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NAS KEY WEST
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PROPOSED PLAN FOR FLEMING KEY SOUTH LANDFILL SITE 8 NAS KEY WEST FL
3/12/2000
NAS KEY WEST



PROPOSED PLAN



Naval Air Station Key West, Florida

Facility/Unit Type: Military Installation/Fleming Key South Landfill (IR 8)
Contaminants: Metals
Media: Groundwater
Remedy: Land-Use Controls

INTRODUCTION

This Proposed Plan 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 Florida Department of Environmental Protection (FDEP). The proposed remedial activities are conducted under the Department of Defense's Installation Restoration Program (IRP) in accordance with Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). Fleming Key South Landfill is the site of interest and is known as IR 8.

The purpose of this Proposed Plan is several-fold. The Proposed Plan identifies the proposed remedy for IR 8 at NAS Key West and explains the rationale for the preference; solicits public review and comment on conclusions of the CERCLA Remedial Investigation (RI); and provides information as to how the public can be involved in the remedy selection process. The Proposed Plan provides a summary of past environmental work at IR 8. This document highlights key aspects of the Supplemental RCRA Facility Investigation and Remedial Investigation (RFI/RI) Report, January 1998, but should not be used as a substitute for this document. Additional details regarding the facility and the investigation conducted may be found in the Sediment Toxicity Report for Sites IR 1 and 8 that is kept as part of the information

repository. Please refer to the Public Participation section for its location.

The public is encouraged to comment on the proposed remedy that is based on the conclusions of the Supplemental RFI/RI Report. The U.S. Navy emphasizes that the proposed remedy is the initial recommendation of the Agency. Changes to the proposed remedy, or a change from the proposed remedy to another remedy, may be made if public comments or additional data indicate that such a change would result in a more appropriate solution.

PROPOSED REMEDY

As discussed above, the proposed remedy represents the U.S. Navy's initial recommendation for IR 8. The proposed remedy is land-use controls (limited site access) with annual monitoring of groundwater quality. Minimal costs are associated with implementing and administering this remedy.

FACILITY BACKGROUND

The U.S. Navy owns 5,660 acres in Monroe County, Florida as part of NAS Key West. IR 8 covers approximately 45 acres in the southwestern portion of Fleming Key (Figure 1). The City of Key West Sewage Treatment Plant borders the southeastern portion of the site. A munitions storage area is located along the east boundary of the site (Figure 2). The Gulf of Mexico borders the remainder of the site. A

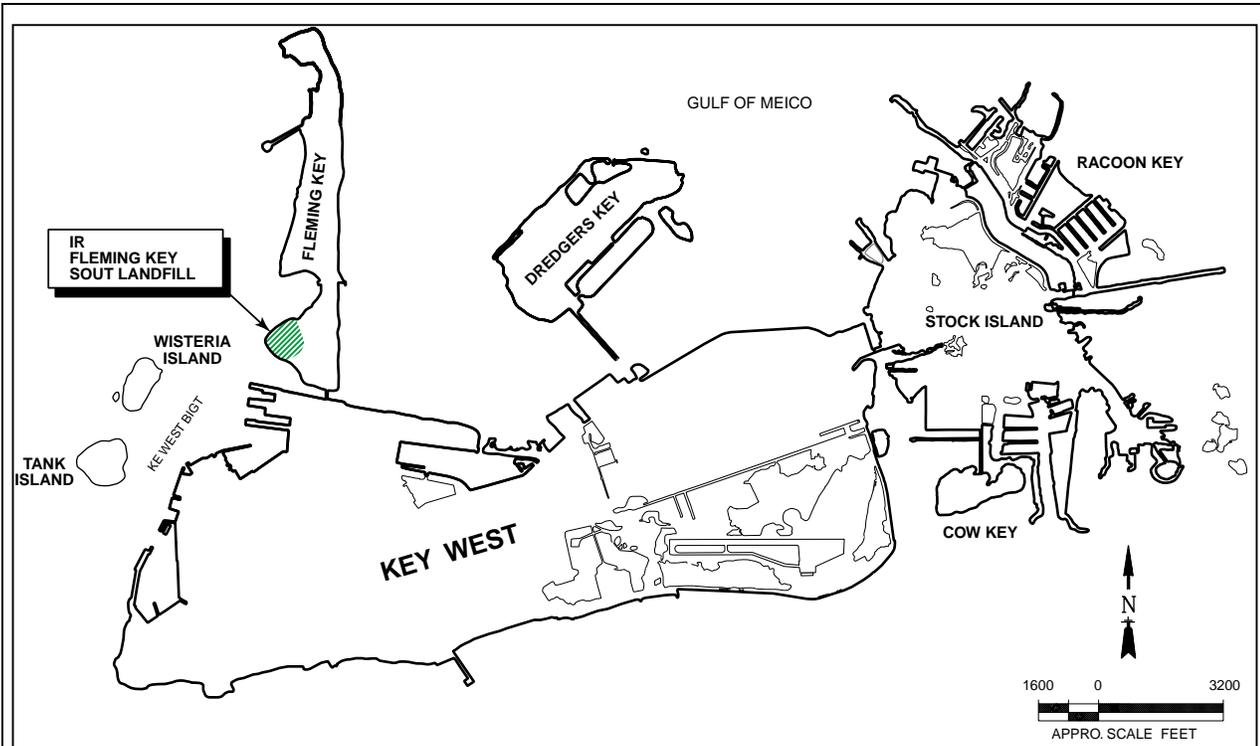


Figure 1. NAS Key West IR 8 Fleming Key South Landfill.

closed canopy of Australian pines covers most of the site. The western portion of the site contains piles of metal debris (heavy equipment, desks, marine equipment, etc.).

As many as 8,000 tons of unknown waste reportedly were disposed at the landfill annually between 1962 and 1982. The waste disposal activities of the City of Key West were combined with those of the Navy from 1968 to 1982 at this site. Waste materials and fill from Sigsbee Key (Dredgers Key) were also disposed of at the site between 1948 and 1951. The open trench disposal method was practiced at this site. Trenches were typically 25 feet wide, 10 feet deep, and 500 to 1,000 feet long. Due to seepage from groundwater, the trenches were partially full of sea water when waste disposal occurred. Combustible wastes were taken to the western portion of the site and burned. The ash and unburned wastes were then deposited in the western portion of the landfill.

In 1986, an initial investigation was conducted at IR 8 involving the installation of five shallow monitoring wells. Based on the results of the investigation, a preliminary RI was recommended at IR 8 that included the

installation of 10 soil borings (six of the soil borings were converted to monitoring wells) and the excavation of 29 test pits to characterize the waste type and distribution patterns. In 1993, a RI was performed involving characterization of contamination at the site, which indicated that groundwater and sediment appeared to be most extensively impacted by metals.

In February 1997, Bechtel Environmental began installation of a "Shoreline Protection System" that involved establishing a stable shoreline along the landfill perimeter to prevent debris from being washed into the harbor by erosion. By August 1997, the shoreline structure had been fully installed. In 1996, the Supplemental RFI/RI was performed.

In 1993, subsurface soil was sampled during the RI. Metals accounted for most of the chemicals found in the subsurface soil at IR 8. Antimony, arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, thallium, tin, and zinc were detected above action levels. In general, metals were found near the center of the site, west of the ammunition storage area. No volatile organic compounds (VOCs) or semivolatile organic compounds (SVOCs) were

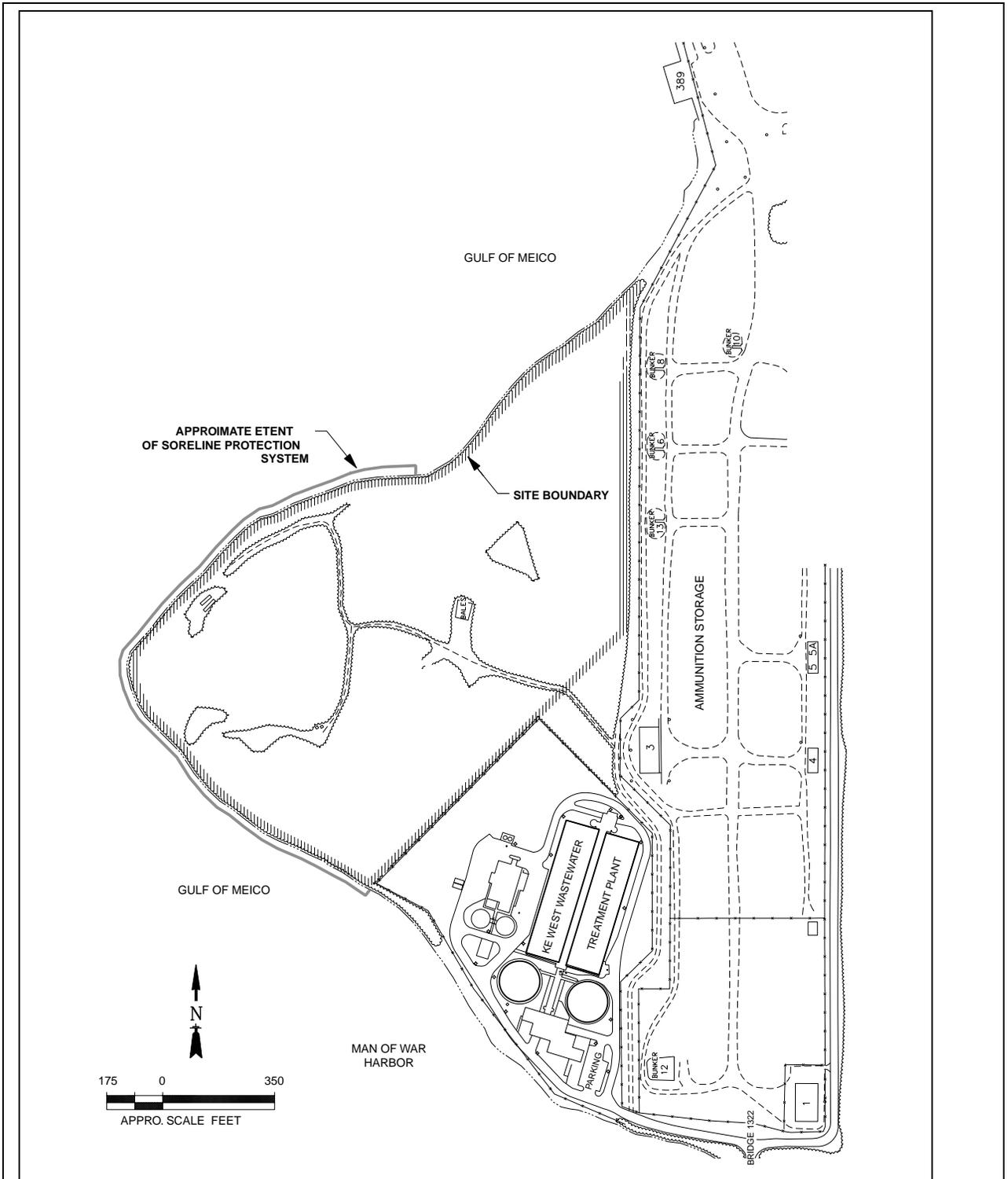


Figure 2. Site Location Map of IR 8.

detected above action levels in subsurface soil at IR 8. However, six VOCs, two SVOCs, and two pesticides were detected below screening values.

Data from the 1993 RFI/RI and the Supplemental 1996 RFI/RI were considered in the analysis of surface soil contamination at IR 8. Metals and pesticides accounted for most of the

chemicals found in the soil at the IR 8. No inorganics were detected in excess of screening values in surface soil at IR 8, but several were detected at levels below their screening criteria. A single pesticide, 4,4'-DDT, was detected in excess of its action level in surface soil at 120 micrograms per kilogram ($\mu\text{g}/\text{kg}$). In 1996, 4,4'-DDT was detected in all samples but exceeded its screening level at only one location. 4,4'-DDD and 4,4'-DDE were also detected in the surface soil at IR 8, but at levels below their screening values.

During the 1990 RI, the 1993 RFI/RI, and the 1996 Supplemental RFI/RI, sediment was sampled at IR 8. One VOC, acetone, was detected in excess of its action level at 72 $\mu\text{g}/\text{kg}$. Other VOCs detected in sediment at concentrations below their screening values include methylene chloride and toluene. SVOCs detected in excess of screening values in sediment at IR 8 include benzo(a)anthracene, benzo(a)pyrene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene. A number of pesticides were detected in excess of screening values in sediment at IR 8 including 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, beta-BHC, and delta-BHC. Other pesticides detected in sediment at IR 8 at concentrations below the screening criteria included 2,4-D and endosulfan I. A single polychlorinated biphenyl (PCB), Aroclor-1254, was detected once in excess of its screening value at 26.1 $\mu\text{g}/\text{kg}$. Several inorganics were detected in excess of screening values in sediment at IR 8. Maximum concentrations of inorganics were consistently detected along the northwestern edge of IR 8 including antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc.

Surface water was sampled at IR 8 during the 1990 RI and 1993 RFI/RI. Three SVOCs were detected in excess of screening values in surface water at IR 8; however, anthracene, bis(2-ethylhexyl) phthalate, and dibenzo(a,h)anthracene were each detected at a single sample location. The single PCB, Aroclor-1242, was detected in excess of its screening value once at 1.1 $\mu\text{g}/\text{L}$. A number of inorganics were detected in excess of screening values in surface water. Aluminum (2,030 mg/L), arsenic (57.3 $\mu\text{g}/\text{L}$), cadmium (19.8 $\mu\text{g}/\text{L}$), chromium (37.2 $\mu\text{g}/\text{L}$), copper (172 $\mu\text{g}/\text{L}$), iron (305,000 $\mu\text{g}/\text{L}$), manganese (294 $\mu\text{g}/\text{L}$), and

silver (10.2 $\mu\text{g}/\text{L}$) were detected in excess of their screening values at a single sample location. Antimony, lead, tin, and zinc were detected above screening values in more than one sample.

Groundwater was sampled at IR 8 during the initial investigation performed in 1986, the 1990 RI, the 1993 RFI/RI, and the 1996 Supplemental RFI/RI. Groundwater contamination beneath the site predominantly consists of metals. In 1986, VOCs were detected in excess of screening criteria including methylene chloride, benzene, chlorobenzene, bromodichloromethane, bromoform, chloroform, and dibromochloromethane. In 1990, a single VOC, chlorobenzene, was detected in excess of its screening value once at 63 $\mu\text{g}/\text{L}$. No VOCs were detected in subsequent groundwater sampling events. Two SVOCs have been detected in excess of action levels at IR 8, including 1,4-dichlorobenzene and bis(2-ethylhexyl)phthalate. Two pesticides, alpha-BHC and heptachlor, were detected in the 1993 and 1996 groundwater sampling events at 0.17 $\mu\text{g}/\text{L}$ and 0.62 $\mu\text{g}/\text{L}$, respectively. Overall detection of inorganics decreased in frequency and concentration from 1986 to 1996. Aluminum, antimony, arsenic, beryllium, cadmium, copper, iron, lead, manganese, mercury, and thallium have been detected in one or more sampling events since 1986. However, in 1996 antimony was the only inorganic detected in excess of its screening value with a maximum detected concentration of 42.3 $\mu\text{g}/\text{L}$.

SUMMARY OF FACILITY RISKS

A Human Health Baseline Risk Assessment (BRA) and an Ecological Risk Assessment (ERA) were performed as part of the Supplemental RFI/RI Report. The IR sites at NAS Key West were evaluated for risk following CERCLA guidance at the request of FDEP and EPA Region IV.

In the BRA, human health risks associated with the exposure to detected contaminants in soil, sediment, and surface water were estimated for each potential receptor. Although groundwater was sampled and analyzed, it was not considered a pathway of concern since groundwater at this site meets the FDEP criteria for a Class G-III nonpotable aquifer. The full BRA is in the Supplemental RFI/RI Report.

The potential receptors were based on current and future land uses. The current potential receptors identified for IR 8 include adolescent/adult trespasser, site maintenance worker, excavation worker, and occupational 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 is a residential child and adult, although residential development of IR 8 is considered unlikely. Under the master plan for land use on NAS Key West, the future land use for the area where IR 8 is located is a restricted-access military base, with future zoning to limit access at the site.

There is potential for a future resident to be exposed to concentrations of contaminants that may cause limited carcinogenic and noncarcinogenic risks. This potential risk was modeled for possible human receptors. The chemicals of potential concern (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 IR 8 that are expected to contribute significantly to one or more of the exposure pathways selected for risk estimation. Conservative risk-based screening levels were used in the exposure pathway model for sediment and surface water. Therefore, COPCs may be selected that do not actually contribute significantly to the quantitative risk. No COPCs were identified for surface soil in the BRA. One inorganic, arsenic, was identified as a COPC in subsurface soil. In sediment, COPCs selected included metals (aluminum, antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, and thallium), SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene], and one pesticide (delta-BHC). Surface water COPCs at IR 8 included metals (aluminum, antimony, arsenic, barium, cadmium, iron, lead, manganese, tin, vanadium, and zinc), SVOCs [benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, and dibenzo(a,h)anthracene], one PCB (Aroclor-1242), and one VOC (acetone). The BRA also includes a calculation of risk to humans from the presence of contaminants in shellfish tissue. Two inorganics (copper and lead) and three pesticides (delta-BHC, aldrin, and chlorobenzilate) were identified as COPCs in

crab and lobster tissue for potential consumption of shellfish by the future resident.

The IR 8 BRA identified three risk scenarios exceeding the FDEP target cancer risk of one in one million (1E-06). The principal constituent contributing to the cancer risks is arsenic in sediment and surface water. The estimated carcinogenic risk for the hypothetical future resident is 1E-04, which is greater than both the EPA "target risk range" of 1E-04 to 1E-06 and the FDEP target cancer risk of 1E-06. The estimated carcinogenic risks for trespasser adults (1E-05) and trespasser adolescents (1E-05) are within the EPA target risk range but are greater than the FDEP target cancer risk. The carcinogenic risk for excavation workers (1E-07) is below both the EPA target risk range and FDEP target cancer risk. Carcinogenic risks for maintenance workers and occupational workers do not exist since no COPCs were identified in surface soil. The BRA indicates that COPCs at IR 8 are present at concentrations that may cause adverse carcinogenic health effects for the future resident using EPA standards and criteria.

The BRA also identified a single noncarcinogenic risk scenario of 2.0 for the future resident exceeding the hazard index threshold of 1.0. The principal constituents contributing to the noncarcinogenic risk are antimony, arsenic, iron, and thallium in sediment, and antimony, arsenic, and iron in surface water. The noncarcinogenic risk for the adolescent trespasser was equal to the hazard index threshold of 1.0, and the trespasser adult scenario (0.7) had a noncarcinogenic risk less than 1.0. The noncarcinogenic risk for the excavation worker was significantly below the hazard index threshold of 1.0. Noncarcinogenic risks for maintenance and occupational workers do not exist since no COPCs were identified in surface soil. However, adverse noncarcinogenic health effects could be caused by chemicals at IR 8 for the hypothetical future resident.

An ERA was conducted to evaluate the possibility that aquatic or 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, and laboratory analyses of fish collected from the Gulf of Mexico. The ERA recommended that sediment toxicity testing was necessary to evaluate whether elevated concentrations of metals in sediment are potentially impacting

benthic organisms near the site. The Sediment Toxicity Report for Sites IR 1 and 8 prepared in 1999 contains the results of the sediment toxicity testing, concluding that potential ecological risks from site-related contaminants at IR 8 appear to be negligible.

The proposed remedy for IR 8 is land-use controls with annual monitoring of groundwater quality. Land-use controls will include limited site access to address human health risks for the future resident. Land-use controls with monitoring will be protective of human health and the environment.

SCOPE OF THE REMEDIAL ACTION

The U.S. Navy recognizes that CERCLA allows various options for implementing remedies based on site conditions. For IR 8 at NAS Key West, the Supplemental RFI/RI Report recommended that a Feasibility Study (FS) be performed to evaluate possible site remedies. However, the NAS Key West Partnering Team made the decision to perform a Sediment Toxicity Study instead of an FS to determine if ecological risks exist at IR 8. The Sediment Toxicity Report concluded that potential ecological risks are negligible at IR 8. Land-use controls with annual performance monitoring of groundwater quality are recommended at IR 8. Minimal costs are associated with implementing and administering land-use controls with performance monitoring.

PUBLIC PARTICIPATION

To make a final decision and incorporate a remedy into the Decision Document, the U.S. Navy is soliciting public review and comment on this Proposed Plan for the proposed remedy to IR 8 at NAS Key West. CERCLA requires a comment period for public to review and comment of the proposed remedy.

The comment period will begin on Sunday, March 12, 2000, which is the date of publication of the public notice in *The Citizen* newspaper. Saturday, May 13, 2000 is the end of the comment period.

The Proposed Plan and the associated supporting documents, including the Supplemental RFI/RI Report, may be viewed and copied at the FDEP Office in Tallahassee, Florida between the hours of 8:00 a.m. and 4:30

p.m., Monday through Friday, except legal holidays. Additional copies of the Supplemental RFI/RI Report and Proposed Plan are available for public review at the information repository in the Local and State History Department at the Monroe County Library, 700 Fleming Street, Key West, Florida (Phone: 305-292-3595).

Further, the U. S. Navy has determined there is sufficient need to hold a public meeting. The public meeting will be held at 7:00 p.m. on Monday, March 27, 2000 at the Holiday Inn Beachside, N. Roosevelt Blvd., Key West, Florida. Please call Ron Demes at 305-293-2194 for directions to the public meeting. At the meeting, the proposed remedy will be discussed and questions will be answered. The public meeting will also address the proposed remedy for IR 1. To request information about the public meeting or comment period, to obtain more information concerning this Proposed Plan, or to submit written comments, please contact Ron Demes at the following address:

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All comments must be postmarked by Saturday, May 13, 2000.

NEXT STEPS

Following the 60-day public comment period, the U.S. Navy will issue a final decision on the proposed remedy. The Decision Document, which will describe the remedy chosen for IR 8, will include responses to oral and written comments received during the public comment period. Concurrence from EPA and FDEP will be obtained before implementing the final remedy.

**Comments on Proposed Plan
Fleming Key South Landfill (IR 8)**

Place
Stamp
Here

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