RECORD OF DECISION

Operable Unit 2 - Soil and Sediments

RECORD OF DECISION AMENDMENT

Operable Unit 1 - Light Non-Aqueous Phase Liquid Source Area

Diamond Head Oil Refinery Superfund Site

Kearny Township, Hudson County, New Jersey

U.S. Environmental Protection Agency

Region 2

September 2017

DECLARATION STATEMENT
RECORD OF DECISION AND AMENDMENT

SITE NAME AND LOCATION

Diamond Head Oil Refinery Superfund Site (EPA ID# NJD092226000)
Kearny Township, Hudson County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document selects two remedies for the Diamond Head Oil Refinery Superfund Site, located in Kearny Township, Hudson County, New Jersey: (1) the amendment to the Light Non-Aqueous Phase Liquid (LNAPL) source area remedy selected in the Operable Unit 1 (OU1) September 25, 2009 Record of Decision (ROD), and (2) the Operable Unit 2 (OU2) remedy to address soil and sediments at the Site.

The Amended Remedy and Selected Remedy (collectively, the Remedies) were selected in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601 *et seq.*, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the Administrative Record file for the Site, an index of which can be found in Appendix IV.

The State of New Jersey concurs with the Remedies. A copy of the concurrence letter can be found in Appendix V.

ASSESSMENT OF THE SITE

The Remedies are necessary to protect public health, welfare, or the environment from actual or threatened releases of hazardous substances from the Site into the environment.

DESCRIPTION OF THE REMEDIES

First, this document amends the OU1 ROD remedy for the LNAPL source area, which included excavation of the principal threat LNAPL source areas, construction of an on-site biocell for treatment of lesser contaminated LNAPL wastes, and off-site disposal of the most highly contaminated portion of the excavated material. EPA has concluded, based on extensive bench scale testing of the biocell during the design phase, that it will not effectively treat the LNAPL. Therefore, the LNAPL source areas will instead be excavated and disposed off Site.

Second, this document selects the remedy for OU2 (OU2 Selected Remedy), which is envisioned to be implemented in conjunction with the Amended Remedy for OU1, and involves the disposal of contaminated soils; installation of a vegetative soil cover in Areas A, B, and C; institutional controls to restrict future use; and excavation of sediments in the drainage ditch.

The major components of the OU1 Amended Remedy include:

- Excavation and off-site disposal of the LNAPL source areas;
- Backfilling of excavated areas with non-hazardous I-280 berm soil, and additional clean fill to grade; and,
- Supplementing backfill with clean soil as needed.

The major components of the OU2 Selected Remedy include:

- Excavation of two feet of surface soil from Areas B and C, and wetland areas located in Area A, totaling 31,300 cubic yards;
- Disposal of any Resource Conservation and Recovery Act (RCRA) or Toxic Substances Control Act (TSCA) hazardous waste at an appropriate off-site facility (*i.e.*, RCRA Subtitle C or TSCA disposal facility);
- Distribution of excavated soils not requiring off-site disposal from Areas B and C, and wetland areas, across Area A for regrading;
- Disposal of excavated sediments from the drainage ditch at an appropriate off-site facility;
- Installation of a two-foot vegetated soil cover as an engineering control;
- Wetland restoration; and
- Implementation of a deed notice as an institutional control.

OU3 groundwater investigations have been conducted at the Site and groundwater conditions will be re-assessed after implementation of the OU1 and OU2 soil remedies to determine the appropriate response action for groundwater.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1 - Statutory Requirements

The Remedies are protective of human health and the environment, comply with federal and state requirements that are applicable or relevant and appropriate to the remedial actions, and are cost-effective. EPA has determined that the Amended Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site.

Part 2 - Statutory Preference for Treatment

The Remedies do not meet the statutory preference for the use of remedies that involve treatment as a principal element. Treatability testing of the OU1 source material indicated that the treatment remedy was not feasible. EPA has determined that the Amended Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. No source materials constituting principal threats will be addressed within the scope of the OU2 remedy.

Part 3 - Five-Year Review Requirements

The Remedies will result in hazardous substances, pollutants, or contaminants remaining above levels that do not allow for unlimited use and unrestricted exposure; therefore, a five-year review will be required for both OU1 and OU2.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this document. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations may be found in the "Site Characteristics" section.
- A discussion of source materials constituting principal threats may be found in the "Principal Threat Waste" section.
- A discussion of the baseline risk represented by the chemicals of concern may be found in the "Summary of Site Risks" section. This discussion is based on the baseline risk assessment found in the OU2 Remedial Investigation Report. Cleanup goals can be found in the "Remedial Action Objectives" section.
- Current and reasonably anticipated future land use assumptions used in the baseline risk assessment and OU1 ROD can be found in the "Current and Potential Future Site and Resource Uses" section.
- Estimated capital, operation and maintenance (O&M), and total present worth costs, and the number of years over which the remedy cost estimates are projected can be found in the "Description of Remedial Alternatives" section.
- Key factors that led to selecting the remedy may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

A. Carpenter
Angela Carpenter, Acting Director
Emergency & Remedial Response Division
EPA Region 2

9.29.17
Date

DECISION SUMMARY

RECORD OF DECISION AMENDMENT

Operable Unit 1 - Light Non-Aqueous Phase Liquid Source Area

AND RECORD OF DECISION

Operable Unit 2 - Soil and Sediments

Diamond Head Oil Refinery Superfund Site

Kearny Township, Hudson County, New Jersey

U.S. Environmental Protection Agency
Region 2
New York, New York
September 2017

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SITE NAME, LOCATION AND DESCRIPTION

The Diamond Head Oil Refinery site (Site), located at 1401 Harrison Avenue, Kearny Township, Hudson County, New Jersey, near the Hackensack Meadowlands, is a former waste oil reprocessing facility. Figure 1 shows the Site location. The Site is comprised of a 20.2-acre unoccupied parcel that includes wetland areas and drainage ditches, a small wetland/pond, a vegetated landfill area along the western border, and the remnants of the former Diamond Head Oil Refinery facility on the eastern portion of the Site (designated Area A in Figure 2). Area A is bordered by Harrison Avenue (also called the Newark Turnpike) to the north, entrance ramp "M" of Interstate 280 (I-280) to the east, I-280 to the south, and Campbell Distribution Foundry to the west. The construction of I-280 and associated entrance and exit ramps across the original property created a cloverleaf, dividing the Site into several sections, Areas A, B and C (see Figure 2). Area A, is also referred to as the current property; Areas B and C of the Site are cloverleaf areas created during the construction of I-280, addressed as part of OU2.

Land use surrounding the Site is industrial or open space/wetlands; the nearest residential area is approximately one half-mile to the west. To the south, a Municipal Sanitary Landfill Authority (MSLA) landfill, identified as the 1-D Landfill, is situated south of I-280. Area A is fenced along the north, east and south. Former operations took place on the eastern half of Area A. A landfill area which rises 10 to 15 feet above the rest of the Site is located on the western portion of Area A and was once an access road to the 1-D Landfill. Surface water drains through a drainage ditch that discharges to Frank's Creek, which in turn discharges to the Passaic River.

Based on 2015 tax records, Area A is currently divided into three parcels with mixed ownership. The western and eastern portions (Block 285, Lots 14 and 15) of Area A are owned by the Town of Kearny. The central portion of the Area A (Block 285, Lot 3) is owned by the Hudson Meadows Urban Renewal Corporation. New Jersey Department of Transportation (NJDOT) owns a parcel with soil berms adjoining the I-280 clover leaf (Block 285, Lot 2.01 in Area A and Block 285, Lot 4 in Areas B and C).

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The former Diamond Head Oil Refining Company operated from February 1, 1946, to early 1979 under several company names, including PSC Resources, Inc., Ag-Met Oil Service, Inc., and Newtown Refining Corporation. All of these companies were owned by Mr. Robert Mahler. During facility operations, multiple aboveground storage tanks and possibly subsurface pits were used to store oil wastes. These wastes were intermittently discharged directly to adjacent properties to the east, and to the wetland area on the south side of the Site, creating an “Oil Lake.”

In 1968, as part of its plans for construction of I-280, the NJDOT acquired part of the property from PSC Resources Inc., a subsidiary of the Phillips Screw Company, which in turn had acquired the property from the Diamond Head Oil Refining Company.

In 1977, NJDOT removed over 10 million gallons of oil and oil-contaminated liquid, and over 230,000 cubic yards of oil sludge, from the vicinity of the Oil Lake. The liquid wastes were shipped to waste-oil recycling facilities. The oil-contaminated sludge was excavated and placed in a series of disposal cells – one atop the MSLA 1-D Landfill, and a series of smaller cells located on the Site within the I-280 highway right-of-way (ROW), next to the oil-reprocessing facility which was still in operation at the time. The details of these disposal efforts are not well documented, but a simple liner and clay-based capping material were used as part of the disposal efforts for the sludge. While the surficial Oil Lake was removed and filled in, the NJDOT also reported finding an "underground lake" of oil-contaminated groundwater, extending from the eastern limits of the I-280 ROW to Frank's Creek, located west of the Site.

From the close of operations in 1979 until 1982, the abandoned Site was not completely fenced. In 1982, during the dismantling of the oil reprocessing facility, approximately 7,500 gallons of materials were pumped out of tanks and disposed off Site, and 27 tons of contaminated soil were reportedly removed from the Site. Sampling conducted during this cleanup effort identified hazardous substances, including polychlorinated biphenyls (PCBs) in waste material collected from the Site. Aerial photographs from 1982 show that the oil reprocessing facility infrastructure had been dismantled. The buildings and facilities associated with previous Site operations were constructed on the eastern half of the Site, and some remnant concrete building and tank foundations remain. In 1985, the refinery property was sold to Mimi Urban Development Corporation, which subsequently changed its name to Hudson Meadows Urban Development Corporation.

The property sat idle for a number of years, at least in part because of the alleged contamination. NJDEP requested that EPA evaluate the Site for inclusion on the National Priorities List (NPL) in 1999. The Site was added to the NPL in September 2002.

In 2003, EPA began an OU1 Remedial Investigation (RI) to determine the nature and extent of the contamination at the Site. In addition to the light non-aqueous phase liquid (LNAPL), the OU1 RI found soil, sediment, groundwater, and surface water contamination attributable to the Site. The OU1 RI also included a number of test trenches through the landfill portion of the Site to assess the nature of the material buried there, and collected borings along the I-280 ROW soil berms to ascertain the presence of buried sludge. New groundwater monitoring wells were installed in 2009 on a number of neighboring properties in order to fully assess the extent of the groundwater contamination.

In 2009, EPA initiated an OU2 RI to supplement the results of the OU1 RI. The general objectives of the OU2 RI were to investigate the nature and extent of contamination, and determine if the chemical contamination observed during the OU1 RI was present beyond the boundary of the property addressed in OU1

In September 2009, EPA signed the ROD for OU1, addressing the LNAPL source material at the Site. The ROD selected on-site biocell treatment technology as a component of the remedy. Excavation and disposal was another component of the remedy.

A Pre-Design Investigation (PDI) for OU1 was conducted between 2010 and 2015. The PDI refined the criteria used for measuring the extent of LNAPL source material, identified the remedial target areas (RTA) for LNAPL source material, and demonstrated that the on-site biocell treatment technology would not attain the remedial action objectives and remediation goals outlined in the OU1 ROD.

In April of 2017, EPA identified several parties as potentially responsible parties (PRPs) for the Site and informed each party of their potential liability for the cleanup or costs associated with environmental response actions at the Site. The search for PRPs is ongoing.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

Supporting documentation for the OU1 ROD Amendment, the RI/FS Report and Proposed Plan for OU2 were released to the public for comment on June 19, 2017. These documents were made available to the public at the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York and at the Kearny Public Library, 318 Kearny Avenue, Kearny, New Jersey. A notice of the availability of these documents was published in the Kearny newspaper, *The Observer*, on June 19, 2017. A public comment period was held from June 19 to July 19, 2017. At this meeting, representatives from EPA answered questions about problems at the Site and remedial alternatives. EPA's response to comments received during this period is included in the Responsiveness Summary section of this document.

SCOPE AND ROLE OF OPERABLE UNITS

As with many Superfund sites, the problems at the Diamond Head Oil Refinery Site are complex. EPA has organized the work into three operable units (OUs) for the purpose of managing Site-wide response actions:

Operable Unit 1: LNAPL Source Area.
Operable Unit 2: Comprehensive site remedy addressing contaminated soil and sediments.
Operable Unit 3: Groundwater.

The first operable unit, the subject of this ROD Amendment, addresses soils contaminated with LNAPL that constitute a principal threat.

The second operable unit, also the subject of this ROD, addresses residual soil and sediment contamination at the Site, not addressed as part of OU1, and the on-site landfill.

The third operable unit focuses on groundwater. Groundwater investigations have been conducted at the Site and groundwater conditions will be re-assessed after implementation of the OU1 and OU2 soil remedies to determine the appropriate response action for groundwater.

SITE CHARACTERISTICS

Site Features

The major physical features on the property include the remnants of concrete foundations in the oil reprocessing area of the former Diamond Head Oil refinery, the remnants of a former refinery in the northern section of the property, a landfill (covering approximately 7 acres) occupying the western section of the property, soil berms along the eastern and southern borders of the property along the I-280 ROW, and a stormwater drainage ditch between the berms and I-280, flowing south-southwest (see Figure 3). Wetland areas are present on the property in the western, southern, and central sections, and a remnant feature referred to as the "sludge lagoon" is present in the southern section of the property. The location of the former Oil Lake, which is evident in historical aerial photographs from the period of operation of the former oil refinery, is no longer a major physical feature of the property.

Site Geology

The stratigraphy at the Site consists of a relatively uniform vertical sequence of unconsolidated materials from top to bottom. A highly variable (in content and thickness) layer of anthropogenic fill is found across the Site, consisting of typical demolition-type debris, including wood, brick, metal, glass, plastic, and concrete mixed in a matrix of poorly sorted fine to coarse sand and gravel or silt, sand, and gravel. The next unit that is encountered is a sand unit about five feet thick on the western side of the Site, pinching out until it is not present on the eastern side of the Site. A silty clay unit, up to eight feet thick in sections of the Site, that appears to be continuous throughout the study area is encountered next, followed by a distinctive peat layer of varying thickness, but considered continuous across the Site. A silt and sand unit approximately 15 to 20 feet thick, beneath the peat layer, is encountered next, and followed by a laminated silt and clay unit, the full thickness of which was not observed in any of the study borings to date (as deep as 50 feet). The final unit is bedrock, which also has not been encountered to date.

Surface soils at the Site have been disturbed and reworked as a result of numerous construction and earthmoving activities.

Site Hydrology

Groundwater at the Site is generally observed from 2 to 6 feet below ground surface, within the fill materials and natural and reworked soils that form the shallow overburden aquifer. The water table fluctuates seasonally and is highly influenced by precipitation and freeze-thaw cycles. Groundwater in some areas of the Site is observed in the form of perched water that is trapped above less permeable materials at shallower depths than the water table.

Water levels in the shallow groundwater above the silty clay and peat layers indicate a mounding of water near the wetland area in the southeastern portion of the property. At the local scale of the property, the shallow groundwater is considered to flow somewhat radially from this mounded area.

In the water-bearing unit below the peat layer, groundwater flows generally from northeast to southwest, consistent with regional trends in groundwater flow.

Surface Water

As a result of the construction of I-280, all drainage on the north and west side of the highway now travels a distance of 600 feet to Frank's Creek via a man-made drainage ditch. Frank's Creek discharges to the Passaic River. Prior to the 1940s, the area south of Harrison Avenue was wetlands. Landfilling activities that started in the 1940s began to shrink and divide the wetland areas. The eventual Oil Lake, estimated in 1977 to be between six and seven acres, appears to have formed in a remaining lowland area surrounded by properties filled for industrial development, and by what would become the MSLA 1-D Landfill to the south. With the construction of I-280, including the placement of the ROW berms, there is an isolated, frequently ponded wetland located just south of the former Diamond Head Oil facility.

The presence of wetlands along the southern Site boundary that include areas of surface water, and the presence of an LNAPL plume in the southeast corner of the Site, in the area of the former lagoon, have a significant influence on the water table at the Site. Although lighter than water, the density of the LNAPL has the effect of depressing the water table and influencing groundwater flow.

Five wetland areas and vegetated drainage channels were delineated during the RI. In general, these areas were observed to be significantly disturbed and degraded because of historical industrial activities that have occurred at the Site. These wetlands were characterized as palustrine forested, palustrine, emergent, and open water resources and total approximately 1.85 acres.

Nature and Extent of Contamination

The purpose of the RIs is to obtain data on the nature and extent of soil, groundwater, surface water, and sediment contamination at the Site. The OU1 RI was conducted in two phases and the OU2 RI was conducted in one phase.

The OU1 RI investigated the extent of LNAPL that had been observed in the former surficial Oil Lake area as well as the groundwater conditions at the upgradient and downgradient boundaries of the landfill, and at the boundary of the Diamond Head Oil property. The OU1 RI also investigated surface and subsurface soil contamination, and the nature and extent of surface water and sediment contamination on the Site and at the junction of Frank's Creek and within the drainage ditch. Wetland delineation was conducted during the OU1 RI.

EPA initiated a second phase of the OU1 RI in 2008. The objectives were to investigate contamination associated with the principal threat LNAPL and to confirm that, as suggested by the Phase 1 RI results, the landfill did not represent a source of groundwater contamination.

Summary of the OU1 RI

The results of the OU1 RI were presented in the OU1 ROD. The results are being repeated here for completeness and to provide a full understanding of the contamination at the Site.

The OU1 RI identified two potential source areas where LNAPL may be continuing to release contamination to the environment. The first potential source area is the former oil reprocessing section of the Site, once containing two buildings, multiple aboveground storage tanks (ASTs), drum storage areas, and possibly underground pits. The second potential source area is the former Oil Lake, estimated in 1977 to cover an area of six to seven acres, located in the southern section of the Site, extending into the I-280 cloverleaf to the east and south.

In the former oil processing section of the Site, only the foundations of one building and two ASTs are visible. No remnants of the oil lake are visible, but historical information indicates the lagoon occupied the southeastern section of the Site and extended eastward. Figure 2 shows the boundary of the Oil Lake.

There was evidence of oil contamination in nearly every boring installed within Area A and in many borings to the southeast. Because of this "smear" of oil contamination across the Site, the following methods were used to document the nature and extent of the LNAPL, and to identify the more severely contaminated areas of the Site:

- A geotechnical measurement tool called laser-induced fluorescence (LIF) allowed for the subsurface mapping of borings that contain LNAPL. LIF can rapidly identify an oil "fingerprint," including both extent and relative concentration;

- Soil borings were collected throughout the Site down to the laminated silt and sand unit as much as 50 feet deep, and the presence of oil staining or separate-phase oil in the soil borings was documented. These results were compared with the LIF sample points to calibrate the LIF data to site-specific conditions; and

- A number of monitoring wells, meant to measure groundwater contamination, have thicknesses of floating product in the tops of the wells, with as much as five feet of LNAPL floating in some wells.

Samples of contaminated soil, oily wastes, and sludge were collected and sent for laboratory analysis to identify potential contaminants of concern, and to establish an analytical profile of the LNAPL.

Using the methods outlined above, several characteristics of the LNAPL were established:

- The LIF study concluded that LNAPL is present in the subsurface throughout most of the investigated area, though the LIF showed wide variations in the intensity of the LNAPL signal, indicating substantial variation in concentration across the Site;

- LNAPL was measured in wells in three areas of the Site, one in the former processing area, and two within the footprint of the Oil Lake;

- The vertical occurrence of LNAPL can be further separated into two depth intervals: (1) at the water table (approximately two feet below ground surface), sometimes with an extended smear zone into the saturated fill-containing material and soil to about 10 feet below ground surface; and (2) as a distinct deeper interval at depths of 10 to 16 feet below ground surface within the silty/clayey soil. The bulk of LNAPL-containing soil is located near the water table within the fill layer;

- LNAPL appears to contain more diesel range organics than gasoline range organics. The following compounds or classes of compounds were detected in the LNAPL: benzene, toluene, ethylbenzene, and xylenes, as well as a number of other volatile and semivolatile organic compounds (VOCs and SVOCs) consistent with a petroleum matrix. In addition, two PCBs (Aroclor 1232 and Aroclor-1260) and a variety of metals, including lead and cyanide were also identified in LNAPL-zone samples;

- Despite the large thickness of LNAPL found in some monitoring wells and its relatively high saturation, LNAPL is extremely viscous and is relatively immobile under ambient gradients;

- This is indicative of a highly weathered LNAPL where much of the more mobile components have degraded or already traveled away from the Site, leaving the less mobile fractions; and

- Within the LNAPL source areas, there are pockets of less weathered LNAPL of high saturation that present a leaching concern to groundwater.

A total area of approximately 176,000 square feet was identified in the OU1 ROD as LNAPL source areas. This included the two areas of the Site where monitoring wells contain measurable thicknesses of LNAPL. The thicknesses of the principal threat LNAPL varies. Based on an average depth of seven feet below ground surface, a total volume of 45,825 cubic yards (including 2,593 cubic yards where LNAPL floating product is found in wells) constitutes the principal threat LNAPL.

In 2015, EPA completed PDI of the principal threat LNAPL waste at the Site. The PDI objective was to define the area of OU1 principal threat waste and support the remedial design of a biocell. The PDI helped to refine the criteria used to measure the extent of LNAPL source material at the Site. Based on the refined criteria, the volume of LNAPL source material measured at the Site increased by approximately 3,000 cubic yards – from approximately 46,000 cubic yards to approximately 49,000 cubic yards.

Of note, areas below the east and south berms are considered to represent principal threat and are included in the RTA of principal threat waste. The berms themselves, however, are not considered to contain principal threat LNAPL waste.

Summary of the OU2 RI

EPA collected additional soil, sediment, and surface water samples from the Site over the course of the OU2 RI. Samples were analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and dioxins and furans. Soil samples at the Site were categorized as being taken from within or outside the property boundary – "within" referring to the 20.2 acres of Area A that served as the original Diamond Head Oil Refinery property, and "outside" referring to the 10.3 acres of Areas B and C containing the I-280 interchange cloverleaf.

Analytical results were compared to Federal or New Jersey standards for each medium, whichever was more stringent, to determine if concentrations pose a potential threat to human health or the environment and need further evaluation in the baseline risk assessment.

Analytical results were compared to the following:

- Soil – New Jersey Non-Residential Direct Contact Soil Remediation Standards (NJNRDCSRS), New Jersey Ecological Screening Criteria, National Oceanic and Atmospheric Administration Screening Quick Reference Tables (SQuiRTs), and EPA Regional Screening Levels (RSL) for Dioxins and Furans;
- Sediment - NJDEP's Ecological Screening Criteria Lowest Effects Levels;
- Surface water - New Jersey Surface Water Quality Standards (NJSWQS) for Fresh Water; and
- Impact to groundwater pathway - NJDEP's Impact to Groundwater Soil Screening Levels.

The OU2 RI indicated the presence of multiple contaminants, including chromium, dioxin, PCBs, lead, aldrin, thallium, and benzo[a]pyrene.

Soils: Soil samples were taken in approximately 118 sample locations at multiple depths, from surface soils (0-4 ft.), subsurface soils (5-10 ft.), and the I-280 ROW soil berms, both inside (Area A) and outside (Area B and Area C) the property boundary (Figure 2). Samples were tested for VOCs, SVOCs, pesticides, PCBs, metals, and dioxins and furans. Surface soil samples taken within the property boundary detected maximum concentrations of lead at 27,900 parts per million (ppm), chromium at 7,650 ppm, and PCBs at 14 ppm. Subsurface soil samples taken within the property boundary revealed concentrations of chromium at 22,300 ppm, thallium at 45.7 ppm, and benzo[a]pyrene at 35 ppm. The highest levels of contamination in the surface and subsurface soils were located in Area A in the general area of the former refining operations, and in the central section of Area A at the location of the former Oil Lake.

Sampling of the I-280 ROW soil berms on the eastern and southern portion of the Site revealed maximum concentrations of lead at 306 ppm and chromium at 7,700 ppm, at depths of 5-7 feet. Surface soil samples taken outside the property boundary (Areas B and C) detected maximum concentrations of PCBs at 1,800 ppm and aldrin at 75 ppm. Subsurface soil samples taken outside the property boundary revealed concentrations of lead at 13,200 ppm and PCBs at 8.4 ppm. The highest levels of contamination in the surface and subsurface soils were found from 0-

2 feet in the surface soil and 5-17 feet in the subsurface soil, and were located in Areas B and C, within the footprint of the former Oil Lake.

Surface soil samples analyzed for dioxin and furan contamination from within the property boundary detected a concentration of 1,873 parts per trillion (ppt) at 0-2 feet, located in the central section of Area A, within the footprint of the former Oil Lake. Soil samples taken from outside the property boundary detected concentrations of dioxin/furans at 8,188 ppt from 0-2 feet, and 11,172 ppt from 2.5-3 feet, and were located in Area C, within the footprint of the former Oil Lake.

Sediment: Sediment samples were taken from the drainage ditch, which is only underwater during flooding events, and from Frank's Creek in approximately 25 locations. Sediment samples were tested for VOCs, SVOCs, pesticides, PCBs, metals, and dioxins and furans. Analysis of sediment samples detected lead contamination at a concentration of 84,400 ppm, found at 0-3 feet in the central section of Area A, within the footprint of the former Oil Lake. Sediment samples taken from the drainage ditch, near it's confluence with Frank's Creek, indicated the presence of lead contamination at a concentration of 84,300 ppm from a depth of 0-0.5 feet. The sediments analyzed from the drainage ditch function more like soils, in that they are compacted and vegetated, and are less likely to travel into Frank's Creek. The contamination present in sediments that were analyzed from Frank's Creek are therefore likely related to contributing sources other than the Site, which is reflective of the industrial nature of the Creek's surrounding and upstream areas.

Surface Water: Surface water samples were taken from approximately 10 sample locations. Samples were tested for VOCs, SVOCs, pesticides, PCBs, and metals. Analysis of surface water samples detected maximum concentrations of lead at 712 µg/L (micrograms per Liter), thallium at 160 µg/L, and beryllium at 990 µg/L, found in ponded surface water within Area A, and in one sample taken in the drainage ditch near its confluence with Frank's Creek.

Landfill: Two trenches were dug along the length of the landfill. The majority of the landfill content was observed to consist of municipal-type wastes with a lesser component of demolition-type debris. In general, the municipal-type waste consisted of glass and plastic beverage bottles, steel and aluminum cans from foodstuffs, residential and consumer papers including newspapers (the oldest noted were from 1959), and other glass, metal, plastic, wood, and cardboard-type materials typical of residential and consumer goods. Demolition-type debris was also observed, including brick and concrete fragments up to 5 feet in diameter; wood products including timbers, planks, and tree stumps; metal including pipes, rebar, and flatiron; and general construction materials, including shingles and sheet plastic. Industrial-type debris was also observed including steel, poly and fiber drums, and industrial resin or polymer-type materials intermixed with the general landfill refuse.

Samples were taken at 14 locations in the trenches that were excavated along the length of the landfill. All samples contained VOCs. VOCs exceeded the NJNRDCSRS at 1 of the 14 sampling locations, and the New Jersey Impact to Groundwater Soil Screening Levels at 12 of the 14 sampling locations. Benzene exceeded its standards and criteria most often. Benzene was the only VOC that exceeded the NJNRDCSRS. The following VOCs exceeded their New Jersey

Impact to Groundwater Soil Screening Levels: benzene, ethylbenzene, chlorobenzene, toluene, cis-1,3-dichloropropene, 1,1,2,2-tetrachloroethane, PCE, and TCE. SVOCs exceeded the NJNRDCSRS and the New Jersey Impact to Groundwater Soil Screening Levels at all 14 sampling locations. The SVOCs that exceeded standards and criteria most often include benzo(a)pyrene, benzo(a)anthracene, and dibenzo(a,h)anthracene. All 14 trench samples contained pesticides. Pesticides exceeded the NJNRDCSRS at 2 of the 14 sampling locations, and the New Jersey Impact to Groundwater Soil Screening Levels at all 14 sampling locations. The pesticides that exceeded standards and criteria most often include BHC-alpha, BHC-beta, and heptachlor epoxide. The concentrations measured in the samples from the landfill trenches were not observed to increase or decrease with depth within the landfill or in any pattern along the length of the trenches. This lack of trend in concentration changes was expected based on the heterogeneous nature of the landfill materials.

EPA concluded that while contamination is present in the landfill materials, the results of three rounds of groundwater sampling suggest the materials do not present a significant source to groundwater contamination, as an increase in groundwater concentrations is not evident downgradient of the landfill. The landfill is also not a source of LNAPL.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The Site, located within the Kearny Urban Enterprise Zone, is currently undeveloped, and is designated on the tax map as industrial/commercial. The land use surrounding the Site is industrial/commercial and open space/wetlands, and is not anticipated to change in the future. The nearest residential area is located a half-mile to the west, and is not impacted by Site contamination. An MSLA landfill, identified as the 1-D Landfill, is situated south of I-280. Based on the zoning of the Site and the surrounding land uses, it is anticipated that the future use of the Site will involve industrial/commercial/or retail use.

Groundwater beneath the Site is located in the Newark Basin and is classified by the State of New Jersey as Class IIA - Groundwater for Potable Water Supply. Municipal water is provided to the town’s residences and businesses through the North Jersey District Water Supply Commission. The Commission primarily takes its water from the Wanaque Reservoir. It is supplemented by the Monksville Reservoir during periods of drought.

SUMMARY OF SITE RISKS

EPA conducted a baseline risk assessment 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 remedial alternative that was chosen for the Site addresses contamination at the Site. The risks and hazards for the Site were presented in the baseline risk assessments 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, berm soil, surface water, and sediment contaminants related to the Site, which may pose a significant risk to human health. Analytical information was collected to determine the nature and extent of contamination, and indicated the presence of site-related contaminants in surface soil, subsurface soil, berm soil, surface water, and sediment at concentrations of potential concern.

A comprehensive list of all COPCs that were investigated can be found in the Baseline Human Health Risk Assessment (BHHRA), contained within the OU2 RI report for the Site. This document is available in the Administrative Record file. The list of COCs identified in surface soil, subsurface soil, surface water, and sediment, as well as exposure point concentrations, are presented in Table 1.

Exposure Assessment

Consistent with Superfund policy and guidance, the BHHRA, is an assessment, and therefore assumes no remediation or institutional controls to mitigate or remove releases of hazardous substance. 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 where the risk or hazard exceeded the acceptable levels, the central tendency estimate (CTE), or the average exposure, was also evaluated.

The Site is currently zoned for industrial use. In addition, the drainage ditches and Frank's Creek could be used for recreational activities by trespassers. It is expected that future use will be similar to the current use. The BHHRA evaluated potential risks to populations associated with both current and potential future land uses.

Exposure pathways were identified for each potentially exposed population and each potential exposure scenario for exposure to surface soil, subsurface soil, berm soil, surface water, and sediment. Exposure pathways assessed in the BHHRA are presented in Table 2. The current and future land use scenarios refer to exposure to soil from within or outside the property boundary – "within" referring to the 20.2 acres of Area A that is the former Diamond Head Oil Refinery property, and "outside" referring to the 10.3 acres of Areas B and C containing the I-280 interchange clover leaf. As the Site is currently undeveloped and is designated on the tax map as industrial/commercial, the current and future land use scenarios included the following exposure pathways and populations:

- Site Maintenance Worker (adult): current/future ingestion, dermal contact and inhalation of soil particles and vapors for surface and subsurface soil from within the property boundary (Area A, Figure 2), and future exposure to the I-280 ROW berm;

- Trespassers (child/adult): current/future ingestion, dermal contact and inhalation of soil particles and vapors for surface and subsurface soil from within the property boundary and the I-280 ROW berm, and sediment and surface water;

- Highway Worker (adult): current/future ingestion and dermal contact and inhalation of soil particles and vapors for surface and subsurface soil from outside of the property boundary (Area B and C), including the I-280 ROW berm;

- Industrial Worker (adult): future ingestion, dermal contact and inhalation of soil particles and vapors for surface and subsurface soil from within the property boundary and the I-280 ROW berm; and

- Construction Workers (adult): future ingestion, dermal contact and inhalation of soil particles and vapors from surface and subsurface soil from within the property boundary and the I-280 ROW berm.

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 reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures. Central tendency exposure assumptions, which represent typical average exposures, were also developed. A complete summary of all exposure scenarios can be found in the BHHRA.

Toxicity Assessment

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to site-related 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 provided by 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 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:

Risk = LADD x 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 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}.

The HIs for noncancer effects are presented in Table 5 and the cancer risks are presented in Table 6. Lead was evaluated separately for surface soil. Initially lead concentrations were compared to the NJNRDCSRS value of 800 ppm. An additional evaluation for lead using the Adult Lead Model was also conducted. Specifically, four default parameters in the ALM were modified to reflect the current science. The blood lead value of 10 µg/dl was changed to 5 µg/dl, the geometric standard deviation (GSD_i) was adjusted from 1.7 to 1.8 to reflect the most recent National Health and Nutrition Evaluation Survey (NHANES) data set (2009-2014), the baseline blood lead concentration was changed from 0.7 to 0.6 to reflect the most recent NHANES data set (2009-2014), and the soil ingestion rate was modified from 100 mg/kg to 67 mg/kg based on recent literature studies on soil ingestion rates for outdoor receptors. The modifications to the ALM are documented in a technical memorandum in the administrative record. The ALM provided a comparison value of 784 ppm. Based on both evaluations (NJNRDCSRS and ALM), surface soil lead concentrations were elevated within the property boundary, the berm soil, and surface water, resulting in lead being identified as a COC in surface soil, subsurface soil and sediment.

Surface Soil

Risks and hazards were evaluated for current and/or future exposure to surface soil. The populations of interest included adult maintenance workers, child and adult trespassers, adult highway workers, adult industrial workers and adult construction workers.

The potential current hazards for trespassers (child), industrial workers and construction workers are above the acceptable hazard index of 1 from exposure to surface soil within the property boundary. The potential current risk for all populations is above the acceptable risk range for exposure to surface soil within the property boundary. Chromium[1], dioxin, and PCBs are COCs for surface soil within the property boundary. Exposure to surface soil from the berms results in estimated hazards that are equal to or below the acceptable hazard index of 1, and the cancer risk is equal to or above the acceptable risk range, with chromium being identified as a COC. The potential future hazards and risks for future highway workers exposed to surface soil outside of the property boundary exceed the acceptable hazard index of 1 and the cancer risk range, due to dioxin, aldrin and PCBs.

Subsurface Soil

Risks and hazards were evaluated for the potential future exposure to subsurface soil. The populations of interest included future adult industrial workers, construction workers, maintenance workers and trespassers within the property boundary, and highway workers from outside of the property boundary. The hazard index was equal to or greater than 1 for all populations, and the cancer risk was above the acceptable risk range for all populations. The COCs within the property boundaries were chromium, thallium, and benzo[a]pyrene, while the COCs outside of the property boundary were PCBs and dioxin.

Surface Water and Sediment

Risks and hazards were evaluated for the potential current and future exposure to surface water and sediment in Frank's Creek, and sediment from the drainage ditch, which is more representative of soil. The populations of interest included adult maintenance workers and adult and child trespassers. The non-cancer hazards for surface water were above the EPA acceptable value of 1 for the maintenance worker and child trespasser. The COCs identified for surface water were beryllium and thallium. The cancer risks were below or within EPA's acceptable ranges for all populations. Lead was also identified as a COC for the sediment due to several hot spot locations with lead concentrations exceeding both the NJNRDCSRS and ALM values.

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1 Chromium speciation was not conducted on the samples, therefore the risks and hazards from chromium exposure was evaluated assuming that total chromium was 100% chromium VI, the most toxic form of chromium.

Groundwater and Vapor Intrusion

Although LNAPL source material is present on Site, contaminant levels in groundwater, in general, slightly exceed the groundwater standards. For example, benzene (with relatively higher solubility and mobility compared to other site-related contaminants) was detected in exceedance of the NJ Class IIA standard of 1 part per billion (ppb) in groundwater in only 4 wells where LNAPL source material was present in the RTA (Area A, Figure 2). The large majority of wells had no exceedances of VOC criteria, or had just one exceedance for only one VOC during the three sampling rounds, and were observed in wells that contained LNAPL source material. LNAPL has not been observed in any deep monitoring wells (monitoring wells screened beneath the clay and peat layers) in any of the monitoring events conducted. Based on the low level of contaminants in groundwater, the low solubility of SVOCs, dioxins/furans and PCBs, and the removal of LNAPL source material, there would be limited potential for remaining soil contaminants to migrate to groundwater and thus levels of groundwater contaminants would be expected to decrease over time.

The potential risks and hazards associated with contaminated groundwater and volatilization of volatile organic compounds (VOCs) from contaminated groundwater into future buildings built over the contaminated groundwater were evaluated in the human health risk assessment, however, exposure to groundwater and vapors are being addressed in OU3, thus they are not discussed here.

<u>Uncertainties</u>

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 baseline human health risk assessment report. In general, the main sources of uncertainty include:

- Environmental data;
- Environmental parameter assumptions;
- Toxicity data; and,
- Risk characterization.

Two of the primary sources of uncertainty identified in the HHRA were associated with exposure parameters and toxicological data. Uncertainty in exposure parameters leads to many of the parameters being associated with default values since site-specific values were not available. This would tend to provide a conservative estimate of potential risk and hazards.

Another important source of uncertainty was toxicological data. The toxicity factors used in the quantitative evaluation of potential risks and hazards were primarily selected from the Integrated Risk Information System (IRIS). For many chemicals, there is a lack of appropriate information on effects in humans (*i.e.,* epidemiologic studies). Therefore, animal studies are generally used to develop toxicity values in human health risk assessments, which may under- or over-estimate potential risks and hazards, Additionally, for this evaluation, chromium was analyzed as total chromium, however the toxicity value for hexavalent chromium was used to estimate risks and hazards. Given that trivalent chromium, which is less toxic than hexavalent chromium, is the most frequent form of chromium in the environment, it is likely that the risks and hazards from chromium exposure are overestimated.

The Remedies are necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances in the environment.

Ecological Risk Assessment

An Ecological Risk Assessment (BERA) was performed, evaluating the potential for impacts to sensitive ecological receptors from site-related COCs through exposure to surface soil, surface water, sediment, and prey items (*i.e.*, small mammals and fish). Surface soil, surface water and sediment concentrations were compared to ecological screening values, and food web modeling for upper trophic level predators was completed to determine the potential for adverse effects to ecological receptors. A complete summary of all exposure scenarios can be found in the BERA in the Administrative Record.

Surface Soil

Although animals using the Site do not distinguish boundaries, soil was evaluated using two different exposure areas, exposure to Site-wide soil and exposure to berm soil. This was done to identify if there are different risks associated with different areas of the Site. Soil concentrations were compared with screening values that are protective for soil invertebrates. Based on the evaluation, there is a potential for adverse effects to soil invertebrates from exposure to surface soil in both the Site-wide soil and the berm soil. The risk from exposure to berm soil was less than the risk for Site-wide soil. The surface soil screening criteria for soil invertebrates were exceeded for 38 compounds consisting of metals, pesticides, SVOCs and PCBs in soil Site-wide, which resulted in hazard quotients (HQs) greater than the acceptable value of 1. The soil screening criteria for soil invertebrates were exceeded for 30 hazardous substances consisting of metals, pesticides, SVOCs, a VOC and dioxin in berm soil, which resulted in HQs greater than the acceptable value of 1.

Food Web Modeling

Exposure to compounds in the soil and prey items (small mammals) was evaluated for upper trophic level terrestrial animals, including the short-tailed shrew, white-footed mouse, mourning dove, barred owl, American woodcock and red fox. All of the terrestrial receptors exposed to Site-wide soil had HQs greater than 1 due to metals, PCBs and dioxin for both No Observed Adverse Exposure Levels (NOAELs) and Lowest Observed Adverse Exposure Levels (LOAELs) comparisons. Short-tailed shrew, white-footed mouse, and American woodcock exposed to berm soil had HQs greater than 1 for LOAEL comparisons due to a combination of either metals, PCBs, and/or dioxin, and all terrestrial receptors had HQs above 1 for NOAEL comparisons due to metals, PCBs and/or dioxin.

Exposure to compounds in the surface water, sediment and prey items (fish) was evaluated for upper trophic level aquatic animals, including mink, muskrat, raccoon, and belted kingfisher. All of the aquatic receptors evaluated had HQs greater than 1 due to a combination of metals, PCBs, and/or dioxin for the NOAEL comparison. Muskrat had an HQ greater than 1 for the LOAEL comparison due to lead, and belted kingfisher had an HQ greater than 1 for the LOAEL comparison due to mercury. The rest of the aquatic receptors had HQs less than 1. Additionally, mummichogs in the drainage ditch had HQs greater than 1 for 9 compounds consisting of metals, pesticides, and PCBs.

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) and risk-based levels established in the BHHRA, prepared at the time of the 2009 OU1 ROD. Because the BHHRA established that the principal threat LNAPL source areas at the Site pose an unacceptable risk to human health and the environment, remedial action objectives (RAOs) were established. EPA has concluded that these remedial action objectives are still appropriate.

OU1 RAOs from the 2009 OU1 ROD

- Remove or treat principal threats, consistent with the NCP, to the extent practicable;
- Prevent current and future migration of LNAPL and associated chemical contaminants to the various media at the Site, including groundwater and seeps to surface water; and,
- Prevent human exposure through direct contact with the principal threat LNAPL.

OU2 RAOs

EPA established the OU2 RAOs to prevent/minimize potential receptor exposures that present unacceptable risk as a result of contact, ingestion, or inhalation (dust).

Surface water on the Site appears only as surficial flooding, areas of standing water during wet seasons or flooding events, and in delineated wetlands. An RAO for surface water has therefore not been developed, as soils are the contributing source of contamination to surface water, and any risks presented by surface water will be addressed through attainment of the soil RAO.

Soil:

- Prevent/minimize potential ecological receptor exposures and human receptor exposures through contact, ingestion, and inhalation of contaminated soils.

Sediment:

- Prevent/minimize potential ecological receptor exposures and human receptor exposures to contaminated sediment in the drainage ditch.

After the concurrent implementation of the OU1 and OU2 remedial actions, OU3 will evaluate changes in groundwater concentrations over time.

To achieve the RAOs for OU2, EPA is proposing soil and sediment remediation goals for the COCs based on NJDEP's NRDCSRS and EPA risk-based values with the exception of thallium[2]. The remediation goals are as follows:
Soil:

- Chromium: 20 ppm
- Dioxin: 730 ppt
- PCBs: 1 ppm
- Aldrin: 0.2 ppm
- Lead: 800 ppm
- Benzo[a]pyrene: 2 ppm

Sediment:

- Lead: 800 ppm[3]

BASIS FOR OU1 REMEDY MODIFICATION

The biocell treatment component of the Original Remedy selected in the 2009 ROD will not be effective in treating the LNAPL source areas and therefore will not meet the RAOs.

DESCRIPTION OF PROPOSED CHANGES TO THE OU1 LNAPL SOURCE AREA REMEDY

After the OU1 ROD was signed, new information was generated that affected the implementation of the selected remedy. The PDI demonstrated that biocell treatment would not be effective and therefore would not achieve the OU1 RAOs, as those pertained to the LNAPL that was to be treated on-site. This prompted EPA to amend the source area remedy. EPA began by reevaluating other the alternatives that were considered at the time of the OU1 ROD to see if any of them would now be more appropriate. EPA believes that the original Alternative 4, Excavation and Off-Site Treatment/Disposal of Entire LNAPL Source Area, is appropriate for

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2 The toxicity value for thallium used in the risk assessment is no longer supported as a basis for decision making. As a result, it is not possible to calculate non-cancer hazards to support a decision. NJDEP also removed the soil remediation value from their promulgated soil standards in September of 2017, thus there is no remediation goal provided for thallium. Thallium is co-located with the COCs for which remediation goals are available so the original identified areas that contained thallium at elevated levels will be removed as part of the remedy.
3 The resulting preliminary remediation goal (PRG) value using the latest information from the National Health and Nutrition Examination Survey (NHANES) (2009-2014) is 784 ppm, incorporating the Region 2 proposed adjusted adult soil and dust ingestion rate and a target blood level of 5 µg/dl. This value was rounded to 800 ppm which is also the NJNRDCSRS value. This value will be used as the PRG for both soil and sediment cleanup, as sediments found in the drainage ditch function more like soils (compacted and vegetated), and are only underwater during flooding events. The drainage ditch areas represent a small percentage of the area used by the ecological receptors, therefore the cleanup goal should be protective for both human health and the environment.

comparison to the Original Remedy that was selected. A description of each of the OU1 alternatives is provided below followed by a comparison between the Original Remedy, Alternative 2: On-Site Biocell, and Alternative 4: Excavation and Off-Site Treatment/Disposal of Entire LNAPL Source Area.

OU1 Alternative 2: On-Site Biocell

Capital Cost:	*$16,080,000*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$17,340,000*
Construction Time Frame:	*1 year*

The Original Remedy called for the off-site disposal of the principal threat LNAPL source material, and construction of an on-site biocell for the treatment of the remaining low-level threat source material.

The major components of the Original Remedy included:

- Isolation of the RTAs with cut-off walls, and excavation of the principal threat LNAPL source material, a total of approximately 45,825 cubic yards of material;

- Transportation and off-site disposal to a facility (with treatment as required to meet Resource Conservation and Recovery Act (RCRA) Land Disposal Requirements) for the principal threat LNAPL portion of the excavated material that is not amenable to on-site treatment;

- For the low-level threat LNAPL material amenable to on-site treatment, construction of a biocell within the excavated area to facilitate biodegradation of the LNAPL wastes, including the installation of piping for air and nutrient distribution and a collection system for air and water that may accumulate in the biocell;

- Introduction of nutrients and bulking agents to the low-level threat LNAPL material to enhance permeability and the conditions for biological activity, followed by placement of the augmented LNAPL material in the biocell for treatment and capping;

- Operation of the aeration, nutrient distribution, and water collection systems for the biocell for an estimated five-year period; and,

- Performance sampling and final confirmation sampling to demonstrate that the LNAPL wastes have been destroyed through biological degradation, at which time the biocell components will be dismantled.

OU1 Alternative 4: Excavation and Off-Site Treatment/Disposal of Entire LNAPL Source Area

Capital Cost:	*$13,733,000*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$13,733,000*
Construction Time Frame:	*1 year*

The major components of the Amended Remedy for OU1 include:

- Isolation of the RTAs with cut-off walls, and excavation of the LNAPL source material, a total of approximately 49,000 cubic yards of material, and

- Transportation and off-site disposal to an appropriate facility (with treatment as required to meet RCRA Land Disposal Requirements).

The estimated volume of the LNAPL source area to be excavated has increased by 3,175 cubic yards, to 49,000 cubic yards. The increase is due to a refined areal extent principal threat LNAPL in the PDI and the volume of the low level threat LNAPL that will now be excavated.

This Alternative, Excavation and Off-Site Treatment/Disposal, was evaluated in the OU1 Phase 2 Focused FS and presented as Alternative 4 in the 2009 OU1 ROD. This alternative called for the excavation of only principal threat LNAPL, and is now being modified to also include excavation of low-level threat LNAPL, as well as utilizing non-hazardous I-280 ROW berm soils as fill for the excavated RTA. Under this alternative, all LNAPL source material would be excavated from the RTA, which is approximately 49,000 cubic yards. The excavated material would then be stabilized on Site to allow for transportation to off-site treatment and disposal facilities. The excavated areas would then be backfilled with the non-hazardous I-280 ROW berm soil, which in turn would be covered with clean fill. Any hazardous wastes would be transported to an appropriate disposal facility. This alternative would be conducted concurrently with the OU2 remedial action. As with the Original Remedy, dewatering would be required prior to excavation, and the removed water would need to be treated prior to discharge. The FS estimates that this alternative could be implemented in approximately one year. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

EVALUATION OF ALTERNATIVES FOR OU1

A Comparative Analysis between the Original Remedy and the Amended Remedy is presented below.

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measure against each of nine evaluation criteria described below and a comparative analysis focusing upon the relative performance of each response measure against the criteria.

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

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Because the treatment component of the Original Remedy failed, it will not meet RAOs or the remediation goals outlined in the OU1 2009 ROD, and is not protective of human health and the environment. The Amended Remedy for OU1 would achieve the RAOs and remediation goals by removing contamination, and thereby preventing direct contact with the LNAPL source area.

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

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," " unless such ARARs are waived under CERCLA section 121(d)(4).

The Original Remedy is not effective and therefore would not meet the RAOs and not attain the ARARs. The Amended Remedy for OU1 would remove the entire LNAPL source area and meet the RAOs. EPA has developed site-specific remediation goals that are consistent with the expectations of the New Jersey Technical Requirements for the remediation of free product (N.J.A.C 7:26E-1). The RCRA is applicable for assessing the disposal requirements of potentially hazardous wastes, such as the LNAPL-contaminated soils. Based upon the available documentation, EPA has concluded that the LNAPL wastes are not listed hazardous waste under RCRA, but will require treatment to meet RCRA Land Disposal Restrictions. The Amended Remedy can be designed to meet location- and action-specific ARARs, and would also require a reliance on institutional controls (ICs) indefinitely to prevent damage to the soil cover and any intrusive activities into the residual contamination.

3. Long-Term Effectiveness and Permanence

A similar degree of long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls.

The Original Remedy kept the low-level threat LNAPL within an on-site biocell, and provided a cover to control the potential risks associated with direct contact and erosional transport of the low-level threat LNAPL, which was originally thought to be adequate and reliable. Since the biocell was shown to be ineffective at treating the low-level threat LNAPL, the Original Remedy would not satisfy this criterion.

The Amended Remedy would achieve remediation goals that are protective for the LNAPL source material by removing all potential risks associated with the presence of LNAPL source material, thereby providing long-term effectiveness and permanence.

4. Reduction of Toxicity, Mobility, or Volume through Treatment
Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

The Original Remedy would not reduce toxicity, mobility, or volume because the biocell treatment was ineffective. The Amended Remedy does not employ treatment and therefore would not reduce toxicity, mobility, or volume.

5. Short-Term Effectiveness
Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

The Original Remedy would not provide short-term effectiveness.

The Amended Remedy would mitigate potential risks to workers through adherence to site-specific health and safety plans, to communities through the use of engineering controls, and would have minimal potential risks to the environment during construction. The Amended Remedy has a construction duration of approximately one year.

6. Implementability
Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

The Original Remedy is not implementable.

The Amended Remedy is technically and administratively feasible. The necessary engineering services, equipment, and materials are readily available, and excavation and disposal are well proven technologies. The Amended Remedy would require ICs to prevent intrusive activities into remaining residual contamination.

7. Cost
Includes estimated capital and operation and maintenance costs, and net present-worth values.

The Original Remedy has a present worth cost of $17,340,000[4] based on the Phase 2 Focused FS, while the Amended Remedy has a present worth cost of $13,733,000.

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[4] The present worth costs for the Biocell remedy were not updated because the biocell treatment is not technically feasible.

Modifying Criteria *- The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.*

8. **State Acceptance**
Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

The State of New Jersey concurs with EPA's selected remedies. A letter of concurrence is attached in Appendix IV.

9. **Community Acceptance**
Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

EPA solicited input from the community on the Amended Remedy proposed for the Site. The community was not opposed to EPA's Proposed Plan for the OU1 ROD Amendment. Appendix III, The Responsiveness Summary, addresses the comments received at the public meeting. No substantive comments were received during the public comment period.

DESCRIPTION OF REMEDIAL ALTERNATIVES FOR OU2

CERCLA requires that each selected remedy be protective of human health and the environment, be cost effective, 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, utilize permanent solutions and alternative treatment technologies, and utilize resource recovery alternatives to the maximum extent practical. 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 hazardous substances.

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

Full descriptions of each proposed alternative can be found in the FS which is part of the Administrative Record. Table 7 provides a summary of the components for each alternative.

The time frames below are for construction and do not include the time to design a remedy, or the time to procure necessary contracts. Five-year reviews will be conducted as a component of the three alternatives (Alternative 2, Alternative 3, and Alternative 4) that leave contamination in place above levels that would allow for unrestricted use/unlimited exposure. The present worth cost for all alternatives includes the periodic present worth cost of five-year reviews.

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 control or remove low-level contamination or to prevent exposure at the Site.

Alternative 2 – Excavation of Soils in Areas B and C; Vegetated Soil Cover in Areas A, B, and C; Institutional Controls; and Excavation of Sediments

Capital Cost: *$8,461,000*
Annual O&M Cost: *$67,000*
Present Worth Cost: *$10,048,000*
Construction Time Frame: *Less than 1 year*

This alternative consists of construction of a two-foot soil cover as the primary measure to prevent exposure to residual contamination in the underlying soil, that is, contaminated soil not addressed in OU1. In Areas B and C (Figure 2), up to two feet of surface soil would be excavated before placing a cover to maintain the current drainage patterns. Excavated soils not requiring off-site disposal from Areas B and C would be placed within Area A, and would be graded to facilitate cover placement. The soil cover for Areas A, B, and C would consist of 18 inches of clean fill and six inches of topsoil. The wetland areas within Area A would also be excavated to a depth of two feet, to accommodate the soil cover and wetland restoration, but no other locations within Area A would be excavated.

Sediment in the drainage ditch along I-280 would be excavated to an approximate depth of 18 inches, and 18 inches of stone bedding would be added.

Approximately 440 cubic yards of TSCA/RCRA contaminated soil, and 800 cubic yards of sediment, would be removed under this alternative and transported to an appropriate disposal facility (*i.e.*, RCRA Subtitle C or TSCA disposal facility).

For cost-estimation purposes, EPA has assumed that approximately 500 cubic yards of soil contaminated with dioxin greater than 7,300 ppt would be disposed of at a RCRA Subtitle C facility.

Institutional controls, such as a deed notice, would be used to prevent contact with contaminated soil and sediment remaining under the cover material, and ensure that future use of the Site does not damage the covers. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Alternative 3 – Excavation of Soils in Areas A, B, and C and Off-Site Disposal; Vegetated Soil Cover; Institutional Controls; and Excavation of Sediments

Capital Cost:	*$18,745,000*
Annual O&M Cost:	*$67,000*
Present Worth Cost:	*$20,337,000*
Construction Time Frame:	*Less than 1 year*

This alternative consists of construction of a two-foot soil cover as the primary measure to prevent exposure to residual contamination in the underlying soil. Soils in Areas A, B, and C would be excavated to a depth of two feet, except for the landfill, which would be covered without any prior excavation. The wetland areas within Area A would also be excavated to a depth of two feet, to accommodate the soil cover and wetland restoration, but no other locations within Area A would be excavated. The soil cover for Areas A, B, and C would consist of 18 inches of clean fill and six inches of topsoil.

Sediment in the drainage ditch along I-280 would be excavated to an approximate depth of 18 inches, and 18 inches of stone bedding would be added.

Approximately 72,450 cubic yards of soils excavated from Areas A, B, and C, 800 cubic yards of contaminated sediment, and 5,250 cubic yards of TSCA/RCRA contaminated soil, would be removed under this alternative and transported off Site to an appropriate disposal facility (*e.g.*, RCRA Subtitle C or TSCA disposal facility).

For cost-estimation purposes, EPA has assumed that approximately 500 cubic yards of soil contaminated with dioxin greater than 7,300 ppt will be disposed of at a RCRA Subtitle C facility.

Institutional controls, such as a deed notice, would be used to prevent contact with contaminated soil and sediment remaining under the cover material, and ensure that future use of the Site does not damage the covers. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Alternative 4 – Excavation of Soils in Areas A, B, and C; On-Site Stabilization and Consolidation of Soils and Sediments in Area A; Vegetated Soil Cover; Institutional Controls; and Excavation of Sediments

Capital Cost:	*$10,561,000*
Annual O&M Cost:	*$67,000*
Present Worth Cost:	*$12,148,000*
Construction Timeframe:	*2 years*

This alternative consists of construction of a two-foot soil cover as the primary measure to prevent exposure to residual contamination in the underlying soil. Soils in Areas A, B, and C would be excavated to a depth of two feet, except for the landfill. Excavated soil not requiring off-site disposal from Areas A, B, and C would then be stabilized and placed in Area A, and a six-inch topsoil cover would be added. The wetland areas within Area A would also be excavated to a depth of two feet, to accommodate the soil cover and wetland restoration, but no other locations within Area A would be excavated. The soil cover placed in Areas B and C would consist of 18 inches of clean fill and six inches of topsoil.

Sediment in the drainage ditch along I-280 would be excavated to an approximate depth of 18 inches, and 18 inches of stone bedding would be added.

Approximately 94,200 cubic yards of soil will be removed, stabilized and put back in place. Approximately 5,250 cubic yards of TSCA/RCRA contaminated soil, and 800 cubic yards of sediment, will be removed and transported off site to an appropriate disposal facility (*e.g.*, RCRA Subtitle C or TSCA disposal facility).

For cost-estimation purposes, EPA has assumed that approximately 500 cubic yards of soil contaminated with dioxin greater than 7,300 ppt will be disposed of at a RCRA Subtitle C facility.

ICs, such as a deed notice, would be used to prevent contact with contaminated soil and sediment remaining under the cover material, and ensure that future use of the Site does not damage the covers. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

EVALUATION OF ALTERNATIVES FOR OU2

EPA uses nine criteria to evaluate the remedial alternatives individually and against each other to select a remedy. This section presents the relative performance of each alternative against the nine criteria, noting how each alternative compares to the other alternatives under consideration. The nine evaluation criteria are discussed below. A detailed analysis of each of the alternatives is presented in the FS report.

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

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative 1, No Action, would not be protective of human health or the environment since it does not include measures to prevent exposure to contaminated soils or sediments.

Alternatives 2, 3 and 4 are protective, and prevent unacceptable human health and ecological risk by eliminating exposure pathways through containment, removal, or treatment.

Each alternative includes varying degrees of removal and cover, and institutional controls to help protect against exposure and address the risk at the Site. Alternative 4 includes treatment (*i.e.*, stabilization) of soil and incorporation of stabilized soil into the Area A cover, while Alternatives 2 and 3 use clean fill for the soil cover. The stabilization under Alternative 4 would aim to achieve the NJNRDCSRS, which are appropriate for the anticipated future industrial use of the Site. Treatability testing would be needed to determine the effectiveness of stabilization under Alternative 4 to achieve these standards.

2. **Compliance with applicable or relevant and appropriate requirements (ARARs)**
Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Actions taken at any Superfund site must meet all ARARs under federal and state laws or provide grounds for invoking a waiver of those requirements. EPA evaluated NJDEP's Impact to Groundwater Soil Remediation Standards while developing alternatives for the Site. New Jersey relies on a series of guidance documents to provide a basis for developing site-specific impact-to-groundwater soil cleanup goals, however, the methodologies for developing the site-specific numbers have not been promulgated, and are therefore not ARARs, but are "to be considered".

The three broad categories of ARARs include chemical-specific, location-specific and action-specific ARARs.

Alternative 1 is the only alternative that would not comply with chemical-, action-, or location-specific ARARs, since no action will be taken, leaving soils and sediments in place that exceed NJNRDCSRS, posing an unacceptable risk to human health and the environment.

Alternatives 2, 3, and 4 comply with chemical-specific ARARs, such as the NJNRDCSRS, which establish minimum direct contact soil remediation levels. Alternatives 2 and 3 accomplish this by removing and covering soils and sediment that exceed NJNRDCSRS, while Alternative 4 accomplishes this by treating soils and sediment through stabilization. Location- and action-specific ARARs can be met through design and implementation for Alternatives 2, 3, and 4. Action-specific ARARs, such as the Toxic Substances Control Act will be met through the proper management of PCB remediation wastes, while location-specific ARARs, such as the Flood Hazard Area Control Act Regulations, will be met by ensuring that measures for excavating, grading, and fill do not impede overland flow of stormwater.

Primary Balancing Criteria *- The next five criteria, criteria 3 through 7, are known as "primary balancing criteria". These criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions.*

3. Long-term Effectiveness and Permanence

A similar degree of long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls.

Alternative 1 provides no controls and does not maintain protection of human health and the environment over the long-term because there is no mechanism to prevent exposure to contaminated soils or sediment.

With regard to the soil cover alternatives, Alternatives 2 and 3 would both provide long-term effectiveness and permanence since the cover thickness is the same under both alternatives and the cover material would meet New Jersey Residential Direct Contact Soil Remediation Standards. Under Alternative 4, surface soils that are excavated from Areas B and C to accommodate the soil cover would be stabilized and incorporated into the soil cover material in Area A.

Under Alternatives 2, 3, and 4, ICs, such as a deed notice, would be used to help protect against direct contact with contaminated soil and sediment remaining under the cover material, and ensure that future use of the Site does not damage the covers.

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

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 1 does not implement any treatment processes, and therefore does not provide for a reduction in the toxicity, mobility, or volume of contaminants. Alternative 1 also does not generate any treatment residuals, and it does not meet the statutory preference for treatment.

Alternatives 2 and 3 do not implement any treatment processes, so the toxicity, mobility, and volume of contaminants remains unchanged.

Alternative 4 is the only remedial alternative that includes a treatment component (stabilization), which provides a greater reduction of toxicity and mobility than Alternatives 2 and 3. The stabilization component of Alternative 4 results in a reduction in the toxicity and mobility, but it would be expected to result in an increase in volume due to the addition of stabilization materials.

5. Short-term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1 involves no action, so there is no risk to workers, no additional risks to the community or the environment, and the Alternative will not achieve RAOs.

Alternative 2 has the lowest potential risks for workers, the shortest construction duration, and is the least intrusive when compared to Alternatives 3 and 4. Alternative 2 also has the lowest potential risks to the community due to the short construction duration and the fewest impacts to traffic. The potential for additional risks to the environment is minimal for Alternative 2, and RAOs are expected to be met within one year.

Alternative 3 has a longer construction duration than Alternative 2 (less than one year), and a shorter construction duration than Alternative 4 (two years). Alternative 3 would produce more truck traffic when compared to Alternatives 2 and 4, and would have the greatest traffic impact to the community resulting from the volume of material transported off site for disposal, and the importing of backfill material. The potential for additional risks to the environment is minimal for Alternative 3, and RAOs are expected to be met within two years.

Alternative 4 would have the longest construction duration, and more construction related activities than Alternatives 2 and 3. Alternative 4 would present the highest potential risks to workers, but have less traffic impacts than Alternative 3. Alternative 4 would also present the highest potential risks to the community resulting from a longer construction duration, including additional noise, odor, and dust. Additional emission control techniques would need to be implemented under Alternative 4. The potential for additional risks to the environment is minimal for Alternative 4, and RAOs are expected to be met within 2 years.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 1 is implementable and feasible because no action would be taken.

Alternative 2 is the most technically feasible, and is administratively feasible, and materials and services for Alternative 2 are readily available.

Alternative 3 is technically feasible, but would require additional soil management and traffic management when compared to Alternative 2. Alternative 3 is administratively feasible, and materials and services are readily available, however it may require increased transport distances due to the larger quantity of backfill materials needed for this alternative.

Alternative 4 is the least technically feasible, and requires additional soil management to stabilize the soils, when compared to Alternatives 2 and 3. Alternative 4 is administratively feasible, and materials and services are readily available. Alternative 4 would require treatability testing to determine the effectiveness of the technology to select the appropriate stabilizing agent(s).

Alternatives 2, 3, and 4, will require access, which would need to be addressed with property owners for each alternative, as well as ICs, such as deed notices, which will also require the consent of the property owners.

7. Cost

Includes estimated capital and operation and maintenance costs, and net present-worth values.

The total estimated present worth costs of Alternatives 1, 2, 3, and 4 are $0, $10,423,000, $20,702,000, and $12,388,000, respectively. Alternative 3 is the most expensive and Alternative 1 is the least expensive.

Modifying Criteria *- The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.*

8. State Acceptance

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

The State of New Jersey concurs with EPA's selected remedies. A letter of concurrence is attached in Appendix IV.

9. Community Acceptance

Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

EPA solicited input from the community on the remedial alternatives proposed for the Site. The community was generally supportive of EPA's Proposed Plan for the OU2 ROD. Appendix III, The Responsiveness Summary, addresses the comments received at the public meeting. No substantive comments were received during the public comment period.

PRINCIPAL THREAT WASTE

The principal threat concept is applied to the characterization of source materials at Superfund sites. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. 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. Using multiple lines of evidence, LNAPL detected at the Site was separated into areas where LNAPL material is considered to represent a principal threat waste and areas where LNAPL can be considered to represent a lower-level threat waste.

The OU1 ROD identified LNAPL source material as principal threat waste. EPA defines principal threat wastes as 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. They include liquids or other highly mobile materials (*e.g.,* solvents) or materials that have high concentrations of toxic compounds. By contrast, low-level threat wastes are defined as those materials that generally can be reliably contained and that would represent a low risk in the event of a release. They include materials that exhibit low toxicity, low mobility in the environment, or are near health-based levels.

The OU1 ROD Amendment portion of this document addresses LNAPL principal threat waste source material. Treatability testing during OU1 indicated that treatment of low-level threat waste was not feasible, and therefore the alternatives considered for the OU1 ROD Amendment do not include treatment as a principal element.

SELECTED REMEDIES

Based upon consideration of the results of the RI and PDI at the Site, the requirements of CERCLA, the detailed analysis of the remedial alternatives and public comments, EPA has determined that the appropriate remedies are: (1) Excavation and Off-Site Treatment/Disposal to address the LNAPL source areas for OU1; and (2) Alternative 2 – Excavation of Soil in Areas B, and C; Vegetated Soil Cover in Areas A, B, and C; Institutional Controls; and Excavation of Sediments for OU2.

The Remedies best satisfy the requirements of Section 121 of CERCLA and the NCP's nine evaluation criteria for remedial alternatives at 40 CFR §300.430 (e) (9). Below is a summary of the major components of the Remedies.

OU1 Remedy

The selected remedy for OU1 is Excavation and Off-Site Treatment/Off-Site Disposal. EPA anticipates that this portion of the remedy will be implemented in conjunction with the OU2 remedy. The major components of the OU1 remedy include:

- Excavation and off-site disposal of LNAPL source areas;
- Backfilling of excavated areas with I-280 ROW berm soil containing non-hazardous soil, and additional clean fill to grade; and
- Supplementing backfill with clean fill as needed.

OU2 Remedy

The selected remedy for OU2 is Alternative 2 – Excavation of Soil in Areas B, and C; Vegetated Soil Cover in Areas A, B, and C; Institutional Controls; and Excavation of Sediments. The major components of this alternative include:

- Excavation of two feet of surface soil from Area B and C, and wetland areas located in Area A;
- Distribution of excavated soils not requiring off-site disposal from Areas B and C across Area A for regrading;
- Disposal of excavated sediments at an appropriate off-site facility;
- Installation of a two-foot vegetated clean soil cover as an engineering control;
- Wetland restoration; and
- Implementation of a deed notice as an institutional control.

A two-foot soil cover will be constructed as the primary measure to prevent exposure to contaminants in the underlying soil. In Areas B and C, up to two feet of surface soil will be excavated before placing a cover to maintain the current drainage patterns. For cost-estimation purposes, EPA has assumed that approximately 500 cubic yards of soil contaminated with dioxin greater than 7,300 ppt will be disposed at a Subtitle C facility. In addition, EPA has estimated that approximately 440 cubic yards of TSCA/RCRA contaminated soil will be disposed off Site at an appropriate disposal facility (*i.e.*, RCRA Subtitle C or TSCA disposal facility).

Based on groundwater data to date, EPA does not believe that soil remaining on site will contribute to groundwater contamination. To confirm this, Synthetic Precipitation Leaching Procedure (SPLP), or a comparable test, will be performed during the design phase. For soils that fail SPLP, or a comparable test, additional actions will be taken to prevent the migration of contaminants to groundwater. Excavated soils not requiring off-site disposal from Areas B and C will be placed within Area A, and graded to facilitate cover placement. The wetland areas within Area A will also be excavated to a depth of two feet, to accommodate the soil cover, and be restored, but no other locations within Area A will be excavated.

Sediment in the drainage ditch along I-280 will be excavated to an approximate depth of 18 inches, and 18 inches of stone bedding will be added.

The selected remedies will reduce the risk within a reasonable time frame, and at a lower cost than other alternatives. The selected remedies will meet chemical-specific ARARs and can be designed to meet action- and location-specific ARARs. The selected remedies pose the lowest potential risks to on-site workers and the community because they would have the shortest construction duration, and the fewest impacts to traffic.

The selected remedies are technically feasible, and are administratively feasible, and materials and services are readily available for their implementation. The potential for additional risks to the environment are minimal, and RAOs are expected to be met within one year.

The selected remedies would achieve remediation goals that are protective for non-residential use, but would not achieve levels that would allow for unrestricted use and therefore, institutional controls, such as a deed notice would be required. Five-year reviews will be conducted since contamination remains above levels that allow for unlimited use and unrestricted exposure.

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 the selected remedies.

STATUTORY DETERMINATIONS

As previously noted, CERCLA Section 121(b)(1) mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. CERCLA Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA Section 121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4). For the reasons discussed below, EPA has determined that the selected remedies meet the requirements of CERCLA Section 121.

Protection of Human Health and the Environment

The selected remedies will adequately protect human health and the environment through the removal of the LNAPL source material. The selected remedies will remove contaminated soils and sediment that will result in the reduction of exposure levels through direct contact. Implementation of the selected remedies will not pose unacceptable short-term risks or adverse cross-media impacts.

Compliance with ARARs

The selected remedies will comply with all ARARs. A comprehensive ARAR discussion is included in the FS, and a listing of ARARs is included in Table 8 of this ROD.

Location-specific ARARs would apply to wetlands protection due to excavation activities causing the disruption of an existing wetland. When work is required within a wetland, regulations generally favor actions that minimize ecosystem disturbance, and then expect restoration efforts to attain similar, or where possible, improved ecosystem conditions post action. Minimization of disturbance is generally preferred, because post-action wetlands restoration can have limited effectiveness, and it can take many years for the pre-action ecosystem conditions to reestablish themselves naturally. Federal Floodplain Protection and New Jersey's Floodplain/Flood Hazard Area Protection would also require no net loss of flood water storage capacity, an essential wetland function.

The ARARs have been determined to be potentially applicable to the selected remedies include:

Chemical Specific ARARs

State

- New Jersey Non-Residential Direct Contact Soil Remediation Standards NJAC 7:26D

Action Specific ARARs

Federal

- RCRA and TSCA regulations governing disposal of hazardous waste
- Land Disposal Restrictions (40 CFR 268)
- Hazardous Materials Transportation Regulations (40 CFR 107,171,172,177 to 179)

State

- New Jersey Technical Requirements for Site Remediation N.J.A.C. 7:26E
- Soil Erosion and Sediment Control Plan Certification, N.J.A.C. 2:90
- Transportation of Hazardous Materials (N.J.A.C. 7:14A)

Location Specific ARARs

Federal

- Wetlands Protection Executive Order 11990
- Coastal Zone Management Act 16 USC 1451
- Section 404 and Executive Order 11990

State

- New Jersey Rules on Coastal Resources and Development (7:7E-1.1 *et seq*.)
- Hackensack Meadowlands Development Commission, N.J.S.A. 13:17-1 *et seq*.

Cost-Effectiveness

In EPA's judgment, the selected remedies are cost-effective and represent reasonable value for the money to be spent. 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 costs to determine cost-effectiveness. The overall effectiveness of the selected remedies has been determined to be proportional to the costs, and the selected remedies, therefore, represent reasonable value for the money to be spent. The estimated present net worth cost of the selected remedies is $13,733,000 for OU1 and $8,461,000 for OU2.

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

EPA has determined that the selected remedies represent the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner. Of those alternatives that are protective of human health and the environment and comply with ARARs (or provide a basis for invoking an ARAR waiver), EPA has determined that the selected remedies provide the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element, the bias against off-site disposal without treatment, and State/support agency and community acceptance. The selected remedies are implementable since they employ standard technologies that are readily available.

Preference for Treatment as a Principal Element

The selected remedies do not meet the statutory preference for the use of remedies that employ treatment that reduces toxicity, mobility, or volume, as a principal element to address the principal threats at the Site. The treatment component of the Original Remedy was proven to be ineffective. The stabilization treatment in Alternative 4 results in an unacceptable increase in volume and also increases cost by two million dollars.

Five-Year Review Requirements

The Remedies will result in hazardous substances, pollutants, or contaminants remaining above levels that do not allow for unlimited use and unrestricted exposure; therefore, a five-year review will be required for both OU1 and OU2.

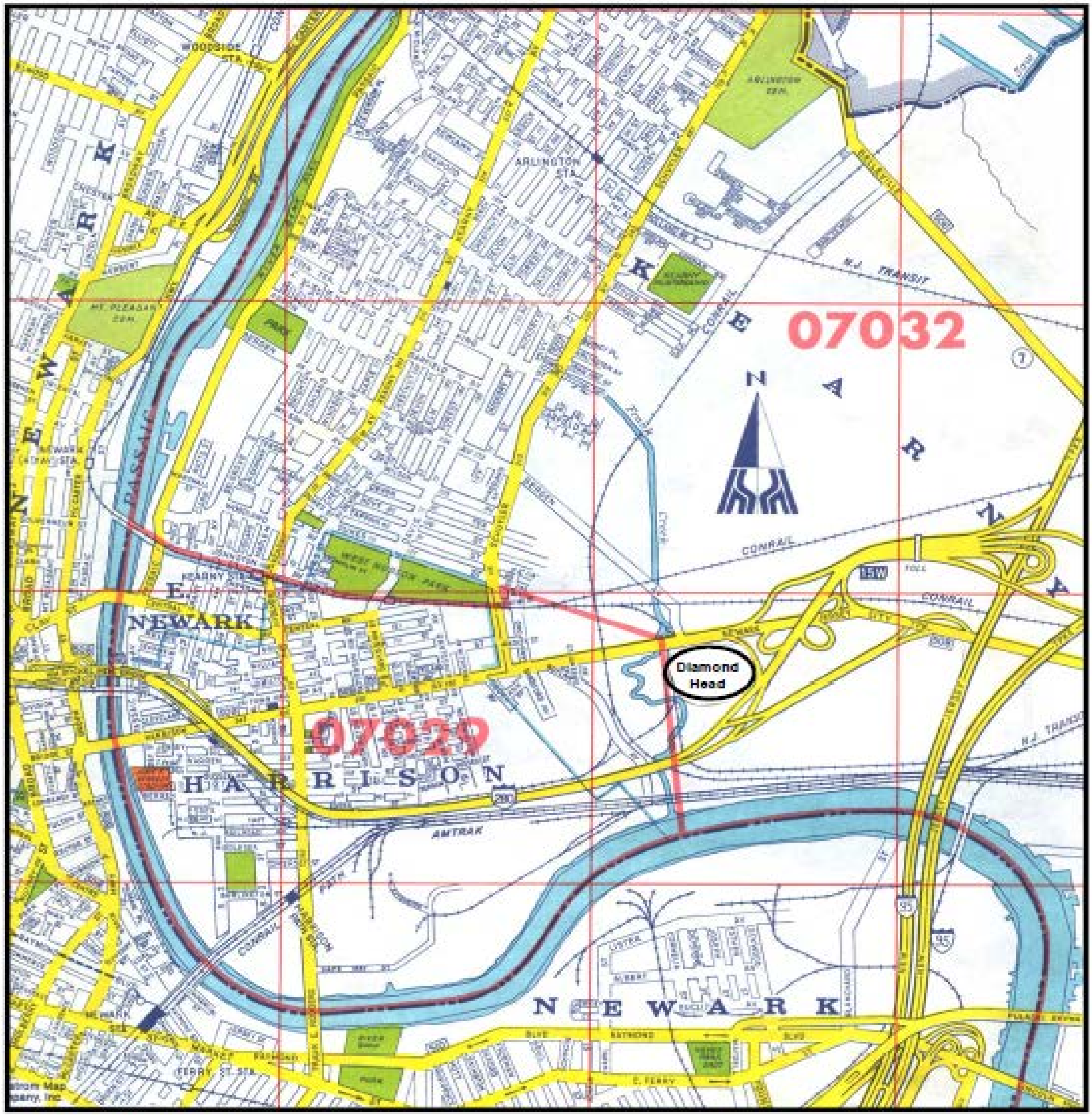
DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the OU1 ROD Amendment and OU2 ROD for the Site was released for public comment on June 19, 2017. The comment period closed on July 19, 2017. All verbal and written comments submitted during the public comment period were reviewed by EPA. Upon review of the comments, it was determined that no significant changes to the Remedies, as they were originally identified in the Proposed Plan, were necessary.

APPENDIX I - FIGURES

Source: Hagstrom Union/Hudson/Essex County Atlas, 1990

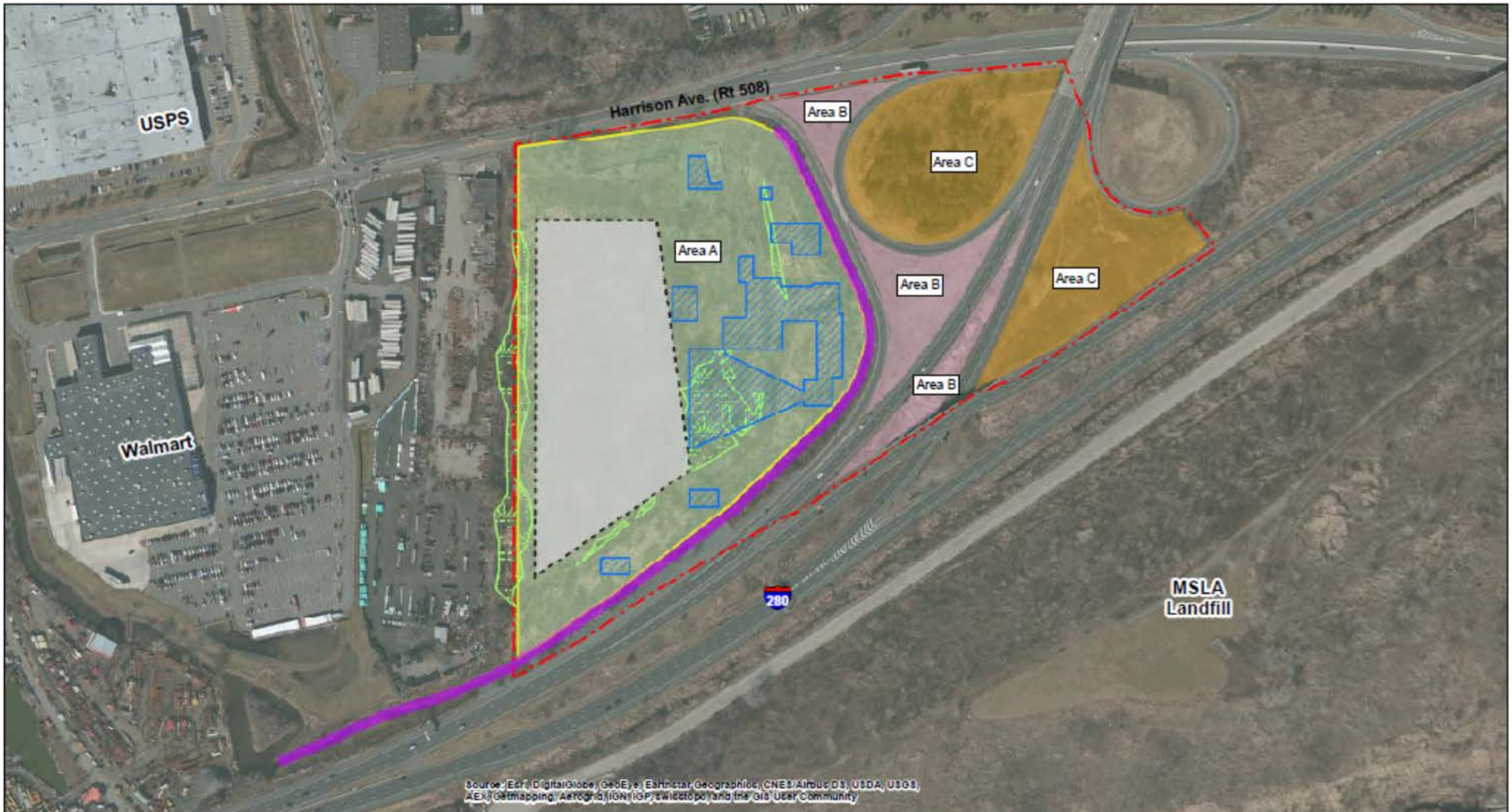
Hudson County, Page 6, Grid C-7



Block 285, Lots: 3, 14, 15
Vacant Lot Adjacent to 1235 Harrison Avenue
Kearny, NJ 07032 (Hudson County)

See Also: USGS 7.5' Quadrangle: Elizabeth, NJ: Photorevised 1981
40° 44' 50" lat., 74° 07' 55.9" long. (NAD 83)

FIGURE 1
Site Location Map
Diamond Head Oil Superfund Site, Operable Unit 2
Kearny, NJ



Legend

- Drainage Ditch
- Remedial Target Area for OU2 - Soils
  - Area A
  - Area B
  - Area C
- Current Property Boundary
- Site Boundary
- Landfill
- Delineated Wetlands
- Remedial Target Area for OU1 Principal Threat LNAPL Waste

N

0 62.5 125 Feet

Figure 2
Extent of OU2 Remedial Target Area
Diamond Head Oil Superfund Site
Kearny, NJ

CH2MHILL

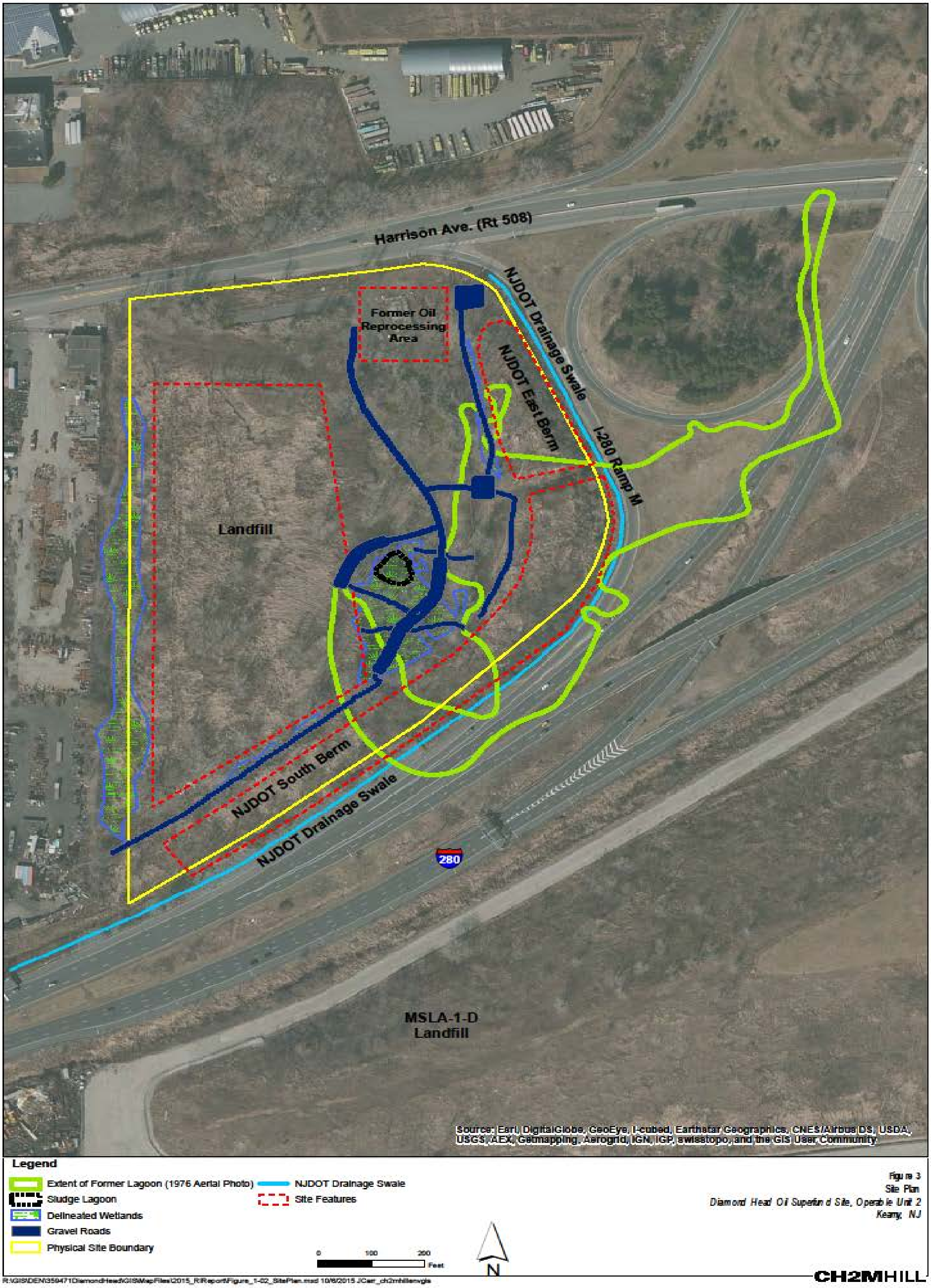


Figure 3
Site Plan
Diamond Head Oil Superfund Site, Operable Unit 2
Kearny, NJ

R:\GIS\DEN\359471DiamondHead\GIS\MapFiles\2015_RIReport\Figure_1-02_SitePlan.mxd 10/6/2015 JCarr_ch2mhillenvgis

APPENDIX II - TABLES

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

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	EPC Units	Statistical Measure
		Min	Max					
Medium: Surface Soil **Exposure Medium:** Surface Soil								
Within Property	Chromium	12	7700	mg/kg	52/52	2100	mg/kg	95% Chebyshev (Mean, Sd) UCL
Within Property	Dioxin TEQ	0.000038	0.0019	mg/kg	19/19	0.00057	mg/kg	95% Adjusted Gamms UCL
Within Property	PCB-Aroclor 1254	4	8	mg/kg	2/52	8	mg/kg	Maximum
Within Property	Lead	31	28000	mg/kg	51/51	2200	mg/kg	Mean
Berm Soil	Chromium	8.2	310	mg/kg	28/28	160	mg/kg	95% Student's-t UCL
Berm Soil	Lead	8.9	7700	mg/kg	28/28	1300	mg/kg	Mean
Outside Property	Aldrin	0.0033	75	mg/kg	3/17	75	mg/kg	Maximum
Outside Property	Dioxin TEQ	0.000013	0.0082	mg/kg	16/16	0.0066	mg/kg	99% Chebyshev (Mean, Sd) UCL
Outside Property	PCB-Aroclor 1242	0.14	1800	mg/kg	6/18	1200	mg/kg	99% KM(t) UCL
Outside Property	Lead	130	7200	mg/kg	18/18	1200	mg/kg	Mean
Medium: Subsurface Soil **Exposure Medium:** Subsurface Soil								
Within Property	Benzo[a]pyrene	0.022	35	mg/kg	82/96	12	mg/kg	95% KM (Chebyshev) UCL
Within Property	Chromium	18	22000	mg/kg	101/101	4000	mg/kg	95% H-UCL
Within Property	Thallium	0.65	46	mg/kg	78/101	5.1	mg/kg	95% KM (BCA) UCL
Outside Property	Dioxin TEQ	0.000025	0.011	mg/kg	9/9	0.011	mg/kg	Maximum
Outside Property	Lead	2	1300	mg/kg	40/40	1100	mg/kg	Mean
Medium: Surface water **Exposure Medium:** Surface water								
Drainage Ditch/Frank's Creek	Beryllium	990	990	ug/l	1/10	920	ug/l	Maximum
Drainage Ditch/Frank's Creek	Thallium	160	160	ug/l	1/10	160	ug/l	Maximum
Medium: Sediment **Exposure Medium:** Sediment								
Drainage Ditch/Frank's Creek	Lead	67	84000	mg/kg	37/37	3600	mg/kg	Mean

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, surface water and sediment, within the property boundaries, outside of the property boundaries, berms, drainage ditches and Frank's Creek. 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.

TABLE 2
SELECTION OF EXPOSURE PATHWAYS
Diamond Head Oil Superfund Site

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis
Current/ Future	Surface Soil	Surface Soil	Surface Soil Within Property Boundary	Maintenance Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Trespasser	Adult	Ingestion	Quant
						Dermal	Quant
					Child	Ingestion	Quant
						Dermal	Quant
			Surface Soil Outside Property Boundary	Maintenance Worker (Highway Worker)	Adult	Ingestion	Quant
						Dermal	Quant
		Air	Within Property Boundary	Maintenance Worker	Adult	Inhalation	Quant
				Trespasser	Adult	Inhalation	Quant
					Child	Inhalation	Quant
			Outside Property Boundary	Maintenance Worker (Highway Worker)	Adult	Inhalation	Quant
	Soil	Total Soil	Berm Soil	Maintenance Worker (Highway Worker)	Adult	Ingestion	Quant
						Dermal	Quant
				Trespasser	Adult	Ingestion	Quant
						Dermal	Quant
					Child	Ingestion	Quant
						Dermal	Quant
		Air	Berm	Maintenance Worker (Highway Worker)	Adult	Inhalation	Quant
					Adult	Inhalation	Quant
				Trespasser	Child	Inhalation	Quant
	Sediment	Sediment	Drainage Ditches and Frank's Creek	Maintenance Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Trespasser	Adult	Ingestion	Quant
						Dermal	Quant
					Child	Ingestion	Quant
						Dermal	Quant
	Surface Water	Surface Water	Drainage Ditches and Frank's Creek	Maintenance Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Trespasser	Adult	Ingestion	Quant
						Dermal	Quant
					Child	Ingestion	Quant
						Dermal	Quant
Future	Surface Soil	Surface Soil	Surface Soil Within Property Boundary	Industrial Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Construction Worker	Adult	Ingestion	Quant
						Dermal	Quant
		Air	Within Property Boundary	Industrial Worker	Adult	Inhalation	Quant
				Construction Worker	Adult	Inhalation	Quant
	Subsurface Soil	Subsurface Soil	Subsurface Soil Within Property	Maintenance Worker	Adult	Ingestion	Quant
						Dermal	Quant

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis
			Boundary	Trespasser	Adult	Ingestion	Quant
						Dermal	Quant
					Child	Ingestion	Quant
						Dermal	Quant
				Industrial Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Construction Worker	Adult	Ingestion	Quant
						Dermal	Quant
			Subsurface Soil Outside Property Boundary	Maintenance Worker (Highway Worker)	Adult	Ingestion	Quant
						Dermal	Quant
		Air	Within Property Boundary	Maintenance Worker	Adult	Inhalation	Quant
				Trespasser	Adult	Inhalation	Quant
					Child	Inhalation	Quant
				Industrial Worker	Adult	Inhalation	Quant
				Construction Worker	Adult	Ingestion	Quant
			Outside Property Boundary	Maintenance Worker (Highway Worker)	Adult	Inhalation	Quant
	Soil	Total Soil	Berm Soil	Industrial Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Construction Worker	Adult	Ingestion	Quant
						Dermal	Quant
				Maintenance Worker	Adult	Ingestion	Quant
						Dermal	Quant
		Air	Berm	Industrial Worker	Adult	Inhalation	Quant
				Construction Worker	Adult	Ingestion	Quant
				Maintenance Worker	Adult	Inhalation	Quant

Quant: will be quantitatively evaluated
Qual: will be qualitatively evaluated
Child = 0-6 years
None: not considered to be a significant exposure pathway; therefore, not evaluated

TABLE 3

Non-Cancer Toxicity Data Summary

Pathway: Oral/Dermal

Chemical of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	% Absorp. Efficiency (Dermal)	Adjusted RfD (Dermal)	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD: Target Organ	Dates of RfD:
Beryllium	Chronic	2E-03	mg/kg-day	0.7	1.4E-05	mg/kg-day	GI	300	IRIS	04/02/15
Chromium (VI)	Chronic	3E-03	mg/kg-day	2.5	7.5E-05	mg/kg-day	Blood	300	IRIS	04/02/15
Dioxin TEQ (2,3,7,8-TCDD)	Chronic	7E-10	mg/kg-day	100	7E-10	mg/kg-day	Sperm, Develop mental	30	IRIS	04/02/15
PCB-Aroclor 1254	Chronic	2E-05	mg/kg-day	100	2E-05	mg/kg-day	Ocular, nails, immune	300	IRIS	04/02/15
Thallium	Chronic	1E-05	mg/kg-day	100	1E-05	mg/kg-day	Hair	3000	PPRTV	10/25/12

Key

GI – Gastrointestinal System
IRIS: Integrated Risk Information System, U.S. EPA
PPRTV: Provisional Peer Review Toxicity Value

Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in surface soil, subsurface soil, sediment, and surface water exposure within and outside of the property boundary and in the berms. 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
Aldrin	1.7E+01	$(mg/kg/day)^{-1}$	1.7E+01	$(mg/kg/day)^{-1}$	B2	IRIS	04/02/15
Benzo[a]pyrene	7.3E+00	$(mg/kg/day)^{-1}$	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	04/02/15
Chromium VI	5E-01	$(mg/kg/day)^{-1}$	2E+01	$(mg/kg/day)^{-1}$	D	NJ	04/08/09
Dioxin TEQ (2,3,7,8-TCDD)	1.3E+05	$(mg/kg/day)^{-1}$	1.3E+05	$(mg/kg/day)^{-1}$	B2	CalEPA	04/02/15
PCB-Aroclor 1242	2E+00	$(mg/kg/day)^{-1}$	2E+00	$(mg/kg/day)^{-1}$	B2	IRIS	04/02/15

Pathway: Inhalation

Chemical of Concern	Unit Risk	Units	Inhalation Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Chromium VI	8.4E-02	$1(ug/m^3)$	-----	-----	A	IRIS	04/02/15

Key: **EPA Weight of Evidence:**

IRIS: Integrated Risk Information System. U.S. EPA
B2: Probable Human Carcinogen
D: Not Classifiable as to Human Carcinogenicity
NJ: New Jersey Department of Environmental Protection
CalEPA: California Environmental Protection Agency
----- No information available

Summary of Toxicity Assessment

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

TABLE 5

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Surface water	Surface water	Drainage ditches and Frank's Creek	Beryllium	GI	0.04	**2**	-----	**2**
			Thallium	Hair	**1**	0.4	-----	**1**
							Hazard Index Total=	**3**

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
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
Surface soil	Surface soil	Surface soil within Property Boundary	Dioxin TEQ	Sperm, Developmental	**2**	0.1	-----	**2**
			PCB-Aroclor 1254	Ocular, Nails, Immune	0.8	0.3	-----	**1**
							Hazard Index Total=	**3**

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
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
Surface water	Surface water	Drainage ditches and Frank's Creek	Thallium	Hair	**2**	0.2	-----	**2**
							Hazard Index Total=	**2**

Scenario Timeframe: Future
Receptor Population: Maintenance Worker (Highway Worker)
Receptor Age: Adult

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 outside of Property Boundary	Dioxin TEQ	Sperm, Development	**2**	0.2	-----	**2**
							Hazard Index Total=	**2**

Scenario Timeframe: Future Receptor Population: Industrial Worker Receptor Age: Adult								
Medium	**Exposure Medium**	**Exposure Point**	**Chemical of Concern**	**Primary Target Organ**	**Non-Carcinogenic Risk**			
					Ingestion	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface and Subsurface soil	Surface and subsurface soil	Surface and subsurface soil within Property Boundary	Chromium (surface)	Blood	0.6	**1**	-----	**2**
			Chromium (subsurface)	Blood	**1**	**2**	-----	**3**
							Hazard Index Total=	**5**

Scenario Timeframe: Future Receptor Population: Construction Worker Receptor Age: Adult								
Medium	**Exposure Medium**	**Exposure Point**	**Chemical of Concern**	**Primary Target Organ**	**Non-Carcinogenic Risk**			
					Ingestion	**Dermal**	**Inhalation**	**Exposure Routes Total**
Surface and subsurface soil	Surface and subsurface soil	Surface and subsurface soil within Property Boundary	Chromium (surface)	Blood	**1**	0.6	-----	**2**
			Chromium (subsurface)	Blood	**2**	**1**	-----	**3**
							Hazard Index Total=	**5**

Scenario Timeframe: Future Receptor Population: Trespasser 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 Property Boundary	Chromium	Blood	**3**	**2**	-----	**5**
			Thallium	Hair	**1**	**0.2**	-----	**1**
							Hazard Index Total=	**6**

Scenario Timeframe: Future Receptor Population: Maintenance Worker (Highway Worker) Receptor Age: Adult								
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 outside of Property Boundary	Dioxin TEQ	Sperm, Developm ental	**3**	0.41	-----	**3**
							Hazard Index Total=	**3**

GI – Gastrointestinal system

Summary of Risk Characterization - Non-Carcinogens

TABLE 6

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Surface soil	Surface soil	Surface soil within Property Boundary	Chromium	7E-05	1E-04	-----	2E-04
						Total Risk =	2E-04

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Surface soil	Surface soil	Surface soil within Property Boundary	Chromium	5E-05	9E-05	-----	1E-04
						Total Risk =	1E-04

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Surface soil	Surface soil	Surface soil within Property Boundary	Chromium	9E-04	9E-04	-----	2E-03
						Total Risk =	2E-03

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Child (0-6 years)

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Total Soil	Berm soil	Chromium	7E-05	7E-05	-----	1E-04
						Total Risk =	1E-04

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker (Highway Worker)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Surface soil	Surface soil	Surface soil outside of Property Boundary	Aldrin	8E-05	3E-5	-----	1E-04
			PCB-Aroclor 1242	1E-04	9E-05	-----	2E-04
						Total Risk =	3E-04

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Surface soil	Surface soil	Surface soil within property boundary	Chromium	3E-04	5E-04	-----	9E-04
						Total Risk =	9E-04

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Subsurface soil	Subsurface soil	Subsurface soil within Property Boundary	Chromium	6E-04	1E-03	-----	2E-03
						Total Risk =	2E-03

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Subsurface soil and air emissions	Subsurface soil and air emission	Subsurface soil and air emissions within Property Boundary	Chromium	4E-05	4E-05	1E-04	2E-04
						Total Risk =	2E-04

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Subsurface soil	Subsurface soil	Subsurface soil within Property Boundary	Chromium	1E-04	2E-04	-----	3E-04
						Total Risk =	3E-04

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Subsurface soil	Subsurface soil	Subsurface soil within Property Boundary	Chromium	1E-04	2E-04	-----	3E-04
						Total Risk =	3E-04

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	**Dermal**	**Inhalation**	**Exposure Routes Total**
Subsurface soil	Subsurface soil	Subsurface soil within Property Boundary	Chromium	2E-03	2E-03	-----	4E-03
			Benzo[a]pyrene	8E-05	2E-05	-----	1E-04
						Total Risk =	4E-03

Scenario Timeframe: Future
Receptor Population: Maintenance Worker (Highway Worker)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	**Dermal**	**Inhalation**	**Exposure Routes Total**
Subsurface soil	Subsurface soil	Subsurface soil outside of Property Boundary	Dioxin TEQ	9E-05	1E-05	-----	1E-04
						Total Risk =	1E-04

Summary of Risk Characterization - Carcinogens

The table presents cancer risks for surface soil, subsurface soil, sediment, and surface water exposure within and outside of the property boundary and in the berms for all routes of exposure. 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

Diamond Head - Summary of Alternative Components

	Alternative 2 (1)						Alternative 3						Alternative 4					
	Area A (1)	Area A-wetlands	Landfill	Area B	Area C	Drainage Swale	Area A	Area A-wetlands	Landfill	Area B	Area C	Drainage Swale	Area A	Area A-wetlands	Landfill	Area B	Area C	Drainage Swale
Institutional Controls	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Removal and Treatment Ex-situ																		
Excavate Surface soil (2 feet) Sediment (18 inches)		x		x	x	x	x	x		x	x	x	x	x		x	x	x
Treat by Stabilization													x	x		x	x	
On-site reuse																		
Consolidate excavated soil in Area A		x		x	x									x		x	x	
Disposal																		
Dispose in Subtitle D						x	x	x		x	x	x						x
Dispose in Subtitle C Area A - 10% assumed Area B - TSCA soil				x			x			x						x		
Cover (2 feet)																		
Stabilized excavated soil													x					
Clean fill (18 inches)	x	x	x	x	x		x	x	x	x	x			x	x	x	x	
Top soil (6 inches)	x	x	x	x	x		x	x	x	x	x		x	x	x	x	x	
Restore wetlands																		
Grade		x						x						x				
Seed		x						x						x				

(1) Under Alternative 2, while a cover would be placed over the existing surface soils, wetland areas and Areas B and C will also be excavated to maintain drainage patterns and existing grade.

(2) Disposal includes addition of drying agent to pass paint filter test.

Note: Excavation of berm materials and their re-use to backfill the OU1 RTA is included under OU1.

Table 8-1. Applicable or Relevant and Appropriate Requirements – Chemical Specific

Diamond Head Oil Superfund Site

Act/Authority	Medium	Criteria/ Issues	Requirement/ Citation	Synopsis of Requirement	Status
New Jersey Soil Cleanup Standards	Soil	New Jersey Soil Quality	NJAC 7:26D, Appendix 1, and Table 1B Non-Residential Direct Contact Soil Remediation Standards.	Establishes minimum non-residential direct contact soil remediation levels.	ARAR
New Jersey Soil Cleanup Guidance	Soil	New Jersey Soil Quality	Impact to Ground Water Guidance (2009) pursuant to NJSA 58:10B-12a, Impact to Groundwater Soil Screening Levels.	Provides numerical guidance for impact to groundwater soil remediation levels.	TBC
NJDEP	Sediment	New Jersey Sediment Quality	New Jersey Ecological Screening Criteria (March 10, 2009).	Establishes screening criteria to evaluate contaminant concentrations in sediment.	TBC

Table 8-2. Applicable or Relevant and Appropriate Requirements – Action Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
Toxic Substances Control Act	Soil	Soil Containing PCBs	40 CFR 761.61(c)	TSCA establishes requirements and thresholds for management of PCB remediation waste (i.e., soil which contains >50 ppm PCBs). 40 CFR 761.61(c) allows for risk-based management, as approved by the TSCA coordinator.	ARAR
New Jersey Solid Waste Regulations	Soil	Generation and Management of Solid Wastes	NJAC 7:26-1 Solid Waste – Generator Standards	Defines beneficial reuse requirements and the exemption from being solid waste. Soils that have been decontaminated to the satisfaction of, or in a manner acceptable to NJDEP are categorically approved as long as the reuse of the material, if released, will not cause pollution to surface or ground water, or pose a substantial or material threat.	ARAR
Resource Conservation and Recovery Act	Hazardous Waste	General Waste Management Practices	40 CFR 260	Establishes procedures and criteria for modification or revocation of any provision in 40 CFR Part 260-265.	ARAR. Establishes general requirements for hazardous waste management.

Table 8-2. Applicable or Relevant and Appropriate Requirements – Action Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
Resource Conservation and Recovery Act	Hazardous Waste	Identification and Listing of Hazardous Waste	40 CFR 261	Identifies solid wastes which are subject to regulation as hazardous wastes.	Applicable for the disposal of hazardous solid wastes that meet the hazardous waste characteristic thresholds.
Resource Conservation and Recovery Act	Hazardous Waste	Standards Applicable to Generators of Hazardous Waste	40 CFR 262	Establishes requirements (e.g., EPA ID numbers and manifests) for generators of hazardous waste.	Applicable for waste that is characterized as hazardous.
Resource Conservation and Recovery Act	Hazardous Waste	Standards Applicable to Transporters of Hazardous Waste	40 CFR 263	Establishes standards which apply to persons transporting manifested hazardous waste within the United States.	Applicable for transport of waste that is characterized as hazardous.
Resource Conservation and Recovery Act	Hazardous Waste	Standards Applicable to Owners and Operators of Treatment, Storage and Disposal Facilities	40 CFR 264	Establishes the minimum national standards which define acceptable management of hazardous waste.	Applicable for generation and storage of hazardous waste

Table 8-2. Applicable or Relevant and Appropriate Requirements – Action Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
Resource Conservation and Recovery Act	Hazardous Waste	Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40 CFR 265	Establishes minimum national standards that define the periods of interim status and until certification of final closure or if the facility is subject to post-closure requirements, until post-closure responsibilities are fulfilled.	Relevant and appropriate since remedies should be consistent with the more stringent 40 CFR 264 standards, as these represent the ultimate RCRA compliance standards and are consistent with CERCLA's goal of long-term protection of public health and environment.
Resource Conservation and Recovery Act	Hazardous Waste	Land Disposal Restrictions (LDRs)	40 CFR Part 268	Generated waste will need to meet LDRs for offsite disposal.	Applicable for the disposal of hazardous solid wastes.
Resource Conservation and Recovery Act	Hazardous Waste	Hazardous Waste Permit Program	40 CFR 270	Establishes provisions covering basic EPA permitting requirements	Relevant and appropriate. A permit is not required for on-site CERCLA response actions. Substantive requirements are added in 40 CFR 264.

Table 8-2. Applicable or Relevant and Appropriate Requirements – Action Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
Federal Hazardous Material Transportation Act	Hazardous Waste	Hazardous Materials Transportation Regulations	49 CFR 107, 171-177	Regulates transportation of hazardous materials.	Applicable. Response action will involve transportation of hazardous materials.
State of New Jersey Statutes and Rules	Hazardous Waste		N.J.A.C. 7:26C Hazardous Waste	Establishes rules for the operation of hazardous waste facilities in the state of New Jersey.	Provides the requirements for storing and handling hazardous waste onsite.
NJDEP	Soil	Beneficial Reuse of Soil During Remediation	Guidance for Beneficial Use of Soil and Non-Soil Material in the Remediation of Contaminated Sites and Closure of Solid Waste Landfills, June 2008.	Provides guidance on alternative choices for fill that will be protective of human health and/or the environment.	TBC

Table 8-2. Applicable or Relevant and Appropriate Requirements – Action Specific

Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
NJDEP Site Remediation Program	Soil	Technical Guidance on Capping of Sites Undergoing Remediation	Guidance Version 1.0, July 14, 2014.	Provides guidance on technical and regulatory considerations in selecting a type of cap, and cap design.	ARAR
NJDEP Site Remediation Program	Soil	Technical Regulations for Site Remediation– Historic Fill	NJAC 7:26E-5.4 Remedial Action Requirements for Historic Fill and NJAC 7:26C-7.4, 7.7, and 7.8.	Requires the establishment of engineering and institutional controls pursuant to NJAC 7:26C-7. Substantive requirements establish a level or standard of control, such as requiring a land use or activity use restriction. Mechanism of institutional controls may be considered substantive if it provides for enforceability; non-enforceable provisions would be administrative and are not an ARAR.	ARAR

Table 8-2. Applicable or Relevant and Appropriate Requirements – Action Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
New Jersey Hazardous Waste Regulations	Soil/ Sediment	Generation and Management of Hazardous Wastes	NJAC 7:26G-6 Standards Applicable to Generators of Hazardous Waste and NJAC 7:25G-11 Land Disposal Restrictions.	Establishes requirements for generators and facilities that manage or treat hazardous waste. The AOC Policy as set forth in the National Contingency Plan applies to onsite generation and management of any hazardous soils and sediments, which is consolidated or treated in-situ. Land disposal treatment standards do not apply to hazardous soil, if such soil is consolidated or treated in-situ onsite within an AOC.	NJAC 7:26G-6 is Applicable. Regulations associated with off-site actions are not ARARs; land-disposal restrictions must be fully complied with, administratively and substantively for off-site land disposal of hazardous wastes.
Soil Erosion and Sediment Control Act	Soil	Standards for Soil Erosion and Sediment Control	NJAC 2:90	The New Jersey Department of Agriculture, Hudson Essex Passaic Soil Conservation District governs all soil disturbances greater than 5,000 square feet.	Applicable

Table 8-2. Applicable or Relevant and Appropriate Requirements – Action Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
Federal Clean Water Act	Wastewater	General Pretreatment Regulations for Existing and New Sources of Pollution	40 CFR 403	Prohibits discharge of pollutants to a publicly owned treatment works (POTW) which cause or may cause pass-through or interference with operations of the POTW.	Potentially applicable if discharge of wastewater to POTW.
Effluent Limitations	Wastewater	Discharge requirements	33 U.S.C. 1251 Section 301	Technology-based discharge limitations for point sources of conventional, nonconventional, and toxic pollutants.	Potentially applicable if discharge of wastewater to POTW.
Toxic and Pretreatment Effluent Standards	Wastewater	Pretreatment standards for discharge into POTW.	33 U.S.C. 1251 Section 307	Establishes list of toxic pollutants and promulgates pretreatment standards for discharge into POTW.	Potentially applicable if discharge of wastewater to POTW.
State of New Jersey Statutes and Rules	Wastewater	Groundwater Quality Standards	N.J.A.C. 7:9-6 Groundwater Quality Standards	Establishes standards for the protection of ambient groundwater quality. Used as the primary basis for setting numerical criteria for discharges to groundwater.	Potentially applicable if disposal of treated groundwater by reinjection.

Table 8-2. Applicable or Relevant and Appropriate Requirements – Action Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
Kearny Municipal Utilities Authority (MUA)	Wastewater	Receives wastewater in South Kearny and the Meadowlands Area	Local Limits	Establishes the standards for discharge of groundwater through the MUA's sewage system.	TBC.
Passaic Valley Sewerage Authority (PVSC)	Wastewater	Receives wastewaters from the Kearny MUA	N.J.A.C. 7:14A and PVSC Local Limits	Establishes the standards for the discharge of waters to PVSC.	TBC.
State of New Jersey Statutes and Rules	Wastewater	Surface Water Quality Standards	N. J. A. C. 7:9B	Establishes standards for surface water quality.	Potentially applicable if discharge of wastewater to surface water.

Table 8-3. Applicable or Relevant and Appropriate Requirements – Location Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
Federal Clean Water Act	Water/ Wetlands	Clean Water Act, U.S. Army Corps of Engineers Nationwide Permit Program Permit #38 Cleanup of Hazardous and Toxic Waste	33 CFR 330 33 USC 1251 Section 404, 40 CFR 230, 231	Provides requirements for discharges to areas such as waters, headwaters, and special aquatic sites such as wetlands, caused by the containment, stabilization, or removal of hazardous or toxic waste materials. At this Site, EPA will regulate the wetlands that would otherwise be regulated under Section 404.	Applicable.
Executive Order 11990 – Protection of Wetlands	Wetlands	Federal Agency Actions in Wetlands	EO 11990	Federal agencies are to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out their responsibilities at Federally undertaken, financed, or assisted construction and improvements.	Applicable

Table 8-3. Applicable or Relevant and Appropriate Requirements – Location Specific
Diamond Head Oil Superfund Site

Act/Authority	Media	Criteria/Issues	Requirement/ Citation	Synopsis of Requirement	Status
Flood Hazard Area Control Act Regulations	Water/soil/ wetlands	Protection of floodplains	NJAC 7:13-10, 11	Delineates flood hazard areas and regulates use. Protects floodplains through requirements for construction and development activities. Portions of the site are delineated as flood hazard zones A and AE. Actions that would trigger substantive requirements under the flood zone regulations and that are part of the remedy include altering the topography and clearing/cutting of vegetation in the riparian zone. However, the remedy includes no permanent development so many of the substantive requirements would not apply.	Applicable.

AOC – Area of Contamination
LDR – Land Disposal Restriction
NJSA - New Jersey Statutes Annotated
RAO – remedial action objective
TSDF – treatment, storage, and disposal facility
ARAR – applicable or relevant and appropriate requirement
NJAC – New Jersey Administrative Code
POTW – publically owned treatment works
RTA – remedial target area
USACE – U.S. Army Corps of Engineers
CFR – Code of Federal Regulations
NJDEP – New Jersey Department of Environmental Protection
PRG – preliminary remediation goal
TBC – to-be-considered
USC – United States Code

APPENDIX III – RESPONSIVENESS SUMMARY

APPENDIX III

RESPONSIVENESS SUMMARY

Diamond Head Oil Refinery Superfund Site

INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns regarding the Proposed Plan for the Diamond Head Oil Refinery Superfund 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 remedies 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 community involvement and concerns regarding the Site.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES - This section includes summaries of oral comments received by EPA at the June 29, 2017 public meeting, EPA's responses to these comments, as well as responses to written comments received during the public comment period.

The Responsiveness Summary includes attachments which document public participation in the remedy selection process for the Site. The attachments are as follows:

- Attachment A – June 2017 Proposed Plan for the Site;
- Attachment B – Public Notice published in the June 19, 2017 edition of *The Observer*;
- Attachment C – Transcript of the June 29, 2017 Public Meeting.

BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

On June 19, 2017, EPA released the *Proposed Plan* and supporting documentation for the proposed change to the Light Non-Aqueous Phase Liquid (LNAPL) source area remedy selected in the Operable Unit 1 (OU1) September 25, 2009 Record of Decision (ROD), and the Operable Unit 2 (OU2) Preferred Alternative to address contaminated soil and sediment at the Diamond Head Oil Refinery Div. Superfund Site. EPA made these documents available to the public, as well as the Administrative Record repositories, which are maintained at the EPA Region 2 office (290 Broadway – 18th Floor, New York, New York 10007) and the Kearny Public Library (318 Kearny Avenue, Kearny, New Jersey 07032). EPA published a notice of availability involving these documents in *The Observer* newspaper, and opened a public comment period on the documents from June 19, 2017 to July 19, 2017. On June 29, 2017, EPA held a public meeting at the main council chambers in Kearny Town Hall to inform local officials and interested residents about the Superfund process, present the preferred remedial alternative for the Site, solicit oral comments, and respond to any questions.

The oral comments received from the public and EPA's responses can be found in the next sections of this summary. All recorded comments for the Diamond Head Oil Proposed Plan have been included as an attachment to this Responsiveness Summary.

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

Part 1 - Verbal Comments. The following are the comments received during the June 29, 2017 public meeting.

1.1 A commenter asked whether the slides from the presentation would be available to the public.

EPA Response: The slides from the presentation have been posted on the Diamond Head Oil Refinery Superfund Site webpage.

1.2 A commenter asked about the time frame for the work.

EPA Response: It is expected to take about one and a half years to design the remedy and approximately one year to construct the remedy.

Part 2: Written Comments

No significant comments, criticisms or new relevant information were received by EPA during the public comment period.

Attachment A – June 2017 Proposed Plan

Superfund Proposed Plan

U.S. Environmental Protection Agency, Region II

Diamond Head Oil Refinery Superfund Site
Kearny Township, New Jersey

June 2017

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the U.S. Environmental Protection Agency's (EPA's) proposed change to the Light Non-Aqueous Phase Liquid (LNAPL) source area remedy selected in the Operable Unit 1 (OU1) September 25, 2009 Record of Decision (ROD), and identifies the Operable Unit 2 (OU2) Preferred Alternative to address contaminated soil and sediment at the Diamond Head Oil Refinery Superfund Site (Site), located in the Town of Kearny, Hudson County, New Jersey.

The 2009 OU1 ROD addressed the LNAPL source material at the Site. EPA, with the concurrence of the New Jersey Department of Environmental Protection (NJDEP), selected a combination of offsite disposal and on-site biocell treatment as the remedy for OU1. Results of bench-scale testing of the biocell treatment technology, however, indicated that it would not achieve the remedial action objectives (RAOs) and remediation goals outlined in the OU1 ROD. The RAOs would be achieved by attaining the remediation goals of no measurable thickness of LNAPL in monitoring wells, and no potential for LNAPL-contaminated soil to leach oil to groundwater. As there are no Federal or State cleanup standards for LNAPL, EPA established these remediation goals based upon the toxicity and mobility and the principal threats to address this continuing source. Based on these results, EPA is proposing to amend the OU1 ROD and has identified [1]excavation and off-site treatment/disposal as the Preferred Alternative to address LNAPL source material at the Site.

1 Excavation and Off-Site Treatment/Disposal was evaluated in the OU1 FS and is identified as Alternative 4 in the OU1 ROD

MARK YOUR CALENDARS

PUBLIC COMMENT PERIOD
June 19– July 19, 2017
EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING
June 29, 2017 at 6 P.M.
EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at the main council chambers in Town Hall, 402 Kearny Avenue, Kearny, Hudson County, New Jersey, 07032

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.

Kearny Public Library
318 Kearny Avenue
Kearny, Hudson County, New Jersey 07031
(201) 998-2666

The Administrative Record for the Diamond Head Oil Refinery Site can also be found at the following website: https://www.epa.gov/superfund/diamond-head-oil

Send comments on the Proposed Plan to:
Brittany Hotzler, Remedial Project Manager
U.S. EPA, Region 2
290 Broadway, 19th Floor
New York, NY 10007-1866
Telephone: 212-637-4337
Email: hotzler.brittany@epa.gov

510579

The Preferred Alternative for OU2 calls for the placement of two feet of soil cover over residual contamination found within the Diamond Head Oil Refinery site. Institutional controls (ICs) in the form of deed notices will be implemented to maintain the integrity of the vegetated soil cover.

Any hazardous wastes encountered during the implementation of the OU1 or OU2 remedies would be disposed of offsite at an appropriate disposal facility.

Groundwater will be the subject of a subsequent remedial investigation (RI), Operable Unit 3 (OU3), after completion of the OU2 remedy.

This Proposed Plan was developed by EPA, the lead agency, in consultation with NJDEP, the support agency. EPA, in consultation with NJDEP, will select a remedy for OU1 and OU2 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 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 Remedial Investigation (RI) and Feasibility Study (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 Superfund activities that have been conducted there.

SITE DESCRIPTION

The Site, located near the Hackensack Meadowlands at 1401 Harrison Avenue, Kearny, New Jersey, was the location of a former oil reprocessing facility. Figure 1 shows the Site location. The Site is comprised of a 20.2-acre unoccupied parcel that includes wetland areas, a drainage ditch, a small wetland/pond, a vegetated landfill area along the western border, and the remnants of the former Diamond Head Oil Refinery on the eastern portion of the Site. The parcel is bordered by Harrison Avenue (also called the Newark Turnpike) to the north, entrance ramp “M” of Interstate 280 (I-280) to the east, I-280 to the south, and Campbell Distribution Foundry to the west. The Site also includes a 10.3-acre portion of the I-280 interchange clover leaf located east of the 20.2-acre unoccupied parcel.

The Site is currently undeveloped and is designated on the tax map as industrial/commercial. The land use surrounding the Site is industrial/commercial and open space/wetlands, and is not anticipated to change in the future. The nearest residential area is located a half-mile to the west, and is not impacted by Site contamination. A Municipal Sanitary Landfill Authority (MSLA) landfill, identified as the 1-D Landfill, is situated south of I-280.

Prior Site operations took place on the eastern half of the 20.2-acre parcel. The landfilled area on the western portion of the parcel was once an access road to the 1-D Landfill, and a landfill mound remains from those activities, rising 10 to 15 feet above the rest of the Site. Surface water drains through a drainage ditch that eventually discharges to Frank’s Creek, which in turn discharges to the Passaic River.

OU1 addresses the remedial target areas (RTAs) containing source material LNAPL, and the remedial alternatives for OU2 address residually contaminated soils, sediment, and surface water (Figure 2). OU2 consists of Area A, within the 20.2-acre parcel, and Areas B and C, the I-280 interchange cloverleaf area.

SITE HISTORY

Oil reprocessing at the Diamond Head Oil facility operated under several companies, including PSC Resources, Inc., Ag-Met Oil Service, Inc., and Newtown Refining Corporation, from 1946 to early 1979. All of these companies were owned by Mr. Robert Mahler. During facility operations, multiple aboveground storage tanks and possibly subsurface pits were used to store oily wastes. These wastes were intermittently discharged directly to adjacent properties to the east, and to the wetland area on the south side of the Site, creating an "Oil Lake."

In 1968, the New Jersey Department of Transportation (NJDOT) purchased several lots from PSC Resources, Inc., as part of its plans for construction of I-280. In 1977, NJDOT removed over 10 million gallons of oil and oil-contaminated liquid, and over 230,000 cubic yards of oily sludge, from the vicinity of the Oil Lake. The liquid wastes were shipped to waste-oil recycling facilities. The oil-contaminated sludge from the bottom of the Oil Lake was excavated and placed in a series of disposal cells – one atop the MSLA 1-D Landfill, and a series of smaller cells located within the I-280 right-of-way (ROW) soil berms, next to the oil-reprocessing facility which was still in operation at the time. The details of these disposal efforts are not well documented, but a simple liner and clay-based capping material were to be used as part of the disposal efforts for the sludge. While the surficial Oil Lake was removed and filled in, the NJDOT also reported finding an "underground lake" of oil-contaminated groundwater, extending from the eastern limits of the I-280 right-of-way to Frank's Creek, located west of the Site.

Plant operations ceased in 1979. In 1982, during the dismantling of the oil reprocessing facility, approximately 7,500 gallons of materials were pumped out of tanks and disposed of off-site, and 27 tons of contaminated soil were reportedly removed from the Site. Sampling conducted during this cleanup effort identified hazardous substances, including polychlorinated biphenyls (PCBs) in waste material collected from the Site. In 1985, part of the refinery property, Block 285, Lot 3, was sold to Mimi Urban Development Corporation, which subsequently changed its name to Hudson Meadows Urban Development Corporation. The Town of Kearny has owned the landfill parcel located in Area A and the parcel to the east of the Hudson Meadows Urban Development Corporation parcel since 1942. Parcels in Areas B & C are owned by the NJDOT.

NJDEP requested that EPA evaluate the Site for inclusion on the National Priorities List (NPL) in 1999[2]. The Site was added to the NPL in September of 2002, and a potentially responsible party (PRP) search is ongoing.

A phased RI was initiated for the Site in 2002. The OU1 Phase 1 RI obtained data on the nature and extent of soil, sediment, surface water, and groundwater contamination in areas of the Site where there was no information from previous investigations. The investigation also included a number of test trenches through the landfill in Area A to assess the nature of the buried material, and borings along the I-280 ROW soil berms to confirm the presence of buried sludge. The OU1 Phase 2 Focused RI/FS investigated contamination associated with the LNAPL source material and also concluded that the landfill in Area A was not a contributing source of contamination to the Site.

The RI for OU2 commenced in 2009 and was followed by two supplemental investigations in 2011 and 2015. Over the course of the investigation soil, sediment, surface and groundwater media were sampled and analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and dioxins and furans. The main objective of the OU2 RI was to identify and delineate areas containing contamination in soils and sediment that pose a direct exposure risk. Groundwater will be addressed under OU3 after completion of the remedial actions for OU1 and OU2.

The OU1 ROD, signed in 2009, addressed the LNAPL source material at the Site. The Selected Remedy included the construction of an on-site biocell for treatment of low-level threat source material, and off-site disposal of principal threat source material.

SITE CHARACTERISTICS OF THE DIAMOND HEAD OIL REFINERY SUPERFUND SITE

Site Hydrogeology

The stratigraphy at the Site consists of a relatively uniform vertical sequence of unconsolidated materials from top to bottom, as follows:

- A highly variable (in content and thickness) layer of anthropogenic fill across the Site, consisting of typical demolition-type debris,

2 The *National Priorities List* (NPL) is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide EPA in determining which sites warrant further investigation.

including wood, brick, metal, glass, plastic, and concrete mixed in a matrix of poorly sorted fine to coarse sand and gravel or silt, sand, and gravel;

- A sand unit about five feet thick on the western side of the Site, pinching out until it is not present on the eastern side of the Site;
- A silty clay unit, up to eight feet thick in sections of the Site, that appears to be continuous throughout the study area;
- A distinctive peat layer of varying thickness, but considered continuous across the Site;
- A silt and sand unit approximately 15 to 20 feet thick, beneath the peat layer;
- Laminated silt and clay unit, the full thickness of which was not observed in any of the study borings to date (as deep as 50 feet); and
- Bedrock, which also has not been encountered to date.

Groundwater at the Site is generally observed from 2 to 6 feet below ground surface, within the fill materials and natural and reworked soils that form the shallow overburden aquifer. The water table fluctuates seasonally and is highly influenced by precipitation and freeze-thaw cycles. Groundwater in some areas of the Site is observed in the form of perched water that is trapped above less permeable materials at shallower depths than the water table.

Water levels in the shallow groundwater above the silty clay and peat layers indicate a mounding of water near the wetland area in the southeastern portion of the property. At the local scale of the property, the shallow groundwater is considered to flow somewhat radially from this mounded area.

In the water-bearing unit below the peat layer, groundwater flows generally from northeast to southwest, consistent with regional trends in groundwater flow.

The nearest surface water body is Frank's Creek which drains into the Passaic River. As a result of I-280's construction, all drainage on the north side of the highway now travels a distance of 600 feet to the creek by a man-made drainage ditch. Prior to the 1940s, the area south of Harrison Avenue was wetlands. Landfilling activities that started in the 1940s began to shrink and divide the wetland areas. The eventual Oil Lake, estimated in 1977 to be between six and seven acres, appears to have formed in a remaining lowland area surrounded by properties filled in for industrial development, and by what would become the MSLA 1-D Landfill. With the construction of I-280, including the placement of the I-280 ROW soil berms, there is an isolated, frequently ponded wetland located just south of the former Diamond Head Oil facility.

Two factors have a significant influence on the water table at the Site: the first is the presence of wetlands along the southern Site boundary that includes areas of surface water, and the second is the presence of an LNAPL plume in the southeast corner of the Site in the area of the former Oil Lake. Although lighter than water, the density of the LNAPL has the effect of depressing the water table and influencing groundwater flow. Excepting these areas, groundwater is generally first encountered at a depth of 2 to 6 feet below ground surface. During wet seasons, extensive surficial flooding and standing water occur across much of the property, including the delineated wetland areas.

Summary of Diamond Head Oil Refinery Superfund Site Investigations

The complete results of the OU1 and OU2 Remedial Investigations can be found in the Diamond Head Oil Refinery Superfund Site Remedial Investigation Reports (2005 & 2009; 2016) which are part of the Administrative Record.

Summary of the OU1 Pre-Design Investigation

A Pre-Design Investigation (PDI) for OU1 was conducted between 2010 and 2015. The PDI: (1) refined the criteria used for measuring the extent of LNAPL source material; (2) identified the RTA for LNAPL source material, and (3) determined that the on-site biocell treatment technology would not attain the RAOs and remediation goals outlined in the 2009 ROD. The information collected has been used to refine the excavation/off-site disposal component of Alternative 4 (EPA's Preferred Alternative) in the OU1 ROD.

Following extensive bench scale testing, it was determined that the biocell technology would not be an effective treatment for the low-level threat source material.

Bench-scale testing of the biocell technology was performed in two phases, with Phase 1 testing focusing on LNAPL solubility, and the application of the biocell technology on soils excavated from areas of source material containing principal threat waste LNAPL. Phase 2 testing focused on the application of the biocell technology on soils excavated from areas of source material containing low-level threat waste. Phase 1 testing concluded that biocell technology would not be effective for treating LNAPL principal threat waste. Following 8 months of monitoring and testing during Phase 2, no significant changes in contaminant mass were observed, and there was no definitive indication that augmented degradation would occur in the low-level threat waste. Phase 2 bench-scale testing was therefore terminated before fully completing the scheduled test cycle.

In 2014/2015, EPA completed a second PDI of the LNAPL source material at the Site. The PDI collected a significant amount of information on the chemical and physical characteristics of the LNAPL, and the extent of its presence at the Site. It also included information on the Site's physical characteristics and how such characteristics may relate to LNAPL behavior and implemented remedies. The PDI helped to refine the criteria used to measure the extent of LNAPL source material at the Site. Based on the refined criteria, the volume of LNAPL source material measured at the Site increased by 3,000 cubic yards – from approximately 46,000 cubic yards to approximately 49,000 cubic yards. The PDI also helped to identify the RTA for LNAPL source material, and helped to further refine the preliminary remediation goals (PRGs) to permit field verification of their attainment.

Summary of the OU2 Remedial Investigation

EPA collected additional soil, sediment, and surface water samples from the Site over the course of the OU2 RI. Samples were analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and dioxins and furans. Soil samples at the Site were categorized as being taken from within or outside the property boundary – "within" referring to the 20.2 acres of Area A that served as the original Diamond Head Oil Refinery property, and "outside" referring to the 10.3 acres of Areas B and C containing the I-280 interchange clover leaf.

Analytical results were compared to Federal or New Jersey standards for each medium, whichever was more stringent, to determine if concentrations pose a potential threat to human health or the environment and need further evaluation in the baseline risk assessment.

Analytical results were compared to the following:

- Soil: NJDEP's Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS), New Jersey Ecological Screening Criteria, National Oceanic and Atmospheric Administration Screening Quick Reference Tables (SQuiRTs), and EPA Regional Screening Level (RSL) for Dioxins and Furans;

- Sediment: NJDEP's Ecological Screening Criteria Lowest Effects Levels;

- Surface water: New Jersey Surface Water Quality Standards (NJSWQS) for Fresh Water; and,

- Impact to groundwater pathway: NJDEP's Impact to Groundwater Soil Screening Levels.

The RI revealed multiple contaminants, including chromium, dioxin, PCBs, lead, aldrin, thallium, and benzo[a]pyrene.

Soils: Soil samples were taken in approximately 118 sample locations at multiple depths, from surface soils (0-4 ft.), subsurface soils (5-10 ft.), and the I-280 ROW soil berms, both inside (Area A) and outside (Area B and Area C) the property boundary (Figure 2). Samples were tested for VOCs, SVOCs, pesticides, PCBs, metals, and dioxins and furans. Surface soil samples taken within the property boundary revealed maximum concentrations of lead at 27,900 parts per million (ppm), chromium at 7,650 ppm, and PCBs at 14 ppm. Subsurface soil samples taken within the property boundary revealed concentrations of chromium at 22,300 ppm, thallium at 45.7 ppm, and benzo[a]pyrene at 35 ppm. The highest levels of contamination in the surface and subsurface soils were located in Area A in the general area of the former refining operations, and in the central section of Area A at the location of the former Oil Lake.

Sampling of the I-280 ROW soil berms on the eastern and southern portion of the Site revealed maximum concentrations of lead at 306 ppm and chromium at 7,700 ppm, at depths of 5-7 feet.

Surface soil samples taken outside the property boundary (Areas B and C) revealed maximum concentrations of PCBs at 1,800 ppm and aldrin at 75 ppm. Subsurface soil samples taken outside the property boundary revealed concentrations of lead at 13,200 ppm and PCBs at 8.4 ppm. The highest levels of contamination in the surface and subsurface soils were found from 0-2 feet in the surface soil and 5-17 feet in the subsurface soil, and were located in Areas B and C, within the footprint of the former Oil Lake.

Surface soil samples analyzed for dioxin and furan contamination from within the property boundary revealed a concentration of 1,873 parts per trillion (ppt) at 0-2 feet, located in the central section of Area A, within the location of the former Oil Lake. Soil samples taken from outside the property boundary revealed concentrations of dioxin/furans at 8,188 ppt from 0-2 feet, and 11,172 ppt from 2.5-3 feet, and were located in Area C, within the footprint of the former Oil Lake.

Sediment: Sediment samples were taken from the drainage ditch, which is only underwater during flooding events, and from Frank's Creek in approximately 25 locations. Sediment samples were tested for VOCs, SVOCs, pesticides, PCBs, metals, and dioxins and furans. Sediment samples revealed lead contamination at a concentration of 84,400 ppm, found at 0-3 feet in the central section of Area A, within the footprint of the former Oil Lake. Sediment samples taken from the drainage ditch, near it's confluence with Frank's Creek, revealed lead contamination at a concentration of 84,300 ppm, from a depth of 0-0.5 feet. The sediments analyzed from the drainage ditch function more like soils, in that they are compacted and vegetated, and are less likely to travel into Frank's Creek. The contamination present in sediments that were analyzed from Frank's Creek are therefore likely related to contributing sources other than the Site, which is reflective of the industrial nature of the Creek's surrounding and upstream areas.

Surface Water: Surface water samples were taken from approximately 10 sample locations. Samples were tested for VOCs, SVOCs, pesticides, PCBs, and metals. Surface water samples revealed maximum concentrations of lead at 712 µg/L (microgram per Liter), thallium at 160 µg/L, and beryllium at 990 µg/L, found in ponded surface water within Area A, and in one sample taken in the drainage ditch near its confluence with Frank's Creek.

PRINCIPAL THREATS

OU1 LNAPL source material is a principal threat waste. Exposure to residual contaminants in OU2 soil and sediment, while not considered principal threat waste, present unacceptable risks to ecological and human receptors if not addressed by remedial action.

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.

SCOPE AND ROLE OF ACTION

EPA is addressing the Diamond Head Oil Refinery Site in three operable units (OUs):

OU1:	LNAPL Source Area
OU2:	Residual contamination in soils, sediment, and surface water
OU3	Groundwater

This Proposed Plan identifies EPA's proposed change to the remedy selected in the 2009 OU1 ROD, and contains descriptions and evaluations of the remedial alternatives considered for OU2. The remedies for OU1 and OU2 will be implemented concurrently. While the scope of OU2 originally included contaminated groundwater at the Site, at this time, EPA is adding a third operable unit (OU3) to address groundwater, after completion of the OU1 and OU2 remedies.

The remedy identified in the 2009 OU1 ROD intended to address the LNAPL source material at the Site through excavation and off-site disposal of principal threat waste source material and on-site treatment of low-level threat waste source material (biocell treatment technology). However, bench scale testing indicated that the biocell treatment technology would not meet the RAOs and remediation goals outlined in the 2009 OU1 ROD. EPA's proposed changes to the 2009 OU1 ROD include excavation and off-site treatment/disposal of all LNAPL source material, as defined by the OU1 RTA (Figure 2). The I-280 ROW soil berms containing non-hazardous wastes will be moved during excavation to facilitate removal of LNAPL source materials from the RTA identified below the berms. After excavation, berm soils will be used as backfill in the excavated areas in Area A (Figure 2).

After the LNAPL source material has been removed, OU2 will address the residually contaminated surface and subsurface soil, sediment, and surface water at the Site.

WHAT ARE THE "CONTAMINANTS OF CONCERN" (COCs)?
EPA has identified Chromium, Dioxin, PCBs, Aldrin, Lead, Thallium, and Benzo[a]pyrene, as the primary contaminants of concern at the Diamond Head Oil Refinery Superfund Site that pose the greatest potential risk to human health and the environment.

Chromium: Chromium is a naturally-occurring element that can exist in several different forms, and is widely used in manufacturing processes to make various metal alloys. Chromium (VI) compounds are classified as known carcinogens.

Dioxin: Dioxins can occur during the manufacture of certain organic chemicals.

PCBs: Polychlorinated biphenyls (PCBs) are mixtures of chlorinated compounds that have historically been used as coolants and lubricants in electrical equipment. PCBs are classified as probable carcinogens.

Aldrin: Aldrin is an insecticide that was widely used on crops such as corn and cotton. Aldrin is considered to be a probable carcinogen.

Lead: Lead is a naturally-occurring metal found in the earth's crust. Lead is used in the production of batteries and ammunition, and was formerly used in the production of paints, caulking, and as an additive to gasoline. Lead is considered a probable carcinogen.

Thallium: Thallium is a naturally-occurring metal found in trace amounts in earth's crust, and is mostly used in the manufacture of electronic devices.

Benzo[a]pyrene: Benzo[a]pyrene is a polycyclic aromatic hydrocarbon (PAH) that forms during the incomplete burning of coal, oil, gas, wood, or other organic substances. Benzo[a]pyrene is classified as a probable carcinogen.

SUMMARY OF SITE RISKS

As part of the RI/FS, a baseline human health risk assessment (HHRA) and a baseline ecological risk assessment (BERA) were conducted to estimate the risks and hazards associated with the current and future effects of contaminants on human health and the environment. A baseline human health risk assessment is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate these under current and future land uses.

In the HHRA, cancer risk and noncancer health hazard estimates are based on current reasonable maximum exposure scenarios. They were developed by taking into account various health protective estimates about the concentrations, frequency and duration of a variety of individual's exposure to chemicals selected as contaminants of potential concern (COPCs), as well as the toxicity of these contaminants.

For the ecological risk assessment, representative ecological receptors were identified for each exposure area. Measurement and assessment endpoints were developed during the BERA to identify those receptors and areas where unacceptable risks are present.

Human Health Risk Assessment

A four-step human health risk assessment process was used for assessing site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see adjoining box "What is Risk and How is it Calculated" for more details on the risk assessment process).

The baseline human health risk assessment began with selecting COPCs in the various media (i.e., surface soil, subsurface soil, sediment and surface water) that could potentially cause adverse health effects in exposed populations. The current and future land use scenarios refer to exposure to soil from within or outside the property boundary – "within" referring to the 20.2 acres of Area A that served as the original Diamond Head Oil Refinery property, and "outside" referring to the 10.3 acres of Areas B and C containing the I-280 interchange clover leaf. As the Site is currently undeveloped and is designated on the tax map as industrial/commercial, the current and future land use scenarios included the following exposure pathways and populations:

- Site Maintenance Worker (adult): current/future ingestion, dermal contact and inhalation of soil particles and vapors for surface and subsurface soil from within the property boundary (Area A, Figure 2), and future exposure to the I-280 ROW berm soil
- Trespassers (child/adult): current/future ingestion, dermal contact and inhalation of soil particles and vapors for surface and subsurface soil from within the property boundary and the I-280 ROW berm, and sediment and surface water
- Highway Worker (adult): current/future ingestion and dermal contact and inhalation of soil particles and vapors for surface and subsurface soil from outside of the property boundary (Area B and C, Figure 2), including the I-280 ROW berm
- Industrial Worker (adult): future ingestion, dermal contact and inhalation of soil particles and vapors for surface and subsurface soil from within the property boundary and the I-280 ROW berm
- Construction Workers (adult): future ingestion, dermal contact and inhalation of soil particles and vapors from surface and subsurface soil from within the property boundary and the I-280 ROW berm

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 reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures. Central tendency exposure (CTE) assumptions, which represent typical average exposures, were also developed. A complete summary of all exposure scenarios can be found in the baseline human health risk assessment.

Summary of the Human Health Risk Assessment

This section provides an overview of the human health risks from the major COCs. A complete discussion of all risks from the Site can be found in the Human Health Risk Assessment which is contained in the Administrative Record.

Surface Soil

Risks and hazards were evaluated for current and/or future exposure to surface soil. The populations of interest included adult maintenance workers, child and adult trespassers, adult highway workers, adult industrial workers and adult construction workers. The estimated hazards and risks are presented in Table 1.

The potential current hazards for trespassers (child), industrial workers and construction workers is above the acceptable hazard index of 1 from exposure to surface soil within the property boundary. The potential current risk for all populations is above the acceptable risk range for exposure to surface soil within the property boundary. Chromium[3], dioxin, and PCBs are COCs for surface soil within the property boundary. Exposure to surface soil from the berms results in estimated hazards that are equal to or below the acceptable hazard index of 1, and the cancer risk is

3 Chromium speciation was not conducted on the samples, therefore the risks and hazards from chromium exposure was evaluated assuming that total chromium was 100% chromium VI, the most toxic form of chromium.

equal to or above the acceptable risk range, with chromium being identified as a COC. The potential future hazards and risks for future highway workers exposed to surface soil outside of the property boundary exceed the acceptable hazard index of 1 and the cancer risk range, due to dioxin, aldrin and PCBs.

Lead was evaluated separately for surface soil. Initially lead concentrations were compared to the New Jersey Non-Residential Direct Contact value of 800 ppm. An additional evaluation for lead using the Adult Lead Model, which is documented in a technical memorandum in the administrative record, was also conducted. The ALM provided a comparison value of 784 ppm. Based on both evaluations, surface soil lead concentrations were elevated within the property boundary, the berm soil, and surface water. Therefore, lead was also identified as a COC at the site.

Table 1. Summary of hazards and risks associated with surface soil.

Receptor	Hazard Index	Cancer Risk
Within Property Boundary Current/Future		
Maintenance Worker – adult	0.8	**$2x10^{-4}$**
Trespasser – adult	0.8	**$2x10^{-4}$**
Trespasser – child	**7**	**$2x10^{-3}$**
Future		
Industrial Worker – adult	**4**	**$9x10^{-4}$**
Construction Worker – adult	**5**	**$1x10^{-4}$**
Berm Future		
Trespasser – child	**1**	**$2x10^{-4}$**
Industrial Worker – adult	0.8	**$1x10^{-4}$**
Outside Property Boundary Future		
Highway Worker – adult	**3**	**$4x10^{-4}$**
The COCs identified in the surface soil within the property boundary were chromium, dioxin and PCBs. The COCs identified in the berm surface soil was chromium. The COCs identified in the off property surface soil were dioxin, aldrin and PCBs. In addition, lead is a COC in surface soil within the property boundary and the berm.		

Subsurface Soil

Risks and hazards were evaluated for the potential future exposure to subsurface soil. The populations of interest included future adult industrial workers, construction workers, maintenance workers and trespassers within the property boundary and highway workers from outside of the property boundary. The hazard index was equal to or greater than 1 for all populations, and the cancer risk was above the acceptable risk range for all populations. The COCs within the property boundaries were chromium, thallium and benzo[a]pyrene while the COCs outside of the property boundary were PCBs and dioxin (Table 2).

Table 2 Summary of hazards and risks associated with subsurface soil.

Receptor	Hazard Index	Cancer Risk
Within Property Boundary Future		
Industrial Worker – Adult	**5**	**$2x10^{-3}$**
Construction Worker - Adult	**8**	**$2x10^{-4}$**
Maintenance Worker – Adult	**1**	**$4x10^{-4}$**
Trespasser – Adult	**1**	**$3x10^{-4}$**
Trespasser – Child	**9**	**$4x10^{-3}$**
Outside of Property Boundary Future		
Highway Worker – Adult	**3**	**$4x10^{-4}$**
The COCs identified in the subsurface soil within the property boundary are chromium, thallium and benzo[a]pyrene. PCBs and dioxin were identified as a COC in subsurface soil outside of the property boundary. In addition, lead was detected in elevated concentrations in subsurface soil in several areas outside of the property boundary.		

Surface Water and Sediment

Risks and hazards were evaluated for the potential current and future exposure to surface water and sediment in Frank's Creek, and sediment from the drainage ditch, which is more representative of soil. The population of interest included adult maintenance workers and adult and child trespassers. The non-cancer hazards for surface water were above the EPA acceptable value of 1 for the maintenance worker and child trespasser. The COCs identified for surface water were beryllium and thallium. The cancer risks were below or within the EPA acceptable ranges for all populations. Lead was also identified as a COCs for the sediment due to several hot spot locations with lead concentrations exceeding both the NJNRDC and ALM values.

Table 3. Summary of hazards and risks associated with surface water and sediment.

Receptor	Hazard Index	Cancer Risk
Frank's Creek and Drainage Ditch Current/Future Surface Water		
Maintenance Worker – Adult	**3**	$5x10^{-5}$
Trespasser – Adult	0.6	$2x10^{-5}$
Trespasser – Child	**3**	$6x10^{-5}$
Frank's Creek and Drainage Ditch Current/Future Sediment		
Maintenance Worker – Adult	0.05	$2x10^{-5}$
Trespasser – Adult	0.09	$2x10^{-5}$
Trespasser – Child	0.02	$5x10^{-5}$
Beryllium and thallium were identified as COCs in the surface water. Lead was identified in several locations at elevated concentrations. These areas may represent hot spots and lead would be considered a sediment COC.		

Groundwater and Vapor Intrusion

Although LNAPL source material is present on site, contaminant levels in groundwater, in general, slightly exceed the groundwater standards. For example, benzene (with relatively higher solubility and mobility compared to other site contaminants) was detected in exceedance of the NJ Class IIA standard of 1 part per billion (ppb) in groundwater in only 4 wells where LNAPL source material is present in the RTAs (Area A, Figure 2). The large majority of wells had no exceedances of VOC criteria, or had just one exceedance for only one VOC during the three sampling rounds, and were observed in wells that contained LNAPL source material. LNAPL has not been observed in any deep monitoring wells (monitoring wells screened beneath the clay and peat layers) in any of the monitoring events conducted. Based on the low level of contaminants in groundwater, the low solubility of SVOCs, dioxins/furans and PCBs, and the removal of LNAPL source material, there would be limited potential for remaining soil contaminants to migrate to groundwater and thus levels of groundwater contaminants would be expected to decrease over time and not require active treatment.

The potential risks and hazards associated with contaminated groundwater and volatilization of volatile organic compounds (VOCs) from contaminated groundwater into future buildings that are over the contaminated groundwater were evaluated in the human health risk assessment, however, exposure to groundwater and vapors are being addressed in OU3, thus they are not discussed in this proposed plan.

Based on the results of the human health risk assessment a remedial action is necessary for substances in the surface soil, subsurface soil, surface water, and sediment to protect public health, welfare and the environment from actual or threatened releases of hazardous substances.

Ecological Risk Assessment

A baseline ecological risk assessment (BERA) focused on evaluating the potential for impacts to sensitive ecological receptors to site-related constituents of concern through exposure to surface soil, surface water, sediment, and prey items (i.e., small mammals and fish). Surface soil, surface water and sediment concentrations were compared to ecological screening values, and food web modeling for upper trophic level predators was completed to determine the potential for adverse effects to ecological receptors. A complete summary of all exposure scenarios can be found in the baseline level ecological risk assessment (BERA).

Surface Soil

Although animals using the site do not distinguish boundaries, soil was evaluated using two different exposure areas, exposure to site-wide soil and exposure to berm soil. This was done to identify if there are different risks associated with different areas of the site. Soil concentrations were compared with screening values that are protective for soil invertebrates. Based on the evaluation, there is a potential for adverse effects to soil invertebrates from exposure to surface soil in both the site-wide soil and the berm soil. The risk from exposure to berm soil was less than the risk for site-wide soil. The surface soil screening criteria for soil invertebrates were exceeded for 38 compounds consisting of metals, pesticides, SVOCs and PCBs in the site-wide soil, which resulted in hazard quotients (HQs) greater than the acceptable value of 1. The soil screening criteria for soil invertebrates were exceeded for 30 compounds consisting of metals, pesticides, SVOCs, a VOC and dioxin in berm soil, which resulted in HQs greater than the acceptable value of 1.

Surface Water

Surface water concentrations were compared to ecological screening values. There is a potential for adverse effects to water column aquatic communities from exposure to surface water in the drainage ditch. The surface water screening criteria were exceeded for 9 compounds consisting of metals and pesticides, which resulted in HQs greater than the acceptable value of 1.

Sediment

Sediment concentrations from the drainage ditch and Frank's Creek were compared to ecological screening values. There is a potential for adverse effects to benthic invertebrates from exposure to sediment in the drainage ditch leading to Frank's Creek. The sediment screening criteria were exceeded for 54 compounds consisting of metals, pesticides, SVOCs and VOCs, which resulted in HQs greater than the acceptable value of 1.

Food Web Modeling

Exposure to compounds in the soil and prey items (small mammals) was evaluated for upper trophic level terrestrial animals, including short-tailed shrew, white-footed mouse, mourning dove, barred owl, American woodcock and red fox. All of the terrestrial receptors exposed to site-wide soil had HQs greater than 1 due to metals, PCBs and dioxin for both No Observed Adverse Exposure Levels (NOAELs) and Lowest Observed Adverse Exposure Levels (LOAELs) comparisons. Short-tailed shrew, white-footed mouse and American woodcock exposed to berm soil had HQs greater than 1 for LOAEL comparisons due to a combination of either metals, PCBs, and/or dioxin, and all terrestrial receptors had HQs above 1 for NOAEL comparisons due to metals, PCBs and/or dioxin.

Exposure to compounds in the surface water, sediment and prey items (fish) was evaluated for upper trophic level aquatic animals, including mink, muskrat, raccoon and belted kingfisher. All of the aquatic receptors evaluated had HQs greater than 1 due to a combination of metals, PCBs and/or dioxin for the NOAEL comparison. Muskrat had an HQ greater than 1 for the LOAEL comparison due to lead, and belted kingfisher had an HQ greater than 1 for the LOAEL comparison due to mercury. The rest of rest of the aquatic receptors had HQs less than 1. Additionally, mummichogs in the drainage ditch had HQs greater than 1 for 9 compounds consisting of metals, pesticides, and PCBs.

Based on the results of the ecological risk assessment remedial action is necessary for site-wide soils and the drainage ditch to protect the environment from actual or threatened releases of hazardous substances.

REMEDIAL ACTION OBJECTIVES

The remedial action objectives (RAOs) describe what the proposed site cleanup is expected to accomplish. These objectives are based on available information and standards, such as Applicable or Relevant and Appropriate Requirements (ARARs), to-be-considered standards and guidance, and site-specific risk based levels.

OU1 RAOs from the 2009 OU1 ROD

- Remove or treat principal threats, consistent with the NCP, to the extent practicable;
- Prevent current and future migration of LNAPL and associated chemical contaminants to the various media at the Site, including groundwater and seeps to surface water; and,
- Prevent human exposure through direct contact with the principal threat LNAPL.

OU2 RAOs

EPA established the OU2 RAOs to prevent/minimize potential receptor exposures that present unacceptable risk as a result of contact, ingestion, or inhalation (dust).

Surface water on the Site appears only as surficial flooding, areas of standing water during wet seasons or flooding events, and in delineated wetlands. An RAO for surface water has therefore not been developed, as soils are the contributing source of contamination to surface water, and any risks presented by surface water will be addressed through attainment of the soil RAO.

Soil:

- Prevent/minimize potential ecological receptor exposures and human receptor exposures through contact, ingestion, and inhalation of contaminated soils.

Sediment:

- Prevent/minimize potential ecological receptor exposures and human receptor exposures to contaminated sediment in the drainage ditch.

After the concurrent implementation of the OU1 and OU2 remedies, OU3 will evaluate changes in groundwater concentrations over time.

To achieve the RAOs for OU2, EPA is proposing soil and sediment cleanup preliminary remediation goals (PRGs) for the COCs based on NJDEP's NRDCSRS and EPA risk-based values. The PRGs are as follows:

Soil:
- Chromium: 20 ppm
- Dioxin: 730 ppt
- PCBs: 1 ppm
- Aldrin: 0.2 ppm
- Lead: 800 ppm
- Thallium: 79 ppm
- Benzo[a]pyrene: 0.2 ppm

Sediment:
- Lead: 800 ppm[4]

DESCRIPTION OF PROPOSED CHANGES TO THE OU1 LNAPL SOURCE AREA REMEDY

After a ROD is signed, new information may be received or generated that could affect the implementation of the remedy selected in the ROD, or could prompt the reassessment of the remedy.

Original Remedy

Capital Cost:	$16,080,000
Annual O&M Cost:	$0
Present Worth Cost:	$17,340,000
Construction Time Frame:	1 year

In 2009, EPA signed a ROD for OU1 to address the principal threat LNAPL waste. The original remedy called for the off-site disposal of the LNAPL principal threat source material, and construction of an on-site biocell for the treatment of low-level threat source material.

The major components of the Original Remedy included:

- Isolation of the remedial target areas with cut-off walls, and excavation of the principal threat LNAPL source material, a total of approximately 46,000 cubic yards of material;

- Transportation and off-site disposal to a facility (with treatment as required to meet land disposal requirements) for the principal threat LNAPL portion of the excavated material that is not amenable to on-site treatment;

- For the low-level threat LNAPL material amenable to on-site treatment, construction of a biocell within the excavated area to facilitate biodegradation of the LNAPL wastes, including the installation of piping for air and nutrient distribution and a collection system for air and water that may accumulate in the biocell;

- Introduction of nutrients and bulking agents to the low-level threat LNAPL material to enhance permeability and the conditions for biological activity, followed by placement of the augmented LNAPL material in the biocell for treatment and capping;

4 The resulting PRG value using the latest information from NHANEs (2009-2014) is 784 ppm incorporating the Region 2 proposed adjusted adult soil and dust ingestion rate and a target blood level of 5 ug/dl. This value was rounded to 800 ppm which is also the NJDEP's NRDCSRS value. This value will be used as the PRG for both soil and sediment cleanup, as sediments found in the drainage ditch function more like soils (compacted and vegetated), and are only underwater during flooding events. There are no ecological receptors associated with the sediments in the drainage ditch, and therefore the cleanup goal should be protective for both human health and the environment.

- Operation of the aeration, nutrient distribution, and water collection systems for the biocell for an estimated five-year period; and,

- Performance sampling and final confirmation sampling to demonstrate that the LNAPL wastes have been destroyed through biological degradation, at which time the biocell components will be dismantled.

Preferred Alternative for OU1, Excavation and Off-Site Treatment/Disposal

Capital Cost:	$13,733,000
Annual O&M Cost:	$0
Present Worth Cost:	$13,733,000
Construction Time Frame:	1 year

EPA's Preferred Alternative, Excavation and Off-site Treatment/Disposal was evaluated in the OU1 Phase 2 Focused RI/FS and presented as Alternative 4 in the 2009 OU1 ROD. This original alternative called for the excavation of only principal threat LNAPL, and is now being modified to also include low-level threat LNAPL, as well as utilizing the I-280 ROW berm soils as fill for the excavated RTAs. Under this alternative, all LNAPL source material will be excavated from the RTA, which is approximately 49,000 cubic yards (Figure 2). The excavated material will then be stabilized on site to allow for transportation for offsite treatment and disposal. The excavated areas will then be backfilled with the non-hazardous I-280 ROW berm soil, and clean fill that will be added to grade. Any hazardous wastes will be transported to an appropriate disposal facility. This alternative will be conducted concurrently with the OU2 remedial action.

A Comparative Analysis between the Original Remedy and the Preferred Alternative is presented below.

EVALUATION OF ALTERNATIVES FOR OU1

1. Overall Protection of Human Health and the Environment

The Original Remedy will not meet RAOs or remediation goals outlined in the OU1 2009 ROD. The Preferred Alternative would achieve the RAOs and remediation goals by providing protection to human health and the environment through the removal, and therefore prevention of direct contact with the entire LNAPL source area.

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

The Preferred Alternative would remove the entire LNAPL source area, while the Original Remedy would only remove the principal threat LNAPL waste. Bench scale testing performed on the low-level threat waste indicated that the biocell treatment technology was not effective and therefore the waste cannot be treated. EPA has developed site-specific remediation goals that are consistent with the expectations of the New Jersey Technical Requirements for the remediation of free product (N.J.A.C 7:26E-1). The Resource Conservation and Recovery Act (RCRA), 40 CFR 261, is applicable for assessing the disposal requirements of potentially hazardous solid wastes, such as the LNAPL-contaminated soils. Based upon the available documentation, EPA has concluded that the LNAPL wastes are not listed hazardous waste, but will require treatment to meet RCRA Land Disposal Restrictions. Both remedies can be designed to meet location- and action-specific ARARs, and would also require a reliance on ICs indefinitely to prevent damage of the soil cover and any intrusive activities into the residual contamination. The Original Remedy would not meet the RAOs, except for preventing direct contact with principal threat LNAPL waste at the surface, while the Preferred Alternative would meet all RAOs at the end of the estimated 1-year construction timeframe.

3. Long-Term Effectiveness and Permanence

The Preferred Alternative would remove all potential risks associated with the presence of LNAPL source material, providing reliable controls to prevent future contact. Use of a soil cover addressed under OU2 would be adequate and reliable in preventing direct contact with, and erosional transport of, berm materials used as backfill. Any remaining contamination present in the I-280 ROW berm soil would still present potential risks, however the concentration would be comparable to the concentration found in the residual soils around the RTA. Any potential risks associated with the I-280 berm soil would be addressed by the placement of the soil cover as part of the OU2 remedy.

The Original Remedy would keep the low-level threat LNAPL within a biocell onsite, and provide a cover to control the potential risks associated with direct contact and erosional transport of the low-level threat LNAPL at the Site, which would be adequate and reliable. Since the biocell was shown to be ineffective at treating the low-level threat LNAPL, the waste would remain unchanged. The preferred alternative would achieve remediation goals that are protective for the LNAPL source material, but a subsequent decision is still necessary to address the residual contaminated soil. Thus, the need for institutional controls, such as a deed notice, would be determined as part of OU2.

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

In the Preferred Alternative, the toxicity and volume of the LNAPL source material would remain unchanged, as the Preferred Alternative does not implement treatment, rather the source material would be transferred from the Site to a disposal facility. The mobility of contaminants in surface soil berm materials used as backfill in the RTAs would be reduced through the use of a soil cover as part of OU2 to control potential releases by water and wind erosion. In the Original Remedy, the toxicity and volume of the principal threat LNAPL waste would remain unchanged, as it would be transferred off-site for disposal, but the toxicity, mobility, and volume of the remaining low-level threat LNAPL waste placed inside the biocell would remain unchanged, since the proposed treatment was found to be ineffective.

5. Short-Term Effectiveness

Both the Original Remedy and the Preferred Alternative would mitigate potential risks to workers through adherence to site-specific health and safety plans, to communities through the use of engineering controls, and would have minimal potential risks to the environment during construction. Short-term risks associated with the Preferred Alternative would be greater than those associated the Original Alternative because of the larger transportation component that is involved, while the short-term risks associated with the Original Alternative would be the lowest for construction and operation.

6. Implementability

The Original Remedy is technically and administratively feasible, and necessary engineering services and materials are readily available to design, construct, and operate the biocell, but the technology has proved ineffective for the treatment of the principal threat LNAPL waste at this Site. The Preferred Alternative is technically and administratively feasible, the necessary engineering services, equipment, and materials are readily available, and excavation and disposal are well proven technologies. Both the Original and Preferred Remedy would require ICs to prevent intrusive activities into remaining residual contamination. ICs for both alternatives are readily implementable.

7. Cost

The Original Remedy has a present worth cost of \$17,340,000[5] based on the Phase 2 Focused RI/FS, while the Preferred Alternative has a present worth cost of \$13,733,000.

SUMMARY OF REMEDIAL ALTERNATIVES FOR OU2

CERCLA requires that each selected remedy be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practical. 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 soil remediation were identified and screened by effectiveness, implementability, and cost, with emphasis on effectiveness. Those technologies that passed the initial screening were then assembled into remedial alternatives.

Full descriptions of each proposed alternative can be found in the FS which is part of the Administrative Record. Table 1 provides a summary of the components for each alternative.

[5] The present worth costs for the Biocell remedy were not updated because the biocell treatment is not technically feasible.

The time frames below are for construction and do not include the time to design a remedy, or the time to procure necessary contracts. Five-year reviews will be conducted as a component of the three alternatives (Alternative 2, Alternative 3, and Alternative 4) that leave contamination in place. The present worth cost for all alternatives includes the periodic present worth cost of five-year reviews.

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 control or remove low-level contamination or to prevent exposure at the Site.

Alternative 2 – Excavation of Soils in Areas B and C; Vegetated Soil Cover in Areas A, B, and C; Institutional Controls; and Excavation of Sediments

Capital Cost:	$8,461,000
Annual O&M Cost:	$67,000
Present Worth Cost:	$10,048,000
Construction Time Frame:	Less than 1 year

This alternative consists of construction of a two-foot soil cover as the primary measure to prevent exposure to residual contamination in the underlying soil. In Areas B and C (Figure 2), up to two feet of surface soil will be excavated, totaling 31,300 cubic yards, before placing a cover to maintain the current drainage patterns. Excavated soils from Areas B and C containing non-hazardous materials will be placed within Area A, and graded to facilitate cover placement. The soil cover for Areas A, B, and C will consist of 18 inches of clean fill and six inches of topsoil. The wetland areas within Area A will also be excavated to a depth of two feet to accommodate the soil cover and wetland restoration, but no other locations within Area A will be excavated.

Sediment in the drainage ditch along I-280 will be excavated to an approximate depth of 18 inches, and 18 inches of stone bedding will be added.

Approximately 440 cubic yards of TSCA/RCRA contaminated soil, and 800 cubic yards of sediment, will be removed under this alternative and transported to an appropriate disposal facility (i.e RCRA Subtitle C or TSCA disposal facility).

For cost estimation purposes, EPA has assumed that approximately 500 cubic yards of soil contaminated with dioxin greater than 7,300 ppt will be disposed of at a Subtitle C facility.

Institutional controls, such as a deed notice will be used to prevent contact with residual contaminated soil and ensure that future use of the site does not damage the soil covers. Since this alternative results in contaminants remaining on site above acceptable levels, five-year reviews are required.

Alternative 3 – Excavation of Soils in Areas A, B, and C and offsite disposal; Vegetated Soil Cover; Institutional Controls; and Excavation of Sediments

Capital Cost:	$18,750,000
Annual O&M Cost:	$67,000
Present Worth Cost:	$20,337,000
Construction Time Frame:	Less than 1 year

This alternative consists of construction of a two-foot soil cover as the primary measure to prevent exposure to residual contamination in the underlying soil. Soils in Areas A, B, and C will be excavated to a depth of two feet, except for the landfill, totaling 70,600 cubic yards. A two-foot soil cover will be added, and the wetlands in Area A will be restored. The soil cover for Areas A, B, and C will consist of 18 inches of clean fill and six inches of topsoil.

Sediment in the drainage ditch along I-280 will be excavated to an approximate depth of 18 inches, and 18 inches of stone bedding will be added.

Approximately 107,470 cubic yards of TSCA/RCRA contaminated soil, and 800 cubic yards of sediment, will be removed under this alternative and transported offsite to an appropriate disposal facility (i.e. RCRA Subtitle C or TSCA disposal facility).

For cost estimation purposes, EPA has assumed that approximately 500 cubic yards of soil contaminated with dioxin greater than 7,300 ppt will be disposed of at a Subtitle C facility.

Institutional controls, such as a deed notice will be used to prevent contact with contaminated soil and ensure that future use of the site does not damage the soil covers. Since this alternative results in contaminants remaining on site above acceptable levels, five-year reviews are required.

Alternative 4 – Excavation of Soils in Areas A, B, and C; Onsite Stabilization and Consolidation of soils and sediments in Area A; Vegetated Soil Cover; Institutional Controls; and Excavation of Sediments

Capital Cost:	$10,561,000
Annual O&M Cost:	$67,000
Present Worth Cost:	$12,148,
Construction Timeframe:	2 years

This alternative consists of construction of a two-foot soil cover as the primary measure to prevent exposure to residual contamination in the underlying soil. Soils in Areas A, B, and C will be excavated to a depth of two feet, except for the landfill, totaling 70,600 cubic yards. Excavated soil from Areas A, B, and C will then be stabilized and placed in Area A, and a six-inch topsoil cover will be added. Wetlands in Area A will be restored. The soil cover placed in Areas B and C will consist of 18 inches of clean fill and six inches of topsoil.

Sediment in the drainage ditch along I-280 will be excavated to an approximate depth of 18 inches, and 18 inches of stone bedding will be added. The excavated sediment will be transported to Area A for stabilization.

Approximately 94,200 cubic yards of soil will be removed, stabilized, and put back in place. Approximately 5,250 cubic yards of TSCA/RCRA contaminated soil, and 800 cubic yards of sediment, will be removed and transported offsite to an appropriate disposal facility (i.e. RCRA Subtitle C or TSCA disposal facility).

For cost estimation purposes, EPA has assumed that approximately 500 cubic yards of soil contaminated with dioxin greater than 7,300 ppt will be disposed of at a Subtitle C facility.

THE NINE SUPERFUND EVALUATION CRITERIA

1. Overall Protectiveness of Human Health and the Environment evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

3. Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

4. Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

5. Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

6. Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

7. Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

8. State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

9. Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Institutional controls, such as a deed notice will be used to prevent contact with contaminated soil and ensure that future use of the site does not damage the covers.

Since this alternative results in contaminants remaining on site above acceptable levels, five-year reviews are required.

EVALUATION OF ALTERNATIVES FOR OU2

EPA uses nine criteria to evaluate the remedial alternatives individually and against each other to select a remedy. This section of the Proposed Plan presents the relative performance of each alternative against the nine criteria, noting how each alternative compares to the other alternatives under consideration. The nine evaluation criteria are discussed below. A detailed analysis of each of the alternatives appears in the FS report.

1. Overall Protection of Human Health and the Environment

Alternative 1, No Action, would not be protective of human health or the environment since it does not include measures to prevent exposure to contaminated soils or sediments.

Alternatives 2, 3 and 4 are protective, and prevent unacceptable human health and ecological risk by eliminating exposure pathways through containment, removal, or treatment.

Each alternative includes varying degrees of removal or cover, and institutional controls to prevent exposure and address the risk at the site. Alternative 4 includes treatment (stabilization) of soil and incorporation of stabilized soil into the Area A cover, while Alternatives 2 and 3 use clean fill for the soil cover. The stabilization under Alternative 4 would aim to achieve the New Jersey Non-Residential Direct Contact Remediation Standards for industrial use. Treatability testing would be needed to determine the effectiveness of stabilization under Alternative 4 to achieve these standards.

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. EPA evaluated NJDEP's Impact to Groundwater Soil Remediation Standards while developing alternatives for the Site. New Jersey relies on a series of guidance documents to provide a basis for developing site-specific impact-to-groundwater soil cleanup goals, however, the methodologies for developing the site-specific numbers have not been promulgated, and are therefore not Applicable or Relevant and Appropriate Requirements (ARARs), but are "to be considered".

Alternative 1 is the only alternative that would not comply with chemical-, action-, or location-specific ARARs, since no action will be taken, leaving soils and sediments in place that exceed New Jersey Non-Residential Direct Contact Remediation Standards (NJNRDCSRS), posing an unacceptable risk to human health and the environment.

Alternatives 2, 3, and 4 comply with chemical-specific ARARs, such as the NJNRDCSRS, which establish minimum direct contact soil remediation levels. Alternatives 2 and 3 accomplish this by removing soils and sediment that exceed ARARs, while Alternative 4 accomplishes this by treating soils and sediment through stabilization. Location- and action-specific ARARs can be met through design and implementation for Alternatives 2, 3, and 4. Action-specific ARARs, such as the Toxic Substances Control Act will be met through the proper management of PCB remediation wastes, while location-specific ARARs, such as the Flood Hazard Area Control Act Regulations, will be met by ensuring that measures for excavating, grading, and fill do not impede overland flow of stormwater.

3. Long-Term Effectiveness and Permanence

Alternative 1 provides no controls and does not maintain protection of human health and the environment over the long-term because there is no mechanism to prevent exposure to contaminated soils or sediment.

With regard to soil cover, Alternatives 2 and 3 would have equal reliability of controls since the cover thickness is the same under both alternatives and the cover material would meet New Jersey's Residential Direct Contact Remediation Standards (NJRDCRS). Under Alternative 4, surface soils that are excavated from Areas B and C to accommodate soil cover would be stabilized and incorporated into the soil cover material in Area A.

Alternative 4 would have lower reliability than Alternatives 2 and 3 because stabilized material would be used as part of the cover. The stabilized material would be used as part of the 2-foot cover, except in the wetlands areas and in Areas B and C, where soils with concentrations below New Jersey's Residential Direct Contact Remediation Standards would be used for cover.

Under Alternatives 2, 3, and 4, institutional controls, such as a deed notice, would be used to prevent contact with contaminated soil and ensure that future use of the site does not damage the covers.

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

Alternative 1 does not implement any treatment processes, and therefore does not provide for a reduction in the toxicity, mobility, or volume of contaminants. Alternative 1 also does not generate any treatment residuals, and it does not meet the statutory preference for treatment.

Alternative 2 does not implement any treatment processes, and the toxicity, mobility, and volume of contaminants remains unchanged.

Alternative 3 does not implement any treatment processes, and the toxicity, mobility, and volume of contaminants remains unchanged.

Alternative 4 is the only remedial alternative that includes a treatment component (stabilization), which provides a greater reduction of toxicity and mobility than Alternatives 2 and 3. The stabilization component of Alternative 4 results in a reduction in the toxicity and mobility, but it would be expected to result in an increase in volume due to the addition of stabilization materials.

5. Short-Term Effectiveness

Alternative 1 involves no action, so there is no risk to workers, no additional risks to the community or the environment, and the Alternative will not achieve RAOs.

Alternative 2 has the lowest potential risks for workers, the shortest construction duration, and is the least intrusive when compared to Alternatives 3 and 4. Alternative 2 also has the lowest potential risks to the community due to the short construction duration and the fewest impacts to traffic. The potential for additional risks to the environment is minimal for Alternative 2, and RAOs are expected to be met within 1 year.

Alternative 3 has a longer construction duration than Alternative 2, and a shorter construction duration than Alternative 4. Alternative 3 would produce more truck traffic when compared to Alternatives 2 and 4, and would have the greatest traffic impact to the community resulting from the volume of material transported offsite for disposal, and the importing of backfill material. The potential for additional risks to the environment is minimal for Alternative 3, and RAOs are expected to be met within 2 years.

Alternative 4 would have the longest construction duration, and more construction related activities than Alternatives 2 and 3. Alternative 4 would present the highest potential risks to workers, but have less traffic impacts that Alternative 3. Alternative 4 would also present the highest potential risks to the community resulting from a longer construction duration, including additional noise, odor, and dust. Additional emission control techniques would need to be implemented under Alternative 4. The potential for additional risks to the environment is minimal for Alternative 4, and RAOs are expected to be met within 2 years.

6. Implementability

Alternative 1 is implementable and feasible because no action would be taken.

Alternative 2 is the most technically feasible, and is administratively feasible, and materials and services for Alternative 2 are readily available.

Alternative 3 is technically feasible, but would require additional soil management and traffic management when compared to Alternative 2. Alternative 3 is administratively feasible, and materials and services are readily available, however it may require increased transport distances due to the larger quantity of backfill materials needed for this alternative.

Alternative 4 is the least technically feasible, and requires additional soil management to stabilize the soils, when compared to Alternatives 2 and 3. Alternative 4 is administratively feasible, and materials and services are readily available. Alternative 4 would require treatability testing to determine the effectiveness of the technology to select the appropriate stabilizing agent(s).

For Alternatives 2, 3, and 4, access requirements would have to be addressed with property owners for each alternative, as well as institutional controls, such as deed notices.

7. Cost

The total estimated present worth costs of Alternatives 1, 2, 3, and 4 are $0, $10,048,000, $20,337,000, and $12,148,000, respectively. Alternative 3 is the most expensive and Alternative 1 is the least expensive.

SUMMARY OF PREFERRED ALTERNATIVES

OU1 Preferred Alternative

The Preferred Alternative for OU1 is Alternative 4 – Excavation and Off-site Treatment/Off-site Disposal. The major components of this alternative include:

- Excavation and offsite disposal of entire RTA of LNAPL source material
- Backfilling of excavated areas with I-280 ROW berm soil containing non-hazardous soil, and additional clean fill to grade; and,
- Supplementing backfill with clean soil as needed.

OU2 Preferred Alternative

The Preferred Alternative for OU2 is Alternative 2 – Excavation of Soil in Areas B and C; Vegetated Soil Cover in Areas A, B, and C; Institutional Controls; and Excavation of Sediments. The major components of this alternative include:

- Excavation of 2 feet of surface soil from Area B and C, and wetland areas located in Area A, totaling 31,300 cubic yards;
- Disposal of any RCRA or TSCA hazardous waste at an appropriate offsite facility (i.e. RCRA Subtitle C or TSCA disposal facility);
- Distribution of excavated soils from Areas B and C, and wetland areas, across Area A for regrading;
- Disposal of excavated sediments at an appropriate offsite facility;
- Installation of a 2-foot vegetated clean soil cover as an engineering control;
- Wetland restoration; and
- Implementation of a deed notice as an institutional control.

A two-foot soil cover will be constructed as the primary measure to prevent exposure to contaminants in the underlying soil. In Areas B and C, up to two feet of surface soil, approximately 31,300 cubic yards, will be excavated before placing a cover to maintain the current drainage patterns. For cost estimation purposes, EPA has assumed that approximately 500 cubic yards of soil contaminated with dioxin greater than 7,300 ppt will be disposed of at a Subtitle C facility. In addition, EPA has estimated that approximately 440 cubic yards of TSCA/RCRA contaminated soil will be disposed of offsite at an appropriate disposal facility (i.e. RCRA Subtitle C or TSCA disposal facility).

Based on groundwater data to date, EPA does not believe that soil remaining onsite will contribute to groundwater contamination. To confirm this, Synthetic Precipitation Leaching Procedure (SPLP), or a comparable test, will be performed during the design phase. For soils that fail SPLP, or a comparable test, additional actions will be taken to prevent the migration of contaminants to groundwater. Excavated soils from Areas B and C will be placed within Area A, and graded to facilitate cover placement. The wetland areas within Area A will also be excavated to a depth of two feet, to accommodate the soil cover, and restored, but no other locations within Area A will be excavated.

Sediment in the drainage ditch along I-280 will be excavated to an approximate depth of 18 inches, and 18 inches of stone bedding will be added.

The Preferred Alternative was selected over other alternatives because it reduces the risk within a reasonable time frame, and at a lower cost than other alternatives. The Preferred Alternative will meet chemical-specific ARARs and can be designed to meet action- and location-specific ARARs. It poses the lowest potential risks to onsite workers and the community because it would have the shortest construction duration, and the fewest impacts to traffic.

The Preferred Alternative is technically feasible, and is administratively feasible, and materials and services are readily available for its implementation. The potential for additional risks to the environment are minimal, and RAOs are expected to be met within 1 year.

The Preferred Alternative would achieve PRGs that are protective for non-residential use, but would not achieve levels that would allow for unrestricted use and therefore, institutional controls, such as a deed notice would be required. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

State Acceptance

The State of New Jersey concurs with the EPA's Preferred Alternatives presented in this Proposed Plan.

Community Acceptance

The Preferred Alternatives are believed to provide the best balance of tradeoffs among the alternatives based on the information available to EPA at this time. EPA believes the Preferred Alternatives would be protective of human health and the environment, would comply with ARARs, would be cost-effective, and would utilize permanent solutions. The selected alternatives may change in response to public comment or new information.

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.

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 OUs and the remedial investigation activities that have been conducted at them.

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 Diamond Head Oil Refinery Superfund Site contact:

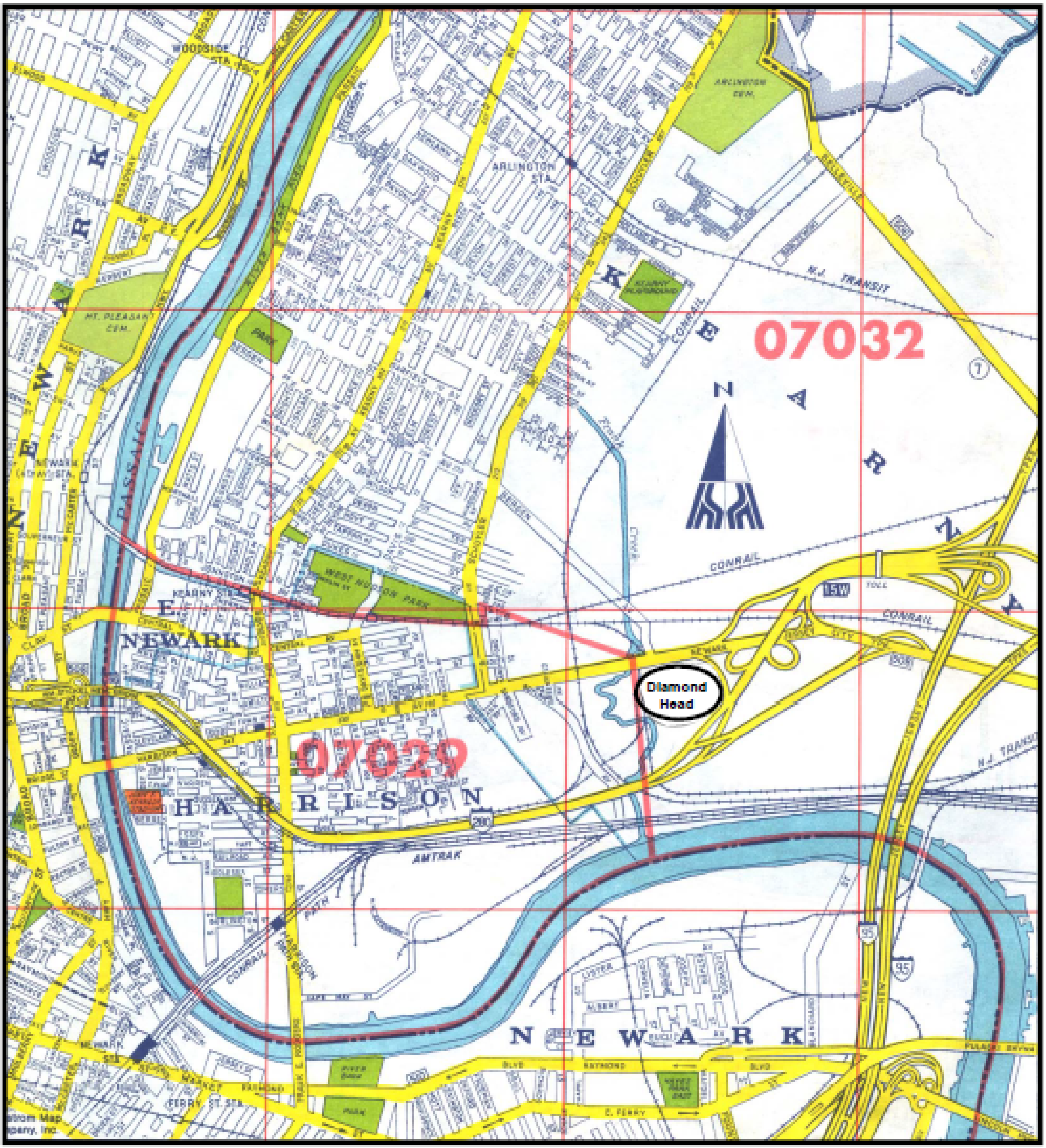
Brittany Hotzler	Wanda Ayala
Remedial Project Manager	Community Relations
(212) 637-4337	(212) 637-3676

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

On the Web at:
https://www.epa.gov/superfund/diamond-head-oil

Source: Hagstrom Union/Hudson/Essex County Atlas, 1990

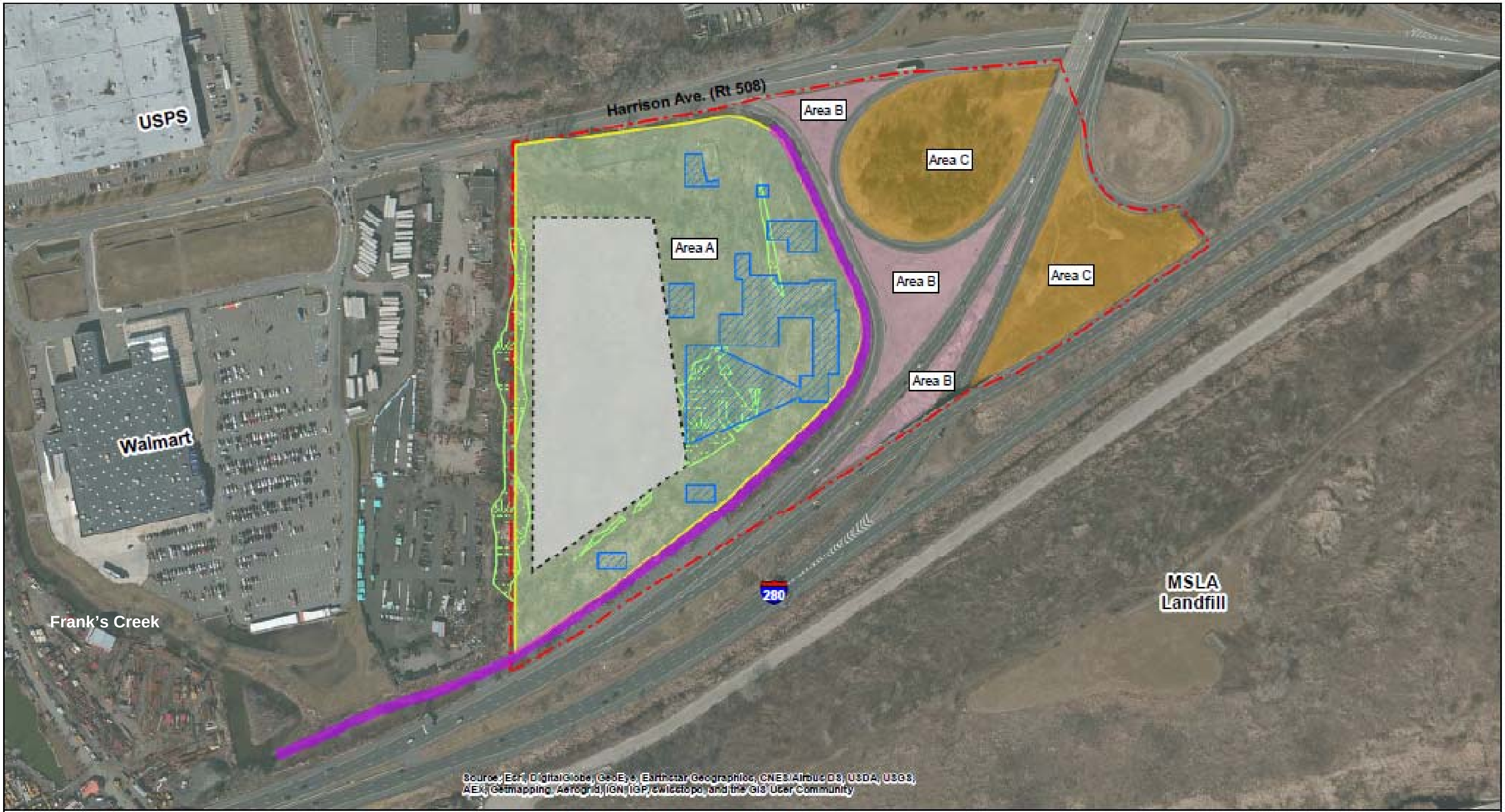
Hudson County, Page 6, Grid C-7



Block 285, Lots: 3, 14, 15
Vacant Lot Adjacent to 1235 Harrison Avenue
Kearny, NJ 07032 (Hudson County)

See Also: USGS 7.5' Quadrangle: Elizabeth, NJ: Photorevised 1981
40° 44' 50" lat., 74° 07' 55.9" long. (NAD 83)

FIGURE 1
Site Location Map
Diamond Head Oil Superfund Site, Operable Unit 2
Kearny, NJ



Legend

- Drainage Ditch
- Remedial Target Area for OU2 - Soils
  - Area A
  - Area B
  - Area C
- Current Property Boundary
- Site Boundary
- Landfill
- Delineated Wetlands
- Remedial Target Area for OU1 Principal Threat LNAPL Waste

N

0 62.5 125 Feet

Figure 2
Extent of OU2 Remedial Target Area
Diamond Head Oil Superfund Site
Kearny, NJ

CH2MHILL

R:\GIS\DEN\258471DIAMONDHEAD\GIS\MAPFILES\437258_DIAMONDHEAD_FS\FIGURE2-1_EXTENT OF OU2 REMEDIAL TARGET AREA.MXD CGAUTHIER_CH2MHILL 6/2/2016 1:29:00 PM

Table 1

Diamond Head - Summary of Alternative Components

	Alternative 2 (1)						Alternative 3						Alternative 4					
	Area A (1)	Area A-wetlands	Landfill	Area B	Area C	Drainage Swale	Area A	Area A-wetlands	Landfill	Area B	Area C	Drainage Swale	Area A	Area A-wetlands	Landfill	Area B	Area C	Drainage Swale
Institutional Controls	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Removal and Treatment Ex-situ																		
Excavate Surface soil (2 feet) Sediment (18 inches)		x		x	x	x	x	x		x	x	x	x	x		x	x	x
Treat by Stabilization													x	x		x	x	
On-site reuse																		
Consolidate excavated soil in Area A		x		x	x									x		x	x	
Disposal																		
Dispose in Subtitle D						x	x	x		x	x	x						x
Dispose in Subtitle C Area A - 10% assumed Area B - TSCA soil				x			x			x						x		
Cover (2 feet)																		
Stabilized excavated soil													x					
Clean fill (18 inches)	x	x	x	x	x		x	x	x	x	x			x	x	x	x	
Top soil (6 inches)	x	x	x	x	x		x	x	x	x	x		x	x	x	x	x	
Restore wetlands																		
Grade		x						x						x				
Seed		x						x						x				

(1) Under Alternative 2, while a cover would be placed over the existing surface soils, wetland areas and Areas B and C will also be excavated to maintain drainage patterns and existing grade.

(2) Disposal includes addition of drying agent to pass paint filter test.

Note: Excavation of berm materials and their re-use to backfill the OU1 RTA is included under OU1.

Attachment B – Public Notice published in the June 19, 2017 edition of *The Observer*

VIEW from 15

chance to play with the best of the best. I made friends with everyone."

Schnoll said that he wasn't too disappointed about his team's loss.

"We all came together for one team," Schnoll said. "We had fun out there. I wanted to show everyone what we were all about. It really made me feel proud to be a part of it. In the second half, I made it like we were playing without a scoreboard. So we couldn't give up."

Carrino just loved the chance, a regular Golden Bear reunion.

"It was great to be a part of it," Carrino said. "I got a chance to play one more game and the game was played on my home field. I've played there my whole life, given that the place has artificial turf."

Of course, having the turf in their own backyard gave the South a fighting chance. But it wasn't meant to be.

"It was pretty tough, not having played football for a while," Carrino said.

Lyndhurst played Manchester Regional to a 10-10 tie in the consolation game.

"I felt good running," Carrino said. "It felt good. Even with the lack of running, it felt good."

Carrino will play college football for the Red Hawks of Montclair State.

"It's great to be playing with Schnoll, but it's a little sad that this was my last game with the others," Carrino said. "I was pretty close with James, too. By being selected and playing in the game, it's a great feeling. I had one of the most awesome times with the All-Stars."

Just like in life, there's a time to move on. For the Lyndhurst kids, the rest of their lives has now fully begun.

Photos by Jim Hague

Lyndhurst long time friends Matt Schnoll (l.) and Michael Carrino (r.) will get the chance to play together in the fall for Montclair State after playing for the South All-Stars Friday night.

Attachment C – Transcript of the June 29, 2017 Public Meeting

U.S. ENVIRONMENTAL PROTECTION AGENCY

Region II

- - - - - - - - - - - - - - - x

DIAMOND HEAD OIL REFINERY	:	STENOGRAPHIC
Superfund Site	:	TRANSCRIPT
Kearny Township, New Jersey	:	OF

- - - - - - - - - - - - - - - x PUBLIC MEETING

Town Hall
402 Kearny Avenue
Kearny, New Jersey
Thursday, June 29, 2017
Commencing 6:07 p.m.

PRESENT:

PAT SEPPI, Community Liaison, Public Affairs Division

BRITTANY HOTZLER, Remedial Project Manager, NJ Remediation Branch

RICH PUVOGEL, Remedial Project Manager

RICHARD HO, Remedial Project Manager

ELIAS RODRIGUEZ, M.P.A., Press Officer, Public Affairs Division

CHUCK NACE, Environmental Toxicologist, Emergency and Remedial Response Division

ALSO PRESENT:

ANDREW B. JUDD, Hydrogeologist, Project Manager, CH2M Hill

I N D E X

MS. SEPPI: Okay. When you're ready we'll get started. I don't think we need microphones. I thank you for coming out tonight. We appreciate you taking the time to come here to talk about the Diamond Head proposed plan.

Just a couple of things. Hopefully, you've read the proposed plan. If not, there are some copies out there, and they're also online, which the comment period if you know will end on July 19th. This is a little bit different type of meeting for E.P.A., much more formal.

We have a stenographer who will be taking down all comments and all of the presentation, any questions, and then we will have a transcript of that at the end. And when the Record of Decision's final legally binding document is written, the answers to the questions that people ask tonight will be a part of that document. It's called a Responsiveness Summary. So you'll see that at that time.

And, also, if you leave here tonight and you decide, oh, you know, there are a couple things I didn't ask, you can certainly send that information to Brittany online. So I'd like to have other people who are here from E.P.A. and our contractor introduce themselves. First, Brittany.

MS. HOTZLER: Brittany Hotzler, I'm one of the Remedial project managers for the Diamond Head Oil site.

MR. PUVOGEL: I'm Rich Puvogel.

MS. SEPPI: Two Riches in a row, right?

MR. PUVOGEL: I'm Rich Puvogel. I'm the section chief of the central New Jersey remediation section.

MR. HO: I am Richard Ho. I am the other remedial project manager on the Diamond Head Oil site.

MS. SEPPI: Chuck.

MR. NACE: I'm Chuck Nace, I'm an environmental toxicologist with E.P.A. I did the human health and ecological risk assessments for the site.

MS. SEPPI: Elias.

MR. RODRIGUEZ: Elias Rodriguez, press officer for the E.P.A.

MR. JUDD: I'm Andy Judd with CH2M Hill. I'm a consultant for E.P.A. at the site.

MS. SEPPI: Okay. So the reason

we're here tonight is talk about E.P.A.'s proposed remedy, which you've already read, and give you the opportunity to ask questions. Brittany has a presentation and then after that presentation we'll certainly open the floor up to any questions you might have.

One thing I would like to ask, and I know sometimes it's difficult, if it's possible if you could hold your answers until the end. A lot of times what happens is, you know, your question will be like the next slide or something like that. So this way we'll get right through it and then get to your questions, which is the most important for us here tonight. So I think with that I'll let Brittany do her presentation.

MS. HOTZLER: Thank you, Pat. As I said, my name is Brittany Hotzler. I'm one of the remedial project managers for the Diamond Head Oil site. Tonight I'll be giving you an overview of the Superfund process, the history of the site and E.P.A.'s activities at the site, a discussion of the remedial alternatives, which are the different cleanup options, and we'll end with a discussion of our preferred cleanup plan before we open it up to questions. The presentation should be about 15 minutes.

So the Superfund process starts when someone alerts state or federal officials to a site and a preliminary assessment and site investigation are conducted. The site is then added to the National Priorities List and this is a really important step in the process. Once a site is listed it officially becomes a Superfund site and that releases federal funding for us to do a study of the site.

From here, we conduct a Remedial Investigation, and this is to find out the nature and the extent of the contamination or what contaminants are at the site, where they're located and who might be effected by it, be it adults, children, animals or the local environment.

Then we perform a Feasibility Study. This is to evaluate the different methods that could be used to clean up the site. And this now looking at various technologies and using E.P.A.'s nine criteria and I'll be -- -

(Discussion off the record.)

MS. HOTZLER: A Feasibility Study is then performed to evaluate the different methods that could be used to cleanup the site. This involves looking at various technologies and comparing them to E.P.A.'s nine criteria, and I'll be discussing what those criteria are later in the presentation.

So based on the results of the Remedial Investigation and Feasibility Study, E.P.A. proposes a remedy and that's where we are now, as shown by the box highlighted in red.

E.P.A. does this by releasing a proposed plan for the preferred alternative, and we seek input from the community during a 30-day public comment period. The public comment period, as Pat said, for Diamond Head started on June 19th and will conclude on July 19th.

So at the start of the public comment period -- I'm sorry, at the end of public comment period we use the information from the proposed plan and community input to create the Record of Decision for what we call the ROD, and that documents the selected remedy and initiates the start of the remedial design and remedial action phase.

During the remedial design and remedial action phase, the remedy is engineered and the construction and implementation of the remedy is carried out.

So this concludes the Superfund process portion of the presentation, and next I'll be giving you a brief history of the Diamond Head Oil site.

This image shows the general location of the site. It's located at 1401 Harrison Avenue in Kearny, New Jersey. It's in the red box. So the site is comprised of a 30.5 acres in total, and it's comprised of three areas that we refer to as Areas A, B and C.

Area A is a 20.2 acre unoccupied parcel that includes wetland areas, a drainage ditch, a vegetative landfill and the remnants of the former Diamond Head Oil refinery.

Areas B and C consist of a 10.32 acre portion of the I 280 interchange cloverleaf and they're located east of the 20.2 acre parcel.

The site was a location of an oil reprocessing facility operated under several different names from approximately 1946 until 1979. The facility used multiple aboveground storage tanks, drum storage areas and subsurface pits to store oily wastes that were then discharged to the property.

In this image from 1976, the Diamond Head facility is circled in red, and inside the circle you can see vertical and horizontal storage tanks as well as some drums. To the south and east of the facility is a large oil lake, which is approximately 6 to 7 acres in size.

So in 1976, while the facility was still in operation, the New Jersey Department of Transportation began construction of Interstate 280. During construction N.J.D.O.T. removed over 10 million gallons of oil and oil contaminated liquid, as well as 230,000 cubic yards of oily sludge from the vicinity of the oil lake, and at this time they also noticed an underground lake of oil.

The facility was abandoned in 1979 and lie dormant until the New Jersey Department of Environment Protection requested that E.P.A. evaluate the site in 1999.

The site was then added to the National Priorities List in September of 2002, and as I said previously, this was an important step because it released federal funding for

E.P.A. to conduct studies at the site.

In this image you can see Harrison Avenue to the north and the Diamond Head facility is again circled in red. The construction activities at this point have changed the landscape. Ramp M and the I 280 Interchange cloverleaf can be seen in the central portion of the site. And the outline for the I 280 right-of-way soil berms can also be seen in the center of the image, and there's also visible staining in the soil from the remnants of the oil lake.

So here is an aerial view of the Diamond Head Oil site today with some overlays. We have Harrison Avenue to the north, Entrance ramp M of Interstate 280 in the central portion of the site and I 280 running along the South.

In this image we can see the location of the former oil reprocessing facility near Harrison Avenue located in Area A.

The New Jersey Department of Transportation right-of-way soil berms are outlined in red and they follow along Entrance ramp M and I 280, along with the drainage ditch, which is shown in light blue.

Outlined in green is the footprint of the former oil lake and that extends out into the I 280 cloverleaf area, which we refer to as Areas B and C.

So from 2003 to 2008, E.P.A. conducted a Remedial Investigation and Feasibility Study at the site. Sampling during these studies revealed LNAPL source material or light non aqueous phase liquid containing PCBs, heavy metals and petroleum compounds such as Benzene. LNAPL are liquids are less dense than water, so oil is a good example of this because it floats on top of the water.

E.P.A. made the decision to divide the site into three separate phases or what we call "operable" units, and this was to address source material, residual contamination and ground water at the site.

The 2009 Record of Decision addressed the source material at the site through excavation and construction of an onsite biocell for the treatment of the LNAPL waste. The biocell technology that was chosen in the Record of Decision involved using bio remediation or microbes to break down the LNAPL material.

From 2009 to 2015, pre design investigations were conducted for Phase 1 and a Remedial Investigation and Feasibility Study was also conducted for Phase 2. The Phase 2 study focused on the residual contamination found in the soil, sediment and surface water at the site.

So this concludes the site history portion of the presentation, and next I'll be discussing E.P.A.'s findings at the site from the Phase 2 investigation.

So the results of the pre design investigation determined that the onsite biocell treatment technology would not attain the remedial action objectives and the remediation goals that were outlined in the Record of Decision for the LNAPL source material.

So the investigation also helped to refine the criteria used for measuring the extent of the source material and it also increased the volume from approximately 46,000 cubic yards to 49,000 cubic yards. It also helped to identify the remedial target area for the source material.

E.P.A. collected additional soil, sediment and surface water samples from the site over the course of the Phase 2 Remedial

Investigation. The Remedial Investigation revealed multiple contaminants including chromium, dioxin, PCBs, lead, aldrin, thallium and benzo[a]pyrene, and these are the contaminants at the site that drive the risk.

The highest level of contaminants are found in the area of the former refining operation and within the footprints of the former oil lake.

As part of the investigation for Phase 2 a Baseline Human Health Risk Assessment was conducted. The results of the risk assessment are provided in Tables 1 through 3 in the proposed plan. The Human Health Risk Assessment evaluates cancer risks and non cancer hazards under current and future land use scenarios. This means looking at the toxicity of the chemicals found in various media, such as soil or sediment, and the ways in which people may be exposed to these chemicals.

The risk assessment revealed risks from exposure to residual contamination at the site through ingestion, dermal contact and inhalation. The potentially effected population includes adult site maintenance workers, child and adult trespassers, adult highway workers, adult industrial workers and adult construction workers.

A Baseline Ecological Risk Assessment was also conducted. This, the potential risks to the ecological community include potential risks to soil invertebrate, water column aquatic communities and benthic invertebrates from exposure to surface soil, surface water and sediment.

So next I'll be discussing E.P.A.'s nine criteria and the proposed cleanup plans for the source material and residual contamination at the site. So these are the nine criteria that E.P.A. uses to evaluate each potential alternative and ultimately select a preferred remedial alternative.

Alternatives must meet the first two criteria. These are the threshold criteria. The next five are the balancing criteria, and these are used to evaluate and compare the possible alternatives and select the preferred alternative.

The final two are modifying criteria because based on new information or input from the community E.P.A. may modify the preferred alternative.

Next I'll discuss E.P.A.'s proposed changes to the Phase 1 cleanup of the source material at the site.

The original Phase 1 remedy addressed the source material at the site through off-site disposal of source material that pose a principal threat, and construction of an on-site biocell for the treatment of source material that posed a low-level threat.

After a Record of Decision is signed, new information may be received or generated that could effect the implementation of the selected remedy, or could prompt the reassessment of the remedy, and an amendment to the Record of Decision may be issued.

E.P.A. has selected excavation and off-site disposal as a preferred alternative for the LNAPL source material. This alternative has a cost of $13.7 million.

Under E.P.A.'s preferred alternative for the source material at the site, all LNAPL source material, principal threat and low-level threat, will be excavated from the remedial target area, which is approximately 49,000 cubic yards. The excavated material will then be taken off-site for disposal.

Excavated areas will be backfilled with non hazardous soil from the I 280 right-of-way soil berm and clean fill will be added to grade.

Under this alternative all hazardous wastes will be transported off-site to an appropriate disposal facility. This alternative will be conducted concurrently with the Phase 2 remedial action.

This image depicts the remedial target area of the LNAPL source material that will be excavated under the preferred alternative for Phase 1. The areas that we have outlined in orange represent approximately 49,000 cubic cards of LNAPL source material and these will be excavated from Area A.

Now I'll be discussing the preferred alternative for the residual contamination at the site. So we're moving on from Phase 1 into Phase 2. E.P.A. evaluated four different alternatives for cleaning up the residual contamination at the site. The No Action alternative is always included as an alternative. It shows what would happen if the E.P.A. did not perform a cleanup at the site. Alternatives 2, 3 and 4 all include an excavation component and placement of a vegetated soil cover, but each of these alternatives include varying degrees of consolidation, off-site disposal or stabilization.

There are several common elements to the proposed alternatives, which include the construction of a clean soil cover as the primary measure to prevent exposure to the residual contamination in the underlying soil, the excavation of sediments in the drainage ditch along I 280, the restoration of wetland areas at the site, and the implementation of institutional controls such as a Deed notice to prevent contact with contaminated soil.

E.P.A. has selected Alternative 2, excavation of soil in Areas B and C, vegetated cover in Areas A, B and C, institutional controls, and excavation of sediment as the preferred alternative for addressing residual contamination at the site. This alternative has a cost of approximately $10 million.

When compared to the other active

alternatives, Alternative 2 is the most cost effective, has the lowest potential risks for site workers and the community, has the shortest construction duration and the fewest impacts to traffic, and is the least intrusive alternative.

Under this alternative, two feet of surface soil in Areas B and C, and wetland areas located in Area A would be excavated.

Any hazardous wastes that are found will be disposed of at an appropriate offsite facility before the excavated soils are then consolidated and placed into Area A.

2 feet of clean soil would then be placed as a cover in Areas A, B and C.

Sediment in the drainage ditch would be excavated to approximately 18 inches to allow for the placement of 18 inches of stone bedding.

The excavated sediments would be disposed of at an appropriate off-site facility, and wetlands area in Area A would also be restored.

This alternative would also include the placement of Deed notices as institutional controls, and this concludes this evening's presentation.

MS. SEPPI: Okay. Thank you, Brittany.

MS. HOTZLER: Thank you.

MS. SEPPI: So I just wanted to remind everybody who just came in, if you didn't sign in I would appreciate it if you do. And if you don't have a copy of the proposed plan there are some copies and you're certainly welcome to take. You might have already seen them online.

AUDIENCE MEMBER: Will these slides be available?

MS. SEPPI: Well, you know what we'll do, Brittany will send them to me --

AUDIENCE MEMBER: Okay.

MS. SEPPI: -- and we'll post them on the web page.

AUDIENCE MEMBER: Okay.

MS. SEPPI: I would say give it maybe until Monday because sometimes it takes a day to get posted. So Brittany will just send those to me and I'll do that.

So if anybody has questions, that's fine, this is the time for it. I would just like to remind you if you have a question if you would just state your name first for our stenographer, and spell it if it's difficult. I know she has a lot of the cards, so that will help also. So are, are there any questions?

Oh, no, this cannot be this easy. Anything?

MR. BRUNO: Jim Bruno, B-r-u-n-o. What is the time frame?

MS. HOTZLER: The time frame should be, I believe it's one year completion, correct me if I am wrong, Rich.

MR. PUVOGEL: It's one year to construct a remedy, but before that it's about a year and a half to do the design of the remedy.

MS. SEPPI: I can't believe there's not any more questions. That's because your presentation was just so good it answered everybody's questions.

Yeah, I mean, if there aren't any more questions, you know, that's really it for us tonight. We appreciate you coming.

And remember you have until July 19th. If you have any more comments you can certainly send them to Brittany via e-mail or by snail mail whatever's easier for you.

Okay. That's it. Thanks very much

for coming.

AUDIENCE MEMBER: Thank you.

(Time noted at 6:30 p.m.)

C E R T I F I C A T E

I CERTIFY that the foregoing is a true and accurate transcript of the testimony as taken by and before me stenographically at the time and place aforementioned.

I FURTHER CERTIFY that I am neither attorney for nor counsel to any of the parties; parties of any of the attorneys in this action; and that I am not financially interested in the outcome of this case.

RENEE RUSSO, CCR, CRCR, RPR, CRR
Certificate No. XI00143700

APPENDIX IV – ADMINISTRATIVE RECORD INDEX

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL
06/19/2017

REGION ID: 02

Site Name: DIAMOND HEAD OIL REFINERY DIV
CERCLIS ID: NJD092226000
OUID: 01
SSID: 02KK
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
336023	6/19/2017	COMPREHENSIVE ADMINISTRATIVE RECORD INDEX FOR OU1 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	4	Administrative Record Index		(US ENVIRONMENTAL PROTECTION AGENCY)
103741	Undated	DIAMOND HEAD OIL REFINERY DIV. SITE, OPERABLE UNIT ONE, ADMINISTRATIVE RECORD FILE, INDEX OF DOCUMENTS.	4	List/Index		(US ENVIRONMENTAL PROTECTION AGENCY)
105191	Undated	DIAMOND HEAD OIL REFINERY DIV. SITE, OPERABLE UNIT ONE, ADMINISTRATIVE RECORD FILE UPDATE, INDEX OF DOCUMENTS.	1	List/Index		(US ENVIRONMENTAL PROTECTION AGENCY)
107966	6/19/1981	Letter of Transmittal to Mr. James A. Landon, Architect, from Mr. John C. Mahle, Jr., P.E., Johnson Soils Engineering Company, re: Proposed Hotel Development, Harrison Avenue, Kearny, New Jersey, June 19, 1981. (Attachment: . . .	23	Letter	Landon, James, A (NONE)	Mahle, Jr, John, C (JOHNSON SOILS ENGINEERING COMPANY)
107967	10/1/1988	Report: Site Characterization Plan for the Former Diamond Head Oil Refinery Site, Hudson Meadows Urban Renewal Development Corporation, Kearny, New Jersey, prepared by Killam Associates, Inc., Consulting Engineers, October, 1988.	34	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(KILLAM ASSOCIATES)
107968	9/1/1990	Report: Report for Harbor Consultants, Inc. to Conduct a Non-Tidal Wetland Delineation on, a Track Designated as: Block 294, Lots 3, 15 and 14, Kearny, New Jersey, prepared by Nova Consultants LTD., John F. Szczepanski, PHD., Principal Investigator/ . . .	43	Report	(HARBOR CONSULTANTS INCORPORATED)	(NOVA CONSULTANTS LTD)
107969	11/12/1991	Letter to Ms. Jeryl Turco-Maglio, Hudson Meadows Urban Renewal Corp., from R. Brian Ellwood, Ph.D., Vice President, and Mr. Robert L,. Zelley, CPG, Project Hydrogeologist, Converse Consultants East, re: Aerial Photograph Analysis, . . .	12	Letter	Turco-maglio, Jeryl (HUDSON MEADOWS URBAN RENEWAL CORPORATION)	Zelley, Robert, L (CONVERSE CONSULTANTS EAST), Ellwood, R. Brian (CONVERSE CONSULTANTS EAST)
107965	7/1/2000	Report: Hazard Ranking System Documentation Package, Diamond Head Oil Refinery Div., Kearny, Hudson County, New Jersey, Cerclis Id No. NJD092226000, Volume 1 of 1, prepared by Region 2 Superfund Technical Assessment and Response . . .	38	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(ROY F. WESTON INCORPORATED)

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OUID: 01
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Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
107982	10/2/2002	Memorandum to Ms. Grisell Diaz-Cotto, ERRD/NJRB, U.S. Environmental Protection Agency, Region 2, from Mr. Arthur Block, Sr. Regional Representative, Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease ...	36	Memorandum	Diaz - Cotto, Grisell (US ENVIRONMENTAL PROTECTION AGENCY)	Block, Arthur (DEPARTMENT OF HEALTH AND HUMAN SERVICES)
107970	12/11/2002	Report: Response Action Contract, United States Environmental Protection Agency, Region 6, Contract No. 68-W6-0036, Work Assignment No. 112- RICO-02KK DCN 02-4664, Revised Work Plan, Diamond Head Oil, Remedial Investigation/Feasibility Study, . . .	162	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107976	6/1/2004	Report: Draft Phase 1 Remedial Investigation Technical Memorandum, Volume 2 Appendices, for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental Protection . . .	1070	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107977	2/1/2005	Report: Final Phase 1 Remedial Investigation Technical Memorandum, Volume 1, for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental Protection Agency . . .	710	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107971	12/1/2007	Report: Final Phase 2 Focused Remedial Investigation/Feasibility Study, Contractor Quality Control Plan for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental . . .	43	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107972	12/1/2007	Report: Final Phase 2 Focused Remedial Investigation Uniform Federal Policy, Quality Assurance Project Plan (UFP - QAPP) for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental . . .	208	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107973	12/1/2007	Report: Final Phase 2 Focused Remedial Investigation/Feasibility Study Health and Safety Plan for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental Protection Agency, . . .	98	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)

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107974	12/1/2007	Report: Final Phase 2 Focused Remedial Investigation Sampling and Analysis Plan Addendum 1 for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental Protection . . .	156	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107975	12/1/2007	Report: Final Attachment A, Phase 2 Remedial Investigation Site Management Plan for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental Protection . . .	23	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107978	7/1/2008	Report: Draft Phase 2 Focused Remedial Investigation Technical Memorandum, Volume 2 Appendices, for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental Protection . . .	637	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107979	2/1/2009	Report: Final Phase 2 Focused Remedial Investigation Technical Memorandum, Volume 1, for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental Protection Agency . . .	190	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107980	2/1/2009	Report: Revised Draft Phase 2 Focused Feasibility Study Technical Memorandum, LNAPL Interim Remedial Measure Technology Screening and Evaluation for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, . . .	45	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107981	6/1/2009	Report: Draft Final Operable Unit 1 Focused Feasibility Study for the LNAPL Source Area for the Diamond Head Oil Superfund Site, Kearny, New Jersey, prepared by CH2MHILL, prepared for U.S. Environmental Protection Agency, . . .	159	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)
107983	7/1/2009	Report: Superfund Program Proposed Plan, Diamond Head Oil Refinery Superfund Site, Kearny, New Jersey, prepared by U.S. Environmental Protection Agency, Region 2, July 2009.	17	Report		(US ENVIRONMENTAL PROTECTION AGENCY)

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DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
105100	9/25/2009	RECORD OF DECISION, OPERABLE UNIT 1 - LIGHT NONAQUEOUS PHASE LIQUID SOURCE AREA, DIAMOND HEAD OIL REFINERY SITE, KEARNY TOWNSHIP, HUDSON COUNTY, NEW JERSEY	128	Report		(US ENVIRONMENTAL PROTECTION AGENCY)
510343	1/1/2002	AERIAL PHOTOGRAPHIC ANALYSIS - TS-PIC-20102331S/20202331S FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	52	Report		(US ENVIRONMENTAL PROTECTION AGENCY)
451928	5/30/2017	COMPREHENSIVE REMEDIAL INVESTIGATION REPORT FOR OU1 AND OU2 FOR THE DIAMOND HEAD OIL SITE	3941	Report	(US ENVIRONMENTAL PROTECTION AGENCY), (US ARMY CORPS OF ENGINEERS)	(CH2M HILL)
451949	5/30/2017	FEASIBILITY STUDY REPORT FOR OU1 AND OU2 FOR THE DIAMOND HEAD OIL SITE	256	Report	(US ENVIRONMENTAL PROTECTION AGENCY), (US ARMY CORPS OF ENGINEERS)	(CH2M HILL)
510579	6/14/2017	PROPOSED PLAN FOR OU1 - ROD AMENDMENT AND OU2 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	23	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)

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DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
510505	6/19/2017	ADMINISTRATIVE RECORD INDEX FOR OU2 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	1	ARI / Administrative Record Index		R02: (US ENVIRONMENTAL PROTECTION AGENCY)
510343	1/1/2002	AERIAL PHOTOGRAPHIC ANALYSIS - TS-PIC-20102331S/20202331S FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	52	RPT / Report		R02: (US ENVIRONMENTAL PROTECTION AGENCY)
472626	2/24/2017	CORRESPONDENCE REGARDING TRW LEAD CONSULTATION REVIEW OF THE SOIL-DUST INGESTION RATE AND TARGET BLOOD LEAD LEVEL OF CONCERN IN THE ADULT LEAD METHODOLOGY FOR OU2 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	4	MEMO / Memorandum	R02: Hotzler, Brittany (US ENVIRONMENTAL PROTECTION AGENCY)	R02: Burgess, Michele (US ENVIRONMENTAL PROTECTION AGENCY)
472625	3/1/2017	CORRESPONDENCE REGARDING HEADQUARTERS LEAD CONSULTATION OSRTI REVIEW OF THE PREFERRED ALTERNATIVE FOR OU2 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	3	MEMO / Memorandum	R02: Hotzler, Brittany (US ENVIRONMENTAL PROTECTION AGENCY)	R02: Stalcup, Dana (US ENVIRONMENTAL PROTECTION AGENCY)
472624	3/13/2017	CORRESPONDENCE REGARDING LEAD TRW AND HEADQUARTERS CONSULTATION COMMENTS FOR THE ADMINISTRATIVE RECORD FOR OU2 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	2	MEMO / Memorandum	R02: Hotzler, Brittany (US ENVIRONMENTAL PROTECTION AGENCY)	R02: Nace, Charles (US ENVIRONMENTAL PROTECTION AGENCY)
451928	5/30/2017	COMPREHENSIVE REMEDIAL INVESTIGATION REPORT FOR OU1 AND OU2 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	3941	RPT / Report	R02: (US ENVIRONMENTAL PROTECTION AGENCY), R02: (US ARMY CORPS OF ENGINEERS)	R02: (CH2M HILL)
451949	5/30/2017	FEASIBILITY STUDY REPORT FOR OU1 AND OU2 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	256	RPT / Report	R02: (US ENVIRONMENTAL PROTECTION AGENCY), R02: (US ARMY CORPS OF ENGINEERS)	R02: (CH2M HILL)
510579	6/14/2017	PROPOSED PLAN FOR OU2 FOR THE DIAMOND HEAD OIL REFINERY DIVISION SITE	23	PUB / Publication		R02: (US ENVIRONMENTAL PROTECTION AGENCY)

APPENDIX V – STATE LETTER OF CONCURRENCE

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SITE REMEDIATION & WASTE MANAGEMENT PROGRAM
Mail Code 401-06
P. O. Box 420
Trenton, New Jersey 08625-0420
Tel. #: 609-292-1250
Fax. #: 609-777-1914

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

September 13, 2017

Mr. John Prince, Acting Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway
New York, NY 10007-1866

Re: Diamond Head Oil Refinery Superfund Site
Record of Decision Amendment Operable Unit 1
Record of Decision Operable Unit 2
EPA ID# NJD092226000
DEP PI# G000003964

Dear Mr. Prince:

The New Jersey Department of Environmental Protection (DEP) completed its review of the "Record of Decision, Operable Unit 2 - Soil and Sediments, Record of Decision Amendment, Operable Unit 1 - Light Non-Aqueous Phase Liquid Source Area, Diamond Head Oil Refinery Superfund Site, Kearny Township, Hudson County, New Jersey" prepared by the U.S. Environmental Protection Agency (EPA) Region II in September 2017 and concurs with the selected remedies to address principal threat waste and other soil and sediment contamination.

DEP appreciates that its concerns for appropriate excavation and out of state off-site disposal of hazardous wastes and elevated dioxin levels have been addressed through the remedies selected, as well as incorporating DEP's concerns for potential impacts to groundwater from material capped on site. The selected remedies include an amendment to the Light Non-Aqueous Phase Liquid (LNAPL) source area remedy selected in the Operable Unit 1 (OU1) September 25, 2009 Record of Decision (ROD), and a selected cleanup for other contaminated soil and sediments as part of the Operable Unit 2 (OU2).

The amended remedy described in this document modifies a component of the LNAPL source area remedy selected in the 2009 ROD, and now calls for the entirety of the LNAPL source areas that primarily address principal threat waste to be excavated and disposed off site.

In addition, the response action described in the document selects the remedy for OU2, which is planned to be implemented in conjunction with the amended remedy for OU1, and involves the disposal of contaminated soils; installation of a vegetative soil cover in Areas A, B, and C; institutional controls; and excavation of sediments in the drainage ditch.

The major components of the OU1 amended remedy includes:

- Excavation and off-site disposal of the entire Remediation Target Area of LNAPL source material;
- Backfilling of excavated areas with I-280 berm soil containing non-hazardous soil, and additional clean fill to grade; and,
- Supplementing backfill with clean soil as needed.

The major components of the OU2 remedy include:

- Excavation of two feet of surface soil from Areas B and C, and wetland areas located in Area A, totaling 31,300 cubic yards;
- Disposal of any RCRA or TSCA hazardous waste at an appropriate offsite facility (i.e., RCRA Subtitle C or TSCA disposal facility);
- Distribution of excavated soils from Areas B and C, and wetland areas, across Area A for regrading;
- Disposal of excavated sediments from the drainage ditch at an appropriate offsite facility;
- Installation of a two-foot vegetated soil cover as an engineering control;
- Wetland restoration; and,
- Implementation of a deed notice as an institutional control.

Operable Unit 3 groundwater investigations have been conducted at the Site and groundwater conditions will be re-assessed after implementation of the OU1 and OU2 soil remedies to determine the appropriate response action for groundwater.

DEP appreciates the opportunity to participate in the decision-making process to select an appropriate remedy for this site. Further, DEP is looking forward to future cooperation with EPA during remedial actions for all three Operable Units to ensure appropriate cleanup and further monitoring at this site.

If you have any questions, please call me at 609-292-1250.

Sincerely,

Mark J. Pedersen
Assistant Commissioner
Site Remediation & Waste Management Program

C: Kenneth J. Kloo, Director, Division of Remediation Management, DEP
Edward Putnam, Assistant Director, Publicly Funded Response Element, DEP
Carole Petersen, Chief, New Jersey Remediation Branch, EPA Region II