STATEMENT OF BASIS

VISITOR COMPLEX MAINTENANCE AREA (SWMU 099)
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 Visitor Complex Maintenance Area (VCMA)[1]. The VCMA is located southwest of the Visitor Complex and includes maintenance and storage buildings, the western storage area, fleet maintenance, and fleet fueling. The Kennedy Space Center (KSC) Remediation Team, 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 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 isopropylbenzene (listed in Table 1) is present in groundwater, which could be potentially harmful to human health if this water is used for human consumption now or in the future. In addition, the results of the RFI indicated that Total Benzo(a)Pyrene Equivalents (BaP TEQ) exceed the Residential Soil Cleanup Target Level (SCTL) as listed in Table 2.

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 VCMA will eventually be incorporated into the Hazardous and Solid Waste Amendments (HSWA) Permit for KSC.

The Cleanup Remedy

The proposed cleanup remedy for the VCMA includes the following components:

- Monitored natural attenuation for the isopropylbenzene dissolved plume.
- Implementation of institutional controls to prohibit residential exposure to site surface soils and to prohibit the use of groundwater as a potable water supply.

[1] In accordance with RCRA §7004(b), this Statement of Basis summarizes the proposed remedy for the NASA VCMA. For detailed information on the site, consult the VCMA RFI Report, which is available for review by contacting the KSC Environmental Assurance Branch at telephone number (321) 867-8411.

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 will 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 to 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
Federal Facilities Section
Bob Martinez Center
2600 Blair Stone Road, MS 4535
Tallahassee, FL 32399-2400
Telephone: (850) 245-8981

The HSWA Permit, SB, and associated administrative file, including the RFI Report and Interim Measure (IM) Reports, can be requested by contacting one of the following people :

Ms. Rosaly Santos-Ebaugh, P.E.
Remediation Program Manager
Environmental Assurance Branch
Mail Code TA-B1B
Building M6-399, room 1641
Kennedy Space Center, Florida 32899
E-mail: Rosaly.J.SantosEbaugh@nasa.gov
Telephone: (321) 867-8402

Mr. John R. Armstrong, P.G.
FDEP - Bureau of Waste Cleanup
Federal Facilities Section
Bob Martinez Center
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 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. 0026028-HO-003) issued by the FDEP and/or the Environmental Protection Agency (EPA), KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) 099, the VCMA.

SITE DESCRIPTION AND HISTORY

The VCMA is an active NASA subcontractor-operated facility that was built to support the Visitor Complex. The VCMA consists of office, storage, and maintenance buildings and has an open storage area on the western side of the site and bus wash and maintenance facilities on the northeast side.

The site is bordered by wooded property to the north, the Visitor Complex to the east, wooded property and detention ponds to the south, and wooded property to the west. SWMU 099 is shown on Figure 1.

The site is currently developed with ten numbered buildings as shown on Figure 2:

- Roads & Grounds Maintenance #2 (M6-0506)
- Storage Building (M6-0556)
- Tour Bus Fueling Facility (M6-0505)
- Gas Storage (M6-0505A)
- Nursery (M6-0555)
- Storage Building (M6-0503)
- Maintenance/Exhibit Building (M6-0504)

- Exhibit Maintenance Building (M6-0553)
- Dumpster Enclosure (M6-0553A)
- Main Campus Storage Warehouse (M6-0454)

An additional seven numbered buildings are included as part of the fleet maintenance area:

- Tour Bus Servicing Facility (M6-0455)
- Bus Wash Facility (M6-0455A)
- Maintenance Shop (M6-0455B)
- Maintenance Shop (M6-0455C)
- Storage Building (M6-0455D)
- Maintenance Shop (M6-0455E)
- Battery Storage Facility (M6-0456)

A fenced containment area for two water chillers is also located on the east side of the site, and an open storage area is located on the western side of the facility. The water chillers occupy the former location of Sewage Treatment Plant 10. A former wash water holding pond was located in the north-central portion of the site.

Investigations conducted at the site include:

SWMU 20 (1990 to Present)

SWMU 20 is located within the boundaries of the VCMA. Previous investigations conducted for SWMU 20 include the Spaceport USA Diesel Fuel Storage Area, Spaceport USA Oil/Water Separator Area, and Bus Wash Holding Pond. Based on previous assessment and remediation activities, SWMU 20 is awaiting No Further Action approval from FDEP.

SWMU Assessment (2006)

A SWMU Assessment (SA) was conducted at the site. Ten Locations of Concern (LOCs) were identified in the SA and Confirmatory Sampling (CS) was recommended.

Confirmatory Sampling (2006)

CS was conducted in 2006, and the results indicated that the soil, shallow groundwater, and surface water at VCMA have been affected. An RFI Work Plan was recommended and approved for the assessment of the following constituents that were retained as chemicals of potential concern (COPCs) or chemicals of potential ecological concern (COPECs):

- Chromium and copper as COPECs in surface water
- 4-(2-Methyl-4-chlorophenoxy)butyric acid (MCPP) and beta-Hexachloro-cyclohexane (beta-BHC) as COPCs in soil and groundwater
- Total recoverable petroleum hydrocarbons (TRPH) as a COPC in soil and groundwater
- Isopropylbenzene as a COPC in groundwater
- BaP TEQ as a COPC in soil

RFI (February 2007 through December 2008)

RFI activities were conducted in multiple phases to identify, characterize, and delineate identified COPCs and COPECs. Analytical data from the field investigation were used to estimate the potential human health risks at the site. BaP TEQ were the only retained chemicals of concern (COCs) detected in the soil at concentrations exceeding applicable human health screening criteria. Therefore, an

IM Work Plan was prepared and approved by the FDEP to excavate affected soils exceeding the Industrial-SCTL and to manage the soil exceeding the Residential-SCTL in-place with land use controls (LUCs). The IM was implemented in March 2008, and the BaP TEQ-affected soil exceeding the screening criteria was excavated and properly disposed of off-site. An IM Report documenting the soil removal activities was submitted to the FDEP and was approved by the FDEP on May 6, 2009.

The concentrations of isopropylbenzene in groundwater exceeded the Groundwater Cleanup Target Level (GCTL), but were below the Natural Attenuation Default Concentration. This constituent was retained as a COC. No other constituents were retained as COCs in groundwater.

SUMMARY OF SITE RISK

As part of the RFI activities a Preliminary Risk Evaluation (PRE) was completed in accordance with KSC's Remediation Team Risk Assessment Decision Process Document.

The COCs identified for human health from the RFI are isopropylbenzene in groundwater (Table 1) and BaP TEQ in soil (Table 2).

There were no contributors to the lifetime excess cancer risk for groundwater at the VCMA facility that exceed the threshold value of 1×10^{-6} used by FDEP. The only contributor to the non-cancer risks (by target organ) for groundwater at the VCMA is isopropylbenzene. The PRE results for potential non-cancer risks indicated that isopropylbenzene (1.8) exceeds the calculated total Hazard Quotient of 1.0 for multiple target organs used by FDEP. The total Hazard Index is above the threshold value of 1.0 used by FDEP to indicate potentially significant non-cancer risks. Both of these scenarios assume use of site groundwater as a drinking water source. However, there is no current use of site groundwater and no exposure or current risks.

The only contributor to the lifetime excess cancer risk for soil at the VCMA facility was BaP TEQ and the PRE estimated the lifetime excess cancer risk for the hypothetical future resident was 7×10^{-6}, which exceeds the threshold value of 1×10^{-6} used by FDEP. However, there is no current or planned residential use of site soil. There were no contributors to the non-cancer risks (by target organ) for soil at the VCMA.

WHAT ARE THE REMEDY OBJECTIVES AND LEVELS?

The remedial action objective (RAO) is to protect humans from exposure to groundwater and soil contaminants that exceed FDEP residential-use cleanup target levels by restricting use of site groundwater as a drinking water source and direct contact to affected soil. Tables 1 and 2 list the COCs present in groundwater and soil, respectively. The first column lists the chemical name, the second column lists the range of concentrations detected, and the last column presents the FDEP cleanup target level.

Table 1

Site-Related COC	Range of Detections (µg/L)	Site-Specific Cleanup Level[1] (µg/L)
Isopropyl benzene	0.67 to 1.4	0.8

[1] Cleanup levels are GCTLs from Florida Administrative Code 62-777

Table 2

Site-Related COC	Range of Detections (mg/kg)	Site-Specific Cleanup Level[2] (mg/kg)
Total Benzo(a) Pyrene Equivalents	0.01 to 0.7	0.1

[2] Cleanup levels are Residential SCTLs from Florida Administrative Code 62-777

REMEDIAL ALTERNATIVES FOR THE VCMA

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

Because of the low levels of affected groundwater present at the VCMA, only one remedy was considered for groundwater at the site.

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

Under this alternative, material processes such as biological degradation, dispersion, advection, and adsorption will reduce COC concentrations to cleanup levels over time. Groundwater will be regularly sampled and analyzed to monitor and document the decrease in COC concentrations. Data collected during the RFI indicated that natural attenuation mechanisms will likely reduce contaminant concentrations below cleanup levels within five years. In the long-term this alternative will meet the RAO. Ongoing evaluation of the alternative will be conducted to determine whether the remedy is working and to provide an opportunity for change if necessary. In addition, institutional controls will be implemented to limit the use of groundwater as a drinking water source. NASA and the FDEP have entered into a Memorandum of Agreement (MOA) that outlines how institutional controls will be managed at NASA[2]. Controls will include periodic inspection, condition certification, and agency notification. The area of the site that will be under institutional control is shown on Figure 3.

Soil

Land Use Controls

Given the wide-spread nature of affected soil present at the VCMA and continuing operations, excavation to Industrial-SCTLs with LUCs restricting residential usage of the VCMA was selected. Institutional controls will be implemented to prevent residential human health exposure to affected soil and to provide an opportunity for change of remedy if necessary. NASA and the FDEP have entered into an MOA

[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.

that outlines how institutional controls will be managed at NASA². Controls will include periodic inspection, condition certification and agency notification. The area of the site that will be under institutional control is shown on Figure 4.

EVALUATION OF REMEDY

The selected remedy was evaluated to determine if it will comply with EPA's four threshold criteria and five balancing 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.

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.

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 isopropylbenzene. Long-term monitoring will be used to monitor and document reduction in contamination concentrations to the cleanup target levels.

The institutional controls will also prevent exposure to contaminants 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 the balancing criteria.

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.

Legend

Site Boundary

Notes:
KSC - Kennedy Space Center
NASA - National Aeronautics and Space Administration
SB - Statement of Basis
VCMA - Visitor Complex Maintenance Area
VAB - Vehicle Assembly Building

Site Location Map
Statement of Basis

Visitor Complex Maintenance Area
NASA Kennedy Space Center, Florida

Figure 1

This page intentionally left blank.

KSC-TA-10370
VCMA SB
Revision: 0
July 2009

Legend

- Existing Structure
- Assessment Area

Notes:
KSC - Kennedy Space Center
NASA - National Aeronautics and Space Administration
POL - Paints, Oils & Lubricants
SB - Statement of Basis
VCMA - Visitor Complex Maintenance Area

N

0 50 100
Scale in Feet

Site Plan
Statement of Basis

Visitor Complex Maintenance Area
NASA Kennedy Space Center, Florida

Figure 2

This page intentionally left blank.

KSC-TA-10370
VCMA SB
Revision: 0
July 2009

Notes:
DPT - direct push technology
KSC - Kennedy Space Center
MW - monitoring well
NASA - National Aeronautics and Space Administration
SB - Statement of Basis
SDSA - Spaceport Diesel Storage Area
SWMU - Solid Waste Management Unit
TMW - temporary monitoring well
VCMA - Visitor Complex Maintenance Area

Legend

- Assessment Area
- Existing Structure
- Groundwater SB Area
- SWMU 20 Boundary
- Monitoring Well
- Direct Push Technology Groundwater and Monitoring Well
- Direct Push Technology Groundwater
- Direct Push Technology Groundwater and Temporary Monitoring Well

N

0 25 50
Scale in Feet

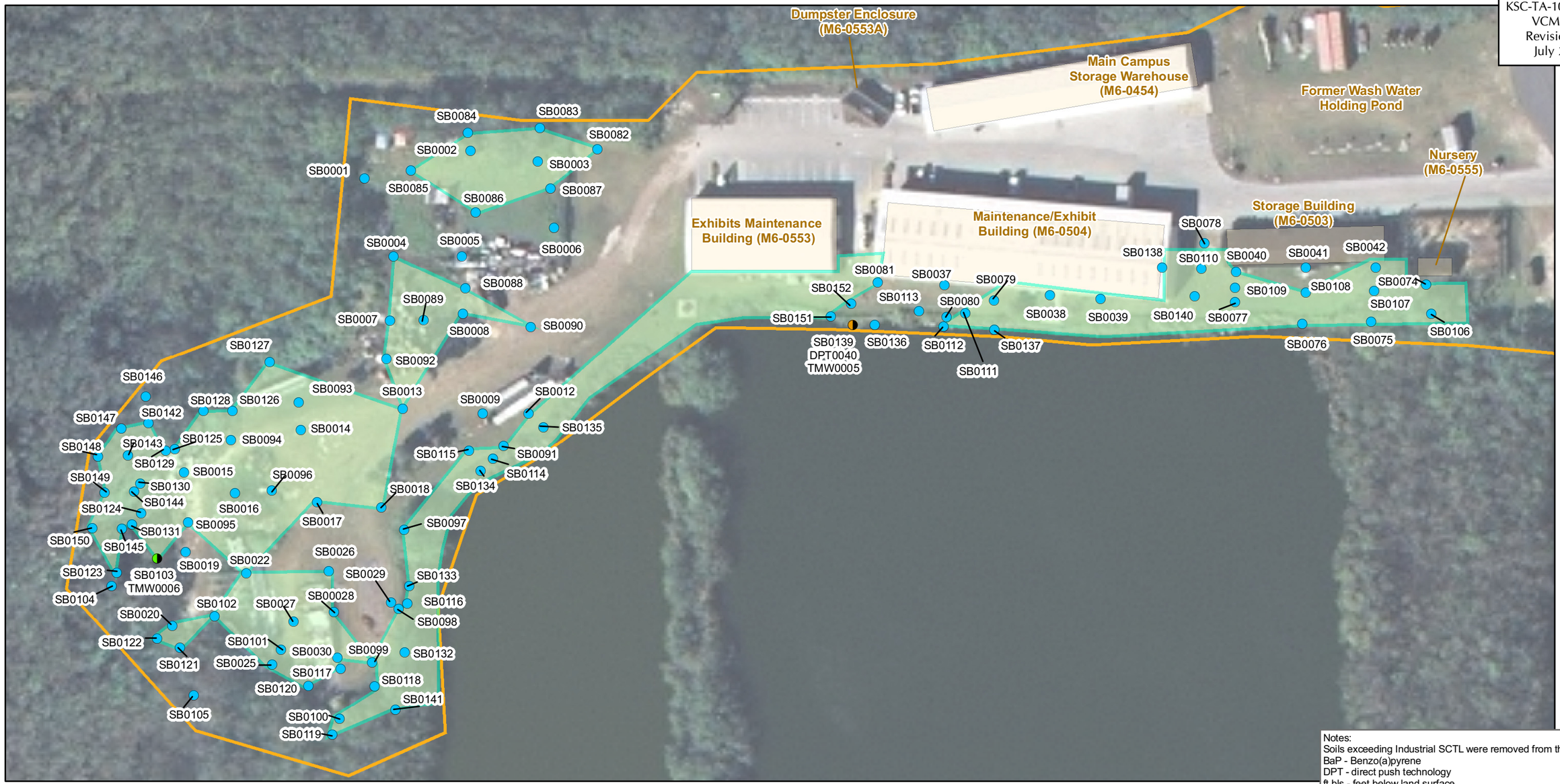
Groundwater Statement of Basis Area
Statement of Basis

Visitor Complex Maintenance Area
NASA Kennedy Space Center, Florida

Figure 3

This page intentionally left blank.

KSC-TA-10370
VCMA SB
Revision: 0
July 2009



Legend

- Area of Soil Affected with BaP Equivalents Above the R-SCTL
- Assessment Area
- Existing Structure
- Soil Boring Location
- Soil Boring and Temporary Monitoring Well Location
- Soil Boring, Direct Push Technology Groundwater, and Temporary Monitoring Well Location

SB0010 Soil Boring Designation

N

0 35 70

Scale in Feet

Notes:
Soils exceeding Industrial SCTL were removed from the Site.
BaP - Benzo(a)pyrene
DPT - direct push technology
ft bls - feet below land surface
KSC - Kennedy Space Center
NASA - National Aeronautics and Space Administration
R-SCTL - Residential Soil Cleanup Target Level
SB - Statement of Basis
TMW - temporary monitoring well
VCMA - Visitor Complex Maintenance Area

Extent of Soil Affected with Total BaP Equivalents above the R-SCTL Statement of Basis

Visitor Complex Maintenance Area
NASA Kennedy Space Center, Florida

Figure 4

This page intentionally left blank.