



STATEMENT OF BASIS

**FIRE STATION #6 (SWMU 106)
 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 Fire Station #6 (FS6; currently known as Fire Station No. 3). FS6 is located along Pad B Road and encompasses approximately 6 acres (Figure 1). The Kennedy Space Center (KSC) Remediation Team (KSCRT), consisting of National Aeronautics and Space Administration (NASA) and Florida Department of Environmental Protection (FDEP) personnel, 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 KSCRT 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 KSCRT 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 Confirmation Sampling and Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report indicated that vinyl chloride is present in groundwater above the FDEP

Groundwater Cleanup Target Level (GCTL) and that polychlorinated biphenyls (PCBs) are present in soil above the FDEP Residential-Direct Exposure (R-) Soil Cleanup Target Level (SCTL). Both compounds are listed in Table 1. These conditions could be potentially harmful to human health if the groundwater is used or the soil is contacted for extended periods during site activities now, or in the future.

HOW DO YOU PARTICIPATE?

The KSCRT solicits public review and comment on this SB before implementing the proposed remedy. The remedy for FS6 will be incorporated into the next update of the Hazardous and Solid Waste Amendments (HSWA) Permit for KSC.

The Cleanup Remedy

The proposed cleanup remedy for FS6 includes the following components:

- Natural attenuation of vinyl chloride in groundwater through naturally occurring processes.
- Monitoring of groundwater to document vinyl chloride concentrations.
- Implementation of institutional controls to maintain the concrete pad beneath transformer USS1054 and to prohibit the use of groundwater.

The public comment period for the SB will coincide with the date of publication for notice of availability of the HSWA Permit in major local newspapers of general circulation and will end 45 days thereafter.

SB-SWMU 106

If requested during the comment period, the KSCRT will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy.

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

Ms. Rosaly Santos-Ebaugh, P.E.
Remediation Program Manager
Environmental Assurance Branch
Mail Code TA-A4B
Building K6-1547 (Logistics Facility),
Room 2813-A
Kennedy Space Center, Florida 32899
E-mail: Rosaly.J.SantosEbaugh@nasa.gov
Telephone: (321) 867-8402
Fax: (321) 867-4446

Mr. John R. Armstrong, P.G.
FDEP - Waste Cleanup Program
Bob Martinez Center
Mail Station 4535
2600 Blair Stone Road
Tallahassee, FL 32399-2400
Email: John.Armstrong@dep.state.fl.us
Telephone: (850) 245-8981
Fax: (850) 245-8976

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. 0026028-HO-005) issued by the FDEP, KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) 106, FS6.

SITE DESCRIPTION AND HISTORY

FS6 is located along Pad B Road, which extends northward from Saturn Causeway and leads to Launch Complex 39B (Figure 1). The Site is bordered by the SCAPE Building (J7-1338) and Emergency Response Building (J7-1339) immediately to the north, Pad B Road to the west, and wooded areas to the south and east (Figure 2). FS6 encompasses the facilities and associated structures along Pad B Road and includes 14 numbered structures and several unnumbered support structures. The numbered structures in the immediate Land Use Control (LUC) area include the following:

- SCAPE (Self-Contained Atmospheric Protective Ensemble) Building (J7-1338);
- Emergency Response Building (J7-1339);
- Industrial Water Pumping Station (J7-1388);
- Groundwater Storage Tanks (J7-1387 and J7-1389); and
- Hazardous Waste Staging Buildings/Portables (J7-1388B and J7-1388C).

Multiple investigations have been conducted at the site.

SWMU Assessment Report (2007)

A SWMU Assessment Report (SAR) was completed to determine the potential for historical site activities to affect the environment in the vicinity of FS6. The SAR identified 15 Locations of Concern (LOCs): LOC 1 - Drainage Outfalls (near the Industrial Water Pumping Station); LOC 2 - Groundwater Storage Tank; LOC 3 - Former Drainfield (at the Industrial Water Pumping Station); LOC 4 - Location of Former Underground Storage Tank; LOC 5 -

Hazardous Waste Staging Buildings; LOC 6 - Transformer (north of the Industrial Water Pumping Station); LOC 7 - Controlled Waste Container; LOC 8 - Former Above Ground Storage Tank; LOC 9 - Transformer (north of the SCAPE building). LOC 10 - Drainage Outfalls (north of the Emergency Response Building); LOC 11 - Former Weather Tower; LOC 12 - Repeater Buildings No. 5 and No. 6 Former Transformer Pads; LOC 13 - Former Drain Field Area (north of Pad B Operations Support Building); LOC 14 - Former Location of Pesticide Sprayer Tank; and LOC 15 - Vacuum Fault Interrupters.

Confirmatory Sampling Work Plan (2007)

A Confirmatory Sampling (CS) Work Plan (CSWP) was presented at the October 2007 KSCRT meeting and consensus was reached to implement the CSWP. The LOCs identified in the SAR were included in the CSWP to confirm the presence or absence of chemicals of potential concern.

Confirmatory Sampling Report and Interim Measure Work Plan (2010)

CS activities included the collection of 163 soil samples and one concrete sample, field screening of select soil samples at 1-foot intervals to the water table using an Organic Vapor Analyzer equipped with a Photoionization Detector, collection of 114 direct-push technology (DPT) groundwater samples from 28 locations, and the installation and sampling of one monitoring well (MW0001). Based on the results of these CS activities, the KSCRT reached consensus on the following recommendations:

- (i) No Further Action (NFA) for groundwater at LOC 3, LOC 4, LOC 5, and LOC 13;
- (ii) NFA for soil at LOC 3, LOC 7, LOC 9, LOC 10, LOC 11, LOC 12, LOC 13, LOC 14, and LOC 15;
- (iii) complete an Interim Measure (IM) to excavate soil at LOC 1 with barium, chromium, copper, and mercury concentrations above R-SCTLs;
- (iv) complete an IM to excavate soil at LOC 2 with lead and PCB concentrations above R-SCTLs;
- (v) complete an IM to excavate soil at LOC 5 with benzo(a) pyrene toxicity equivalent (BaP) concentrations above the R-SCTL and General Industrial Area Range of Reference Values;
- (vi) complete an IM to excavate soil at LOC 8 with arsenic concentrations above the R-SCTL;
- (vii) prepare a LUC Implementation Plan (LUCIP) for soil with concentrations of constituents above R-SCTLs that will remain onsite at LOC 5 (BaP) and LOC 6 (PCBs); and
- (viii) complete RFI activities to delineate groundwater affected with vinyl chloride concentrations above the GCTL at LOC 1.

Interim Measure Report (2011/2012)

Excavation of the affected media in LOC 1 (24.7 cubic yards), LOC 2 (15.9 cubic yards), LOC 5 (39.3 cubic yards), and LOC 8 (24.5 cubic yards) was completed during the IM. Following the excavation, and based on the results presented in the IM Report, the KSCRT reached consensus for NFA for soil at LOC 1, LOC 2, and LOC 8.

Based on the results presented in the IM Report, the KSCRT re-evaluated the interim LUC proposed in the CS Report for soil at LOC 5 and reached consensus that NFA for soil at LOC 5 was appropriate and an interim LUC was not required. NFA for soil at LOC 5 was recommended in the RFI Progress Report (2013).

The IM Report was submitted to FDEP in May 2012.

Interim Land Use Control Implementation Plan (2012)

The Interim LUCIP presented an interim institutional LUC to prohibit groundwater use at the site associated with concentrations of vinyl chloride above the GCTL at LOC 1 and to prevent exposure to soils affected with PCBs under an active transformer pad at LOC 6.

RFI Progress Report (2013)

The RFI Progress Report was presented to the KSCRT in January 2013 and submitted to FDEP in April 2013. The RFI Progress Report detailed the results of the assessment of LOC 1. Characterization activities performed included collecting groundwater samples via DPT (87 samples from 15 locations) and analyzing the samples for chlorinated volatile organic compounds (VOCs), installing two monitoring wells (MW0002 and MW0003), collecting groundwater samples from three monitoring wells (MW0001, MW0002, and MW0003) for VOC analysis, collecting groundwater level measurements from three monitoring wells, and advancing two lithology borings to 40 feet below land surface.

The KSCRT reached consensus on the delineation of trichloroethene (TCE) and vinyl chloride exceedances in DPT

groundwater samples in the vicinity of LOC 1 and reached consensus that the TCE exceedance was not confirmed by monitoring well results. The KSCRT also reached consensus on the recommendation to conduct interim groundwater monitoring of MW0001, MW0002, and MW0003 for VOCs during two semi-annual events and to recommend either long-term monitoring (LTM) or NFA for LOC 1 upon completion of the interim monitoring period.

The KSCRT also reached consensus that NFA at LOC 5 was appropriate.

RFI Progress Report Addendum (2014)

The RFI Progress Report Addendum was presented to the KSCRT in May 2014. The results of the two semi-annual sampling events for VOCs indicated that vinyl chloride concentrations were above the GCTL in MW0001 and MW0003. No other constituents exceeded GCTLs. Based upon the results, the KSCRT reached consensus that LTM of groundwater at LOC 1 was appropriate and to revise the Interim LUCIP to reflect these changes.

WHAT ARE THE REMEDY OBJECTIVES AND LEVELS?

The remedial action objective (RAO) is to protect humans from exposure to groundwater affected with vinyl chloride above the GCTL and PCB-affected soil that exceeds the FDEP SCTL by minimizing exposure to the media affected in these areas. Table 1 lists the chemicals of concern (COCs) present in groundwater and soil. The first column lists the chemical name, the second column lists the units of the COC units, the third column lists the concentrations detected in groundwater monitoring wells or soil samples, and the last

column presents the site specific cleanup target level.

Table 1

Site-Related COC	Unit	Detections	GCTL or SCTL ¹
VC in Groundwater	µg/L	1.6 to 5.2	1.0
PCBs in Soil	mg/kg	> 0.5	0.5

¹ Cleanup levels established by Chapter 62-777 Florida Administrative Code .

REMEDIAL ALTERNATIVES FOR FS6

Remedial alternatives are different combinations of plans or technologies to restrict access and to contain or treat contamination to protect human health and the environment.

Groundwater

Low-level concentrations of vinyl chloride are present in groundwater that exceed the FDEP GCTL, and the following remedy was considered for groundwater at the site.

Land Use Controls and Long-Term Monitoring:

Under this alternative natural processes will reduce the vinyl chloride concentration over time. Groundwater will be regularly sampled and analyzed to monitor and document the vinyl chloride concentrations. The current and projected land use of FS6 does not include the use of site groundwater; therefore, no current or projected exposure risk exists.

This alternative will meet the RAO in the long term. Ongoing evaluations of the alternative will be conducted to determine whether the remedy is working and to provide an opportunity for change, if necessary. In addition, a LUC prohibiting the use of groundwater will be implemented until the cleanup level is achieved.

NASA and the FDEP have entered into a Memorandum of Agreement (MOA) that outlines how institutional controls will be managed at NASA¹. Controls will include periodic inspection, condition certification, and agency notification. The area of the site that will be under a LUC for groundwater is shown on Figure 3.

¹ By separate MOA effective February 23, 2001, with the FDEP and 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 the 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, 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.

Soil

Land Use Control

Soil beneath the active transformer (USS 1054) pad contains PCBs above the FDEP R-SCTL. The concrete transformer pad is acting as a cap, preventing exposure to the affected soil. Therefore, a LUC is required to maintain the integrity of the transformer pad to prevent contact with affected soil. Under this alternative, potential human health risks will be minimized, and ongoing evaluation of the alternative will provide an opportunity for change of remedy, if necessary.

NASA and the FDEP have entered into a MOA that outlines how institutional controls will be managed at NASA¹. Controls will include periodic inspection, condition certification, and agency notification. The area of the site that will be under a LUC for soil is shown on Figure 4.

EVALUATION OF REMEDY

The selected remedy was evaluated to determine if it will comply with the four threshold criteria and five balancing criteria established 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.

The following are the five balancing criteria considered for corrective measures:

- Long-term reliability and effectiveness;

- Short-term effectiveness;
- Reduction in the toxicity, mobility, and volume of wastes;
- Implementability; and
- Cost.

LUCs meet the threshold criteria and were determined to be the most appropriate approach with respect to the balancing criteria.

WHAT IMPACTS WOULD THE REMEDY HAVE ON THE LOCAL COMMUNITY?

There would be no impacts to the local community because administrative actions to limit access to the site are consistent with current operating procedures, and the projected future land use of FS6 is industrial in nature.

WHY DOES THE KSCRT RECOMMEND THIS REMEDY?

The KSCRT recommends the proposed remedy because the naturally-occurring processes are sufficient for degradation of the low-level concentrations of vinyl chloride. LTM will be used to monitor and document vinyl chloride concentrations.

The LUCs will prevent exposure to affected groundwater and soil prior to the cleanup levels being achieved. The proposed remedy meets the four general standards for corrective measures and was determined to be the best overall approach with respect to balancing criteria.

NEXT STEPS

The KSCRT will review all comments on this SB to determine if the proposed remedy needs modification prior to implementation and prior to incorporating the proposed

SB-SWMU 106

remedy into KSC's HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then a LUCIP will be developed to incorporate the LUCs at this site.