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PROPOSED PLAN FOR SITE 3 NORTHWEST LANDFILL NCBC GULFPORT MS
7/1/2010
NCBC GULFPORT

**PROPOSED PLAN FOR SITE 3 – NORTHWEST LANDFILL
NAVAL CONSTRUCTION BATTALION CENTER GULFPORT
GULFPORT, MISSISSIPPI
July 2010**

NAVY ANNOUNCES PROPOSED PLAN

This Proposed Plan presents the Navy's recommendation to address contaminants detected in surface soil and **groundwater** at Site 3, the Northwest Landfill, at the Naval Construction Battalion Center (NCBC) Gulfport. This Proposed Plan was developed by the Navy as the lead agency and follows United States Environmental Protection Agency (USEPA) and Mississippi Department of Environmental Quality (MDEQ) policies and procedures.

This document provides environmental information about the site, summarizes the remedial alternatives that were evaluated, explains the rationale used to support the **preferred alternative** for cleaning up Site 3, and summarizes information found in detail in the **Remedial Investigation (RI)** and **Feasibility Study (FS)** Reports for Site 3 at NCBC Gulfport.

The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 117 (a) of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, as amended, and Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan** to assist and involve the community in the decision-making process.

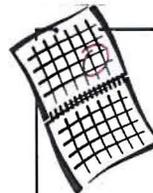
The public is invited to comment on this Proposed Plan during the Public Comment Period beginning on July 15, 2010, and ending on August 16, 2010. The Proposed Plan and other site documents are available for review at the NCBC Gulfport **Information Repository**, which is located in the Temporary Gulfport Library (see the box at right for more information). Public comments will be considered in the selection of the final remedy and will be addressed in the Site 3 Decision Document.

SITE BACKGROUND AND HISTORY

NCBC Gulfport is a Navy base located in the western portion of Gulfport, Mississippi, in southeastern Harrison County, about 1.2 miles north of the Gulf of Mexico. The installation is approximately 1,100 acres and currently consists of military housing, training, and support facilities.



Figure 1 – Site 3 is Located on the Former Pine Bayou Golf Course



MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD
July 15, 2010, to August 16, 2010

The Navy will accept written comments on the Proposed Plan during the Public Comment Period.

PUBLIC MEETING
July 15, 2010

The Navy will hold a public meeting to explain the Proposed Plan and the alternatives evaluated in the **FS**. Written comments will also be accepted during the meeting, which will be held at the Isiah Fredericks Community Center, 3312 Martin Luther King Jr. Boulevard, Gulfport, Mississippi, with a poster session starting at 5:30 p.m. and a presentation followed by a question and answer session at 6:30 p.m.

INFORMATION REPOSITORY

All the technical and public information publications prepared to date for the site are available at the following location:

Temporary Gulfport Library
47 Maples Drive #1
Gulfport, MS 39507
Telephone: (228) 871-7171



*For more information about this plan, please call
Mr. Gordon Crane, NCBC Gulfport at (228) 229-0446.*

*Words in **italicized boldface** are defined in the glossary on Page 9.

SITE CHARACTERISTICS

Site 3, as shown in Figure 2, is an approximately 2.6-acre former landfill located in the northwestern section of NCBC Gulfport. The landfill area is located northeast of the intersection of 8th Street and Colby Avenue and has until recently been used as a portion of the 16th fairway and 18th tee box at the Pine Bayou Golf Course. Future use of the area is currently being planned, but is anticipated to remain recreational. A small pond is located north of the 16th fairway (Golf Course Pond), and a second larger pond located south of 8th Street serves as a water source for golf course irrigation.



Figure 2 – Site 3 Location

The Site 3 landfill operated from 1948 to 1966. During this time, nearly all of the solid waste (approximately 30,000 tons) and some of the liquid/chemical waste generated at NCBC Gulfport were disposed of in this landfill.

No significant contamination was found at Site 3 during a base-wide Initial Assessment Study completed in 1987. Contamination was first reported during a base-wide **groundwater** study completed in 1995, at which time only lead and thallium were detected in **groundwater** at concentrations greater than their **Maximum Contaminant Levels**.

In 1999, two **groundwater** monitoring wells were installed downgradient of Site 3 and sampled. All analytes were either non-detect, or were less than regulatory criteria.

To determine the nature and extent of contamination at the site, an **RI** was conducted between the summer of 2006 and fall of 2007. The **RI** consisted of a **geophysical survey**; **soil gas survey**, and surface soil, subsurface soil, **sediment**, **surface water**, and **groundwater** sampling. The **RI** Report concluded that conditions at Site 3 are similar to a typical military landfill with characteristics similar to a municipal landfill and that a **Presumptive Remedy** approach should be applied at the site to expedite cleanup. (See highlight box on Page 3 for more information about presumptive remedies.)

The **RI** report, which included the risk assessments, identified **contaminants of concern (COCs)** for Site 3. **COCs** are contaminants that are identified as needing further evaluation to determine if their presence poses a risk to human health or the environment.

The original study boundary shown on Figure 3 below was based on historical information and provided a starting point of the investigation. Due to the results of the investigation, the study boundary changed as shown.

The following constituents were identified in the **RI** report as **COCs** for Site 3:

Soil

- **Polynuclear aromatic hydrocarbons (PAHs)**
 - Benzo(a)anthracene
 - Benzo(a)pyrene
 - Benzo(b)fluoranthene
- Arsenic

Groundwater

- Metals (iron and arsenic)
- Benzene
- **Chlorinated solvents**
 - Vinyl chloride
 - cis-1,2-Dichloroethene (DCE)
 - Trichloroethene (TCE)
 - 1,2-Dichloroethane (DCA)
 - Methylene chloride

The **chlorinated solvents** found at the site form a **dissolved plume** covering an area of approximately 90,000 square feet. The presence of **chlorinated solvents** is likely associated with waste disposal practices and base operations that included the use of solvents in degreasing. Elevated arsenic concentrations were detected in **groundwater** samples from the southern part of the site. Although upgradient of the landfill and apparently not related to waste disposal activities, arsenic was considered a **COC** and will be addressed in the remedial action.

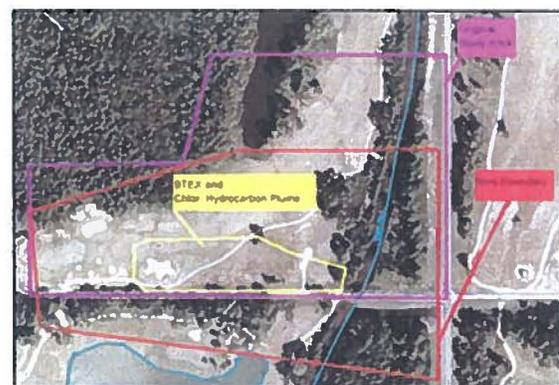


Figure 3 – Site 3 Boundary

PRESUMPTIVE REMEDY FOR MILITARY LANDFILLS

In early 1990, the USEPA began looking at various ways to streamline environmental cleanup. One approach was to use standardized proven technologies to cleanup similar sites such as municipal landfills. These standardized technologies for specific categories of sites are called "**Presumptive Remedies**". Use of **Presumptive Remedies** has been shown to ensure consistency in remedy selection and to reduce the cost and time required for investigation and remediation of sites with similar characteristics.

The USEPA has published guidance documents that specifically encourage source containment for military landfills with characteristics similar to municipal landfills. The application of containment as the **Presumptive Remedy** most often requires the design and installation of some form of landfill surface cover designed to meet the following three goals:

- Minimize infiltration of water that could dissolve contaminants in the landfill.
- Prevent direct contact with the landfill wastes and prevent movement of the waste by wind or water.
- Prevent exposure to landfill gas.

Site 3 fits the criteria of a landfill mentioned in the USEPA guidance based on the following:

- Risks are low level except for hotspots.
- Waste types are generally household, commercial, non-hazardous sludge, and industrial solid wastes.
- Lesser quantities of hazardous wastes are present as compared to municipal-type wastes, if any.
- No military-specific wastes (such as unexploded ordnance, radioactive waste, or biological/chemical warfare agents) are present.

According to the USEPA **Presumptive Remedy** guidance and based on the characteristics of the site, containment using a final cover that minimizes the passage of water, prevents direct contact with the waste, and management of landfill gas would be considered adequate to address contamination at Site 3.

SCOPE AND ROLE OF THE ACTION

As part of the Navy's Installation Restoration Program, an Initial Assessment Study of the base was performed

in the 1980s, and nine sites were identified for further investigation. Although the base has not been placed on the **CERCLA National Priorities List**, the Department of Defense is conducting investigations and cleanup activities following **CERCLA** regulations under their **Environmental Restoration Program** with MDEQ as the lead regulatory agency. Decision Documents and cleanup have been completed for three sites (Sites 5, 8, and 10), and an Action Memorandum was prepared for Site 6, which is in the **groundwater** monitoring phase. The overall strategy for the **Environmental Restoration Program** at the base is to perform cleanup on a site-by-site basis to ensure protection of current and future site users to support the military base operation and mission.

Implementation of the **preferred alternative** will allow the current and reasonably anticipated future land use at Site 3 to remain recreational. The remedy described in this Proposed Plan is intended to be the only remedial action at Site 3 and addresses the risks involved with potential exposure to soil and **groundwater** at the site. The remedial action proposed will address the source area and reduce risk to human health and the environment.

SUMMARY OF SITE RISKS

A summarized explanation of the evaluation and results of the **human health risk assessment** and **ecological risk assessment** is presented below. Detailed results and in-depth information can be found in the **RI**. The **RI**, **FS**, and other documents pertaining to Site 3 can be found at the **Information Repository**.

Human Health Risk Assessment

A **human health risk assessment** estimates the likelihood of health problems occurring if no cleanup action were taken at the site. The following four-step process is used to calculate the baseline risk:

- **Data evaluation** – This first step looks at the concentrations of contaminants found at a site and compares the data to risk-based numbers to determine which contaminants are most likely to pose the greatest threat to human health.
- **Identification of exposure pathways** – In Step 2, consideration is given to the different ways that people might be exposed to the contaminants identified in the previous step, the concentrations to which people might be exposed, and the potential frequency and duration of exposure. Using this information, a "reasonable maximum exposure" scenario is calculated, which portrays the greatest level of human exposure that could reasonably be expected to occur.
- **Assess potential health dangers (also called toxicity assessment)** – In Step 3, the information from Step 2 is combined with information on the

toxicity of each chemical to assess potential health risks. Two types of risks, cancer risk and noncancer risk, are considered. The likelihood of any kind of cancer resulting from a site is generally expressed as an upper bound probability (for example, a "1 in 1,000,000 chances"). In other words, for every 1,000,000 people that could be exposed, one extra cancer case may occur because of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. The MDEQ considers any risk above one in one million unacceptable. For noncancer health effects, a hazard index is calculated. The hazard index is a threshold level below which noncancer health effects are no longer predicted. The MDEQ considers a hazard index of 1 or less as acceptable.

- **Estimation of potential risks** – In Step 4, it is determined 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 risk assessment for Site 3 was based on chemical data in surface soil and **groundwater** collected during the **RI**. Although a site may have numerous receptors, the **human health risk assessment** for Site 3 evaluated the most sensitive hypothetical receptors, which were trespassers, site/occupational workers, construction/ excavation workers, and residents.

Based on the findings of the risk assessment, an unacceptable human health risk was identified for hypothetical future residents based on potential exposure to **COCs** in surface soil and **groundwater** at the site and for lifelong trespassers and industrial workers exposed to **COCs** present in surface soil at the site. The **COCs** identified in the risk assessment are listed on Pages 2 and 8. Receptor exposure to surface water and sediment was evaluated and does not pose unacceptable risk. It should also be noted that **groundwater** associated with Site 3 is not currently used as a source of drinking water, and there are no plans to develop this resource or the Site 3 area for residential purposes in the future.

Screening-Level Ecological Risk Assessment

Ecological risks resulting from exposure to site surface soil were not evaluated because of the planned final cover for Site 3 (based on the **Presumptive Remedy** guidance). Ecological risks were evaluated for **sediment** and **surface water** in Canal No. 1 (see Figure 4). Preliminary screening of **COCs** against regulatory criteria indicated potential risk to receptors. Food chain modeling, which more thoroughly evaluates the site-specific conditions, was performed, and the overall level of ecological risk associated with the site is considered minimal.

Because of past activities at Site 3, various chemicals (see Pages 2 and 8) are present in soil and groundwater at concentrations that could result in unacceptable human health risks. In addition, there is an inherent risk associated with potential exposure to landfill materials remaining at the site. It is the Navy's judgment that the **preferred alternative** identified in this Proposed Plan is necessary to protect public health or welfare or the environment from disposed waste, contaminants, or hazardous substances from this site, which may present an imminent and substantial endangerment to public health or welfare.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are the goals that a cleanup plan should achieve. They are established to protect human health (and the environment if necessary) and to comply with all pertinent federal and state regulations. The following **RAOs** were developed for Site 3 in the **FS** based on its current and reasonably anticipated future use:

- RAO 1: Prevent direct contact with landfill contents, landfill gas, and **groundwater** affected by the landfill, thereby eliminating unacceptable human exposure scenarios for soil, landfill gas, and **groundwater**.
- RAO 2: Minimize infiltration and resulting contaminant **leaching to groundwater**.

Because a **Presumptive Remedy** is proposed for this site, the evaluation of alternatives was streamlined and only two remedial alternatives were analyzed.

SUMMARY OF REMEDIAL ALTERNATIVES



**Figure 4 –
Alternative 1**

The following section summarizes the remedial alternatives developed for Site 3:

Alternative 1: No Action

A "no action" alternative is always used as a baseline for comparison. This alternative assumes that no changes would be made to the existing conditions at the site.

Alternative 2: Comprehensive Action

This alternative consists of the following components: (1) landfill cap, (2) **land use controls**, (3) **natural attenuation** of the **chlorinated solvent** plume and **long-term monitoring of groundwater**, and (4) landfill gas management and monitoring. After implementation

of the **Presumptive Remedy**, the covered site would be available for recreational uses.

The landfill “cap” will be constructed as a surface cover consistent with MDEQ solid waste regulations (see Figure 5). This final cover would prevent direct contact with solid waste, minimize rainfall passage through soil that can leach contaminants to **groundwater**, and prevent transport of waste from the landfill site to **surface water** due to erosion along Canal No. 1. The proposed cover would consist of various layers to prevent infiltration and to manage landfill gas and stormwater runoff. Prior to installing the final cover, the site would be regraded to promote runoff from the site.

Land use controls would be developed and implemented to prevent future residential development of the site, withdrawal of **groundwater** from beneath the site, and excavation that could result in exposure to impacted soil and/or **groundwater** and landfill materials. Periodic inspections would be conducted to ensure that the cover has not been damaged and to determine if maintenance to the surface is required.

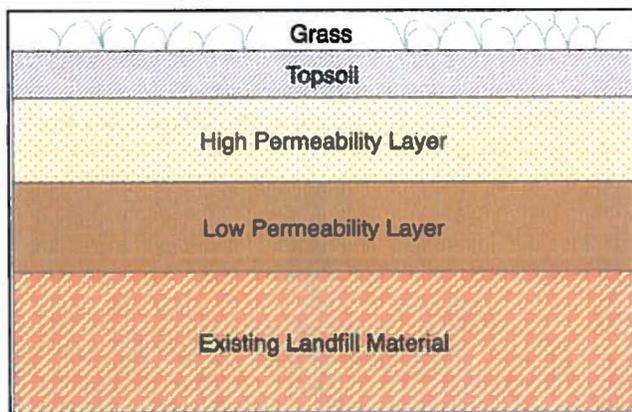


Figure 5 – Alternative 2

Chlorinated solvents in **groundwater** would be addressed with **natural attenuation**. **Natural attenuation** is the process in which naturally occurring microorganisms, such as bacteria, break down the target chemicals (in this case **chlorinated solvents**) into less toxic or non-toxic substances.

Long-term monitoring would consist of periodically collecting **groundwater** samples from selected wells to assess the effectiveness of the landfill cap and the progress of **natural attenuation** in breaking down the **chlorinated solvents** at the site.

Landfill gas would be controlled by preventing the accumulation of methane gas below the cap. Methane gas is created when the waste within the landfill degrades. Methane concentrations would be measured at landfill vents and from probes installed during the remedial action.

EVALUATION OF ALTERNATIVES

The remedial alternatives were compared to each other using the nine criteria established by the **National Contingency Plan** (see “Nine Evaluation Criteria” on Page 7). Please consult the Site 3 **FS Report** for more detailed information. The following is a summary of these comparisons.

Overall Protection of Human Health and the Environment

Alternative 1 would not be protective of human health and the environment because there would be nothing to prevent exposure to contaminants in soil and **groundwater**. Alternative 1 would not meet the **RAOs**.

Alternative 2 would be protective of human health and the environment because a final cover would be installed over the area of contamination to ensure that future potential site users would be protected from exposure to unacceptable levels of contaminants. **Land use controls** would restrict residential uses of the site and prevent potential exposure to the remaining landfill materials and unacceptable levels of contaminants in soil and **groundwater** that would remain under the capped area. The site would be suitable for its planned future use as a recreational area. All of the **RAOs** would be met under this alternative.

Compliance with ARARs

Applicable or Relevant and Appropriate Requirements (ARARs) establish the regulatory constraints of the cleanup. See the “What are ARARs?” highlight box for more information about **ARARs**.

Alternative 1 would not comply with chemical-specific **ARARs** because unacceptable levels of contaminants would remain at the site and exposure to the contaminants would not be controlled. There are no location-specific **ARARs** for Site 3, and action-specific **ARARs** would not be applicable because no action would be taken.

Alternative 2 would comply with chemical-specific and action-specific requirement **ARARs** because exposure to media with contaminant concentrations greater than regulatory criteria would be prevented by the landfill cap and **land use controls**. Location- and action-specific **ARARs** would be met and include the Mississippi Air Pollution Rules (for grading and landfill gas discharge), Mississippi Solid Waste Management Facility Regulations (for the landfill cap), and Mississippi Brownfields Voluntary Cleanup and Redevelopment Regulations.

WHAT ARE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)?

ARARs stands for "Applicable or Relevant and Appropriate Requirements". The following three types of legal requirements are addressed in a cleanup action:

- Chemical-specific ARARs address concentrations of contaminants that the cleanup must meet. The MDEQ Target Remediation Goals are chemical-specific ARARs for Site 3.
- Action-specific ARARs regulate how a cleanup remedy is implemented and define how contaminants are managed.
- Location-specific ARARs address legal issues for special location such as wetlands and tribal lands. There are no location-specific ARARs for Site 3.

Long-Term Effectiveness and Permanence

Alternative 1 would have no long-term effectiveness or permanence because waste would remain on site and there would be no **land use controls** to prevent human exposure and no monitoring to detect potential contaminant migration.

Alternative 2 would be effective long-term and permanent because the cap would provide a barrier that would prevent recreational personnel from exposure to contaminants at the site, and **land use controls** would provide further protection against inadvertent exposure to contaminants in the subsurface.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 would not reduce toxicity, mobility, or volume of waste through treatment.

Alternative 2 would reduce toxicity, mobility, and volume of contaminants through treatment. Treatment under Alternative 2 includes the landfill cover, which would reduce the mobility of contaminants within the landfill, and ongoing **natural attenuation**, which is expected to continue to reduce the toxicity and volume of contamination.

Short-Term Effectiveness

Implementation of Alternative 1 would not result in risks to site workers or adversely affect the surrounding community or environment because no remedial activities would be performed.

Potential risks to humans during implementation of Alternative 2 would be managed using dust suppression and control measures to minimize exposure to contaminated soil particulates during on-site activities such as regrading. Erosion control measures would minimize the potential migration of contaminants into Canal No. 1. On-site workers would be adequately

protected using established health and safety equipment and procedures. Alternative 2 would be expected to achieve **RAOs** immediately upon completion of remedial actions.

Implementability

Alternative 1 would be extremely simple to implement because no action would occur.

Alternative 2 would be implementable because of the following:

- It would use a proven approach, which was recently implemented at a similar site on the base.
- It would use typical construction industry equipment for excavation and earthmoving.
- Off-site locations for clean soil have been identified and are available.
- **Land use controls** have been successfully developed by the Navy with concurrence by the MDEQ and USEPA at other sites on this base.

Cost

The capital and **operation and maintenance** costs of Alternative 1 is \$0 since nothing would be performed. For Alternative 2, the capital cost was estimated to be \$1,749,000. The **net present worth** of Alternative 2 including the capital and long-term costs is estimated at \$2,559,000. The costs have been rounded to the nearest \$1,000 to reflect the preliminary nature of these estimates.

PREFERRED ALTERNATIVE

The **preferred alternative** for cleaning up Site 3 is Alternative 2: Comprehensive Action, which includes (1) landfill cap, (2) **land use controls**, (3) **natural attenuation** of the **chlorinated solvent** plume and **long-term monitoring of groundwater**, and (4) landfill gas management and monitoring.

Because waste will remain in place with contaminants in excess of levels that allow for unlimited exposure or unrestricted use, the Navy would review the remedial action every 5 years after initiation of the remedial action [per **CERCLA** Section 121(c) and the **National Contingency Plan** at 40 Code of Federal Regulations 300.430(f)(4)(ii)]. If the results of any five-year reviews show that remedy integrity is compromised and that protection of human health is insufficient, additional remedial actions would be evaluated and may be implemented by the Navy.

Based on the information currently available, the Navy believes that the **preferred alternative** meets the threshold criteria and complies with the modifying criteria (see "Nine Evaluation Criteria"). The Navy expects the **preferred alternative** to satisfy the following statutory requirements of **CERCLA** Section 121(b): (1) be protective of human health and

the environment, (2) comply with **ARARs**, (3) be cost effective, and (4) utilize permanent solutions to the maximum extent practical, and satisfy the preference for treatment as a principal element of the remedy.

The Navy, in conjunction with the USEPA and MDEQ, will not select a final alternative until public comments have been considered.

COMMUNITY PARTICIPATION

The public is encouraged to participate in the decision-making process for the cleanup of Site 3 by reviewing and commenting on this Proposed Plan during the Public Comment Period.

Additional information on this site can be found in the **RI** and **FS** Reports and other Site 3 documents. These documents are maintained at the NCBC Gulfport **Information Repository**, which is located at the Temporary Gulfport Library, 47 Maples Drive #1, Gulfport, Mississippi, 39507.

A public meeting to present this Proposed Plan will be held on July 15, 2010. The date, location, and time of the public meeting, as well as the dates for the Public Comment Period and the location of the **Information Repository**, are provided on Page 1 of this Proposed Plan.

NINE EVALUATION CRITERIA

Threshold Criteria

The selected remedy must satisfy the following criteria:

Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through **land use controls** or treatment.

Compliance with ARARs evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Balancing Criteria

These criteria are used to weigh the relative merits of the following alternatives:

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

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

Short-Term Effectiveness considers the length of time needed to implement an alternative and the risk the alternative poses to workers, residents, and the environment during implementation.

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

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

Modifying Criteria

The following criteria are also considered during remedy selection:

State/Support Agency Acceptance considers whether the state agrees with the Navy's analyses and recommendations, as detailed in the **RI**, **FS**, and Proposed Plan.

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

CONTAMINANTS OF CONCERN AT SITE 3

COCs are substances detected at concentrations and/or in locations where they could have an adverse effect on human health and the environment. For Site 3, **COCs** include the following:

Benzene

Benzene is a naturally occurring element and is a major industrial chemical made from coal and oil. Potential short-term health effects associated with exposure to benzene include skin, eye, and respiratory tract irritation as well as drowsiness and dizziness. Potential long-term effects include an increase cancer risk in humans exposed long-term to high concentrations of benzene as well as affects to the blood and immune system.

Chlorinated Solvents

Chlorinated solvents are widely used in industry and in common household products. These chemicals are or have been used as degreasing fluids for many different purposes such as dry cleaning clothes, decaffeinating coffee, cleaning metal machinery, and dissolving grease buildup in septic tanks. Some chlorinated solvents are found in household products such as spot removers, typing correction fluids, adhesives, automotive cleaners, inks, and wood furniture cleaners, which could be associated with the household waste disposal that occurred in this landfill. The chlorinated solvents detected in the groundwater at this site include vinyl chloride, cis-1,2-DCE, TCE, 1,2-DCA, and methylene chloride as a result of landfill activity that included the disposal of solvents and typical daily waste from a military base. Many chlorinated solvents can affect the central nervous system, liver, and kidneys. Most are irritating to the skin, eyes, and mucous membranes. Some can be absorbed through intact skin, and several are suspected or known to cause cancers or rapid, erratic heartbeats.

Metals

Arsenic and iron were the two metals identified as **COCs** at Site 3. Arsenic is a naturally occurring metal in regional soil. At this site, elevated iron was typically found in the same monitoring wells as wells with elevated concentrations of arsenic. Exposure to high doses of arsenic can cause thickening and discoloration of the skin, stomach pain, nausea, vomiting, diarrhea, and numbness in the hands and feet. Direct skin contact with arsenic may cause redness and swelling. Iron exposures can cause gastrointestinal effects.

Polynuclear Aromatic Hydrocarbons

PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances such as tobacco and charbroiled meat. **PAHs** usually occur naturally but can also be manufactured as individual compounds for research purposes; however, they cannot be manufactured as the mixtures found in combustion products. The **PAHs**, which were present in soil in excess of regulatory criteria at this site, include benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene. A potential health affect associated with breathing or having skin contact with **PAHs** over a long period is cancer.

Glossary

This glossary defines the bolded, italicized terms used in the Proposed Plan. The definitions in this glossary apply specifically to this Proposed Plan and may have other meanings when used in different circumstances.

Applicable or Relevant and Appropriate Requirements (ARARs): The federal, state, and local environmental rules, regulations, and criteria that must be met by the selected remedy under **CERCLA**.

Chlorinated Solvents: An organic solvent (cleaner) that contains chlorine atoms. The more common uses are as a dry-cleaning agent, degreaser, parts cleaner, and paint remover.

Contaminant of Concern (COC): A substance detected at a concentration and/or in a location where it could have an adverse effect on human health and the environment.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law also known as "Superfund". This law was passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. The Department of Defense complies with **CERCLA** requirements via their **Environmental Restoration Program**.

Dissolved Plume: An area of groundwater that is contaminated above acceptable levels.

Ecological Risk Assessment: A study that evaluates the potential risk to ecological receptors (various types of plants and animals) from contaminants at a site.

Environmental Restoration Program: The Department of Defense Program established to comply with **CERCLA** regulations and the **National Contingency Plan**.

Feasibility Study (FS): A report that presents the development, analysis, and comparison of cleanup alternatives for a site that has undergone an **RI**.

Geophysical Survey: The collection of information associated with subsurface physical features at a site. For Site 3, the **geophysical survey** was used to gather information regarding disturbances that may indicate landfill activities.

Groundwater: The supply of fresh water found beneath the Earth's surface that supply wells and springs.

Human Health Risk Assessment: A study that evaluates the potential risk to human receptors (such as site workers and residents) from contaminants at a site.

Information Repository: The public collection of documents related to the investigations and cleanup actions for the site.

Land Use Controls: Engineered and non-engineered measures formulated and enforced to regulate current and future land use options. Engineered measures include fencing and posting. Non-engineered measures typically consist of administrative deed restrictions that prohibit residential development and/or **groundwater** use.

Leaching: The process by which soluble constituents are dissolved and filtered through soil by a percolating fluid.

Long-Term Monitoring: A program used to verify the site status, which typically involves groundwater sampling. The intent is to ensure that site conditions do not change in a way that might adversely affect the environment or public.

Maximum Contaminant Level: The legal threshold limit on the amount of a hazardous substance that is allowed in drinking water under the Safe Drinking Water Act.

Natural Attenuation: The reduction of contaminant concentrations in the environment through biological processes, physical phenomena, and/or chemical reactions. For example, a specialized bacterium is capable of digesting **chlorinated solvents** such as those found at Site 3, which results in the solvents being degraded into a less harmful compound.

National Oil and Hazardous Substances Pollution Contingency Plan: More commonly called the **National Contingency Plan**, is the federal government's blueprint for responding to both oil spills and hazardous substance releases.

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

Net Present Worth: A costing technique that expresses the total of initial capital cost and long-term **operation and maintenance** costs in terms of present day dollars

Operation and Maintenance: Activities conducted after a site action is completed to ensure that the action is effective.

Polynuclear Aromatic Hydrocarbon: Chemical compounds that are commonly found in oil, tar, gasoline and diesel fuel.

Preferred Alternative: The remedy recommended by the Navy for cleaning up a site. The remedy may be modified or changed based on comments received during the Public Comment Period.

Presumptive Remedy: A standardized proven technology to cleanup a specific type of site such as a municipal landfill. **Presumptive Remedies** have been shown to ensure consistency in remedy selection and reduce the cost and time required for investigation and remediation of similar types of sites.

Remedial Action Objective (RAO): A cleanup objective agreed on by the Navy, USEPA, and MDEQ. One or more **RAOs** are typically formulated for each environmental site.

Remedial Investigation (RI): A report that describes the site, documents the type and distribution of environmental contaminants detected, and presents the results of the human health and **ecological risk assessments**.

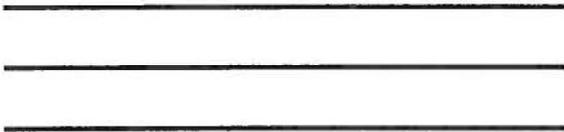
Sediment: Solid material deposited in **surface water** bodies such as ditches, streams, or lakes.

Soil Gas Survey: An investigative technique to measure air that is present in the void spaces of the soil above the **groundwater** table.

Surface Water: Water bodies that are on land surface such as lakes, river, streams, and ditches. The **surface water** body at Site 3 is Canal No. 1.

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