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EPA Superfund
Record of Decision:

NAVY SHIPS PARTS CONTROL CENTER
EPA ID: PA3170022104
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MECHANICSBURG, PA
09/27/2000

Record of Decision

Naval Support Activity (NSA)
(Formerly Naval Inventory Control Point
Mechanicsburg, Pennsylvania
Site 3 Soil
Ball Road Landfill and Burn Pits

September 2000

Department of the Navy

Record of Decision for Site 3 Soil:
Ball Road Landfill and Burn Pits

Naval Support Activity (NSA)
(Formerly Naval Inventory Control Point)
Mechanicsburg, Pennsylvania

September 2000

DECLARATION

SITE NAME AND LOCATION

Ball Road Landfill and Burn Pits ("Site 3" or "the site") is located at the Naval Support Activity (NSA), formerly the Naval Inventory Control Point (NAVICP) and previously Navy Ships Parts Control Center (SPCC), in Mechanicsburg, Pennsylvania (Figure 1).

STATEMENT OF BASIS AND PURPOSE

The selected remedy for Site 3 Soil is presented in this decision document. The remedy has been chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site.

The Department of the Navy ("the Navy") and the U.S. Environmental Protection Agency (EPA) have jointly selected the remedial action for Site 3 Soil. The Commonwealth of Pennsylvania, represented by the Pennsylvania Department of Environmental Protection (PADEP), concurs with the selected action.

ASSESSMENT OF THE SITE

Actual or threatened release of hazardous substances from this site, if not addressed by implementing the limited action as detailed in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Navy, EPA, and PADEP recommend that institutional controls be implemented at Site 3 because there is the potential for unacceptable risk to human health if the land use were to change to residential use.

Institutional controls will include the preparation of a note on the site summary map stating that residential use is prohibited within the boundaries of the site. The Navy will mark the land use restriction on a summary map on file with Northern Division's real estate section within 90 days of signing this ROD. NSA will also incorporate these restrictions into any real property documents necessary for sale or lease, in the form of a deed notice or lease notice, in the unlikely event that the Navy transfers the property. This notice will also include a discussion of

the National Priorities List (NPL) status of the site as well as a description of the contaminants of concern in the soil.

Within 90 days of signing the ROD, the NSA installation commander shall prohibit residential use (e.g., houses, schools, nursing homes, daycare, and other residential-style facilities) of the site by issuing an order or directive. The NSA installation commander shall be responsible for enforcing the prohibition on residential use.

The installation commander will provide annual monitoring/inspection of the site and shall certify annually to EPA and PADEP that there have been no violations of these restrictions. If a violation occurs, a description of the violation and corrective action to be taken will be reported immediately to EPA and PADEP. As early as possible, but at least 90 days prior to an anticipated major land use change or property transfer (by sale or lease), EPA and PADEP will be notified of such pending land use change or transfer.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment given the current industrial land usage. Land use will not change without notice to, and concurrence of, EPA and PADEP. The selected remedy complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action. The remedy is the most cost-effective of the alternatives considered in the focused feasibility study (FFS) (EA 1999b). The remedy uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for the site. However, because treatment of the principal threats at the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element. Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review of the remedy and its protectiveness will be conducted every 5 years after the commencement of the remedial action.

David A. Higgins
CAPT, SC, USN
Commanding Officer, Naval Support Activity

26 Sep 00
Date

Abraham Ferdas, Director
Hazardous Site Cleanup Division
U.S. EPA Region III

9/27/00
Date

DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION

Site 3, Ball Road Landfill and Burn Pits, is located at NSA, as shown in Figure 2. NSA occupies approximately 824 acres in Hampden Township and the Borough of Mechanicsburg, Pennsylvania. Land usage at NSA includes open storage areas, buildings/warehouses, roads, and railroads,

Site 3 is currently a cleared and paved area with no visual evidence of its past use as a disposal area (Figure 3). Bituminous pavement and limestone gravel cover the majority of the site. The pavement is sloped to the east for drainage purposes, with elevations ranging from 433 to 426 feet above mean sea level. Soil at Site 3 is classified as Urban Land Complex Hagerstown. The classification "Urban Land" indicates that the native soil types have been disturbed by human activities to the point that classification is not possible. The Hagerstown soil type is formed from weathered limestone.

The limestone and dolomitic bedrock that underlies Site 3 includes the Rockdale Run Formation under the majority of the site, with the northern portion underlain by the Pinesburg Station Formation and St. Paul Group. The Hogestown Fault, an east-west reverse thrust fault, is believed to lie just north of the Site 3 boundary. The aquifer beneath the site is unconfined (water table) and is recharged from rainwater infiltration. The ground water flow direction, as assessed by a tracer dye study at the site, is to the north/northeast. There is a ground water flow divide to the south of Site 3 that runs in an east-west direction across the southerly portion of NSA. Ground water enters Site 3 from the south.

As there are no surface water bodies on NSA, there are no aquatic ecosystems at or near Site 3.

Within NSA, there is minimal naturally occurring vegetation due to the industrialized setting. Most of the existing vegetation (lawn, shrubs, and trees) has been planted. Site 3 is mostly covered with bituminous pavement or limestone gravel. Given the limited available habitat, documented wildlife on NSA is minimal and can be classified as species typically found in urban settings. There are no known or threatened species on NSA (EA 1993a).

The land use in the areas surrounding NSA is mixed. To the north, along U.S. Route 11, there are industrial, residential, and recreational areas. Site 3 is located on the west-central portion of NSA. Use to the north and south is commercial and residential.

The Borough of Mechanicsburg is located immediately to the southwest of NSA and Mechanicsburg has a population of approximately 9,452 residents.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Site 3 is a former disposal area located on the west-central portion of NSA to the south of Brandy Lane (Figure 2). It is located northwest of South Gate and north of Ball Road. The site is approximately 7.5 acres. According to the Installation Assessment Study (IAS) report, the site was used from the mid-1940s to 1977 for the disposal of waste materials including solvents and lubricants, paints and varnishes, gasoline, and medical supplies. These waste materials were placed into two pits and burned. The Navy has removed the soil affected by these burning

operations. Site 3 is now a flat cleared area mostly covered with bituminous pavement (Figure 3). It is not currently being used. The planned future use of this site is for open storage.

In 1984, the Navy completed an IAS at NSA, which is equivalent to a Preliminary Assessment (PA) under CERCLA, to obtain information regarding potential waste disposal sites and to determine whether additional action was required. It was recommended in the IAS (Fred C. Hart Associates 1984) that a Site Inspection be performed at Site 3.

Site Inspection (SI)

The SI investigations (EA 1990) at Site 3 included sampling (at the locations shown on Figure 4) and laboratory analysis of soil and ground water. Twelve test borings were sampled through the overburden (unconsolidated soil and fill material overlying consolidated bedrock). Four of these borings were advanced into the limestone bedrock and completed as ground water monitoring wells. Hydrocarbon/solvent odor, metal debris, and various burned materials were evident in soil samples from two borings that were converted into overburden ground water monitoring wells. The overburden is comprised of silty clay and is predominantly native soil and soil fill. The depth to bedrock was determined to range from 3 to 23 ft, averaging 9.2 ft. The depth to ground water varies seasonally and is normally below the bedrock surface. Perched ground water was found in the former burn pit locations. Ground water flow direction is generally north/northeast.

Twenty-six soil samples taken from the test borings were submitted for laboratory analysis. Samples of ground water were taken from the four monitoring wells during three rounds of sampling. The samples were analyzed for EPA's Target Compound List (TCL) and Target Analyte List (TAL) substances.

Elevated levels of antimony, arsenic, barium, beryllium, cadmium, chromium, mercury, selenium, silver, and thallium (with respect to published background values) were found in subsurface soil samples taken at this site, as shown in Table 1.

Volatile organic compounds (VOCs) were found in several of 26 soil samples. These VOCs included gasoline and solvent components.

Nearly half of the subsurface soil samples were reported to contain semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs). Analytical results are shown in Table 2.

Soil sample analyses from the SI confirmed the presence of numerous organic compounds and metals in concentrations greater than potential applicable or relevant and appropriate requirements (ARARs) of federal and state environmental law. Many of these compounds and metals were also detected in ground water samples, particularly in the burn pit areas. Based on these results, the SI concluded that a Remedial Investigation should be conducted.

Remedial Investigation (RI)

Phase I of the RI (EA 1993a) at Site 3 dealt with ground water related issues. Eight deep monitoring wells were installed at Site 3 and Site 8 (which abuts Site 3) (Figure 4). One set of ground water samples was collected from these wells. A dye tracer study was done by injecting dye into two monitoring wells at the site, and tracking the direction of ground water flow by sampling nearby wells and streams for the dye. The ground water samples were reported to

contain similar organic compounds and metals as the ground water samples taken during the SI. The liquids burned in the burn pits were shown to have leaked into the underlying rock and ground water. A geophysical survey was done to evaluate areas in the limestone where ground water flows. A north-northeast trend of these features was found to pass beneath both burn pits.

Feasibility Study and Treatability Study

Additional soil samples were collected during a Feasibility Study (EA 1992 and 1993b) to further assess the organic compounds and metals in burn pit soil. Analytical results of six composited soil samples indicated that VOCs in three samples exceeded land disposal regulations. Metals concentrations did not exceed land disposal regulations. These VOCs, along with PCB concentrations from the SI that were greater than 50 mg/kg [a Toxic Substances Control Act (TSCA) regulatory level], were targeted for a Treatability Study.

Composite soil samples followed by discrete soil samples collected for the Treatability Study did not contain VOCs or PCBs greater than the Resource Conservation and Recovery Act (RCRA) land disposal regulations.

The Treatability Study was underway when PADEP indicated that certain siting and permitting requirements could be waived if it could be shown that the soil was acceptable for placement in a Class III landfill and backfilling would conform to Class III landfill requirements. Based on this information, the Navy discontinued the Treatability Study and conducted an updated Feasibility Study. Onsite bioremediation with onsite disposal was selected as the preferred cleanup method (EA 1993c).

Interim Remedial Action (IRA)

The IRA consisted of clearing equipment and spent building materials from the surface of the site and installing a fence around the remediation area. The area around each burn pit was graded prior to applying a new cover of crushed stone and asphalt. Utility areas, including a construction management area, sediment retention pond, and stormwater retention pond were constructed.

The fill material from Burn Pit No. 1 and most of the fill material from Burn Pit No. 2 was excavated. The majority of the soil from the burn pit excavations was used to form a biotreatment cell, which was a large pad of soil with a piping network across the top and a corresponding set of pipes across the bottom. Nutrients were circulated through the soil in water pumped onto the top of the soil and collected at the bottom. These nutrients enhanced the normal microbiological processes that can break down organic chemicals. The remaining soil was stockpiled and awaited treatment. Operations of the biotreatment cell commenced on 14 June 1995. The biotreatment cell operated for 120 days. Final sampling was conducted on 21 September 1995. Operation of the biotreatment cell was stopped because the sample results indicated that bioremediation did not successfully reduce the contamination in soil.

EPA became the lead regulatory agency when NSA (then called Navy Ships Parts Control Center) was placed on the NPL in 1994. After EPA's evaluation of Site 3, it was decided that additional soil samples should be collected from the excavated soil and unexcavated soil areas. These data (EA 1997a) were used to re-evaluate the criteria for backfilling the treated soil into the burn pits.

Backfill criteria were developed as part of a Focused Feasibility Study (FFS). This effort included extensive modeling of the effects on ground water concentrations if the soil were backfilled (EA 1998a). During the FFS, a decision was made that all soil and waste material should be removed from the site for offsite disposal. This was done as a removal action, which is a step in the CERCLA process.

Action Memorandum

The Action Memorandum (EA 1998b) contains the plans for removing burn pit related soil and disposing of it offsite. Performance standards, which are the soil cleanup values, were developed and presented in the Action Memorandum. The performance standards for 12 organic compounds (including VOCs, SVOCs, PCBs) and 9 metals were developed from several sources including modeling done during the IRA, site-specific and generic standards developed by EPA, the TSCA cleanup level for PCBs in an industrial use area, and the EPA model for lead.

Soil Removal Action

The removal action was undertaken between late Summer 1998 and Spring 1999 (EA 1999a). The soil in the biotreatment cell and other stockpiles was sampled and analyzed to develop waste profiles. These waste profiles were sent to disposal facilities for their acceptance. Soil from Site 3 was classified into three general waste streams:

1. Non-Hazardous Pennsylvania (PA) waste
2. TSCA waste
3. RCRA waste

A total of 47,000 tons of soil were removed from Site 3. Non-hazardous residual waste (three-fourths of the total) was disposed of at the Waste Management Facility in York County, Pennsylvania. The TSCA and RCRA wastes (the remaining one-fourth of the total) were disposed of at the Model City Facility in Niagra County, New York.

Once soil was excavated and removed for off-site disposal, the soil beneath the excavation was sequentially sampled and analyzed. For specific areas of excavation, the soil analyses were averaged and compared to the applicable cleanup standards. When average soil contamination was less than the cleanup standards, no more soil was excavated for off-site disposal. Ten confirmatory samples were collected and analyzed from Burn Pit No. 1. Soil affected by burn pit activities at Burn Pit No. 2 was more widespread, and an initial set of 14 confirmatory soil samples showed that more excavation was needed. Shallow soil to the east and south of Burn Pit No. 2 was excavated and disposed of offsite, and 10 additional confirmatory soil samples were taken, which met the performance standards. Sample locations are shown on Figure 5.

More than 3,000,000 gallons of water that had collected in the burn pits and site structures (sedimentation pond and stormwater retention pond) were treated onsite and discharged in compliance with a local permit to the Hampden Township sanitary sewer system.

The burn pits were backfilled with clean fill and crushed limestone boulders (that had been removed from the burn pits during the IRA). The sedimentation pond was removed and backfilled. In addition to crushed boulders, about 40,000 tons of soil and 10,000 tons of 2-inch limestone gravel were used to backfill the burn pits. The surface of the burn pit areas was finished with asphalt pavement to match the surrounding area (Figure 3).

HIGHLIGHTS OF COMMUNITY PARTICIPATION

A public meeting was held at the Hampden Township Municipal Building in Mechanicsburg, Pennsylvania on 31 May 2000. The Proposed Plan and Administrative Record were made available at the Mechanicsburg Area Public Library and at NSA Mechanicsburg, Pennsylvania. The public was invited to submit oral and/or written comments at the public meeting or in writing to NSA, in accordance with the public participation requirements of CERCLA Sections 113 (k)(2)(B) and 117(b). The 30-day comment period began on May 24, 2000, and ended on June 23, 2000. No comments were received during the comment period.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

This ROD documents the selected remedy for soil at Site 3. The selected remedy for Site 3 Soil is Institutional Controls. This site is one component of a comprehensive environmental investigation and cleanup being performed under the IR Program at NSA. Protectiveness of this action will be evaluated during the 5-year review process. Separate investigations and documentation will be undertaken for Site 3 ground water pursuant to another ROD.

SITE CHARACTERISTICS

Known Sources Of Contamination

Soil sampling was conducted during the SI, RI, and IRA, and after the soil removal action. Total soil (surface and subsurface) was considered in the human health risk assessment despite bituminous pavement and limestone gravel covering the majority of the site surface.

There is no surface water and sediment onsite, so these media were excluded from the human health risk assessment.

Site 3 ground water will be addressed as a separate operable unit.

Using data from 26 confirmatory soil samples analyzed during the soil removal action and 8 samples from SI locations (those not excavated during the IRA or soil removal action), concentration levels of several metals, SVOCs, and PCBs in one or more soil samples were found to exceed U.S. EPA Region III's Risk-Based Concentrations (RBCs) and published background values. In the risk assessment for the site, these substances were designated as constituents of potential concern (COPC):

<u>TAL</u>

- Aluminum
- Antimony
- Arsenic
- Beryllium
- Chromium
- Lead
- Manganese
- Thallium
- Vanadium

PCBS

- Aroclor 1248
- Aroclor 1260

Polycyclic Aromatic Hydrocarbons

- Benzo(a)pyrene
- Dibenz(a,h)anthracene

SUMMARY OF SITE RISKS

A human health risk assessment (EA 2000) was conducted to predict risks associated with exposure to COPC at Site 3.

Human Health Risk Analysis for Soil

The risk assessment evaluates the toxicity, or degree of hazard, posed by COPC related to the site. It involves identifying the pathways through which humans could come in contact with COPC and calculating potential risks associated with such contact. Separate calculations are made for COPC considered cancer causing (carcinogenic) and COPC that can cause adverse health effects other than cancer (non-cancer).

The NCP establishes acceptable levels of potential risk for CERCLA sites. For carcinogenic risk, the NCP states that the statistical probability of a risk increase from exposure should fall below or within a risk range of $1x10^{-6}$ (an increase of one case of cancer for 1 million people exposed) to $1x10^{-4}$ (one additional case per 10,000 people exposed).

EPA measures non-carcinogenic risk by the ratio of the COPC concentration at the point of exposure to the established safe concentrations known as reference doses (RfDs). If the ratio exceeds one (1.0), there may be concern for non-cancer health effects. This ratio is called the Hazard Index or HI. This is calculated by adding the hazard quotients (HQs), which are the effects of single contaminants in a single media (i.e., the sum of the HQs equals the HI). The HI provides a useful reference point for assessing the significance of multiple-contaminant exposures within a single medium or across media. RfDs, which are expressed in mg/kg-day, have been developed by EPA and are estimates of lifetime daily exposure of humans to chemicals that indicate potential adverse health effects.

Because the site is fully paved and used for open storage, there was no assessment of health risk for current conditions. The following groups of individuals were considered for future potential exposure to COPC:

- Future office workers
- Future construction workers
- Future adult and child trespassers
- Future resident adults and children

Although it is extremely unlikely that the area will ever become residential property, a residential exposure scenario was used for Site 3 soil. This scenario includes the highest intake of soil and the greatest amount of contact with soil and is, therefore, a conservative scenario. If risk under

this scenario is acceptable, then other scenarios with less potential for exposure will result in acceptable risk estimates. A residential exposure scenario includes exposure of adults and children to soil via ingestion, dermal contact, and inhalation of soil particulates in air. No surface water or sediment exists at Site 3, and, therefore, were not evaluated in the human health risk assessment. Site 3 ground water will be dealt with as a second operable unit in future documents.

The Navy, EPA, and PADEP considered human health risks associated with exposure to total (surface and subsurface) soil. Concentrations from 26 soil removal action confirmatory soil samples and the 8 unexcavated SI soil sample locations (Figure 5) were used to estimate the concentrations that potential future populations may encounter.

Cancer risks did not exceed the acceptable risk range for any of the potential future groups of individuals. Non-cancer risks were found to be acceptable (with a cumulative HI less than 1.0 for all groups except potential future resident children, For these unacceptable risks to a potential child resident, arsenic was the only analyte that had an HQ greater than 1.0. However, certain analytes can cumulatively affect certain organs in the body, and along with arsenic, antimony, chromium, and manganese contributed to the cumulative HI that ranged from 1.8 to 2.5 (EA 2000). Arsenic in Site 3 soil samples was also consistently greater than background arsenic concentrations.

For the foregoing reasons, total soil at Site 3 could be a human health concern to future child residents should the land use change from its current industrial usage to residential usage. This risk formed the basis for an FFS that was used to consider remedial alternatives.

Ecological Risk Screening

A basewide site visit involving the Navy, EPA, PADEP, and natural resources trustees took place on 05 August 1996. During this visit, agreements on several significant issues were reached, including identification of sites that did not merit further ecological evaluation. Site 3 was found not to merit further ecological evaluation because there is no permanent habitat on the site (EA 1997b).

DESCRIPTION OF ALTERNATIVES

Three alternatives were considered in the FFS for Site 3 soil (EA 1999b). A "No Action" alternative was considered, as required by the NCP. The FFS also included an evaluation of institutional controls (land use restrictions) and site remediation through soil excavation and disposal.

Alternative 1: No Action

Present Worth Cost: $0
Time to Implement: None

The NCP requires that a "No Action" alternative be considered to establish a baseline or reference point against which each of the alternatives can be compared. In the event that the other identified alternatives do not offer substantial benefits in the reduction of toxicity, mobility, or volume of the COPC, the "No Action" alternative may be considered a feasible approach.

This alternative leaves the subsurface soil undisturbed. Risks to potential future resident children would remain.

Alternative 2: Institutional Controls

Present Worth Cost: $34, 000 (Estimated administrative cost associated with preparation of deed notice, asphalt maintenance, annual monitoring and certification over a 5-year period)

Time to Implement: Established within 90 days of the signed ROD and enforced at time of conveyance of the property

This alternative will prohibit the use of the property for residential purposes (e.g., houses, schools, nursing homes, daycare, and other facilities intended for residential use). Within 90 days of signing this ROD, the Navy will mark the land use restriction on the Navy summary map of NSA. In addition, in the event that the property is transferred to a non-Navy party, a deed notice and a copy of this ROD will be appended to the deed for the property and filed with the applicable Recorder of Deeds before such conveyance occurs.

Within 90 days of signing this ROD, the NSA installation commander will prohibit residential use (e.g., houses, schools, nursing homes, daycare, and other residential-style facilities) of the site by issuing an order or directive. The NSA installation commander will be responsible for enforcing the prohibition on residential use.

NSA will conduct annual field inspections of the site to determine whether current land use remains protective and consistent with the restrictions on residential use selected in this ROD. The installation commander will certify continued compliance with the residential use restriction in an annual report to the Chief of the Federal Facilities Branch, Hazardous Site Cleanup Division at the EPA and the Chief of the Hazardous Sites Cleanup Section, Environmental Cleanup Program at PADEP. If a violation occurs, a description of the violation and actions to be taken to correct the violation and to ensure such violation is never repeated will be reported in writing within 10 business days of discovery of the violation to EPA and PADEP.

NSA will give notice to EPA and PADEP and obtain their written concurrence whenever NSA anticipates a "major change in land use" (defined below) at the site. The installation will notify the regulatory agencies as soon as a major land use change is anticipated in order to allow sufficient time for regulatory review and amendments to remedy selection documents, such as this ROD, if needed. Such notifications should be made to the regulatory agencies at least 90 days prior to a major change in land use and will include:

a. An evaluation of whether the anticipated land use change will pose unacceptable risks to human health or environment or negatively impact the effectiveness of the remedy,

b. An evaluation of the need for any additional remedial actions resulting from the anticipated land use changes to ensure the same degree of protectiveness provided by the remedy selected in this ROD, and

c. A proposal for any necessary changes to the selected remedial action and the anticipated procedural requirements for the proposed change (e.g., amending this ROD).

NSA will notify EPA and PADEP immediately upon discovery of any unauthorized major change in land use at the site.

NSA will give advance (at least 90 days) notice to EPA and PADEP in the event NSA contemplates transfer, by sale or lease, of any portion of the site.

For the purpose of this ROD, the following are considered "major changes in land use":

a. A change in land use that is inconsistent with the exposure assumptions in the human health risk assessment that is the basis for the land use control objectives above. Any changes from industrial or commercial land use to a land use resulting in greater public exposure to the site such as housing, schools, hospitals, day care centers, or recreational land is a major change in land use.

b. Any action that may disrupt the effectiveness of the remedial action.

c. Any other action that might alter or negate the need for land use controls. An example is any plan to actively remediate any part of the site in order to allow unrestricted use.

This alternative addresses the exposure pathway by preventing residential use. This alternative seeks to establish procedures for the future prevention of risk.

Alternative 3: Site Remediation (Soil Excavation and Disposal)

Present Worth Cost: $362,000
Time to Implement: 6 months

Under this alternative, the area of elevated arsenic concentrations would be excavated and the soil transported offsite for subsequent disposal at a licensed residual waste facility. Following excavation and removal of approximately 4,440 cubic yards of waste fill, the excavation would be backfilled with clean soil. This procedure eliminates the COPC, thereby eliminating the risk.

COMPARATIVE ANALYSIS OF ALTERNATIVES

Each of the three alternatives summarized in the FFS have been evaluated with respect to the nine evaluation criteria set forth in the NCP, Title 40 Code of Federal Regulations (CFR) Section 300.430(e)(9)(iii). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria

Threshold Criteria

Overall Protection of Human Health and the Environment

A primary requirement of a selected alternative is to be protective of human health and the environment. A remedy is protective if it reduces current and potential risks posed by each exposure pathway at the site to acceptable levels.

Alternative 1 (No Action) would not effectively reduce future risk to human health at Site 3 because it would allow unrestricted future use of the land. Potential future child residents on the site could possibly experience unacceptable human health risks if exposed to subsurface soil. Because this alternative does not meet the threshold criterion of protection of human health and the environment, it will not be considered further in this analysis.

Alternatives 2 and 3 are protective of human health and the environment. Both alternatives reduce the potential for exposure to site contaminants; Alternative 2 prohibits residential use of the site as it presently exists. In addition, the Navy will annually inspect the site, and annually certify to the EPA that there have been no violations of the prohibition. Alternative 3 requires the removal of contaminated soil and backfilling the area with clean soil.

Although Alternatives 2 and 3 are both effective in protecting human health and the environment, each involves different tradeoffs as to other factors, such as implementability and cost, which are discussed below.

Compliance With Applicable or Relevant and Appropriate Requirements

Alternative 2 (institutional Controls) will ensure that human health risks from the site are kept within acceptable limits (i.e., excess cancer risk between 10^{-6} and 10^{-4} and HI less than or equal to 1.0). This alternative will comply with Federal and State requirements that are applicable or relevant and appropriate.

Although not the selected remedy, the action associated with Alternative 3 would comply with the ARARs presented in the FFS (EA 2000).

Primary Balancing Criteria

Long-Term Effectiveness and Permanence

Alternative 2 does not remove the contaminated soil at the site. Effectiveness and permanence is based on the prevention of residential exposure to the subsurface soil. The notice on the Navy summary map or subsequent deed will specify the potential for unacceptable risk so that if the area is graded or excavated, soil can be handled or disposed in an appropriate way so as to not pose unacceptable risk for future child residents. In addition, annual inspection and certification will demonstrate to EPA and PADEP that these restrictions are not violated. If a violation has occurred, a description of the violation and corrective actions to be taken will be provided. These safeguards help to ensure that the restrictions will be effective in the long-term.

Alternative 3 provides a more permanent and effective long-term than Alternative 2. Alternative 3 removes all contaminated soil from the site, thereby eliminating the possibility of any unacceptable risks to potential child residents at the site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Section 121 (b) of CERCLA, 42 U.S. Code (U.S.C.) Section 9621(b), and 40 CFR Section 300.430(e)(a)(iii)(D) establish a preference for remedial actions which include treatment that permanently and significantly reduces the toxicity, mobility, or volume of contaminants.

The contaminants at Site 3 were found to be relatively immobile in soil. Alternatives 2 and 3 would not reduce toxicity, mobility, or volume through treatment. Alternative 3 would remediate (excavate and dispose) the 4,440 cubic yards of affected soil, thereby reducing the toxicity and volume of contaminants onsite through removal, not treatment. Thus, neither alternative is superior in the context of this criterion.

Short-Term Effectiveness

Alternative 2 is more effective in the short term because it poses no short-term health risk because it does not involve site disturbance.

Alternative 3 could pose an increased short-term health risk to onsite construction and maintenance workers and other onsite personnel during earth-moving activities during remediation. These activities have the potential to make subsurface soil available for exposure. These short-term risks would be minimized using standard safety measures.

Implementability

This evaluation criterion addresses the difficulties and unknowns associated with implementing each alternative, including the ability and time necessary to obtain the required permits and approvals and the availability of services and materials.

Alternative 2 would pose no implementability problems other than those associated with drafting and appending the notice to the deed, annually inspecting the site, and annually certifying compliance. Alternative 2 is easier to implement given the intended land use, which is for industrial purposes. Alternative 2 would avoid any risks involved with excavating and disposing of contaminated soils.

Excavation of wastes, described in Alternative 3, would require additional sampling and waste characterization to determine the boundaries of soil to be excavated and the appropriate landfill(s) for disposal. Excavation would require the removal, disposal and re-installation of the asphalt cover, making Alternative 3 more difficult to implement than Alternative 2.

Cost

Evaluation of costs of each alternative includes the calculation of direct and indirect costs, calculated on a present-worth basis. The total present worth of Alternatives 2 and 3 have been calculated for comparative purposes and is presented below:

Alternative	Total Present-Worth Cost
2	$34,000
3	$362,000

Direct capital costs include costs of construction, equipment, building and services, and waste disposal. Indirect capital costs include administrative expenses, engineering expenses, startup and shutdown, and contingency allowances.

Modifying Criteria

State Acceptance

The Commonwealth of Pennsylvania, represented by PADEP, concurs with the selected remedy.

Community Acceptance

Community acceptance of the preferred alternative was evaluated after the public comment period, which ended on 23 June 2000. There were no comments from the public on the Proposed Plan during the comment period.

SELECTED REMEDY

Based on the comparison of the nine evaluation criteria for each of the alternatives in the FFS, the Navy, EPA, and PADEP recommend the selection of Alternative 2: Institutional Controls. Alternative 2 meets the threshold criteria of overall protection of human health and the environment. In considering the balancing criteria, the Navy believes that Alternative 2 can be readily implemented and minimizes short-term impacts at a reasonable cost. The Navy considers this alternative to be the most appropriate for short- and long-term management to prevent or limit exposure to COPC in soil. Based on the balance of tradeoffs among alternatives and the need to handle affected soil only in potential future residential development, Alternative 2 is also the most practical. Residential development is not expected under current and anticipated future land use conditions. NSA is an active military installation with no plans for closure in the foreseeable future. In addition, a land use restriction, annual inspection, and certification procedures will, over time, achieve long-term effectiveness and permanence.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, given the current industrial land use. Only one chemical-specific ARAR applies to the remedy selected for the site. The federal PCB cleanup level for bulk PCB remediation waste in a low-occupancy area is 25 ppm (or less), pursuant to regulations at 40 C.F.R. Part 761.61 (a)(4)(i)(B). As long as the site remains an industrial-use area, the ARAR is met. Land use will not change without notice to, and concurrence of, EPA and PADEP. The selected remedy complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action. This remedy is the most cost-effective of the alternatives considered in the FFS. This remedy uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this site, However, because treatment of the principal threats of the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element. Because this remedy will result in hazardous substances

remaining onsite above health-based levels, a review of the remedy and its protectiveness will be conducted every 5 years after the commencement of the remedial action.

EXPLANATION OF SIGNIFICANT CHANGES

The Proposed Plan for Site 3 Soil was released for public comment on 24 May 2000. Alternative 2 Institutional Controls was identified in the Proposed Plan as the preferred alternative. Since there were no written and verbal comments submitted during the public comment period, it was determined that no significant changes to the remedy, as it was identified in the Proposed Plan, were necessary.

RESPONSIVENESS SUMMARY

The selected remedy for Site 3 Soil is the implementation of institutional controls by restricting potential future residential development. No written comments, concerns, or questions were received by the Navy, U.S. EPA, or the Commonwealth of Pennsylvania during the public review period from 24 May 2000 to 23 June 2000. A public meeting was held on 31 May 2000 to present the Proposed Plan for Site 3 Soil and to answer any questions on the Proposed Plan and on the documents in the information repositories. No questions were asked during the meeting concerning the selected remedy for the site. The Navy did, however, receive comments approximately 25 days after the close of the comment period, which pertained in their entirety to the ground water at the site. Ground water has been designated as OU-2 and will be addressed in a future proposed plan and ROD. The comments received regarding the ground water will be considered in the context of the pending OU-2 decision documents and addressed in the Responsiveness Summary of the Site 3 OU-2 ROD.

The Pennsylvania Department of Environmental Protection, representing the Commonwealth of Pennsylvania, concurs with the selected remedy.

TABLE 1 - SITE 3 SOIL: ANALYTICAL VALUES THAT EXCEEDED PUBLISHED BACKGROUND VALUES FOR METALS

Compound	Detections Exceeding National Background Levels	National Background Level (mg/kg)[1]	No. of Detections Exceeding Regional Background Levels	Regional Background Level (mg/kg)[2]
Antimony	15/26	8.60	26/26	1.00
Arsenic	05/26	42.00	21/26	8.25
Barium	00/26	5,000.00	02/26	600.00
Beryllium	01/26	7.00	00/26	18.00
Cadmium	19/26	1.82	00/26	--
Chromium	00/26	1,500.00	01/26	85.00
Mercury	00/26	4.60	11/26	0.17
Selenium	03/26	0.62	03/26	0.60
Silver	03/26	7.80	03/26	7.80
Thallium	09/26	0.80	09/26	0.80

1 Source: Composited from Ure and Berrow (1982).
2 Source: Shackette and Boerngen (1984).

TABLE 2 - SITE 3 SITE INSPECTION: SVOCs, PESTICIDES or PCBs DETECTED IN SITE 3 SOIL SAMPLES[3]

Compound	Detections	EPA Region III Risk Based Concentration Residential Scenario (mg/kg)	Concentration Range (mg/kg)
SVOCs			
PAHs	13/26	87	51.99 - 68,660
1,2,4-Trichlorobenzene	04/26	780,000	56.87 – 380
1,4-Dichlorobenzene	02/26	27,000	51.05 - 14,000
2-Methylnaphthalene	05/26	1,600,000	660 - 27,946
Benzoic Acid	05/26	310,000,000	38.72 - 11,000
Bis(2-ethylhexyl)phthalate	20/26	46,000	46.04 - 4,000
Di-n-butylphthalate	11/26	7,800,000	45.77 – 490
Di-n-octylphthalate	01/26	1,600,000	99.59
Isophorone	03/26	670,000	460 - 1,448.90
N-nitroso-di-n-propylamine	01/26	91	2,316.40
Benzidine	01/26	2.80	11,000
Dimethylphthalate	01/26	780,000,000	17,000
Dibenzofuran	01/26	310,000	56.91
Pesticides			
4,4'-DDD	03/26	2,700	260 - 460
4,4'-DDE	07/26	1,900	13 - 890
4,4'-DDT	08/26	1,900	10 - 1,800
Alpha-chlordane	01/26	1,800	103
Gamma-chlordane	01/26	1,800	95
Heptachlor epoxide	02/26	70	210 - 2,012
PCBs			
Aroclor ! 1016	01/26	5,500	110
Aroclor ! 1248	02/26	320	6,800 - 240,000
Aroclor ! 1260	10/26	320	304 - 160,000

3 Sampling result shown prior to the 1998 removal action.

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GLOSSARY

Action Memorandum: A document that contains the process for implementing a near-term action to address the release of a hazardous substance.

Administrative Record: A body of documents that form the basis for the selection of a CERCLA response action and which demonstrates the public's opportunity to participate in and comment on the selection process.

Applicable or Relevant and Appropriate Requirements (ARARs): Related federal and state environmental statues, laws, or provisions. Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or other limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

Aroclor 1248 and 1260: Commercial mixtures of polychlorinated biphenyls (PCB) historically used as dielectric fluid in electrical transformers.

Benzo(a)pyrene: A polycyclic aromatic hydrocarbon (PAH) that appears as pale yellow crystals in a pure form. This organic compound is a common by-product of petroleum processing or combustion.

Bioremediation: The use of micro-organisms or microbial processes to detoxify and degrade environmental contaminants.

Carcinogenic: Causing or inciting cancer.

Comprehensive Environmental Response, Compensation. and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and reauthorization Act (SARA). The act created a special tax that goes into a Trust Fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Navy compliance with CERCLA/SARA (see IR Program) is funded by the Department of Defense under the defense Environmental Restoration Fund.

Constituents of Potential Concern (COPC): Compounds or analytes identified as a possible source of risk based upon a comparison between compound concentrations and established screening levels (e.g., Federal Drinking Water Standards).

Dibenzo(a,h)anthracene: A polycyclic aromatic hydrocarbon (PAH) that appears as silvery crystals in a pure form. This organic compound is a common by-product of petroleum processing or combustion.

Ecological Risk Screening: The qualitative evaluation to assess the risk posed to ecological receptors by the presence, potential presence, and/or use of specific COPC.

Feasibility Study (FS): Report that summarizes the development and analysis of remedial alternatives considered for the cleanup of CERCLA sites. Focused Feasibility Studies are for sites with conditions that allow a limited number of alternatives to be considered.

Geophysical Survey: The use of electromagnetics, sound waves, radio waves, nuclear particles and waves, and gravity to identify structure and composition of the subsurface.

Ground Water: Free water located beneath the ground surface in pores of materials such as sand, soil, gravel, and in cracks or solution features in bedrock. Often serves as a source of drinking water.

Hazard Index (HI): A number indicative of non-carcinogenic health effects which is the ratio of the existing level of exposure to an acceptable level of exposure. A value equal to or less than one indicates that the human population is not likely to experience adverse effects.

Hazard Quotient (HQ): The ratio of a single substance exposure level over a specified time period to a reference dose for that substance derived from a similar exposure period.

Human Health Risk Assessment: The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health by the presence or potential presence and/or use of specific COPC.

Installation Restoration (IR) Program: A component of the Defense Environmental Restoration Program created under CERCLA regulations and funded by the Department of Defense. The purpose of the IR Program is to identify, assess, characterize, and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills at military activities.

National Priorities List: EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under CERCLA.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The federal regulation that guides determination of the sites to be corrected under the CERCLA program and the program to prevent or control spills into surface water or other portions of the environment.

Perched Ground Water: Water that is held above the water table by a geologic structure such as a clay layer.

Pesticides: Substances or mixtures of substances intended for preventing, destroying repelling, or mitigating any pest, e.g., rats, weeds, or mosquitoes.

Polychlorinated Biphenyls (PCB): A group of 209 organic compounds comprised of biphenyl molecules on which two or more chlorine atoms have been attached. PCB were manufactured for many years for use as dielectric fluids in electrical transformers and capacitors due to their stability, low vapor pressure, low flammability, high heat capacity, and low electrical conductivity.

Polycyclic Aromatic Hydrocarbons (PAH): Organic compounds composed of two or more fused benzene rings. These compounds are common by-products of petroleum processing or combustion.

Preliminary Assessment: The process of collecting and reviewing available information about a known or suspected waste site or release.

Record of Decision (ROD): A ROD is a public document which explains the cleanup alternative to be used at a CERCLA site. The ROD is based on technical and financial analyses generated during the Remedial Investigation/Feasibility Study (RI/FS) and on consideration of the public comments and community concerns.

Remedial Investigation (RI): The RI is prepared to report the type, extent, and potential for transport of constituents of potential concern at a hazardous waste site,and directs the types of cleanup options that are developed in the Feasibility Study (FS).

Resource Conservation and Recovery Act (RCRA): Federal regulations for hazardous and non-hazardous waste disposal.

Risk-Based Concentrations (RBCs): EPA Region III has developed this list of concentration levels for screening analytical data from CERCLA sites to identify COPC.

Semivolatile Organic Compounds (SVOC): A group of organic compounds composed primarily of carbon and hydrogen that are characterized by their low volatility. SVOC include substances that are contained in hydrocarbon products like asphalt, oil, and tar.

Site Inspection (SI): The initial intrusive investigation at a site to assess presence or absence of contaminants.

Superfund Amendments and Reauthorization Act : A modification to CERCLA that established a fund to back the cleanup of abandoned hazardous waste sites.

Target Analyte List (TAL): A list of inorganic analytes including naturally occurring elements and cyanide which EPA has identified for use in assessing potential hazards at CERCLA sites.

Target Compound List (TCL): A list of organic compounds including VOC, SVOC, pesticides, and PCB which EPA has identified for use in assessing potential hazards at CERCLA sites.

Toxic Substances Control Act (TSCA): Federal regulations that allow EPA to review risks to health or the environment prior to a chemical being manufactured.

Treatability Study: Part of a Feasibility Study that allows the collection of additional data on a waste that allows a more accurate assessment of potential remedial methods.

Volatile Organic Compounds (VOC): A group of organic compounds composed primarily of carbon and hydrogen that are characterized by their tendency to readily evaporate (or volatize) into the air from water or soil. VOC include substances that are contained in common fuels, solvents, and cleaning fluid.

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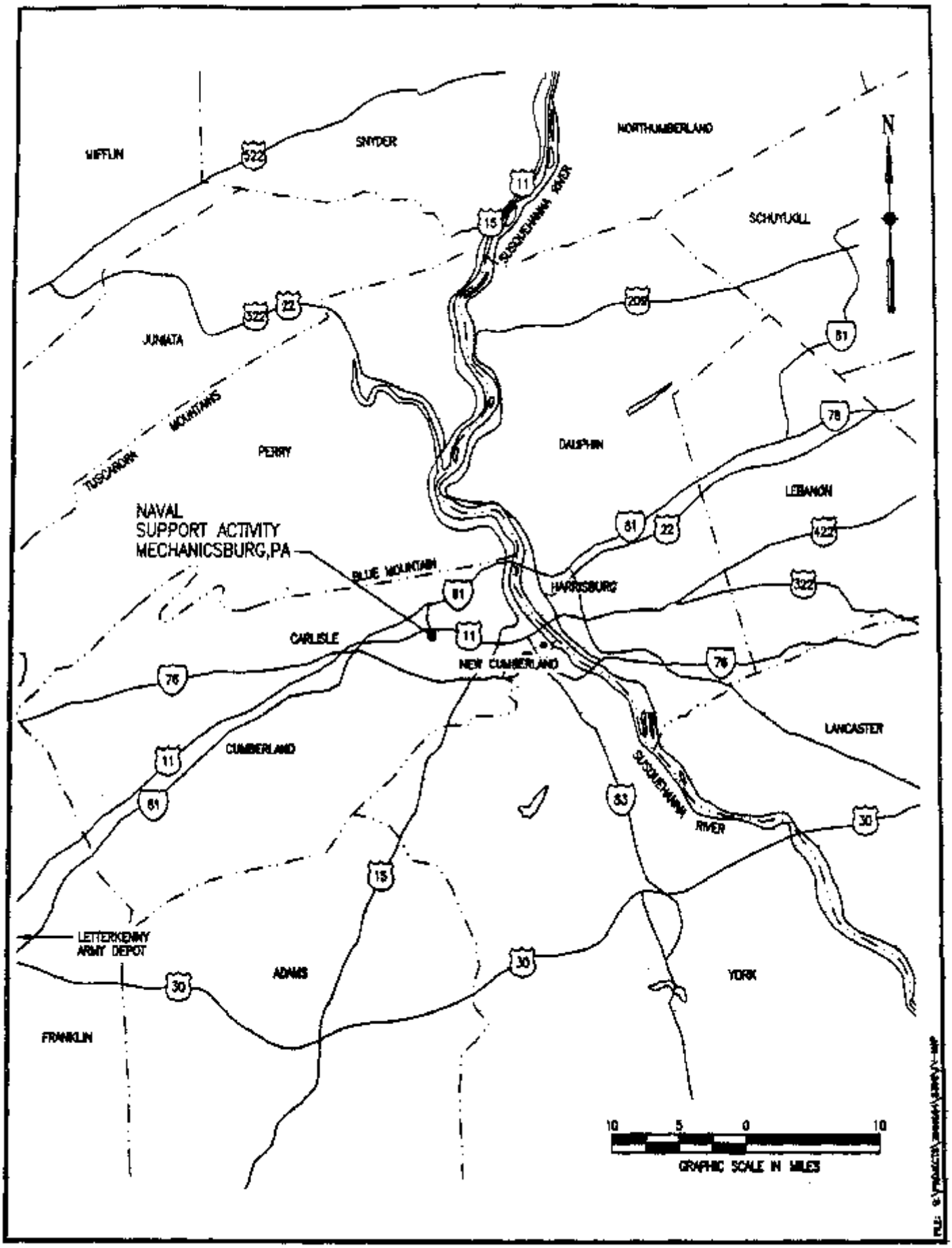

Figure 1. NSA LOCATION MAP

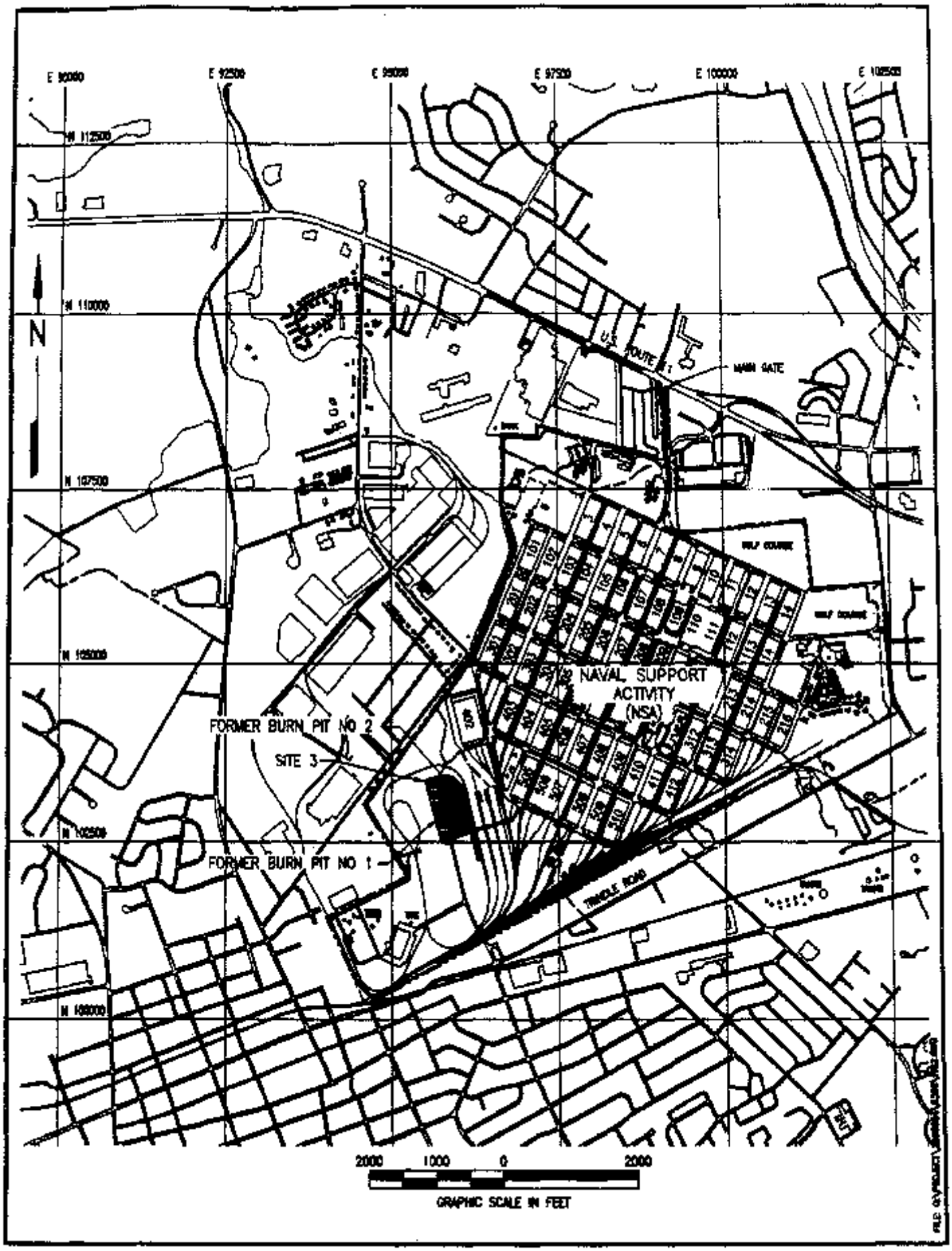

Figure 2. SITE 3 LOCATION MAP

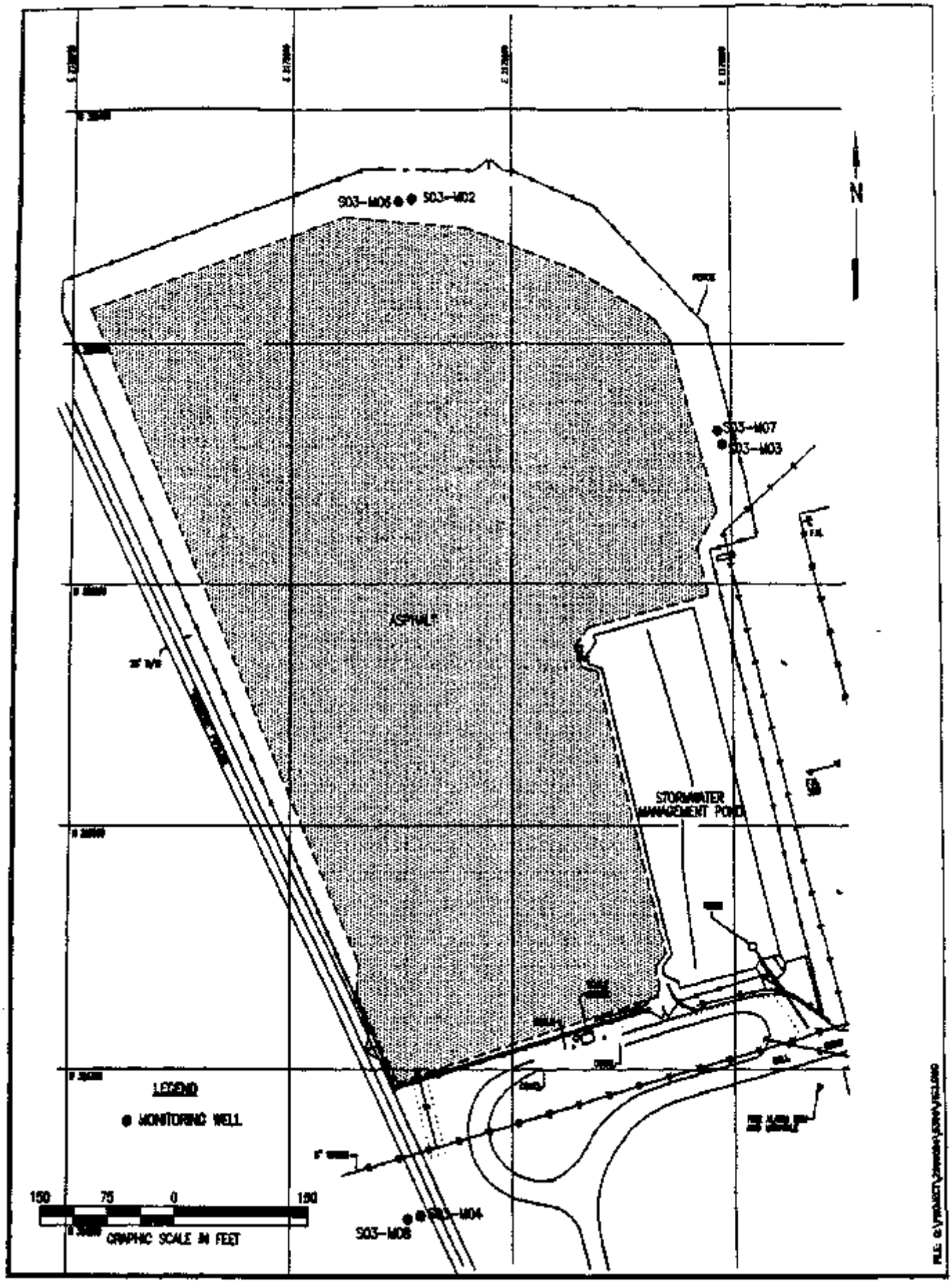

Figure 3. CURRENT SITE 3 CONDITION

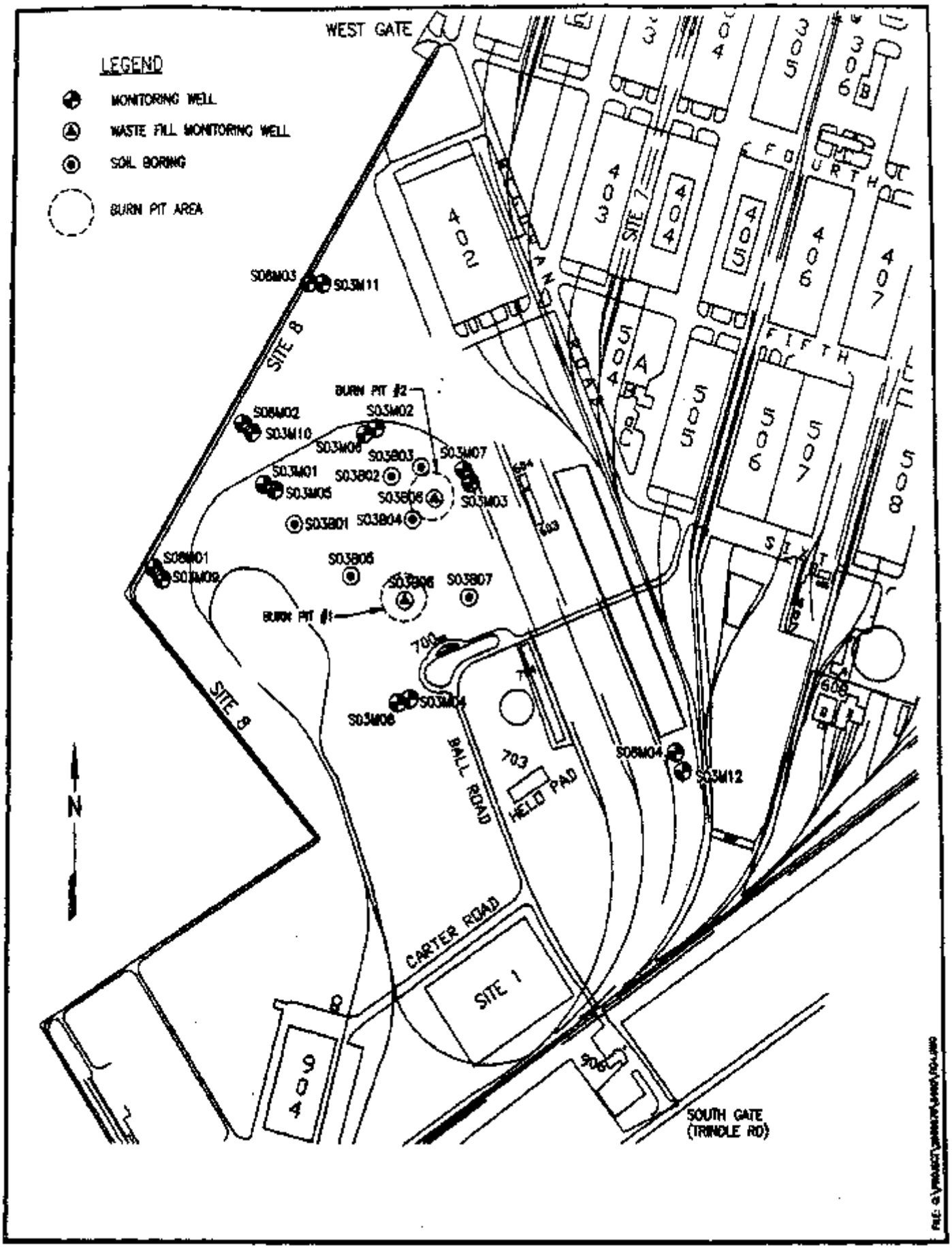

Figure 4. SITE 3 SI AND RI SAMPLE LOCATIONS

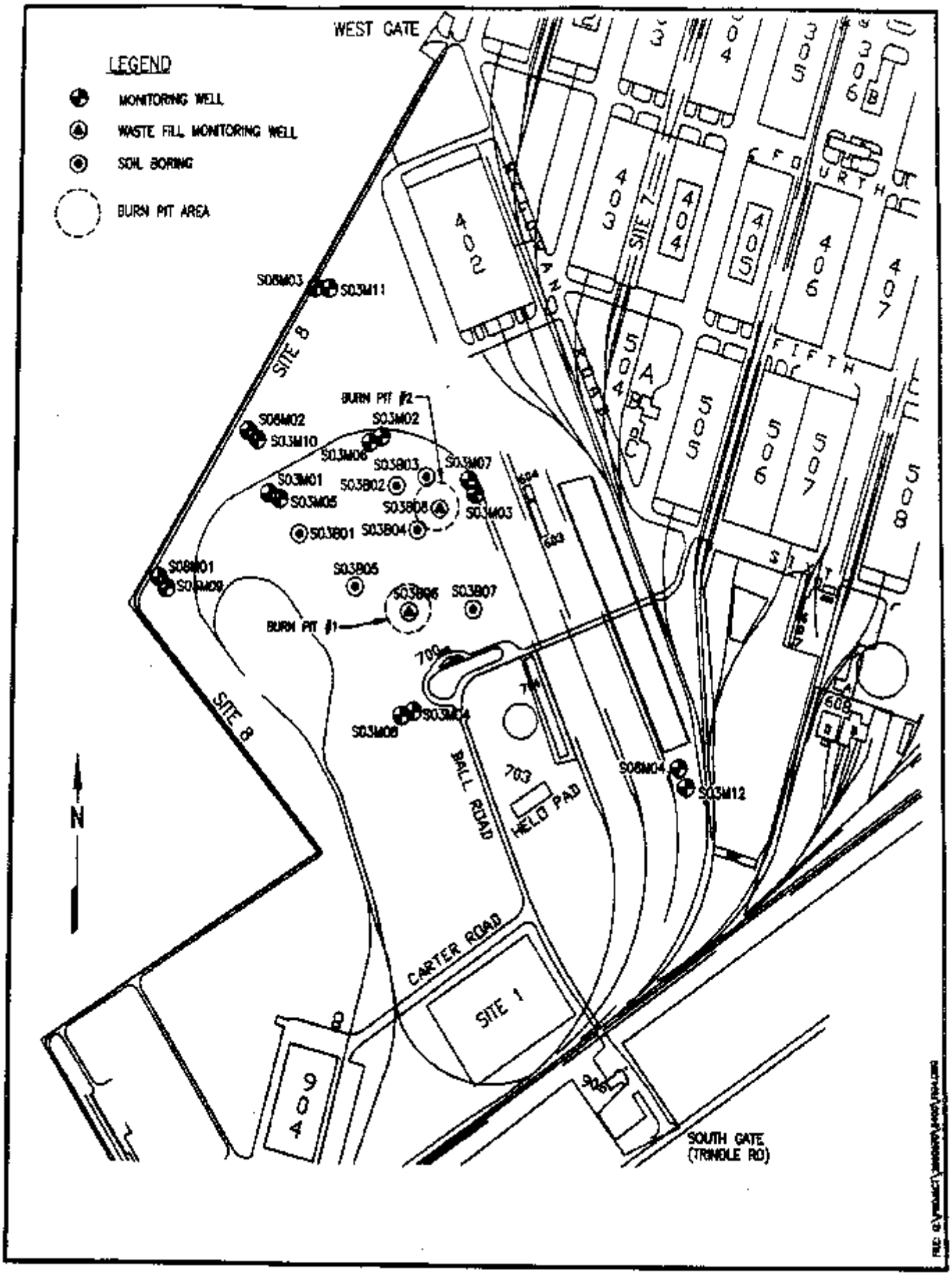

Figure 4. SITE 3 SI AND RI SAMPLE LOCATIONS

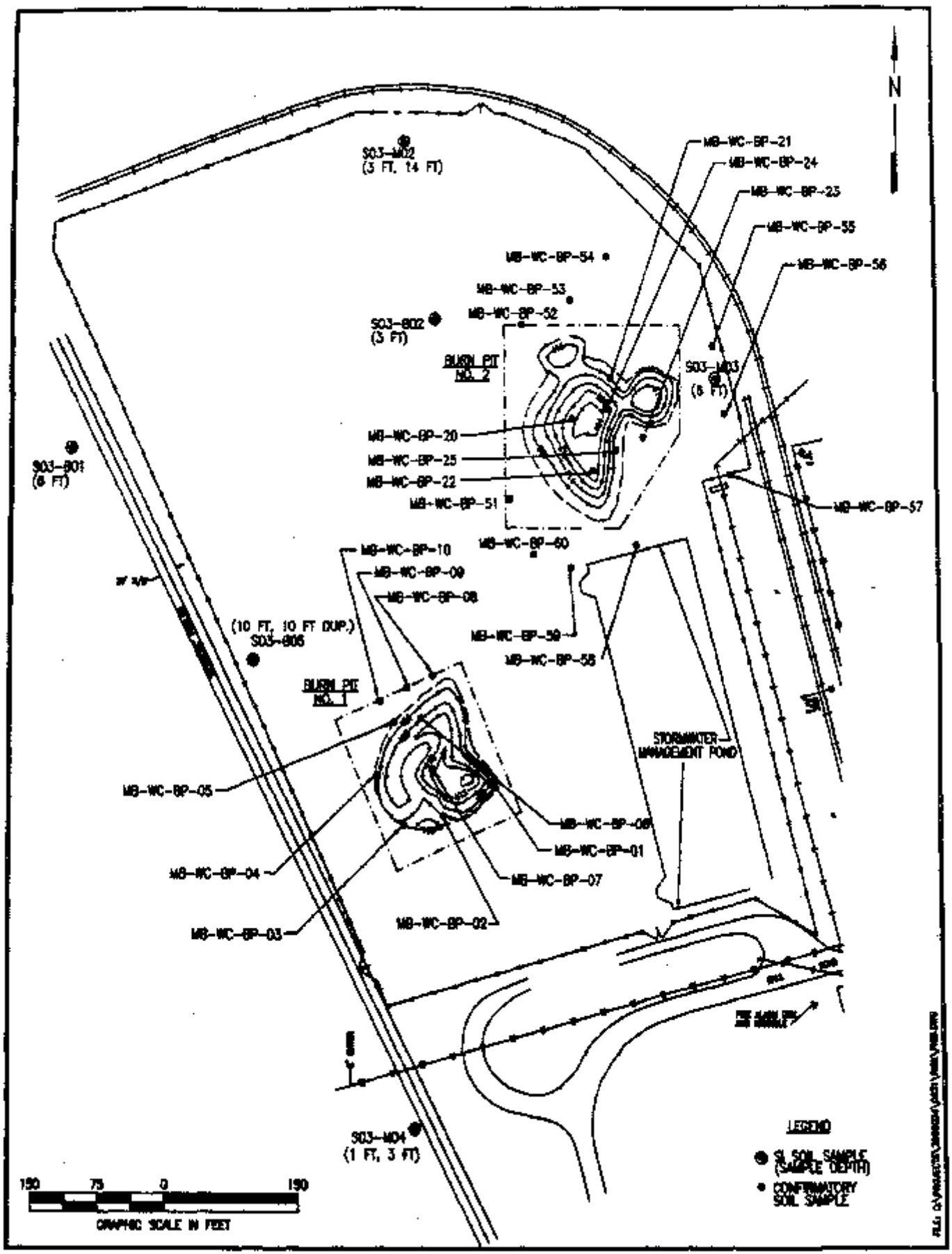

Figure 5. SAMPLE LOCATIONS USED IN THE POST SOIL REMOVAL HUMAN HEALTH RISK ASSESSMENT