Proposed Remedial Action Plan
Site 4, Landfill D

St. Juliens Creek Annex
Chesapeake, Virginia

May 2004

1 Introduction

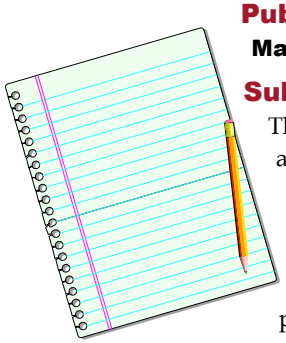
This **Proposed Remedial Action Plan** identifies the Preferred Alternative for addressing potential contamination at **Site 4**, Landfill D (formerly called Dump D), at St. Juliens Creek Annex (SJCA), and provides the rationale for this preference. In addition, this Proposed Remedial Action Plan includes summaries of other cleanup alternatives evaluated for use at Site 4.

This document is issued by the U.S. Department of the Navy (Navy), the lead agency for site activities, and the **U.S. Environmental Protection Agency (USEPA)** Region III, in consultation with the **Virginia Department of Environmental Quality (VDEQ)**, the support agencies. The Navy, in consultation with the VDEQ and with the concurrence of USEPA, will make the final decision on the remedial approach for Site 4 after reviewing and considering all information submitted during the 30-day **public comment period**. The Navy and USEPA, in consultation with VDEQ, may modify the Preferred Alternative or select another **remedial action** based on new information or public comments. Therefore, public comment on the Preferred Alternative is invited and encouraged. Information on how to participate in this decisionmaking process is presented in Section 10.

The Navy is issuing this Proposed Remedial Action Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**. This Proposed Remedial Action Plan summarizes information that can be found in greater detail in the Final Remedial **Investigation/Human Health Risk Assessment/Ecological Risk Assessment (RI/HHRA/ERA**) Report for Sites 3, 4, 5, and 6 (March 2003), the Final **Feasibility Study (FS)** for Site 4 (March 2004), and other documents contained in the Administrative Record file and Public Repositories for SJCA (see Section 9). This plan provides the following:

- Site background and summary of previous investigations (Section 2)
- Site characteristics and a discussion of the nature and extent of contamination (Section 3)
- Scope and role of response action (Section 4)
- Summary of site risks (Section 5)
- Remedial action objectives (Section 6)
- Summary of alternatives (Section 7)
- Evaluation of remedial alternatives (Section 8)
- Preferred Alternative rationale (Section 9)
- Opportunities for public participation (Section 10)
- Glossary defining terms used in this document (words included in the glossary are identified in **bold** print the first time they appear in the text)

Mark Your Calendar for the Public Comment Period



Public Comment Period
May 12 – June 12, 2004

Submit Written Comments
The Navy, EPA, and VDEQ will accept written comments on the Proposed Remedial Action Plan during the public comment period. To submit comments or obtain further information, please refer to the insert page.

Attend the Public Meeting
May 17, 2004

Time - 4:30 pm
Place - Major Hillard Library
824 Old George Washington Hwy N
Chesapeake, Virginia 23323

The U.S. Navy will hold a public meeting to explain the Proposed Remedial Action Plan and all of the alternatives presented in the Site 4 Feasibility Study. Verbal and written comments will also be accepted at this meeting.

Location of Information Repository

For more information about Site 4, see the Public Repository at the following location:

Major Hillard Library
824 Old George Washington Hwy N
Chesapeake, VA, 23323
Phone: 757.382.3600

2 Site Background

2.1 Site Description and Background

The SJCA facility is situated at the confluence of St. Juliens Creek and the Southern Branch of the Elizabeth River in the City of Chesapeake in southeastern Virginia (Figure 1). The facility covers approximately 490 acres and includes administrative buildings, wharf areas on the Southern Branch of the Elizabeth River, a central heating plant, numerous non-operational industrial facilities, and miscellaneous structures.

The facility is bordered on the north by the Norfolk and Western Railroad, the City of Portsmouth, and residential areas; on the west by residential areas; on the south by St. Juliens Creek; and on the east by the Southern Branch of the Elizabeth River. Most surrounding areas are developed and include residences, schools, recreational areas, and shipping facilities for several large industries. The Norfolk Naval Shipyard is located approximately 1 mile north. Some undeveloped areas surround the facility. In August 2000, SJCA was placed on USEPA's **National Priorities List (NPL)**.

Site 4, Landfill D, is located in the northeastern portion of SJCA. Although the areal extent of Site 4 was previously reported to be about 5 acres, the site actually covers an estimated 10 acres (Figure 2). A review of historical aerial photographs and site reconnaissance during Phase I of the **Remedial Investigation (RI)** showed that Site 4 extends further west than previously thought.

The disposal history at Site 4 is based on information provided in the **Initial Assessment Study (IAS)** conducted in 1983, the Phase II **Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)** conducted in 1989, and a review of historical aerial photographs. Though SJCA has been active in ordnance related activities, there is no record of ordnance material being disposed at the site. The first indication of activity at Site 4 is a trench identified on a historical aerial photograph from 1961. The trench was approximately 1,000 feet long and was located parallel to and about 500 feet north of Blows Creek. The original trench and others were filled with trash, wet garbage, and soil from subsequent trenches. It is not known how many trenches were eventually dug, but based on a review of historical aerial photographs, there appeared to have been only two trenches.

Figure 1 - Base Location Map

The IAS indicates that around 1970, sanitary landfill operations began at Site 4 in the marshes of Blows Creek. Primarily trash and wet garbage were disposed of. Sanitary landfill operations continued until 1976, at which time trash and garbage were hauled to an off-site facility and inert material was then disposed of at the landfill. The RFA indicates that refuse was disposed of at Site 4 between 1970 and 1981. The wastes managed were primarily trash, wet garbage, construction material, and out-dated civil defense storage areas. Although the RFA indicated that some solvents, acids, bases, and polychlorinated biphenyls (PCBs) were disposed of at Site 4, it is assumed that these materials were disposed of prior to 1976 as the IAS states that only inert material was disposed of after 1976. Wastes disposed of at Site 4 were estimated at 1,500,000 cubic feet. According to Base Public Works Center personnel, the PCBs most likely came from ballast containers for fluorescent light fixtures and it is not known whether or not these ballasts were sealed units.

Sample results from the RI conducted from 1997 to 2001 do not indicate the presence of chlorinated solvents or hazardous materials in soil or groundwater at Site 4. Based on the findings of the RI and historic disposal dates, Site 4 does not require closure as a hazardous waste landfill.

2.2 Summary of Previous Investigations

Previous basewide investigations include the IAS, dated August 1981; the Phase II RFA, dated March 1989; and the Relative Risk Ranking (RRR) System Data Collection Report, dated April 1996. Additionally, an RI was performed at Site 4 in conjunction with Sites 3, 5, and 6. The SJCA Sites 3, 4, 5, and 6 RI, dated March 2003, was conducted from November 1997 to August 2001. Subsequent to the RI, a **Baseline Ecological Risk Assessment (BERA)** for Blows Creek is currently being conducted and an FS was completed in March 2004.

The following paragraphs briefly summarize the purpose and scope of the previous investigations completed to date at Site 4.

Initial Assessment Study (1981)

In 1981, the Navy conducted the IAS as part of the Naval Assessment and Control of Installation Pollutants (NACIP) Program. The purpose was to qualitatively identify and assess sites that posed a potential threat to human health or the environment as a result of contamination from past handling of (and operations involving) hazardous materials.

The IAS indicated that a sanitary landfill was started at Dump D (Site 4) in 1970. The landfill operation consisted of a series of unlined trenches filled with trash and wet garbage and the disposal of inert material. The IAS indicated that the first trench was approximately 1,000 feet long and was located parallel to and about 500 feet north of Blows Creek. As the trenches were filled, parallel trenches were dug and covered with soil from subsequent trenches. Sanitary landfill operations continued until 1976, at which time trash and garbage were hauled to an off-site facility and inert material was then disposed of at the landfill.

The IAS determined that Dump D (Site 4), did not pose a threat to human health and the environment, and no confirmation study was recommended.

Phase II RCRA Facility Assessment (1989)

In 1989, A.T. Kearney, Inc. and K.W. Brown and Associates, Inc. prepared the RFA. The RFA included a preliminary review of all available relevant documents and a visual site inspection of 34 Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs), including Dump D (Site 4). No sampling was conducted during the RFA.

The RFA indicated that the use of Dump D (Site 4) was discontinued in 1981. The wastes disposed of were estimated at 1,500,000 cubic feet and included trash, wet garbage, construction materials, solvents, pesticides, acids, bases, PCBs, and out-dated civil defense stores. According to personnel at the Base Public Works Center, the PCBs most likely came from ballast containers for fluorescent light fixtures. It is not known whether or not these ballasts were sealed units. Drums of unknown materials were stored on the surface and buried at the site and several tanks with undetermined wastes were also once stored in the area.

Dump D (Site 4) was recommended for a RCRA Facility Investigation (RFI) due to the high potential for release to soil because of the unlined nature of the waste disposal area and the moderate to high potential for release to surface water via runoff and groundwater discharge due to the proximity to Blows Creek.

Relative Risk Ranking System Data Collection Report (1996)

In April 1996, CH2M HILL submitted an RRR System Data Collection Report for SJCA. The report contained results from sampling at 21 sites where data had not been previously available. The sampling effort's goal was to gather data for the Navy to perform assessments of the sites in order to rank and prioritize the sites based on

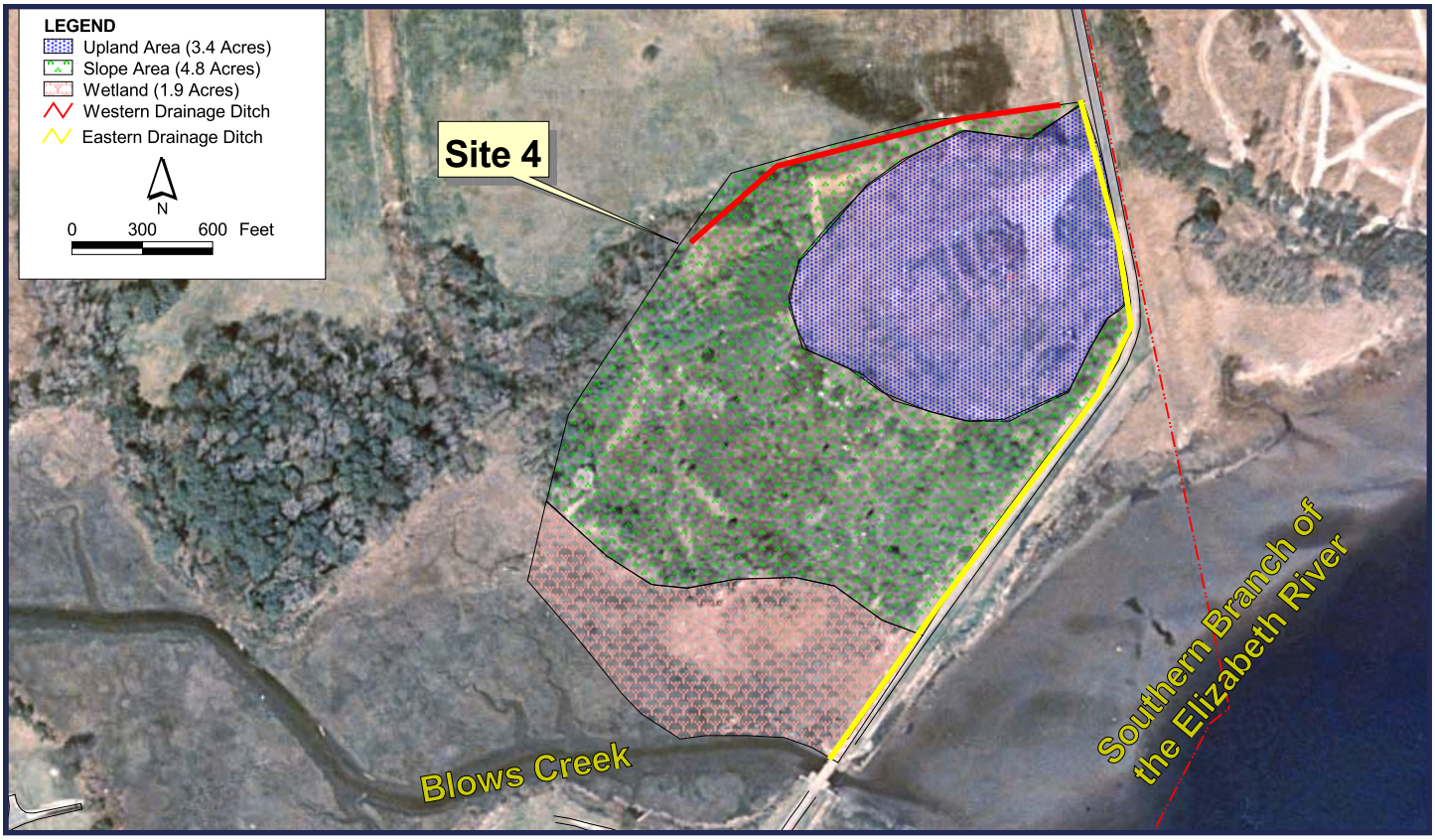


Figure 2 - Site Location Map

level of risk.

Site 4 was sampled as part of the RRR System Data Collection. Two surface soil and three groundwater samples were collected from Site 4. Analytical results were not validated. Several pesticides, PCBs, and polycyclic aromatic hydrocarbons (PAHs) were detected in the surface soil samples. Acetone was detected in one groundwater sample collected from the northeastern corner of Site 4. No other organic compounds were detected in groundwater. Several inorganic analytes were detected in both soil and groundwater samples.

Remedial Investigation/Human Health Risk Assessment/ Ecological Risk Assessment Report (1997 through 2003)

The RI/HHRA/ERA report was completed by CH2M HILL in March 2003. Surface and subsurface soil, shallow (Columbia Aquifer) and deep (Yorktown Aquifer) groundwater, sediment, and surface water samples were collected and analyzed to characterize the nature and extent of contamination and potential risk to human health and the environment. Additionally, a geophysical investigation was conducted to determine the horizontal extent of waste and tidal studies were conducted to assess tidal influences of Blows Creek on the Columbia and Yorktown Aquifers. The field activities were conducted in three phases: the first phase was conducted from June to November 1997; the second from April to October 1999; and the third phase was conducted from June to August 2001.

The nature and extent of contamination, as well as likely fate and transport of contaminants, characterized during the RI are discussed in this Proposed Remedial ActionPlan in Section 3.2. A baseline **Human Health Risk Assessment (HHRA)** was conducted to evaluate the potential human health risks associated with the presence of site-related soil, surface water, sediment, and shallow and deep groundwater contamination at Site 4. Additionally, a screening **Ecological Risk Assessment (ERA)** was conducted to evaluate the potential ecological risks to terrestrial and aquatic **receptors**.

The RI concluded that there is potential risk to human and ecological receptors from exposure to chemicals in soil (primarily inorganics and PAHs) and an FS was recommended to evaluate remedial alternatives. Mitigation of risk through remedial actions for soil would also eliminate concern for continued transport of potential contaminants to Blows Creek via the site-related drainage ditches.

No human health risk drivers were identified for the Columbia Aquifer groundwater. Although human health risk drivers (arsenic, iron, manganese, and chloroform) were identified for the deeper Yorktown Aquifer, the SJCA Tier I Partnering Team made a risk management decision for these constituents based on the concentrations of compounds, the risks identified with these compounds, and the nature of the groundwater flow conditions.

Further evaluation of the potential for adverse effects to aquatic life in Blows Creek sediment was recommended based on elevated chemical concentrations of inorganics, pesticides, and PAHs. A baseline ERA for Blows Creek was planned and included the evaluation of sediment in the wetland area associated with Site 4 and the portion of a drainage ditch along the eastern site boundary which exhibited elevated mercury concentrations.

Because surface water is transient at Site 4 and the drainage ditches provide minimal ecological habitat, there was no significant risk to human health and the environment identified from direct exposure to surface water.

Baseline Ecological Risk Assessment for Blows Creek (2004)

Sampling for a baseline ERA (BERA) for Blows Creek was conducted by CH2M HILL in September 2003. The purpose of the BERA is to assess potential ecological risk in Blows Creek associated with adverse effects from Navy Installation Restoration (IR) sites, including Site 4, as well as other potential non-Navy sources. Sampling included the collection of sediment from the wetland area and eastern drainage ditch of Site 4. BERA sampling results will be used to assess the impact to the Blows Creek watershed (including the wetland area of Site 4), recommend further action, and develop remedial goals, if necessary.

Feasibility Study (2004)

An FS was completed for Site 4 in March 2004 to present the development and evaluation of remedial action alternatives. The FS used information gathered from the previous investigations conducted at Site 4 (detailed in the above subsections). The data from these investigations were compiled and evaluated to identify **Remedial Action Objectives (RAOs)** were identified. Presumptive remedies were considered in the development of the following remedial action alternatives for Site 4:

- Alternative 1-No Action
- Alternative 2-Soil Cover
- Alternative 3-RCRA Subtitle D Cap
- Alternative 4-Excavation and Offsite Disposal of Landfill Materials

Each remedial alternative was analyzed with respect to the nine evaluation criteria provided in the NCP (See Section 8, "Evaluation of Alternatives", and Glossary at Page 18.). The alternatives were then compared to one another with respect to their rating under the NCP evaluation criteria. Based on the comparative analysis, Alternative 2 - Soil Cover was selected as the Preferred Alternative for Site 4.

3 Site Characteristics

3.1 Site Characteristics

Site 4 covers an estimated 10 acres and can be divided into three distinct areas based on differences in surface topography and vegetation (Figure 2):

- **Upland Area** - Comprises roughly 3.4 acres in the site's northern portion. This area is relatively flat and grass-covered with little to no brush.
- **Slope Area** - Located west and south of the upland area and comprises approximately 4.8 acres. The area slopes to the west and south from the upland area to the wetland area of Site 4, described below. Surface vegetation is heavy in this area and consists of low to medium dense brush (honeysuckle and briars) and stands of mature hardwood and pine trees.
- **Wetland Area** - Consists of roughly 1.9 acres in the southern portion of Site 4. The wetland area is regularly inundated by Blows Creek, which lies adjacent and south of the wetland area.

Along the eastern boundary of Site 4, a drainage ditch diverts stormwater run-on from the site's upland and slope areas into Blows Creek. An east-west trending ditch is also present along the northern boundary of Site 4. This ditch appears to receive only surface water run-off from the site's northern portion as well as run-off from adjacent northern areas, which eventually discharge into the wetlands on the site's western side.

Groundwater at the site ranges seasonally between 3 and 9 feet below ground surface and flows toward nearby surficial water bodies (i.e., Blows Creek to the south and the Southern Branch of the Elizabeth River to the southeast).

3.2 Nature and Extent of Contamination

A summary of the RI/HHRA/ERA nature and extent of contamination at Site 4 is included in this section. The results of the geophysical survey conducted at Site 4 indicated magnetic anomalies consistent with typical landfilled materials such as buried metal and construction debris. Similar materials were also visually observed on the ground surface during the geophysical survey. The geophysical survey was limited, conducted in the upland portion of the slope area, and identified numerous buried objects. These objects were most likely concrete blocks, metal pipes, drums, or other reflective materials.

Surface and subsurface soils contained several inorganic compounds elevated above background (based on statistically derived upper tolerance limit [UTL] and population central-tendency comparisons). These were antimony, copper, lead, nickel, and zinc in surface soil and antimony, arsenic, barium, beryllium, copper, iron, lead, manganese, mercury, vanadium, and zinc in subsurface soil. The surface soils also contained PAHs, pesticides, and PCBs. None of the pesticides indicated a statistical difference from the background data based on central-tendency population comparisons, and all pesticide UTL exceedances occurred within the limits of waste. The most significant PCB detection was aroclor-1260 in a surface soil sample collected from within the upland area of the site. In general, these potential site contaminants were restricted to the soils located within the limits of waste (Site 4 boundary). The soil sample locations along the northern and western perimeters, adjacent to the aerial extent of waste, indicated a few elevated concentrations of inorganics in both surface and subsurface soils.

In shallow and deep groundwater, several total and dissolved inorganic compounds were detected above maximum background values. However, the highest concentrations of inorganics in groundwater were located upgradient of the site. Based on constituent concentrations detected in groundwater and the existence of a laterally extensive hydraulic aquitard (Yorktown Confining Unit), deep groundwater does not appear to have been impacted at Site 4.

Several inorganics, PAHs, and pesticides/PCBs were detected at elevated concentrations in the sediment collected from the drainage ditches and wetland area adjacent to Site 4. Of significance in sediment was an elevated mercury concentration found in the eastern drainage ditch at Site 4.

In surface water, several inorganics were elevated, with the highest concentrations from a sample collected along the western drainage of Site 4.

In general, similar concentrations of constituents found in Site 4 groundwater, surface water and sediment were found in the upgradient former Site 3 groundwater, surface water and sediment.

Primary fate and **contaminant migration pathways** at Site 4 were examined during the RI, including surface runoff and erosion of soil to the drainage ditches at Site 4 and the wetland marsh area in the southwest portion of the site, infiltration and leaching of precipitation through the unsaturated soil to the groundwater system, discharge from groundwater to surface water and sediment, and transport of constituents from shallow to deep groundwater.

The RI presents a summary of the risks determined by the baseline HHRA and ERA and the results are included in Section 5 of this Proposed Remedial Action Plan.

4 Scope And Role of Response Action

The role of the Preferred Alternative presented in this Proposed Remedial Action Plan is to address all potential threats posed by Site 4 and to eliminate current exposure pathways that may pose unacceptable human health or ecological risk from contamination. The specific objectives of the preferred remedy are referred to as RAOs, as listed in Section 6. The response action does not include or affect any other sites at the facility that fall under the Comprehensive Environmental Response, **Compensation, and Liability Act of 1980 (CERCLA)** process.

5 Summary Of Site Risks

A summary of the RI's human health and ecological risk assessments is included in the following subsections and in Table 1. The RI provides a more detailed analysis and evaluation.

5.1 Human Health Risk Summary

A baseline HHRA was conducted to evaluate the potential human health risks associated with the presence of soil, (surface and subsurface soil combined), surface water, sediment, shallow groundwater, and deep groundwater contamination at Site 4. The HHRA characterizes the current and potential future human health risks at each site if no additional remediation is implemented. Health risks are based on a conservative estimate of the potential **carcinogenic risk** or the potential to cause other health effects not related to cancer (**noncarcinogenic risk**).

Health risk levels, determined using USEPA guidance to ensure that conservative estimates of potential health effects are obtained, differ depending on the assumed land use because human exposure differs with land use. A conservative estimate of risk was developed incorporating potential exposure scenarios (i.e., current/future adult and adolescent trespassers and future adult, child, and lifetime residents) for Site 4. No hazards or risks were identified based on the industrial use of Site 4.

In soil, future residential development would result in carcinogenic risk to human health due to arsenic. Additionally, there is a noncarcinogenic hazard for a child resident exposed to arsenic and iron in soil. No human health risk drivers were identified for the shallow Columbia Aquifer groundwater. Future residential development would result in an unacceptable carcinogenic risk to human health due to the use of deeper Yorktown Aquifer groundwater as a potable water supply, associated primarily with arsenic. The noncarcinogenic hazard associated with exposure to deep groundwater via inhalation through showering by current/future adult residents is equal to the USEPA's target HI of 1, associated with inhalation of chloroform. However, chloroform was only detected in July 1997 samples at concentrations below the MCL and was not detected in subsequent sampling events. Additionally, chloroform is a known potential lab contaminant and it is suspected that the samples reflect artifacts of the analysis process. Noncarcinogenic hazards associated with use of the deeper Yorktown Aquifer groundwater as a drinking water source were also identified, associated with the ingestion of arsenic, iron, and manganese. Although several human health risk drivers were identified for the deeper Yorktown Aquifer, the SJCA Tier I Partnering Team determined that the risks posed by these constituents were not significant enough to merit action based on the generally low concentrations of compounds, the low risks identified with these compounds, and the nature of the groundwater flow conditions.

A noncarcinogenic hazard (in excess of the HI of 1) was identified for a child resident exposed to iron in the sediment. There were no human health risk drivers associated with surface water at Site 4.

5.2 Ecological Risk Summary

A **hazard quotient (HQ)** is used to evaluate ecological risks; below an HQ of 1, adverse effects to ecological receptors are not expected. For Site 4, risks were evaluated for terrestrial habitats related to the landfills' surface and the aquatic habitats in the surface water bodies that may be impacted from discharges of site-related contaminants in the groundwater.

The ERA also considered the following factors when evaluating and interpreting the risk results: inorganic and PAH concentrations in site soils compared to those in reference samples, chemical bioavailability in sediment, chemical distribution in site soil and sediment, influence of grain size and total organic carbon (TOC) on chemical distribution in sediment, potential chemical sources to site drainages, and potential risks to ecological receptors in Blows Creek.

The ERA for Site 4 indicated the potential for adverse effects to:

Lower trophic-level receptors (plants and soil inverte-

Media	Human Health Risk	Ecological Risk
Surface Soil	Unacceptable	Unacceptable
Subsurface Soil	Unacceptable	Not Evaluated
Groundwater	Acceptable	Acceptable
Sediment	Unacceptable	Unacceptable
Surface Water	Acceptable	Acceptable

Table 1 - Site 4 Risk Assessment Results

What is Human Health Risk and How is it Calculated?

A human health risk assessment estimates the "baseline risk." This is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. To estimate the baseline risk at a site, the Navy performs the following four-step process:

Step 1: Analyze Contamination

Step 2: Estimate Exposure

Step 3: Assess Potential Health Dangers

Step 4: Characterize Site Risk

In **Step 1**, the Navy looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies help the Navy to determine which contaminants are most likely to pose the greatest threat to human health.

In **Step 2**, the Navy considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency (how often) and length of exposure. Using this information, the Navy calculates a "reasonable maximum exposure (RME) scenario that portrays the highest level of human exposure that could reasonably be expected to occur.

In **Step 3**, the Navy uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. The Navy considers two types of risk: (1) cancer risk, and (2) noncancer risk. The likelihood of any kind of cancer resulting from a contaminated site is generally expressed as an upper bound probability; for example, a "1 in 10,000 chance." In other words, for every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than normally would be expected to from all other causes. For noncancer health effects, the Navy calculates a "**hazard index**." The hazard index represents the ratio between the the "reference dose", the dosage at which no adverse health effects are expected to occur, and the "reasonable maximum exposure", the estimated maximum exposure level for a given category of individuals coming into contact with contaminants at the Site. The key concept here is that a "threshold level" (measured usually as a hazard index of less than 1) exists below which noncancer health effects are no longer predicted.

In **Step 4**, the Navy determines whether site risks are great enough to cause health problems for people at or near the site. The results of the three previous steps are combined, evaluated, and summarized. The Navy adds up the potential risks from the individual contaminants and exposure pathways and calculates a total site risk.

brates) from the presence of chemicals in Site 4 surface soils. The **contaminants of potential concern (COPCs)** in the surface soil include the inorganic compounds chromium, copper, iron, lead, nickel, vanadium, and zinc; the PCB aroclor-1260; and the PAHs anthracene, benzo(a)anthracene, benzo(a)pyrene, fluoranthene, phenanthrene, and pyrene.

Chemicals present in the drainage sediments at Site 4 are present at concentrations that could potentially adversely affect aquatic life. The COPCs in Site 4 sediment include the inorganic compounds arsenic, barium, cobalt, copper, cyanide, iron, lead, manganese, mercury, nickel, and zinc; the pesticides/PCBs DDD, DDE, DDT, dieldrin, and aroclor-1260; and the PAHs 2-methylnaphthalene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, diethylphthalate, fluoranthene, phenanthrene, and pyrene. However, the drainages provide very little viable habitat for aquatic species based on the limited surface water present within them. A broader range of aquatic species could be exposed to chemicals if they are transported via the site-related drainages to Blows Creek, where a much greater diversity of aquatic species is expected to occur based on habitat present in this water body.

Chemicals present in surface water may also have limited potential to adversely affect aquatic life. The COPCs in Site 4 surface water include the inorganic compounds aluminum, copper, cyanide, iron, lead, manganese, nickel, silver, and zinc and the semivolatile organic compound (SVOC) carbon disulfide. However, as with sediment, a broader range of aquatic species could be exposed to chemicals if they are transported via the site-related drainages to Blows Creek, where a variety of aquatic species could be exposed to chemicals in surface water or following deposition to sediment.

Risk calculations also indicated the potential for adverse effects to avian piscivores (i.e. Great Blue Heron) from mercury in drainage sediments at Site 4. Avian piscivores are, however, expected to spend most of their time foraging in the higher quality aquatic habitats provided by Blows Creek. Available data suggests a very limited potential for chemicals in Blows Creek to adversely affect aquatic life, however, only limited samples have been collected from Blows Creek and further evaluation of this potential exposure pathway is needed.

A BERA for Blows Creek, a receiving body for Site 4 groundwater and surface water, is currently being conducted. The results will be used to assess the impact to the Blows Creek watershed (including the wetland area of Site 4), recommend further action, and develop remedial goals, if necessary.

6 Remedial Action Objectives

It is the Navy's current judgement, after consultation with VDEQ and USEPA, that the Preferred Alternative identified in the Proposed Remedial Action Plan, or one of the other active measures considered in this Proposed Remedial Action Plan, is necessary to protect public health, welfare, and the environment from actual or threatened

releases of hazardous substances. The site-specific **Remedial Action Objectives (RAOs)** for Site 4 are as follows:

- Prevent or minimize direct contact of human and ecological receptors with landfill contents.
- Reduce infiltration and any resulting leaching of contaminants from the landfill into groundwater.
- Prevent overland flow entering the site (surface water run-on) and control surface water run-off and erosion.

7 Summary of Remedial Alternatives

This section presents a summary of the four remedial alternatives developed in the FS. Each alternative, with the exception of the no-action alternative, was developed to meet the RAOs. Alternative 2 is recommended as the Preferred Alternative. A detailed description of the various remedial alternatives is presented in the FS, which was conducted in accordance with USEPA Guidance (Conducting Remedial Investigations and Feasibility Studies for CERCLA Municipal Landfill Sites, the NCP, and Presumptive Remedies: Policy and Procedures).

The remedial alternatives for Site 4 are as follows:

- Alternative 1—No Action
- Alternative 2—Soil Cover
- Alternative 3—RCRA Subtitle D Cap
- Alternative 4—Excavation and Offsite Disposal of Landfill Materials

Detailed descriptions of each remedial alternative are included in Sections 7.2 through 7.5.

7.1 Common Elements of Alternatives

Several elements are common to remedial alternatives 2, 3, and 4 considered in the FS report. These elements are discussed below.

Clearing and Grubbing

Portions of the site will need to be cleared prior to the commencement of any remedial action. The upland area consists of grassy ground cover with little to no brush. However, the slope area between the upland and wetlands areas consists of a variety of low to medium dense brush (Honeysuckle, Briars) and stands of mature hardwood and pine trees. Brush and trees cleared from the site will be transported to an offsite location for disposal. No onsite stockpiling or burning will be permitted.

Consolidation or Removal of 7.5-Ton Weights

Seven 7.5-ton concrete counterweights are located on top of the ground surface in the upland area. If the Alternatives 2 or 3 are selected, these counterweights will be broken up and consolidated within the cover or cap design. If Alternative 4 is selected, then the counterweights will be broken up and hauled offsite as construction debris.

Surface Debris Removal from Wetland Area of Site 4

The northern portion of the wetland area—the area along the toe of slope between the slope and wetland areas—contains little debris. However, a 30x80-feet long swath against Blows Creek has the highest density of surface debris in the area and the surface debris extends along the edge of Blows Creek. The debris primarily consisted of 8x8-inch railroad ties in various stages of decay. Other debris includes corrugated panels (suspected of containing asbestos), glass, metal cylinders, pipes, and wooden boards. It is unlikely that debris was intentionally buried beneath the ground surface in the wetland area because of the shallow interface between groundwater and surface water, and more likely that the debris was from landfill operations [i.e. spill over].

For Alternatives 2 and 3, depending on the type of material encountered, it will be consolidated into landfill cover or cap or hauled offsite for appropriate disposal. If Alternative 4 is selected, the debris will be hauled offsite for appropriate disposal. The Navy will confer with the VDEQ to make determinations on items which will be required to be removed for off site disposal and those items which will be consolidated beneath the cover.

Installation of Rip-Rap Upgradient of Wetland Area

Rip-rap will be placed along the toe of the slope adjacent to and upgradient of the wetland area. The rip-rap will minimize the erosion of the slope area during high-tide events. Slope erosion could result in the premature loss of wetland area because of the settlement of fine sands and silts in standing water bodies within the wetland area. The area at the toe of the slope in which rip-rap will be placed is estimated to be 10 feet wide by 600 feet long.

Sediment Removal from Eastern Drainage Ditch

Because of the ecological and human health risks associated with contaminated sediment in the eastern drainage ditch, the remedial alternatives will include the removal and offsite disposal of sediment from this ditch. One foot of sediment will be removed from the floor and sideslopes of the drainage ditch.

Stormwater Drainage Ditch Improvements and Construction

Based upon previous site visits and a review of surface topography at Site 4, stormwater runoff appears to flow via surficial sheet flow to drainages along the eastern and western boundaries, with discharge into the tidal wetlands of Blows Creek. The culvert underneath the former landfill entrance accepts flow from Site 3 to the north then resurfaces and discharges into the eastern drainage ditch.

As part of remedial Alternatives 2, 3, and 4 considered in the FS, an open stormwater drainage ditch will be constructed along the eastern boundary of Site 4. The drainage ditch will be designed to convey stormwater runoff from locations upgradient of Site 4, as well as runoff that falls within Site 4 boundaries. The drainage ditch will be lined with a synthetic geotextile membrane and rip-rap in order to minimize stormwater erosion and contact with native soil. The ditch will traverse approximately 1,000 feet and discharge its load into the tidal wetlands of Blows Creek south of Site 4.

If Alternatives 2 or 3 are selected, a new drainage ditch will be constructed along the site's western boundary. This ditch will be lined with erosion matting and graded to convey runoff from the vegetated soil cover to the wetland area adjacent to Blows Creek.

7.2 Alternative 1 – No Action

An analysis of the no action alternative is required by the NCP and serves as the baseline alternative. All other remedial action alternatives are judged against the no action alternative. Under this alternative, no additional controls or remedial technologies would be implemented and no further site-related monitoring or maintenance would be conducted. CERCLA (Section 121(c)), as amended by the Superfund Amendments Reauthorization Act (SARA, 1986), requires that the site be reviewed every 5 years since contamination (i.e., landfill contents) would remain on site. It is assumed that the current level of maintenance would be maintained.

With the exception of the costs to prepare the 5-year review, there are no capital (e.g., construction) or operation and maintenance (O&M) costs related to this alternative.

7.3 Alternative 2 – Soil Cover

Alternative 2 consists of installing a soil cover over landfill contents at Site 4. The major components of this alternative are as follows:

- Cover materials will be placed over the upland and slope areas (approximately 8.2 acres).
- Cover material will be certified clean.
- Cover materials will consist of a topsoil layer capable of sustaining vegetation, a vegetative support layer to provide a stable base for the overlying topsoil layer, and a leveling layer to protect the overlying layers from landfill contents and to serve as a proper sub-base for the overlying layers.
- A stand of vegetation will be established on top of the final cover. Temperature- and drought-resistant vegetation indigenous to the area will be planted. The vegetation will have a root system that does not extend past the vegetative support layer, will require minimal maintenance, can survive in low-nutrient soil, and has sufficient density to control the rate of erosion to recommended levels.
- Development of **institutional controls**, including land use and aquifer use restrictions will be part of the Site 4 Remedial Design.
- 5-year site remedy reviews will be conducted, as required by CERCLA and the NCP, since contamination (i.e., landfill contents) would remain on-site.
- Development of a long-term groundwater monitoring and reporting plan to ensure that no potential future releases will cause unacceptable risks to human health and the environment.
- Implementation of an O&M plan consisting primarily of annual visual inspections of the soil cover to verify the continued integrity of the cover, ensure appropriate surface runoff and erosion controls are maintained, and ensure adequate vegetation is maintained.

The capital costs associated with this alternative are $1,396,000. The total O&M cost for the soil cover would be approximately $650,000 for 30 years. The **present worth cost** is estimated to be $1,825,000.

7.4 Alternative 3 – RCRA Subtitle D

Alternative 3 consists of installing a RCRA Subtitle D Cap over landfill contents at Site 4. Based on the findings of the RI and historic disposal dates, Site 4 does not require closure as a solid waste landfill and a RCRA Subtitle D cap is not required. This alternative is evaluated for comparison only and is included as an additional option.

Alternative 3 consists of installing a cap that incorporates the minimum landfill cover requirements specified by the Virginia Solid Waste Management Regulations incorporating the requirements of RCRA Subtitle D (40 CFR Part 258). The overall goals of landfill closure under the Subtitle D regulations are to minimize the infiltration of water into the landfill and to maintain the integrity of the cover during the post-closure period by minimizing cover erosion. Subtitle D cap and closure requirements are expanded upon in the seminar publication Design, Operation, and Closure of Municipal Solid Waste Landfills (USEPA, 1994). The major components of Alternative 3 are as follows:

- Cover materials will be placed over the upland and slope areas (approximately 8.2 acres).
- Cover materials will consist of a topsoil layer capable of sustaining vegetation, a vegetative support layer to store moisture and support the overlying vegetation, a drainage layer to maintain slope stability and promote the growth of a healthy stand of vegetation on the cap surface, a barrier layer to provide an adequate sub-base for the overlying layers, and a leveling layer

to protect the overlying layers from landfill contents and to serve as a proper sub-base for the overlying layers.

- A stand of vegetation will be established on top of the final cover. Indigenous temperature- and drought-resistant vegetation will be planted. The vegetation will have a root system that does not extend past the vegetative support layer, will require minimal maintenance, can survive in low-nutrient soil, and has sufficient density to control the rate of erosion to recommended levels.
- Development of institutional controls, including land use and aquifer use restrictions will be part of the Site 4 Remedial Design.
- 5-year site remedy reviews will be conducted, as required by CERCLA and the NCP, since contamination (i.e., landfill contents) would remain on-site.
- Development of a long-term groundwater monitoring and reporting plan to ensure that no potential future releases will cause unacceptable risks to human health and the environment.
- Implementation of an O&M plan consisting primarily of annual visual inspections of the soil cover to verify the continued integrity of the cover, ensure appropriate surface runoff and erosion controls are maintained, and ensure adequate vegetation is maintained.
- RCRA Subtitle D requires that post-closure care, maintenance, and monitoring be performed for at least 30 years. As part of landfill closure, the owner will prepare a written post-closure care plan and a monitoring plan. The plans will include a maintenance program, an end-use plan, groundwater monitoring, and other monitoring procedures as appropriate for the site.

Similar to Alternative 2, both capital and O&M costs are associated with implementing Alternative 3. The capital cost for Alternative 3 is estimated at $2,358,000. O&M costs are estimated at approximately $650,000 for 30 years. The present worth is estimated to be $2,787,000.

7.5 Alternative 4 – Excavation and Offsite Disposal of Landfill Materials

Alternative 4 consists of excavating soil from the landfill and disposing of the excavated material in an appropriately licensed and permitted disposal facility. The major components of this alternative are as follows:

- Soil and landfill contents will be excavated to a depth of 8 ft in the upland area (3.4 acres), 5 ft in the slope area (4.8 acres), and 3 ft in the wetland area (1.9 acres). These quantities were selected based on available site data. It is assumed that these disposal depths will be sufficient to remove landfill contents.
- Installation of well points for dewatering of the excavation. Groundwater will be tested and properly managed to comply with regulatory requirements.
- Excavated sediment from the eastern drainage ditch will be classified as either hazardous or nonhazardous waste based on the results of waste characterization testing.
- Following characterization, the excavated materials will be properly manifested and transported to a landfill facility located within 50 mi. of Site 4.
- The excavated area will be backfilled and graded to allow for surface drainage southward into the wetland area north of Blows Creek.

The capital cost of excavation and offsite disposal of landfill materials is estimated at $10,791,000. There would be no annual O&M activities associated with Alternative 4. Therefore, the present worth of Alternative 4 is $10,791,000.

8 Evaluation of Alternatives

8.1 The Nine Evaluation Criteria

The NCP outlines the approach for com-paring remedial alternatives. Evaluation of the alternatives uses **nine evaluation criteria** (see glossary for a detailed description of each). These consist of "threshold," "primary balancing," and "modifying" criteria. To be considered for remedy selection, an alternative must meet the two following threshold criteria:

1. Overall protection of human health and the environment
2. Compliance with **Applicable or Relevant and Appropriate Requirements (ARARs)** and **to-be-considered (TBC) criteria**

The primary balancing criteria, which are technical criteria based on environmental protection, cost, and engineering feasibility, are then considered to determine which alternative provides the best combination of attributes. The primary balancing criteria are:

3. Long-term effectiveness and permanence
4. Reduction in toxicity, mobility, or volume through treatment
5. Implementability
6. Short-term effectiveness
7. Cost

The Preferred Alternative is evaluated further against two modifying criteria:

8. Acceptance by the State
9. Acceptance by the community

The remedial alternatives presented in Section 7 were evaluated in the FS against the first seven of the nine criteria identified in the NCP. The two additional modifying criteria are considered after the public comment period for the Proposed Remedial Action Plan. The State supports the Preferred Alternative, however, their final concurrence with the alternative will be provided following the review of all comments received during the public comment period.

8.2 Relative Evaluation of Alternatives

A comparison of the alternatives is discussed below and is summarized in Table 2. The FS provides a more detailed analysis and evaluation.

Protection of Human Health and the Environment

Direct contact of human and ecological receptors with impacted soil, sediment in the eastern drainage ditch, and with surface debris in the wetland area would not be prevented by Alternative 1. Surface water run-on, surface water runoff, and erosion would not be minimized within the Site 4 landfill boundaries and the existing wetlands would not be protected. The potential for contaminants leaching into the groundwater would also remain. Therefore, Alternative 1 will not be considered further in the criteria analysis.

Alternatives 2 and 3 are considered protective because the cover and cap reduces the potential of direct human or ecological contact with impacted landfill soil, the landfill materials, and drainage ditch sediment. The cover and cap would also reduce the infiltration of precipitation and the subsequent leaching of contam-inants to the groundwater. Unlike Alternative 2, a RCRA Subtitle D cap is designed, at a minimum, to meet regulatory solid-waste disposal requirements. A RCRA Subtitle D cap is constructed with a barrier layer and often includes a drainage layer to more effectively divert infiltration water away from the landfill cell. This would further reduce the potential of water penetrating the landfill materials and leaching contaminants to the groundwater.

Alternative 4 is considered protective because it involves the removal of the landfill materials, thereby eliminating the potential for direct human or ecological contact with the landfill contents. Removal also eliminates any future potential risk associated with contaminants leaching into the groundwater.

Compliance with ARARs

Alternatives 2, 3, and 4 would achieve compliance with chemical-, action-, and location-specific ARARs for Site 4. Although impacted soil and landfill materials would remain in place with Alternative 2, they are not considered hazardous waste and only require a soil cover. The soil cover would minimize surface water run-on, surface water runoff, and erosion; protect the existing wetlands; prevent exposure to soil and landfill contents; and reduce infiltration through contaminated soil and landfill contents, thereby reducing the potential contribution to groundwater.

Long-Term Effectiveness and Permanence

Alternatives 2 and 3 would eliminate the risk posed by impacted drainage ditch sediment by removing this material from the site and minimize the risk associated with surface and subsurface soil by preventing direct contact with the landfill contents. Because of the cap design, Alternative 3 would be more effective in preventing infiltration of surface runoff through the landfill contents and, ultimately, into the groundwater.

With both Alternatives 2 and 3, land use restrictions would reduce residual risk by preventing future disturbances of covered media. Covering the landfill with soil, however, will not remove impacted soil or debris from

Criterion	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Overall Protection of Human Health and the Environment	○	●	●	●
Compliance with ARARs	○	●	●	●
Long-Term Effectiveness and perrmanence	○	◎	◎	●
Reduction in Toxicity, Mobility, or Volume	○	◎	◎	●
Short-Term Effectiveness	○	◎	◎	◎
Implementability	●	●	◎	○
Present-Worth Cost	$0	$1,825,000	$2,787,000	$10,791,000

Ranking: ● High ◎ Moderate ○ Low

Table 2 - Relative Ranking of Alternatives

the site. With a thorough O&M program, the useful life of a soil cover or RCRA Subtitle D cap can easily surpass 30 years. The level of effectiveness of this alternative would remain virtually the same over that period. The soil cover would have to be maintained to prevent degradation. The soil cover or cap is expected to be effective and reliable over the long-term if properly designed and maintained.

Alternative 4 would eliminate risks associated with impacted soil, the landfill materials, and sediment by removing these materials from Site 4. This alternative has a higher degree of permanence than Alternatives 2 and 3 because O&M activities would not be required to prevent exposure to contaminants at the site.

Reduction of Toxicity, Mobility, and Volume

Alternatives 2 and 3 would reduce contaminant volume by removing impacted sediment from the eastern drainage ditch. Alternatives 2, 3, and 4 do not include a treatment component that would reduce the toxicity, mobility, and/or volume of contaminants that would remain onsite.

Short-Term Effectiveness

Implementation of Alternatives 2 or 3 would require typical construction activities, such as excavation, placement of fill, and grading. Construction activities would likely take several months. These activities would potentially expose workers to contaminated materials and debris. Workers would be required to receive training and use personal protective equipment (PPE). Implementation of this alternative would result in minimal increased risk to the surrounding community and ecosystems during construction over current conditions because landfill contents will remain in place.

Alternative 4 would require construction activities (e.g., excavation, grading) similar to those associated with Alternatives 2 and 3. Because all of the landfill soil and debris would be excavated and hauled offsite under Alternative 4, a greater volume of offsite truck traffic would occur under this Alternative than under Alternatives 2 and 3. This increased traffic poses a slightly higher risk of exposure to communities surrounding Site 4, as compared to Alternatives 2 and 3.

Implementability

Installation of a soil cover or RCRA Subtitle D cap, as included in Alternatives 2 and 3, is a well-established technology. Placement of soil cover material can be done with conventional equipment in a relatively short time. Waste handling, hauling, and disposal are routine operations for waste management contractors. Construction and improvements of drainage ditches are implementable using standard construction methods. To minimize wetland disturbance, low-pressure equipment and/or logging mats would be required to remove debris from the wetlands area of Site 4.

Periodic maintenance would be required to maintain the integrity of the soil cover or RCRA Subtitle D cap. Landfill contents would remain onsite under this alternative and would require incorporation of land use restrictions in the Navy's planning documents and administrative resources to conduct the 5-year site reviews. Maintenance of the soil cover or cap would also require an annual expenditure of administrative resources. The implementation of land use restrictions would need to be coordinated with the Navy.

Implementation of Alternative 4 would be the most difficult of the four alternatives. In the upland and slope areas, soil excavation and offsite disposal can be performed using conventional construction equipment and methods. Although there are no suspected unexploded ordnance (UXO) at the site, due to past ordnance handling activities at the base, UXO support would be required during construction for worker safety reasons, causing difficulty in implementation. Dewatering operations, that include testing of discharge water, would also be required for this alternative. Low-pressure equipment and/or logging mats would be required to remove debris from the wetlands area of Site 4. Drainage ditch construction and improvements are implementable using standard construction methods.

Cost

Alternatives 2 and 3 would have both capital and annual O&M costs. The capital cost associated with constructing the soil cover in Alternative 2 is estimated to total $1,396,000, whereas Alternative 3 is estimated at $2,358,000. O&M costs for both alternatives would include inspection of cover or cap material and drainage ditches, groundwater monitoring and reporting, mowing, and minor repairs to the cover or cap material and ditches. The total O&M costs for either Alternatives 2 or 3 would be approximately $650,000 for 30 years. The present worth for Alternative 2 is $1,825,000 whereas the present worth for Alternative 3 is $2,787,000.

The capital cost of excavation and offsite disposal of landfill materials is estimated at $10,791,000. There would be no annual O&M activities associated with Alternative 4. Therefore, the present worth of Alternative 4 is $10,791,000.

State Acceptance

The State supports the Preferred Alternative, however, their final concurrence with the alternative will be provided following the review of all comments received during the public comment period.

Community Acceptance

Community acceptance will be evaluated after the public comment period for the Proposed Remedial Action Plan and will be fully evaluated in the **Record of Decision (ROD)**.

9 Preferred Alternative

Based on the comparative analysis, Alternative 2-Soil Cover was selected as the Preferred Alternative for Site 4. Alternative 2 is recommended because it will achieve substantial risk reduction by removing contaminated sediment and preventing direct exposure to contaminated soil and landfill contents. Alternative 2 will include stormwater drainage improvements to prevent overland flow entering the site and control surface water run-off and erosion. Further, the alternative would reduce future potential risk associated with contaminants leaching into the Columbia and Yorktown Aquifers.

The Preferred Alternative is anticipated to meet the following statutory requirements of CERCLA: protection of human health and the environment, compliance with ARARs of Federal and Virginia environmental laws, cost-effectiveness, and use of permanent solutions and alternative treatment technologies to the maximum extent practicable. Other than Alternative 1-No Action, Alternative 2 is the most cost-effective of all the alternatives considered for Site 4. While Alternative 3-RCRA Subtitle D Cap is considered as slightly more protective, the costs are significantly higher and implementability is considered more difficult. Therefore, based on available information and the current understanding of site conditions, Alternative 2 provides the best balance with respect to the first seven of the nine NCP evaluation criteria.

The Preferred Alternative does not satisfy the statutory preference for treatment as a principal element of the remedy because there is no principal threat waste at Site 4 that require treatment and treatment of the landfill contents is not practicable in a cost-effective manner because of the significant size of the landfill (10 acres).

The Preferred Alternative is based on current information and can change in response to public comment or new information. The VDEQ and the USEPA have reviewed the Proposed Remedial Action Plan and support the Preferred Alternative. However, their final concurrence with the alternative will be provided following review of all comments received during the public comment period.

10 Community Participation

A community relations program is being conducted through the Installation Restoration process. Public input is a key element in the decisionmaking process. Nearby residents and other interested parties are strongly encouraged to use the comment period to relay any questions and concerns about Site 4, the remediation alternatives that have been evaluated, and the Preferred Alternative. The Navy will summarize and respond to comments in a responsiveness summary, which will become part of the official ROD.

This Proposed Remedial Action Plan fulfills the public participation requirements of CERCLA Section 117(a), which specifies that the lead agency (i.e., the Navy) must publish a plan outlining any remedial alternatives evaluated for the site and identifying the Preferred Alternative. The remedial alternatives are presented in detail in the FS. All documents referenced in this Proposed Remedial Action Plan are available for public review at the information repositories (see Section 10.3 below).

A Restoration Advisory Board (RAB) was formed in 1999. Meetings continue to be held to provide an information exchange among community members, the USEPA, VDEQ, and the Navy. These meetings are open to the public and are held about every 6 months.

10.1 Public Comment Period

The public comment period for the Proposed Remedial Action Plan provides an opportunity to provide input regarding the source control and risk reduction process for Site 4. The public comment period will be from May 12 to June 12, 2004, and a public meeting will be held on May 17, 2004 at the Major Hillard Library, St. Juliens Creek Annex at 4:30 pm. All interested parties are encouraged to attend the meeting to learn more about the alternatives developed for Site 4. The meeting will provide an additional opportunity to submit comments on the Proposed Remedial Action Plan to the Navy.

Comments must be postmarked no later than June 12, 2004. On the basis of comments or new information, the Navy may modify the Preferred Alternative or choose another alternative. The back page of this Proposed Remedial Action Plan may be used to provide comments to the Navy. Please cut off the page, fold, and add postage where indicated. Use of this form is not required.

10.2 Record of Decision

After the public comment period, the Navy, in consultation with the USEPA and VDEQ, will determine whether the Proposed Remedial Action Plan should be modified on the basis of comments received. Any required modifications will be made by the Navy and reviewed by the USEPA and VDEQ. If the modifications substantially change the proposed remedy, additional public comment may be solicited. If not, then the USEPA and Navy will prepare and sign the ROD. The ROD will detail the remedial actions chosen for the site and will include

the Navy's responses to comments received during the public comment period.

10.3 Available Information

The Community Relations Plan, Installation Restoration Program fact sheets, and final technical reports concerning Site 4 are available to the public at the following location:

Major Hillard Library
824 Old George Washington Hwy N
Chesapeake, Virginia 23323

(757) 382-3600

If individuals have any questions about SJCA Site 4, they may call or write to one of the contacts provided.

During the comment period, interested parties may submit written comments to the following addresses:

Mr. Robert Schirmer, Code EV22-RGS
Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Blvd.
Norfolk, VA 23508-1278
(757) 322-4751
Fax - (757) 322-4805

Mr. Todd Richardson, Code 3HS13
USEPA Region III
1650 Arch Street
Philadelphia, PA 19103
(215) 814-5264
Fax - (215) 814-3051

Ms. Debra Miller
Virginia Dept. of Environmental Quality
629 E. Main Street
Richmond, VA 23219
(804) 698-4206
Fax - (804) 698-4234

Glossary

ARARs: Applicable or Relevant and Appropriate Standards, Limitations, Criteria, and Requirements. These are Federal or State environmental rules and regulations.

Background Concentration: The concentration of a naturally occurring or manmade constituent, such as a metals, found in groundwater, soil, sediment, and surface water in areas not impacted by spills, releases, or other site-specific activities. Background concentrations of some metals and other constituents are often at levels that may pose a risk to human health or the environment. These background-related risks should be considered (i.e.: subtracted) when calculating the risk posed by site conditions.

Carcinogenic Risk: Cancer risks are expressed as a number reflecting the increased chance that a person will develop cancer if exposed to chemicals or substances. For example, EPA's acceptable risk range for Superfund sites is 1 x 10-4 to 1 x 10-6, meaning there is 1 additional chance in 10,000 (1 x 10-4) to 1 additional chance in 1 million (1 x 10-6) that a person will develop cancer if exposed to a site that is not remediated.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act. A Federal law, commonly referred to as the "Superfund" Program, passed in 1980 that provides for cleanup and emergency response in connection with numerous existing inactive hazardous waste disposal sites that endanger public health and safety or the environment.

Contaminant Migration Pathway: The routes that site contaminants may take to get from the source of contamination to a human being, animal, or plant.

ERA: Ecological Risk Assessment. An evaluation of the risk posed to the environment if remedial activities are not performed at the site.

FS: Feasibility Study. Analysis of the practicability of a remedial proposal. The feasibility study usually recommends the selection of a cost-effective alternative.

Groundwater: Subsurface water that occurs in soils and geologic formations that are fully saturated.

HHRA: Human Health Risk Assessment. An evaluation of the risk posed to human health should remedial activities not be implemented.

HI: Hazard Index. A number indicative of noncarcinogenic health effects that 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.

HQ: Hazard Quotient. HQs are used to evaluate noncarcinogenic health effects and ecological risks. A value equal to or less than one indicates that the human or ecological population are not likely to experience adverse effects.

IAS: Initial Assessment Study. A document produced in 1981 as part of the Navy Assessment and Control of Installation Pollutants (NACIP) program to systematically identify, assess, and control contamination from past hazardous materials management operations.

Institutional Controls: Administrative methods to prevent human exposure to contaminants, such as by restricting the use of groundwater for drinking water.

Media (singular, Medium): Soil, groundwater, surface water, or sediments at the site.

MCL: Federal Maximum Contaminant Level. Enforceable standards that apply to public water systems, developed by USEPA. The highest level of a contaminant that is allowed in drinking water.

NCP: National Oil and Hazardous Substances Contingency Plan. Provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

Nine Evaluation Criteria:

- **Overall Protection of Human Health and the Environment** - Addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- **Compliance with ARARs** - Addresses whether a remedy will meet all of the Applicable or Relevant and Appropriate Standards (ARARs) of other Federal and State environmental laws and/or justifies a waiver of the requirements.
- **Long-Term Effectiveness and Permanence** - Addresses the expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up goals have been met.
- **Reduction of Toxicity, Mobility, and Volume Through Treatment** - Discusses the anticipated performance of the treatment technologies a remedy may employ.
- **Short-Term Effectiveness** - Considers 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 clean-up goals are achieved.
- **Implementability** - Evaluates the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement an option.
- **Cost** - Compares the estimated capital, operation and maintenance (O&M) and present worth costs.
- **State Acceptance** - Considers the State support agency comments on the Proposed Remedial Action Plan.
- **Community Acceptance** - Provides the public's general response to the alternatives described in the Proposed Remedial Action Plan and Remedial Investigation (RI) and Feasibility Study (FS) Reports. The specific responses to the public comments are addressed in the Responsiveness Summary section of the Record of Decision (ROD).

Noncarcinogenic Risk: Noncancer Hazards (or risk) are expressed as a quotient that compares the existing level of exposure to the acceptable level of exposure. There is a level of exposure (the reference dose) below which it is unlikely for even a sensitive population to experience adverse health effects. USEPA's threshold level for noncarcinogenic risk at Superfund sites is 1, meaning that if the exposure exceeds the threshold, there may be a concern for potential noncancer effects.

NPL: National Priorities List. A list, developed by USEPA, of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

Present-Worth Cost: Total cost, in current dollars, of the remedial action. The present-worth cost includes capital costs required to implement the remedial action, as well as the cost of long-term operations, maintenance, and monitoring.

Proposed Remedial Action Plan: A document that presents and requests public input regarding the proposed cleanup alternative.

Public Comment Period: The time allowed for the members of an affected community to express views and concerns regarding an action proposed to be taken by USEPA, such as a rulemaking, permit, or Superfund-remedy selection.

RAOs: Remedial Action Objectives. Objectives of remedial actions that are developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health and ecological risk assessment, and attainment of regulatory cleanup levels, if any exist.

RCRA: Resource Conservation and Recovery Act. A Federal law, passed in 1976 that ensures that wastes are managed in a manner that protects human health and the

environment, reduce or eliminate the amount of waste generated, and conserve energy and natural resources through waste recycling and recovery.

Receptors: Humans, animals, or plants that may be exposed to risks from contaminants related to a given site.

Remedial Action: A cleanup method proposed or selected to address contaminants at a site.

RFA: RCRA Facility Assessment. A document produced as part of the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), that authorizes the USEPA to require corrective action for releases of hazardous waste or hazardous constituents from solid waste management units (SWMUs) and other areas of concern (AOCs) at all operating, closed, or closing RCRA facilities. The RFA includes a Preliminary Review (PR) of all available relevant documents, a Visual Site Inspection (VSI), and, if appropriate, a Sampling Visit (SV).

RI: Remedial Investigation. A study of a facility that supports the selection of a remedy where hazardous substances have been disposed or released. The RI identifies the nature and extent of contamination at the facility.

ROD: Record of Decision. A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and public comment on the considered selected remedy.

Site: The facility and any other areas in close proximity to it where a hazardous substance, hazardous waste, hazardous constituent, pollutant, or contaminant from the facility has been deposited, stored, disposed of, placed; has migrated; or otherwise come to be located.

TBCs: To be considered criteria. Non-enforceable guidelines that are used to help evaluate the merits of a remedial alternative. An example of TBC criteria are the USEPA risk-based concentrations database.

USEPA: United States Environmental Protection Agency. The Federal agency responsible for administration and enforcement of CERCLA (and other environmental statutes and regulations), and with final approval authority for the selected ROD.

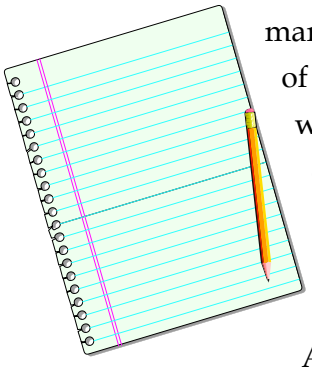
VDEQ: The Virginia Department of Environmental Quality. The Commonwealth agency responsible for administration and enforcement of Commonwealth environmental regulations.

Please print or type your comments here

Mark Your Calendar for the Public Comment Period

Public Comment Period
May 12 - June 12, 2004

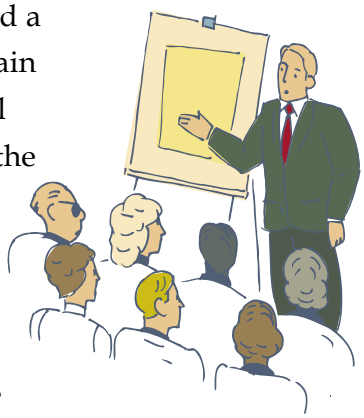
Submit Written Comments



Written comments must be post-marked no later than the last day of the public comment period, which is June 12, 2004. Based on the public comments or on any new information obtained, the Navy may modify the Preferred Alternative. This form may be used to provide comments, please fold page, seal, add postage where indicated, and mail to addressee as provided.

Attend the Public Meeting

Monday May 17, 2004 at 4:30 pm
Major Hillard Library
824 Old George Washington Hwy N
Chesapeake, Virginia 23323



The U.S. Navy will hold a public meeting to explain the Proposed Remedial Action Plan and all of the alternatives presented in the Site 4 Feasibility Study. Verbal and written comments will also be accepted at this meeting.

FOLD HERE

Place stamp here

Mr. Robert Schirmer, Code EV22-RGS
Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Blvd.
Norfolk, Virginia 23508-1278