Proposed Plan

Building 81 – Operable Unit 9
Former Naval Air Station South Weymouth
Weymouth, Massachusetts

The Proposed Plan

This Proposed Plan was prepared in accordance with federal law to present the Navy's proposed cleanup approach for the Building 81 Site at the former Naval Air Station (NAS) South Weymouth in Weymouth, Massachusetts. **The Navy's proposed remedy for the Building 81 Site consists of in-situ enhanced bioremediation, bio-barriers, monitored natural attenuation, and land use controls.** This document summarizes the proposed remedy and describes how to become involved in the decision-making process.

Let us know what you think!

Mark Your Calendar!

PUBLIC COMMENT PERIOD

October 15, 2013 to November 14, 2013

The Navy will accept written comments on the Proposed Plan for the Building 81 Site during this period. Send written comments postmarked no later than November 14, 2013 to:

Mr. Brian Helland
Remedial Project Manager
BRAC PMO, Northeast
4911 South Broad Street
Philadelphia, PA 19112

or email your comments to: brian.helland@navy.mil

PUBLIC MEETING AND PUBLIC HEARING – October 22, 2013

The Navy will hold a public meeting at 7:00 p.m. that will include posters and a Navy presentation describing the Proposed Plan. Following the presentation the Navy will host a question-and-answer session. The Navy will then hold a formal public hearing from 8:00 p.m. until all comments are heard. At the formal hearing an official transcript of comments will be entered into the record. The above activities will be held at the Caretaker Site Office, 1134 Main Street, Building 11, South Weymouth, MA (phone: 617-753-4656).

For more information, visit one of the Information Repositories listed at the end of this Proposed Plan.

Introduction

This Proposed Plan provides information to the public on the proposed cleanup approach for the Building 81 Site at the former NAS South Weymouth (the Base), located in Weymouth, Massachusetts. This plan has been prepared to inform the community of the Navy's basis for the preferred cleanup approach for the Site, and encourage community participation in the decision-making process.

The Navy prepared this Proposed Plan for the Building 81 Site based upon a thorough evaluation conducted in accordance with the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This law, better known as Superfund, establishes procedures for investigating and cleaning up hazardous waste sites. Key terms, such as CERCLA, are defined in the Glossary of Terms at the end of this document.

The Navy (as the lead agency) works closely with the U.S. Environmental Protection Agency (USEPA) and the Massachusetts Department of Environmental Protection (MassDEP) in performing environmental investigations, remedial actions, and related activities at the Base in order to return the property to the local communities for reuse and redevelopment.

The Navy prepared this Proposed Plan in accordance with CERCLA Section 117(a) and Section 300.430(f)(2) of the National Contingency Plan (NCP) to fulfill its public participation responsibilities. This plan and associated community involvement fulfill the Navy's public participation responsibilities under these laws.

The purpose of this Proposed Plan is to:

- Provide background information about the environmental investigations and removal actions completed at the Site;
- Identify and explain the Navy's preferred cleanup plan for the Site;
- Describe other cleanup options that were considered;
- Encourage public review and comment on the alternatives presented in this Proposed Plan; and
- Provide information on how the public can be involved in the decision-making process.

Once the public has had the opportunity to review and comment on this Proposed Plan, the Navy will summarize and respond to all comments received during the comment period and public hearing in a document called the Responsiveness Summary. The Navy, USEPA, and MassDEP will carefully consider all comments received; based on the comments, the Navy could modify the cleanup plan or even select a different plan from that proposed. Ultimately, the selected cleanup plan for the Site will be documented in the Record of Decision (ROD). The Responsiveness Summary will be issued with the ROD.

This Proposed Plan summarizes key information from various reports concerning the Building 81 Site. More detailed information can be found in the referenced reports. The reports, including the Remedial Investigation (RI) and Feasibility Study (FS), are available for review at the Information Repositories for the Base (locations listed at the end of this document) and in the Navy's Administrative Record file for the Site.

The Navy encourages the public to review the referenced reports to gain a better understanding of environmental activities completed for the Building 81 Site.

Scope and Role of the Response Action

The Building 81 Site is one of the sites identified at the former NAS South Weymouth for cleanup under CERCLA. Each site undergoing cleanup under CERCLA progresses through the cleanup process independently of the other. The response action for the Building 81 Site is not expected to affect the strategy or progress of environmental investigations at other sites at the Base. As these sites advance through the cleanup process, separate Proposed Plans will be issued accordingly.

The CERCLA Process and the Building 81 Site

The Building 81 Site is one of several CERCLA Operable Units (OUs) located at the former NAS South Weymouth (see Figure 1). Each step in the CERCLA process was completed by the Navy with input from the USEPA and MassDEP.

The Building 81 Site was first investigated during the removal of a waste oil tank in 1991 as part of the Base changeover from underground storage tank (UST) storage to storage in 55-gallon drums. A voluntary Phase I Limited Site Investigation was conducted under the Massachusetts Contingency Plan (MCP) in June 1993 to determine if waste oil from the tank had contaminated the soil below.

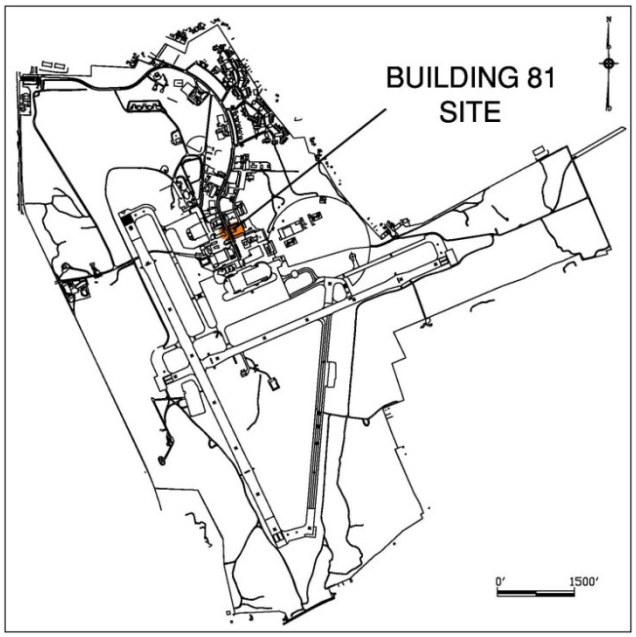

Figure 1 - Building 81 Site Location

The Navy performed several soil removals and additional investigations under the MCP regulatory program between 1993 and 1998; chlorinated volatile organic compounds (CVOCs) were detected in soil and groundwater. Once non-petroleum based contaminants were found, the Site was moved from the MCP program into the Navy's Installation Restoration (IR) Program for further investigation - under CERCLA. The Site was designated as IR Site 9, also referred to as OU 9. Work plans for the CERCLA investigations, which described the number of samples, locations and media, and analytical parameters, were developed in collaboration with the USEPA and MassDEP.

The Navy conducted Phase I and Phase II RIs between 2005 and 2007 and presented the findings in the 2008 Draft RI Report. In response to regulator comments regarding a need for additional site characterization, the Navy performed a Supplemental RI in 2009 and 2010. All of these studies were summarized in the October 2011 Final RI Report which included the results of the RIs and the previous environmental investigations. The RI also included a human health risk assessment (HHRA) to determine if contaminants at the Site posed a threat to human health. An ecological risk assessment (ERA) was not conducted due to the lack of any significant ecological habitat and thus incomplete exposure pathways for ecological receptors. An FS, prepared to evaluate potential cleanup alternatives, was completed in April 2013.

Information about the Building 81 Site is provided below. The reports referenced in this Proposed Plan are available at the Information Repositories listed at the end of this document as well as in the Navy's Administrative Record file for the Site.

Site Background

Where is the Building 81 Site?

The Building 81 Site is located in the central portion of the Base in the Town of Weymouth (Figure 1). A part of the site where the release occurred is fenced and bounded by Shea Memorial Drive to the west, Redfield Road to the north, an overgrown, heavily vegetated area to the east, and Building 140 to the south. A dissolved VOC contaminant plume extends west-southwest, across Shea Memorial Drive toward the Transportation Building as shown on Figure 2, page 12.

What was the Site used for?

Approximately 25 people typically worked at Building 81 on a full-time basis. Up to 200 Marine Reservists may have used Building 81 during training on weekends, which occurred up to three times per month when the Base was in operation.

The one-story building was demolished in 1997, leaving only the building's slab foundation. Waste materials generated during the vehicle maintenance activities were stored in a 500-gallon steel UST. The tank was installed in 1983 and removed in 1991. This tank and activities associated with the use of this tank are believed to be the cause of the contamination at the Building 81 Site.

Site Characteristics

What does the Site look like today?

The fenced portion of the Site surrounds approximately one acre of level land occupied by the former Building 81 foundation (a concrete slab) and paved areas to the east and south (Figures 2 and 3). The excavation area surrounding the former waste oil tank is located east of the building foundation (Figure 4).

Figure 3 – Building 81 Site from Shea Memorial Drive

Figure 4 – Building 81 Foundation; Grassy Area is the Former Waste Oil Tank Excavation Area

What were the investigation results?

Several investigations and removal actions have been conducted at the Building 81 Site, including soil removal actions, an in-situ chemical oxidation (ISCO) pilot test, soil and bedrock characterization, multiple groundwater sampling programs, the Phase I and Phase II RIs, and the Supplemental RI.

Summaries of these activities and investigations are provided below. The Environmental Investigations text box on page 5 provides a chronological summary of the various investigations.

Waste Oil Tank Removal

The Navy removed the 500-gallon waste oil UST and associated piping in 1991, along with an estimated 30 cubic yards of soil. The location of the former tank is shown on Figure 2. No significant holes, cracks, or leaks in the tank or piping were reported at the time of removal.

However, evidence of potential petroleum-contaminated soil was observed during removal of the tank. A soil sample was collected from the excavation bottom; the analytical results indicated the presence of total petroleum hydrocarbons (TPH) above MCP screening criteria. Metals concentrations were less than MCP screening criteria.

Voluntary Phase I Limited Site Investigation

A voluntary Phase I Limited Site Investigation was conducted under the MCP in June 1993 to further investigate the contamination associated with the former tank. Two soil borings were advanced to collect and analyze soil samples; one monitoring well (MW-1) was installed and groundwater samples were collected. TPH, arsenic, chromium, and lead were detected in all the soil and groundwater samples and sheen was observed on groundwater collected from MW-1. The TPH concentrations in soil all exceeded the MCP screening criteria.

Immediate Response Action

An Immediate Response Action (IRA) was conducted under the MCP in August 1994 to address the release of oil confirmed in 1993. Approximately 170 cubic yards of soil surrounding the former tank area were excavated. Seven confirmation samples were collected from the sidewalls and bottom of the excavation; concentrations of six samples exceeded the screening criteria for TPH and polycyclic aromatic hydrocarbon (PAH) compounds.

Three additional monitoring wells were installed and groundwater samples were collected. TPH and PAHs were not detected in the groundwater from these three new wells. A groundwater sample was not collected from MW-1. However, light non-aqueous phase liquid (LNAPL) was observed in MW-1 at a measured thickness of approximately 0.6 to 0.7 feet. The LNAPL was evacuated from the well.

Release Abatement Measure

A Phase I Initial Site Investigation (1995), Interim Phase II Comprehensive Site Assessment (1996), and Supplemental Phase II Comprehensive Site Assessment (1997) were performed to characterize the Site and determine the extent of soil and groundwater contamination. VOCs, including tetrachloroethene (PCE), and benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, were detected in the groundwater. (Investigations prior to 1995 focused primarily on TPH and did not include analyses for chlorinated VOCs [CVOCs]).

Based on the results of these investigations a soil removal action, referred to as a Release Abatement Measure (RAM), was conducted under the MCP in July and August 1998. The RAM included removal of approximately 1250 cubic yards of impacted soil around the former tank/MW-1 area and the localized PAH-impacted area east of the former tank as described below.

Approximately 450 cubic yards of soil were initially removed from an area approximately 40 feet by 35 feet beneath and surrounding the MW-1/former tank area. Based on confirmation samples, an additional 750 cubic yards were also excavated from this area, expanding the excavation significantly. A second set of confirmation sample results showed that two locations along the western wall of the excavation slightly exceeded the applicable MCP standards. However, additional soil was not excavated because the excavation was near recently installed bedrock wells and the building foundation.

A limited removal action was conducted to remove shallow soil east of the larger excavation area where PAHs were detected during the 1995 and 1996 investigations. Approximately 50 cubic yards of soil were excavated; confirmation sample results were less than the screening criteria.

In-Situ Chemical Oxidation Pilot Test

An Additional PCE Assessment (1998) and Bedrock Characterization Study (1999) were conducted to obtain additional groundwater data, bedrock core information, and complete a field testing program prior to implementing an in-situ chemical oxidation (ISCO) pilot test. Prior to implementation of the test, an additional 23 monitoring wells were installed in the overburden and bedrock.

A complete round of groundwater samples was collected to serve as a baseline to evaluate the performance of the pilot test. The ISCO treatment process involved injecting Fenton's reagent (a mixture of hydrogen peroxide and a catalyst solution

Environmental Investigations

1991: The 500-gallon waste oil UST and associated piping were removed.

1993: The Navy conducted a voluntary Phase I Limited Site Investigation under the MCP to further investigate the area beneath the former tank location. One well was installed, and soil and groundwater samples were collected.

1994: An IRA was conducted under the MCP; contaminated soil was removed from the former tank area. Additional wells were installed and soil and groundwater samples were collected. LNAPL was observed at a monitoring well.

1995-1997: Several investigations were conducted under the MCP to determine the extent of contamination in soil and groundwater around the former tank. VOCs, including PCE and BTEX compounds, were detected in groundwater samples; the highest PCE concentrations were detected downgradient of the former tank.

1998: A RAM was performed to remove the remaining VOC-impacted soil around the former tank excavation area and PAH-impacted soil east of the former tank. A total of 1,250 cubic yards of soil were removed and replaced with clean backfill.

1998-1999: An additional PCE assessment and bedrock characterization were performed. Soil borings were advanced, bedrock cores inspected, and groundwater samples collected. The data were used to support a potential ISCO pilot test.

2000-2001: An ISCO pilot test was conducted to assess the reduction in CVOC concentrations and evaluate the effectiveness of ISCO for full-scale application at the Site.

2005-2011: The Navy performed Phase I, Phase II, and Supplemental RIs to determine the nature and extent of contamination in site soil and groundwater. The field program included: installation of borings and monitoring wells; collection of soil, groundwater, and sub-slab vapor and soil gas samples; and hydraulic conductivity tests. The RI included an HHRA to determine risks to human health posed by the Site.

consisting of trace quantities of ferrous iron) into the subsurface under pressure to destroy organic contaminants in saturated soil and groundwater. Two ISCO injection rounds were performed; each round was followed by a post-injection groundwater sampling event.

The ISCO pilot test was somewhat effective in reducing CVOC concentrations in some areas but did not successfully meet all of its objectives due to: 1) inability to adequately reach all target zones, even with a very close spacing of injection wells; and (2) continued persistence of catalyst, reactant, and contaminants, which may be indicative of contaminant sources in very small and/or dead-end fractures that are hydraulically isolated.

Remedial Investigation Results

The results of the environmental investigations and removal actions completed between 1995 and 2002 were used in planning the RI; analytical results from historical investigations that were validated in accordance with USEPA guidelines were used in the RI Report where appropriate.

The RI included sampling of all of the available monitoring and ISCO injection wells installed during the prior investigations; the results were used in the data analysis to provide a complete picture of current conditions. In addition, soil results from the Phase I Initial Site Investigation and RAM were used in the RI evaluation of contaminant nature and extent and fate and transport. Soil results from the Interim and Supplemental Phase II Comprehensive Site Assessments were used in the RI evaluation of the nature and extent of contamination, fate and transport, and the HHRA.

Surface soil, subsurface soil, groundwater, and soil vapor samples were collected and used in the RI. The groundwater and soil samples were analyzed for a wide range of chemicals to characterize and delineate the presence, nature, and extent of contamination. The soil vapor samples were analyzed for VOCs only. The findings of the October 2011 RI are summarized below:

VOCs - VOCs, primarily PCE and its degradation products (trichloroethene [TCE], cis-1,2-dichloroethene [cis-1,2-DCE], and vinyl chloride), along with benzene (and other BTEX products), were detected in groundwater, soil, and soil vapor. VOCs were detected with the greatest frequency in groundwater and were generally detected infrequently in soils. PCE was the most frequently detected VOC in site groundwater and soil. The highest VOC concentrations in groundwater and soil were detected in the vicinity of the former tank excavation. The highest VOC concentrations in soil vapor were detected in the southeast quadrant of the foundation. Concentrations of five VOCs (PCE, 1,2,4-trimethyl-

benzene, 1,3,5-trimethylbenzene, benzene, total xylenes) in subsurface soil, three VOCs (PCE, benzene, ethylbenzene) in soil vapor, and eight VOCs (PCE, TCE, cis-1,2-DCE, vinyl chloride, 1,2-dichloro-ethane, chloroform, 1,2,4-trichlorobenzene, benzene) in groundwater exceeded USEPA screening criteria.

Semi-volatile Organic Compounds (SVOCs) - SVOCs were detected infrequently in groundwater and soil. Concentrations of nine SVOCs (mostly PAHs) in groundwater and seven SVOCs (all PAHs) in soil exceeded the USEPA screening criteria in a small number of samples.

Pesticides - Pesticides were detected infrequently and at low concentrations in site soil and groundwater. Four pesticides (aldrin, dieldrin, heptachlor, and heptachlor epoxide) were detected in groundwater at concentrations exceeding the USEPA screening criteria.

Polychlorinated Biphenyls (PCBs) - PCBs were not detected in groundwater. One PCB (Aroclor-1260) was detected infrequently in surface and subsurface soil samples.

Inorganics - Several inorganics (metals) were detected at the Site. Concentrations of four metals (arsenic, iron, manganese, and vanadium) in soil exceeded the USEPA screening criteria with the greatest frequency. Concentrations of three metals (arsenic, iron, and manganese) in groundwater exceeded the USEPA screening criteria with the greatest frequency. Many of the soil and groundwater sample metals concentrations were less than the established background values.

Figure 2 on page 11shows the Site boundary based on the findings of the RI. The boundary indicates the extent of CVOC contamination in overburden and bedrock groundwater. The Site overburden is 15 to 20 feet of unconsolidated materials, comprised primarily of sands with varying amounts of silt and gravel, underlain by bedrock.

Summary of Site Risks

Samples collected and evaluated in the RI were used in risk assessments to determine if site concentrations pose a threat to human health and the environment. An ERA was not conducted due to the lack of significant ecological habitat and thus incomplete exposure pathways for ecological receptors. The results of the HHRA are described below.

Human Health Risks

The HHRA was conducted to determine whether detected concentrations of chemicals at the Building 81 Site pose an unacceptable risk to human health. A four-step process was used to estimate the baseline risk for human health.

Step 1 - Hazard Identification. Chemicals of potential concern (COPCs) were identified as those analytes with concentrations that exceeded benchmark screening levels (USEPA Regional Screening Levels or RSLs) and background levels, if applicable. COPCs were used for site-specific risk calculations (i.e., Steps 2 through 4 described below).

Step 2 - Exposure Assessment. This step examines possible pathways by which humans may contact the COPCs based on current and future use scenarios.

Under current use scenarios potential risks to adolescent trespassers were evaluated. Potential exposure pathways included touching and incidental ingestion of surface soil, and inhalation of fugitive dust.

Under future use scenarios potential risks were evaluated for adolescent trespassers, child and adult recreational users, industrial/commercial workers, construction workers, and child and adult residents. Potential exposure pathways included touching and incidental ingestion of groundwater or soil, and inhalation of fugitive dust and chemicals volatilized from groundwater into indoor and outdoor air.

Step 3 - Toxicity Assessment. The possible harmful effects to humans from the COPCs were evaluated. These chemicals were separated into two groups: carcinogens (COPCs that may cause cancer) and non-carcinogens (COPCs that may cause adverse health effects other than cancer).

Step 4 - Risk Characterization. Lastly, the results from the exposure and toxicity assessments were combined to calculate the overall risks from exposure to site COPCs. The HHRA did not identify any unacceptable risks to human health under current exposure scenarios. The HHRA identified potential future cancer and non-cancer risks exceeding the acceptable USEPA risks described in the text box below.

Conclusions - Potential unacceptable risks were identified for three receptors/exposure scenarios: (1) future residents who use groundwater as drinking water; (2) future residents (building occupants) exposed to contaminants that volatilize from groundwater into the indoor air; and (3) construction

workers exposed to contaminants that volatilize from groundwater into construction trench air.

How Are the Risks Expressed?

It depends on the type of chemical. For potential carcinogens, the risk to human health is expressed in terms of the probability of the chemical causing cancer over an estimated lifetime of 70 years. EPA's acceptable risk range for carcinogens is from 1 in 1 million to 1 in 10,000. In general, calculated risks that are greater than 1 in 10,000 would require consideration of cleanup alternatives. For non-carcinogens, the risk to human health is expressed as a Hazard Index. A Hazard Index greater than 1 suggests that adverse health effects are possible.

The following groundwater contaminants contributed most significantly to human health risks and were identified as chemicals of concern (COCs): PCE, TCE, vinyl chloride, carcinogenic PAHs, arsenic, cadmium and manganese in groundwater used as drinking water; and PCE and naphthalene in indoor air and trench air (vapor intrusion).

Additional Risk Considerations

There are no medium- or high-yield aquifers mapped at the Site, so site groundwater is not considered a drinking water source. Future use of site groundwater for production, supply, or irrigation are not reasonably foreseeable uses and were not exposure scenarios evaluated in the FS.

Future uses of the former NAS South Weymouth property have been set by the Zoning and Land Use By-Laws and the Reuse Plan approved in 2005. The extent of groundwater contamination shown on Figure 2 (on page 11) is predominantly in an area zoned as a Recreation District (RecD). Allowable future uses in the RecD zone include institutional (by special permit), commercial, and public recreation and open space. The western extent of the groundwater contamination is in an area zoned as Village Center District (VCD). Allowable future uses in the VCD zone include institutional, commercial, office, retail, and residential.

It is the Navy's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other alternatives considered, is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants 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, and comply with all pertinent federal and state regulations.

Based on the risk assessments, an FS was required to address the identified human health risks. The media of concern include groundwater and vapor intrusion from volatilization of chemicals from site groundwater. The following RAOs were identified for the Building 81 Site:

1. Prevent the migration of COC-impacted groundwater at concentrations that pose unacceptable risk.
2. Prevent exposure of construction workers to COCs at concentrations that pose unacceptable risk.
3. Prevent exposure of potential building occupants to VOCs resulting from vapor intrusion into any future buildings on the Site at concentrations that pose unacceptable risk.
4. Prevent human exposure to COCs in groundwater at concentrations that pose unacceptable risk.

Preliminary Remediation Goals

Cleanup goals (also known as preliminary remediation goals [PRGs]) for the groundwater COCs were developed in the FS. The human health risk-based PRGs were based on calculations of acceptable risk levels, regulatory criteria, and background concentrations, taking into account exposure scenarios based on allowable future uses and the fact that site groundwater is not considered a drinking water source. The PRGs selected for site groundwater in the VCD and RecD zoning districts are shown below.

COC	PRG (µg/L)	
	VCD	RecD
PCE	110	500
TCE	8.5	23
cis-1,2-DCE	29,000	29,000
Vinyl Chloride	2.6	18
Benzene	21	140
Toluene	32,000	40,000
Naphthalene	38	38

Summary of Remedial Alternatives

Remedial alternatives, or cleanup options, were identified for the Building 81 Site in the FS. The alternatives identified were selected because they would meet the RAOs listed above. Table 1 on page 12 summarizes the estimated timeframes and costs for each alternative. Each alternative is described below.

Alternative G-1: No Action

A "no action" alternative would leave the Site as it is today. Although the Navy has not considered this to be an appropriate response action for the Building 81 Site, it is a statutory requirement under CERCLA to include it as a baseline for comparison with other alternatives.

Alternative G-2: Bio-barriers, Monitored Natural Attenuation (MNA), and LUCs

Under this alternative two bio-barriers, one in the overburden and one in bedrock, would be installed to intercept and treat the contaminant plume in the overburden and bedrock at its leading edge. An emulsified vegetable oil substrate (EOS) product would be injected into the ground through rows of injection points to stimulate reductive dechlorination of CVOCs in groundwater by naturally occurring microorganisms that would use the oil as food. A pilot study would be performed to confirm well spacing and application rate in both the overburden and bedrock. Alternatively, a phased design could be used for the installation of wells and injection of reagent. Monitoring (baseline and quarterly for 1 year) would be implemented to evaluate the effectiveness and progress of treatment as part of the MNA component. The reducing conditions resulting from injection of the EOS product could potentially cause temporary mobilization of metals such as iron and manganese. A contingency measure would be implemented if monitoring indicates that concentrations of these metals exceed target levels that would cause unacceptable risks (to be determined during the preparation of the long-term monitoring plan). MNA would be implemented for the rest of the plume, including the higher concentrations near the former tank location. The COCs that have not naturally attenuated by the time the contaminated groundwater reaches the bio-barriers would be treated as the groundwater passes through them. Contaminants downgradient of the bio-barriers would also degrade through natural attenuation processes. Natural attenuation of CVOCs has been found to be occurring to varying degrees across the Site. Groundwater monitoring would be conducted to assess the effectiveness of natural attenuation over time until the PRGs are achieved.

The locations and numbers of groundwater monitoring wells and the monitoring frequency would be identified in a long-term monitoring plan to be developed during the remedial design (RD). Groundwater samples would be analyzed for the COCs and various natural attenuation parameters.

LUCs would be implemented to control exposure to COCs in groundwater until the PRGs are achieved. The PRGs are based on the uses allowed in the VCD and RecD zoning districts. Permanent LUCs would be implemented to: prohibit installation of groundwater production, supply, or irrigation wells at the Building 81 Site; and prohibit future residential uses within the RecD zoning district at the Building 81 Site. The interim LUCs listed below are consistent with the types of construction and uses allowed in the RecD zoning district. The interim LUCs would be established upgradient of the LUC compliance boundary. The location of the interim LUC compliance boundary will be determined during the LUC RD.

- A LUC restricting the type and nature of construction permitted in the source area of the plume where the highest VOC concentrations have been detected and where active remediation might be conducted (as a contingency), until PRGs are achieved. Construction in the vicinity of the bio-barriers would also be restricted to prevent disturbance of and damage to the injection wells and allow future injections.

- A LUC requiring prior Navy, USEPA, and MassDEP approval of construction dewatering plans before excavation activities could be conducted, until PRGs are achieved.

- A LUC specifying health and safety procedures to be used by construction workers to prevent unacceptable exposure risks, until PRGs are achieved.

- A LUC specifying passive ventilation design and building construction methods, such as a sub-slab vapor migration system, to prevent exposure of building occupants to vapor intrusion from VOCs in groundwater at levels that pose an unacceptable risk, until PRGs are achieved.

The LUCs would be implemented through a LUC RD as part of the RD phase for the selected remedy. The LUC RD would describe the specific controls for the Site, as well as the implementation protocols and reporting requirements.

Annual inspections would be conducted to confirm compliance with the LUC objectives. An annual compliance certificate would be prepared and

provided to USEPA and MassDEP. USEPA and MassDEP would be notified prior to any property conveyance by the Navy.

Five-year reviews, including a site inspection, would be conducted within 5 years of initiation of the remedial action to ensure that the remedy continues to be protective of human health and the environment. Five-year reviews would continue to be performed as long as contaminants are present at concentrations that prevent unlimited exposure and unrestricted use.

Alternative G-3: Enhanced In-Situ Bioremediation, Bio-barriers, MNA, and LUCs

This alternative includes active treatment by enhanced in-situ bioremediation to reduce the source mass in areas with the highest contaminant concentrations in overburden and bedrock groundwater. An EOS product would be introduced via injection wells into the target treatment zones (TTZs) in overburden and bedrock to stimulate the reductive dechlorination of CVOCs in groundwater. The conceptual design in the FS assumed that injection locations would be on a grid with a spacing of approximately 10 feet between points in each TTZ to account for the uncertainty of lateral connection, particularly in bedrock fractures. A pilot study would be performed to confirm or adjust well spacing, the number of injection wells, and the EOS application rate and volume in both the overburden and the bedrock for optimal effect. Pilot study and groundwater monitoring data would be used during the RD to determine details for a second EOS injection.

The bio-barrier component would be identical to Alternative G-2.

The monitoring component would be similar to Alternative G-2, except that MNA would be implemented in the area between the source zone TTZs and bio-barriers. MNA would further reduce any residual CVOCs after active treatment with enhanced bioremediation in the TTZs.

The LUCs would be identical to those proposed for Alternative G-2 and will remain in place until the PRGs are achieved. Five-year reviews would be performed as long as contaminants are present at concentrations that prevent unlimited exposure and unrestricted site use.

Alternative G-4: In-Situ Chemical Oxidation, Bio-barriers, MNA, and LUCs

This alternative includes active treatment by in-situ chemical oxidation to reduce the source mass in areas with the highest contaminant concentrations in overburden and bedrock groundwater. A sodium permanganate solution would be injected into the overburden TTZ. The conceptual design in the FS assumed that injection locations would be on a hexagonal grid with a spacing of approximately 10 feet between points. A potassium permanganate and sand blend solution would be injected into the bedrock TTZs by hydrofracture emplacement. A pilot study or phased approach is proposed for this alternative to further evaluate hydrofracturing. A phased approach may be considered for application of the reagent.

The bio-barrier component would be identical to Alternative G-2.

The MNA component would be nearly identical to Alternative G-2, except that MNA would be implemented in the area between the source zone TTZs and bio-barriers. MNA would further reduce any residual CVOCs after active treatment with chemical oxidation in the TTZs.

The LUCs would be identical to those proposed for Alternative G-2. Five-year reviews would be performed as long as contaminants are present at concentrations that prevent unlimited exposure and unrestricted site use.

Evaluation of Alternatives

USEPA has established nine criteria for use in comparing the advantages/disadvantages of each remedial alternative. These criteria fall into three groups: threshold criteria that any selected alternative must meet; primary balancing criteria that are used to differentiate between alternatives; and modifying criteria that may be used to modify the recommended remedy. Each remedial alternative is individually evaluated in the FS with respect to seven of the nine criteria and then compared against each other with respect to each criterion. The two modifying criteria are evaluated after receipt of state and public comments on the Proposed Plan.

Table 1 on page 12 provides a general description of the nine evaluation criteria and presents a summary of the evaluation of the alternatives for the Building 81 Site. A detailed comparative analysis of the alternatives is provided in the FS. The Preferred Alternative described below meets the required threshold criteria and provides the best combination of the primary balancing criteria through treatment, long- and short-term effectiveness, and cost.

Preferred Alternative

In summary, the Navy is proposing Alternative G-3, In-Situ Enhanced Bioremediation, Bio-barriers, MNA,

and LUCs. This alternative is recommended because it will achieve substantial risk reduction by both actively treating the source materials constituting principal threats at the Site and providing safe management of the remaining material. A comparison of Alternative G-3 to the other alternatives evaluated in the FS indicates that Alternative G-3 provides a shorter overall time frame than either Alternative G-2 or Alternative G-4, is more protective than Alternative G-2, and is less costly than Alternative G-4. Alternative G-3 will also meet the RAOs and PRGs.

Enhanced in-situ bioremediation will be applied to the overburden and bedrock source areas using a series of injection wells. Because of uncertainties associated with current site conditions surrounding the former excavation/tank area, a pilot study will be performed, consisting of injection points in the overburden, shallow bedrock, and deep bedrock.

The results of the pilot study will be used, in conjunction with data collected during the pre-design investigation, to determine the appropriate level of effort for the aggressive source control component of the final bioremediation system design. For costing purposes, the FS assumed a specific area, number of wells, and amount of substrate for the system. The pre-design investigation and pilot study results will be used in the remedial design to ensure that the remedy will be effective in reducing source area contamination and preventing further migration of contaminated groundwater. Performance monitoring will be conducted at regular intervals to evaluate the effectiveness and progress of the source area treatment. Additional actions to control and reduce source contaminants will be evaluated if the performance monitoring demonstrates that the bioremediation system is not working as anticipated. In addition, the remedial system will be designed with the objective of achieving all remedial goals at the site within the shortest reasonable, and cost-effective, timeframe.

Two bio-barriers, one in the overburden and one in bedrock, would be installed to intercept and treat the contaminant plume at its leading edge using injections of an EOS product. A pilot study would be performed to confirm well spacing and application rate in both the overburden and bedrock. Alternatively, a phased design could be used for the installation of wells and injection of reagent.

Permanent LUCs will be implemented to prohibit installation of groundwater production, supply or irrigation wells at the Site and prohibit future residential use within the RecD portion of the Site. The permanent LUC compliance boundaries will be determined during the LUC RD.

Interim LUCs will be implemented in the RecD portion of the Site to prevent unacceptable risk from vapor intrusion and exposure to vapors in construction trenches until the PRGs are achieved. The location of the interim LUC compliance boundary will be determined during the LUC RD.

Based on information currently available, the Navy believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The Navy expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA §121(b): (1) be protective of human health and the environment; (2) comply with Applicable or Relevant and Appropriate Requirements (ARARs); (3) be cost-effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element, to the extent practicable.

Next Steps

Community review and comment on this Proposed Plan is the next step in the CERCLA process for the Building 81 Site. The Navy encourages the public to review this plan and submit comments. The Navy will accept written comments on the Proposed Plan during the public comment period from October 15, 2013 to November 14, 2013. The Navy will accept oral comments during a Public Hearing that will follow a Public Meeting to be held on October 22, 2013 at the Caretaker Site Office, 1134 Main Street, South Weymouth, MA.

Once the communities have commented on this Proposed Plan, the Navy and USEPA will consider all formal comments received. The Navy's proposed remedial alternative could change based on community comments. The Navy will provide written responses to all formal comments received on the Proposed Plan. The responses will be provided in the Responsiveness Summary which is included in the ROD for the Site.

The Navy and USEPA anticipate that all comments will be reviewed and the ROD will be signed by December 2013. The ROD will then be made available to the public at the Information Repositories listed at the end of this document. The Navy will also announce the availability of the ROD through the local news media and the community mailing list.

After the ROD is signed, the Navy will design and implement the selected remedy. After the design is completed, the Navy will oversee construction and implementation of the selected alternative.

Commitment to the Communities

The Navy is committed to keeping the communities informed on the environmental cleanup program at former NAS South Weymouth. A Restoration Advisory Board (RAB), comprised of community leaders, government agency representatives, and local citizens, meets regularly to discuss the environmental cleanup program at former NAS South Weymouth. At these meetings, you can learn about and offer suggestions for the Navy's cleanup program activities. Upcoming RAB meetings are publicized on local town websites and are open to the public. Past meeting minutes are available on the former NAS South Weymouth website: http://www.bracpmo.navy.mil.

The Navy also maintains a community mailing list for distributing information about the environmental cleanup program. If you would like to be added to the mailing list, please contact Mr. Brian Helland at the address or email provided on the first page of this Proposed Plan.

The information summarized in this Proposed Plan is available for review at the information repositories listed at the end of this document.

Important Dates

Public Comment Period
October 15, 2013 to November 14, 2013

Public Information Session and Public Hearing
October 22, 2013

Your Questions and Comments are Important!

Formal comments are used to improve the decision-making process. The Navy will accept written comments from the public during the 30-day comment period and will hold a public meeting and hearing to receive oral comments (see page 1 regarding how to submit formal comments to the Navy).

Your formal comments during this time will become part of the official record for the Building 81 Site. The Navy will consider the comments received during the comment period before making the final decision for the Site. The public is encouraged to participate during this period. You do not have to be a technical expert to take part in the process.

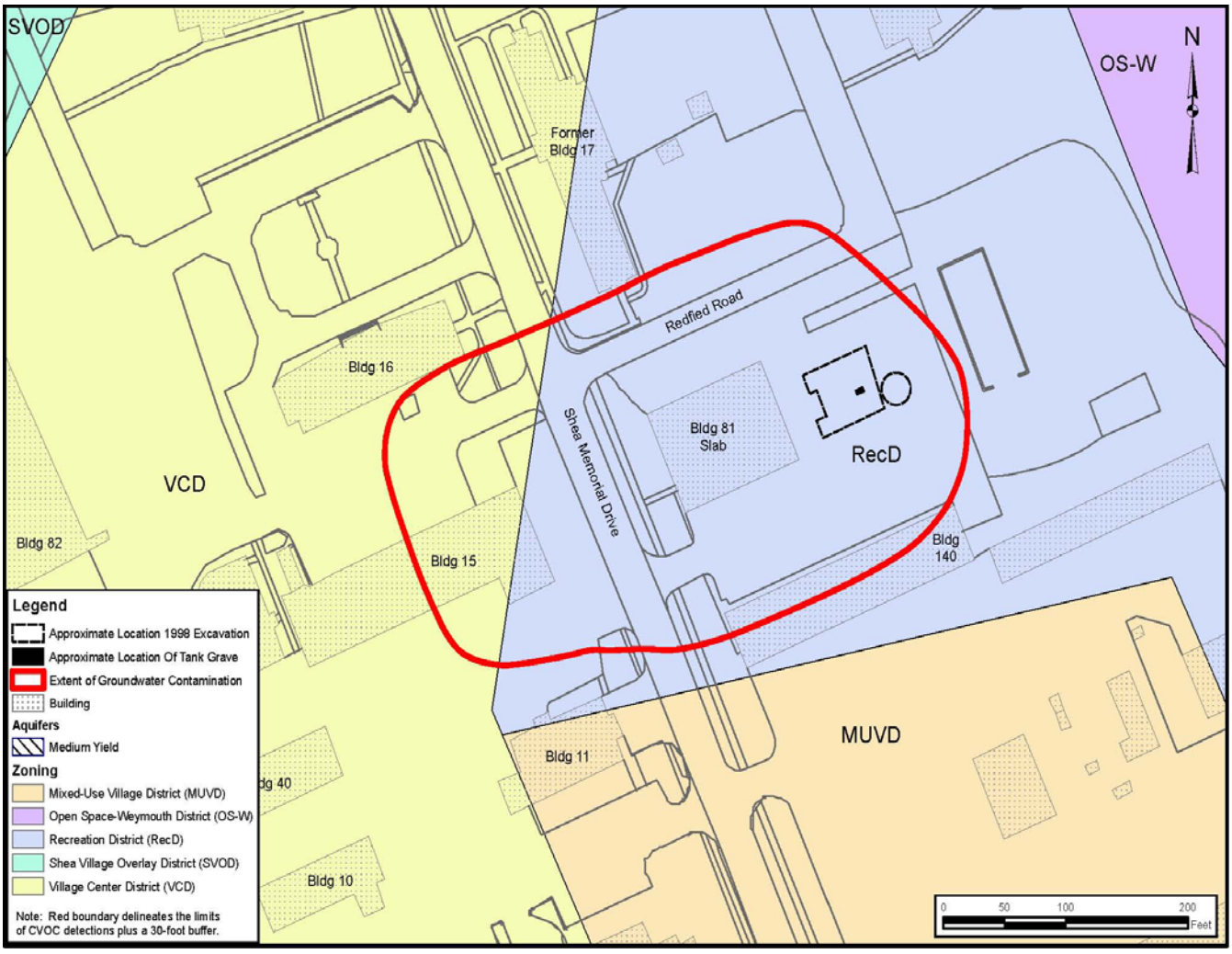

Figure 2 – Building 81 Site Features, Zoning, and Extent of Groundwater Contamination

TABLE 1
COMPARISON OF REMEDIAL ALTERNATIVES

ALTERNATIVE NUMBER	G-1	G-2	G-3	G-4
Estimated Timeframes (years)				
Designing and constructing the alternative	NA	<1	<1	<1
Achieving the cleanup objectives	NA	250	30	200
CRITERIA ANALYSIS				
Threshold Criteria				
Protects human health and the environment: • Will it protect you and the animal life on and near the site?	⊘	●	★	★
Meets federal and state regulations: • Does the alternative meet federal and state environmental statutes, regulations and requirements?	⊘	●	●	●
Primary Balancing Criteria				
Provides long-term effectiveness and is permanent: • Do risks remain from wastes left on site? • Are the controls adequate and reliable?	⊘	O	●	●
Reduces, mobility, toxicity and volume of contaminants through treatment: • Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	⊘	O	●	●
Provides short-term protection: • How soon will the site risks be reduced? • Are there hazards to workers, residents, or the environment that could occur during cleanup?	⊘	O	★	●
Can be implemented: • Is the alternative technically feasible? • Are the goods and services necessary to implement the alternative readily available?	●	●	●	●
Cost ($): * • Up-front costs to design and construct the alternative (called capital costs) • Operating and maintaining any system associated with the alternative (called O&M costs) • Total cost in today's dollars (called the present worth cost)	 11K 109K 120K	 1M 2.5M 3.5M	 1.2M 2.6M 3.8M	 1.7M 2.7M 4.3M
Modifying Criteria				
State agency acceptance: • Do state agencies agree with the Navy's recommended alternative?	To be determined after the public comment period			
Community acceptance: • What objections, suggestions, or modifications does the public offer during the public comment period?	To be determined after the public comment period			

Notes:
★ = Best ● = Better O = Good ⊘ = Poor
K = Thousand M = Million

* For cost estimating purposes all O&M costs represent a 30-year timeframe. Actual costs will be higher for the full duration of the remedial action.

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COMMENT SHEET – Proposed Plan for the Building 81 Site

Use this space to write your comments or to be added to the mailing list.

The Navy encourages your written comments on the Proposed Plan for the Building 81 Site, former NAS South Weymouth, Weymouth, Massachusetts. You can use the form below to send written comments. If you have questions about how to comment, please contact Brian Helland at (215) 897-4912 or via email at brian.helland@navy.mil.

This form is provided for your convenience. Please mail this form or additional sheets of written comments, postmarked no later than November 14, 2013, to the address shown below:

Mr. Brian Helland
Remedial Project Manager
BRAC Program Management Office, Northeast
4911 South Broad Street
Philadelphia, PA 19112

Comment Submitted by: _____

Address: _____

_____

_____

_____

Affix
Postage

Mr. Brian Helland
Remedial Project Manager
BRAC Program Management Office, Northeast
4911 South Broad Street
Philadelphia, PA 19112

(Fold on dotted line, staple, stamp, and mail)

GLOSSARY OF TERMS

Analyte: A substance or chemical constituent that is determined in an analytical procedure.

Applicable Relevant and Appropriate Requirements (ARARs): Federal environmental and state environmental and facility siting statutes and regulations that must be complied with for each alternative. The ARARs vary depending on the alternative being proposed.

Background Level: Concentrations of chemicals present in the environment due to naturally occurring geochemical processes and sources, or to human activities not related to specific point sources or source releases.

Benchmark: Concentration of a chemical considered to be protective of human health or the environment.

Chemicals of Concern (COCs): Chemicals of concern are chemicals identified in the risk assessments as the primary drivers of unacceptable risks.

Chemicals of Potential Concern (COPCs): Chemicals of potential concern are chemicals found at a site at concentrations above federal and state risk-screening levels and therefore are included in the risk assessment evaluations.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). These laws created a system and funding mechanism for investigating and cleaning up abandoned and/or uncontrolled hazardous waste sites. The Navy's cleanup of sites regulated by CERCLA/SARA is funded by the Department of Defense under the Defense Environmental Restoration Fund.

Feasibility Study (FS): A description and engineering study of the potential cleanup alternatives for a site.

Groundwater: Water found beneath the earth's surface that fills pores and cracks between materials such as sand, soil, gravel, or rock.

In-Situ Chemical Oxidation (ISCO): A form of treatment accomplished by injecting or otherwise introducing strong chemical oxidizers directly into the contaminated media to destroy chemical contaminants in place.

Land Use Control (LUC): Any legal or administrative restriction that prevents access or certain uses of a property.

Monitoring Well: A monitoring well is drilled at a specific location on or off a waste site. Groundwater can be sampled at selected depths, studied to determine the direction of groundwater flow, and analyzed to determine the types and quantities of chemicals present in groundwater.

Operable Unit: A site or sites being addressed collectively under the CERCLA process.

Proposed Plan: A CERCLA document that summarizes the preferred cleanup remedy for a site and provides the public with information on how they can participate in the remedy selection process.

Record of Decision (ROD): A CERCLA legal, technical, and public document that explains the rationale and final cleanup decision for a site. It contains a summary of the public's involvement in the cleanup decision.

Remedial Action Objective (RAO): A goal that is set to protect human health and the environment, and provide the basis to select cleanup methods. The RAOs must be met by the selected remedial alternative.

Remedial Investigation (RI): A step in the CERCLA process that involves a full characterization of the nature and extent of the chemicals at a site and determines whether or not the chemicals present a significant risk to human health or the environment.

Responsiveness Summary: A document included in the ROD which contains the responses to the formal comments submitted by the public regarding the Proposed Plan.

For More Information…

Contacts

If you have questions or comments about this Proposed Plan, or any other questions about the Building 81 Site, please contact us:

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EPA Project Manager
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Mr. David Chaffin
MassDEP Project Manager
(617) 348-4005
david.chaffin@state.ma.us

Information Repositories

Documents relating to environmental cleanup activities for the former NAS South Weymouth property are available for public review at the following information repositories:

Tufts Library
46 Broad Street
Weymouth, MA 02188
(781) 337-1402

Abington Public Library
600 Gliniewicz Way
Abington, MA 02351
(781) 982-2139

Department of the Navy
Caretaker Site Office
c/o David Barney
1134 Main Street, Building 11
South Weymouth, MA 02190
(617) 753-4656

Hingham Public Library
66 Leavitt Street
Hingham, MA 02043
(781) 741-1406

Rockland Memorial Library
20 Belmont Street
Rockland, MA 02370
(781) 878-1236

Librarian and NARA Certified
Records Manager NAVFAC Atlantic
Environmental
6506 Hampton Blvd
Norfolk, VA 23508-1278
757-322-4785
757-322-4805 (fax)
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