Consolidated Iron and Metal Superfund Site

Newburgh, New York

EPA
Region 2

July 2006

PURPOSE OF PROPOSED PLAN

This Proposed Plan identifies the preferred remedial alternative for the Consolidated Iron and Metal site, and provides the rationale for this preference. The Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC). The preferred remedial alternative described in this plan addresses human and environmental risks associated with contaminants identified in the soils at the site.

This Proposed Plan is being provided as a supplement to the Remedial Investigation and Feasibility Study (RI/FS) reports to inform the public of the remedy preferred by EPA, and to solicit public comments on this preference. Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f) of the National Oil & Hazardous Substances Pollution Contingency Plan (NCP) require EPA to solicit public comments on proposed plans. The remedial alternative summarized here is more fully described in the FS report contained in the Administrative Record file for the site.

EPA's preferred remedy for the site is excavation and off-site disposal of site soils exceeding the residential cleanup criteria for lead to a depth of six feet below ground surface (bgs). The excavated material will be backfilled to grade with clean fill. For soils beneath six feet bgs, volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) exceeding the NYSDEC cleanup guidelines for these compounds at depth will also be excavated, disposed of off-site, and backfilled. All other soils beneath six feet bgs will be subject to a soils management plan (SMP) should they be disturbed. Institutional controls would also be part of the remedy in order to engage the SMP if soils six feet bgs were to be exposed and to prevent the use of groundwater at the site. The preferred remedy would also include a monitoring component and periodic reviews by the regulatory agencies to ensure that the remedy continues to be protective of public health and the environment.

The remedy described in this Proposed Plan is the *preferred* remedy for the site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments on the Proposed Plan.

MARK YOUR CALENDAR

July 26, 2006 - August 24, 2006: Public comment period on the Proposed Plan.

August 7, 2006 at 7:00 P.M.: Public meeting at the Newburgh Free Library, 124 Grand Street, Newburgh, NY.

COMMUNITY ROLE IN SELECTION PROCESS

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI and FS reports and this Proposed Plan have been made available to the public for a public comment period which begins on July 26, 2006 and concludes on August 24, 2006.

A public meeting will be held during the public comment period at the Newburgh Free Library on August 7, 2006 at 7:00 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedy, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

INFORMATION REPOSITORIES

Copies of the Proposed Plan and supporting documentation are available at the following information repositories:

Newburgh Free Library
124 Grand Street
Newburgh, New York 12550
(845) 563-3601
www.newburghlibrary.org

Hours: Call or see website for summer hours.

USEPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308

Hours: Monday - Friday, 9:00 A.M. - 5:00 P.M.

Written comments on this Proposed Plan should be addressed to:

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SCOPE AND ROLE OF ACTION

The action described in this Proposed Plan represents a long-term remedial phase focusing on cleanup of the entire site. The primary objectives of this action are to remediate contaminated site soils which could potentially come in contact with human and ecologic receptors, remediate site soils with contaminants that could be potentially mobile, migrating downward to the groundwater, and to manage those site soils at depth that are not considered to be potentially mobile so that they are properly addressed if disturbed.

SITE BACKGROUND

Site Description

The Consolidated Iron and Metal site is a former car and scrap metal junk yard located at the foot of Washington Street, in Newburgh, Orange County, New York. The site is bounded by a public boat launch and marina to the north, Conrail railroad tracks and South Water Street to the west, an inactive municipal incinerator and an active wastewater treatment plant to the south, and the Hudson River to the east. A site map is presented as Figure 1.

Downtown Newburgh is located approximately 500 feet west of South Water Street. The City of Newburgh, which is 60 miles north of New York City, is located on the western side of the Hudson River in eastern Orange County. The City has a land area of 3.9 square miles and is bounded by the incorporated Town of Newburgh on the north and west, by the Town of New Windsor to the south, and by the Hudson River to the east.

Currently, the former garage, which is empty, is the only building remaining onsite. Building foundations remain from the former office, metal shear, compactor/bailer, and smelter buildings. The former metal shear building foundation contains a sub-basement, which is currently covered by metal plates to prevent access. The former compactor/bailer building foundation is open and filled with rain water; the foundation is surrounded by orange fencing to prevent entrance. Two pits remain along the western side of the site from underground storage tank (UST) removal activities. The site drainage direction is northeast, toward the Hudson River. A storm water retention basin on the northeastern portion of the site was constructed by EPA contractors; the berm surrounding the basin is of site-derived soils. The retention basin was constructed to intercept storm water flowing toward the river, preventing direct discharge to the Hudson River. A small pile of debris with tires is located in the southern part of the site. Rip-rap and vegetation, in the form of trees and shrubs, are present on the eastern border of the site, along the Hudson River.

Site History

From World War I until the early 1940s, the Eureka Shipyard operated at the site. Consolidated Iron and Metal's scrap metal processing and storage operations occurred at the site for approximately 40 years before the facility's closure in 2000. A smelter operated on site between 1975 and 1995 that was used primarily to melt aluminum scrap materials as well as transmissions. Other metallic materials also were smelted, creating a lead-contaminated ash and slag by-product. Other site operations included sorting ferrous and non-ferrous metal scrap for processing, including automobile batteries.

Historical aerial photographs taken since the mid-1940s show that standing liquids have occupied large areas of the site. Throughout the past 50 years, the site has been covered with piles of debris, scrap metal, numerous small and large mounds of dark-toned and light-toned materials, and numerous areas of dark-stained soil. From approximately 1960 to 1980, the area of land on which the facility operated increased by approximately 25 percent, as fill material was added to the Hudson River along the property's shoreline. Throughout the historical photographs, intermittent surface drainage pathways across the site were noted that appeared to discharge to the Hudson River, and were associated with discharge plumes visible in the river waters.

From 1997 to 1999, the NYSDEC conducted several inspections at the facility and cited the owner for a number of violations. Subsequent inspections by NYSDEC noted that the owner had failed to adequately correct the violations and in the spring of 2000, the New York State Attorney General shut down operations at the site for various violations, including illegal discharge to surface water without a permit.

In 1998, EPA sampled an ash/slag pile at the site that was generated by the aluminum smelting operation and found it to be contaminated with lead and PCBs. The scrap metal in the pile was segregated out and the resulting fines pile, estimated at 6,600 tons, was removed from the site in 1999 and placed in an approved treatment, storage, and disposal facility (TSDF) for stabilization and landfilling. Also in 1999, EPA sampled other processed soil piles at the site which were also found to be contaminated with lead and PCBs; these soil piles, too, were transferred to an approved TSDF. Additionally, EPA constructed a berm from site soils to prevent storm water from carrying site contaminants into the Hudson River.

In December 2000, a Hazard Ranking System package was prepared by EPA utilizing data collected during an integrated assessment at the site to determine the horizontal and vertical extent of contamination. Surface and subsurface soil, groundwater, and sediment samples were collected and analyzed, indicating the presence of VOCs, semivolatile organic compounds (SVOCs), pesticides, PCBs, and metals at concentrations greater than background in the surface and subsurface soils. Accordingly, the site was placed on the National Priorities List on June 14, 2001.

In 2002, EPA responded to local concerns about trespassing and scavenging taking place at the site and constructed a security fence around the site. Concurrently, EPA initiated the development of a work plan for the performance of the RI/FS. Prior to collecting samples for the RI, it was necessary to clear the site of the excessive debris and some of the structures located on-site. Accordingly, from June to September 2003, EPA conducted a site clearing which included the following tasks:

- the removal of 32 truckloads of tires (approx. 30,000 tires total);
- the removal of 58 truckloads (1450 tons) of scrap metal for recycling;
- the removal of 19 roll-offs (380 tons) of concrete for recycling;
- the disposal of 68 truckloads (1962 tons) of lead-hazardous soil and debris;
- the demolition and removal of an office building and 3 process buildings;
- the pumping and removal of approximately 28,000 gallons of hydraulic oil from a process building basement for recycling; and
- rough grading of the site surface.

Completion of the site clearing enabled the initiation of the RI sampling program, which began in June 2004.

Site Geology/Hydrogeology

Geologically, the site is underlain by a stratified clay and silt unit with occasional thin layers of sand and gravel at the land surface and below the water table. The unconsolidated deposits are underlain by the Martinsburg Formation, which consists of shale and carbonate rocks (e.g., limestones and dolostones). The bedrock is cross-cut by faults near the site.

Lithologic logs from onsite soil borings suggest the localized stratigraphy described below.

Fill - Fill deposits are primarily confined to the top 20 feet of material at the site. The lithology includes a mixture of yellow, brown, greyish green, and black, fine- to coarse-grained sand, gravel, and trace silt with bricks, concrete, rebar, metal, glass, wood, ash, cinders, and plastic.

Sand/Gravel - Natural deposits, which underlie fill deposits, consist of a mixture of yellow, brown, greyish green, and black, fine- to coarse-grained sand, gravel, and trace silt.

Clay - Clay lenses occur as thin, non-continuous layers within the fill and natural sand and gravel deposits. The lenses consist of tan to dark greenish gray, medium to stiff clay. In some instances, these layers cause perched water table conditions. A thicker clay layer was observed below the natural sand/gravel deposits, in some of the deeper borings. The clay was gray, loose to stiff, and plastic.

Bedrock - Weathered rock was encountered at only one vertical profile boring in the northwest corner of the site (MW-1), at a depth of 38 feet bgs. Bedrock is a dark gray shale belonging to the middle Ordovician Martinsburg Formation.

The water table aquifer is in the unconsolidated fill, natural sand/gravel and clay deposits that overlie the bedrock aquifer. The water table aquifer is approximately 20 feet thick. Groundwater flows to the east/southeast toward the Hudson River. The water table at the site is generally flat, with elevations in August 2004 ranging from 3.18 feet above mean sea level (amsl) (14.43 feet bgs) at MW-1 in the northwest corner of the site, to 0.44 feet amsl (11.97 feet bgs) at MW-7 in the southeastern part of the site.

Groundwater flow gradients vary across the site and ranged from 0.0036 to 0.107. Steeper gradients are present at the northern and southern ends of the site, with a shallower gradient across the center of the site. The calculated groundwater velocity ranges from 0.23 - 0.67 foot per day, or 82.8 to 246 feet per year.

RESULTS OF THE REMEDIAL INVESTIGATION

The characterization and evaluation of the nature and extent of contamination were focused on those constituents identified as indicator contaminants (ICs) in site media. A brief summary of the determination of ICs and evaluation of the nature and extent of contamination in site media is presented below.

Determination of Site Indicator Contaminants: Selected ICs are used to focus the evaluation of the nature and extent of contamination in soil, sediment, surface water, and groundwater. RI data, historical Site activities, and the results of the Human Health Risk Assessment were reviewed to determine the ICs listed below.

- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Benzo(a)pyrene
- Indeno(1,2,3-c,d)pyrene
- Dibenz(a,h)anthracene
- Aroclor-1254
- Arsenic
- Cadmium
- Copper
- Lead
- Mercury
- Zinc

Soil Contamination: Indicator contaminants exceeded screening criteria in surface and subsurface soil samples in both process area and site-wide soil borings. The term "process area" is used to describe the area of the site in which the metal shear, compactor/bailer, and smelter buildings were located; "site-wide" is used to describe locations outside the process area. In general, surface soils are contaminated with higher levels of ICs than subsurface soils. The PAH benzo(a)pyrene, which exceeded its screening criterion in the greatest number of samples, exemplifies the general trend of PAH contamination in site soils. PAH contamination is generally highest in areas surrounding the former metal shear building, and east of this area, along the Hudson River.

The highest concentrations of the PCB Aroclor-1254 were found in surface soils surrounding the former metal shear and compact/bailer buildings, as found in both screening and analytical samples.

The highest concentrations of the majority of metal ICs occur in the process area in both surface and subsurface soils. Lead, however, is widely distributed throughout the site, with the highest levels generally occurring in the southeast sector.

Sediment Contamination: The majority of site-specific ICs exceeded screening criteria in sediment samples adjacent to the site. However, many of these exceedances were below representative background values. The highest levels of PAH ICs are in SD-19, offshore of the southern boundary of the site; two of these ICs were above background values. It should be noted that the PAH ICs are also designated COCs for the manufactured gas plant site located adjacent to the Site to the south.

Approximately half of the inorganic ICs exceeded both screening criteria and background. The highest levels of inorganic ICs are in samples offshore of the southern half of the site and one sample just north of the site.

Surface Water Contamination: Iron and lead exceeded calculated background levels and screening criteria in surface water samples adjacent to the site. Lead exceedances occurred in only two samples. Iron exceedances ranged from 1.2 to 2.5 times screening criteria. In general, iron and lead contamination does not exhibit a clear pattern of migration, and is likely influenced by tidal flow.

Groundwater Contamination: VOCs and inorganic ICs were detected in groundwater across the site. The highest concentrations are found in MW-5, approximately 250 feet downgradient of the former metal shear building. With the exception of iron and zinc, most of the groundwater samples showed ICs below or only slightly in excess of the screening criteria.

LNAPL Distribution: LNAPL was observed at four locations in two areas across the Site; as a result, the amount is not sufficient for delineation purposes. Rather, LNAPL occurs in two small areas: the first area is located adjacent to the former metal shear building on the northern and eastern side. The second area is located near the Hudson River, just downgradient of the former compactor/bailer building. The latter building was found to contain free product in the two-level basement, which was removed in 2003. Soil and groundwater samples collected for LNAPL delineation in these areas indicate that LNAPL levels, although observed, are minimal.

SITE RISKS

Based upon the results of the RI, a baseline human health risk assessment was conducted to estimate the risks associated with current and future property conditions.

The human-health estimates summarized below are based on current reasonable maximum exposure scenarios and were developed by taking into account various conservative estimates about the frequency and duration of an individual's exposure to chemicals selected as contaminants of potential concern. Cancer risks and hazard indexes (HIs) are summarized below. Cancer risks are compared to a target risk range of 1×10^{-6} to 1×10^{-4} while HIs are used to indicate non-cancer hazards.

A screening level ecological risk assessment was also conducted to assess the risk posed to ecological receptors due to Site-related contamination. For ecological risks hazard quotients (HQs) are developed to evaluate potential adverse effects to ecological receptors.

Human Health Risk Assessment

Summary of Risks to Current and Future Site Trespassers: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from surface soil. The total incremental lifetime cancer risk estimate is 2×10^{-5}. This estimate is within EPA's target range of 1×10^{-6} to 1×10^{-4}. The calculated HI is 3. Exposure to PCBs accounts for most of the potential non-cancer hazard.

Summary of Risks to Current and Future Recreational Users (Adult): Risks and hazards were evaluated for incidental ingestion and dermal contact with sediment in the Hudson River. The total incremental lifetime cancer risk estimate is 5×10^{-5}. This estimate is within EPA's target range of 1×10^{-6} to 1×10^{-4} . The calculated HI is 0.2; non-cancer hazards are not expected.

Summary of Risks to Current and Future Recreational Users (Adolescent): Risks and hazards were evaluated for incidental ingestion and dermal contact with sediment in the Hudson River. The total incremental lifetime cancer risk estimate is 1×10^{-5}. These estimates are within EPA's target range of 1×10^{-6} to 1×10^{-4} . The calculated HI is 0.2; non-cancer hazards are not expected.

Summary of Risks to Future Site Workers: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from surface soil; inhalation of VOCs in indoor air from vapor intrusion from subsurface groundwater; and ingestion of tap water. The total incremental lifetime cancer risk estimate is 1×10^{-4}. The estimate is at the high end of EPA's target range of 1×10^{-6} to 1×10^{-4}. The calculated HI is 5. Exposure to PCBs accounts for most of the potential non-cancer hazard.

Summary of Risks to Future Construction Workers: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from subsurface soil. The total incremental lifetime cancer risk estimate is 3×10^{-6}. This estimate is within EPA's target range of 1×10^{-6} to 1×10^{-4} . The calculated HI is 3. Exposure to PCBs accounts for most of the potential non-cancer hazard.

Summary of Risks to Residents: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from surface soil; inhalation of VOCs in indoor air from vapor intrusion from subsurface groundwater; and ingestion of tap water. The total incremental lifetime cancer risk estimate is 2×10^{-4} (adult) and 4×10^{-4} (child). These estimates are slightly above EPA's target range of 1×10^{-6} to 1×10^{-4} . Exposure to PCBs in soil and to arsenic in soil and water account for the majority of the risk. The calculated HIs are 14 (adult) and 80 (child). Exposure to PCBs in soil accounts for most of the potential non-cancer hazard.

Summary of Risks to Future On-Site Recreational Users (Adult): Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from surface soil. The total incremental lifetime cancer risk estimate is 6×10^{-5}. This estimate is within EPA's target range of 1×10^{-6} to 1×10^{-4}. The calculated HI is 3. Exposure to PCBs accounts for most of the potential non-cancer hazard.

Summary of Risks to Future On-Site Recreational Users (Child): Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from surface soil. The total incremental lifetime cancer risk estimate is 1×10^{-4}. The estimate is at the high end of EPA's target risk range. The calculated HI is 22. Exposure to PCBs accounts for most of the potential non-cancer hazard.

Screening Level Ecological Risk Assessment

Surface Water Risks: Aluminum, iron, and lead had HQs above one; however, none of these inorganics is considered a major source of site-related risk to ecological receptors.

Sediment Risks: Bis(2-ethylhexyl)phthalate and 2-methylnaphthalene had HQs over one. Total PAHs yielded an HQ of 132.9 at sample location SD-19. The DDT HQ was 3.44. The highest HQ for 4,4'-DDD was 3.1 at sample location SD-17. Eleven inorganics (antimony, arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc) had HQs greater than one, with copper at location SD-17 the highest with an HQ of 163.

Surface Soil Risks: Process Area - Bis(2-ethylhexyl) phthalate and butylbenzylphthalate had HQs of 78.8 and 39.7, respectively. Total PAHs had an HQ of 256.7 at sample location PASS-04-D. Six pesticides (4,4'-DDE, 4,4'-DDT, endosulfan sulfate, endrin, heptachlor, and methoxychlor) had HQs above one. The total DDT and total PCB HQs were 1,768 and 208,630, respectively. Seventeen inorganics (aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium, and zinc) had HQs above one. The three highest inorganic HQs were cadmium (43,864 at sample location PASS-06-D), aluminum (2,940 at sample location PASS-15-D), and lead (86,667 at sample

WHAT IS RISK AND HOW IS IT CALCULATED?

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

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

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

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

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 10^{-6} being the point o departure. For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which non-cancer health effects are not expected to occur.

location PASS-11-D).

Non-Process Area - Three VOCs (benzene, ethylbenzene, and m,p-xylenes) had HQs above one. Total PAHs had an HQ of 285 at sample location SWSS-16-D. Thirteen pesticides (4,4'-DDE, 4,4'-DDT, aldrin, alpha-BHC, beta-BHC, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, gamma-BHC [lindane], heptachlor, heptachlor epoxide, and methoxychlor) had HQs above one. The total DDT and total PCB HQs were 968 and 140,843, respectively. Nineteen inorganics (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc) had HQs above one. The three highest inorganic HQs were for cadmium (14,682 at sample location SWSS-05-D), aluminum (1,828 at sample location SWSS-17-S), and lead (294,444 at sample location SWSS-24-D).

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), TBC guidance, and site-specific risk-based levels.

The following RAOs were established for the Site soils:

- Prevent or minimize exposure through ingestion and inhalation of or dermal contact with contaminated soils
- Prevent or minimize exposure pathways and transport mechanisms for soil to protect human health and the environment

Soil cleanup objectives will be those established pursuant to the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) guidelines or human health protection value. The soil cleanup objectives are also referred to as preliminary remedial goals (PRGs) in this document.

SUMMARY OF REMEDIAL ALTERNATIVES

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

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the Site can be found in the FS report. This document presents four soil remediation alternatives. To facilitate the presentation and evaluation of these alternatives, the FS report alternatives were modified to formulate the remedial alternatives discussed below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction.

The remedial alternatives are described below.

Alternative 1: No Action

Capital Cost:	$0
Annual Operation and Maintenance Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative for soil does not include any physical remedial measures that address the problem of soil contamination at the Site.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Alternative 2: Debris Removal and Capping of Site Soils

Capital Cost:	$3.7M
Annual Operation and Maintenance Cost:	$99,000
Present-Worth Cost:	$4.6M
Construction Time:	12 months

All building materials and surface debris would be removed and disposed of off-site. Following debris removal, a non-RCRA cap (e.g., clay, clean soil, asphalt, concrete) would be placed over the surface. After completion of the remedial action, institutional controls prohibiting future below-ground activities would be utilized to protect the integrity of the cap. Long-term monitoring of site conditions would be necessary to assess the effectiveness of the remedy.

Alternative 3: Excavation of Site Soils, Off-Site Disposal, and Backfill with Clean Soil

Capital Cost:	$31.1M
Annual Operation and Maintenance Cost:	$30,000
Present-Worth Cost:	$32.0M
Construction Time:	18 months

This alternative includes removal and off-site disposal of surface debris and building materials from the site. Following debris and building material removal, contaminated soil that exceeds the PRGs will be excavated. The PRGs are based on residential future use for both surface and subsurface soils and the NYSDEC TAGM guideline.

During excavation, the foundations/basements of the former process area buildings would be demolished, removed, and disposed of off-site. The soil that exceeds PRG values would also be excavated and disposed of off-site. Clean fill would be used to backfill the excavations and would function as a non-RCRA cap. Only minimal, if any, institutional controls for future site development would be necessary with this alternative. Long-term monitoring of groundwater will be necessary to assess the effectiveness of the remedy.

Alternative 4: Partial Excavation of Site Soils with Off-Site Disposal, Backfill with Clean Soil, and Soils Management Plan

Capital Cost:	$21.9M
Annual Operation and Maintenance Cost:	$30,000
Present-Worth Cost:	$22.8M
Construction Time:	18 months

The objectives of this alternative are to limit human exposure to contaminated soil and dust, reduce contaminant migration through dispersion, and limit possible contaminant migration to groundwater in the future. The objectives are achieved by (1) removing contaminated soil from the site down to six feet bgs, and (2) additionally removing VOC and PCB-contaminated soil to the groundwater table. A soils management plan will be implemented to address those affected soils six feet bgs that will be left in place.

As in Alternative 2, this alternative includes removal and off-site disposal of surface debris and building materials from the site. Following debris and building material removal, contaminated soil down to six feet bgs that exceeds the residential PRG for lead (400 parts per million (ppm)) would be excavated and disposed of off-site. Because limited data are available to estimate the quantity of excavated material that would be classified as either hazardous or non-hazardous, the median point was selected for costing purposes (*i.e.,* 50% is assumed hazardous and 50% is assumed non-hazardous). The residential PRG for lead, 400 ppm, is utilized to map affected soil areas from the ground surface to six feet bgs and to calculate the volume of material (in cubic yards) that would be removed for off-site disposal. Six feet was chosen as an appropriate depth of excavation based on reasonably anticipated future land use. The site is currently zoned for mixed use, including residential, recreational, and commercial uses, and based on discussions with the City of Newburgh, it is highly likely that residential or commercial structures will occupy the site in the future. Building zoning regulations and architectural practices generally require excavations to the frost line, 42 inches bgs in Newburgh, with an additional 18 inches to allow for footings.

Between six feet and the water table, the subsurface PRG for VOCs and PCBs (10 ppm for each) is utilized to map affected subsurface soil areas and to calculate the volume of material (in cubic yards) that would be removed for off-site disposal. For soils between 6 feet bgs to the water table, VOCs and PCBs exceeding the PRG will be removed from the site to eliminate the potential for migration of these contaminants to site groundwater.

During excavation, the foundations/basements of the former process area buildings would be demolished, removed, and disposed of off-site.

A site soils management plan (SMP) will be put in place to account for soils beneath six feet bgs that are left in place. These are soils that are primarily impacted by lead, which based on sampling and analysis of site groundwater, is not mobile and therefore best left in place with a clean fill cap. The SMP would be an institutional control to prescribe proper handling of those soils should they become exposed. Institutional controls would also be required to prevent the use of groundwater at the site. The preferred remedy would also include a monitoring component and periodic reviews by the regulatory agencies to ensure that the remedy continues to be protective of public health and the environment.

COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

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

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital and operation and maintenance costs, and net present-worth costs.

- State acceptance indicates if, based on its review of the RI/FS and Proposed Plan, the state concurs with the preferred remedy at the present time.

- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

Overall Protection of Human Health and the Environment

Lead contaminated soil is prevalent at the site. Alternative 1 provides no protection of human health or the environment, as nothing would be done to address the contamination. Alternative 2 provides minimal protection to human health and the environment by limiting direct exposure to the contaminated soil; however, in the event that the clean soil cap is compromised, the alternative would cease to be protective. Alternative 3 is the most protective because it would eliminate current and future exposure to contaminated soil by removing contaminated soil from the site entirely. Alternative 4 would eliminate current and future exposure to contaminated soil likely to be encountered based on reasonably anticipated future land use and provides a contingency plan to protect human health and the environment for impacted soils left in place.

Compliance with ARARs

There are no Federal or State chemical-specific ARARs for contaminated soil at the site. The NYSDEC recommended soil cleanup objectives and site-specific human health risk assessment based cleanup criteria were used to develop the PRGs. Alternative 1 would not achieve the PRGs, since no action would be taken. Alternative 2 would achieve PRGs for exposure at the surface, but contaminated subsurface soil would be left onsite and untreated. Alternative 3 has the highest probability of achieving the PRGs, since soil with contaminant concentrations exceeding the PRGs would be permanently removed from the site. Alternative 4 would achieve the PRGs for all COPCs from the surface to six feet bgs and for those mobile COPC at depth. Although some soils exceeding the PRGs would be left in place at depth, the contamination is not considered to be mobile and those soils are unlikely to be accessed through reasonably anticipated future land use. Should that occur, a SMP would be employed to ensure compliance with chemical-specific ARARs.

Alternatives 2, 3, and 4 would comply with location- and action-specific ARARs.

Long-Term Effectiveness and Permanence

Magnitude of Residual Risk

Alternative 1 would not reduce risk in the long term, since the contaminants would not be controlled, treated, or removed. Alternatives 2 and 4 would both have residual risk due to contamination remaining onsite, but Alternative 4 would reduce this risk by adopting a SMP as an institutional control at the site. Alternative 3 would have the least amount of residual risk, since all contaminated soil above the water table would be excavated and disposed of offsite.

Adequacy and Reliability of Controls

Alternative 1 would provide no engineering or institutional controls for remaining risk at the site. Alternatives 2 relies on institutional and engineering controls to prevent disturbances of the clean soil cap. In the event that the institutional controls are not enforced or engineering controls fail, exposure to contaminated media could occur. Alternative 4 is more reliable than Alternative 2 because the institutional controls would be applied to soils not likely to become exposed based on reasonably anticipated future land use. Alternative 3 would include institutional controls that mandate no onsite activities below the groundwater table. Since the site-use limitations associated with Alternative 3 are the least restrictive, they could be more easily enforced, and would be the most adequate and reliable in the long term.

Reduction of Toxicity, Mobility, or Volume (TMV) Through Treatment

Alternatives 1 and 2 would not provide reductions in TMV through treatment; however, Alternative 2 would provide some reduction in contaminant mobility by limiting contaminant migration due to erosion and fugitive dust. Alternative 3 would not provide any reductions in TMV directly through treatment, but it would provide a near-total reduction in the volume of contaminated media by removing contaminated soil from the site. Alternative 4, like Alternative 2, would provide a reduction in contaminant mobility by limiting contaminant migration due to erosion and fugitive dust, and like Alternative 3, would provide a reduction in the volume of contaminated media through its removal from the site. Treatment, however, is not a component of any of the alternatives. This is due to the heterogeneity of site contaminants not being conducive to a single treatment technology that would be compatible with reasonably anticipated future land use.

Short-Term Effectiveness

Alternative 1 would achieve the highest degree of short-term effectiveness because no further action would be taken at the site and construction workers would not be subjected to any potential risks. Alternative 3 would have the lowest degree of short-term effectiveness since the excavated materials would require off-site transportation to disposal facilities, increasing the potential for accidents and releases to occur during shipment, as well as potential traffic and noise issues. Alternative 4 would have similar short-term impacts but for a smaller duration due to less material being removed from the site. However, a combination of air monitoring, engineering controls, and appropriate worker personal protective equipment would be used to protect the community and workers. Alternative 2 would have a higher degree of effectiveness since no materials would be excavated, and the duration of onsite activities is expected to be less than that of Alternatives 3 and 4.

Implementability

Alternative 1 would be easiest both technically and administratively to implement because no additional work would be performed at the site. Alternative 2 would be the second easiest to implement since there would be no excavation aside from that encountered with surface debris removal. Alternatives 3 and 4 would be easy to implement technically because building demolition, excavation and disposal are all common construction site activities, and regulatory/permitting requirements for these alternatives are not expected to be administratively intensive.

Cost

The estimated capital, operation and maintenance (O&M) (which includes monitoring), and present-worth costs for each of the alternatives are presented in the table, below.

Alternative	Capital	Annual O&M	Total Present-Worth
1	$0	$0	$0
2	$3.7M	$99,000	$4.6M
3	$31.1M	$30,000	$32.0M
4	$21.9M	$30,000	$22.8M

As indicated by the table, Alternative 1 is the least costly at $0 while Alternative 3 is the most costly with a total present-worth cost of $32 million.

State Acceptance

NYSDEC concurs with the preferred alternative.

Community Acceptance

Community acceptance of the preferred alternative will be assessed in the ROD, following review of the public comments received on the Proposed Plan.

PROPOSED REMEDY

Based upon the results of the RI/FS and after careful evaluation, EPA recommends Alternative 4 as the proposed remedy. Specifically, this would involve the following:

- removal and off-site disposal of surface debris and demolition, removal, and off-site disposal of the foundations/basements of the former process area buildings;
- excavation and off-site disposal of contaminated soil exceeding the residential PRG for lead (400 ppm) down to six feet bgs;
- excavation and off-site disposal of contaminated soil exceeding the NYSDEC TAGM guideline for VOCs and PCBs in subsurface soils (10 ppm for each) to the water table;
- backfilling the excavated soil with clean fill to grade;
- institutional controls in the form of an enforceable soils management plan for soils from six feet bgs to the water table that are left in place to prescribe proper handling and treatment if they become exposed;
- institutional controls in the form of deed restrictions to prevent the use of groundwater at the site;
- monitoring of the site remedy and periodic reviews by the regulatory agencies to ensure that the remedy continues to be protective of public health and the environment.

Basis for the Remedy Preference

The selected alternative provides the most cost effective solution applying the evaluation criteria given reasonably anticipated future land use of the site. Excavation of soils exceeding the residential PRG for lead to six feet bgs accomodates the current zoning code and anticipates the construction of residential or commercial structures on the site. Cleanup to this depth is commensurate with building zoning regulations and architectural practices which generally require excavations to the frost line (42 inches bgs in Newburgh), with an additional 18 inches to allow for footings.

Soils beneath six feet bgs will be excavated only where a threat to groundwater due to contaminant mobility exists. This would be limited to VOCs and PCBs. The remaining soils are unlikely to be disturbed given anticipated future site use, but in the event that they are, a contingency plan will ensure their proper handling and treatment. The groundwater data collected indicate that the contaminants in these soils are not mobile; periodic groundwater monitoring will ensure that they remain immobile.

Given these factors, the selected alternative provides the best balance of trade-offs among alternatives with respect to the evaluating criteria. EPA and NYSDEC believe that the selected alternative will be protective of human health and the environment, comply with ARARs, be cost effective, and utilize permanent solutions and treatment technologies to the maximum extent practicable.

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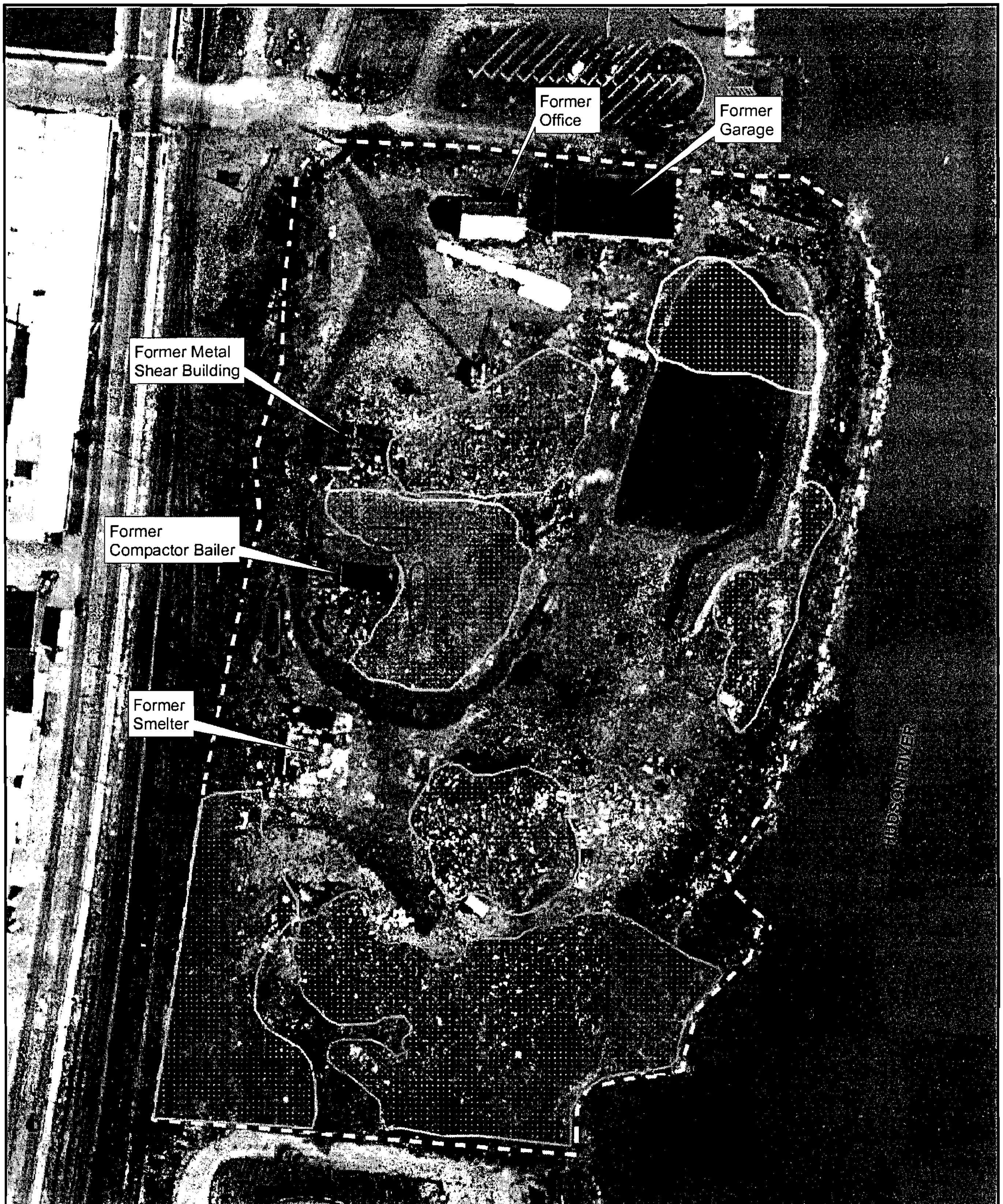

Note: aerial photograph dated April 2001

LEGEND

Former Ash/ Slag Pile
Former Soil Pile
Former Underground Storage Tank
Former Tire Pile
Former Scrap Metal Pile
Site Boundary

0 25 50 100 150 Feet

Figure 1
Site Map

Consolidated Iron and Metal Superfund Site
Newburgh, Orange County, New York

CDM