



STATEMENT OF BASIS

ORBITER PROCESSING FACILITY 1 AND 2, SWMU 72
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
KENNEDY SPACE CENTER
BREVARD COUNTY, FLORIDA



PURPOSE OF STATEMENT OF BASIS

This Statement of Basis (SB) has been developed to inform and give the public an opportunity to comment on a proposed remedy to address contamination at the Orbiter Processing Facility 1 and 2 (OPF 1 and 2)1. A Kennedy Space Center (KSC) Remediation Team consisting of the National Aeronautics and Space Administration (NASA), United States Environmental Protection Agency (EPA), and Florida Department of Environmental Protection (FDEP) has determined that the proposed remedy is cost effective and protective of human health and the environment. However, prior to implementation of the proposed remedy, the KSC Remediation Team would like to give an opportunity for the public to comment on the proposed remedy. At any time during the public comment period, the public may comment as explained in the "How Do You Participate" section of this SB. After the end of the public comment period, the KSC Remediation Team will review all comments and issues raised in the comments and determine if there is a need to modify the proposed remedy prior to implementation.

WHY IS A REMEDY NEEDED?

The results of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) indicated that aluminum and volatile organic compounds (VOCs)

listed in Table 1 are present in groundwater, which could be potentially harmful to human health if this water was used for human consumption now or in the future. In addition, the results of the RFI indicated that several metals, polynuclear aromatic hydrocarbons (PAHs), and Total Recoverable Petroleum Hydrocarbons (TRPH) listed in Table 2 are present in soil and/or soil/dry sediment (swale soil), which could potentially be harmful to human health. Numerous compounds of concern (COCs) were also identified in the surface water which is periodically present in the drainage swales at the site. However, the drainage swales are dry for a majority of the year.

HOW DO YOU PARTICIPATE?

The KSC Remediation Team solicits public review and comment on this SB before implementing the proposed remedy. The remedy for the OPF 1 and 2 will eventually be incorporated into the Hazardous and Solid Waste

The Cleanup Remedy
The proposed cleanup remedy for the OPF 1 and 2 includes the following components:
- Natural attenuation of groundwater to remove contaminants through natural processes.
- Monitoring of groundwater to document water quality and contaminant levels.
- Implementation of institutional controls to prohibit the use of groundwater as a potable water supply, prohibit residential use of the site, restrict industrial use access to soil and soil/dry sediment (swale soil), and maintain the current soil configuration.

1. In accordance with RCRA §7004(b), this Statement of Basis summarizes the proposed remedy for the NASA OPF 1 and 2 site. For detailed information on the site, consult the OPF 1 and 2 RFI Report, which is available for review at the information repository located at the North Brevard Library, 2121 South Hopkins Avenue, Titusville, FL 32780, telephone: (321) 264-5026.

Amendments (HSWA) Permit for KSC.

The public comment period for this SB and proposed remedy will begin on the date of publication for notice of availability of the SB in major local newspapers of general circulation and end 45 days thereafter. If requested during the comment period, the KSC Remediation Team will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy.

To request a hearing or provide comments, contact the following person in writing within the 45-day comment period:

Mr. John Armstrong, P.G.
FDEP - Bureau of Waste Cleanup
2600 Blair Stone Road, MS 4535
Tallahassee, FL 32399-2400

The HSWA Permit, SB, and associated administrative file, including the RFI Report, will be available to the public for viewing and copying at:

NASA Document Library
North Brevard Library
2121 South Hopkins Avenue
Titusville, FL 32780
Telephone: (321) 264-5026

To request further information, you may contact one of the following people:

Mr. Harold Williams
Remediation Program Manager
Environmental Program Office
Mail Code: TA-C3
Kennedy Space Center, FL 32899
E-mail: Harold.G.Williams@nasa.gov
Telephone: (321) 867-8411

Mr. John Armstrong, P.G.
FDEP-Bureau of Waste Cleanup
2600 Blair Stone Road, MS 4535
Tallahassee, FL 32399-2400
E-mail: John.Armstrong@dep.state.fl.us
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FACILITY DESCRIPTION

NASA established KSC as the primary launch site for the space program. These operations have involved the use of toxic and hazardous materials. Under the RCRA and applicable HSWA permit (Permit No. FL6800014585) issued by the FDEP and/or EPA, KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 72, the OPF 1 and 2 site.

SITE DESCRIPTION AND HISTORY

The OPF 1 and 2 is a NASA-operated facility that was constructed in the late-1970s and early-1980s to support space flight efforts at KSC. The facility includes two (OPF 1 and OPF 2) of the three processing facilities for the Space Shuttle Orbiters. The facility buildings include two, 29,000 square feet (ft²) high bays separated by a 23,600 ft² low bay. An equipment area, which is commonly known as the "back yard" and includes an oxidizer and fuel processing equipment (scrubbers), is located immediately south of the OPF 1 and OPF 2 buildings (Figures 1 and 2). Past and current operations at the OPF 1 and 2 include safing procedures for the removal of residual fuels, oxidizers, and explosive ordnance from the Space Shuttle Orbiters immediately following landing at the nearby Shuttle Landing Facility.

Investigations conducted at the site include:

- 1993: During this time, investigations at the OPF 1 and 2 were focused on potential contamination in the vicinity of the drainage swale located along the southern portion of the site. Groundwater, surface water, soil, and soil/dry sediment (swale soil) samples were collected and analyzed. Aluminum was identified in groundwater samples at concentrations above FDEP groundwater cleanup target levels (GCTLs).
- 1998: SWMU Site Assessment activities were conducted to evaluate impacts to site groundwater, surface water, soil, and soil/dry sediment (swale soil). Samples were collected/analyzed and numerous metals, VOCs, semi-volatile volatile organic compounds (SVOCs), PAHs, polychlorinated biphenyls (PCBs), and TRPH were identified in site media above regulatory criteria.
- 2001: Up to 300 gallons of diesel fuel were discharged to the drainage swale located along the southern portion of the site. Diesel fuel/water mixtures were recovered and impacted soil and soil/dry sediment (swale soil) were excavated. Surface water samples collected after completion of the cleanup activities revealed no petroleum-related compounds above FDEP surface water cleanup target levels (SWCTLs).
- 2001-2004: A RCRA Facility Investigation was conducted. Samples of groundwater, surface water, soil, and soil/dry sediment (swale soil) were collected and analyzed. Results of these analyses were used to evaluate potential risks to human health and ecological receptors. The Preliminary Risk Evaluation (PRE) for human health indicated that groundwater containing aluminum and VOCs would result in an

unacceptable human health risk if the groundwater was used as a source of drinking water. The screening-level ecological risk assessment (ERA) indicated that no unacceptable risk exists at the site for ecological receptors.

SUMMARY OF SITE RISK

As part of the RFI activities, limited risk assessments were completed in accordance with KSC's Remediation Team Risk Assessment Decision Process Document (DPD). The screening-level ERA was performed in accordance with the eight-step process described in the EPA's "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments", dated 1997.

COCs identified for human health risk during the RFI that exceeded FDEP/EPA cleanup target levels were aluminum and VOCs in groundwater; and metals, PAHs, and TRPH in soil and soil/dry sediment (swale soil). For a complete list of COCs in groundwater and soil/dry sediment (swale soil) see Tables 1 and 2. No cancer risks or non-cancer hazards were estimated for current or future receptors to groundwater because of (1) the lack of exposure pathways for any current use at the site and (2) the facility is located in an industrial area of KSC.

The ERA did not identify any unacceptable ecological risks primarily due to the lack of quality habitat at the OPF 1 and 2.

WHAT ARE THE REMEDY OBJECTIVES AND LEVELS?

The remedial action objectives (RAOs) are to: (1) protect humans from exposure to groundwater by preventing its use as a drinking water source in the shallow aquifer where contaminant concentrations are higher than FDEP GCTLs; and (2) protect humans

from exposure to soil and soil/dry sediment (swale soil) contaminants that exceed FDEP residential-use cleanup target levels by limiting access only to industrial workers.

Table 1 lists the COCs present in groundwater at the OPF 1 and 2. The first column lists the chemical name, the second column lists the range of concentrations in groundwater detected at the OPF 1 and 2 during the RFI, and the last column presents the FDEP cleanup target level to be achieved at the site. Table 2 lists the COCs present in soil and soil/dry sediment (swale soil) at the OPF 1 and 2. Cleanup target levels are shown for residential and industrial scenarios.

Table 1

Site-Related Chemicals of Concern (COCs)	Range of Detections (ug/L) ¹	Site-Specific Cleanup Target Level (ug/L) ²
Aluminum	211 – 3,410	1,300 ³
Benzene	3.2	1
Vinyl Chloride	17.7 – 26.8	1

¹ Detections in monitoring wells

² Cleanup levels are GCTLs from Florida Administrative Code 62-777

³ Upper limit of background concentration range.

Table 2

Site-Related Chemicals of Concern (COCs)	Range of Detections (mg/kg) ²	Residential SCTL (mg/kg) ¹	Industrial SCTL (mg/kg) ¹
Arsenic	0.55 – 3.4	0.8	3.7
Benzo(b)fluoranthene	7.000	1.4	4.8
Benzo(a)pyrene	0.0856 - 1.150	0.1	0.5
Copper	3.0 – 8,470	110	76,000
TRPH	8.79 - 910	340	2,500
Vanadium	13.4 – 36.7	15	74,000

¹ Cleanup levels are SCTLs from Florida Administrative Code 62-777

² Includes dry sediment (swale soil)

REMEDIAL ALTERNATIVES FOR THE OPF 1 AND 2 SITE

Because of the low levels of groundwater contamination and the limited aerial extent of soil and soil/dry sediment (swale soil) contamination present at the OPF 1 and 2, only one remedy was considered for the OPF 1 and 2.

Land Use Controls and Natural Attenuation with Long-Term Monitoring:

Under this process, natural processes such as biological degradation, dispersion, advection, and adsorption will reduce COC concentrations to cleanup target levels over time. Groundwater will be regularly sampled and analyzed to monitor and document the decrease in contaminant concentrations. In the long term, this alternative will meet RAOs and will also allow re-evaluation to determine if the remedy is working and provide an opportunity for change if necessary. In addition, institutional controls will be implemented for site soil and soil/dry sediment (swale soil) to maintain the current soil configuration. The institutional controls will limit access to site soil and soil/dry sediment (swale soil) by individuals other than industrial workers. NASA, EPA and FDEP have entered into a Memorandum of Agreement (MOA), which outlines how institutional controls will be managed at NASA.² The MOA requires periodic inspections, condition certification, and agency notification. The area of the site that will be under institutional control is shown on Figure 2.

2. By separate MOA effective February 23, 2001, with the EPA and FDEP, KSC, on behalf of NASA, agreed to implement Center-wide, certain periodic site inspections, condition certification, and agency notification procedures designed to ensure the maintenance by Center personnel of any site-specific LUCs deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that agreement was that through the Center's substantial good faith compliance with the procedures called for herein, reasonable assurances would be provided to EPA and FDEP as to the permanency of those remedies which included the use of specific LUCs.

Although the terms and conditions of the MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed by NASA KSC, EPA and FDEP that the contemplated permanence of the remedy reflected herein shall be dependent upon the Center's substantial good faith compliance with the specific LUC maintenance commitments reflected herein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred in may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment

EVALUATION OF REMEDY

The selected remedy was evaluated to determine if it will comply with EPA's four threshold criteria for corrective measures. The four threshold criteria for corrective measures are:

- overall protection of human health and the environment;
- attain media cleanup standards;
- control the sources of releases; and
- comply with standards for management of wastes

Land Use Controls and Natural Attenuation with Long-Term Monitoring meet each of the threshold criteria and were determined by the KSC Remediation Team to be the best overall approach.

WHAT IMPACTS WOULD THE REMEDY HAVE ON THE LOCAL COMMUNITY?

There would be no impacts to the local community because groundwater is not used for potable water at KSC. The natural attenuation and long-term monitoring alternative includes administrative actions to limit the use of groundwater until the cleanup levels have been achieved. In addition, the administrative actions will limit site access to soil and soil/dry sediment (swale soil) to industrial workers.

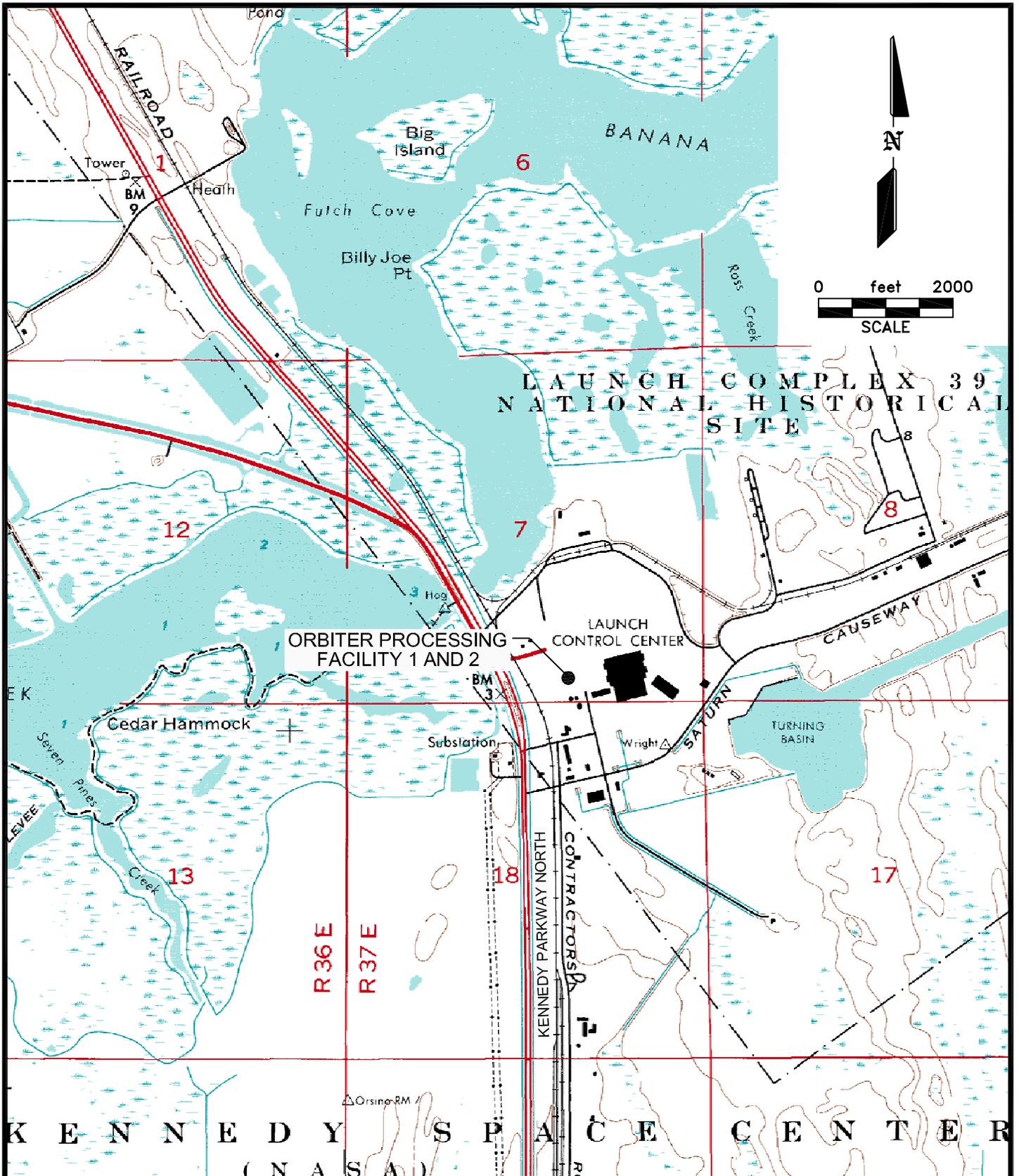
WHY DOES THE KSC REMEDIATION TEAM RECOMMEND THIS REMEDY?

The team recommends the proposed remedy because the naturally-occurring processes observed at the site are sufficient for the removal of low concentrations of VOCs. The long-term monitoring will be used to monitor and document reduction in contaminant concentrations to the cleanup

target levels. The institutional controls will also be an effective way to prevent exposure to contaminants in soil and soil/dry sediment (swale soil). The proposed remedy meets the four general standards for corrective measures and was determined to be the best overall approach.

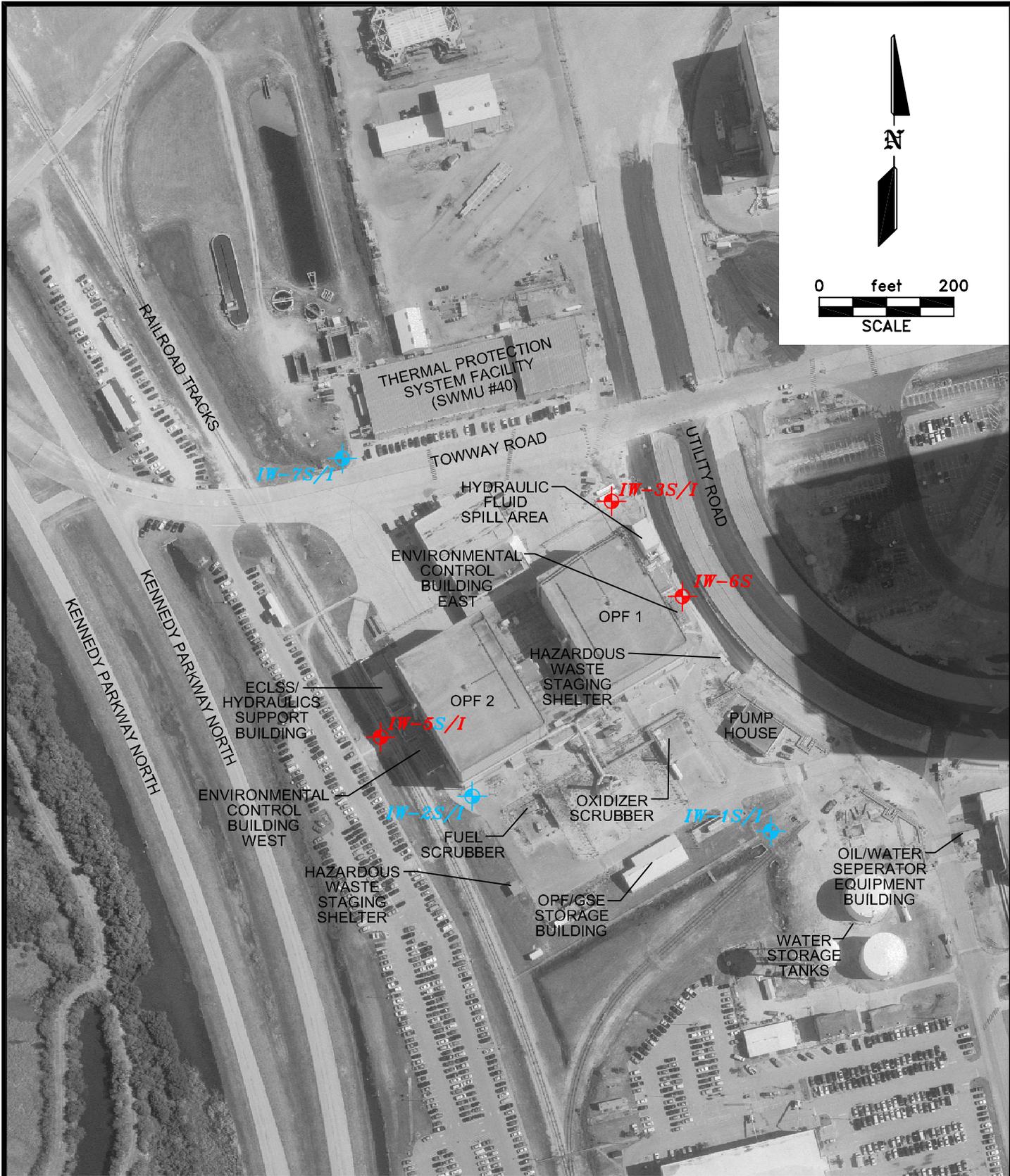
NEXT STEPS

The KSC Remediation Team will review all comments on this SB to determine if the proposed remedy needs modification prior to implementation and prior to incorporating the proposed remedy into KSC's HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then a long term monitoring program will be initiated, and a Land Use Control Implementation Plan will be developed to incorporate the institutional controls at this site.



SOURCE: 7.5 MINUTE SERIES USGS QUADRANGLE MAP, ORSINO AND FALSE CAPE, FLORIDA, DATED 1976.

FIGURE 1
 LOCATION MAP
 ORBITER PROCESSING
 FACILITY 1 AND 2



SECTION: 7 TOWNSHIP: 22 S RANGE: 37 E

FIGURE 2
 SITE MAP
 ORBITER PROCESSING
 FACILITY 1 AND 2

 MONITORING WELL
 (ANALYTICAL TESTING
 AND WATER LEVEL)

 MONITORING WELL
 (WATER LEVEL)