STATEMENT OF BASIS FACT SHEET FOR FORMER FIRE FIGHTING TRAINING AREA SOLID WASTE MANAGEMENT UNIT 3 NAS KEY WEST FL

5/1/1998

NAS KEY WEST

NAVAL AIR STATION KEY WEST
U.S. Navy Statement of Basis Fact Sheet for the Former Fire-Fighting Training Area (SWMU 3)

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This fact sheet is one in a series informing interested citizens of the Installation Restoration (IR) program being conducted at Naval Air Station (NAS) Key West. The IR program is the Department of Defense plan for environmental investigation and cleanup of military installations nationwide. The program is designed to address areas of contamination from past spills and waste disposal practices. Fact sheets will be produced at milestones and in response to other items of public interest. Community relations activities associated with the IR program, including distribution of fact sheets, are coordinated through the NAS Key West Public Affairs Office, (305) 293-2425.

Introduction

This fact sheet is issued by the U.S. Navy, the lead agency for Naval Air Station (NAS) Key West remedial activities, with concurrence by the U.S. Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (FDEP). The purpose of the fact sheet is to describe the preferred alternative for addressing environmental contamination at the Former Fire-Fighting Training Area and to solicit public comment on the preferred alternative. This fact sheet meets the EPA Resource Conservation and Recovery Act (RCRA) guidance recommending the preparation of a statement of basis (40 CFR 124.8).

The purpose of the fact sheet is to describe the preferred alternative for addressing environmental contamination at the Former Fire-Fighting Training Area and to solicit public comment on the preferred alternative

NAS Key West manages certain waste materials regulated under RCRA, a comprehensive law requiring responsible management of hazardous waste. Section 3004(u) of RCRA requires that releases from solid waste management units (SWMUs) be investigated and remediated as necessary. The former Fire-Fighting Training Area is a SWMU regulated under Section 3004(u) of RCRA and designated SWMU 3 at NAS Key West.

RCRA requires that the public be given the opportunity to review and comment on the proposed remedial alternative that will be the basis for a future draft RCRA permit modification (40 CFR 124.10 and 270.41). FDEP has similar requirements for public participation, which are listed in Chapter 62-004 Florida Administrative Code (F.A.C.). These requirements include establishing an Information Repository that documents the selection of remedial alternatives, and allowing for review and comment by the public on those alternatives. The NAS Key West Community Relations Plan (1996) facilitates public involvement in the decision-making processes for permitting, closure, and selection of remedial alternatives. FDEP requires the Navy to advertise the draft permit modifications and proposed remedial actions so that the public can participate in the selection of a remedial action (Chapter 62-004 F.A.C.).

Background

This fact sheet summarizes the information in the Information Repository that led to the selection of the preferred alternative. The fact sheet presents the preferred alternative and the reasons for its selection. Community involvement during the evaluation of remedial alternatives for SWMU 3 is sought.

RCRA provides opportunities for the public to comment on draft permit modifications (40 CFR 270.41). The preferred alternative proposed in this Fact Sheet is also being proposed in the draft permit modification under RCRA. Therefore, comments received on this Fact Sheet will apply to the draft RCRA permit modification that proposes the same remedy for this waste unit.

The final selection of the remedial alternative under RCRA will coincide with the final permit modification decisions made by EPA and FDEP in the near future. It is important to note that, depending on new information or public comments, the final action may be different from the

Public Comment Period Monday, June 29 to Thursday, August 27, 1998.

Public Meeting Monday July 27, 1998 at 7:00 pm

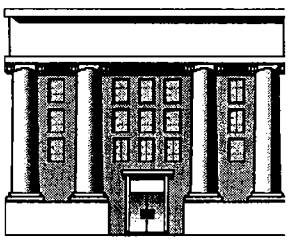
Holiday Inn Beachside, N. Roosevelt Blvd. Key West, Florida. Phone: 305-294-2571.

preferred alternative discussed in this fact sheet. In any case, the alternative chosen will be protective of human health and the environment and will comply with Federal and state environmental laws.

FDEP also requires that a brief description and response to all significant comments be made available to the public as part of the public record (Chapter 62-004 F.A.C.). All submitted comments will be reviewed and considered. Following the public comment period, a Responsiveness Summary will be prepared to address significant issues raised during the comment period. The Responsiveness Summary will be available with the final RCRA permit. To better understand RCRA activities as they pertain to SWMU 3, the public is encouraged to consult the Information Repository for this unit. The Community Involvement section of this fact sheet provides information on access to the Information Repository.

Community Involvement

This fact sheet summarizes information from the documents listed in the Reference section. The reference documents are part of the Information Repository, which is available to the public.



700 Fleming Street
Key West, Florida
(305) 292-3595

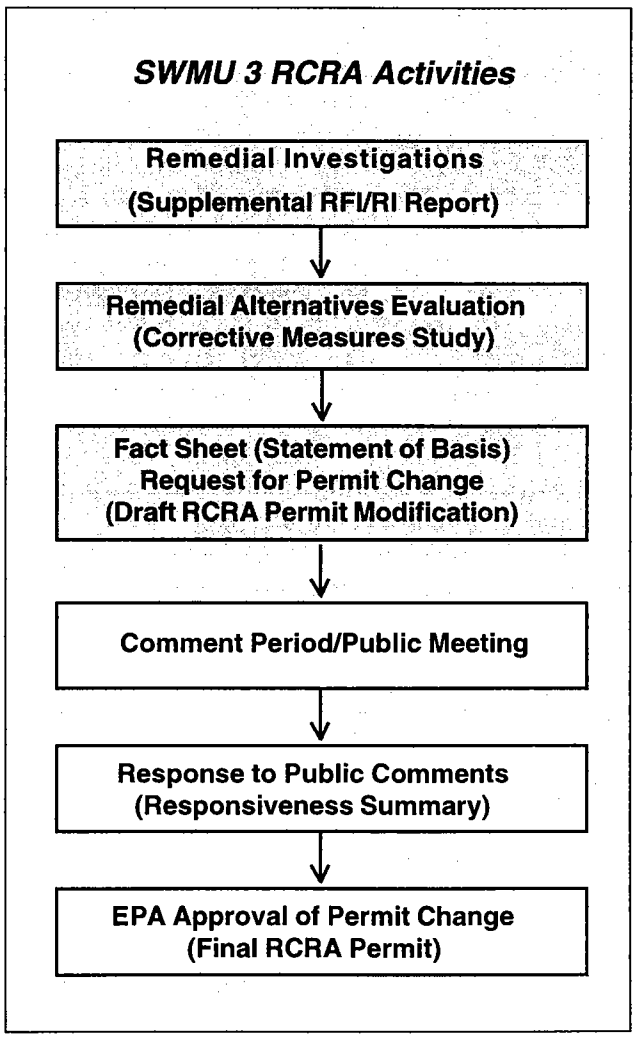
An Information Repository has been set up in the Local and State History Department at the Monroe County Library.

Public Comment Period and Meeting: The public will be notified of the public comment period (June 26 through August 26, 1998) through a mailing sent to approximately 100 citizens and through *The Citizen* newspaper that serves the southern Keys. The Navy has determined there is sufficient need to hold a public meeting 7 pm Monday, July 27, 1998, at the Holiday Inn Beachside N. Roosevelt Blvd., Key West, Florida; Phone: 305-294-2571.

At the meeting, the proposed action will be discussed and questions about the proposed action answered. To request information about the public meeting or comment period, to obtain more information concerning this Fact Sheet, or to submit written comments contact:

Martha Berry
Remedial Project Manager
U.S. Environmental Protection Agency
61 Forsyth Street, SW
Atlanta, GA 30303-3104
(404) 562-8533 or Fax (404) 562-8518

Following the public comment period, the EPA will issue a final decision for the RCRA permit modification. The RCRA permit modification will detail the remedial alternative chosen for the unit and will include responses to oral and written comments received during the public comment period in the Responsiveness Summary. EPA will issue a permit modification incorporating this remedy into the NAS Key West permit.



The following is excerpted from the Supplemental RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report for the High-Priority Sites (BRE 1997). It summarizes the results of the report in language that is more technical than is usually included in a fact sheet. If you have questions or would like further explanation of these results, call Phillip Williams, Installation Restoration Coordinator, Environmental Branch, NAS Key West, at 305-293-2061.

Scope and Role of Response Action within the Facility Strategy

NAS Key West is in southern Monroe County, Florida, primarily on Boca Chica Key and Key West. The entire Naval complex encompasses approximately 5,000 acres.

Boca Chica Key is approximately 3 miles wide and 3 miles long, and the air station encompasses 3,250 acres. The elevations of Boca Chica Key are less than 5 feet above mean sea level (msl) except for fill that underlies U.S. Highway 1. SWMU 3 is in the eastern portion of Boca Chica Key (Figure 1), west of the closed taxiway, approximately 700 feet southwest of Building A1005 (Figure 2).

There are several SWMUs on Boca Chica Key that are currently being evaluated to determine the impacts of contamination, if any, to associated groundwater, surface water, soil, and sediment. The proposed action for SWMU 3 is a final action. Upon disposition of all the SWMUs on Boca Chica Key, a final comprehensive RCRA permit modification will be pursued.

Media Specific Investigation for the Former Fire-Fighting Training Area SWMU 3

Unit Description and History

SMWU 3 is flat with little vegetation and is largely covered by concrete, gravel, or crushed shell. The unit contains aircraft and vehicles that were ignited with JP-5 fuel, waste oil, or hydraulic fluid for use in fire-fighting training. Until recently, two unlined circular pits approximately 20 feet in diameter and 2 to 3 feet deep, surrounded by gravel aprons, existed at SWMU 3. These pits received combustible liquids, which were ignited. In October 1995, soil and berms in the southern burn pit were excavated to bedrock and replaced with clean fill material as part of an Interim Remedial Action (IRA). Approximately 200 feet to the south and west of the former pits is a 16-acre lagoon fringed by red and black mangroves (Figure 2). Water depth in the lagoon ranges from approximately 16 to 26 inches. The lagoon is landlocked; therefore, no surface water connections exist to the ocean.

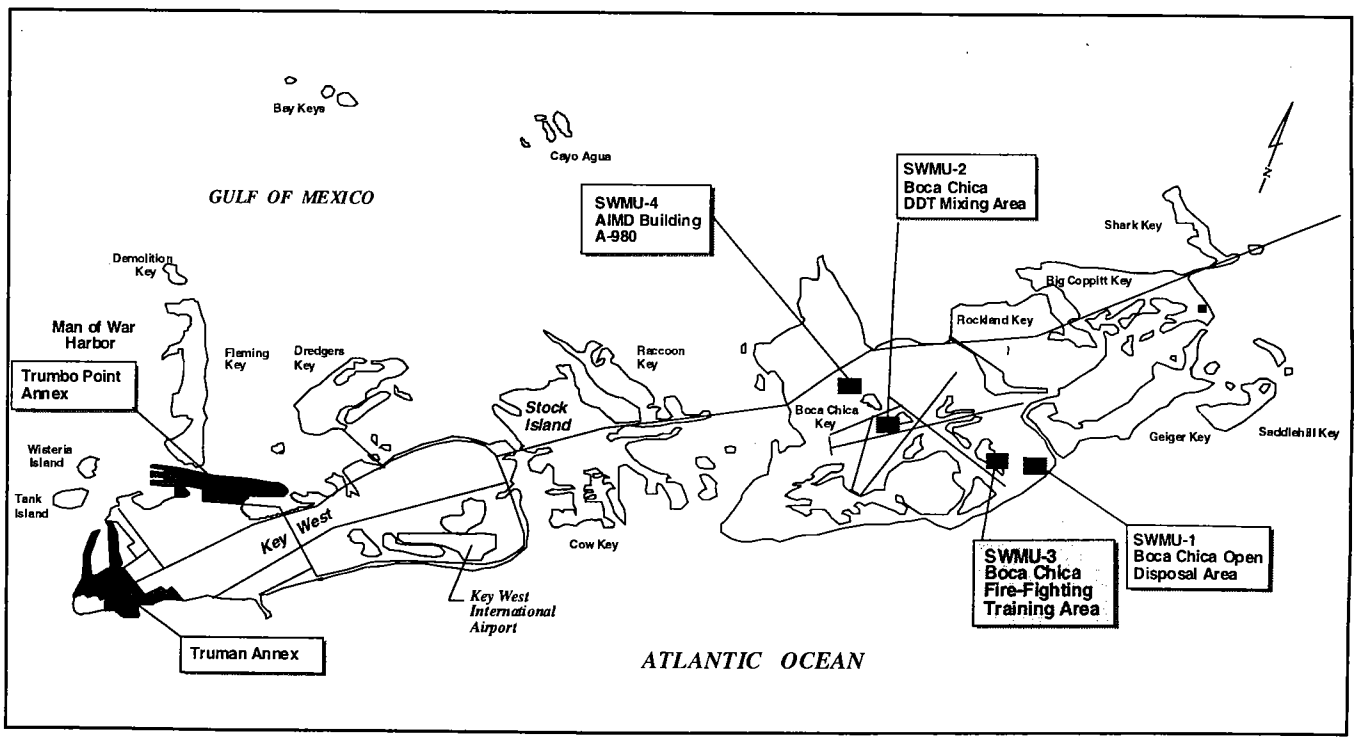


Figure 1. NAS Key West Installation Restoration Sites.

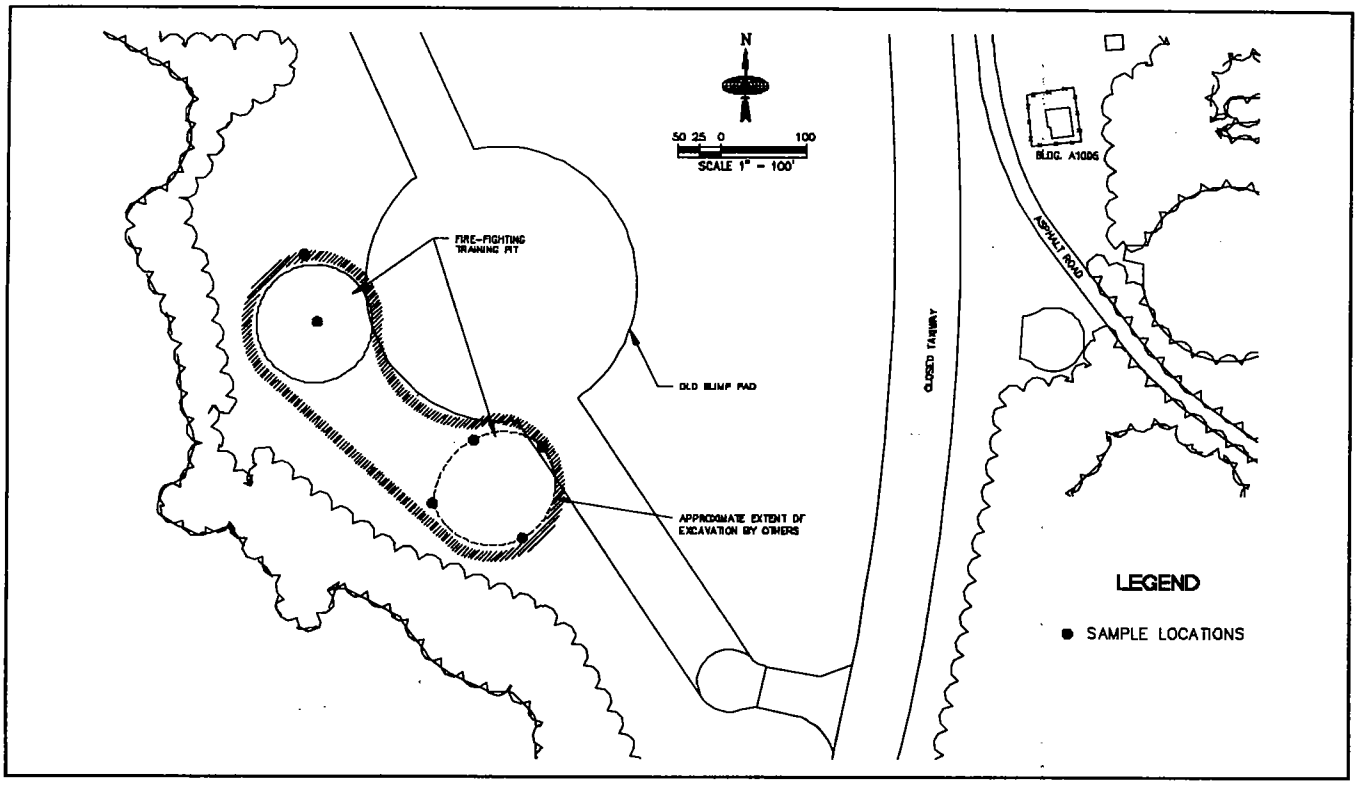


Figure 2. Site Location Map of SWMU 3.

The 1995 IRA at SWMU 3 was performed in parallel with the remedial investigation in an effort to expedite the remediation of the unit. The IRA included delineation sampling of the soil for benzene, toluene, ethylbenzene, and xylene (BTEX),

In October 1995 an IRA was conducted at SWMU 3 to remove contaminated soil from inside and around a burn pit.

and polynuclear aromatic hydrocarbon (PAH) contamination associated with the southern pit through the use of immunoassay kits followed by laboratory confirmation sampling. Post excavation soil sampling was also performed and analyzed by a laboratory. Approximately 900 tons (726 cubic yards) of contaminated soil were removed from the pit to a depth of between 20 to 35 inches and properly disposed offsite. The excavation was backfilled with crushed limerock to match the surrounding grade.

Media Assessment

A Conceptual Site Model (Figure 3) was developed to characterize the sources, potential exposure pathways, and exposure media relevant to SWMU 3. The primary source of contamination is material from past training activities. The potential contaminants of concern are hazardous substances within the oils and other fuels that were applied to the pit and burned, and the media used to extinguish the fires. Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, pesticides, and polychlorinated biphenyls (PCBs) were the contaminants investigated in surface and subsurface soils, sediment, surface water, and groundwater. The SWMU 3 environmental media impacted by the release of contamination could include surface soil, subsurface soil, groundwater, and sediment and surface water in a nearby lagoon.

Although groundwater was sampled and analyzed, it was not considered a pathway of concern and was not evaluated further. The State of Florida classifies the groundwater at NAS Key West as a Class G-III nonpotable aquifer that has not been accessed by public or domestic wells. Further, the Monroe County Health Department recognizes the public water supply obtained from the mainland to be the only potable water supply available to Key West. Therefore, this pathway was not fully evaluated. However, a comparison was performed between the concentrations of chemicals in groundwater samples and the EPA Tap Water Risk-Based Concentrations (RBCs) and EPA Maximum Contaminant Levels (MCLs) as part of the Baseline Risk Assessment (BRA). In addition, groundwater chemical concentrations were compared to surface water threshold concentrations that are considered to be protective of ecological receptors. A summary of the comparison is found in the BRA section of this Fact Sheet. The entire comparison can be found in the Supplemental RFI/RI Report for High-Priority Sites (BRE 1997).

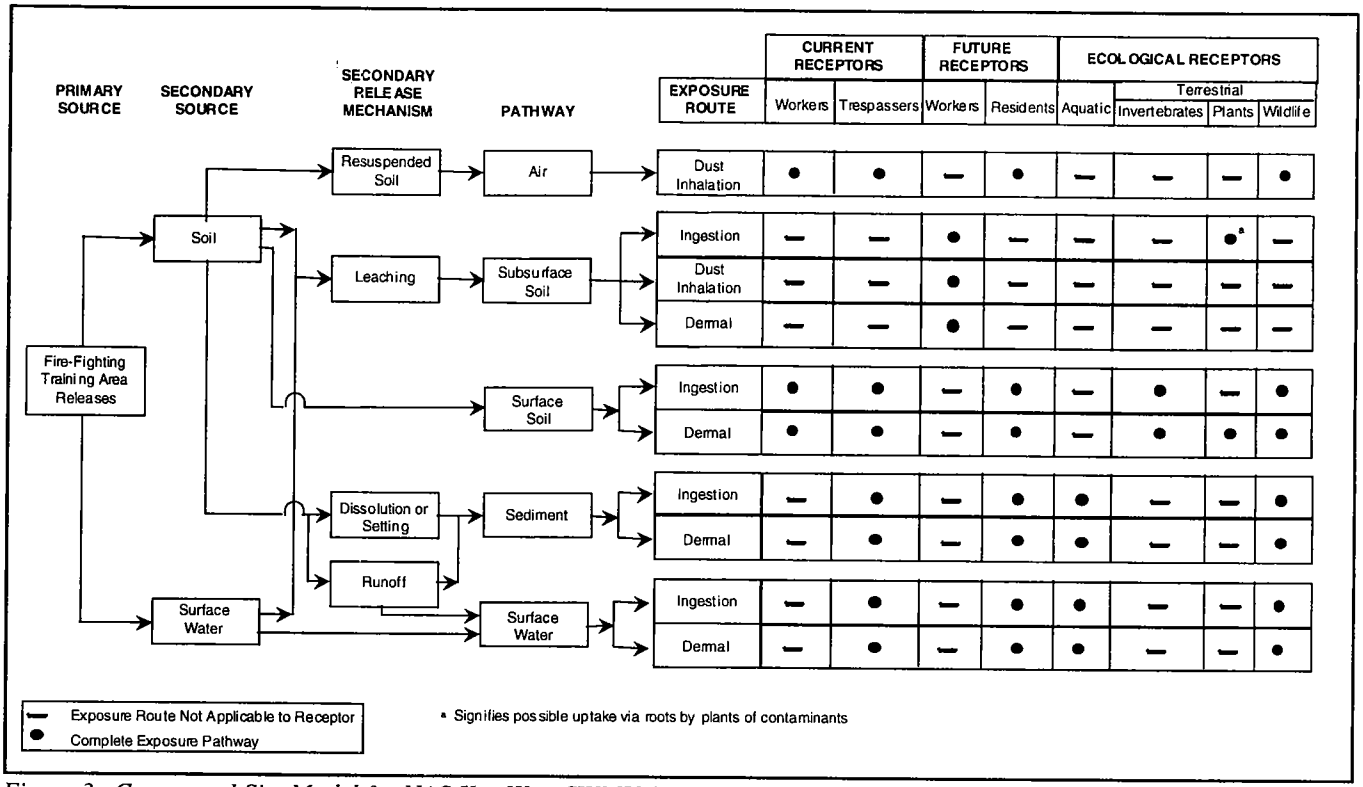


Figure 3. Conceptual Site Model for NAS Key West SWMU 3.

Nature and Extent of Contamination

Media sampling at SWMU 3 was conducted to characterize constituent types and distributions. Sampling was performed in 1986, 1990, 1993, 1995, and 1996 during a series of remedial investigations. The sampling activities in each investigation were tailored to SWMU 3 based on known activities and existing data. In 1995, the soil IRA delineation and post-excavation sampling provided additional data for the evaluation of SWMU 3.

Soil

In 1990, 1993, and 1995, soil was sampled in the two pits. During the 1996 supplemental sampling effort, the Navy did not sample soil because sufficient data had already been collected for decision-making purposes.

The soil sampling was conducted at the surface (0 to 1 feet below ground surface) and at subsurface (3 to 5 feet below ground surface). Five surface soil samples and one subsurface soil sample were taken during each investigation. These samples were analyzed for VOCs, SVOCs, inorganics, and pesticides/PCBs. In addition, a total of 17 samples were taken and analyzed in the field for BTEXs and PAHs. VOCs and SVOCs were not detected in excess of applicable or relevant and appropriate requirements and screening action levels (ARAR/SALs). Inorganics were the most common class of contaminants detected in soil. Specifically, arsenic and chromium were detected consistently in surface soil from the perimeter of the southern training pit during the 1995 IRA confirmation sampling. Chromium was also detected in both surface and subsurface soil samples from the unexcavated northern pit. Pesticides and PCBs were not detected in soil during the investigations.

Sediment

In 1993 and 1996, sediment was sampled at the lagoon to the west and south of the two pits. VOCs and SVOCs were detected in excess of ARAR/SAL levels in two of the four samples collected in 1993. These contaminants included cis-1,2-dichloroethene, bis(2-ethylhexyl)phalate and carbon disulfide. As in soil, inorganics were the most common class of contaminants detected in sediment. In both 1993 and 1996, arsenic was found in the sediments at levels much higher than those observed in soil with a maximum value to the west of the north pit. Copper and lead were consistently detected and cyanide exceeded the SAL at two of the nine sample locations. In 1993, mercury was detected in excess of its SAL in one sample. In 1996, cadmium exceeded its SAL in two of four samples.

After the removal action, the media were resampled. Metals and SVOCs were identified as contaminants in sediment and surface water.

Surface Water

In 1993 and 1996, surface water was sampled in the lagoon to the west and south of the two pits. VOCs and SVOCs (analyzed only in 1993) were not detected in excess of ARAR/SALs in the nine samples. As in soil and sediment, inorganics were the most common class of contaminants detected in surface water. Antimony and thallium, detected in 1993 and 1996, respectively, are assumed to be common surface water contaminants based on results from the previous investigations. Copper was detected in excess of its ARAR/SAL in a single sample in 1993 and 1996. No pattern of copper as a surface water contaminant is apparent from the investigation results. In 1993, lead and tin were detected above their ARARs/SALs. In addition, cyanide was twice detected above its SAL in 1996.

Groundwater

Groundwater was sampled in 1986, 1990, 1993, and 1996. Fourteen wells have been installed and sampled in and around the two pits. The 1990 and 1993 sample results indicated levels of VOCs and SVOCs above ARAR/SAL levels. Benzene, ethylbenzene, methyl chloride, trans-1,2-dichloroethene, vinyl chloride, and naphthalene were consistently detected in groundwater under the unexcavated training pit during previous investigations. In 1996, however, ethylbenzene was the only VOC detected in excess of ARAR/SAL criteria. The SVOC naphthalene was detected in groundwater in increasing concentrations from 1990 to 1996. No other SVOCs were detected in excess of available ARAR/SAL criteria. In 1990, a single sample revealed pesticide concentrations in excess of ARAR/SAL levels. PCBs were not detected in groundwater during the investigations. In 1990, only chromium and manganese exceeded ARAR/SALs but they were not identified as significant contaminants in subsequent investigations. In 1993, antimony was the only inorganic detected above ARAR/SALs. Antimony was not detected during the other sampling periods.

Contaminant Fate and Transport

The main contaminant source at SWMU 3 is the soil from the former burn pits. The potential contaminant release pathways at the site include volatilization, wind erosion, overland runoff, and infiltration. Constituents in the soil can volatilize from surficial material or become airborne via resuspension. Contaminated fugitive dust also can be generated during ground-disturbing activities such as construction or excavation. These contaminants would then be dispersed in the surrounding environment and transported to downwind locations where they could repartition to surface soil, surface water, or sediment through gravitational settling, precipitation, and deposition. However, the burn pit areas at SWMU 3 are relatively small, precluding extensive fugitive dust or gaseous emissions.

Precipitation runoff can carry constituents to nearby surface waters, sediments, and surface soils but primarily to surface water and sediments in the lagoon. Infiltrating precipitation can contaminate subsurface soil and groundwater. Contaminants with a strong tendency to adsorb to organic matter in soil, such as PAHs, PCBs, and pesticides, are likely to migrate at a slower rate. Upon infiltrating the soil column and reaching the water table, a contaminant can be carried with the flow of groundwater to downgradient locations. Groundwater at SWMU 3 is shallow and probably is hydrologically connected tc surface water in the lagoon. Therefore, soil contaminants that migrate to groundwater ultimately can be deposited in sediment or they can accumulate in the tissues of aquatic organisms.

Former Fire-Fighting Training Area Risks

Human Health Risk Assessment

A human health BRA was conducted to evaluate the risks to current and/or future potential receptors from contamination present at SWMU 3. The risk assessment for the RFI/RI activities at NAS Key West was conducted in accordance with guidance under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The RCRA sites at NAS Key West were evaluated for risk following CERCLA guidance at the request of EPA Region IV.

Summary statistics, an identification of chemicals of potential concern (COPCs), and exposure point concentrations (EPCs) for chemicals detected in each medium (surface soil, subsurface soil, groundwater, sediment, and surface water) were prepared. The COPCs were selected within a medium based on comparison of the detected concentrations to risk-based screening levels. The selected COPCs represent those chemicals at SWMU 3 that are expected to contribute significantly to one or more of the exposure pathways (Figure 3) selected for risk estimation. The exposure pathways at SWMU 3 are based on a reasonable maximum exposure (RME). RME scenarios are intended to provide a conservative yet realistic estimate of exposure to potential receptors. EPCs provide the quantitative representation (e.g., the input value) of each COPC for an exposure pathway.

In the BRA, the human health risks associated with the exposure to contaminants in soil, sediments, and surface water were estimated for each potential receptor. The potential receptors were based on current and future land uses. The current potential receptors identified for SWMU 3 include adolescent/adult trespasser, occupational worker, and site maintenance worker. Under the future land use scenario, the most likely potential receptor is believed to be an excavation worker. Also considered under the future land use scenario are a residential child and adult, although

residential development of SWMU 3 is considered unlikely. Under the master plan for land use on NAS Key West, the future land use for the area where SWMU 3 is located is as a restricted-access military base, with future zoning to limit access at the site because it is near an active airstrip. The full study is in the Supplemental RFI/RI Report (BRE 1997). The quantitative results of the BRA, including an incremental lifetime cancer risk (ILCR) and the noncancer risk (hazard index; HI) for the potential receptors, and exposure pathways are discussed in the following sections.

A human health risk assessment was conducted to evaluate the significance of the contamination to humans.

ILCR refers to the cancer risk in exposed individuals that is over and above the background cancer risk in unexposed individuals. ILCRs are determined by multiplying the intake level of a chemical for a particular exposure pathway by its cancer toxicity factor. The estimated cancer risk is typically expressed in scientific notation (e.g., $1x10^{-6}$). As an example, an ILCR of $1x10^{-4}$ means that one person out of ten thousand may be at risk of developing cancer due to exposure to chemicals at a site under the conditions set forth in the exposure scenario for that receptor. EPA has set as acceptable a target cancer risk range of no more than $1x10^{-4}$ to $1x10^{-6}$. FDEP has set an acceptable target cancer risk of no more than $1x10^{-6}$. Risks greater than these may trigger a remedial action. Future child and adult residential exposure to potential carcinogens is combined for a lifetime-weighted average (LWA) to estimate the ILCR.

Potential concern for the noncarcinogenic effects of a single contaminant in a single medium is expressed as a hazard quotient (HQ). By adding the HQs for all contaminants within a medium or across all media to which a given population reasonably may be exposed, an HI can be generated. The HI provides a useful reference point for gauging the potential significance of exposure to multiple contaminants within a single medium or across media. The HI refers to noncarcinogenic effects and is defined as the ratio of the estimated level of exposure to the level of exposure that does not result in noncarcinogenic health effects. An HI of less than 1.0 is acceptable for noncarcinogenic health effects defined by EPA and FDEP. Table 1 summarizes the total ILCRs and HIs estimated for the potential receptors at SWMU 3.

The risks at SWMU 3 for the current trespasser are greater that the acceptable threshold of $1x10^{-6}$ incremental lifetime cancer risk and slightly exceeds the threshold for noncarcinogenic health effects.

Neither the current site trespasser nor future site worker exceed the $1x10^{-6}$ point of departure for the ILCR or 1.0 for the HI. The estimated total ILCR for the future residential receptor ($1x10^{-5}$) did have an ILCR that exceeded $1x10^{-6}$ and an HI equal to 1.2. An explanation follows to discuss the significance of these values for the future resident.

Table 1

Total Incremental Lifetime Cancer Risk and Hazard Index

	Future Adolescent/Adult Resident	Current Adult Trespasser	Current Adolescent Trespasser	Current Maintenance Worker	Current Occupational Worker
All Pathways Cumulative Total Risk/Hazard with Surface Soil					
HI	**	**	**	**	**
ILCR	**	**	**	**	**
All pathways Cumulative Total Risk/Hazard with Sediment					
HI	0.2	0.04	0.05	NA	NA
ILCR	$1x10^{-5}$	$3x10^{-6}$	$2x10^{-6}$	NA	NA
All Pathways Cumulative Total Risk/Hazard with Surface Water					
HI	1.0	0.09	0.1	NA	NA
ILCR	**	**	**	NA	NA
Total Risk/Hazard for Receptors					
HI	1.2	0.1	0.2	**	**
ILCR	$1x10^{-5}$	$3x10^{-6}$	$2x10^{-6}$	**	**

Source : BRE 1997

** = Either no COPCs were selected or the COPCs selected for this pathway did not have applicable toxicity values.

NA = not applicable, pathway is not applicable for the respective media.

Human Health: Soil

The BRA did not identify any COPCs in soil; therefore, no further action is required to protect human health.

Human Health: Groundwater

Groundwater was not fully evaluated as part of the BRA because of its designation and use at NAS Key West. Groundwater is classified by FDEP as a nonpotable aquifer (Class G-III) and potable water sources from groundwater do not exist on NAS Key West. The local water authority regulates the installation of potable water wells and the Monroe County Health Department recognizes the only potable water source for the Florida Keys to be from the mainland. However, a preliminary comparison was performed on the chemical concentrations in the groundwater samples collected at SWMU 3 against EPA Tap Water Risk-Based Concentrations (RBCs) and EPA Maximum Contaminant Levels (MCLs) as part of the Supplemental RFI/RI Report for High-Priority Sites (BRE 1997). The maximum values of heptachlor and benzene exceeded both MCLs and RBC screening criteria. Heptachlor was detected in one of eight samples at levels above the MCL and above the tap water RBC. Benzene was detected in 2 of 18 samples at levels above the MCL and above the tap water RBC. The benzene concentration in one sample was slightly lower than the MCL value, yet still exceeded the tap water RBC.

The maximum values of aldrin, alpha-BHC, beta-BHC, gamma-BHC, 1,1-dichloroethene, methylene chloride, vinyl chloride, antimony, and arsenic exceeded only their maximum RBC values. Aldrin, alpha-BHC, beta-BHC, and gamma-BHC were all detected in one out of eight samples at levels slightly above their respective RBCs. 1,1-dichloroethene was detected in only 1 of 18 samples, but at a level that is over 300 times greater than its tap water RBC value. Methylene chloride was detected in 6 of 18 samples. The maximum range of the samples was only slightly above the RBC value. Vinyl chloride was detected in 7 of 17 samples at levels far exceeding the tap water RBC value. Antimony and arsenic were detected in seven and eight out of nine samples, respectively.

Human Health: Surface Water/Sediment

The COPCs consisted of antimony and lead for surface water, and arsenic, iron, and lead for sediment in the current adolescent and adult trespasser and future residential pathway.

Uncertainties

An uncertainty analysis was performed for the BRA at SWMU 3. The uncertainty analysis provides the major uncertainties associated with a BRA and determines the impact on the risk assessment results. As a result of the uncertainty analysis process, no human health remediation goal options (RGOs) were developed for iron, arsenic, or lead in sediment or for antimony or lead in surface water. The following uncertainties should be considered in any evaluation of SWMU 3:

- The uncertainty associated with the human dermal exposure is high because of the method used to derive the dermal reference dose (See Appendix G, Section 3.2.3.4 of the Supplemental RFI/RI Report for High-Priority Sites [BRE 1997]). Dermal exposure is a primary contributor to the cumulative cancer risk (via sediment) for the hypothetical future residential receptor. The uncertainty associated with the dermal exposure route may overestimate the risk at SWMU 3.

- Iron was selected as a COPC in sediment, but it was detected at levels in SWMU 3 that only slightly exceed background levels. The inclusion of iron as a site-related sediment COPC could overestimate the quantitative risk at SWMU 3 for the hypothetical future residential receptor. Additionally, there is high uncertainty associated with the oral reference dose for iron.

Uncertainties in the human health risk assessment must be considered in evaluating the results.

- Use of residential RBCs for sediment and tap water RBCs for surface water probably results in the selection of COPCs that do not contribute significantly to the quantitative risk at SWMU 3 (i.e., iron and arsenic in sediment and antimony in surface water). This bias is based on the fact that sediment exposure is generally well below the intakes a receptor would be exposed to under a realistic residential soil exposure pathway.

- Lead was determined to be a COPC in sediment and surface water at SWMU 3. Lead exposure via sediment and surface water cannot be estimated under the Integrated Exposure and Uptake Biokinetic (IEUBK) Lead Model for the BRA at SWMU 3. Therefore, lead exposure could not be modeled. This probably underestimates the risks to potential human receptors exposed to lead in sediment and surface water, especially residential children.

Ecological Risk Assessment

An ecological risk assessment (ERA) was conducted to evaluate the possibility that aquatic and terrestrial ecological receptors may be at risk from site-related contaminants. The ERA was based on laboratory analyses of groundwater, surface water, sediment, and soil samples; sediment and surface water toxicity tests; and laboratory analyses of fish collected from the nearby lagoon.

Ecologically-based toxicity benchmarks, which are concentrations of contaminants in various media low enough to be protective of ecological receptors, were selected to compare against SWMU 3 concentrations of chemicals in surface water, groundwater, sediment, and soil to determine if they qualify as COPCs at SWMU 3. The samples used to determine the ERA COPCs were the same as those used in the human health risk assessment.

Toxicity tests were performed using five surface water and five sediment samples collected in 1996 from the edge of the lagoon at SWMU 3. Surface water was evaluated using silverside minnows, and sediment was evaluated using the amphipod *Hyallela azteca*.

An ecological risk assessment was done to evaluate the possibility that aquatic and terrestrial receptors may be at risk from site-related contaminants.

Minnows were collected from the lagoon immediately west of the site and analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Concentrations of contaminants detected in the fish were compared to concentrations in fish collected at background sites and to benchmark concentrations considered to be protective of fish and piscivorous (i.e., fish-eating) receptors.

Ecological Risk: Soil

Results of the ERA indicate that no metals or organic compounds in site soils exceeded ecological benchmark values. Thus, contaminants in soils at SWMU 3 do not appear to pose significant ecological risks to terrestrial plants or animals.

Ecological Risk: Groundwater

Groundwater is not directly available to ecological receptors, but groundwater could become available by discharging to surface water or sediment. Groundwater contaminants at SWMU 3 did not match surface-water and sediment COPCs. Hence, the groundwater-to-surface-water/sediment migration pathway does not appear to represent significant ecological risks.

Ecological Risk: Surface Water

Four metals (copper, cyanide, lead, and tin) in surface water exceeded ecological benchmark values, but were present in only a few samples. The survival of silverside minnows in the surface water toxicity tests was similar to the survival of laboratory controls, indicating no site-related toxic effects. No VOCs or SVOCs were detected in fish tissue samples collected from the lagoon. Concentrations of metals and pesticides in fish tissues were generally less than in fish collected from background locations and less than concentrations considered hazardous to piscivorous receptors. Concentrations of Aroclor-1260 (the only PCB detected in fish tissue from SWMU 3) were generally higher than in background fish. However, all Aroclor-1260 concentrations were less than mean values in fish collected nationwide and analyzed by the U.S. Fish and Wildlife Service as part of the National Pesticide Monitoring Program. Because PCBs were not detected in site groundwater, surface water, soil, or sediment, and because the concentrations of PCBs in fish were low in relation to available benchmarks, the presence of Aroclor-1260 in fish from SWMU 3 is not believed to pose a significant risk to aquatic receptors. In addition, there has been no known disposal of PCBs at or near SWMU 3, and the source of contamination at SWMU 3 (primarily waste jet fuel) would not be expected to be a source of PCBs.

Ecological Risk: Sediment

Concentrations of sediment analytes were generally less than benchmark values. Survival of amphipods in one of five sediment samples from SWMU 3 was significantly less than in the laboratory controls, and survival in the other four samples was similar to survival in the laboratory controls. Growth of the amphipods in all five samples from this site was greater than in laboratory controls. Based on the generally low levels of chemicals found in fish tissue and sediment, the reduced survival in a single sediment sample does not appear to have been a SWMU-related effect. Overall, the potential risks to aquatic receptors from sediment contaminants appear to be negligible.

Conclusions

The primary objectives of the RFI/RI at SWMU 3 were to identify the existing nature and extent of contamination following the IRA, to provide a human health BRA of COPCs identified in those media, and to perform an ecological risk assessment. COPCs in SWMU 3 media are not present at sufficient concentrations to cause adverse noncarcinogenic health effects to any current or future potential receptor. The estimated cancer risks for the future resident ($1x10^{-5}$), current adolescent trespasser ($2x10^{-6}$), and adult trespasser ($3x10^{-6}$) were within the $1x10^{-4}$ to $1x10^{-6}$ target risk range used by EPA in setting standards and criteria to evaluate the need for environmental remediation. However, these estimated cancer risks exceed the $1x10^{-6}$ target risk range used by FDEP. The future land uses planned for this site include a military base with restricted access, or future zoning to limit access

The future land uses planned for the site does not include residential.

at the site because it is near an active airstrip, but does not include residential land use.

The potential risks to aquatic and terrestrial receptors are negligible.

The ecological risk assessment concluded that potential risks to terrestrial receptors are negligible. This is largely because of the lack of terrestrial habitat and low levels of contaminants present. In addition, the low levels of contamination present in surface water and sediment at the site are negligible and do not pose a significant risk to aquatic receptors. The results of the BRA for all media evaluated at SWMU 3 support a decision for no further action.

Preferred Alternative

The preferred alternative for SWMU 3 is No Action. The previous soil removal activities at SWMU 3 have eliminated the need to perform additional remedial action. The SWMU 3 BRA identified three risks exceeding the one in one million ($1x10^{-6}$) cancer threshold. For the hypothetical future resident ($1x10^{-5}$), current hypothetical adult trespasser ($3x10^{-6}$), and adolescent trespasser ($2x10^{-6}$), the principal constituent contributing to the cancer risk is arsenic in sediment. However, the uncertainty analysis indicates that the estimate of the cancer risk associated with arsenic for the three receptors is very conservative.

The calculated noncarcinogenic risk for the hypothetical future resident slightly exceeds 1.0, a benchmark below which adverse noncarcinogenic health effects are not anticipated. The primary chemicals contributing to the calculated noncarcinogenic risk (antimony in surface water and arsenic in sediment) are not believed to be indicators of contamination, but rather of the wide variability inherent in the analytical results.

For the BRA, the carcinogenic and noncarcinogenic risks associated with antimony and arsenic are considered negligible. Further, both types of risk are calculated for receptors who, in all probability, will never be present at the unit. The land use for that part of NAS Key West does not include residential use in the foreseeable future, and access is restricted because it is part of a military installation and adjacent to the airstrip. Lastly, the ecological risk assessment concluded that potential risks to terrestrial and aquatic receptors at SWMU 3 are negligible. No Action will therefore be protective of human health and the environment at SWMU 3. There are no costs associated with the No Action alternative.

The preferred alternative is No Action.

This proposal is consistent with EPA guidance and is an effective use of risk management principles. This fact sheet provides for involvement with the community through a document review process and a public comment period. Public input will be documented in the responsiveness summary, as previously discussed. To submit written or oral comments, please refer to the Community Involvement Section of this fact sheet.

References

These documents are in the Information Repository at the Monroe County Library.

BEI (Bechtel Environmental, Inc.), 1995, *Delineation Sampling Report for SWMU 1, SWMU 2, SWMU 3, SWMU 7, AOC-A, AOC-B, IR-1, and IR-2 at the Naval Air Station Key West, Florida*, Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command, Oak Ridge, Tennessee.

IT (IT Corporation), 1991, *Remedial Investigation Report, Naval Air Station, Key West, Florida*, Final Draft, Prepared for Southern Division, Tampa, Florida.

IT (IT Corporation), 1994, *RCRA Facility Investigation/ Remedial Investigation, Final Report, NAS Key West, Florida*, Prepared for SOUTHNAVFACENGCOM, Tampa, Florida, June.

BRE (Brown & Root Environmental), 1997, *Supplemental RCRA Facility Investigation/Remedial Investigation Report, NAS Key West, Florida*, prepared for SOUTHNAVFACENGCOM, Aiken, South Carolina, July.

BEI (Bechtel Environmental, Inc.), *1997 Project Completion Report for SWMU 1, SWMU 2, SWMU 3, SWMU 7, AOC-A, AOC-B, IR-1, and IR-2 at the Naval Air Station Key West, Florida*, prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command, Oak Ridge, Tennessee.

GLOSSARY

Applicable or Relevant and Appropriate Requirements (ARARs): Refers to the Federal and state requirements that a selected remedy will attain. These requirements may vary from site to site.

Baseline Risk Assessment (BRA): Analysis of the potential adverse health effects (current or future) caused by hazardous substance release from a site in the absence of any actions to control or mitigate these releases.

Characterization: The compilation of all available data about the waste units to determine the fate and extent of contaminant migration resulting from the waste site, and the concentration of any contaminants that may be present.

Chemicals of Potential Concern (COPCs): Chemicals selected for further analysis in each environmental media sampled by comparing their concentrations with threshold concentrations known to be harmful. Only those chemicals found to be of potential concern are considered for evaluation in the quantitative risk assessment.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 1980: A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. The Acts created a special tax that goes into a Trust Fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Exposure: Contact of an organism with a chemical or physical agent. Exposure is quantified as the amount of the agent available at the exchange boundaries of the organism (e.g., skin, lungs, digestive tract, etc.) and available for absorption.

Hazard Quotient/Hazard Index (HQ/HI): The hazard quotient (HQ) is used to express the risk of adverse noncarcinogenic effects from constituent exposure. The HQ is the ratio of the estimated chronic daily intake of a constituent to the reference dose (RfD). RfDs are reported as chemical intakes (mg/kg-day) and are the toxicity values used most often in evaluating noncarcinogenic effects on human health. The RfDs are developed by the EPA and are defined as estimates of a daily exposure level for the human population, including sensitive subpopulations, likely to be without an appreciable risk of deleterious effects during a lifetime. The constituent-specific HQs are summed for each environmental medium and exposure pathway to obtain the hazard index (HI). After individual pathway risks are calculated, HIs may be combined across pathways to estimate total unit risk for each receptor. An HI greater than 1.0 has been defined by the EPA as the level of potential concern for adverse noncarcinogenic health effects.

Incremental Lifetime Cancer Risk (ILCR): The ILCR refers to the cancer risk over and above the background cancer risk in unexposed individuals. ILCRs are determined by multiplying the intake level with the cancer potency factor and are typically expressed in scientific notation. For instance, an ILCR of $1x10^{-04}$ indicates that one additional person out of ten thousand may be at risk of developing cancer.

Information Repository: The collection of documents from the Installation Restoration Program at NAS Key West. Refer to the Community Involvement section for its location in Key West, Florida.

Media: Environmental matter through which contaminants are transferred. Five media by which contaminants may be transferred are groundwater, soil, surface water, sediment, and air.

Pathway: The route by which a receptor is exposed to a contaminant in an environmental medium. Common pathways include inhalation, ingestion, and dermal absorption.

Reasonable Maximum Exposure (RME): This is the value that the average concentration will fall below 95 percent of the time.

Resource Conservation and Recovery Act (RCRA) of 1976: A Federal law that established a regulatory means to track hazardous substances from their generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent the creation of new, uncontrolled hazardous waste sites.

Responsiveness Summary: A summary of oral and/or written comments and Navy responses received during the proposed comment period. The responsiveness summary is a key part of the Record of Decision (ROD) highlighting community concerns.

Screening Action Levels (SAL): Refers to Federal and State recommendations that a selected remedy should attain. These recommendations vary from site to site.

Statement of Basis: A report describing the corrective measures/remedial actions being conducted pursuant to Florida Department of Environmental Protection (FDEP) regulations, as amended.

Target Risk Range: EPA guidance for carcinogenic risk due to exposure to a known or suspected carcinogen between one excess cancer in an exposed population of 10,000 ($1x10^{-4}$) and one excess cancer in an exposed population of 1 million ($1x10^{-6}$). Risks within this range require risk management evaluation of remedial action alternatives to determine if risks can be reduced below one excess cancer in a million ($1x10^{-6}$). Risks greater than $1x10^{-4}$ indicate that remedial action is generally warranted.

Who Do I Call?	*Where Can I Find Them?*
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NAVAL AIR STATION KEY WEST
U.S. Navy Statement of Basis Fact Sheet for the Former Fire Fighting Training Area (SWMU 3)

Your comments on the SWMU 3 preferred remedial alternative:

Does this fact sheet provide the type of information you expected about the SWMU 3 preferred remedial alternative? Yes ☐ No ☐

If not, what other information would you like? Do you have any other comments on the actions taking place?

If you have additional comments include on separate page. Note the fact sheet you are commenting on.

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Comments on Statement of Basis Fact Sheet 8
SWMU 3 Former Fire Fighting Training Area

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