



STATEMENT OF BASIS

**SHUTTLE FLIGHT OPERATIONS CONTRACT (SFOC)
 GENERATOR MAINTENANCE FACILITY (GMF) SWMU 81
 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 SFOC GMF. A Kennedy Space Center (KSC) Remediation Team consisting of 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, before implementing the proposed remedy, the KSC Remediation Team would like to provide the public an opportunity 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 the metal, antimony, listed in Table 1 is 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 classes of compounds listed in Table 2 are present in soil and swale soil which could potentially be harmful to human health.

<p>The Cleanup Remedy</p> <p>The proposed cleanup remedy for the SFOC GMF includes the following components:</p> <ul style="list-style-type: none"> ▪ Natural attenuation of antimony in 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 and prevent residential exposure to site surface and swale soils.
--

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

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 SFOC Generator Maintenance Facility will eventually be incorporated into the Hazardous and Solid Waste 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 R. 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 R. 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
Telephone: (850) 245-8981

FACILITY DESCRIPTION

NASA established the 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 EPA, KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 81, the SFOC Generator Maintenance Facility.

SITE DESCRIPTION AND HISTORY

The SFOC Generator Maintenance Facility is a NASA facility that was constructed in 1988 to be utilized as the main generator maintenance shop and storage facility for the SFOC at KSC. The facility was designed to accommodate maintenance and storage operations for portable generators and portable above ground diesel fuel storage tanks. The SFOC GMF is currently operated by United Space Alliance (USA). The facility has formerly been referred as the Shuttle Processing Contract (SPC)

Generator Shop, the Launch Support Operations Contract (LSOC) Generator Shop and the Lockheed Generator Shop.

The GMF has historically been a generator maintenance and storage facility. Operations conducted at the site include installation of equipment such as containment material for possible fuel and oil spills, portable diesel fuel tanks and canister filtering systems for the exhaust pipe of the generator. Several types of tests are conducted at the GMF to assure that generators are always ready for emergency support. The site location and facility map are included as Figures 1 and 2, respectively. Investigations conducted at the site include:

- 1996-1999: A SWMU Assessment and confirmatory sampling were conducted by Environmental Sanitation/Pollution Control (ESPC). Antimony was identified in shallow groundwater exceeding the Maximum Contaminant Level (MCL).
- 2000: A SWMU Assessment conducted by Environmental Compliance and Public Health indicated the need for confirmatory sampling at the SFOC GMF and twelve locations of concern were identified.
- 2000-2002: Confirmatory Sampling of soil, swale soil and groundwater samples was conducted. Total petroleum hydrocarbons (TPH), benzo(a)pyrene (BAP), copper, arsenic, dibenzo(a,h)anthracene (DBANTH) were present in excess of Residential Soil Cleanup Target Levels (SCTLs). Aluminum and antimony were detected in shallow groundwater in excess of Groundwater Cleanup Target Levels (GCTLs).

- 2002-2003: A limited RCRA Facility Investigation was conducted for groundwater. Antimony and aluminum were confirmed in groundwater in excess of the GCTLs. However, aluminum was within the range of background and not further evaluated. A geochemical groundwater model was utilized to demonstrate that antimony present in groundwater at one location was not mobile and would not migrate a significant distance without precipitating out.

SUMMARY OF SITE RISK

As part of the RFI activities, risk assessments were completed in accordance with KSC's Remediation Team Risk Assessment Decision Process Document (DPD). A site visit by the Team determined that no viable ecological habitat existed at this site.

Chemicals of Concern (COCs) identified for human health during the RFI included antimony in groundwater and BAP, DBANTH, copper, arsenic and TPH in soil and swale soil (based on residential cleanup target levels). For a complete list of COCs in groundwater, soil and swale soil see Tables 1 and 2, respectively. No cancer or non-cancer hazards were estimated for current receptors to groundwater because of the lack of exposure pathways for any current use at this site.

The PRE showed that assuming future use of groundwater for drinking water, non-cancer risks would be unacceptable. The hazard index (HI) for non-cancer effects was found to be 31.67, which is above the EPA and FDEP acceptable threshold of 1.0. The only contaminant contributing to the HI is antimony. However, based upon

geochemical modeling migration of antimony was not considered to be of concern.

WHAT ARE THE REMEDY OBJECTIVES AND LEVELS?

The remedial action objectives (RAO) are to: (1) protect humans from exposure to groundwater by preventing its use as a drinking water source in the shallow aquifer where the contaminant concentrations have been found to be higher than FDEP cleanup target levels; (2) protect humans from exposure to soil for residential use. Table 1 lists the COCs present in groundwater at the SFOC GMF. The first column lists the chemical name, the second column lists the range of concentrations in groundwater detected at the SFOC GMF 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 swale soil at the SFOC GMF. Cleanup target levels are shown for residential and industrial scenarios.

Table 1. Groundwater

Site-Related Chemicals of Concern (COCs)	Range of Detections ¹ (µg/L)	Site-Specific Cleanup Level ² (µg/L)
Antimony	120 – 190	6

¹Detections in monitoring wells

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

Table 2. Soil

Site-Related Chemicals of Concern (COCs)	Range of Detections (mg/kg)	Residential SCTL ¹	Industrial SCTL ¹
TPH	11-2100	340	2500
Benzo(a)pyrene	0.0001–0.49	0.1	0.5
Copper	2.1-310	110	76000
Arsenic	1.0 – 2.2	0.8	3.7
DBANTH	0.011 – 0.22	0.1	0.5

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

FINAL REMEDY FOR SFOC GENERATOR MAINTENANCE FACILITY

Because of the low levels of groundwater and soil/swale soil contamination present at small discrete locations at the SFOC GMF only one remedy was considered.

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

Under this alternative, natural processes will reduce COC concentrations to cleanup levels over time. Groundwater will be regularly sampled and analyzed to monitor migration and document the decrease in contaminant concentrations. Data collected during the RFI indicated that the potential for transport of antimony is extremely low due to the presence of sulfide in groundwater in a down-gradient well. These sulfide concentrations would precipitate the antimony out in the event of movement. In addition, institutional controls will be implemented for site soil, swale soil and

groundwater. The institutional controls will remain in place to prevent residential exposure of soil and the use of site groundwater as a drinking water source. 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.

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 (LUC) and Natural Attenuation with Long-Term Monitoring meet each of the threshold criteria and was 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 remedy includes administrative actions to limit the use of groundwater, soil and swale soil until the cleanup levels have been reached. Long-term groundwater monitoring will be used to monitor contaminant concentrations and migration. Institutional controls will also prevent exposure to contaminants prior to cleanup levels being achieved.

WHY DOES THE KSC REMEDIATION TEAM RECOMMEND THIS REMEDY?

The KSC Remediation Team recommends the proposed remedy because it is a cost effective means to control soil and groundwater contamination. The long-term monitoring will be used to determine no migration of antimony is occurring at the site. The institutional controls will also prevent exposure to soil and groundwater contaminants. The proposed remedy meets the four general standards for corrective measures and was determined to be the best overall approach.

2. By separate MOA effective February 23, 2001, with the EPA and FDEP, KSC, on behalf of NASA, agreed to implement Centerwide, certain periodic site inspections, condition certification, and agency notification procedures designed to ensure the maintenance of 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.

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 (LUCIP) will be developed to incorporate the institutional controls at this site.

Figure 1
SFOC Generator
Maintenance Facility
SWMU 81

Site

Indian River

Mosquito Lagoon

Atlantic Ocean

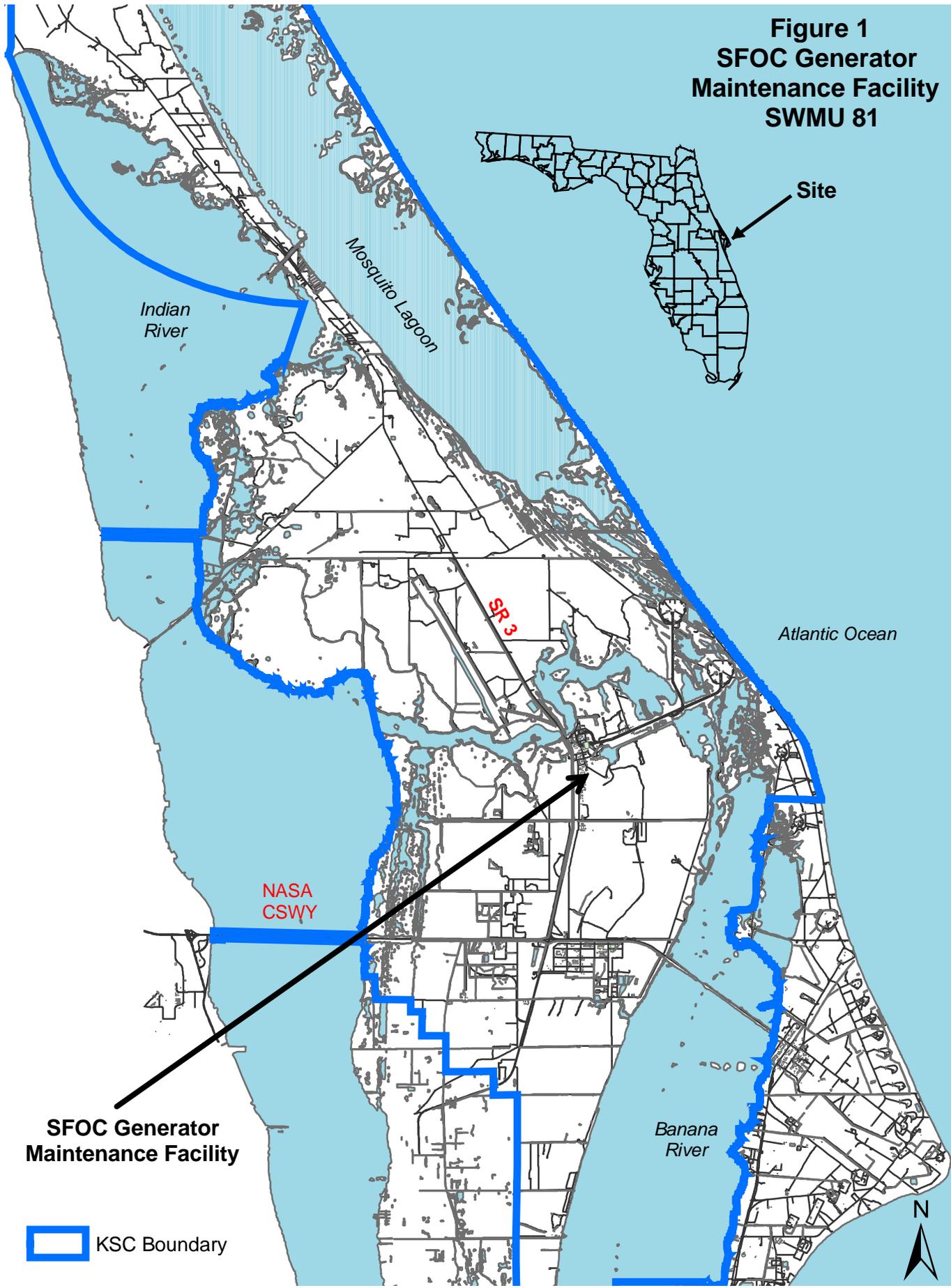
SR 3

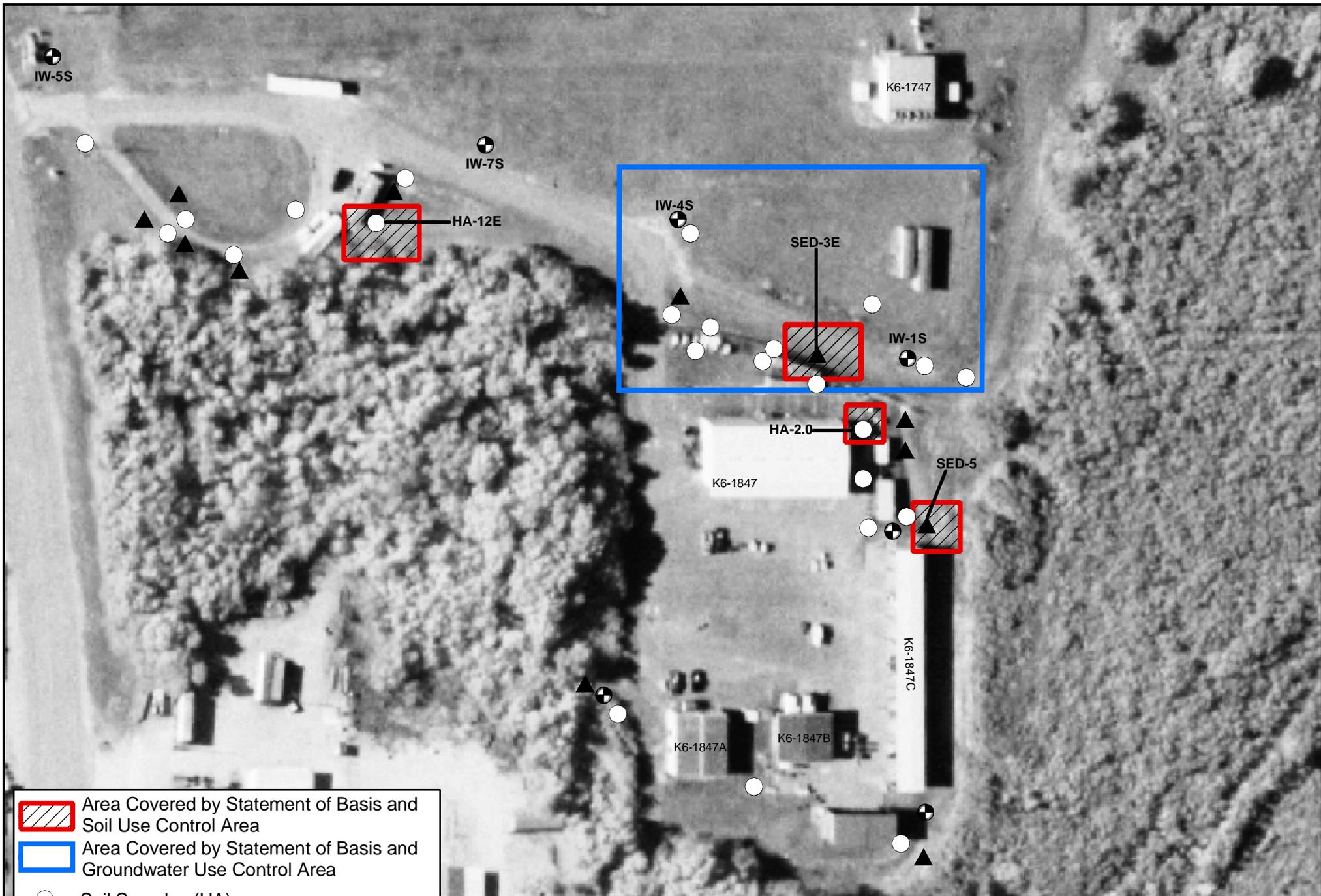
NASA
CSWY

Banana River

SFOC Generator
Maintenance Facility

 KSC Boundary





- Area Covered by Statement of Basis and Soil Use Control Area
- Area Covered by Statement of Basis and Groundwater Use Control Area
- Soil Samples (HA)
- +

 Investigative Well (IW)
- Dry Sediment as Soil (SED)

Figure 2
Site Map
SFOC Generator Maintenance Facility
SWMU 81

