of the investigation of contamination at the Site, and details about the Proposed Plan, before taking questions from meeting attendees. The transcript of this public meeting is included in this Responsiveness Summary as Attachment C.

At the request of the Perth Amboy City Administrator, EPA attended a city council meeting on May 22, 2019, with members of the public in attendance. EPA gave a presentation of the Proposed Plan and answered questions.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES

A. SUMMARY OF QUESTIONS AND EPA'S RESPONSES FROM THE PUBLIC MEETING CONCERNING THE CPS/MADISON SITE – A public meeting was held on May 8, 2019, at the Old Bridge Municipal Court, 1 Old Bridge Plaza, Old Bridge, New Jersey. Following a brief presentation of the investigation findings, EPA presented the Proposed Plan and preferred alternatives for the CPS/Madison Site, received comments from interested citizens, and responded to questions regarding the remedial alternatives under consideration. Comments and questions raised by the public following EPA's presentation are categorized by relevant topics and presented as follows:

Comment #1: One commenter asked, how many chemical oxide wells EPA is planning to install.

EPA Response: The distribution and number of wells will depend on the area of influence of each injection well. The intent is to create a barrier of wells with overlapping areas of influence. For cost estimation purposes BASF estimated that 14 wells may be needed.

Comment #2: One commenter asked, what restrictions will be placed on the Site.

EPA Response: There are two types of restrictions that will be placed on the Site. The first type of restriction would be a "well restriction", which would prevent the placement of drinking water wells in the area of groundwater contamination without treatment. This restriction would be removed when the groundwater achieves New Jersey Groundwater standards.

The second type of restriction would be a "use restriction", in this case the property would be restricted to non-residential use because the soil will be remediated to non-residential standards. Furthermore, any new buildings would require testing for vapor intrusion potential due to the organic chemicals in the groundwater.

Comment #3: One commenter asked if EPA will install a barrier to protect the Perth Amboy wells and, if so, how long will it take.

EPA Response: BASF, under NJDEP's direction, has already installed, and is currently testing a treatment barrier upgradient of Perth Amboy Supply Well 6. The system will be expanded to the other affected wells. The initial results indicate that the barrier is effective in reducing 1,4-dioxane to acceptable levels.

Comment #4: One commenter was concerned that ozone could be released and create breathing difficulties for those with breathing issues. The commenter asked if there would be a filter or air monitoring in place to ensure that ozone is not released to the air.

EPA Response: The ozone should react with the contaminants and be completely consumed within the groundwater during the treatment process. Soil vapor above the groundwater will be monitored during the operation of the chemical oxidation barrier. This monitoring will ensure that the reaction is contained within the groundwater and ozone is not released to the air.

Comment #5: Several commenters asked if EPA considered carbon filtration.

EPA Response: Filtration with carbon or a similar material was evaluated as part of Groundwater Organic Alternative 2A, a pump and treat alternative. That alternative is being retained as a contingency remedy in the event that the In-Situ Chemical Oxidation (ISCO) reactive barrier should prove ineffective. A major advantage of the ISCO barrier over the pump and treatment alternative is that the oxidant will react with contaminants adsorbed onto the soils that would otherwise act as a continuing contaminant source to groundwater under the pump and treatment alternative.

Comment #6: One commenter asked how EPA intends to oxidize the soil?

EPA Response: Oxidant will be injected directly into the soils to a depth of 10 to 25 feet while mixing it in place with augers or other mechanical mixing device. Mixing allows the oxidant to make contact with contaminants that might otherwise be isolated in less permeable zones of soil. Testing of the treated soil and groundwater will determine if a second application is required to meet the remediation goals.

Comment #7: A commenter asked what type of oxidants would be used to address the contamination.

EPA Response: The ISCO reactive barrier that addresses groundwater will employ ozone or a combination of ozone and peroxide. The soil remedy will employ a combination of sodium persulfate, hydrogen peroxide and zero valent iron. These oxidants will be adjusted and possibly supplemented with other known oxidants to maximize the effectiveness under site conditions.

Comment #8: One commenter asked if ISCO has been used successfully at other sites with similar contaminants. If so, can we see the sites that were studied.

EPA Response: EPA has drawn on a broad range of experience with ISCO technology on many sites. Appendix F of the CPS/Madison Site Feasibility Study contains five case studies where ISCO technology was successfully applied at sites with similar contaminants. These five sites are not the complete list of sites reviewed, but they represent the range of similar sites.

Comment #9: One commenter asked if ISCO was already being used for the supply well protection.

EPA Response: The well head protection discussed in Comment #3 is an ISCO Reactive Barrier similar to the one proposed in this record of decision, but on a smaller scale.

Comment #10: One commenter asked if there is currently contamination in the water.

EPA Response: Groundwater in the Runyon Watershed contains contaminants above the groundwater standards. Only one contaminant(1,4-dioxane) reaches the supply wells at levels marginally above the standard. However, after mixing and treatment, water supplied to the community achieves acceptable standards.

Comment #11: One commenter stated that people in the area have been thinking the water may have given them cancer or some other disease, and asked if EPA is sure the water is safe.

EPA Response: The water that reaches the tap achieves water quality standards.

Comment #12: One commenter stated that the companies responsible for contamination have stressed the community's ability to supply water, and asked if EPA has considered removing the companies to restore the land to the watershed.

EPA Response: The Superfund program's objective is to address contamination that presents an unacceptable risk to human health and the environment. The remedial alternatives evaluated in the Proposed Plan are premised on the assumption that the use of the properties that make up the Site will remain commercial or industrial.

Comment #13: One commenter asked if EPA considered removing the soil instead of using ISCO.

EPA Response: Excavation was considered as one of the alternatives in the Feasibility Study and Proposed Plan. EPA is selecting ISCO for the following reasons:

- ISCO satisfies the statutory preference for treatment of contaminants, whereas excavation and off-site disposal of soil would require landfilling of waste.
- Excavation and off-site disposal have the potential for greater short-term risks to workers, the community and the environment than ISCO.
- ISCO is more easily implementable than excavation and off-site disposal, which would require sheet-piling, dewatering, and discharge of treated effluent.
- ISCO is less costly than the off-site disposal alternative but should be just as effective. Therefore, ISCO is more cost-effective.

The Evaluation of Soil Alternatives in the ROD contains a more detailed comparison of these factors and others, consistent with the NCP criteria.

Comment #14: Several commenters asked if EPA could require the companies to drill a new supply well if the remedy should fail.

EPA Response: The selected remedy does not contemplate installation of a new public water supply well if the remedy fails. The ROD provides a contingency remedy that will be implemented if the groundwater remedy for organic contamination is not effective. The contingency remedy would consist of an upgraded version of the CPS IRM pump and treatment system, which is currently in place and has been proven to be effective in addressing organic groundwater contamination.

B. WRITTEN COMMENTS AND EPA'S RESPONSES RECEIVED DURING THE PUBLIC COMMENT PERIOD FROM THE COMMUNITY - The public comment period is the time during which EPA accepts comments from the public on proposed actions and decisions. The public comment period ran from April 24, 2019, to May 24, 2019. EPA's responses to the written comments are provided below.

Comment #15: One commenter was concerned with byproduct formation particularly bromate when using ISCO chemicals. The commenter asked what filter systems will be used to capture byproducts and what other methods will be used to limit byproduct formation.

EPA Response: EPA will evaluate the possibility of byproduct formation (e.g. the formation of bromate and hexavalent chromium ions from naturally occurring bromide and chromium in contact with remedial oxidants) during the Remedial Design Investigation (RDI) phase of the project. A RDI pilot scale testing of ISCO chemicals will be conducted before the design phase. The ISCO pilot test will include a comprehensive groundwater monitoring program using wells that are hydraulically downgradient of the ISCO treatment test zones. The groundwater monitoring program will indicate the type and magnitude of possible byproduct formation and the attenuation/reduction of any byproduct formation downgradient of the groundwater reactive zones. This information will be used in the design of a full-scale treatment program that will include minimizing the production of any potential byproducts, as needed, and the creation of a groundwater monitoring program that will ensure that drinking water quality standards are met at the nearby municipal water supply well field throughout the remedial program. Because oxidant dosing, oxidant contact time, and pH changes are the primary drivers for chemical reactions, measures to control byproduct formation will be evaluated. Evaluation will include optimizing the amount of oxidant added to sufficiently destroy organic contaminants of concern while limiting byproduct formation, and suppressing byproduct formation using other applicable oxidants such as hydrogen peroxide in tandem with ozone, which commonly suppresses the formation of bromate and hexavalent chromium.

Comment #16: One commenter asked what Site chemicals will be removed by the oxidation method.

EPA Response: Oxidation breaks down organic chemicals (such as 1,4-dioxane, benzene, and chlorobenzene) into simpler molecules. Driven to completion, the end product will be carbon dioxide, water, sulfate and chloride ions. A complete list of Site-related organic chemicals can be found in Tables 7 and 8.

Comment #17: One commenter asked what residuals will be produced using ozone and or peroxide.

EPA Response: See response to comment 16.

Comment #18: One commenter asked what Fenton’s Reagent is, and what residuals will be produced using Fenton’s Reagent and/or persulfate.

EPA Response: Fenton's Reagent is a solution of hydrogen peroxide (H_2O_2) with iron (ferrous iron – Fe($^{2+}$)) as a catalyst that produces a strong oxidant radical that oxidizes and destroys organic contaminants found at the Site. Common byproducts of Fenton’s Reagent and persulfate treatment include oxygen, carbon dioxide, and sulfate and chloride ions. Certain organic compounds that are known as ketones, such as acetone and 1,2-butanone, also are commonly formed during the ISCO treatment process, but these reaction byproducts are generally less toxic and more biodegradable (degraded by natural bacteria in the aquifer) than the organic contaminants that are being targeted for treatment. Less common are toxic disinfection byproducts such as trihalomethanes (via oxidation of organic compounds), bromate (via oxidation of naturally occurring bromide ions), and hexavalent chromium (via oxidation of naturally occurring chromium). Typically, the byproducts generated in the treatment zone will naturally attenuate (i.e., reduce to innocuous compounds through pH, mineralization and biological interactions) and thus quickly reduce in concentration as groundwater flows away from the treatment zone. Laboratory and pilot scale testing will be employed to evaluate the field application’s effectiveness of a candidate oxidant and byproduct formation. The information obtained from the pilot scale testing will be used to design full scale treatment to optimize the amount of oxidant added to effectively treat the organic contaminants, control byproduct formation, and monitor groundwater flowing from the treatment zone to ensure that there will be no impacts to potential receptors.

Comment #19: One commenter asked which alternatives will use Fenton's Reagent.

EPA Response: Fenton's Reagent is one of the potential oxidants evaluated for Soil Alternative 5.

Comment #20: One commenter was concerned that Groundwater Alternative 3A would require nanotechnology which some researchers consider risky due to the unknown effects of nanoparticles on human health and the environment.

EPA Response: None of the technologies considered in the alternatives employ nanoparticles. Groundwater Alternative 3A does discuss the use of microbubbles of ozone. These bubbles are not nanoparticles. The bubbles will readily dissolve in the water leaving no residual particles.

Comment #21: One commenter asked what other types of advanced treatment were considered, such as UV/Oxidation.

EPA Response: The advanced water treatment technology UV/Oxidation was considered to support the pump and treat alternative.

Comment #22: Several Commenters expressed a preference for Soil Alternative 4, Excavation and Off-site Disposal. Others were concerned about using ISCO in inaccessible areas.

EPA Response: See response to comment #13. Soil Alternatives 3, 4, and 5 would use ISCO, without mixing, only for contaminated soils that were inaccessible, and that would otherwise be left untreated.

Comment #23: One commenter also asked for details regarding Soil Alternative 4 (above) such as volumes of ozone and hydrogen peroxide, frequency of injection, reaction time, working hours, and injection technology.

EPA Response: These specific details will be addressed in the remedial design phase.

Comment #24: A commenter asked about measures that will be put in place to address vapor releases at the Site and protection of on-site workers.

EPA Response: Vapor emissions will be monitored in real-time using dedicated air monitoring equipment (e.g., photoionization detectors) at the work areas and at the Site perimeter to ensure protection of human health and the environment. Air monitoring will be performed in accordance with a Site Health and Safety Plan (HASP) and a Perimeter Air Monitoring Plan. If emissions exceed a safety threshold, then work will stop and emission control measures will be applied (e.g., the application of environmentally safe chemical foam). In addition, on-site workers will wear appropriate personal protective equipment (PPE) in accordance with the Site HASP to protect the on-site workers and minimize exposure to hazards during remediation activities.

Comment #25: One commenter asked the following questions regarding Groundwater – Organic Alternative 2A:

- How long would the treatability study take?
- What would be included in the treatment process train?
- Will it include a filtration system to capture product formation?
- If a filtration system is used will it be bio-filtration?

EPA Response: Organic Alternative 2A is the contingency remedy, identified by EPA in the event that Organic Alternative 3A does not prove effective under Site conditions. Should it be necessary to move to the contingency remedy, the treatability study would take approximately two months. Pump and treat is a common remedy, and treatment components are often prescribed based on the chemical make-up of the groundwater. The exact treatment train would be determined in design. Since a pump and treatment system is already in place as part of the CPS IRM, the design phase would be based on many of the components that are currently being used at the Site. It is likely that filtration would be a component since it is currently the most common pump and treatment component used to address 1,4-dioxane.

Comment #26: One commenter expressed concern that residents were kept in the dark regarding issues concerning their drinking water. The commenter considered the mixing of water to meet the standards as "unconscionable, careless, and callous" and requested that EPA choose low-risk alternatives with proven track records.

EPA Response: The City of Perth Amboy Water Department informs residents about issues regarding their drinking water. EPA understands that the Water Department has provided notice of the exceedance of standards to residents, including the recent notice regarding the trihalomenthane exceedance. The notice reported that the exceedance was detected through routine monitoring, and the exceedance is not an emergency. Trihalomenthane is a byproduct of chlorination of drinking water to remove bacteria. Without chlorination, drinking water could pose serious health threats.

NJDEP took action to address the 1,4-dioxane issue once data indicated that the groundwater quality standards were of concern. NJDEP has promulgated a new, lower groundwater quality standard for 1,4-dioxane and has evaluated New Jersey's drinking water supply to address the issue. In the drinking water supplied by the Perth Amboy water purveyor, the concentrations at the tap are meeting groundwater quality standards, and steps have been taken to ensure standards continue to be met.

Comment #27: One commenter noted that Tables 1 and 2 in the Proposed Plan summarize health hazards and risks associated with the identified contaminants for present and future trespassers, on-site construction workers and future residents by exposure to the groundwater. The commenter stated that the plan does not address exposure and risk to people exposed to groundwater offsite, including by consuming the groundwater extracted from the Perth Amboy wellfield and asked if it could be assumed that the health risks from the contaminated public water supply wells – both now and in the future - would be similar to the serious risk shown in the tables.

Response: The risks shown in the tables are associated with exposure to the highest contaminant levels on the Site, assuming no treatment has occurred. However, there are some protections currently in place, in the form of the IRM pump and treatment systems. Exposures to the contaminant levels identified in the tables would not occur unless the protections in place were removed.

Comment #28: One commenter stated that any comprehensive remediation plan for these sites is incomplete without consideration of surface water and sediment. The commenter stated that Prickett's Brook runs through both sites, and then empties into Prickett's Pond in the Perth Amboy Runyon Watershed, where it recharges the groundwater. Since it runs through the worst contamination source areas, it is likely the recipient of runoff from the contaminated soil on the CPS and Madison properties. The commenter stated that there is a need to fully assess the results of historical flow of contaminants in surface water and noted that the brook provides a path for surface water to bypass the groundwater and soil monitoring sampling that is ongoing and proposed.

EPA Response: Testing has indicated that the surface water and sediment in Pricket's Brook does not contain organic contamination. EPA expects to address all the contamination issues associated with the Site and, as with other complex Superfund sites, a phased approach is warranted to address threats posed by the Site.

EPA will be investigating metal contamination of sediment as a potential concern as part of a future investigation and remedy selection process. Metal contamination in the public water supply, if any, would be addressed by Utility Service Affiliates (Perth Amboy), Inc., the company that Perth Amboy contracts with to operate Perth Amboy's water treatment and distribution system. While some of the metals that require treatment occur naturally, future remedy selection will address contamination contributed by the Site.

Comment #29: One commenter stated that the groundwater remedial alternative of an ISCO Permeable Reactive Barrier appears reasonable and effective, as long as strict monitoring is kept in place and, because Organic Alternative 3A still needs to be proven in the on-site conditions (as noted in the Proposed Plan), there needs to be an upgraded CPS IRM pump and treatment system ready to go as back up.

EPA Response: Under Groundwater Alternative 3A, the existing CPS IRM pump and treatment system will remain in place until the ISCO is running and EPA is satisfied that it has proven to be effective. The contingency remedy (Organic Alternative 2A, the upgraded IRM pump and treatment system) will only be put in place in the unlikely event that ISCO is ineffective. If that occurred, the pump and treat system would be modified as needed, and the hydrology of the aquifer is already well defined. Should it become necessary, EPA expects that the time it would take to upgrade the pump and treatment system should be relatively short.

Comment #30: One commenter stated, the alternative for the on-site soil remediation at the CPS property, In-Situ Chemical Oxidation thru soil mixing (Alternative 5), is unacceptable when the Perth Amboy wellfield is at risk. The commenter is concerned that complete mixing would be difficult, and failure to mix thoroughly would be difficult to detect in a timely manner. The commenter prefers Alternative 4 because it would remove the soil from the Site.

EPA Response: The groundwater remedy will prevent the contaminants from impacting the Perth Amboy wells. The purpose of the soil remedy is to eliminate direct contact hazards on-site, and to remove the source to groundwater contamination, so the groundwater remedy can attain the remediation goals and, ultimately, no longer be required. Monitoring groundwater that enters the groundwater treatment area would be an effective way of testing to determine if the soil remedy is functioning as designed. Extensive testing will be conducted to ensure the soil source is no longer present at levels that may contaminate the groundwater or pose an unacceptable risk through direct contact before the groundwater remedy is completed. In the event the source is not completely removed, the groundwater remedy technology will continue to operate until the soil remedy is effectively completed.

It is difficult to determine the extent of the source, especially when much of the source material is within the groundwater table. ISCO has the potential to address undetected or difficult to reach areas of contamination. While excavation sounds more effective and permanent, for the CPS property EPA has concluded that ISCO is equally effective and protective.

Comment #31: A commenter stated that EPA's concern with trucking contaminated soil through the community could be addressed by using the rail sidings present on both properties. The commenter added that there would also be cost savings associated with rail transport.

EPA Response: While EPA agrees that rail transport would reduce some of the short-term exposure risk and could cost less than trucking, these differences are not significant. There would still be off-site handling exposures using rail transportation, and while some transportation cost savings could be achieved, the majority of the cost is associated with on-site handling and off-site disposal costs.

EPA is sensitive to the needs of the community and has provided an opportunity for the public to comment on the Proposed Plan. Input from the community was given consideration in the evaluation of the nine criteria for remedy selection and additional community outreach and engagement will continue through the remedial design and remedial action phases of the CPS/Madison Site.

ATTACHMENT A

PROPOSED PLAN

Superfund Proposed Plan

U.S. Environmental Protection Agency, Region II

CPS/Madison Superfund Site
Old Bridge, New Jersey

April 2019

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the Preferred Alternative to address contaminated groundwater and soil at the CPS/Madison Superfund Site (Site). The Site is located in Old Bridge Township, New Jersey (Figure 1). The contamination is associated with the former CPS Chemical (CPS) facility, and adjacent Madison Industries (Madison) facility which is still in operation.

BASF Corporation (current owner of the CPS property) has completed a remedial investigation/feasibility study (RI/FS) for soils and groundwater at the Site (not including soils on the Madison property) under EPA oversight. Madison is conducting an RI for soils on its property. Groundwater and surface water were sampled on the CPS facility, the downgradient Madison facility, and in the Perth Amboy wellfield. The RI identifies areas of groundwater and soil contamination where remedial action is required.

The Preferred Alternative for groundwater at the Site is: 1) a permeable reactive barrier using chemical oxidation to treat organic constituents; and 2) continuation of an existing Interim Remedial Measure (IRM) for metals, which includes groundwater extraction and treatment. The Preferred Alternative for contaminated soil on the CPS property is in-situ chemical oxidation (ISCO) with soil mixing. In areas where soil mixing is impractical, in-situ chemical oxidation alone will be used to destroy organic contaminants in place. Soils on the Madison property will be addressed in a subsequent proposed plan.

This Proposed Plan contains descriptions and evaluations of the cleanup alternatives considered for the Site and EPA's preferred alternative. This Proposed

MARK YOUR CALENDARS

PUBLIC COMMENT PERIOD
April 24, 2019 to May 24, 2019
EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING
May 8, 2019 at 7:00 pm
EPA will hold a public meeting to explain the Proposed Plan and alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at the Old Bridge Municipal Court, 1 Old Bridge Plaza, Old Bridge, New Jersey 08857

For more information, see the Administrative Record at the following locations:

EPA Records Center, Region 2
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308
Hours: Monday-Friday – 9 A.M. to 5 P.M. by appointment

Old Bridge Public Library
1 Old Bridge Plaza
Old Bridge, New Jersey 08857
oldbridgelibrary.org

Send comments on the Proposed Plan to:

John Osolin, Remedial Project Manger
U.S. EPA, Region 2
290 Broadway, 19th Floor
New York, NY 10007-1866
Telephone: 212-637- 4412
Email: Osolin.john@epa.gov

EPA's website for the CPS/Madison Site is:
https://www.epa.gov/superfund/cps-madison

Plan was developed by EPA, the lead agency, in consultation with the New Jersey Department of Environmental Protection (NJDEP), the support agency. EPA, in consultation with NJDEP, will select a final remedy for contaminated groundwater and soil after reviewing and considering all information submitted during the 30-day public comment period.

EPA, in consultation with NJDEP, may modify the Preferred Alternative or select another response action presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on the alternatives presented in this Proposed Plan.

EPA is issuing this Proposed Plan as part of its community relations program under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund), 42 U.S.C. 9617(a), and Section 300.435(c)(2) (ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Proposed Plan summarizes information that can be found in greater detail in the Site RI and FS reports as well as other related documents contained in the Administrative Record. The location of the Administrative Record is provided on the previous page. EPA and NJDEP encourage the public to review these documents to gain a more comprehensive understanding of the site-related Superfund activities performed by the responsible parties, under EPA and NJDEP oversight.

SITE DESCRIPTION

The two facilities which make up the Site are adjacent properties located along Water Works Road in Old Bridge Township, Middlesex County, New Jersey. The Site acts as a source area for groundwater contamination that flows southwest, into the Runyon Watershed. (See Figure 1)

CPS Chemical Facility: The CPS property is approximately 30 acres, located at 570 Water Works Road. The CPS facility is located within the western portion of the property and is approximately 6.7 acres. From 1967 until it ceased operations in 2001, the CPS facility processed organic chemicals used in the production of water treatment agents, lubricants, oil field chemicals, anti-corrosive agents and engaged in solvent recovery. While the main office and a storage building remain on site, the process equipment and storage tanks that were located at the south end of the facility were demolished and removed from the Site in 2005. This portion of the Site is now inactive.

Madison Industries Facility: The Madison property is 15 acres located at 554 Water Works Road. The Madison property is bordered to the east by the CPS property and to the west by the Perth Amboy wellfield. The Madison facility (formerly known as “Food Additives”) has operated in the northern half of this property since 1967, producing inorganic chemicals used in fertilizer, pharmaceuticals and food additives. On the southern portion of the property, Madison’s sister company, Old Bridge Chemical, operates a plant that produces mostly zinc salts and copper sulfate.

Runyon Watershed: The Runyon Watershed is mostly undeveloped land which borders the Madison property to the southwest. The watershed contains the Perth Amboy wellfield which lies approximately 3,000 feet southwest (downgradient) of the CPS and Madison facilities. The wellfield supplies over 5,000 gallons per minute (gpm) to the City of Perth Amboy. The extracted water is treated to remove solids and metals using an on-site clarification and filtration system. Contaminants have entered the watershed via groundwater and to a lesser extent by surface water.

SITE HISTORY

In the early 1970s, releases of organic compounds and metals from the CPS and Madison properties resulted in the closing of 32 wells in the Perth Amboy wellfield. In 1979, a state court ordered the companies to perform a remedial investigation under the supervision of NJDEP. The investigation led to a 1981 court order for the companies to implement a remediation program to address groundwater contamination emanating from each of the properties. On September 1, 1983, the Site was placed on the National Priorities List (NPL) with New Jersey as the lead agency. In 1991 and 1992 an off-site groundwater collection system consisting of six recovery wells (three wells operated by each company) was installed to protect the Perth Amboy wellfield. Between 1993 and 2000 the groundwater surrounding these recovery wells achieved the clean-up goals in place at that time; the recovery wells were shut down and replaced by wells on each of the company’s properties which are collectively known as the Interim Remedial Measure (IRM) wells.

In 1998, NJDEP established a Classification Exception Area (CEA) and a Well Restriction Area (WRA) encompassing the area of the volatile organic plume, covering approximately 32 acres, to a depth of 80 feet. In 1999, NJDEP established CEAs and WRAs encompassing the areas of two metals plumes, which are approximately 20.7 acres, and 3.3 acres, to a depth of 80 feet (Figure 2).

In 2001, the CPS Chemical plant closed. In 2003, Madison Industries went into bankruptcy, and NJDEP requested that EPA take the lead role in overseeing the Superfund cleanup. In 2005, EPA entered into an administrative order with Ciba Specialty Chemicals (Ciba), which had recently purchased the CPS property. The order required Ciba to perform a remedial investigation and feasibility study (RI/FS) to determine the extent of contamination in groundwater and soil, determine if an action was needed to address the contamination, and identify potential alternatives to address the contamination. The RI/FS was completed in August of 2018 and is the basis for this proposed plan. Madison entered into an Order with EPA in 2015 and is currently working on an RI/FS to address soil contamination on its property and sediment contaminated with metals in the watershed.

SITE CHARACTERISTICS

The Site is relatively flat ranging from 20 to 25 feet above mean sea level (AMSL). Most of the Site lies within a 100-year flood hazard area, except for a small area in the northeast corner of the CPS Property that is 28 feet AMSL. The facilities are mostly surfaced with asphalt or concrete, except for the three-acre area of the former tank farm that was demolished by Ciba in 2005. The Magothy Formation, which underlies the Site, is used as a drinking water aquifer. Two of the geologic units of the Magothy lie directly under the Site, the Old Bridge sand, and the Perth Amboy fire clay. The Old Bridge sand is between 60 and 70 feet thick beneath the Site and readily conducts water. The fire clay is discontinuous under the Site but acts as a confining unit in some areas. Below the Magothy is the Raritan Formation which is also a drinking water aquifer. Groundwater under the Site generally flows southwest towards the Perth Amboy supply wells which are approximately half a mile downgradient.

Prickett’s Brook, an intermittent stream on the Site, flows west along the southern border of the CPS property (See Figure 1). The brook turns north along the border between the CPS and Madison properties until it turns west again and bisects the Madison property. From Madison it enters the Runyon Watershed and travels southwest through Prickett’s Pond and eventually reaches Tennent Pond. The ponds both act as recharge basins for the Perth Amboy wellfield. Prickett’s Brook and the downgradient ponds are not currently used for recreational purposes.

SUMMARY OF SITE INVESTIGATIONS

Performance Monitoring Program

Beginning in 1991, under the direction of NJDEP, CPS and Madison installed the IRM wells downgradient of the CPS property, to intercept Site groundwater contamination entering the Runyon Watershed. A Performance Monitoring Program (PMP) was initiated to evaluate the effectiveness of the IRM pump and treatment systems. The PMP continues to monitor the IRM wells which have been reconfigured several times to adjust to reduced contaminant levels in the plumes. The IRM system for CPS has been operating on the CPS property since 1996, and was upgraded in 2015.

The Remedial Investigation

In October 1992, NJDEP executed separate Administrative Consent Orders (ACOs) with CPS and Madison to perform an RI/FS to address each company’s contribution to Site contamination. CPS conducted its RI/FS in three phases, documented in three reports submitted in 1993, 1994, and 1996.

In 2003, NJDEP requested that EPA take the lead for the Site. Ciba submitted an RI/FS Summary Report in 2005 pursuant to an Administrative Order on Consent (AOC) with EPA. Madison was unable to sign an AOC with EPA at that time.

Ciba initiated a Supplemental Remedial Investigation (SRI) in 2008, to address data gaps in the previous RI and provide more current data on the status of Site contamination. When BASF acquired the CPS Property from Ciba in 2009, it took over responsibility for the SRI.

The main focus of the SRI was site-wide groundwater and soil on the CPS property. The SRI also investigated surface-water contamination, which will be addressed by Madison in a future proposed plan. The final SRI Report was submitted in 2015.

Groundwater

Groundwater contamination at the Site originates from source areas on both the CPS and Madison properties.

Volatile organic compounds (VOCs) predominantly originate from soils in the former process area on the southern half of the CPS property. These compounds include: 1,2,4-trichlorobenzene; chlorobenzene; benzene; methylene chloride; 1,1,2,2-tetrachloroethane; 1,4-dichlorobenzene; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; cis-1,2-dichloroethene; and vinyl chloride. A full list of organic compounds in groundwater can be found in Table 3.

A second source area on the CPS property is soils at the former truck and rail car loading area, which was used to repackage 1,4-dioxane for redistribution. That area is located near the south-west corner of the storage building along the border between the CPS and Madison properties and appears to be the primary source of 1,4-dioxane in groundwater.

The VOC groundwater plume extends from the water table to approximately 40 feet below ground surface (bgs) beneath the CPS and Madison facilities (Figure 2). The plume dips downward as it travels south west toward the Perth Amboy wells where it can be found between 60 and 80 feet bgs, which is the depth at which the supply wells are screened.

The IRM system that was initiated in 1991 under a State order has greatly reduced the size and concentration of the organic plume that reaches the Perth Amboy wellfield. Most of the organic contaminants that are found southwest of CPS/Madison properties are near or below both the New Jersey Groundwater Quality Standards (NJGWQS), and Federal and State Maximum Contaminant Levels (MCLs), and attenuate prior to reaching the Perth Amboy wells. Currently the only VOC reaching any of the Perth Amboy wells above the NJGWQS is 1,4-dioxane. Prior to November 2015, the 1,4-dioxane standard was 10 parts per billion (ppb) and there were no exceedances of this level at the Perth Amboy wells. In November 2015, the NJGWQS for 1,4-dioxane was changed to 0.4 ppb, resulting in an exceedance of the new standard at three Perth Amboy wells. However, due to well-head treatment and mixing with non-impacted wells, the finished water supplied to Perth Amboy continues to meet all drinking water standards including the standard for 1,4-dioxane. In April 2016, NJDEP designated the 1,4-dioxane contamination in the Runyon Watershed an Immediate Environmental Concern (IEC). Designation as an IEC requires BASF to evaluate and mitigate this condition. BASF has evaluated the extent of the 1,4-dioxane contamination and intends to place a reactive barrier near the impacted supply wells that will destroy the 1,4 dioxane prior to reaching the Perth Amboy wells. While this action is being performed under NJDEP direction separately from the remedies being chosen in this document, it is an integral part of the overall protectiveness of the Site's remedial program. NJDEP and EPA will monitor the progress of this action to ensure that this contamination is mitigated. If BASF's reactive barrier proves ineffective at meeting NJGWQS and MCLs, EPA may consider other response actions under CERCLA. The CEA/WRA was expanded in 2017 to include the 1,4-dioxane contamination area, and now encompasses 103 acres.

Inorganic Contamination (metals) predominantly originates from the Madison facility with the larger contribution from the northern half of the property. A metals plume, consisting of zinc, cadmium, copper, and lead above the NJGWQS extends approximately 600 feet into the Runyon Watershed. A less concentrated plume containing zinc, cadmium and lead originates from the area of the sludge treatment piles associated with the Perth Amboy water treatment plant. The zinc distribution is the most widespread. Both zinc plumes are approximately 1,400 feet long, and +800 feet apart. The metals concentrations in the Madison plume are currently stable or decreasing. The plume stability is due in part to the ongoing pumping of the recovery wells that make up the Madison IRM. A list of inorganic compounds in groundwater can be found in Table 3.

CPS On-site Soils

The CPS Facility contains contaminated soils that act as a contaminant source to groundwater and pose potential contact hazards. The SRI Report divided the CPS property into three areas based on general use (Figure 3). Area 1, The Former Tank Farm, contained chemical tanks (where the main chemical processing took place), as well as fuel oil storage tanks, and hazardous waste storage. Area 1 also includes the former truck and railroad car loading areas. Area 2, The Former Plant

Operations Area, is associated with support activities, including office and laboratory buildings, storage facilities, and parking lots. Area 3, the Side Lot Area, makes up the eastern two thirds of the property, and is largely undeveloped. RI sampling confirmed that Area 3 was not significantly impacted by the CPS facility operations, and therefore this area will not be included in further Site discussions. Contaminant releases did occur in Area 1 and in the adjacent southwest corner of Area 2. A list of contaminants found in soil can be found in Table 4.

Volatile organic compounds (VOCs) The SRI Report identified multiple VOCs in soils that exceeded the NJDEP Residential and Non-Residential Direct Contact Soil Remediation Standards (RDCSRS and NRDCSRS), at several locations within Areas 1 and 2. The VOCs identified in the RI include: 1,1,2,2-tetrachloroethane; 1,2,4-trichlorobenzene; 1,2-dichloroethane; 1,2-dichloropropane; 1,4-dichlorobenzene; 1,2-dichlorobenzene; benzene; methylene chloride; tetrachloroethene; trichloroethene and vinyl chloride. Table 4 includes the NJ Soil Remediation Standards (SRS) for these VOCs. VOCs with concentrations exceeding the SRS were found in Areas 1 and 2 at depths up to 26 feet. Elevated VOC concentrations have also been detected at some locations within the silts and clays at the Site, however, these low-permeability units have limited the vertical migration of the contaminant mass. Residual non-aqueous phase liquid (NAPL) has also been observed in a few shallow soil borings (< 25 feet) installed within the source areas.

Semi-Volatile Organic Compounds (SVOCs) Semi-Volatile Organic Compounds were detected in surface soil (0-2 ft.) samples at concentrations exceeding RDCSRS and NRDCSRS, at two locations within Area 2. The SVOCs are polynuclear aromatic hydrocarbon (PAH) compounds, and include: benzo(a)anthracene; indeno(1,2,3-CD)pyrene; benzo(a)pyrene; benzo(g)fluoranthene; and dibenzo(a,h)anthracene. The samples were collected from low-lying portions of the CPS facility that receive storm water runoff from the asphalt parking lot/covered areas. PAH detections are likely attributable to parking lot runoff related to either motor vehicles or components of asphalt, as there are no known or suspected operation-related sources of PAHs in this area.

Inorganic Contamination (metals) Surface soil sampling did not identify any areas on the CPS facility with metal concentrations exceeding the direct contact SRS. Arsenic was detected in subsurface soils above the NRDCSRS at one location and exceeded the NRDCSRS by a factor of less than two. Arsenic at the Site can be attributed to the natural background conditions, as there are no known or suspected sources of arsenic associated with past operations at the CPS facility. Glauconitic sediment, associated with elevated metals concentrations reflecting natural background, is also present in the areas where the arsenic exceeded the direct-contact SRS. The SRI Report also indicates that several metals were detected at concentrations slightly above default NJ Impact to Groundwater Screening Levels (IGWSLs) at four surface soil sample locations. The metals with concentrations exceeding the IGWSLs include cadmium, lead, and zinc (Madison Site contaminants), as well as beryllium, manganese, mercury, nickel, and silver. Of these metals, only beryllium and manganese, which are not site-related, have been detected in groundwater at the Site at concentrations above NJGWQS or MCLS. The IGWSLs are generic screening levels that are used to determine whether site-specific SRS for unsaturated soils need to be developed to protect groundwater. The IGWSLs are not soil remediation goals.

Supplemental source characterization sampling was conducted in April 2017. Sampling was conducted to investigate the presence of residual 1,4-dioxane in shallow unsaturated soils, posing a risk to groundwater. Figure 3 shows an area of contamination straddling the north-west border of Area 1. The unsaturated soil in this area contained the highest concentrations of 1,4-dioxane found on the Site, and generally corresponds with the area of highest 1,4-dioxane concentrations (> 100 µg/L to 650 µg/L) in shallow groundwater (< 10 feet).

SCOPE AND ROLE OF OPERABLE UNIT

Due to the complexity of working with two facilities and varying land uses, EPA is addressing the cleanup of the Site in several phases called operable units. Operable Unit 1 (OU1) addresses groundwater contamination emanating from both facilities and impacting the Perth Amboy wellfield. Operable Unit 2 (OU2) addresses contaminated soil on the CPS property that is a direct contact hazard and acts as a contaminant source to groundwater. Operable Unit 3 (OU3) addresses surface water and contaminated soil on the Madison property that is a direct contact hazard and acts as a contaminant source to groundwater.

This Proposed Plan addresses OU1 and OU2. OU3 contamination will be evaluated separately and will be addressed in a future Proposed Plan.

PRINCIPAL THREAT WASTE

Principal threat waste is defined in the box above. The soil contamination that acts as a source to groundwater is considered a Principle Threat Waste due to its high mobility and potential impact to the Perth Amboy supply wells.

WHAT IS A "PRINCIPAL THREAT"?

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

SUMMARY OF SITE RISKS

As part of the RI/FS, baseline risk assessments are conducted to estimate current and future risks posed to human and ecological receptors from exposure to hazardous substances at a site in the absence of any actions (engineering or institutional) to control or mitigate exposures to these hazardous substances. A four-step human health risk assessment process was used for assessing site-related cancer risks and noncancer health hazards. The four-steps are: Hazard Identification of Chemicals of Potential Concern (COPCs); Exposure Assessment; Toxicity Assessment; and Risk Characterization (see box on page 7 entitled "What is Risk and How is it Calculated" for more details on the Superfund risk assessment process).

Consistent with the NCP, the results of the baseline risk assessment are used to determine whether remedial action is necessary at a site in addition to helping identify the exposure pathways that drive the need for a remedial action.

Human Health Risk Assessment

The baseline human health risk assessment (HHRA) for the Site quantified risks and hazards to human health associated with exposure to media present in OU1 and OU2. As mentioned earlier, OU1 addresses contaminated groundwater beneath the Site, while OU2 addresses soils at the CPS Facility. For purposes of evaluating risks/hazards from exposure to soils in the baseline HHRA, OU2 was further subdivided into 3 subareas representing geographically different portions of the CPS facility. The subareas, referred to as Areas 1 through 3, encompass soils at: 1- the former tank farm area (Area 1); 2- the former plant area (Area 2); and 3- the side lot (Area 3). Because the Madison portion of the Site (OU3) remedial investigation has not been completed, it was not considered in the baseline HHRA for the CPS Facility.

Current use of the CPS property consists of operation and maintenance of the groundwater extraction and treatment system. There are currently no full-time employees on the property. The CPS property, as well as most of the surrounding area, is zoned SD3, Specialized Development for industrial land use as part of the Township's long-term development plan. Based on the current zoning and past industrial use of the Site, it is expected that future use would remain unchanged. However, for overall completeness and because the property owner expressed interest in redevelopment or reuse of the Site, a hypothetical future resident (child and adult) was evaluated in the HHRA. In addition, the potential for vapor intrusion from subsurface sources into indoor air was also evaluated.

Excess lifetime cancer risk and noncancer health hazard were estimated based on current and future reasonable maximum exposure scenarios. These numeric risk estimates were developed by considering various health-protective estimates about the concentrations, frequency and duration of an individual's exposure to chemicals selected as contaminants of potential concern (COPCs), as well as the toxicity of these contaminants. COPCs were selected by comparing the maximum detected concentration of each analyte to appropriate medium-specific risk-based screening values. This

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern (COCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other noncancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and noncancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one in ten thousand excess cancer risk;" or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one in ten thousand to a one in a million excess cancer risk.

For noncancer health effects, a "hazard index" (HI) is calculated. The key concept for a noncancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which noncancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site.

screening process was conducted separately for soil at each exposure area.

The exposure media quantitatively evaluated in the baseline HHRA included surface soils, subsurface soils, groundwater within the VOC plume, on-site shallow groundwater, and indoor air (the vapor intrusion pathway). The risk assessment considered the following potential human receptors for the current timeframe: adolescent (12-18 year-old) and adult trespassers. For the future timeframe, potential human receptors included: the trespasser (adolescent and adult), indoor and outdoor workers, construction and utility workers, and on-site residents (child and adult).

Sediment and surface water associated with the nearby Pricket's Brook and Pond watershed was not evaluated in the 2015 Baseline Human Health Risk Assessment Report, however this media will be considered in the future risk assessment addressing the Madison-related contamination.

The HHRA quantified two types of health effects: excess lifetime cancer risk and noncancer hazard. Cumulative cancer risk estimates for each receptor were compared to EPA's target risk range of 10^{-6} (one-in-one million) to 10^{-4} (one-in-ten thousand). The noncancer hazard index (HI) was compared to EPA's target threshold value of 1. Quantitative results and conclusions of the HHRA are discussed below.

Summary of Conclusions- Human Health Risk Assessment

Summary of the total cancer risk and noncancer hazard estimates for each receptor population evaluated in the HHRA are provided in Table 1, below. These numeric estimates are reflective of the sum of all risk stemming from exposure to site-wide groundwater and the soils at the CPS Site. Subsequent subsections of this document further discuss the risks by media (e.g., surface soil, subsurface soil, groundwater, etc.) and identify the media-specific chemicals of concern (COCs), or those chemicals identified in the HHRA as driving the need for the remedial action.

Risk Summary- Surface Soils (depth of 0-2ft bgs)

Cancer risks and noncancer hazards from exposure to surface soil in Areas 1, 2 and 3 were estimated for the following receptor populations: current/future adolescent and adult trespasser, future adult site workers (indoor and outdoor), along with future child and adult residents.

Results of the HHRA indicated cancer risk estimates for all receptor populations did not exceed EPA's target risk range of 10^{-6} (one-in-one million) to 10^{-4} (one-in-ten thousand).

Table 1:
Summary of Total Hazard and Risk Estimates-
All Receptor Populations Evaluated/Considered in the HHRA

Receptor Population- Timeframe	Excess Lifetime Risk Estimates	
	Total Hazard Index (HI)	Excess Lifetime Cancer Risk (ELCR)
	Exposure Area 1	
Adolescent Trespasser- Current/Future	0.2	4.E-07
Adult Trespasser- Current/Future	0.06	2.E-07
Outdoor Worker- Future	**50**	**4.E-04**
Indoor Worker- Future	**4**	1.E-05
Construction Worker- Future	0.4	4.E-07
Utility Worker- Future	**230**	**1.E-03**
Child Resident*- Future	**1027**	**4.E-03**
Adult Resident*- Future	**302**	
	Exposure Area 2	
Adolescent Trespasser- Current/Future	0.08	8.E-07
Adult Trespasser- Current/Future	0.03	3.E-07
Outdoor Worker- Future	**48**	**4.E-04**
Indoor Worker- Future	**48**	**4.E-04**
Construction/Utility Worker- Future	0.5	1.E-06
Child Resident*- Future	**1025**	**4.E-03**
Adult Resident*- Future	**301**	
	Exposure Area 3	
Adolescent Trespasser- Current/Future	0.0008	3.E-07
Adult Trespasser- Current/Future	0.003	1.E-07
Outdoor Worker- Future	**48**	2.E-06
Indoor Worker- Future	0.008	**4.E-04**
Construction/Utility Worker- Future	0.00007	4.E-07
Child Resident*- Future	**1023**	**4.E-03**
Adult Resident*- Future	**301**	

Footnotes:
(*): Total cancer **r**isk estimates for the child/adult resident reflects RME lifetime exposure assumptions (26 years); values derived by summing cancer risk from childhood exposure (0-6 year-old) to those of adult exposure (20 years).
Bolded & underlined values: reflect risk/hazard estimates that exceed EPA's threshold criteria (i.e., ELCR >10^{-4} or HI>1).

Noncancer hazard estimates for the future child resident in Area 1 (HI=4) and Area 2 (HI=2), exceeded EPA's hazard threshold value of 1. The noncancer hazard of 4 for the child resident in Area 1 was primarily due to the presence of 1,2,3-trichlorobenzene and thallium in surface soil. As presented in the Final Human Health Risk Assessment Report, dated 2015, thallium concentrations in Area 1 surface soils are similar to background concentrations, hence thallium was excluded as a site-related contaminant of concern (COC). Although the total noncancer HI for a future residential child in Area 2 was equal to 2, it did not exceed 1 when the hazards were separated by the critical target organ effect. To sum up, 1,2,3-trichlorobenzene was identified as the only COC in surface soil posing an unacceptable risk under a residential scenario.

Risk Estimates- Surface and Subsurface Soil (0-10 ft bgs)

Total lifetime cancer risks and noncancer hazards were evaluated for future construction/utility workers who may encounter contaminants in the first 10 feet of soil present in Areas 1, 2 and 3. Results of the HHRA indicated the cancer and hazard risk estimates of 4×10^{-7} and 0.4, respectively, did not exceed EPA's threshold criteria. Although the risks and hazards associated with soil exposure under a commercial use are within or below EPA's acceptable values, the soil concentrations of several compounds are above the concentrations that are associated with an adverse impact to groundwater; thus, there is a need to address the soil through a remedial action.

Risk Estimates- Groundwater (including potential shallow groundwater exposures)

Total lifetime cancer risks and noncancer hazards based on exposure to groundwater beneath the Site were calculated for the future timeframe only since all potential receptor populations are currently connected to the local public water supply. Populations of interest included the on-site adult/child resident, adult indoor and adult outdoor worker exposed to site-wide groundwater through potable uses (e.g., drinking, hand-washing, bathing, etc.). Exposure to shallow groundwater by an adult construction/utility worker conducting maintenance or upgrades to utility/sewer lines in the three exposure areas at the Site was also considered. The numeric risk results, as documented in the 2015 HHRA for the Site, are presented in Table 2.

Cancer risk and noncancer hazard estimates associated with future potable use of groundwater from within the Site contaminant plume exceeded EPA's benchmark values. Inhalation of volatiles during showering represented more than 50% of the total risks, with ingestion and dermal risks contributing the remainder of the risks. The COCs contributing the largest portion of the estimated cancer risk for residents were: benzene (1.4 X 10^{-3}), 1,4-dichlorobenzene (1 X 10^{-3}), vinyl chloride (7.5 X 10^{-4}), arsenic (5.6 X 10^{-4}), 1,2 dichloroethane (2.8 X 10^{-4}), and 1,1,2,2-tetrachloroethane (6 X 10^{-5}). The COCs based on the noncancer HI were: 1,2,4-trichlorobenzene (527), copper (85), chlorobenzene (74), thallium (51), zinc (48), benzene (36), iron (31), 1,2,3-trichlorobenzene (25), 1,2-dichloropropane (12), 1,2-dichloroethane (8.3), xylenes, total (8.3), cis 1,2-DCE (7), cadmium (7), o-xylene (6.8), naphthalene (6.8), 1,1,2-trichloroethane (6.7), 1,2- dichlorobenzene (6), toluene (5.5), vanadium (6.4), arsenic (5.4), methylene chloride (5.3), mercury (5.2), aniline (4), aluminum (3.5), vinyl chloride (2), antimony (1.4), ethylbenzene (1.3), and 1,3-dichlorobenzene (1.3), trans-1,2-DCE (1.2), 1,4-dichlorobenzene (1.1).

Table 2:
Groundwater Exposures-
Total Lifetime Noncancer Hazard and Cancer Risk Estimates

Receptor Population- Timeframe	**Total Lifetime Risk Estimates** Total Hazard Index (HI)	Excess Lifetime Cancer Risk (ELCR)
	Sitewide Groundwater	
Outdoor Worker- Future	**48**	**4E-04**
Indoor Worker- Future	**48**	**4E-04**
Child Resident*- Future	**1023**	**4.E-03**
Adult Resident*- Future	**301**	
	Exposure Area 1	
Construction/Utility Worker- Future	**230**	**1E-03**
	Exposure Area 2	
Construction/Utility Worker- Future	1	6E-07
	Exposure Area 3	
Construction/Utility Worker- Future	0.00007	6E-10

Footnotes:
(*****): Total cancer risk estimates for the child/adult resident reflects RME lifetime exposure assumptions (26 years); values derived by summing cancer risk from childhood exposure (0-6 year-old) with those from adult exposure (20 years).
Bolded & underlined values: reflect risk/hazard estimates that exceed EPA's threshold criteria (i.e., ELCR >10^{-4} or HI>1).

Additionally, cancer and noncancer hazard estimates for the future utility worker in Area 1 exceeded EPA's benchmark values based on inhalation of vapors released from shallow groundwater during excavation activities. Benzene was identified as the predominant contributor to cancer risk (1 X 10^{-3}), while the largest contributors to the noncancer HI were benzene (140), chlorobenzene (45), xylenes (16), 1,2,4-trichlorobenzene (11), vinyl chloride (7.1), toluene (5.1), and 1,4-dichlorobenzene (1.5).

Risk Estimates- Potential for Vapor Intrusion

The potential for vapor intrusion (VI) from subsurface sources into indoor air was evaluated in the HHRA since groundwater and soils at the Site are known to contain volatile organic compounds (VOCs). Currently a vacant building is present on the former CPS Facility property and occupied manufacturing buildings are present on the Madison property.

The vapor intrusion pathway was quantitatively and qualitatively evaluated using EPA developed vapor intrusion screening values for various media (groundwater, soil vapor, and indoor air) sampled at the Site. Results of the assessment found that potential exposure to site-related volatiles (e.g., benzene, chloroform, ethylbenzene, and tetrachloroethylene) in on-site buildings at the former CPS facility is a potentially complete exposure pathway for the future timeframe. Based on these findings, if the buildings were to be occupied in the future, or new buildings were to be constructed on Site, they would be subject to a VI investigation.

Screening Level Ecological Risk Assessment

In 2015, the responsible parties completed a Screening Level Ecological Risk Assessment (SLERA), to determine if Site contaminants had the potential to affect ecological receptors in the OU1 and OU2 areas. The SLERA concluded the following:

- There were no completed exposure pathways in Areas 1 and 2 on the CPS property due to absence of habitat;

- Risk due to ecological receptor exposure to soils in Area 3 is negligible based on the screening level exposure estimate; and
- Risk due to ecological receptor exposure to CPS related contaminants in groundwater are negligible based on concentrations found in groundwater discharge locations.

Overall the SLERA did not identify any unacceptable risks to ecological receptors exposed to Site contaminants in environmental media in the OU1 and OU2 areas.

It is the EPA's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from the Site which may present an imminent and substantial endangerment to the public health or welfare.

REMEDIAL ACTION OBJECTIVES

The following remedial action objectives (RAOs) for contaminated media address the human health and ecological risks at the Site:

OU1 – Groundwater

The RAOs identified for the remedial alternatives for OU1 groundwater contamination are:

- Prevent exposure to groundwater contaminated by site-related contaminants.

- Prevent the potential for further migration of site-related contaminants.

- Restore groundwater impacted by Site contaminants to applicable State and Federal standards within a reasonable time frame.

- Prevent/Minimize contaminated groundwater from serving as a source of current and future vapor intrusion.

OU2 – CPS Source Soils

The RAOs identified for the remedial alternatives for OU2 are:

- Mitigate the on-going sources of CPS site-related contaminants to groundwater.

- Prevent exposure to soils contaminated by CPS site-related contaminants.

- Prevent/Minimize contaminated soil from serving as a source of current and future vapor intrusion.

Achieving the RAOs relies on the remedial alternatives' ability to meet final remediation goals/cleanup levels derived from Preliminary Remediation Goals (PRGs), which are based on such factors as Applicable or Relevant and Appropriate Requirements (ARARs), risk, and background. EPA and NJDEP have promulgated maximum contaminant levels (MCLs) and NJDEP has promulgated groundwater quality standards (GWQSs) which are enforceable, health-based, protective standards for various drinking water contaminants. In this Proposed Plan, EPA selected the more stringent of the MCLs and GWQSs as the preliminary remediation goals (PRGs) for COCs in Site groundwater. EPA used the more stringent of the NJDEP nonresidential direct contact soil remediation standards and the NJDEP impact to groundwater soil screening levels as the PRGs for the unsaturated soils.

The Lists of PRGS for groundwater and soil may be found in Tables 3 and 4 respectively. PRGs may be further modified through the evaluation of alternatives and are used to select the clean-up goals in the Record of Decision.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected remedy be protective of human health and the environment, be cost effective, comply with ARARs unless a waiver can be justified, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

Potential technologies applicable to groundwater and soil remediation were identified and screened by effectiveness, implementability, and cost criteria, with emphasis on effectiveness. Those technologies that passed the initial screening were then assembled into remedial alternatives.

For the soil alternatives, the proposed depths of remediation are based on the soil boring data taken during the RI. These depths were used to estimate the quantity of soil to be addressed and the associated costs. The actual depths and quantity of soil to be addressed will be finalized during design and implementation of the selected remedy. Full descriptions of each alternative can be found in the FS which is part of the Administrative Record.

The time frames below are for construction and do not include the time to negotiate with the responsible parties, design a remedy or the time to procure necessary contracts. Five-year reviews will be conducted as a component of the alternatives that would leave contamination in place above levels that allow for unlimited use and unrestricted exposure.

For all groundwater and soil alternatives, the present worth cost includes the periodic present worth cost of five-year reviews.

Groundwater Alternatives:

Common Elements for Groundwater

Each groundwater alternative contains the following elements:

- Groundwater performance monitoring.
- Long Term Monitoring (LTM) of the low level organic plume between the groundwater control remedy selected and the Perth Amboy wells.
- Institutional controls (i.e., CEA/WRA).

The groundwater alternatives assume NJDEP's IEC program will address 1,4-dioxane near the Perth Amboy wells as an integral part of the overall protectiveness of the Site's remedial program. EPA and NJDEP will monitor the progress of this action to ensure that this contamination is mitigated.

In order to reduce the number of alternatives and simplify the process of selecting them, EPA has grouped the groundwater alternatives into alternatives that address organic contaminants (1A, 2A, and 3A), and alternatives that address metal contaminants (1B, 2B, and 3B). One alternative will be selected from each group.

Organic Alternative 1A - No Action

Capital Cost:	*$0*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$0*
Construction Timeframe:	*0 years*

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the organic contamination in groundwater at the CPS/Madison Site. Additionally, the existing CPS IRM pump and treatment system would be shut down.

Organic Alternative 2A – Upgraded CPS Site IRM Pump and Treat System with LTM

Capital Cost:	*$8,008,000*
Annual O&M Cost:	*$401,000*
Present Worth Cost:	*$10,573,000*
Construction Time Frame:	*19-22 months*

Alternative 2A involves upgrading the existing CPS IRM pump and treatment system with additional recovery well(s) to fully capture the migration of organic contaminants from the source areas, and additional treatment to address 1,4-dioxane.

Alternative 2A consists of the following elements:

- A Groundwater Treatment Plant (GWTP) treatability study would be performed to evaluate and design the treatment process train.
- The CPS IRM recovery well system would be expanded to fully cover the 1,4-dioxane source area (one additional well is assumed for cost estimating purposes).
- The existing three IRM wells would be relocated further downgradient of the source area to accommodate implementation of the OU2 source soil remedial alternative.
- A new GWTP will be constructed to meet the new project requirements which would include treatment of 1,4-dioxane. The new treatment system would address 1,4-dioxane using chemical oxidation or adsorptive media and to

ensure that the discharge limit is achieved consistently. The existing GWTP would remain in service until the new GWTP is fully operational and tested.

- The treated effluent would continue to be discharged to the current on-site surface water location.
- A LTM program would ensure that the IRM will continue to reduce concentrations in the downgradient plume until remediation goals are achieved.

The CPS Site CEA/WRA would be maintained as an institutional control under this alternative.

Organic Alternative 3A – In-Situ Chemical Oxidation Permeable Reactive Barrier with LTM

Capital Cost:	*$3,828,000*
Annual O&M Cost:	*$283,000*
Present Worth Cost:	*$5,589,000*
Construction Time Frame:	*7-8 months*

Alternative 3A involves placement of a series of closely spaced wells forming a permeable reactive barrier perpendicular to the groundwater flow, and downgradient of the organic contaminant source areas located on the CPS property. These wells would continuously inject an oxidant (ozone or peroxide) into the subsurface, which will destroy dissolved-phase organic contaminants that pass through the oxidant.

Alternative 3A consists of the following remedial activities:

- Treatability study and pilot testing of the ISCO Permeable Reactive Barrier (PRB) to ensure remediation can be achieved.
- Installation and operation of an ISCO PRB well system.
- Installation of groundwater and vadose zone monitoring systems.
- Continued operation of the existing CPS IRM until the PRB system proves it can achieve remediation goals.
- A LTM program will ensure that the PRB continues to reduce concentrations in the downgradient plume until remediation goals are achieved.

Metals Alternative 1B – No Action

Capital Cost:	*$0*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$0*
Construction Timeframe:	*0 months*

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the organic contamination in groundwater at the Site. Under this alternative the Madison IRM would be shut down.

Metals Alternative 2B –Continued Operation of the Madison IRM

Capital Cost:	*$0*
Annual O&M:	*$1,344,000*
Present Worth Cost:	*$12,183,000*
Construction Timeframe:	*0 months*

Alternative 2B involves continued operation of the Madison IRM wells. The Madison IRM wells have been in operation since 1991 and have effectively reduced and controlled the metal contaminant plume over time. It is anticipated that once Madison completes the OU3 RI/FS and addresses the source areas on its property, the IRM may no longer be required.

Metals Alternative 3B – Permeable Reactive Barrier

Capital Cost:	*$2,661,000*
Annual O&M:	*$153,000*
Present Worth Cost:	*$3,355,000*
Construction Timeframe:	*4-5 months*

Alternative 3B involves placing a PRB downgradient of the Madison source areas to precipitate out metal contaminants (lead, cadmium, copper and zinc) in groundwater as they pass through the barrier. The barrier would need to be placed at a depth of approximately 30 feet. Zero valent iron and apatite are two possible reactants that will require treatability testing to determine their viability.

Soil Alternatives:

Common Elements for Soil Alternatives

Each soil alternative contains the following elements:

- Institutional controls in the form of a deed

notice restricting the future use of the CPS property to prohibit residential use.
- Groundwater and soil sampling to verify that performance goals are achieved.
- All soil alternatives would meet substantive requirements for flood zones and wetlands.

Alternative 1 – No Action

Capital Cost:	*$0*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$0*
Timeframe:	*0 years*

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the contaminated soil on the CPS property.

Alternative 2 – Capping

Capital Cost:	*$1,565,000*
Annual O&M Cost:	*$73,000*
Present Worth Cost:	*$1,846,000*
Construction Timeframe:	*6-8 months*

Alternative 2 consists of construction of a low-permeability cap of approximately 56,000 square feet to protect against direct contact hazards to human health and to reduce, to the extent possible, storm water infiltration through the unsaturated source soils that would impact the groundwater. The cap does not treat or destroy the contaminants, it eliminates the pathways to human exposure. Long-term monitoring and maintenance is essential to maintain the integrity of this engineering control.

Alternative 3 – Excavation, Ex-situ Soil Vapor Extraction, and In-situ Chemical Oxidation

Capital Cost:	*$11,338,000*
Annual O&M Cost:	*$2,100*
Present Worth Cost:	*$10,684,000*
Construction Timeframe:	*40-41 months*

Alternative 3 employs excavation and on-site ex-situ soil vapor extraction (SVE) of contaminated soils accessible to excavation, and in-situ chemical oxidation for contaminated source soils inaccessible to excavation (i.e., adjacent/beneath the sewer line). Excavated areas would be backfilled with treated soils. Due to excavation below the water table, this alternative would employ steel sheeting (for sidewall support and groundwater infiltration control) and includes a dewatering and treatment system. This alternative would provide immediate removal of contaminated soil in the source area that presents contact hazards and would reduce contaminant concentrations that impact groundwater. An active groundwater remedy for organics (2A or 3A) must be in place before this alternative can be implemented.

Alternative 4 – Excavation, Off-site Disposal, and In-situ Chemical Oxidation

Capital Cost:	*$13,975,000*
Annual O&M Cost:	*$2,100*
Present Worth Cost:	*$14,004,000*
Construction Timeframe:	*12-15 months*

Alternative 4 employs excavation and off-site disposal of contaminated soils accessible to excavation, backfill of excavated areas with certified clean fill, and in-situ chemical oxidation for contaminated source soils not accessible to excavation. Due to excavation below the water table, this alternative would employ steel sheeting (for sidewall support and groundwater infiltration control) and includes a dewatering and water treatment system. This alternative would provide immediate removal of contaminated soil in the source area that presents a contact hazard and would reduce contaminants that impact groundwater. An active groundwater remedy (2A or 3A) must be in place before this alternative can be implemented.

Alternative 5 – In-Situ Chemical Oxidation with limited excavation

Capital Cost:	$4,507,000
Annual O&M:	$2,100
Present Worth Cost:	$4,536,000
Construction Timeframe:	14-16 months

Alternative 5 uses chemical oxidants (such as peroxide, Fenton's Reagent, persulfate) to destroy contaminants by converting them into simple molecules such as carbon dioxide and water. The critical aspect of ISCO is to achieve contact between the oxidant and the contaminant. This alternative would address the adsorbed mass in the source soils, particularly in the discontinuous low permeability layer within the OU2 boundaries by in-situ mixing of the soil while injecting oxidant to achieve contact with the contaminants. The soil contaminated with 1,4-dioxane from the Repackaging Area would be excavated and placed in the Tank Farm Area to undergo treatment with those soils. An active groundwater remedy (2A or 3A) must be in place before this alternative can be implemented.

EVALUATION OF ALTERNATIVES

The NCP lists nine criteria for evaluation and comparison of remedial alternatives. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, and how each of the alternatives compares to the other options under consideration. Seven of the nine evaluation criteria are discussed below. The final two criteria, "State Acceptance" and "Community Acceptance" are discussed at the end of the document. A more detailed analysis of each of the alternatives is presented in the FS report.

Evaluation of Groundwater Alternatives for Organic Contaminants

1. Overall Protection of Human Health and the Environment

Alternative 1A, No Action, would not be protective of human health or the environment since it does not include measures to prevent exposure to contaminated groundwater. Because the "no action" alternative is not protective of human health and the environment it was eliminated from consideration under the remaining criteria.

Alternatives 2A and 3A would protect human health by preventing off-site migration of organic contaminants and maintaining the institutional controls (CEA and WRA) that are already in place.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Actions taken at any Superfund site must meet all applicable or relevant and appropriate requirements under federal and state laws or provide grounds for invoking a waiver of those requirements.

Alternatives 2A and 3A are both expected to meet NJGWQS and MCLs (which are chemical specific ARARs) for organic contaminants in groundwater migrating from the source areas. The downgradient plume will be monitored to ensure it meets NJGWQS and MCLs through attenuation over time. Any concentrations above NJGWQS and MCLs will be addressed by the IEC actions overseen by NJDEP. Both alternatives will meet action and location specific ARARs.

3. Long-Term Effectiveness and Permanence

Alternatives 2A and 3A would provide long-term effectiveness and permanent protection to human receptors, provided the remedies are maintained. Alternative 3A will require a treatability study to determine which reactants are most effective and if all the chemical specific objectives can be achieved. Alternative 2A would require regular oversight to maintain pumping wells and the treatment plant. While Alternative 3A would also require regular oversight, it would require less equipment maintenance than 2A because it does not require extraction, treatment and discharge to groundwater.

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

Alternative 2A reduces the toxicity and volume of groundwater contaminants by treatment and removal. Treated water may be reintroduced to the ground if it meets discharge standards. Alternative 3A would reduce the groundwater contaminant toxicity and volume by in-situ treatment as contaminants pass through the reactive barrier.

5. Short-Term Effectiveness

Although the estimated time to construct Alternative 2A is expected to be longer than 3A, both alternatives would be protective in the short-term. The CPS IRM wells, which have reduced and controlled the majority of the contaminant plume, would remain in operation until the selected remedy is ready to be turned on. Both alternatives would present risks to on-site workers due to handling caustic chemicals, but the risks can be easily controlled with sound engineering practices. For both alternatives, risks to the community and environment are negligible because the IRM wells would be operating until a new remedy is constructed.

6. Implementability

While Alternative 2A is an augmented version of what is already in place, it would require more infrastructure and O&M than 3A because it involves extraction and reinjection, as well as treatment. For this reason

Alternative 2A would also require more time to construct than 3A. Both remedies are technically and administratively feasible. Alternative 3A has fewer reporting requirements. Both are implementable and require materials and equipment that are readily available.

7. Cost

The total estimated present worth costs are:

- Alternative 1A - $0.
- Alternative 2A - $10,573,000.
- Alternative 3A - $5,589,000.

Evaluation of Groundwater Alternatives for Metal Contaminants

1. Overall Protection of Human Health and the Environment

Alternative 1B, No Action, would not be protective of human health since it does not include measures to prevent exposure to contaminated groundwater. Because the “no action’ alternative is not protective of human health and the environment it was eliminated from further consideration.

Alternatives 2B and 3B would both protect human health by preventing off-site migration of inorganic contaminants and maintaining the institutional controls (CEA and WRA) that are already in place.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Actions taken at any Superfund site must meet all applicable or relevant and appropriate requirements under federal and state laws or provide grounds for invoking a waiver of those requirements.

Alternative 2B has already demonstrated that it controls the migration of metals contamination in groundwater from the source areas, and therefore will meet chemical specific ARARs such as NJGWQS and MCLs. Alternative 3B is expected to capture metals contamination migrating from the source areas, but would require treatability testing to ensure complete capture of all the chemicals of concern. With both alternatives, remedial action objectives would be met in groundwater downgradient of the treatment system through attenuation. Both remedies would meet both action and location specific ARARs.

3. Long-Term Effectiveness and Permanence

Alternative 2B is already in place and would provide long-term effectiveness and permanent protection to human and ecological receptors. Alternative 3B would require a treatability study to determine which reactants are most effective and if all the chemical specific objectives can be achieved. Alternative 2B would require regular oversight to maintain pumping wells and the treatment plant. Alternative 3B may require change out of reactive media over time to remain effective. Alternative 3B may be slightly less permanent because the contaminants remain trapped in the media of the barrier wall and could potentially desorb under changing conditions. This concern could be mitigated by removal of the media when NJGWQS and MCLs are achieved. Both alternatives require technically feasible maintenance tasks.

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

Alternative 2B reduces the volume of groundwater contaminants by treatment and removal in a treatment plant. Alternative 3B would reduce the groundwater contaminant mobility by capture of the contaminants as the groundwater passes through the barrier.

5. Short-Term Effectiveness

Both Alternatives would be protective in the short-term. Alternative 2B is already in place and functioning, and therefore presents no short-term risks to on-site workers, the community, or the environment. Alternative 3B would require 4 - 5 months to construct. During that time the Madison IRM wells, which have reduced and controlled the contaminant plume, would remain in operation until Alternative 3B is functional. Risk to on-site workers would be posed by construction tools and equipment, but these risks are easily controlled by sound engineering practices.

6. Implementability

Both alternatives are implementable. Alternative 2B has been constructed and requires only maintenance. Alternative 3B would require construction materials and equipment that are readily available. If combined with organic Alternative 3A, the choice of reactants for Alternative 3B would be limited by compatibility with the upgradient alternative. This would require sequencing of the treatability testing and add to the implementation time for Alternative 3B.

7. Cost

The total estimated present worth costs calculated using a discount rate of 7 percent are:

- Alternative 1B - $0.
- Alternative 2B - $12,183,000.
- Alternative 3B - $3,355,000.

Evaluation of Soil Alternatives

1. Overall Protection of Human Health and the Environment

Alternative 1 is not protective of human health or the environment because no action would be taken to address soil contamination. Because the “no action’ alternative is not protective of human health and the environment it was eliminated from further consideration under the remaining eight criteria.

Alternative 2 would use capping and institutional controls to protect human health by eliminating contact with the contaminated soil. However, this alternative would not effectively mitigate the sources of organic contamination to the groundwater below the water table.

Alternatives 3, 4, and 5 would protect human health and the environment by treating the soil contaminants that pose a contact risk, and act as a source of groundwater contamination.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Alternative 2 would quickly mitigate soil contact pathways. However, soil contamination below the water table that acts as a groundwater source would require a long period of time before groundwater ARARs could be achieved, and the groundwater remedies shut down.

Alternatives 3, 4, and 5 will all meet soil remediation goals by removing or treating the organic contaminants. All the alternatives will comply with action specific ARARs, and all except Alternative 1 will need to meet substantive requirements of location-specific ARARs for flood hazard areas and wetlands.

3. Long-Term Effectiveness and Permanence

Alternatives 3, 4, and 5, all achieve a similar high degree of long-term effectiveness and permanence by either removal or destruction of the on-site soil contamination. Each of these alternatives would require bench testing for the ISCO portion of the alternatives.

Alternative 2 has a lesser degree of long-term effectiveness and permanence than Alternatives 3,4, and 5 because the organic contaminants would remain on-site and the cap would require maintenance for the foreseeable future.

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

Alternative 2 reduces mobility of the contaminants above the water table by capping but does not reduce toxicity or volume. Contaminants below the water table will still act a source of groundwater, prolonging the time the groundwater remedies would be required to function.

Alternatives 3 and 5 use treatment exclusively to reduce contaminant toxicity and volume.

Alternative 4 relies on removal and off-site disposal and does not reduce toxicity or volume for most of the contaminant mass. However, ISCO treatment would be used to reduce contaminant toxicity and volume in any area not accessible to excavation.

5. Short-Term Effectiveness

Alternative 2 presents very minimal short-term risks to the community and site workers or the environment because none of the contaminated soil is disturbed during placement of the cap.

Alternatives 3 and 4 involve excavation and thus have potential for short-term adverse effects. Potential risks posed to site workers, the community and the environment during implementation of each of the soil alternatives could be due to wind-blown or surface water transport of contaminated soil. Any potential impacts associated with dust and runoff would be minimized through proper installation and implementation of dust and erosion control measures. The areas would be monitored throughout the construction of the ISCO system.

Alternative 5 employs in-situ mixing during ISCO injections and only involves a minor amount of open excavation, which should minimize dust.

Alternatives 3, 4, and 5 all involve use of ISCO chemicals which can be caustic. These hazards can be controlled with proper handling and protective clothing.

6. Implementability

Alternative 2, capping, has the least technical challenges and would be easily implemented.

Alternatives 3 and 4 require excavation, sheet piling, dewatering, water treatment, and discharge of the effluent, which are technically more complex, but still employ readily available equipment and expertise.

Alternative 5 is more implementable compared to Alternatives 3 and 4 because it involves less excavation than Alternatives 3 and 4. In-situ ISCO injection and mixing of soil also employs less infrastructure and would pose fewer technical complexities compared to Alternatives 3 and 4.

Materials for all the alternatives are readily available.

7. Cost

The total estimated present worth costs calculated using a discount rate of 7 percent are:

- Alternative 1 - $0.
- Alternative 2 - $1,846,000.
- Alternative 3 - $10,684,000.
- Alternative 4 - $14,004,000.
- Alternative 5 - $4,536,000.

PREFERRED ALTERNATIVE

The preferred groundwater alternatives for the cleanup of the Site are 3A – ISCO Permeable Reactive Barrier, and 2B – Continued Operation of the Madison IRM. For the on-site soil at the CPS property, the preferred alternative is Alternative 5 – In-Situ Chemical Oxidation with limited excavation. Together, these three elements comprise EPA's preferred alternative.

Groundwater:
The preferred alternative for organic contaminants in groundwater (OU1), Alternative 3A, includes the following remedial activities:

- Treatability study and pilot testing to ensure remediation goals for the organic site contaminants will be achieved.
- Installation and operation of an ISCO PRB well system.
- Installation and operation of groundwater and vadose zone monitoring systems.
- Continued operation of the existing CPS IRM until the PRB system is proven.
- LTM to monitor the low level organic plume between the PRB and the Perth Amboy wells.
- Institutional controls (i.e., CEA/WRA).

The preferred alternative for organics in groundwater was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction by substantially reducing contaminant levels in the groundwater as they begin to migrate off the CPS property and before reaching the Perth Amboy wellfield. The preferred alternative for organics in groundwater reduces risk by destroying organic contaminants leaving the CPS property, at a lower cost compared to the other active alternative (2A), and should be reliable over the long-term.

Because Alternative 3A still needs to be proven under Site conditions, Alternative 2A, Upgraded CPS Site IRM Pump and Treat System, will be selected as the contingency remedy should the groundwater monitoring show that the effluent of the ISCO Barrier is not achieving NJGWQS and MCLs. Although the cost of Alternative 2A is higher, and requires groundwater discharge, it is a proven technology and would be protective.

The preferred alternative for metal contaminants in groundwater, Alternative 2B, includes the following remedial activities:

- Continued operation of the Madison IRM wells.
- Groundwater monitoring.
- Institutional controls (i.e., CEA/WRA).

The preferred alternative for metals in groundwater was selected over other alternatives because it is in place and has been proven effective. It is expected to control the metals contamination coming from the Site, until the sources on the Madison site are removed by a remedy to be selected for OU3. While Alternative 3B is potentially viable, it was not chosen due to potential compatibility issues with the upgradient alternatives for organic contaminants.

Soil:
The preferred alternative for OU2 soil is Alternative 5, in-situ chemical oxidation with limited excavation. The major components of the preferred soil alternative include:

- Excavation of soils contaminated with 1,4-dioxane from the Repackaging Area and placement in the Tank Farm Area for treatment.
- In-situ chemical oxidation.
- In-situ soil mixing in accessible areas (~20,000 cubic yards).
- In-situ injection in inaccessible areas (~ 1,500 cubic yards).
- Post-Remediation Monitoring.
- Institutional Controls.

This alternative would use in-situ chemical oxidation to break down organic chemicals to carbon dioxide and water. By this method, organic chemicals in the soil that contribute to groundwater contamination will be permanently removed.

The preferred alternative for soil was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction through chemical treatment, and is expected to allow the Site to be used for its reasonably anticipated future land use, which is commercial. The preferred soil alternative reduces the risk within 16 months, at a cost comparable to other alternatives and should be reliable over the long-term.

Though the preferred remedy for soil would be protective, it would not achieve levels that would allow for unrestricted use. Therefore, institutional controls, such as deed notices restricting the future use of the CPS property, would be required. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Based on information currently available, the lead agency believes the preferred alternatives meet the threshold criteria and provide the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. EPA expects the preferred alternatives to satisfy the following statutory requirements of section 121(b) of CERCLA: (1) be protective of human health and the environment; (2) be cost-effective; (3) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (4) satisfy the preference for treatment as a principle element, or explain why the preference for treatment will not be met. Section 121(b) of CERCLA further specifies that an action must comply with ARARs unless a waiver can be justified.

The total present worth cost for the groundwater and soil preferred alternatives is $22,308,000.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of a selected remedy.

State Acceptance

The State of New Jersey concurs with the preferred alternatives for site-wide groundwater (OU1), and soil on the CPS property (OU2).

Community Acceptance

Community acceptance of the preferred alternatives will be evaluated after the public comment period ends and will be described in the Record of Decision. Based on public comment, the preferred alternatives could be modified from the version presented in this proposed plan. The Record of Decision is the document that formalizes the selection of the remedy for a site.

COMMUNITY PARTICIPATION

EPA provided information regarding the cleanup of the Site through meetings, the Administrative Record file for the Site and announcements published in the local newspaper. EPA encourages the public to gain a more comprehensive understanding of the Site and the RI activities that have been conducted there.

The dates for the public comment period, the date, location and time of the public meeting, and the locations of the Administrative Record file are provided on the front page of this Proposed Plan.

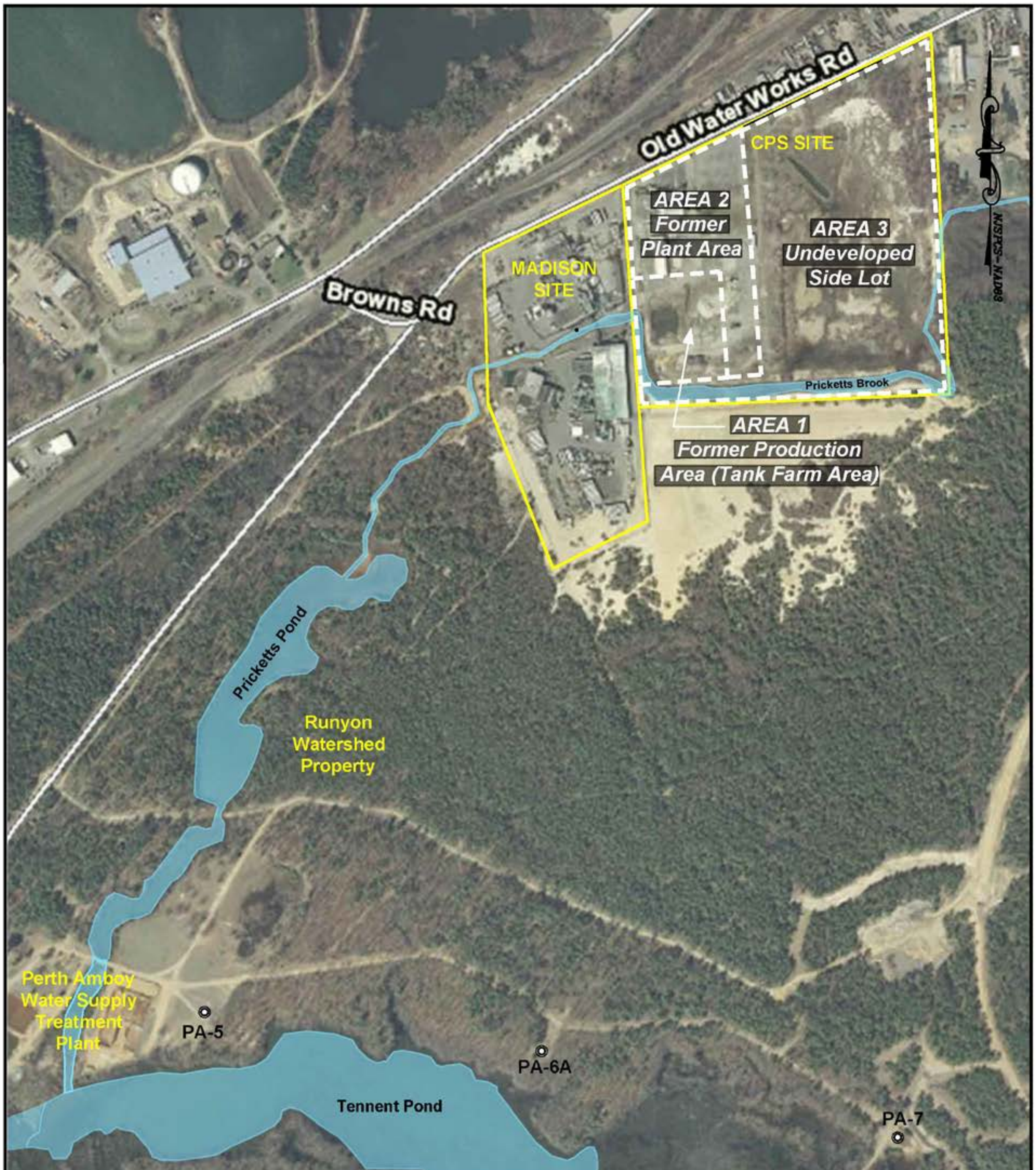
For further information on EPA's preferred alternative for the Site contact:

John Osolin
Remedial Project Manager
Osolin.John@epa.gov
(212) 637-4412

Pat Seppi
Community Involvement Coordinator
Seppi.Pat@epa.gov
(646) 369-0068

U.S. EPA
290 Broadway 19th Floor
New York, New York 10007-1866

On the Web at:
https://www.epa.gov/superfund/cps-madison



Legend:

- CPS Site Soil Exposure Areas
- Site Boundaries
- Water Supply Well

0 250 500

APPROXIMATE SCALE (FEET)

Figure 1
Site Map with Soil Exposure Areas

CPS/Madison Superfund Site
Old Bridge Twp., Middlesex County, NJ

CAD FILE: CPS-FS-01R-10-2018.DWG | DATE: 10/5/2018

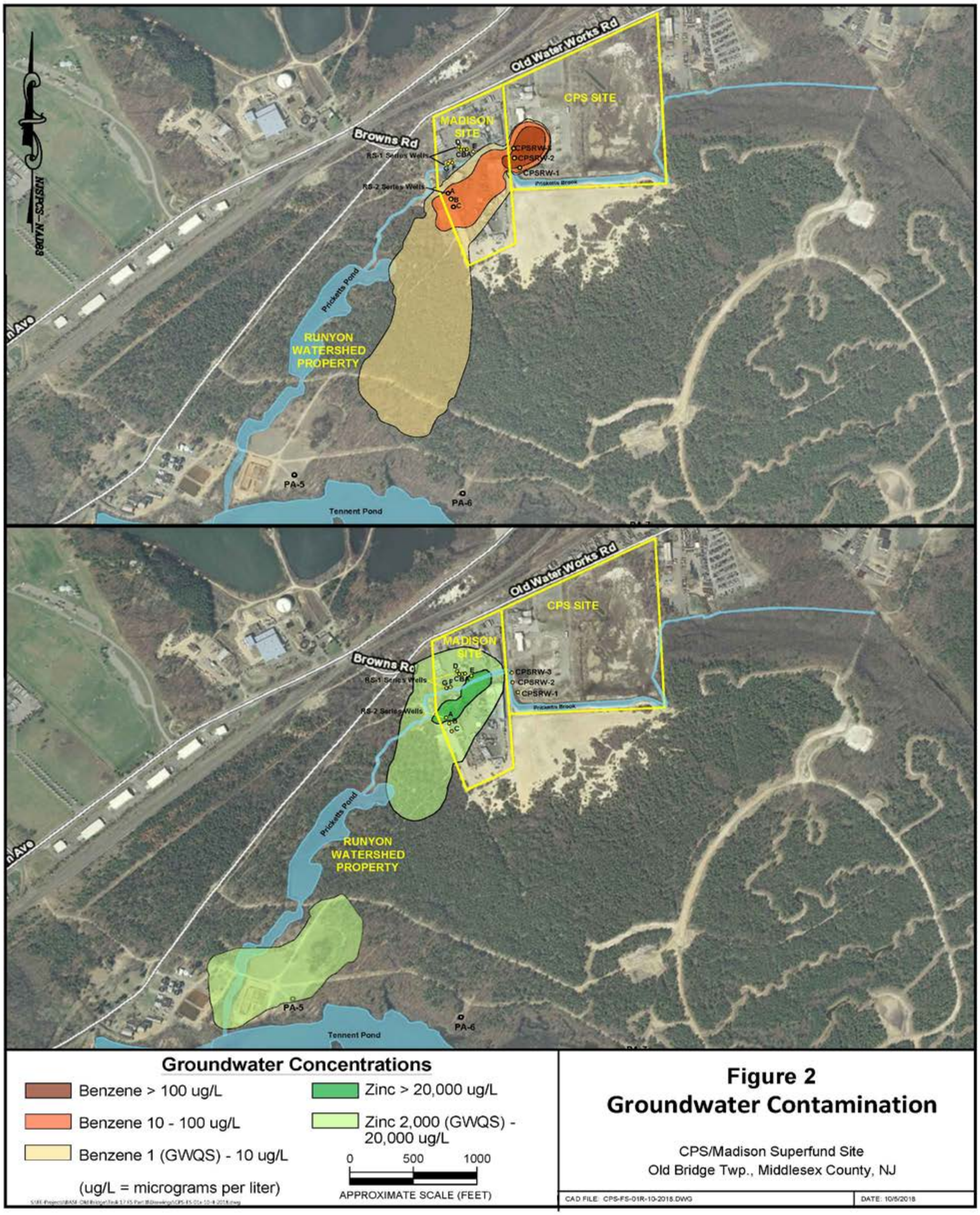


Figure 2
Groundwater Contamination

CPS/Madison Superfund Site
Old Bridge Twp., Middlesex County, NJ

CAD FILE: CPS-FS-01R-10-2018.DWG | DATE: 10/5/2018

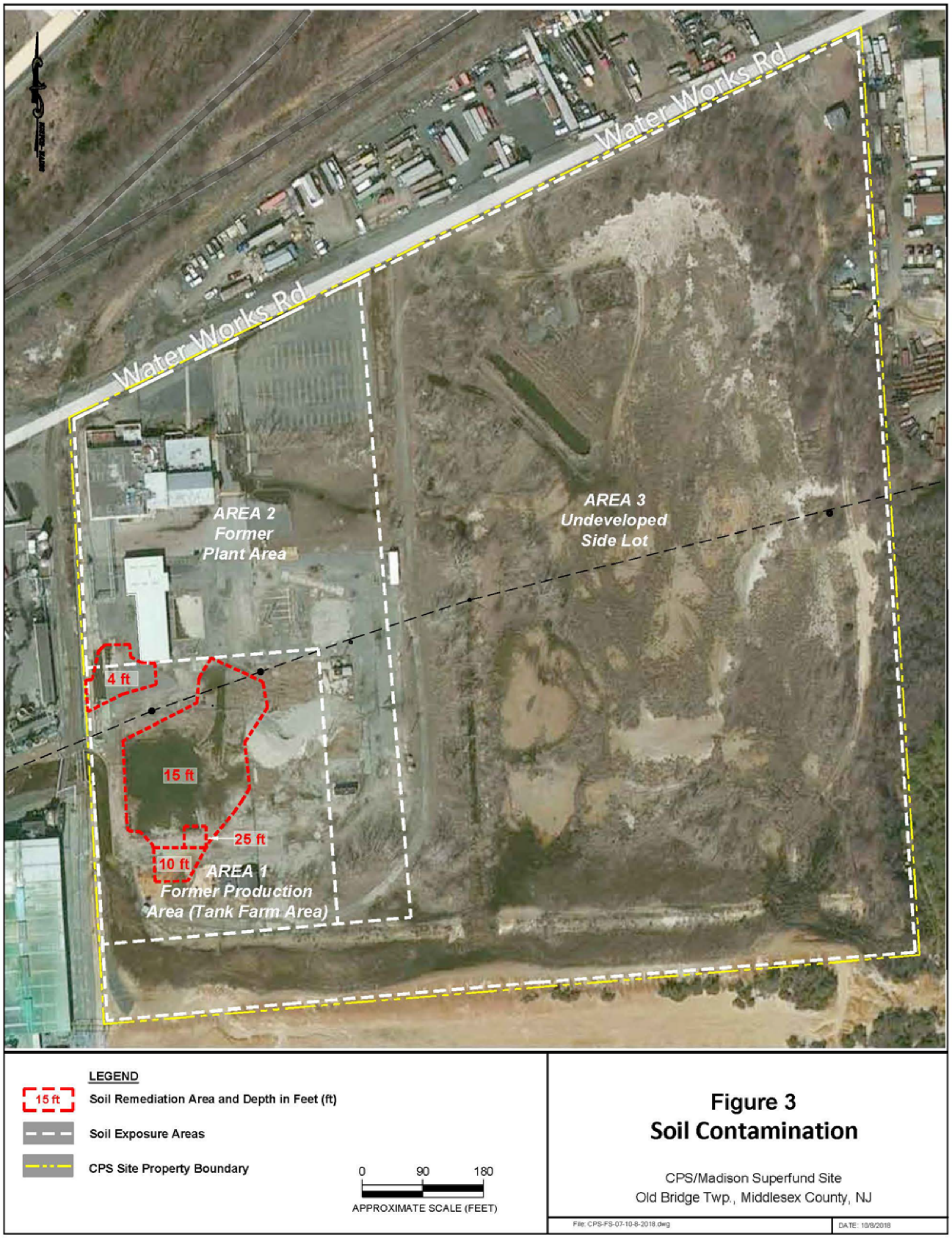

Water Works Rd
Water Works Rd
AREA 2
Former
Plant Area
AREA 3
Undeveloped
Side Lot
4 ft
15 ft
25 ft
10 ft
AREA 1
Former Production
Area (Tank Farm Area)
LEGEND
15 ft Soil Remediation Area and Depth in Feet (ft)
Soil Exposure Areas
CPS Site Property Boundary
0 90 180
APPROXIMATE SCALE (FEET)
Figure 3
Soil Contamination
CPS/Madison Superfund Site
Old Bridge Twp., Middlesex County, NJ
File: CPS-FS-07-10-8-2018.dwg
DATE: 10/8/2018

Table 3 - Preliminary Remediation Goals for Groundwater Contaminants

	State GW Quality Criteria (ppb)	State MCLs (ppb)	Federal MCLS (ppb)	**Preliminary GW Remediation Goals (ppb)***
Organic Contaminants				
aniline	6			**6**
benzene	1	1	5	**1**
chlorobenzene	50	50	100	**50**
1,2-dichlorobenzene	600	600	600	**600**
1,3-dichlorobenzene	600	600		**600**
1,4-dichlorobenzene	75		75	**75**
cis-1,2-dichloroethene	70		70	**70**
trans-1,2-DCE	100		100	**100**
1,2-dichloroethane	2	2	5	**2**
1,1-dichloroethene	1	2	7	**1**
1,2-dichloropropane	1		5	**1**
1,4-Dioxane	0.4			**0.4**
ethylbenzene	700		700	**700**
methylene chloride	3	3		**3**
naphthalene	300	300		**300**
1,1,2,2-tetrachloroethane	1	1		**1**
tetrachloroethene(PCE)	1	1	5	**1**
toluene	600		1,000	**600**
1,2,3-trichlorobenzene	Not found			**TBD**
1,2,4-trichlorobenzene	9	9	70	**9**
1,1,2-trichloroethane	3	3	5	**3**
trichloroethene (TCE)	1	1	5	**1**
vinyl chloride	1		2	**1**
xylenes, total	1,000	1,000	10,000	**1,000**
Metal Contaminants				
aluminum	200		200 Secondary	**200**
antimony	6		6	**6**
arsenic	3	5	10	**3**
cadmium	4		5	**4**
copper	1,300		1,300	**1,300**
iron	300		300 Secondary	**300**
lead	5		15+	**5**
mercury	2		2	**2**
thallium	2		2	**2**
zinc	2,000		5,000 Secondary	**2,000**

* Preliminary Remediation Goals are the lesser of the preceeding groundwater standards.

+ Federal Action Level

Table 4 - Preliminary Remediation Goals for Soil Contaminants *		
Contaminants	**NJ Non-Res Direct Contact Soil Remediation Standard (mg/kg)**	**Default NJ Impact to GW Screening Levels (mg/kg) (Above the Water Table)**
benzene	5	0.005
chlorobenzene	7,400	0.6
1,2-dichlorobenzene	59,000	17
1,3-dichlorobenzene	59,000	19
1,4-dichlorobenzene	13	2
cis-1,2-dichloroethene (DCE)	560	0.3
trans-1,2-DCE	720	0.6
1,2-dichloroethane	3	0.005
1,1-dichloroethene	150	0.008
1,2-dichloropropane	5	0.005
1,4-Dioxane		1.25 +
ethylbenzene	110,000	13
methylene chloride	230	0.01
1,1,2,2-tetrachloroethane	3	0.007
tetrachloroethene(PCE)	1,500	0.005
toluene	91,000	7
1,2,4-trichlorobenzene	820	0.7
1,1,2-trichloroethane	2	0.02
trichloroethene (TCE)	10	0.01
vinyl chloride	0.7	0.005
xylenes, total	170,000	19

* The Preliminary Remediation Goals in this table are based on the NJ default values. It is EPA's intent to replace these with site-specific values based on NJ impact to groundwater guidance.

+ This Impact to Groundwater Screening Level was calculated using NJDEP's default values and guidance.

ATTACHMENT B

PUBLIC NOTICE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY INVITES PUBLIC COMMENT ON THE PROPOSED PLAN FOR THE CPS/MADISON SUPERFUND SITE OLD BRIDGE, NEW JERSEY

The U.S. Environmental Protection Agency (EPA) announces the opening of a 30-day comment period on the preferred plan to address contaminated soil and groundwater at the CPS/Madison Superfund Site located in Old Bridge, New Jersey. The preferred remedy and other alternatives are identified in the Proposed Plan.

The comment period begins Wednesday, April 24, 2019. As part of the public comment period, EPA will hold a public meeting on Wednesday, May 8, 2019 at 7pm at the Old Bridge Municipal Complex/Courtroom, 1 Old Bridge Plaza, Old Bridge, NJ. The Proposed Plan is available electronically at the following address: https://www.epa.gov/superfund/cps-madison.

Written comments on the Proposed Plan, postmarked no later than close of business May 24, 2019, may be emailed to osolin.john@epa.gov or mailed to John Osolin, US EPA, 290 Broadway, 19th Floor, New York, NY 10007-1866.

The Administrative Record files are available for public review at the following information repositories:

The Old Bridge Library, 1 Old Bridge Plaza or at the USEPA – Region 2, Superfund Records Center, 290 Broadway, 19th Floor, New York, NY 10007-1866.

For more information, please contact Pat Seppi, EPA's Community Liaison, at 646.369.0068 or seppi.pat@epa.gov.

AP-GCI0177069-01

☐ PROOF O.K. BY: ____________________ ☐ O.K. WITH CORRECTIONS BY: ____________________

PLEASE READ CAREFULLY • SUBMIT CORRECTIONS ONLINE

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ATTACHMENT C

PUBLIC MEETING TRANSCRIPT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2

- X

GROUNDWATER CONTAMINATION

SUPERFUND SITE PUBLIC MEETING

- X

Old Bridge Municipal Building
1 Old Bridge Plaza
Old Bridge, NJ

May 8, 2019
7:00 p.m.

P R E S E N T E R S

PAT SEPPI,
EPA, Community Liaison

JOHN OSOLIN,
EPA Geologist/Project Manager

RICH PUVOGEL,
EPA, NJ Central Remediation Section Chief

CHUCK NACE,
EPA, Environmental Toxicologist
LYNN VOGEL,
DEP Case Manager

MS. SEPPI: Thank you for coming to our meeting tonight. We really do appreciate it.

First I'd like to go around and have the EPA and the other folks who are here who are working on this site introduce themselves.

First of all, I'm Pat Seppi, I'm the EPA Region 2 and I'm the community liaison for this site.

John?

MR. OSOLIN: John Osolin, I'm project manager for this site for EPA and also Region 2.

MS. SEPPI: Rich? I'm sorry, Chuck?

MR. NASE: I am Chuck Nase, I'm an environmental toxicologist for EPA.

MS. SEPPI: Thank you.

MR. PUVOGEL: I'm Rich Puvogel, I'm the New Jersey Central Remediation Section Chief and John's supervisor.

MS. SEPPI: Right. Lynn?

MS. VOGEL: I'm Lynn Vogel, I'm with New Jersey DEP, case manager.

MS. SEPPI: Thank you. Joe?

MR. GUARNACCIA: I'm Joe Guarnaccia and I work for BASF and we're conducting the remediation working with the State for the EPA.

MS. SEPPI: Thank you. And, Bill, why don't you introduce yourself?

MR. SCHULTZ: Bill Schultz, Raritan Riverkeeper.

MS. SEPPI: Raritan Riverkeeper. We've worked at many other sites together.

Do you want me to turn the lights off now or when we start -- can you see all right if we leave the lights the way they are? Okay. That is fine.

So the reason that we're here tonight is to present to you EPA's plan to clean up the CPS Madison site. Hopefully some of you, if not all of you, had a chance to read the proposed plan. It is on our website and, as I said, we do have some copies that I can hand out to you at the end if you would prefer just to have a written copy.

So this is a little bit different. This is a lot different actually than our normal meetings. Normally we have a stenographer. This is a formal public meeting for EPA and this is something that we have to do whenever we're presenting a proposed plan, you know, for the public and for your input and for your comments. So what we do in a situation like this is we have a stenographer, or in this case, a videographer to -- Joe will video the whole meeting and then when you -- at the end of the presentation when you come up to ask your questions, you know, he will video you also. But we'll talk a little bit about how we're going to handle that after John finishes his presentation.

So after this meeting the next document that you receive from the EPA is called the Record of Decision. We call it a ROD and what it is is actually the legally binding document that states how EPA plans to go ahead and clean up the site. That is only after that we have a chance to look at your comments. All those comments will be taken and put into what's called a responsiveness summary which is a document that will also be available to you and all of this will be posted on our web page and that's what we normally do. Sometimes the towns run it, have it posted too, and I will certainly check with them to see if they would like a link to that Record of Decision. And I'm sure they will say because Old Bridge I have to say is really very cooperative, very nice in helping us set everything up, so I'm sure they'll want to post that on their web page.

The other thing I want to mention is the comment period. There is a 30 day comment period that started on April 24th and it will end close of business on May 24th. So if you leave this meeting tonight and you think of other questions or comments, you can either e-mail or send it to John directly through snail mail, your comments, as long as we receive them by May 24th, close of business, they'll be included in the responsiveness summary.

One other thing I did want to ask, if you wouldn't mind, if you could let us get through our presentation and wait for questions until the end, we would really appreciate that. I know sometimes it's hard, you have this question you want to ask, but a lot of times those questions are answered during the presentation. So that might be a better way to go if you don't mind.

We'll post this presentation on the web page also probably in the next couple of days once I get the final version and John sends it to me, I'll have our IT people post it.

So with that, let me turn this over to John for the presentation.

MR. OSOLIN: One thing I'd like to add to what she said, is on our website and also in the proposed plans that we will have them back at the end of the night, we have all the contact information you need, both the website, the repository, the -- my address, my e-mail address and my phone number. So any of that information you might need.

Okay. My name is John Osolin. Like I said before, I'm the project manager for this site. I'm going to take you here through a presentation tonight.

We're going to start with the history of the site. I'm going to show you how the site came to be, what has taken place over the years. And then I will take you through the investigation, show you how the site was investigated, what we -- how we made the determinations we made and then introduce you to EPA's preferred plan.

So let's get started. The CPS site is made of up of three areas. The CPS Chemical site, the Madison Industry site and the Runyon Watershed.

The CPS site is a 30 acre site. It has a plant area, a former plant, there's a 6.7 seven acre area and that is in the western portion of the site. This plant operated from 1967 to 2001. Over that time they made organic chemicals that are used in oil field -- as oil field chemicals, as water treatment chemicals, as lubricants and other organic chemicals. They also did solvent recovery on the site and that is how some of the contaminants came to be there.

The Madison Industry site is a 15 acre site. It -- they have operated from 1967 to the present. They're still in operation. They produce inorganic -- inorganic chemicals for pharmaceuticals, for food additives and fertilizers. They also have another sister company on the south end of the site which is Old Bridge Chemicals and they produce zinc salts and copper sulfates.

The Runyon Watershed is down here. It contains the Perth Amboy supply wells, Perth Amboy well field, these are three of the five wells on the Perth Amboy well field, PA-5, PA-6, PA-7. They lie about 3,000 feet southwest of the companies and the well field produces about 5,000 gallons per minute and that -- that water goes through a treatment plant and then goes to the public.

In the mid '70s there was a series of wells over here, supply wells called the Bennett suction line. These wells were -- came impacted from contaminants that came from the site and had to be shut down and the wells were moved to where they are now as a result of that.

Next. So in 1979 after the Bennett suction wells were closed down, the State Court ordered the companies, CPS and Madison to do remedial investigation to look at the extent of the contamination in the well field and on their sites.

In 1981, as a result of that investigation, the companies were asked to implement the groundwater remediation program. At about that time the site was brought to EPA's attention and EPA listed it on the National Priorities List or the Superfund List in 1983.

Getting on the Superfund List allows EPA to spend money on investigation of the site.

Next. In 1991 and 1992 the companies placed wells downgradien of their facilities in the Runyon Watershed. There were six wells, three wells from each company. These were recovery wells. The purpose of those wells was to pump and treat the water to reduce the contamination that was coming off the site, capture it as it's coming off the site and prevent it from reaching the Perth Amboy supply wells.

In 1993, between 1993 and 2000, the water around those six wells began to achieve the clean up goals that were set to them and those wells were moved up gradient and eventually onto the sites of the properties of the two companies where they are now. Those wells are collectively known as the interim remedial measure wells or the IRM wells. Then in 2001 the CPS chemical plant closed.

Next. So to give you an idea what's been going on since the site was discovered, the State has been working, as we've said, there's court orders out there, these IRM wells were put in place. I would like to show you a picture of what exactly has been undertaken in that time.

So this picture, you can see CPS up in the corner here and the Madison site right over here, and again, the wells are down in this area. You can see some monitoring wells here. The yellow area represents an exceedance of the groundwater standard for chlorobenzene. And this is the plume as we see it in 1994.

Next. In 2004, after a lot of pumping, the plume is now been shrunken and is now up closer to the sites and further away from the wells. So as you can see, this plume and any exceedance of groundwater standards is well above where the water -- the water wells are.

Next. Now, in 2014, once again, we see shrink -- the shrinkage of the plume and the plume is just barely coming off the properties, the two properties. And that is the chlorobenzene plume. I chose -- well, I chose a lot of these chemicals because they were extensive plumes. Some of the other smaller plumes and I wanted to show you the maximum extent of the contamination.

Next. Another example is benzene plume. Now, this is where the benzene plume had looked in 1991, and you can see the yellow area is the area of exceedance.

Now, the yellow area is very close to

the wells. Very shortly after discovery of this, they did find they had an exceedance in one of the wells down in the Perth Amboy wells but because of the pumping, that lasted -- that didn't last very long. We actually had placed a stripper, a carbon stripper on the Perth Amboy wellhead and that was never used because we pulled back the contamination and it was -- it wouldn't have been effective because the -- it wasn't going into the well. So it still sits there. It's unused. If ever we needed it, it would be used. But -- and in 1991 that's the way it looked.

Now, this is 2002 and you can see the orange area which represents the higher contamination is up closer to CPS and you can see that it's -- it's starting from this area on the CPS property which was a former process facility and it's being pulled back.

Next one. In 2016 you can see that it's been pulled back quite a bit and it's even further and it continues -- those wells continue to pump today and it continues to shrink this plume.

Next. So now this is the zinc plume. The Madison property produces metals chemicals, metals and their contaminants are metals-related. So the zinc plume is emanating from the Madison site here and that has reached down into the well field, in 1996 reached down this far.

In 2004 you see it has shrunk back a little, and in 2014 even further and that continues today. So this represents the exceedance of zinc in the well field that we pumped. And as you can see, we have a fairly extensive -- this well -- this and this are -- the Perth Amboy wells, but all these others are monitoring wells and that's just part of it. I forget the total number of wells that we have in there to monitor this. It's very extensive.

One of my colleagues couldn't believe how many wells we had in this well field.

So in 2003 NJDEP or New Jersey Department of Environmental Protection requested that EPA take the lead role. When the site was listed, it was listed with NJDEP lead.

So for cleaning up the Superfund site, EPA took the lead in 2003 and in 2005 EPA entered into an order with Ciba Special Chemicals who had -- bought the site from CPS. And the order required Ciba to investigate the site, investigate the source areas of these contamination and come up with a plan to -- to clean that up.

In 2009 BASF purchased the property from Ciba Special Chemicals and they became responsible for cleaning up the site. So they took the property and also took the responsibility of cleaning it up at that time.

In 2015 EPA entered into an order with Madison who was unable to enter into an order earlier and they are currently doing a real investigation feasibility study.

Next. In 2015 NJDEP changed the one four dioxane groundwater clean up -- groundwater standard from 10 to .4 parts per billion, that's a 25 fold decrease in the level that's allowable.

At the time, you know, this is in the

middle of the remediation that was going on, the plume looked like this. That was a one four dioxane plume of ten parts per billion, and as you can see, there's nothing leaving the site. At ten parts per billion, there's nothing that exceeds the standard off the site.

In 2016 DEP declared that the Runyon well field was IEC which is Immediate Environment Concern, and as such, the BASF is required to delineate that plume to .4 now to see all the area that's included in the .4 plume, as well as come up with a plan how to address that plume and they're currently doing that.

Next. This plume the -- the orange plume represents the .4 plume. And now, you know, that's -- you can see that that -- that's much more extensive and it does reach down to three of the five wells in the -- the -- the Perth Amboy well field.

Now, what we're doing here today is we're doing a remedy for the source area up here and we're cutting off the source, we're removing that source from going down further, however, the companies are required under this IEC to address the -- the groundwater in front of these wells, to prevent it from getting into these wells, so they -- currently BASF was working with the State of New Jersey and they are working on putting treatment before those wells at this time. So this is a two -- two-pronged attack, two pronged approach at addressing the groundwater here. One, to get rid of the sources, and the other to protect the wells until the source area can be removed. One more.

Next slide. So this slide I'm zooming out to give you a better picture of the Perth Amboy well field. Again, we have the CPS Chemical site right here. Madison is right here. If you remember the plume that you saw in the last slide, that's right here. And you see the Perth Amboy well 5, 6 and 7 over here. Those are the wells that we saw in the previous side.

We also have in this slide we have -- PA-8 which is not affected by the plume and we also have the Ranney well that is not affected by the plume.

Now, this is important because at this time we are taking a lot of water from the Ranney well.

As I said before, 5,000 gallons per minute are coming out of this water field, the well field area and the Ranney well supplies approximately 4,000 gallons per minute. So if you do the math and you add in the -- they have to add in some of the wells over here to that well to get their water, but by the time it is pumped out and goes to the treatment, by the time it gets into the public supply system, it meets standards.

So this issue right over here is being handled under the State with the companies. Like I said, we're looking at putting wellhead protection there and EPA with this action that we're talking about today is addressing the source areas and the plumes that are coming off those source areas.

Next. So we went through the history, we went through -- we're going to look next at the investigation that we did. We're going to look at the way we came to the conclusion of -- that our preferred remedy was the best remedy for the site.

So to start with, very early on in the site, DEP and EPA got together and decided that using a phased approach was the best approach for the site. We do this on most sites. We divide it up into the phases. We call them operable units.

Operable unit 1 is site-wide groundwater. That is being addressed under this proposed plan. Operable unit 2 is the soil contamination on the CPS property, that's the organic contamination, the source of that organic plume, but the site-wide groundwater addresses the contaminants, both organic and inorganic.

These two operable units, 1 and 2, are the subject of this proposed plan. Operable unit 3 is soil contamination, mostly metals on the Madison property, that will be addressed in a future opposed plan.

Next. So we did remedial

investigation, the purpose of our remedial investigation is to look and find out where -- what type of contaminants are on our site and where they are located.

We have a list right here of all organic contaminants that are found in groundwater and also inorganic contaminants that are in groundwater. I won't begin to list these. I don't want to take up too much of your time. They are in the proposed plan. You'll see a list of them. But this -- these are the chemicals that we found on site. In -- we have looked in groundwater, we looked in soils, we looked in surface water. We looked all over. This is what we have found.

To give you a better picture of it, I'm going to go back to the -- the slides with the -- the groundwater contamination and I'm using benzene slide to give you an idea what the plume looks like in benzene. As you can see, the source is on the CPS site and it moves down towards the well field.

This is the zinc contamination and, once again, that starts on the Madison well field, goes into the well field. There's another plume out here that is actually down towards the well field. That is actually treated. In Perth Amboy they have a -- they remove the metals and that is actually removed in the Perth Amboy well field. But our intent with this -- with our actions here are to cut off the plume, to keep it from going down there and also eliminate the sources eventually so that we can turn this off and then -- and we no longer have to address the zinc and the -- organics.

Next. So when we looked at the CPS -- the contamination on the CPS property, contamination in the soils, on the property were mostly volatiles and semi-volatiles, you see a list right here. I am not going to read through the list again. I'll show you a slide to show you where they are.

These chemicals act as a source of contamination and could also be a potential contact hazard. So we took -- we took a look at those.

Next. These are rather located in a

small area. This is the CPS chemical site. This is the edge of the Madison facility, the Perth Amboy well field would be down here somewhere.

That's Waterworks Road going through the top there. The red areas over here, there's two areas that are -- surrounded by the red checkered line, those are the areas of contamination in the soil.

The first -- the smaller one up here is the loading dock where they unloaded and loaded things onto rail cars. That is the area we believe most of the one four dioxane that comes from this site is located and then we have another area over here which is under the former process facility for the tank farm that they had there. That also contains these volatiles and most of this area was never actually used. This is the plant facility, so you will find nothing out here.

We've investigated, we've done samples all over here, groundwater and soil samples and found nothing out there and this is an office building, so there really isn't much here. It's mostly in this plant operation area that we're finding it.

Next. So once we found that we had chemicals on site, we had to look and see are these chemicals -- do they have potential to address -- to affect both ecological and human health. So we did an ecological risk assessment. The ecological risk assessment did not identify any ecological receptors that could be affected by the contaminants at the site.

Next. The human health risk assessment, however, showed that there were unacceptable risks associated with future exposures, potential exposures at the site in both groundwater and soils. By future exposures, we're talking about we look at exposure scenarios and some of them are current -- current day exposures, things that are actually happening today. We didn't find any of those, but there's potential for like say a site worker who's digging in the soil to come in contact with it. There was a potential for somebody to drink the groundwater. These exposures are what is represented here. But -- and they show that there was a potential for unacceptable risk. As such, EPA has to take an action on the site to address these risks.

Next. So EPA put together clean up goals based on Federal and State MCLs and various criteria and we picked the most stringent of them and we put together clean up goals for both groundwater, and again, I'm not going to read through that list and read the numbers to you. It's in the proposed plan. You can read that yourself.

Next. And we also put together clean up goals for soil. So the clean up that we're going to do has to address both chemicals on the site to the levels that we are -- we have here. These are our clean up goals.

Next. So I'm going back now and we're looking at the groundwater. EPA and the State and BASF determined that it -- probably the best way to address the site contaminants was to look at the contaminants in groundwater separately for two reasons. We have a source area on the CPS site that is, you know -- is over here and we have a source area on the Madison site. They're both separated, they're both spacially located in different spots. It's better to, you know, try to cut it off right near the source. So it would be -- better to place a remedy over here and for the Madison to put something over there.

The second is that there's no chemical -- there's nothing that we can do that will address both organics and metals, at the same time we have to put different processes in place. So it doesn't make sense to go out of our way to combine these things in one plant because there -- you know, you are going to have two separate systems anyway within that same plant, so we might as well put the systems where the contamination is.

So we decided to split the groundwater into two sections and I'll show you why that's important here. So when we did the feasibility study, we have to look at alternatives.

A feasibility study basically looks

at all the processes that will address the contaminants at the site. We look at, you know, for organics there's carbon, there's in situ chemical oxidation. There's all these different methods which you can use to destroy or reduce organic chemicals. We also have, you know, different things that will address metals.

So we looked at all these things and we put them together in alternatives and we evaluated those alternatives. For this site we're going to pick three alternatives because we divided the groundwater into organic alternatives and inorganic alternatives and then we have the CPS site soils as the third remedy that we have to choose.

So once we put together all of these alternatives and we're trying to evaluate them, the way we evaluate them is with EPA's nine criteria. The first two criteria of the nine criteria are threshold criteria, those -- every remedy that's going to be accepted has to pass. All the ones that come through those first two criteria are evaluated by the next five criteria, the balancing criteria, those tweak out the little differences between them and which -- which they work better with these chemicals on our site which are -- you know, have the small footprint. We look at all the different possibilities and decide which is the most appropriate for this site. And then we put it into a proposed plan and we put it out to the public and that's where the last two criteria come in, they are the modifying criteria, that's State acceptance and community acceptance and we go to the State and we go to the community, that's what you're here for, and we ask for comments, we ask you to look at what we're doing and give us comments. We'll address those comments in our proposed plan responsiveness and summary, and then based on those comments and the feedback that we get, we'll choose a proposed plan.

So these are the preferred alternatives EPA came up with. I'm not going to read them to you right now. I have slides to explain each of them. But there are three alternatives for each of the -- two for the groundwater and one for soils and they are a total -- at a total cost of $23.3 million.

Next. The first alternative, the alternative for groundwater is a permeable reactive barrier employing chemical oxidation. I'll explain that.

This again is a map of the corner of the CPS, this is even a closer look at the site. Just that you remember these -- this polygon over here and there was another one over here. This is the source area. This is the contaminated soils on the site. So the contaminated -- these represent plumes coming off of that, that source and what we have here is a series of wells that are along the boundary line between CPS and this is the Madison property, the watershed would be down here. These are a series of wells and -- the circles represent an area of influence for each of those wells. This is not totally accurate, I mean that area of influence, we may have more wells are required. We may have less wells, but the -- there will be overlapping areas of influence.

The groundwater -- the contaminated groundwater flows through this area and we pump chemical oxidants in the ground. They can be ozone or peroxide. There's several other oxidants. We're looking at ozone and peroxide right now. And they will be pumped into that area and the -- as the water flows through it, those oxidants will oxidize the organic chemicals and break them down into hopefully harmless chemicals like carbon dioxide and water. That is what we expect to happen here that -- it's been effective on other sites and we think it could work here.

However, we have a contingency remedy right here. In case we get out there, the -- the pump and treat that we have ongoing, we're not going to stop that when we put these wells in and when we start pumping this chemical in.

We're not going to stop pump and treat until it's determined that this is effective. We will have monitoring wells on both sides to monitor what goes into that wall and what comes out of that wall.

So we're going to make sure that

works and then we're going to slowly start backing off of the other wells and make sure that that can take the load of the contaminants coming through.

So we have that as a backup. If, for whatever reason it's not working, we can go back to the pump and treat that already was there and we would be adding more wells and we would be adding more treatment for one four dioxane to make sure that we've got full capture of this and that's our contingency remedy.

So that's the first, the organic remedy that we prefer. That's our preferred remedy for the organics and groundwater.

Next. For metals we chose continued operation of the Madison pump and treat system. Madison pump and treat system has been very effective in pulling it back. We have wellhead treatment at the wells, that is intercepting anything that gets down gradient. We see no reason to change this at this time.

We will be addressing the source area in the future and we hope -- our intent is to be able to turn off this pump and treat once we've removed the sources, but at this time, we are going to continue operation at the Madison pump and treat with modifications. This pump and treat has been modified over time and we can plan to continue to do that.

Next. So the EPA's preferred alternative for the soils is chemical oxidation with soil mixing.

Now, this is very similar to what we're doing with the down gradient water, except one of the problems with getting it in soils is that you need to get the oxidant to where the chemicals are if you have, you know, if you pump it in and it goes preferred pathways, you can lose it. So what we're doing is we're -- as we're pumping in, we're either augering it or we're mechanically mixing the soils with the oxidant and that will kill -- that will destroy the organic chemicals there. And that whole time we will have the other remedy in place and that will never be turned off until there's nothing coming out of this area.

So what we will be doing is this red area over here, the loading area, we plan to excavate, it's a shallow area, we plan to excavate it and to bring it into this area to be treated with oxidation and mixing and we also have an area over here that's around a sewer line, is in an area that's a little difficult to get. Now, we hope to be able to address that and get as much of that out and it put it over here, but if there is some that's left there, we may have to put the chemical oxidation -- chemicals into the ground to address it in place and we may not be able to mix it, it is not ideal, but it's better than nothing and it's -- we're going to do whatever we can to get them out into this area, but that's, you know, that's our alternative.

So that's the EPA's preferred alternative for the soils on site and now we open it to questions.

(The presentation concluded.)

MS. SEPPI: So thank you, John. Thank you very much. And thank you for your attention. We do appreciate it. I know sometimes it can get a little technical and I hope the slides helped.

Now, Joe, because we usually have a stenographer here, this is going to be a little bit different now. So, Joe, what is the best way for you to, you know, handle the questions?

VIDEOGRAPHER: If it isn't too much trouble, if one by one if you can come up, grab the microphone, and state your name for the record, and then proceed with your questions.

MR. OSOLIN: The comments that you make here will be put into the record and will be considered for -- you know, we will respond to them in our responsive summary with the record decision that we put out. So feel free to -- you know, there's no question or any concern that, you know, we don't want to hear. Come on up.

MS. SEPPI: Come on up.

MR. OSOLIN: She can stand at the side if she wants --

MS. SEPPI: You can stand right there.

MR. OSOLIN: -- if she doesn't want to face the front.

MS. SEPPI: We just want to make sure everybody can hear your question.

MS. HUBBERMAN: Can you hear me? Can you hear me? Okay. Good day. My name is Sharon Hubberman and I do appreciate you coming and doing this presentation. It's very informative. I do have some questions though.

MS. SEPPI: Sure. That's why we're here.

MS. HUBBERMAN: If I'm a little repetitive --

MS. SEPPI: No, no.

MS. HUBBERMAN: -- it's because I'm trying to gain a broader understanding --

MR. OSOLIN: Sure.

MS. HUBBERMAN: -- of what's being done. Okay. Now, you have informed us that you would be forming a reactive barrier. From my understanding, this reactive barrier would go on the two sites which is pretty much causing -- you know, that you said you wanted to put wells to form a react -- like to prevent the future contamination, kind of like hinder it, put a barrier there --

MR. OSOLIN: Yes.

MS. HUBBERMAN: How many wells are you planning, approximately?

MR. OSOLIN: It all depends on the influence of the well. I mean, we -- a normal well radius influence I'm guessing is about 15, 20 feet radius. And we overlap those wells so we put them -- you know, say if they were 20-foot radius, maybe we'd put them, I don't know, 15 to 20 feet apart so that they would overlap. And then you pump the contaminate in.

It spreads out and so their fingers are into each other so that they're overlapping. So you have a whole wall of this oxidant in the ground. And as the contaminants move through, it comes into contact with that.

MS. HUBBERMAN: Okay. Regarding the restrictions that you're looking for that you will be placing or the types of activities on this site, what are they? What are these restrictions? What are the activities that are going to be restricted during this cleanup and how is that going to ensure that in the future, there's not further contamination from these sites, whether they're still active or inactive?

Like I said, one of them is inactive but it sounds like one other site is still active. So I just want to hear from you what are the restrictions --

MS. SEPPI: On the site?

MS. HUBBERMAN: On the site.

MR. OSOLIN: The site is being handled -- the Old Bridge Chemicals is actually a RCRA site. That means it's an active facility that's being addressed by our RCRA program, EPA's RCRA program. The other -- the CPS site is closed but there is a potential that it could be used in the future once this is cleaned up.

But those sites are, as all chemical sites in New Jersey, are being overseen by NJDEP and to some extent EPA. And those have to follow very stringent laws that prevent this kind of thing from happening. Quite frankly, when a lot of this was happening, there weren't the laws in place to prevent this from happening.

And now they regularly get visits from people from NJDP from EPA to make sure that these chemical companies are operating under the guidelines and preventing them from causing contamination like that. And the laws that are put in place also are a negative thing.

I mean, any company does not want to end up on the hook for one of these cleanups. They're very expensive; 22 million dollars. It's a lot easier to handle your chemicals when you -- if you know that that cleanup is going to come and -- you know, you're not going to dump it on the ground. You're not going to do the things that have been done in the past.

MS. HUBBERMAN: Okay. Moving forward with that cleanup, now, you indicated that there are wells that are on the Runyon which is down gradient to where the plumes are impacting. There's some sort of impact there.

My question is, is there going to be some sort of like restrictive barrier or a mechanism where it's going to take a while? I mean, from my understanding, there has been problems with this site going back to the 1980s upon which the Court mandated a cleanup and then the companies went and tried to appeal it and it's been -- I mean, this is many, many years of plumes impacting the site.

So as a resident in the neighboring town, even for the residents of Old Bridge, I would imagine that those toxins or those chemicals, whether organic or inorganic, they accumulate and compound throughout the years. So being that our water well is down gradient, I mean, I'm not a hydrologist or anything but common sense would say to me that when it rains or pours, it would tend to move or seep.

So are you going to also put a barrier to help, you know, protect those wells? Because it seems when you were showing the different stages where you had the six wells, that kind of helped make the plumes smaller. So in this case, I mean, we're talking the dioxane which is cause for concern.

And recently, we received a notice that we also had a TTHM which is, you know, the chlorine into the organic material. So as a resident, I just -- I would like to know what else would you be doing to immediately address that versus waiting many, many, many years for efficacy?

MR. OSOLIN: Well, first of all, I would like to characterize -- I wouldn't characterize it as we've waited many, many years. The pumping and treating has been ongoing since 19 -- the 1990s and that has been -- they've been very active in doing that.

When the site was first determined, discovered, the wells were shut down -- the impact of the wells was shut down. Wells were moved down gradient. The companies were required to pull well head protection on those wells. And we protected the wells so that they didn't get impacted by the contaminants from the site.

And we also worked at pulling back the plume. Under the state, the companies worked with the state to pull back the plume. So we weren't getting contaminants in the wells. What we found -- one thing, dioxane is a relatively newcomer on the site and then the change in the standard also -- you know, we -- it was being cleaned up to the standards at the time.

And now the standard changed and we find that it's at levels -- at low levels. It's fairly low levels down near those wells but it is at levels above the standard. And as I had said before, the company, BASF, is working with the state and they're putting a protective barrier in front of the wells that will also use this chemical oxidation method to knock down the contaminants so that it's safe to drink. And with the mixing that is going on, the water that reaches the public is safe to drink.

MS. HUBBERMAN: On that matter of the chemical oxidation, so you had mentioned that the reactive barriers would utilize the chemical oxidation upon which would either be ozone or peroxide, word specific, specific to that.

It's my understanding that ozone does have a direct impact to individuals who have breathing difficulties or ailments. And my concern is, you know, when you conduct some sort of cleanup, it's going to release or not -- I don't know --

MR. OSOLIN: We would monitor

that. That's part of the operation. We won't allow that to happen. We're pumping it into ground water and the intent is for the oxidant to be used up before it leaves the ground more. So you won't have the opportunity to breathe that. It will be down below --

MS. HUBBERMAN: So there's going to be a filter in place and some sort of air monitor in place on that area to make sure that it's not released into the air?

MR. OSOLIN: We'll be monitoring to see that it doesn't come out of the ground but the filter will actually be the ground water, the ground --

MS. HUBBERMAN: Has there been any consideration regarding like a carbon filtration system? Which I know you had said there's both organic and inorganic. And per my understanding, you're not utilizing this same kind of treatment to address both.

So I also know that carbon filtration, which isn't pumping a chemical, it's more of a natural state, does address the organic material, perhaps not the inorganic which is the chemicals, but I would like there to be at least some consideration given to that aspect mostly because the dangers that I feel with engaging in the ozone or adding chemicals, it still incurs a risk. We don't know what that risk is.

So, you know, as a resident, I think it would be very important at least to me, and I don't know if I can speak to other individuals, that we do our best to mitigate not only the current risk and the infiltration of these chemicals but also what could possibly, you know, occur. And then the last is how do you intend to oxidize the soil? I don't understand that part.

MR. OSOLIN: Okay. So these chemicals are in the soil just like the oxidants will interact with the water and, you know, the oxidants are put into the water and they will interact with the chemicals in the water. If you put these oxidants in the soil and mix them, they're going to react with the chemicals that are in the soil.

MS. HUBBERMAN: What type of oxidants would you be --

MR. OSOLIN: Peroxide, --

MS. HUBBERMAN: So the ozone?

MR. OSOLIN: Ozone, yeah. I mean, there are other oxidants and they are very effective. They've been used across the country. This isn't the first time this is being used and they are very effective. And with the proper cautions, they can be made very safe.

MS. HUBBERMAN: Okay.

MR. OSOLIN: It certainly wouldn't -- if we found in the -- you know, this is going to be started out on a very small basis and gradually widened until we're sure that it's working correctly, we have no problems. It's not going to be just like overnight turned on and we're going to turn off the ground water pump and treat system which does use a filtration system similar to what you're talking about.

We're going to slowly turn on this system and work through the -- any hiccups there might be. And by the time we get it running at full capacity, there should be no problems with it.

MS. HUBBERMAN: You cited efficacy rate. So that efficacy rate has been done under the control of the EPA and other Superfund sites? Like did you utilize this proposed process in other sites that had similar contaminants?

And based upon that result, is that open to the public or -- 'cause what I would like to be very clear on is that this proposal of the two measures that you're looking to implement, whether this is a test or whether this is based upon science that has been reached upon through your action somewhere else. So if you could just --

MR. OSOLIN: We can answer that question. And, yes, that has been done. We have sites that have used this.

This isn't the first time this has been used. And all these processes that we use to clean up sites are evaluated by EPA in test studies and stuff like that to determine --

MS. HUBBERMAN: Is it available --

MS. SEPPI: You know what we can do? I mean, I don't think we know that right off the top of our heads what other sites, --

MR. OSOLIN: We have a few sites.

MS. SEPPI: -- but we could certainly -- we have other sites and they may not even be in Region 2. We have, you know, ten different regions across the country that we talk to all the time when we come up with these methodologies. So what we'll do -- and you left me your e-mail?

MS. HUBBERMAN: I'll give it to you.

MS. SEPPI: Okay. Or put it on the sign-in sheet and we'll check into that and we'll get that information back. Thank you.

MR. OSOLIN: One of the things that we do when we look at technologies that are presented to us, we look for other sites where they've been used. We look for tests that were done. We look for things that -- and we don't propose something that we don't feel could work. And, you know, obviously it's going to be addressed in the utmost of caution.

MS. SEPPI: And you had very good questions.

MR. OSOLIN: Yes.

MS. SEPPI: We appreciate that. Are you a science teacher?

MS. HUBBERMAN: No.

MS. SEPPI: It sounded like you were definitely.

MS. HUBBERMAN: I work in finance. Well, I used to work in finance. Not anymore.

MS. SEPPI: Wow. Well, very good questions. Thank you.

MR. OSOLIN: Very good questions.

MS. SEPPI: Yes?

MS. BROWN: Hello?

MS. SEPPI: That's just for Joe.

MR. OSOLIN: Yeah, it's just for the --

MS. BROWN: Oh, okay.

MR. OSOLIN: He's a court reporter.

MS. BROWN: Okay. I don't have nearly as complex questions so don't worry. I'm actually, as you know, the Councilwoman for Ward 3 where the site is actually going to be getting worked on and I want to make sure that I just ask these questions on behalf of the community that will be probably most effected.

So it looks like from what you've stated here today that there is a potential for water to be contaminated in the future but that's not currently the case? Is that what you're saying? Or is there currently contamination in the water?

MR. OSOLIN: Well, there's currently contamination in the water in the well field.

MS. BROWN: Okay.

MR. OSOLIN: But by the time it gets to the tap, it achieves standards, acceptable standards.

MS. BROWN: Okay.

MR. OSOLIN: So you're not in danger from the water that comes off of the -- out of the Perth Amboy well field.

MS. BROWN: Yeah.

MR. OSOLIN: 'Cause we have mixing that occurs. We mix with the clean water. And we also have some, you know, other things in place that we have to -- the pumping that's going on and everything. So there's very little water getting to those wells. And once it's mixed, by the time it gets to the public, it's safe.

MS. BROWN: Okay.

MS. SEPPI: Do you want to --

MR. NACE: I can -- I'm Chuck

Nace with the EPA. The future that he's potentially talking about with the exposure is we assume that if that site were redeveloped or if someone would drill a well on that site and drink the water from that well, so that would be putting the well right in where the highest contamination is and drinking that without treatment. And that's where the future risks would be if someone were to do that.

So we want to make sure we come in and clean up the site so that that won't happen in the future. So that's the future potential. It has nothing to do with the well going down, down gradient, and it's actually on the site itself.

MS. BROWN: Okay. There is a very common belief which I'm actually surprised there's not any -- I don't think there's any constituents here from this ward, but I think there is a perception that contaminants cause, you know, various diseases that are going on right in this area because of the Superfund site.

So, you know, I wanted to, you know, kind of clear that up, you know. Obviously, people are really concerned. People find that if they get any type of cancer or disease, they really do believe that it's coming from contaminants that are being leached through the soil and the water over in this site.

So I just want to relay their fears. I mean, I don't know if this will but I definitely want to just ask on that behalf. So you are 100% sure though that by the time the water reaches the tap, it's completely safe?

MR. OSOLIN: Yes.

MS. BROWN: 'Cause I know they test the water but I know there's things that always get through.

MR. OSOLIN: And, you know, is there contaminants that come through? I mean, at a very low level of course. And there's no drinking water anywhere in the world that don't -- doesn't have some level of contaminants. But these are tested. The testing is available.

The numbers that we use to evaluate this are very, very conservative and you're talking about in order for the number that we're talking about, the 0.4 plus -- and, Bill, maybe you want to talk to this, but it's based on a lifetime of drinking, 70 years of drinking that water every single day.

So it's not like you're drinking -- you know, you're grabbing a glass of water and you're going to get cancer. You would have to drink from water contaminated at that level for 70 years every day.

MS. BROWN: At the current level?

MR. OSOLIN: No, at the level that we're cleaning up to.

MS. BROWN: That you're cleaning up to. Okay.

MR. OSOLIN: Where we're going with it.

MS. BROWN: So you're saying if someone was to drill and actually drink water from that specific area of the site, then they would be affected much more harshly than if they were away from it? 'Cause --

MR. NACE: Right. Because the concentrations are so --

MS. BROWN: Right.

MR. NACE: -- much higher. So it may not take 70 years of --

MS. BROWN: Right.

MR. NACE: We base our cleanups and our drinking water standards on protecting people from long-term chronic exposure.

MS. BROWN: Okay. All right. That was it. Thank you.

MS. SEPPI: Thank you.

MR. OSOLIN: Thank you. That was a good question.

MS. SEPPI: That was a good question. And I have to say, you know, that's one of the number one questions that we always get is are my -- you know, I'm living close to the site. Does that have anything to do with the illnesses?

So please if your constituents have any questions, they can certainly call John or me and I'll -- you know, we'll get the answer to you.

MS. BROWN: I'll post the link for the proposed plan. I'll do that.

MS. SEPPI: Good. Okay, great. Thank you. Thanks for coming tonight.

Here you go, sir.

MR. MAKIEL: Thanks --

MS. SEPPI: You're welcome.

MR. MAKIEL: -- for listening to my concerns. One of my concerns is --

MS. SEPPI: I'm sorry. I don't mean to --

MR. MAKIEL: Vincent Makiel.

MS. SEPPI: Thank you.

MR. MAKIEL: One of my concerns is obviously over the years, 32 wells have been closed. I think that puts a little bit of a stress on the community finding resources. There are such things as droughts. There's such things as developments. This site actually was, not too many years ago, considered for development.

I think any thought about restrictions should say we should remove the companies in some way and use the facilities they have to get back into what's a watershed for people to drink, not for development, not for other things.

I'd also like to present to John, this is 2019. This was given to the homeowners. Triarylmethane levels were above the allowable limit. That's not my imagination. If you read this, this is actually in Spanish but Mr. Perez can give you it in English as well.

But the residents of Perth Amboy, a lot of them are Spanish, we'd like you to talk to them too. So my reason for giving that is during the course from August of last year, there was a pump installed, four million gallons from the Runyon well. That pump, from what I understand, broke. And so it amounted to them trying to get a new pump for this year.

I think they've used at least two pumps in a period of less than a year. So that entails the limited amount of wells. I'm no mathematician or scientist but the stress on trying to find clean water is definitely an element in this problem in this Superfund site. This has gone on. I'll give you a few details.

C.D. Smith Engineering service did a study for the city. 56,000 the city had to appropriate. I appreciate that amount in total. You said 22 million for that barrier. I believe it should be more.

Is there going to be anything -- any soil removal or any part of the site that's actually going to be removed and taken somewhere else and put some other material in there? Is that a consideration?

MR. OSOLIN: That was one of the options that we considered. This issue of soil mixing and chemical oxidation should address that in cleaning up soils so that these chemicals are destroyed.

MR. MAKIEL: But you state in the press release you're going to do studies over five years to see that it's actually working. And I think that that shows that there's some other elements that could arise in terms of organics or other elements on the site. Madison Industries is producing. You said other sites or other part of the sites would be development.

I think the restrictions would be to remove the industries from the site. They've been there too long and we need to have drinking water for Perth Amboy. In the press release, it simply states numerous times the city of Perth Amboy or Perth Amboy. And the way you actually put that in words seems like Perth Amboy is next to the watershed.

No, it has to go through miles and miles of pipes which involve future infrastructure cost which the city of Perth Amboy has to allocate appropriate funding in the future. I think the young woman who stated that the carbon plan -- to have a carbon infrastructure plan put into the site is a proper movement to protect the site for the future.

Not that it's going to -- that your scientific study to remove the oxidant isn't something that you're doing but I think that to protect the public is important. During June, the city appropriated and they recouped $500,000 for the CPA Madison Superfund site by ordinance supposedly. Was that money provided to the city yet of Perth Amboy?

MR. GUARNACCIA: I missed that point. What was that?

MR. MAKIEL: In June, appropriation of $500,000 for the cleanup of CPS Madison Superfund site and the city council told me that that money would be recouped from BASF. Has that money been provided yet or is this going to be five years from now when the testing's done?

MR. GUARNACCIA: I'm not aware of that particular number but we are working with the city to upgrade the treatment plan with pumps and we're making it -- we're at -- we're upgrading the system. And we are -- BASF is repaying the city for any costs associated with that.

MR. MAKIEL: Now, we're having this US EPA Superfund meeting --

MR. GUARNACCIA: We're doing that as we speak.

MR. MAKIEL: -- and that's your -- we're more or less studying this as a possible solution but we don't have a complete answer whether it's going to be a solution. For the people who have to drink the water, I'm not saying that your -- as a science or as a chemist your facts are right, but as a complete three, four decades of this site being a problem and you still stated that there could be other developments. Okay?

In May of 2018, the city entered into an agreement with BASF to address the Superfund issue. If I were to ask you what is your future in terms of the development of the site and your needs in terms of what kind of -- I understand you're into chemicals and what have you. Are you going to continue to use the site for chemical use? 'Cause I don't think that's a good idea.

If you're committing to a Superfund site, I don't think it's a good idea to keep using chemicals on the site. If I went down there right now, it's coming out of the smoke stacks. It's limited in terms of the accumulation. But over many, many years, that -- those fumes go somewhere. So is there any idea --

MR. GUARNACCIA: Well, from BASF's perspective, the immediate goal is to remediate the site so that it's protective of human health and the environment.

MR. MAKIEL: So that's under water?

MR. GUARNACCIA: Beyond that, it's -- there are -- BASF has no plans.

MR. MAKIEL: Okay. The last thing I have to say is I asked Mr. John one question.

MR. OSOLIN: Can I add one thing?

MR. MAKIEL: The 900 cubic yards that you say are going to be imputed back into the watershed area, are there other methods other than using that same material and implementing them back into the watershed?

Are there other materials that can satisfy the same thing that are cleaner -- that are proven to be clean not taken from an area that's been disturbed? You're calling this a Superfund site.

MR. OSOLIN: It is a Superfund site.

MR. MAKIEL: Right.

MR. OSOLIN: The contamination -- one thing -- can we go back to one of the slides?

MS. SEPPI: Do you know which one?

MR. OSOLIN: Let me see.

MR. MAKIEL: In your press

release, it specifically says 900 cubic yards would be put back into the watershed.

MR. OSOLIN: Okay. Let's do this slide here.

MS. SEPPI: This one? All right.

MR. MAKIEL: Just that statement is concerning to somebody. I've looked at some other Superfund sites and it doesn't look like they're putting back materials that are disturbed back into --

MR. OSOLIN: What we're talking about, the area we're talking about I believe, is the area over here where we're taking it out and treating it in an area with the other area, right? Is that the cubic yards?

MR. GUARNACCIA: Right. And it's what's in the plan.

MR. OSOLIN: What's going on here -- you're concerned with the contamination that's right over here. We've got a wall. We currently have a wall of pump and treat that is soaking up -- pulling up this contamination. A lot of what's down gradient here was down -- is contamination that was there years ago and is in the soils and slowly bleeding out. It will take time for that to come out.

We can't pull the small levels of contamination that are in that soil. We can't address that because it's -- it would be -- you'd be basically taking away the whole watershed and throwing it away for levels that aren't even impacting the wells at all.

But what we are doing is we are cutting off input to that to allow that to disseminate, to go away. We are also -- the two-prong approach that I talked about earlier, in the wells that are down here, we are going to have well head treatment.

So anything that remains in the plume over here that moves down gradient will be captured before it goes into those wells. So what the state is working on with the company and the company's agreed to work on is down here. That will protect those wells.

In the meantime, what we're doing is we're putting -- we're placing a wall here to prevent anything further from getting off the site and we are testing to make sure that wall holds up. Before we turn off the pumping wells which are pumping and treating and using carbon strips and being in carbon and all that, before we turn that off, we're going to make sure that this system is as effective if not more effective than the previous system.

And if that's not the case, we will be putting carbon and pumping treatment in this area. But we can test to make sure that nothing gets through this wall and that's the intent. So once this wall prevents any contamination from leaking our source area, then we're going to go after the source area. And this wall is not going to be taken out until the source area is completely remediated and we have nothing passing through that.

MR. MAKIEL: I see that's

part of environmental cleanup, providing a wall. I'm just stating, and I'll put it in writing, why you're taking 900 cubic yards of material and putting it back in. It seems like a cleanup should be taking that out and disposing of it in some way other than a watershed that people are drinking water from.

MR. PUVOGEL: The Superfund program has a preference for treatment when we approached this cleanup program. It's not just taking it out and putting it somewhere else in a landfill or something like that.

MR. MAKIEL: That's more expensive, right, --

MR. PUVOGEL: Then treatment is, yeah.

MR. MAKIEL: -- to put that in another area?

MR. PUVOGEL: Oh, sorry. Rich Puvogel, EPA. It depends where -- if you're taking it offsite, it depends where it's going and what type of landfill it has to go in. If it has to go into a specific landfill that's a hazardous waste landfill, it gets very expensive. And sometimes it's easier -- or not easier but less expensive to treat it onsite.

When you treat it onsite, there's less transportation of this material, long distances to the proper landfill, and you can treat it onsite and contain it better. But there's a preference for EPA's actions when we do these cleanup actions for treatment to destroy the compounds at their sources. That's it.

MR. OSOLIN: And many of the -- many of the contaminant problems we have in New Jersey are due to landfills that we took contaminates -- you know, that contaminates are in those landfills. Why would we want -- instead of destroying those contaminants, why do we want to add them to landfills?

MR. MAKIEL: Some of the major industries in Edison and other things, they actually removed and shipped them.

This is drinking water for communities. As you said, as your director or administrator said, the community -- if you're that serious about helping the community which is miles from here, then removal of the site should be a major -- removal of materials that happen to be disturbed should be a major consideration.

And that if infrastructure needs in the future for the city of Perth Amboy, if you read the budget for this year, it says people are going to be faced with fees as well as infrastructure costs in the future. That's miles from here down Bordentown Avenue.

So if they can be assured that at least their water -- materials have been removed and are clean now, that provides an emphasis for people to feel safer. So I think that that detail should be considered and more money should be spent to clean up the complete area, not use material that is already disturbed. That's my opinion and I'm a resident and I appreciate it.

MR. OSOLIN: We appreciate your comments.

MS. SEPPI: We do.

MR. OSOLIN: We appreciate your comments and we will respond to them.

MS. SEPPI: We will. And you know what? We'll have a transcript of your comments and your questions so you don't have to send everything in writing because we'll have all that. We'll have a transcript of it.

MR. MAKIEL: John has that letter.

MS. SEPPI: Right.

MR. MAKIEL: It was given to the citizens of Perth Amboy, to their homes. It's the ramification of needing multiple wells, not just relying on individuals or a couple. Thirty-two were closed.

MS. SEPPI: We'll have -- we'll see if -- we'll have that translated.

MR. OSOLIN: This doesn't have to do with the 32 wells that were closed. It has nothing to do with that.

MR. MAKIEL: No, it's trying to find cleaner water.

MR. OSOLIN: I read -- I read this thing and it basically said there was an exceedance in trihalomethanes. This was handed out by the well field and it was part of their transparency. But they also said that there was no --

MR. MAKIEL: For transparency, I communicated. It's the idea that they're looking for cleaner water in the Runyon Watershed. That's an idea that went from -- I'm not saying this because they wanted to find cleaner water. So I'm not talking about the -- the 32 wells just means you can't go there, right, in terms of --

MR. OSOLIN: Actually, the area that we -- the area where the 32 wells were, that was part of the area that was remediated with the IRM wells that I spoke to before, the wells that were placed in the Runyon Watershed to pump out that contamination and destroy that contamination.

They did a pump and treat. They pumped it out. They filtered it. They destroyed that contamination. And most of that contamination is no longer there so we did what you're asking. That's been going on for many years now with the companies and the state.

MR. MAKIEL: Basically with the current situation, I'd say organics as well. And I agree totally with what Sharon said that we need to be protective in terms of -- whether it be carbon filtration.

This was said by the representative of the company that provides a service. Carbon filtration in the future is a costly -- it's costly indefinite but it's something that is going to be protective of our health.

MR. OSOLIN: Now, wait a second. Are you saying the company that provides the water for Perth Amboy suggested that they need carbon filtration?

MR. MAKIEL: That could be

it. All I'm saying is that could be one element of helping us be secure that we're going to have cleaner water.

MR. OSOLIN: Well, I was out at the Perth Amboy water field. I went and I visited the Ranney well about two months ago. And I looked at what they had out there and we do have a carbon stack there that was put in by the companies that own CPS --

MR. GUARNACCIA: That's an air stripper.

MR. OSOLIN: Oh, I'm sorry. That's an air stripper. I'm sorry. It wasn't carbon filtration. That hasn't been used because the levels didn't warrant it. The levels that are getting there didn't warrant the use of the air stripper. The water is protected.

MS. HUBBERMAN: What is an air stripper?

MS. SEPPI: John, what is an air stripper? Sharon asked.

MR. OSOLIN: An air stripper

-- all organics -- I'm trying to think how to best explain it. All organics will volatilize. Basically, they vaporize --

MS. SEPPI: Disperse.

MR. OSOLIN: -- like water does and they go into the air. That could be a potential air contaminate. In many cases, it just, you know, it goes off and we don't have any ill effects from it. But what they do in an air stripper is they run it through these balls and various things that make turbulence in there.

And the turbulence makes the water -- the organics come out of the ground -- out of the water and we capture it in a -- I believe it's a carbon filter that they capture the stuff that comes off of the air stripper. So you create turbulence, you volatilize the organic chemicals, and then you capture it in a carbon filter. And so you're just basically taking it right out of the water. So that's how an air stripper works.

MS. SEPPI: Sir, you had a

question?

MR. MAKIEL: I'm responding to the -- when I said the carbon filtration is helping the community deal with the water is safer. There was a meeting that you discussed that as one element of the future needs for Perth Amboy. Plus, I heard --

MR. PEREZ-JIMENEZ: Let me clarify that.

MS. SEPPI: Sure.

MR. PEREZ-JIMENEZ: My name is Luis Perez-Jimenez and I'm the Director of Water Utilities in Perth Amboy. The company that he's referring to that supplies the water to Perth Amboy is USAPA. We have a contract with the city, a long-term contract and we operate and manage the utilities.

I've been working with Joe for a while now and this issue with carbonation. There was an exceedance in THMs and when I went in front of the council to talk about that letter that sent because this is considered a Tier 2 violation and under a

Tier 2 violation, we are supposed to submit or send a letter to each customer in Perth Amboy.

MS. RODRIGUEZ: I did not receive a letter.

MR. PEREZ-JIMENEZ: Excuse me?

MS. RODRIGUEZ: I did not receive a letter.

MR. PEREZ-JIMENEZ: If you give me your address, I'll make sure that you get one. We send letters to whatever addresses we have. The customers that we have, we send letters to those addresses.

MS. RODRIGUEZ: I've been a customer for many, many years since 1985.

MS. SEPPI: I don't mean to interrupt but if you could just say your name so we have it, please?

MS. RODRIGUEZ: My name is Maria Elena Rodriguez and I live in Perth Amboy.

MS. SEPPI: Okay.

MS. RODRIGUEZ: So, Mr.

Perry, you did not send every letter, the notification letter, to every homeowner because I'm here to tell you I have never received any kind of notice. I went to City Hall to ask for a copy. Until now, I'm still waiting.

MR. PEREZ-JIMENEZ: Well, you give me your address and I'll make sure that you get one.

MS. HUBBERMAN: I left a message.

MS. RODRIGUEZ: That too.

MR. PEREZ-JIMENEZ: What number did you call?

MS. HUBBERMAN: Your main number. If you call City Hall, press 1 or whatever the water department is, that's where they directed me.

MR. PEREZ-JIMENEZ: Oh, that's City Hall. I have my own numbers. I'm outside City Hall. Well, give me your address and I'll make sure that you get a letter.

MS. HUBBERMAN: We're

representatives of the entire ward, Ward 6 and 7. We asked our neighbors. They did not receive the letter so there is a big constituency of people that did not receive the letter.

And the other thing, regarding that TTH chemical, it only requires parts per trillion to actually have a negative effect on a person's health. So if we put like a little droplet of this chemical over many, many barrels of water and we drink it, we will have the side effects. So this is serious. And in Perth Amboy, we're not getting -- there's not a transparency here.

MR. PEREZ-JIMENEZ: THM is formed when natural curing organic matter reacts with chlorine and it forms the THM. That's what we were trying to explain to them. It's the same thing that you said about the 14D. It takes 70 years drinking 1.5 gallons of water for something to happen. And it's not guaranteed that it's going to happen.

That letter says that. I don't

know if all of them received the letter. I mean, I didn't send the letter myself. We had a company that sent letters to whatever addresses they got.

MS. SEPPI: But it looks like you're going to look into that?

MR. PEREZ-JIMENEZ: Yes, I'll look into that. Now, that's about that letter and the THM. When I mentioned the carbon filter at the other meeting, I meant -- we were talking about the THM. We were not talking about the 14D. Carbon filters removed the organic matter from the water and that will help reduce the THM. That's what we talked about at that time, not 14D.

The $500,000 that the gentleman mentioned is an amount of money that we put -- that the city put in. So every time that we do something like buying plumes, anything related with the 14D contamination, the city will pay and BASF will reimburse the city. We have up to $500,000. If we exceed that number, we have to consult with them and they will authorize us to put more money so that whatever money we spend, they reimburse. As we spend the money, they reimburse.

It's not that they're going to give us $500,000 and put it in the bank for the contamination. Now, as we spend the money, they reimburse the city.

MR. OSOLIN: And I think that's an important thing to mention here. BASF came onto this. They bought the property from CIBA Specialty Chemicals who bought the property from CPS who caused the contamination out there. So BASF never operated out there. They've taken on the site. They bought it, through whatever method I don't know.

But they've -- in purchasing it, they became responsible for the site and they are working with us. And they've become actually a very important partner in cleaning up this site. We have -- they're working with the water company. They're putting well head treatment on it. They've signed an agreement with EPA to help clean up the site, look at various things to address the site, and they are reimbursing the government for that.

EPA is also being paid for the work that we do out at this site to make sure that this situation is taken care of. So they've become an important partner in this and as with everybody. It's the state, EPA, the water company is involved with this, and BASF. It's a combined effort that's making this happen, that's cleaning this up.

MR. PEREZ-JIMENEZ: Now, also I'm a resident of Perth Amboy. My family is there. I have three kids. We all drink that water and I'm proud of that water. I produced that water. I know that if there's any contamination on that water, I'd be the first one to scream 'cause I don't want my family drinking that water.

Now, but going back to this treatment, and I understand their concern of it, if this is going to take a little longer than expected, will you guys consider at

least drilling more wells to be away from
that plume?

MR. OSOLIN: I guess I'd
throw that back to you. EPA isn't the one
that supplies the water. We're out there
protecting the water. I think it's the -- I
don't know. We wouldn't be the ones
drilling the wells.

MR. PEREZ-JIMENEZ: No, no,
not you. But will EPA approve for BASF?

MR. OSOLIN: I don't think
we've -- that's a state function. I don't
know.

MR. SCHULTZ: Would there be
a restriction on the property for them to
drill additional wells?

MR. OSOLIN: There is a CEA
which is a well-restriction area in that
area where you're not allowed to drill water
wells. Okay? That area influences -- that
comes off the site you're restricted from
using because of the residual contamination
that is in that well field. And that area
will shrink as we shrink the contamination.

That area will get smaller.

But as of now, there's a well-restriction area in place that provides protection from somebody sticking a well in there and drinking the water out of it.

MR. PEREZ-JIMENEZ: That's close to five, six, and seven?

MR. OSOLIN: Yeah.

MR. PEREZ-JIMENEZ: If we want to drill a well near the Runyon not on number nine, number eight, is there any restriction there?

MR. OSOLIN: Not by EPA. Not by EPA. That's a state and a local thing. That's not an EPA -- we don't do well restrictions. With the well restrictions that are in place, they're state well restrictions.

MR. PUVOGEL: And that's not from EPA. The State Bureau of Water Allocation determines where you can put a well and how much you can pump out of that. That's what the state is saying.

MR. PEREZ-JIMENEZ: And we

have to go through the EPA to get all the permits and all that. Like for the permit just to put a pump on well number nine. But if we see that the plume is approaching more and more towards five, six, or seven and then we said, All right, we have to abandon this well, or we don't have to abandon because we're cleaning the water over there because it's taking too long, now that water's going to get into my treatment plan.

Can we say, All right, let's replace this well and put another one near the raining well? I mean, I know that I can -- I know that we need the permit from the DEP but is that something that EPA will say, and maybe it's working with Joe, is that something that EPA will tell Joe or the DEP, Joe, listen, we need to put another well over there. You're paying for that.

MR. PUVOGEL: No, it's not something that we would get into a discussion of what they should pay for or what they shouldn't pay for. That is between the city -- the water purveyor and the city. We don't have the authority to tell them to pay you for that action.

MR. OSOLIN: Yeah. If there is farm from a company's property, the city can take it up with the company and get them to put another well in for protecting that. That's not an EPA function. You know, we would not -- we're not the state or the local authority. We don't do that. We don't say they can and we don't say they can't.

MR. PEREZ-JIMENEZ: Do you guys provide funds?

MR. PUVOGEL: Our focus is to fund the remediation and cleaning up of that scenario. That's what our focus is on. We don't have the authority to make anyone else pay for anybody else's damages.

MR. PEREZ-JIMENEZ: But you don't have funds? Let's say we want to drill on a well. There's no funds?

MR. PUVOGEL: We can't authorize those funds to be for a well. Our funds go to the cleanup process.

MR. NACE: The EPA Superfund does not have funds for that. EPA does have drinking water assistance funds through other parts of the EPA that may or may not be applicable. We could put you in touch with those programs to see if something like that would be applicable if you need to do that. But through Superfund, we cannot do that.

MR. PEREZ-JIMENEZ: This is just a question. I know that Joe -- you know, we've talked about it in different meetings that we've been in and they did mention that whatever they're doing over there, it's not working.

If we need to have more treatment, it will happen. I don't know. I want to make sure I have a plan B just in case something happens. Somebody can fund whatever we need to do there.

MR. OSOLIN: Well, we're addressing --

MR. SCHULTZ: If I may --

MS. SEPPI: If you could just

state your name, please, Bill?

MR. SCHULTZ: Bill Schultz, Raritan Riverkeeper. I think I'm following Luie's thoughts. If your treatments start to fail, you'll be able to document that the plume is encroaching on our existing wells and that we may -- the city may have to take additional actions, in other words, drill additional wells in another part of the field because of the failure of your treatments? And that might open the door for the city to negotiate with BASF to kick in some funds.

MR. OSOLIN: I don't know that I can answer that question to be honest with you. I mean, we'll put that --

MR. SCHULTZ: You'll be able to document the failure of your treatment?

MR. OSOLIN: If it fails, yeah.

MR. NACE: We would be doing long-term monitoring of the down gradient plume and we would be able to tell if the --

MR. SCHULTZ: So if the plume

were to expand, --

MR. NACE: -- if it's increasing or expanding, yes.

MR. SCHULTZ: -- you'd be able to document the expansion of the plume which would be impacting the existing wells? And that would open the city's negotiations with BASF to --

MR. OSOLIN: We actually did that back in -- back when CPS was out there. In the very beginning when we first got involved in the early '90s, we came out there and we drilled wells as part of our program -- our Superfund program. We went out -- and as our removals program, we went out and drilled wells down near the EPA and actually called them EPA wells.

You can see them in the diagram down near the wells to show that there was contamination at the level of the inputs to the Perth Amboy wells down there, that the water was actually being pulled down towards the wells. We put wells there to see that. That actually helps Perth Amboy go to court and get relief from CPS at that time.

So, yes, we would be -- our investigations document when -- I don't think we're going to -- I mean, quite honestly, I don't think we're going to document the failure. I don't -- I'm looking at this remedy and I see it as fairly failure proof. First of all, we're pulling back the contamination. The plume's actually shrinking, okay, what's already there. We're improving that.

We're adding more measures to stop it from going into the Perth Amboy well field, okay, towards the Perth Amboy well field. And then we're going to take out the source. So you've got measures in that area already in place that are working that are pulling the contamination, you know, and removing the contamination.

We're putting more measures in the place and then we're taking out the source. It can only get better, you know. And the method -- this wall that, you know, we're creating here down gradient of the source, that is going to be put in before we start addressing the source. To a certain extent, it's already there in the wells -- in the pump and treat wells that we have that are in place right along the edge over here. They were already there.

Once this wall is proven effective, it will start slowly depending on taking dependents off of those wells and put that in place. That will remain there until nothing is coming out of this area. So I don't see how it could fail. We've got pump and treat contingency. If this doesn't work, we keep the pump and treat and we beef that up and then we take out the source. So it's going to get better.

The area we're working on here, you know, we're monitoring -- if there's a failure, we're going to see a failure and we'll document it. But quite frankly, I don't see how it could fail.

MR. SCHULTZ: That's what I was looking for 'cause he's got a -- I know what he's faced with. He's got to go back and he's got to have some kind of an answer 'cause somebody's going to ask him, If all this falls apart, what do we do, Lu? He's got to have an answer. So that's why I say if you can show -- you'll be able to show an increase in the plume --

MR. OSOLIN: Yes.

MR. SCHULTZ: -- and that's his key to go look for other answers.

MS. SEPPI: I think -- I'm sorry. I don't want to interrupt. Did you have something you were waiting to say?

MS. HUBBERMAN: Yes. In your slide presentation, you stated that the dioxane -- the plumes of the dioxane have actually hit PA5, PA8 or 6? I don't know.

MR. OSOLIN: 6 and 7 -- 5, 6, and 7.

MS. HUBBERMAN: And the only one that is not contaminated is P8?

MR. OSOLIN: 8 and the rainy well.

MS. HUBBERMAN: 8 and the rainy well. Okay. So what I'm understanding is this. The process or the cleanup may not be -- may not have an immediate time frame to it. It takes time to be able to diminish those plumes. As it stands right now, we're looking at these wells. They're contaminated. So I think what he's -- there's that plume in that area, correct?

So I think from his standing point, he wants to look out for the safety of our drinking water and wants to know, All right, is this in writing, which I believe it is just by your presentation that there's a presence of it, and what action, if any, our count would be able to do.

And my understanding from this conversation is the city of Perth Amboy was to take this information and somehow go and bring this either in a legal matter or directly with the company that's involved in the cleanup to help address the short-term issue until your cleanup is accomplished.

MR. OSOLIN: But as I also discussed, they're already doing that.

They're already doing that. The wells that are being impacted, the state -- once the state realized that we have wells -- once they changed the level at which we have the cleanup to do, we looked at the wells, did an intake of those wells, and the companies were forced to put protection on those wells. They're currently in the process of doing that.

One of the wells has already got protection and one of the ones that is most contaminated has already got a line of this that's going on. They're actually -- they put protection on it and they're working to put it in place for the whole thing. That's already taking place. So it's a two-prong approach. We've got EPA and the companies working together.

And with the state, we're taking out the source area and we're preventing -- we're putting up a wall to prevent anything from moving offsite. The second prong is a barrier in front of those wells and around those wells to prevent anything from going in there in the short term. And that's the effort that the state is undertaking right now with the companies.

And the companies are out there -- I was out there in the well field with Joe and with Perth Amboy and I watched and saw what they were doing, what they were pumping, how they were pumping. They've got a pump house there. They've got input wells in. They've got monitoring wells. They're monitoring what's going in.

They're monitoring to make sure that, A, the contamination is being destroyed down gradient of those pumping -- the input wells where they're imputing the ozone. And they're making sure that it's destroyed before it gets to the well 'cause you don't want the ozone. You don't want anything in there.

So they're putting it in and they're measuring it to make sure that it doesn't reach the well, and that the chemicals are destroyed right before they get to the well. So this is all going on.

MS. HUBBERMAN: So this ozone process has been already occurring to the site? Is that what you're saying?

MR. OSOLIN: Yes, that's what I'm saying.

MS. SEPPI: Okay. Do you have more questions?

MR. PEREZ-JIMENEZ: No, I'm done.

MS. SEPPI: Okay. Thank you. Good questions. I'm really impressed with this group here tonight. We're getting some really good, good questions. Yeah.

MR. OSOLIN: We appreciate you coming out. I know this is a concern. It's a concern of ours and a concern of the state, EPA. It's a concern and we're addressing it. And, you know, we have plenty of partners here and we want your questions. We want your concerns and we want to address them.

MS. SEPPI: We do.

MR. OSOLIN: We do.

MS. SEPPI: And are there any

more questions?

(No response.)

MS. SEPPI: I mean, too, let's make sure that we have the e-mail addresses if you all have e-mail rather than, you know, the snail mail addresses 'cause as soon as we get some of the answers as we promised we would tonight about, you know, other Superfunds sites that may have used this type of -- this type of methodology before, you know, I'd like to put all these names on a mailing list and just reach out to you as new information comes around.

And also, when we get this proposed plan signed with the responsive summary that will talk about your comments and address them and your questions, we can get those out to everybody too. And don't forget we have some copies of the proposed plan here tonight if you'd like to take it.

You know, let's keep in contact because I think this was a really good conversation, you know, and I'd like to continue it. I don't just want to leave here tonight and, you know, you don't hear from us ever again. So that would be good. And same thing with the city. I know we spoke -- I e-mailed back and forth with Mr. Farr, Frank Farr?

MR. SCHULTZ: Carr.

MS. SEPPI: Carr. I'm sorry. Why did I say Farr? Carr, yes. And, you know, we're going to be talking to him later in the week to talk about any additional information he might want. So, you know, all these avenues are open out there right now.

MR. OSOLIN: By the way, the studies -- the previous studies on the ozone and the oxidation and all that we were talking about, we have them already. It's not -- we don't have to look for them. We have them already.

They -- we've got -- when this first came up, I was one of the most -- you can ask my Section Chief, I was one of the most skeptical people for the use of chemical oxidation. I was a little concerned about that. I was -- I asked questions. I was concerned. Can we get this oxidant to the chemicals so that we can destroy them and is it safe?

I was given quite a few sites where it had been used and I met with an expert from EPA from I believe Oklahoma. And he confirmed that it absolutely can work and with the right observations with the right input, we can make this happen. And without that assurance, I wouldn't have done -- I wouldn't even have thought -- you know, this wouldn't be the preferred plan here because we obviously -- we don't want to fail.

We don't -- we want to get out there and we want to make it happen. We want to make it work. And so we put this in place and then we asked the companies that we want a contingency remedy that will back this up.

And, you know, I look at this and I'm not really sure how it would fail. I'm that confident of it. So we will get that information to you if you'd like it and we will answer those questions in the responsive summary. Okay?

MS. SEPPI: Does anyone else want the proposed copy? And, Maria and Sharon, do you want to give me your addresses, your e-mails, so I can get information out to you?

\- - -

(This concludes the hearing.)

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C E R T I F I C A T I O N

I hereby certify that the proceedings and evidence noted are contained fully and accurately in the stenographic notes taken by me upon the foregoing matter dated May 20, 2019, and that this is a correct transcript of the same.

AnnMarie Badalamenti
Court Reporter-Commissioner of Deeds

(The foregoing certification of this transcript does not apply to any reproduction of the same by any means, unless under the direct control and/or supervision of the certifying reporter.)

ATTACHMENT D

WRITTEN COMMENTS

May 23, 2019

VIA: ELECTRONIC MAIL AND REGULAR MAIL

US Environmental Protection Agency
Attn: John Osolin, Geologist/Project Mgr.
Emergency & Remedial Response Division
290 Broadway, 19th Floor
New York, NY 10007-1865

RE: Superfund Proposal Plan
CPS/Madison Superfund Site
Old Bridge, NJ

Dear Mr. Osolin,

Thank you for your recent presentations regarding the proposed Superfund site cleanup plan.

Please accept the below as comments and questions pertaining, and in response to your presentation.

On Byproduct formation:
As expressed to you on Wednesday, May 22, 2019, my mom and I have concerns regarding possible byproduct formation when using the caustic chemicals, Ozone and Hydrogen Peroxide. Specifically, in a Tuscon Arizona case study regarding the cleanup of 1,4 Dioxane near the Tucson International Airport area Superfund site located in the Tucson Basin in Pima County, Arizona, there were pilot testing experiments carried out with ozone-hydrogen peroxide (O3-H2O2) systems, and it showed increases in Bromate to over 50 ug/l, which was 5x the regulated limit.

What secondary or tertiary filtration system will be implemented to capture any byproduct formation or byproduct film produced by the use of OZONE and Hydrogen Peroxide?

If Bromate is a byproduct outcome, how will you capture, and or remove it? What type of filtration or technology will be used?

What specific organic and inorganic compounds will be removed by the oxidation method? Please list chemicals.

What other residuals would be produced by the use of Ozone and or Peroxide?

What is Fenton's Reagent?

What other residuals would be produced by Fenton's Reagent, or persulfate?

Is Fenton's Reagent a solvent only used with Alternative 3A technology? Will it be used in the other Alternative solutions presented, ie 2A?

Treatment by Ozone Only

In a public forum in Ann Arbor, Michigan which discussed Ozone only treatment of 1,4 Dioxane, research indicated that it was not successful. Where specifically have you seen success in Ozone only treatment? Is there a report that can be accessed online?

On Advanced Treatment for 1, 4 Dioxane / New Technology

In your plan proposal, you indicate three elements that comprise the EPA's preferred alternatives: "preferred groundwater alternatives for the cleanup of the Site are 3A ISCO Permeable Reactive Barrier, and 2B—Continued Operation of the Madison IRM ..[and] for the on-site soil at the CPS property, the preferred alternative is 5." (page 17)

In the remedial action plan under Organic Alternative 3A, it states that activities would include the installation and operation of an **"ISCO PRB well system."** This type of system utilizes nanotechnology, and has been noted to have "near future" applications for chemicals like 1, 4 Dioxane.

Nanotechnology treatment of contaminated water also carries significant human and ecological risks because such technology is new, requires more research, and is not regulated.

In an article published by University of Arizona, Water Resourced Research Center, titled "Nanotechnology Promised Water Resource Gains but Raises Concerns," it affirms that this type of technology is not regulated and the potential human and ecological risks are unknown:

> *"A prime concern is that the enhanced reactivity of nanoparticles increases their toxicity. Further, nanoparticles are extremely small and very difficult to contain raising the concern that they could escape into the environment and pose a threat to aquatic life. Whether handled at the treatment plant or consumed in treated water nanomaterials pose an unknown risk. Benn says, "Nanotechnology provides a strategy to improve water quality through treatment and remediation. Also, however, the use of nanotechnology has raised concerns that nanoparticles might end up in water supplies ... Our research is looking at the release of engineered nanomaterials that could potentially enter water systems. We are considering nanomaterials as an emerging contaminant."*

Further it is mentioned that since the remediation of groundwater involves nano solvents, it raises concerns that such nanoform solvents are harmful:

"Meanwhile questions have been raised about whether iron in its nanoform is harmful to the environment and human health. Benn asks: "As we inject a nanomaterial into groundwater to remediate a problem are we simultaneously creating a new problem by injecting a material that may have adverse environmental effects?"

Both my mom and I have deep concerns and objections to this type of remedial activity because this type of technology does not have regulations that adequately address the development and use of nano-technology, including and not limited to the potential human and ecological risk and long term impact. Nanoparticles penetrate further into the human cell and organisms because of its subcellular component, and the impact is not yet known and we strongly DO NOT want to incur a potential unknown harm in our future, or in the lives of all residents living in Perth Amboy.

Since nano technology uses nano solvents which has new properties, is there any way in knowing that these new properties could harm people or harm the environment if exposure occurs? Does it accumulate in the body? Is it easily detectable?

If someone is using or handling these nano solvents in the work place, is there any way that they can be exposed to this? Is it dangerous? Is it harmless? Does it accumulate in the body? At what level is it dangerous?

On Oxidation Methods

What other types of Advanced treatment methodology are being considered?

Why hasn't UV/Oxidation treatment been considered? Or is it being considered?
In a technology overview report by GWRTAC titled "Ultraviolet Oxidation Treatment" (UVOT) prepared by Robert J. Trach, it states the following advantages offered by UV/Oxidation processed in the treatment of groundwater:

"• UV/O3/H2O2 treatment processes do not add to the pollutant load to the groundwater treatment system. This is in contrast to many of the existing end-of-pipe pollution abatement systems presently in use which merely transfer the waste from one medium to another leaving, for example, combustion by-products or contaminated absorbent for further disposal (1).
• UV radiation enhanced ozone treatment with hydrogen peroxide additions have been used in the successful treatment of particularly refractive substances such as ferricyanides and other chemical compounds (1, 3,)" (page 6)

According to some reports on other cleanup methods of Superfund sites, this type of UVOT cleanup method has a longer history.

<u>On IN-SITU Chemical Oxidation with limited excavation:</u>

One of the stated EPA preferred alternatives; the recommendation of IN-Situ mixing with limited excavation has raised concerns by other residents in the Perth Amboy Community who attended Wednesday's, May 22nd EPA presentation. There are persons who expressed that they would not want the treated contaminated soil treated on site and/or put back into the site once treated. Others expressed a passionate response to having the contaminated soil excavated, removed, disposed, and/or treated somewhere else. In addition, there was a strong recommendation that once the contaminated soil is excavated and removed, that he excavated area would be filled back with certified clean soil, not treated soil.

The Alternative 4-Excavation, Off-site Disposal, and In-situ Chemical Oxidation, is the alternative presented by your organization which somewhat address the above concerns, wherein certified clean fill would replace the excavated and off-site disposal of contaminated soils.

However, Alternative 4 also includes In-Situ Chemical oxidation, with caustic chemicals.

We would like to know what the calculation of how much Ozone and Hydrogen Peroxide will be used, and what is the surface area in which those chemicals would be injected to? How many meters? How often? What is the duration of how long it will take for this chemical to rid the contamination?

Is there going to be a vacuum or some sort of covering over the In Situ site where these caustic chemicals will be added to?

Will there be some sort of Gas filtration system installed to detect the ozone vapors? Or other types of possible vapors like Ammonia?

What protections will be in place for the workers on the cleanup site who would be using the caustic chemicals?

At what time would these caustic chemicals be used? During the day from 9am to 4pm, or during a "graveyard" shift? Unfortunately, there have been horrible smells late at night which is difficult to report because the EPA offices and other Human Health Agencies are closed at night.

When the ozone treatment occurs, will it be done in a climate-controlled environment? Does temperature or climate impact this caustic chemical? Will it be performed during the summer months? How will you control the volatility of the ozone chemical? What type of technology would be used to inject the ozone into the contaminated site?

On Organic Alternative 2A

How long would the Groundwater Treatment Plant treatability study take?

What will be included in the treatment process train? Would it include a filtration system that will capture any by product formation?

In a presentation made by Dr. Hadas Mamane, titled "Advanced Oxidation Processes (AOP): Technologies for Water Treatment and Reuse" she underscored the importance of having a BIO filtration system that captures byproduct formation and byproduct film.

Regarding Exposure to Toxins

While your goal, as expressed in your presentation, is to cleanup both organic and inorganic contaminates at this CPS/Madison SuperFund site, it does not undo the past human exposure to these toxins in our drinking water.

All of the residents in Perth Amboy have been kept in the dark, and there is a strong lack of transparency regarding our drinking water. To hear at your presentation that 1,4 Dioxane plumes have contaminated three of our drinking wells is very upsetting, and the fact that this was a major problem for many years is extremely disconcerting and scary. In addition, to hear that the methods used in treating our drinking water was composed of mixing contaminated water with clean water in order to reduce the levels of 1,4 Dioxane exposure in our opinion, is unconscionable, careless, and callous.

There are many residents who have been living in Perth Amboy since the time of their birth for many years. In our daily routine, we and all the residents of Perth Amboy have used or consumed the water in many ways, ie. drinked/cooked with the water, taken showers/baths in the water, washed dishes, pots, cars, washed our clothes with the water, etc., which means our exposure to chemical **TOXINS** greatly exceed the 2 Liters of exposure you mentioned in your presentation.

Please take our comments and feedback with extreme consideration because our lives depend on the efficacy and we prefer low risk, regulated methods, and a long historical track record, and proven methodology to clean the contaminated site.

Overall, after evaluating the options presented in the forms of Alternatives, please consider the below options versus your preferred alternatives.

1. (Short Term Immediate Efficacy) Immediate Barrier Implementation: More barriers are needed to stop current migration of 1-4 dioxane plumes, whether in the form of wells or steel as suggested in other alternative methods. They need to be placed in an area which combats the growth of the plumes to safeguard our wells from further contaminations. Is freezing a method that can stop the spread of 1,4 dioxane plumes?

2. (Immediate Removal) Alternative 4 which include Excavation Off-site Disposal with caveats stated above (ie. Including secondary and tertiary filtration systems, vacuum, vapor monitoring and capture)

3. (Has a defined History Record: Pump and Treat) Alternative 2A – Upgraded CPS Site Pump and Treat System with Long Term Monitoring.

4. (Carbon and UV/Oxidation): A combination of treatment systems and technology that have been used in other countries and states.

Thank you in advance for your consideration.

Sincerely,

Sharon D. Hubberman

Sharon D. Hubberman
Perth Amboy Resident

Maria E. Rodriguez

Maria E. Rodriguez
Perth Amboy Resident

From the Desk of Sharon D. Hubberman

May 24, 2019

VIA: ELECTRONIC MAIL AND REGULAR MAIL

US Environmental Protection Agency
Attn: John Osolin, Geologist/Project Mgr.
Emergency & Remedial Response Division
290 Broadway, 19th Floor
New York, NY 10007-1865

RE: Superfund Proposal Plan
CPS/Madison Superfund Site
Old Bridge, NJ Addendum to our Letter

Dear Mr. Osolin,

This is an addendum to our letter submitted to you. Regarding risk, we would like to highlight that we prefer low risk, and what we mean to say is that the risks must be contained in a strong risk controlled environment. The immediacy of the removal of the toxic chemicals weighs heavily, and if extractions of contaminated soil have been performed successfully in other contaminated sites, what is the likelihood of a ZERO toxin result? What are the calculated risks with disposal and removal of contaminated soil? What is the success rate of permanent removal of contaminated soil?

With in-situ cleanups, and redeposits of treated soil, what is the success rate of a permanent cleanup of chemical toxins? Is it a ZERO toxin result? Lastly, we would like for there to be consideration of upgrading the Site Pump and Treat System with Long Term Monitoring at the Madison site.

Thank you again for your time and consideration.

Sincerely,

Sharon D. Hubberman
Perth Amboy Resident

Maria E. Rodriguez
Perth Amboy Resident

EPA CPS/MADISON SUPERFUND SITE
Old Bridge, NJ

Proposed Remediation Plan April 2019

Greg Bender Comments and Suggestions.

I have conducted a brief review of the proposed remediation plan, and had the opportunity to ask some questions at the presentation and meeting with the Perth Amboy City Council on Wednesday, May 22nd in Perth Amboy, NJ. These comments are a result of the additional information you provided and a review of the maps provided, and supersede any verbal remarks made at the meeting.

1. Tables 1 and 2 in the plan summarize health hazard and risks associated with the identified contaminates for present and future trespassers, construction workers and residents (of the site) by exposure to the groundwater. The plan does not address exposure and risk to water exposure offsite, including the groundwater extracted from the Perth Amboy wellfield. Can we assume the health risks from the contaminated wells – both now and in the future, if any more are reached by the plume – would be similar to the serious risk shown in the tables?
2. Any comprehensive remediation plan for these sites is incomplete without the consideration for surface water – both present continued runoff, as well as sediments deposited from past flows. I understand that surfacewater is to be considered separately, but it is essential that a final plan include it before actions are taken. As noted in the plan, and shown on the figure 1 aerial map, Pricketts Brook runs thru both sites, and then runs to Pricketts Pond in the Perth Amboy Runyon Watershed, where it recharges the groundwater. Since it runs thru the worst contamination source areas, the unloading and handling areas, it is likely the recipient of both rain and washdown cleanup attempts. The Brook was a continuous path for contaminates to the watershed. We need to fully assess the results of that history. Note that the Brook provides a path for surfacewater to bypass the groundwater and soil monitoring sampling that is ongoing and proposed. We need a full assessment of the effects of the surfacewater situation and history.
3. The groundwater remedial alternative of an ISCO Permeable Reactive Barrier appears reasonable and effective, as long as strict monitoring is kept in place. Because this alternative, 3A, still needs to be proven in the on-site conditions (as noted in the plan), there needs to be an upgraded CPS site IRM pump and treatment system ready to go as back up.
4. For the on-site soil remediation at the CPS property, the suggested alternative – In-Situ Chemical Oxidation thru soil mixing (Alternative 5) is unacceptable. The risks associated with non-homogeneous mixing of the soil are real, and a failure in this process would seem to be difficult to detect in a timely manner. Since the soil is the source of the groundwater contamination, it is very important to stop the contamination at the beginning. In short, get the contaminated soil out of

there! Alternative 4 removes the soil, provides in-situ remediation for any remaining inaccessible soil, and replacement with certified clean fill. This would be the best alternative for long term risk elimination for the Perth Amboy wellfields. One further note: From discussions at the end of the presentation, EPA staff suggested that the community hazards of trucking many truckloads of contaminated dirt thru the community would be an issue. They noted that Alternative 5 would not have that concern, since all soil would remain on site. What is overlooked in this concern is that both of these sites have an active rail siding within them. The line connects with the freight line thru the area so that soil removal by rail would never enter onto any public streets, or cause traffic and community fears. Movement of hazardous materials by rail, which is quite common in New Jersey, is routine is this region. Further, this same rail network was involved with the transportation of hi-hazard, radioactive soil (from the BOMARC missile fire) from the Joint Base McGuire Dix Lakehurst, via a rail spur that exited Lakehurst onto the freight line from Lakehurst to South Amboy. There is precedent for rail movement of contamination in this area, and very successfully. It is a unique opportunity to have a clean up site(s) that have secure rail access and loading areas. Finally, if the estimate for alternative 4 was based on trucking all the soil, it may be less costly to use rail. Please reconsider alternative 4 for the soil.

Thanks for your time and consideration of these comments.

Sincerely,

Greg Bender

Osolin, John

From:	Vincent Mackiel
Sent:	Friday, May 24, 2019 11:05 AM
To:	Osolin, John
Subject:	Public Comment: CPS/Madison Industries Superfund--CERCLIS ID NJD002141190

Vincent Mackiel

John Osolin, Remedial Project Manager
USEPA, Region 2
290 Broadway, 19th Floor
New York, NY 10007-1866

Re: CPS/Madison Industries Superfund Plan--CERCLIS ID NJD002141190

Dear Mr. Osolin:

I have the following concerns during the Public Comment process including May 8th (with 22nd)regarding cleanup of pollution of the Perth Amboy water supply at Runyon Watershed in Old Bridge, New Jersey.

*The Risk Assessment Reports(Project #3651120035) of April 13,2015 show serious impacts and concerns as a resident drinking Perth Amboy water as cummulative receptor cancer risk and receptor hazard values are above USAEPA limits--not withstanding treatment efforts by Middlesex Water Company. Two public notices in 2018 and 2019 detail this concern(Dioxane and Trihalomethanes violations, PWSSIDNJ1216001.)

Please acknowledge new water-well opportunities as New Jersey Department of Environmental Protection is approached by our Water supplier--Middlesex Water Company. A representative proposed opening up a new well #8 providing better water(in quality and quantity) for the community, at the May 8th public meeting. New technology offers us hope.

*As a concerned resident and consumer, I respectfully asked that the proposed plan for the CPS/Madison Superfund Site, Old Bridge, New Jersey, implement Alternative 4--Excavation, Offsite Disposal and In-Situ Chemical Oxidation.Your press release states 900 cubic yards are involved. This plan would clean the area between the remediation area and the Perth Amboy water supply. Decades of pollution and neglect from the responsible parties have left this area as a sort of" Dead Zone." A new beginning(filling the Runyon Watershed with clean soils and plants) finally can start moving the process toward a real watershed not an Industrial zone.

Thanks for your response.
Sincerely,
Vincent Mackiel