PROPOSED REMEDIAL ACTION PLAN

AMTRAK SUNNYSIDE YARD

Operable Unit 3
Sunnyside, Queens County, New York
Site No. 241006
February 2007

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for Operable Unit 3 (see Figure 12) at Amtrak Sunnyside Yard, Site No. 241006. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, releases associated with fueling operations, maintenance activities, train-mounted transformers, and lead-based paint have resulted in the disposal of hazardous wastes including polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons considered by the NYSDEC to be carcinogenic (cPAHs), petroleum hydrocarbons, and lead. As a result of these releases, PCBs, cPAHs, and lead have been identified as compounds of concern (COCs). As discussed in Section 5.1, NYSDEC has recommended soil cleanup levels for the COCs. These wastes have contaminated the unsaturated soil in Operable Unit 3 and have resulted in:

- A significant threat to human health associated with potential exposure to soil impacted with petroleum hydrocarbons, PCBs, cPAHs, and lead.
- A significant environmental threat associated with the current and potential impacts of contaminants to groundwater from soil impacted with petroleum hydrocarbons, PCBs, and lead.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy:

- A remedial design program to provide the details necessary to implement the remedial program.
- Excavation and off-site disposal of visually hydrocarbon-impacted surface soil.
- Excavation and off-site disposal of the mobile separate-phase petroleum hydrocarbon (SPH) plume and associated hydrocarbon-impacted soil.
- Excavation and off-site disposal of soil impacted by PCBs and lead with concentrations in excess of the site-specific NYSDEC-recommended soil cleanup levels for these COCs.
- Removal and off-site disposal of the two exterior Engine House inspection pits, three subsurface fuel pump vaults, and nine underground storage tanks (USTs).

- In situ application of amendments to enhance biodegradation of saturated soil areas with measurable residual SPH greater than 0.1 foot (as observed in successive measurements in monitoring wells) located in areas discontinuous of the mobile SPH plume (e.g., MW-77) and all hydrocarbon-impacted soils beneath the mobile SPH excavation to a depth of 10 feet bls. The residual SPH at depths greater than 10 feet would be managed and monitored in place through the site management plan.

- Following implementation of the remedy, a residual SPH Contingency Plan would be developed to address areas of apparent product thickness between 0.1 ft and 0.01 ft on the water table.

- Removal of water, SPH, and sludge from the interior Engine House concrete service pits, cleaning of the service pits, sampling of the service pits and their contents, and backfilling with soil/fill. Based on an evaluation of the sampling results, removal and off-site disposal of the concrete service pits and their contents may be required by USEPA to comply with the federal Toxic Substances Control Act (TSCA regulations.).

- Backfilling all excavated areas with soil from approved on-site sources. Covering all backfilled areas with a one-foot layer of clean material.

- Development of a site management plan to (a) address residual contaminated soils that may be excavated on or off site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) require the evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) identify any use restrictions; and (d) provide for the operation and maintenance of the components of the remedy.

- Imposition of an environmental easement that would address underground structures that would remain in place after the remedy is complete. This includes Oil House, the interior Engine House service pits (unless their removal is required by TSCA), and Metro Shed.

- Periodic certification of the institutional and engineering controls.

- Downgradient groundwater monitoring program within the boundary limits of Operable Unit 3.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform to officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria, and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC would select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the Final Operable Unit 3 Remedial Investigation

Report Volumes I-III, dated May 27, 2005 (RI), the Final Operable Unit 3 Feasibility Study, dated December 6, 2005 (FS), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Queens Public Library, Sunnyside Branch
43-06 Greenpoint Avenue
Long Island City, New York 11104
718-784-3033

Monday and Thursday	1:00 PM to 8:00 PM
Tuesday	1:00 PM to 6:00 PM
Wednesday and Friday	10:00AM to 6:00 PM
Saturday	1:00 PM to 5:00 PM
Sunday	Closed

NYSDEC Region 2 Office
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, NY 11101-5407
Contact: Shaun Bollers
718-482-4608

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from February 23, 2007 to March 25, 2007 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for March 14, 2007at the NYSDEC office located at 11-15 47th Avenue in Long Island City beginning at 7:00 PM.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question and answer period will be held during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Shaun Bollers at the above address through March 25, 2007.

The NYSDEC may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the NYSDEC's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

Sunnyside Yard (Yard) is located at 39-29 Honeywell Street, Sunnyside, Queens County, New York. The Yard is a railroad maintenance and storage facility that currently encompasses approximately 133 acres. As shown on Figure 1, the Newtown Creek, which defines the border between Queens and Kings Counties, is located less than 0.5 mile south of the western portion of the Yard. The Yard is bordered by commercial/residential properties, with Northern Boulevard located to the north, 42nd Place located to the east, Thompson Avenue to the west, and Skillman Avenue located to the south.

The Yard (including OU-3) is underlain by the following geologic units (in order of increasing depth): fill (including ballast, cinders/ash), wetland deposits, Upper Pleistocene glacial deposits, and crystalline bedrock. Fill activities, which were part of major topographic changes engineered at the Yard, occurred during construction in the early 1900's.

The fill is predominantly comprised of reworked glacial deposits (unstratified sand, silt, clay and gravel) and railroad ballast, with lesser amounts of ash, cinders and construction debris. With the exception of paved areas and land occupied by buildings, the railroad ballast is ubiquitous at land surface throughout the Yard.

Groundwater beneath the Yard (including OU-3) occurs under water-table (unconfined) conditions in fill deposits, wetlands, or the Upper Pleistocene glacial deposits. The saturated Upper Pleistocene deposits comprise the Upper Glacial aquifer. Beneath the Yard, the saturated fill deposits (excluding ballast, ash/cinders, and construction debris) and the shallow Upper Glacial aquifer were not always distinguishable, and are, therefore, collectively referred to as shallow deposits (that contain the water table). Brackish groundwater is present throughout the southwest half of the Yard, and along the north side of the Yard (in OU-3) where it correlates with a buried channel (i.e., cobble zone) that trends east-west through the Yard, connecting the buried Dutch Kills and saline groundwater lens with the buried northeast wetland. The depth to groundwater across OU-3 varies from one to three feet below ground surface.

Shallow groundwater beneath OU-3 flows predominantly in a west/northwesterly direction (consistent with the regional groundwater flow direction), and apparently is influenced by historical flow patterns of the former Dutch Kills Creek and associated wetlands that were filled in the early 1900s. Based on data obtained from monitoring wells screened deeper in the aquifer, deeper groundwater predominantly flows west across the Yard. The average horizontal flow gradients for the shallow and deeper deposits in the Yard are 0.004 and 0.003 feet/foot, respectively. These values are indicative of a relatively flat water-table surface. Additionally, vertical gradients of -0.0274 and -0.0270 feet/foot were measured in OU-3 indicating upward groundwater flow. Upward groundwater flow reduces or prevents the downward migration of contaminants within the aquifer, if present. Specifically, the upward gradients beneath OU-3 assist in minimizing the impacts of the SPH plume by reducing or preventing the SPH impact on underlying groundwater quality.

Operable Unit 3 (OU-3), which is the subject of this document, encompasses approximately eight acres in the north central portion of the Yard. An Operable Unit (OU) represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. The majority of OU-3 is owned by National Railroad Passenger Corporation (Amtrak). A portion of OU-3 (approximately 2 acres) includes property owned by the Metropolitan Transportation Authority (MTA) and Long Island Rail Road (LIRR). OU-3 consists of unsaturated and saturated soil and SPH above the water table. There are nine USTs and subsurface structures located within the OU-3 boundary. The subsurface structures include the former Engine House foundation, exterior and interior Engine House service pits, the former Oil House basement, the former Turntable, the former Metro Shed foundation and inspection pit, and three fuel pump vaults. The partially demolished Oil House is the only aboveground structure currently present in

OU-3. The portion of the sewer and groundwater that lies within the OU-3 boundary would be addressed as part of Operable Unit-5 (OU-5) and Operable Unit-6 (OU-6), respectively at a later date.

The remaining operable units for this site are:

- OU-1: Soil above the water table within the footprint of the High Speed Trainset Facility Service and Inspection (HSTF S&I) Building. A ROD was issued for OU-1 in August 1997, and the remedial work was completed in April 1998.
- OU-2: Soil above the water table within the footprint of the HSTF S&I Building ancillary structures. A No Further Action ROD was issued for OU-2 in November 1997.
- OU-4: Soil above the water table (unsaturated zone) in the remainder of the Yard.
- OU-5: Sewer system (water and sediment) beneath the Yard.
- OU-6: Saturated soil and the groundwater beneath the Yard.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The Pennsylvania Tunnel and Terminal Company, a subsidiary of the Pennsylvania Railroad, later known as the Penn Central Transportation Company, originally constructed Sunnyside Yard in the early 1900's. The Yard officially opened on November 27, 1910. On April 1, 1976, the Consolidated Rail Corporation (Conrail) acquired the Yard, and the same day conveyed it to Amtrak. The MTA and LIRR currently own a portion of the original Yard, including the northern portion of OU-3. The Yard originally operated as a storage and maintenance facility for railroad rolling stock. From April 1, 1976 until shortly after the Engine House was demolished in 1996, Amtrak continued to perform routine train maintenance activities in OU-3.

OU-3 is contaminated predominantly with petroleum products and PCBs. Petroleum disposal is likely attributable to leaks over time associated with one or more of the nine USTs located in OU-3; leaks over time from underground piping associated with the nine USTs; or surface spills over time associated with fuel transfer or train maintenance activities. Disposal of PCBs in OU-3 is likely attributable to losses from and maintenance of train-mounted transformers over time. With few minor exceptions (as discussed in the Supplement For Phase II Remedial Investigation Report dated May 30, 1996), specific locations, dates, or quantities of petroleum or PCB spillage or onsite disposal are not known.

3.2: Remedial History

In December 1986, the NYSDEC listed the Yard as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

Prior to the Yard's listing, the following investigations were performed in OU-3:

- On August 21 and 22, 1985, three soil samples were collected from the area surrounding the former Engine House. All three samples were analyzed for PCBs and determined to have concentrations below 50 parts per million (ppm).

- On November 12, 1985, two wall scrapings were collected from the former Engine House. The test results indicated both samples had PCB concentrations below 50 ppm.

- On November 21, 22, 23, 25, and 26, 1985, all 49 stationary transformers located in the Yard were analyzed for PCBs. Of the 49 transformers, 14 were determined to have PCB levels above 50 ppm. Four of these were located in OU-3.

Amtrak, in February 1986, conducted an investigation of the former UST area, the former Engine House, the former Oil House, and the former fuel transfer area to determine if leakage of hydrocarbon compounds had occurred and, if so, to determine the extent of contamination in both soil and groundwater. A June 1986 report, titled "Results of Hydrogeologic Investigation at the Amtrak, Sunnyside, Queens, New York Train Yard" concluded that a plume of SPH existed in the area east of the Engine House, and that this plume appeared to have originated at the underground storage tanks of the former fuel storage area and had migrated beyond Amtrak's northern property boundary. PCB concentrations in the SPH plume ranged from non-detected to 360 ppm, with the highest concentrations detected in samples collected immediately east of the Engine House. PCBs were also detected in soil samples, with concentrations ranging from 0.19 to 24 ppm in the 0 to 2 feet below land surface (bls) interval. PCBs were not detected in groundwater samples.

Several Soil IRMs have been conducted on site. The first soil IRM was conducted prior to the start of the remedial investigation in 1985/86. It consisted of excavation of soil saturated with hydrocarbons. The excavated area was approximately 50 feet wide by 150 feet long located at the east end of the former Engine House and was dug to a minimum of 0.5 feet bls (Figure 11). An estimated 140 CY of soil was excavated. A soil sample (821-E) was collected from the excavation and was found to contain total PCBs at a concentration of 43.4 ppm. The excavated soil was disposed offsite in accordance with applicable Federal, State, and local regulations. See Section 5.2 for other IRMs..

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC, Amtrak, and the New Jersey Transit Corporation (NJTC) entered into a Consent Order on September 21, 1989, modified on August 25, 1993 and February 4, 1998. The Order obligates Amtrak and NJTC to implement a remedial investigation/feasibility study (RI/FS) only remedial program. After the remedy is selected, the NYSDEC would approach the PRPs to implement the selected remedy under an Order on Consent.

SECTION 5: SITE CONTAMINATION

An RI/FS has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities in OU-3. The RI was conducted between October 1990 and December 2003. The field activities and findings of the investigation are described in the RI report.

The following activities were conducted during the RI:

- Research of historical operations;

- Installation of 186 soil borings for chemical analysis of soils as well as physical properties of soil;
- Excavation of 4 test pits to further characterize the physical properties of OU-3;
- Installation of 99 observation borings for characterization and delineation of the SPH plume (Plate 3);
- Installation of 20 Cone Penetrometer Ultraviolet Induced Fluorescence borings to help determine the depth of petroleum hydrocarbon impact;
- Installation of four soil borings for the collection of soil samples for bench scale testing of in situ bioremediation;
- Installation of 54 monitoring wells for analysis of groundwater as well as physical properties of hydrogeologic conditions;
- Collection of 3 discrete groundwater samples using a direct push technique;
- A survey of public and private water supply wells in the area around the site;
- Collection of 65 SPH samples from groundwater monitoring wells; and
- Collection of 10 sewer water samples and 4 sewer sediment samples from sewer manholes within OU-3.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil and groundwater contain contamination at levels of concern, data from the investigation were compared to the following New York State Standards Criteria and Guidance (SCGs):

- Soil SCGs are based on the Department's Cleanup Objectives ("Technical and Administrative Guidance Memorandum [TAGM] 4046; Determination of Soil Cleanup Objectives and Cleanup Levels." and 6 NYCRR Subpart 375-6 - Remedial Program Soil Cleanup Objectives).
- Site-specific recommended soil cleanup levels for PCBs (25 ppm), lead (1,000 ppm), and seven specific polycyclic aromatic hydrocarbons that the NYSDEC considers carcinogenic (cPAHs) (25 ppm) were provided by the NYSDEC based on the present and future usage as a rail yard. The seven cPAHs that were collectively identified as a compound of concern (COC) by the NYSDEC are benzo(a)anthracene, benzo(a)pyrene, dibenzo(a,h)anthracene, benzo(a)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.
- SCGs for the contents of the subsurface structures were based on the NYSDEC TAGM 4046; Determination of Soil Cleanup Objectives and Cleanup Levels and Toxic Substance Control Act (TSCA) standards for PCBs in environmental media as provided in 40 CFR 761.
- Part 703. 5 Groundwater Standards.
- Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of OU-3 require remediation. These are summarized in Section 5.1.2. More complete information can be found in the Final RI report.

5.1.2: <u>Nature and Extent of Contamination</u>

This Section describes the findings of the investigation for all environmental media that were investigated.

As described in the Final RI report, many soil, SPH, groundwater, and sewer sediment and water samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main chemical categories that exceed their SCGs in the environmental media are PCBs, inorganics (metals), and volatile organic compounds (VOCs).

PCBs are typically characterized with low to zero mobility due to low solubility in water and low volatility in air. These compounds tend to remain tightly bound to soil particles. However, these compounds are present in surface soil. Surface runoff, if it should occur, during precipitation could result in the transport of contaminated sediment into the sewer system and subsequently offsite. In addition to surface soil, PCBs were identified in SPH samples collected from subsurface soil, the interior Engine House service pits, and sewer sediment.

Metals found at the site are naturally occurring in soil and typical of those expected to be present in soil and groundwater. Additionally, the presence of lead in soil is attributed to on site lead-based painted structures.

As further discussed in the Groundwater and Sewer Section, VOCs (BTEX and TCE) detected in groundwater samples may be attributed to upgradient sources. Metals and VOCs detected in groundwater will be addressed as part of OU-6 at a later date.

Table 1 summarizes the degree of contamination for the contaminants of concern in soil, SPH, groundwater, sewer sediment, and sewer water and compares the data with the SCGs for OU-3, where applicable. The following are the media that were investigated and a summary of the findings of the investigation.

Chemical concentrations are reported in parts per million (ppm) for soil, SPH, and sewer sediment; and parts per billion (ppb) for groundwater and sewer water. The SCGs are provided for each environmental medium, where applicable.

<u>Surface Soils</u>

A total of 117 surface soil samples were collected within the confines of OU-3 between August 1985 and November 2003 and analyzed for one or more of the analyte groups. As shown in Table 1, the number of surface soils samples analyzed were 102 for PCBs, 23 for lead, 3 for other metals, 1 for VOCs, 6 for SVOCs, and 27 for CPAHs. The NYSDEC-recommended soil cleanup levels were exceeded as follows: PCBs (2 out of 102); Lead (3 out of 3); cPAHs (2 of 27). Five (5) of these exceedances in surface soils were remediated through the IRMs; the remaining two locations (CS-76 and S-62) would be addressed as part of the proposed remedy. Boring CS-76 contains a PCB concentration of 73 ppm (Plate 4) and boring S-62 contains a lead concentration of 1,080 ppm (Plate 5). None of the samples exceeded the Recommended SCGs for VOCs and SVOCs. Additionally, approximately half an acre of visible petroleum impacted surface soil area was delineated and based on observations from soil borings completed at different times within this 0.5 acre area, the average depth of the hydrocarbon impacts is approximately one foot below land surface (bls).

Subsurface Soils

A total of 117 subsurface soil samples were collected within the confines of OU-3 between August 1985 and November 2003 and analyzed for one or more of the analyte groups. As shown in Table 1, the number of sub surface soil samples analyzed were 117 for PCBs, 67 for lead, 25 for other metals, 30 for VOCs, 37 for SVOCs, and 37 for cPAHs. While the recommended clean up objectives were not exceeded in any of the sub-surface samples, there were individual exceedances of certain TAGM 4046 parameters. No areas within OU-3 contain cPAHs in excess of the respective NYSDEC-recommended soil cleanup level (Plate 6). Total SVOCs concentrations are shown on Plate 7, and as shown, none exceed the TAGM 4046 recommended number of 500 ppm

Waste Materials

The waste materials onsite consists of PCBs laced petroleum present: 1) in surface soils; 2) a potentially mobile separate phase hydrocarbon (SPH) plume floating over the groundwater surface; 3) as residual SPH trapped in soil pores below the water table; and, 4) as residues in the underground concrete bays of the former Engine House. The SPH plume has been delineated both horizontally and vertically and is located entirely within the boundaries of OU-3 (Figure 8). The historic outer boundary of the plume (historic zero-foot SPH contour), which was conservatively defined by the absence of a visible sheen on the water table, occupies an area of approximately three acres in the central part of OU-3. Physical evidence of residual petroleum and/or petroleum odor was noted up to 10 feet bls in several borings and deeper in some borings.

The core of the plume consisting of mobile SPH, (i.e., SPH that may migrate vertically or horizontally through the soil) is defined by the 0.5-foot apparent SPH thickness contour. The extent of mobile SPH was determined to lie within the 0.5-foot SPH thickness contour using the Brooks-Corey model for calculating SPH distribution. Additional information regarding this calculation is provided in the FS report. The mobile SPH plume currently occupies approximately 0.5 acres (Figure 8). As shown on Figure 12, a small portion of the mobile SPH plume exists on the MTA/LIRR property to the north. An estimated 9400 gallons of recoverable and 85,000 gallons unrecoverable petroleum is present within the historic zero foot plume.

65 samples of SPH were collected from OU-3 monitoring wells and analyzed for PCBs. Table 1 and Plate 9 provide a summary of the PCB concentrations detected in the SPH samples. Analytical results of SPH samples collected in 1994 indicate that the SPH in the plume consists of a slightly degraded No. 2 fuel oil.

With the exception of the interior and exterior Engine House service pits, the subsurface structures are filled with soil/fill (Figure 10). The interior Engine House concrete pits, which are currently capped with an engineered steel and concrete cover, are filled with water and evidence of trace amounts of SPH. One of the two exterior Engine House concrete inspection pits remains open and the other is covered with wood planking. The Oil House basement and the Metro Shed inspection pit were cleaned prior to being filled with soil. Soil samples collected from select structures indicate that the soil/fill does not exceed the NYSDEC-recommended soil cleanup levels for PCBs, cPAHs, and lead.

SPH and sludge samples collected in 1993 from the interior Engine House ~~inspection~~ service pits contained PCB concentrations of 512 ppm and 517 ppm, respectively. These SPH and sludge samples results are in excess of the TSCA standard for PCBs. Waste identified during the RI/FS will be addressed during the remedy selection process, as described in Section 7.0.

Groundwater and Sewer

Groundwater in OU-3 is slightly impacted at concentrations above the GA standards and guidance values from the Yard-related activities. Groundwater in OU-3 may be impacted by at least one suspected upgradient source, Standard Motor Products (Site No. 241016, Class 2 Site on NYSDEC Registry of Inactive Hazardous Waste Disposal Sites) by contamination (primarily chlorinated VOCs, benzene, toluene, ethylbenzene, and xylenes [BTEX], and metals) and by saltwater intrusion. Groundwater contamination in OU-3 will be addressed during the OU-6 RI at a later date.

PCBs were detected in sewer water and sewer sediment samples. As stated above, sewer water and sediment will be addressed later as part of OU-5.

Soil Vapor/Sub-Slab Vapor/Air

Since groundwater contamination will be addressed in OU-6, any potential soil vapor impacts will be addressed in OU-6 in accordance with NYSDOH Guidelines.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. Three SPH IRMs have been performed in an effort to recover mobile SPH. Three soil IRMs have been performed when impacted soil was encountered during railroad operations.

SPH IRMS

Phase I: The Phase I SPH IRM implemented in early 1990 consisted of three SPH recovery trenches (RT-1, RT-2, and RT-3) to mitigate the flow of SPH into the service pit located in the former Metro Shed and recover SPH in the general Metro Shed area. One of the trenches was located along the southern side and two were located along the northern side of the western end of the Metro Shed (Figure 11). The gravel-filled trenches (RT-1, RT-2, and RT-3) measured approximately 25, 35, and 40 feet in length, respectively, and each contained a recovery sump constructed of four-foot diameter perforated concrete rings installed to a depth of six feet bls. The trenches and sumps spanned the water table allowing SPH to accumulate within them. Each sump was outfitted with an ORS® large-diameter Filter Scavenger™ that pumped recovered SPH into one of two 2,000-gallon capacity aboveground tanks for storage and proper disposal.

Phase II: The Phase II SPH IRM was implemented in June 1991 to augment the Phase I SPH IRM and was designed based on additional data on the nature and extent of the SPH plume collected during the Phase I RI. The Phase II IRM consisted of the installation of three 4-inch diameter recovery wells (RW-1, RW-2 and RW-3) in the area immediately northeast of the former Engine House where the apparent SPH plume was thickest (Figure 11). Each well was fitted with an ORS® small-diameter Filter Scavenger™ product-only recovery pump to recover SPH into one of two 2,000-gallon capacity aboveground tanks for storage and proper disposal. SPH recovery continued at the recovery wells until the Phase III IRM was constructed.

Phase III: Construction of the Phase III IRM began in October 1998, and full operation of the system commenced in February 1999. The Phase III SPH IRM consisted of construction of a 340-foot long interceptor trench through the thickest part of the SPH plume (Figure 11). The interceptor trench is approximately two feet in width and up to four feet in depth, and was designed to penetrate the full thickness of the SPH plume and remain functional during seasonal water table fluctuations. A 12-inch inside diameter Schedule 40 perforated PVC pipe was placed horizontally in the trench on a bed of gravel. The remainder of the trench was backfilled with gravel to facilitate mobile SPH movement. Two recovery sumps were installed in the trench approximately one third of the way from each end of the trench (Figure 11). Each sump was constructed with four-foot diameter perforated pre-cast concrete rings stacked to a depth of eight feet bls, and the annulus between the rings and surrounding soil was backfilled with gravel. A large-diameter ORS Filter Scavenger™ was installed in each recovery sump. Recovered SPH was pumped to a new 2,000-gallon capacity aboveground tank for storage and proper disposal. Because Recovery Well RW-3 was situated where the Interceptor Trench was planned, the well was abandoned during construction of the trench. The combined SPH IRM systems have recovered more than 11,500 gallons of SPH to date. An estimated 9,400 gallons of recoverable and 85,000 gallons of residual petroleum still remain in the subsurface.

Soil IRMS

1998: The first soil IRM since the commencement of the RI was done in 1998 and consisted of the excavation of soils at two locations (near Soil Boring HST-22 [area south of the former Engine House] and Monitoring Well MW-58 [area south of the former Locker Room]). cPAHs and lead were detected at concentrations exceeding their respective cleanup levels in soil samples collected from Boring HST-22 and the soil boring for Monitoring Well MW-58, respectively (Figure 11). This IRM took place during construction of tracks associated with the High Speed Train-set Facility (HSTF) Building. Excavation was completed horizontally and vertically to previously delineated depths (minimum of two feet bls) and locations where the respective concentrations of lead (Plate 5) and cPAHs (Plate 6) were below NYSDEC-recommended soil cleanup levels. An estimated 650 CY of soil were excavated. The excavated soil was disposed offsite in accordance with applicable Federal, State, and local regulations.

1999: The second soil IRM since the commencement of the RI was done in 1999 and consisted of the removal of approximately 835 cubic yards (CY) of contaminated soil encountered during an excavation to locate the source of a water leak. Hydrocarbon-impacted soil was discovered in OU-4 located adjacent to OU-3. Further excavation caused the leaking pipe to break. The water from the pipe came in contact with the hydrocarbon-impacted soil, causing a small quantity of SPH to accumulate on the surface of water that had collected in a utility trench downgradient. Both the SPH (estimated to be less than five gallons) and the water were collected for proper disposal. The SPH was sampled and found to contain total PCBs at concentrations of 2,200 ppm and 1,067 ppm.

An investigation of the area soil consisted of the collection of 27 characterization soil samples from 16 boring locations (SP-1 (OU-4) through SP-11 (OU-4) and SPA-1 (OU-4) through SPA-5 (OU-4)), as shown on Plate 2, and analyzed for PCBs. No exceedances of the NYSDEC-recommended soil cleanup level were found. Following excavation and offsite disposal of hydrocarbon-contaminated soil, eight confirmatory samples (CS-1 (OU-4) through CS-8 (OU-4)) were collected at NYSDEC-approved locations and analyzed for PCBs (Plate 2). Again, no exceedances of the PCB soil cleanup level were detected. Remediation was performed to mitigate the unsaturated visually hydrocarbon-impacted soil present in this area of the Yard. Impacted soil did not extend into the water table, further confirming previous data indicating this was an isolated incident and not connected to the OU-3 SPH plume.

5.3 Summary of Human Exposure Pathways

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 12 of the RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Potential Exposure Pathways

Soil

Soil is the primary complete exposure pathway in OU-3. Receptors may come into direct contact with soil within OU-3 while performing routine job-related activities. During the course of contacting the soil on their skin, persons may, under some circumstances, accidentally ingest soil derived from the Site.

Inhalation of vapors from VOCs volatilizing from soils into the ambient air during soil moving activities is not considered a viable exposure pathway because the number of VOCs detected in soil are limited and concentrations are sufficiently low (maximum concentrations below 1 ppm in surface and shallow soil and below 3 ppm in deep soil) that ambient air levels could not rise to a level of concern. There are isolated spots of higher contamination at depth, but these are not within the limits of point of exposure and would be addressed in the Soil Management Plan. While exposure to fugitive dust may occur on a limited basis, the primary exposure routes for on-site receptors to chemicals present in soil is via dermal absorption and incidental ingestion. The Community Air Monitoring Plan (CAMP) to limit exposure to fugitive dust would be discussed in the Soil Management Plan.

Groundwater

Groundwater is present beneath OU-3 at less than one to three feet bls. Direct contact with groundwater could occur during any intrusive activities such as excavation associated with track maintenance. However, any potential contact with groundwater would likely be limited by the dewatering that would be required to conduct such activities. Furthermore, construction personnel who may work in this area would be required to wear personal protective equipment thus limiting any direct contact with groundwater by the hands. An examination of groundwater data in OU-3 indicates that concentrations of VOCs detected are low (less than 30 ppb), and therefore, any potential casual contact with groundwater would result in minimal exposure. Furthermore, ingestion of groundwater in OU-3 is not considered an exposure pathway since groundwater is not a source of drinking water in OU-3 or anywhere at the Yard.

SPH Plume

The SPH plume occurs at a depth of 1 to 3 feet bls. Therefore, direct contact with the SPH plume could occur during any intrusive activities such as excavation associated with track maintenance. However, any potential contact with the SPH plume would likely be limited by the SPH removal that would be required to conduct the planned activity. Furthermore, construction personnel who may work in this area would be required to wear personal protective equipment thus limiting any direct contact with the SPH plume by the hands. Based on samples collected from groundwater monitoring wells, historical PCB concentrations of SPH has ranged from non-detected to 360 ppm (Figure 9). Although higher concentrations of PCBs were found in SPH in other locations as mentioned elsewhere in the PRAP, these are not considered representative of the SPH present in the formation because these samples were not collected from monitoring wells. An examination of current data from OU-3 indicates that concentrations of total PCBs in the remaining SPH detected are relatively lower. Any potential casual contact with the SPH plume would likely result in minimal exposure to PCBs. Furthermore, it can be stated that there would be no ingestion of the degraded No. 2 fuel oil containing PCBs (SPH plume) in OU-3. Thus, ingestion would not be considered a complete exposure pathway.

5.4: <u>Summary of Environmental Assessment</u>

This section describes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

Past releases associated with fueling operations, maintenance activities, train-mounted transformers, and lead-based paint have resulted in the disposal of hazardous wastes including PCBs, SVOCs, cPAHs, lead, and petroleum hydrocarbons. The site also poses a significant environmental threat associated with the current and potential impacts of contaminants to groundwater from soils impacted with petroleum hydrocarbons, PCBs, and lead. There are no wetlands or other exposure pathways to fish and wildlife receptors in OU-3. Off-site related impacts to groundwater will be addressed as part of OU-6 at a later date.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375~~.~~. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for OU-3 are to eliminate or reduce to the extent practicable:

- Exposures to persons at or around the site to PCBs, cPAHs, lead and petroleum hydrocarbons in soil and subsurface structures; and

- The release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards.

- NYSDEC-recommended site-specific soil cleanup levels for PCBs (25 ppm), lead (1,000 ppm), and cPAHs (25 ppm);

- Removal of petroleum present as mobile SPH on the groundwater surface or as visually impacted on the surface soils. For the purpose of this PRAP, petroleum present at 0.1-foot apparent thickness or greater on the water table is defined as mobile SPH;

- Reduction of residual SPH mass in the subsurface to the extent technically feasible and practical. Residual SPH encompasses those areas of measurable apparent thickness less than 0.1 foot and within the historic zero foot petroleum thickness contour.

- Technical and Administrative Guidance Memorandum [TAGM] 4046 for residual contamination in soil ;and 6 NYCRR Subpart 375-6 - Remedial Program Soil Cleanup Objectives;

- PCB cleanup requirements in 40 CFR Section 761.61 (pertaining to PCB remediation waste); and,

- Ambient groundwater quality standards.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, comply with other statutory requirements, be cost-effective, and utilize permanent solutions, alternative technologies, or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for Amtrak OU-3 were identified, screened, and evaluated in the FS report, which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A discount rate of 5% has been used to determine the present worth of all costs.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the mobile and residual SPH and associated hydrocarbon-impacted soil, visually hydrocarbon-impacted surface soil, subsurface structures, and the nine USTs located in OU-3. As stated above, sewer water and sediment, and groundwater would be addressed as part of OU-5 and OU-6, respectively, at a later date.

Remedial Alternative I: No Action

A No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in its unremediated or partially remediated state. This alternative would leave OU-3 in its present condition and would not provide any additional protection to human health or the environment. While several soil removal and SPH removal IRMs implemented to date were successful in reducing the potential threat to the human health and the environment, contamination still remains on site that must be addressed.

Present Worth:………………………………………………………………………………… $142,938
Capital Cost:………………………………………………………………………………... $ 55,120
Present Value OM&M:……………………………………………………………………... $ 87,818
Time to Implement:………………………………………………………………………. Ongoing

<u>Remedial Alternative II: Excavation of Mobile SPH/Enhanced In Situ Biodegradation of Residual SPH/In-place Cleaning or Removal of Interior Engine House Service Pits/Removal of USTs, Exterior Engine House Inspection Pits, and Fuel Pump Vaults</u>

Remedial Alternative II includes the excavation of mobile SPH and associated hydrocarbon-impacted soil, excavation of visually hydrocarbon-impacted surface soil, in situ enhanced biodegradation treatment of residual SPH and residual (entrained and non-recoverable) petroleum impacted soils, the cleaning or removal of the interior former Engine House service pits, removal of the exterior Engine House inspection pits, monitoring of remaining subsurface structures and the removal of the nine USTs, fuel pump vaults, and associated piping.

Excavation of the mobile SPH and associated soil would consist of the removal of approximately 4,060 CY of soil and SPH with thickness of 0.1-foot or greater, as measured in monitoring wells. The excavation would extend beyond the lateral extent of mobile SPH to the extent of 0.1-foot SPH thickness and to a depth of one-foot below the water table (ranging from 2 to 4.5 feet bls) along the fringes of the 0.1-foot SPH plume to a depth of 2.5 feet below the water table in areas of the plume where the observed SPH thickness was 3 feet and greater, as defined in the Remedial Investigation.

The one remaining exceedance of the NYSDEC-recommended soil cleanup level for PCBs within OU-3 lies within the mobile SPH excavation limits and would be removed as part of the excavation.

The extent of visually hydrocarbon-impacted surface soil (Figure 12) would be excavated to a depth of 1-foot. Approximately 450 CY of soil would be excavated and disposed off-site. The one remaining exceedance within OU-3 of the NYSDEC-recommended soil cleanup level for lead lies within the extent of visually hydrocarbon-impacted surface soil. Deeper excavation (average depth of 3 feet) would be performed at this location to address this exceedance.

In situ enhanced biodegradation of the residual SPH would accelerate the natural process of the breakdown of SPH by microorganisms through the addition of nutrient amendments or through the inoculation of SPH-degrading microorganisms. This technology would be applied to saturated soil within the footprint and beneath the mobile SPH excavation to address residual SPH to a maximum depth of 10 feet bls. Nutrient amendments would be injected into the subsurface using direct-push boring methods following the backfill of the mobile SPH excavation.

It is estimated that the proposed excavation remedy would be effective in removing 9,400 gallons of recoverable petroleum (SPH) and another 30,600 gallons of unrecoverable petroleum trapped in the smear zone straddling the groundwater table. Additionally, the enhanced bioremediation component of the proposed remedy would remove 9,372 gallons of residual petroleum trapped in soil pores below the water table within the defined 0.1 ft SPH contour. The remaining petroleum – up to an estimated 45,570 gallons

- would be subject to contingent bioremediation, performance monitoring, and site management plan. An observed SPH thickness no greater than 0.01 ft in a defined monitoring well network and SVOCs in soils no more than 500 PPM would apply as the performance standard for the proposed remedy. Overall, the proposed remedy would remove 52 percent of the total petroleum present in the subsurface in OU3. This does not include petroleum present in the visibly impacted surface area, or the petroleum present in any of the underground structures.

A bench scale testing of the proposed anaerobic bioremediation testing has been completed. A pilot test would be conducted to determine the optimum mode of remedy. The proposed alternative is expected to take 8 to 12 months to complete, but the enhanced bio-remediation may take longer. Initially, field parameters, water levels and SPH measurements would be done weekly. Monthly soil sampling would continue during the entire period of remedy. Soil sampling would discontinue after the treatment goal of 500 ppm of total SVOCs was achieved.

A residual SPH Contingency Plan would be developed to address areas of apparent SPH thickness between 0.1 ft and 0.01 ft on the water table. A monitoring well plan would be developed and subject to approval of the NYSDEC. The Residual SPH Contingency Plan would include: 1) monitoring all wells where SPH thickness presently exceeds 0.01 ft; and, 2) new wells to be installed as necessary based upon site history. These wells would be gauged on a quarterly basis for at least two years and longer if the residual product thickness over 0.01 ft persists. Product thickness greater than 0.01 ft as identified in two quarterly events in a monitoring well network would be removed by absorbent socks or the affected area would be bio-remediated in the same manner as the area under the 0.1 ft plume. Any measurement of product thickness greater that 0.1 ft would trigger evaluation of the occurrence without waiting for the next quarterly sampling event. Remedial action (i.e., use of absorbent socks, product recovery, or bioremediation) would be utilized to address these areas.

Subsurface portions of the former Engine House interior service pits are currently covered with an engineered steel and concrete cover. Portions of the cover would be removed, as necessary, to access the service pits. Water, SPH, sludge and other material potentially inside the pits would be sampled and (if necessary) removed, thereby removing all contents exhibiting PCB concentrations in excess of the TSCA PCB standards. If feasible, the water would be treated and discharged under permit to the sewer. The SPH and sludge and any untreatable water would be disposed off-site. Sampling of the concrete service pits would be performed after cleaning activities, and backfilled with onsite soil. Based on an evaluation of sampling results, removal and off-site disposal of the concrete service pits may be required under TSCA. The exterior Engine House inspection pits and the fuel pump vaults would be removed entirely and backfilled with on-site soil. Remaining structures (Oil House basement and Metro Shed) would remain in place and be monitored under the Site Management Plan.

The nine USTs in the UST areas would be removed and disposed off-site. All liquids within the USTs would be pumped prior to excavation and containerized for off-site disposal or permitted discharge to the sewer. The concrete structure encasing the tanks, if present, would be removed.

Use of soils derived from uncontaminated areas onsite is acceptable for backfilling the interior service pits and excavated soil areas. These backfill soils must meet all site-specific action soil cleanup levels (cPAH, lead, PCB, total SVOC), and exhibit no gross contamination as determined by screening by visual, olfactory or PID methods or gross contamination from petroleum constituents. A plan for sampling of potential backfill material prior to placement would be submitted in the Design Report. Analytical results from characterization sampling of potential backfill material would be submitted for approval as part of the remedy implementation process.

A performance monitoring program, distinct and separate from the contingent residual SPH monitoring, would be developed to evaluate the performance of the proposed remedial action. Its purpose would be to satisfy remedial action objective of preventing impacts to groundwater. This would include sampling and analysis of groundwater for site related contaminants of concern (PCBs, cPAHs, and lead); parameters outlined in the STARS Memo #1; and, chlorinated solvents. Additionally, it would also include gauging the groundwater for the post-remedial apparent SPH thickness measurements. The program would include installation of additional groundwater wells. The details of the performance monitoring plan would be addressed in the Site Management Plan.

An air monitoring program would be implemented during all intrusive remedial actions to measure the concentration of particulates in ambient air in the work zone and at the perimeter of the Yard. A Community Air Monitoring Plan (CAMP) that specifies the components of this program would be developed in accordance with the NYSDOH Generic Community Air Monitoring Plan. A Waste Handling Plan would be prepared to define truck routing and decontamination measures.

A Soil Management Plan would be prepared and implemented to minimize the potential exposure of workers to low-level COCs in soil and groundwater after the remediation is completed. Further, the Soil Management Plan would establish applicable management practices for the future disturbance/reuse of Yard soils, particularly in portions of the Yard that are under a use restriction (subsurface structures).

A Site Management Plan would be developed to include the Performance Groundwater Monitoring Program, the Soil Management Plan, and a program for use restrictions in relation to the subsurface structures. An Environmental Easement would be created to include: 1) Site Management Plan; 2) prohibition on use of groundwater as a source of potable water; 3) a condition of no change in site use; and 4) controlled access to the site.

Present Worth……………………………………………………………………………$4,706,343
Capital Cost……………………………………………………………………………$4,608,150
Present Value OM&M…………………………………………………………………$ 98,193
Time to Implement………………………………………………………………………8-12 months

Remedial Alternative III: Excavation/Off-Site Disposal and Removal of All Mobile and Residual SPH and All Hydrocarbon-Impacted Soil/Off-Site Disposal of Subsurface Structures and USTs

For this alternative, mobile and residual SPH and associated hydrocarbon-impacted soil within the extent of the historic SPH plume and visually hydrocarbon-impacted surface soil would be excavated and disposed off-site. This excavation would restore OU-3 to pre-disposal conditions. The depth of excavation within the historic SPH plume would extend to one-foot below the water table (ranging from 2 to 4.5 feet bls) along the fringes of the historic SPH plume to a depth of 2.5 feet below the water table in all areas of the plume where the observed SPH thickness was 3 feet and greater. This would result in the removal of approximately 24,000 CY of soil. Visually hydrocarbon-impacted surface soil outside of the historic SPH plume would be excavated to a depth of 1 foot bls.

The interior and exterior Engine House service pits, the former Metro Shed inspection pit, fuel pump vaults, and the Oil House basement would be removed in their entirety and disposed off-site. The entire concrete cover over the interior Engine House inspection pits would be removed and any water, SPH, and sludge would be pumped and disposed off-site. The interior inspection pits and foundation would be demolished using standard demolition equipment and disposed off-site. The Metro Shed was formerly demolished to the concrete floor slab and the inspection pit was filled with soil/fill. Any contents of the Metro Shed inspection pit, Oil House basement, and fuel oil pumps would be excavated. Once the concrete structures are accessed, all concrete associated with the structures would be removed using standard demolition equipment.

The nine USTs in the UST areas would be removed and disposed off-site. All liquids within the USTs would be pumped prior to excavation and containerized for off-site disposal or permitted discharge to the sewer. Any concrete structures encasing the tanks, if present, would also be removed and disposed off-site.

All excavations would be backfilled with soil/fill from on-site sources that meet the site-specific NYSDEC-recommended soil cleanup levels for PCBs, cPAHs, and lead and performance goal for total SVOCs and covered with a layer of clean material.

Due to the significant size of the soil/SPH excavation and USTs and concrete structures to be removed, air monitoring would be a major component of the remediation under this alternative. An air monitoring program would be implemented during all remedial actions to measure the concentration of particulates in ambient air in the work zone and the perimeter of the Yard. A CAMP that specifies the components of this program would be developed in accordance with the NYSDOH Generic Community Air Monitoring Plan. A Waste Handling Plan would be prepared to define truck routing and decontamination measures.

A Soil Management Plan would be prepared and implemented to minimize the potential exposure of workers to low-level COCs in soil and groundwater after the remediation is completed. Further, the Soil Management Plan would establish applicable management practices for the future disturbance/reuse of Yard soils, particularly in portions of the Yard that are under a use restriction.

A Site Management Plan would be developed to include the Soil Management Plan. An Environmental Easement would be created to include: 1) Site Management Plan; 2) prohibition on use of groundwater as a source of potable water; 3) a condition of no change in site use; and 4) controlled access to the site.

Present Worth……………………………………………………………………………………$12,099,326
Capital Cost……………………………………………………………………………………… $12,099,326
Present Value OM&M ………………………………………………………………………………$0
Time to Implement;……………………………………………………………………………… 18 months

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed “threshold criteria” and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy would meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYDEC has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternative after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility, or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost–Effectiveness. Capital costs and operation, maintenance and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance. Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary would be prepared that describes public comment received and the manner in which the NYSDEC would address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public would be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The NYSDEC is proposing Remedial Alternative II: Excavation of Mobile SPH/Enhanced, In Situ Biodegradation of Residual SPH/In-place Cleaning of Engine House Service Pits/Removal of USTs, Exterior Engine House Inspection Pits, and Fuel Pump Vaults as the remedy for OU-3. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

Alternative II is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for OU-3 by removing the mobile SPH and associated hydrocarbon-impacted soil, and visually hydrocarbon-impacted surface soil, which pose the most significant threat to public health and the environment.

Alternative I would not adequately satisfy the threshold criteria for protecting human health and the environment nor comply with the SCGs. Therefore, Alternative I is not considered further in this evaluation. Alternative III would be protective of human health and the environment and would meet the SCGs but the balancing criteria must be considered.

Remedial Alternatives II and III provide similar levels of long-term effectiveness and permanence. Both remove the impacted material associated with the Engine House interior pits and greatly reduce the mass of SPH within the subsurface.

Although a larger quantity of material would be removed as part of Remedial Alternative III, Alternative II is as protective as Remedial Alternative III in removing all mobile SPH and reducing an equal volume of residual petroleum through in situ treatment. Both alternatives include the removal of PCB-hazardous waste from the interior Engine House service pits.

Remedial Alternative II is favorable in that it is readily implementable. Remedial Alternative III would pose difficulties due to the lack of working space and staging areas for stockpiling large quantities of waste within OU-3, the level of disruption that would be caused to on-site workers that require this area for routine track operations, access via the only access road to other portions of the Yard, and the increased truck traffic through the surrounding community caused by removing an increased quantity of waste. Significant dewatering and sheeting would also be required.

The cost difference between the alternatives is significant. Remedial Alternative III is the most expensive with a present value of $12 million and is more difficult to implement. Remedial Alternative II has a present value of approximately $4.7 million. The increased cost and increased implementability concerns of Remedial Alternative III, while providing an equal level of protection to human health and the environment is not justified.

The estimated present worth to implement the remedy is $*4,706,343*. The cost to construct the remedy is estimated to be $4*,608,150* and the estimated present worth of operation, maintenance, and monitoring for two years is $*98,193*.

The elements of the proposed remedy are as follows:

1. A remedial design program to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Excavation and off-site disposal of visually hydrocarbon-impacted surface soil.

3. Excavation and off-site disposal of all mobile SPH and associated hydrocarbon-impacted soil.

4. Excavation and off-site disposal of soil impacted by PCBs and lead with concentrations in excess of the site-specific NYSDEC-recommended soil cleanup levels for these COCs.

5. Removal of the two exterior Engine House inspection pits, three fuel pump vaults, and nine USTs.

6. In situ application of amendments to enhance biodegradation of saturated soil areas with measurable residual SPH greater than 0.1 foot (as observed in successive measurements in monitoring wells) located in areas discontinuous of the mobile SPH plume (e.g., MW-77) and all hydrocarbon-impacted soils beneath the mobile SPH excavation to a depth of 10 feet bls. Mobile SPH is defined as free product with apparent thickness of 0.1 ft or greater on the water table. The residual SPH at depths greater than 10 feet would be managed and monitored in place through the site management plan.

7. A residual SPH Contingency Plan would be developed to address areas of apparent product thickness between 0.1 ft and 0.01 ft on the water table. A monitoring well plan would be developed and subject to approval of the NYSDEC. Residual SPH is defined as free petroleum with apparent thickness of 0.01 ft or greater, but less than 0.1 ft on the water table.

8. Removal of water, SPH, and sludge from the interior Engine House service pits and cleaning and ~~bulk~~ sampling of the service pits and their contents prior to backfilling with soil from on-site sources. Based on an evaluation of the sampling results, removal and off-site disposal of the concrete service pits and their contents may be required under TSCA.

9. All excavations would be backfilled with soil/fill from uncontaminated on-site sources except for the top one- foot layer of clean material which would be from offsite sources. These backfill soils must meet all site-specific action soil cleanup levels (cPAH, lead, PCB, total SVOC), and exhibit no gross contamination as determined by screening by visual, olfactory or PID methods or gross contamination from petroleum constituents. A plan for sampling of potential backfill material prior to placement would be submitted in the Design Report. Analytical results from characterization sampling of potential backfill material would be submitted for approval as part of the remedy implementation process.

10. Development of a Site Management Plan to (a) address residual contaminated soils that may be excavated on or off site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) require the evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) identify any use restrictions; and (d) provide for the operation and maintenance of the components of the remedy.

11. Imposition of an institutional control in the form of an environmental easement that would (a) require compliance with the approved Site Management Plan; (b) identify areas of residual contamination remaining in OU-3 with chemical concentrations above the recommended soil clean up levels that

would be managed in place (residual SPH and subsurface structures); (c) restrict the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH; (d) require the property owner to complete and submit to the NYSDEC a periodic certification.

12. The property owner would provide a periodic certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC, until the NYSDEC notifies the owner in writing that this certification is no longer needed. This submittal would contain certification that the institutional controls and engineering controls are still in place, allow the NYSDEC access to the site, and that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan.

13. The operation of the components of the remedy would continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

14. Performance of groundwater monitoring downgradient of the mobile SPH excavation and the residual SPH bioremediation treatment area would be performed. Periodic groundwater monitoring to evaluate post-remedial groundwater concentrations and presence of measurable SPH in residual SPH areas would be performed for two years. This program would allow the effectiveness of the remedy to be monitored and would be a component of the operation, maintenance, and monitoring for OU-3.