

STATEMENT OF BASIS



ORSINO STORAGE YARD FACILITY SWMU 4
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 Orsino Storage Yard Facility. A Kennedy Space Center (KSC) Remediation Team consisting of National Aeronautics and Space Administration (NASA) 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 several 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 polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs) in soil listed in Table 2 are present in surface soil which could potentially be harmful to human health.

The Cleanup Remedy
The proposed cleanup remedy for the Orsino Storage Yard includes the following components:
• Monitored natural attenuation of groundwater.
• Implementation of institutional controls to prohibit the use of groundwater as a potable water supply and prevent residential exposure to site surface soils.

1. In accordance with RCRA §7004(b), this Statement of Basis summarizes the proposed remedy for the NASA Orsino Storage Yard Facility. For detailed information on the site, consult the Orsino Storage Yard RFI, RFI Addendum, and IM 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 Orsino Storage Yard 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
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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/or EPA, KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 4, the Orsino Storage Yard Facility.

SITE DESCRIPTION AND HISTORY

Orsino Storage Yard is a NASA-operated facility located southeast of the intersection of Southeast 5th Street and C Avenue in the KSC Industrial Area. The facility has been used as a staging facility for electrical equipment since 1966. The Orsino Storage Yard comprises an area of approximately 2.6 acres and contains several storage trailers/offices that are permanently staged at the facility. The facility has no buildings onsite and generally is unpaved, with the exception of a concrete area used for drum storage. Past and current operations at Orsino Storage Yard

include storage of wooden electric poles, transformers containing PCBs, electric cables, control panels, metal pipes, oil-based switches, 55-gallon drums containing dielectric fluid drained from discarded transformers, and other miscellaneous equipment, as well as maintenance and repair activities. The site location is shown on Figure 1.

Investigations conducted at the site include:

- 1998-2003: During the RFI, groundwater, soil, surface water, and sediment samples were collected to evaluate potential impacts. 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 VOCs, would result in an unacceptable human health risk if the groundwater was used as a source of drinking water. The PRE also indicated that PCBs in soils would pose an unacceptable risk to human health receptors. The ecological risk assessment (ERA) indicated that no unacceptable risk exists at the site for ecological receptors.
- 2000-2004: Several Interim Measure (IM) phases of soil excavation were performed concurrently with the RFI to remove PCB-contaminated surface and subsurface soil that posed an unacceptable risk to human health. Approximately 3,000 tons of industrial waste soil and approximately 375 tons of TSCA soil were excavated and removed from the facility during IM activities.
- 2004-2005: Additional groundwater and soil sampling was performed as part of an RFI Addendum. VOCs were identified in

groundwater above regulatory criteria. Additional soil sampling indicated Total PCBs were present in soil above regulatory criteria.

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). The 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.

Chemicals of Concern (COCs) identified for human health during the RFI included VOCs in groundwater, and PCBs and PAHs in soil. For a complete list of COCs in groundwater and soil see Tables 1 and 2, respectively.

For soil, the PRE using the 95% Upper Confidence Limit (UCL) indicated that potential lifetime excess cancer risk for the industrial receptor was 6.3×10^{-7} for surface soil and 6.1×10^{-7} for mixed soil which were less than the FDEP target risk value of 1×10^{-6} . When using the 95% UCL, non-cancer risk for residential receptors was 0.6 for surface soil and 0.04 for mixed soil; and for industrial receptors, non-cancer risk was 0.4 for surface soil and 0.02 for mixed soil. All of these non-cancer risk estimates are below the FDEP threshold value of 1.0.

The results of the groundwater PRE indicated that total lifetime excess cancer risk was 3.6×10^{-6} which is above the target risk value of 1×10^{-6} used by FDEP to identify potentially significant cancer risks. Results of the groundwater PRE also indicated that total non-cancer risk was 7.7 for 1,2,4-

trichlorobenzene, which exceeds the threshold value of 1 used by FDEP to identify potentially significant non-cancer risks.

The ERA did not identify any unacceptable ecological risks.

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 contaminant concentrations are higher than FDEP cleanup target levels, and (2) protect humans from exposure to soil contaminants that exceed FDEP residential use cleanup target levels by limiting site access only to industrial workers. Table 1 lists the COCs present in groundwater at Orsino Storage Yard. The first column lists the chemical name, the second column lists the range of concentrations in groundwater detected at Orsino Storage Yard 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 at Orsino Storage Yard. The first column lists the chemical name, the second column lists the range of concentrations in soil detected at Orsino Storage Yard during the RFI, and the last column presents the FDEP Residential and Industrial cleanup target levels to be achieved at the site.

Table 1
Chemicals of Concern in Groundwater

Site-Related Chemicals of Concern (COCs)	Range of Detections ¹ (µg/L)	Site-Specific Cleanup Level ² (µg/L)
1,2,4-Trichlorobenzene	0.35 - 540	70
Vinyl Chloride	1 - 3.6	1

¹Detections in monitoring wells and DPT groundwater samples.

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

Table 2
Chemicals of Concern in Soil

Site-Related Chemicals of Concern (COCs)	Range of Detections (mg/kg)	Site-Specific Cleanup Level ¹ (mg/kg)
Benzo(a)anthracene	0.0032 - 2.1 (0.00032 - 0.21 BaP)	0.1 / 0.7 BaP equiv
Benzo(a)pyrene	0.009 - 0.13	0.1 / 0.7
PCBs (Total)	0.0019 - 4.7	0.5 / 2.6

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

FINAL REMEDY FOR ORSINO YARD

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.

The RFI performed for Orsino Storage Yard identified ingestion as the principal exposure pathway for groundwater. Monitored Natural Attenuation (MNA) was selected as the presumptive remedy for monitoring groundwater impacted by VOCs above the GCTL. Because of the very limited nature of the soil contamination following the various IM phases, the only alternative considered for soil at Orsino Storage Yard was Land Use Controls (LUCs). LUCs will additionally be used to prohibit groundwater use.

Monitored Natural Attenuation: MNA entails the use of natural processes (chemical, physical, and biological) to reduce VOC concentrations. Chemical MNA processes include volatilization, sorption, and hydrolysis. Physical MNA processes include dilution due to infiltration, advection, and dispersion. Biological MNA processes include biological consumption due to electron acceptor reactions (reductive dehalogenation), electron donor reactions, and cometabolism. All of these processes combine to reduce chlorinated VOC concentrations over time.

Land Use Controls: Institutional land use controls would be implemented to limit access to site soils 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 NASA². The MOA requires periodic inspections, condition certification, and agency notification. The area of the site that will be under institutional control for groundwater and soil is shown on Figure 2.

EVALUATION OF REMEDIES

The selected remedies were evaluated to determine if they 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.

Monitored Natural Attenuation of groundwater and Land Use Controls meet each of the threshold criteria and were determined by the KSC Remediation Team 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 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.

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 and administrative actions to limit access to the site are consistent with current operating procedures. The alternatives selected include administrative actions to limit the use of groundwater until the cleanup levels have been reached. Long-term groundwater monitoring will be used to monitor and document reduction in contaminant concentrations to cleanup target levels. Institutional controls will also prevent exposure to contaminants prior to cleanup levels being achieved.

WHY DOES THE KSC REMEDIATION TEAM RECOMMEND THIS REMEDY?

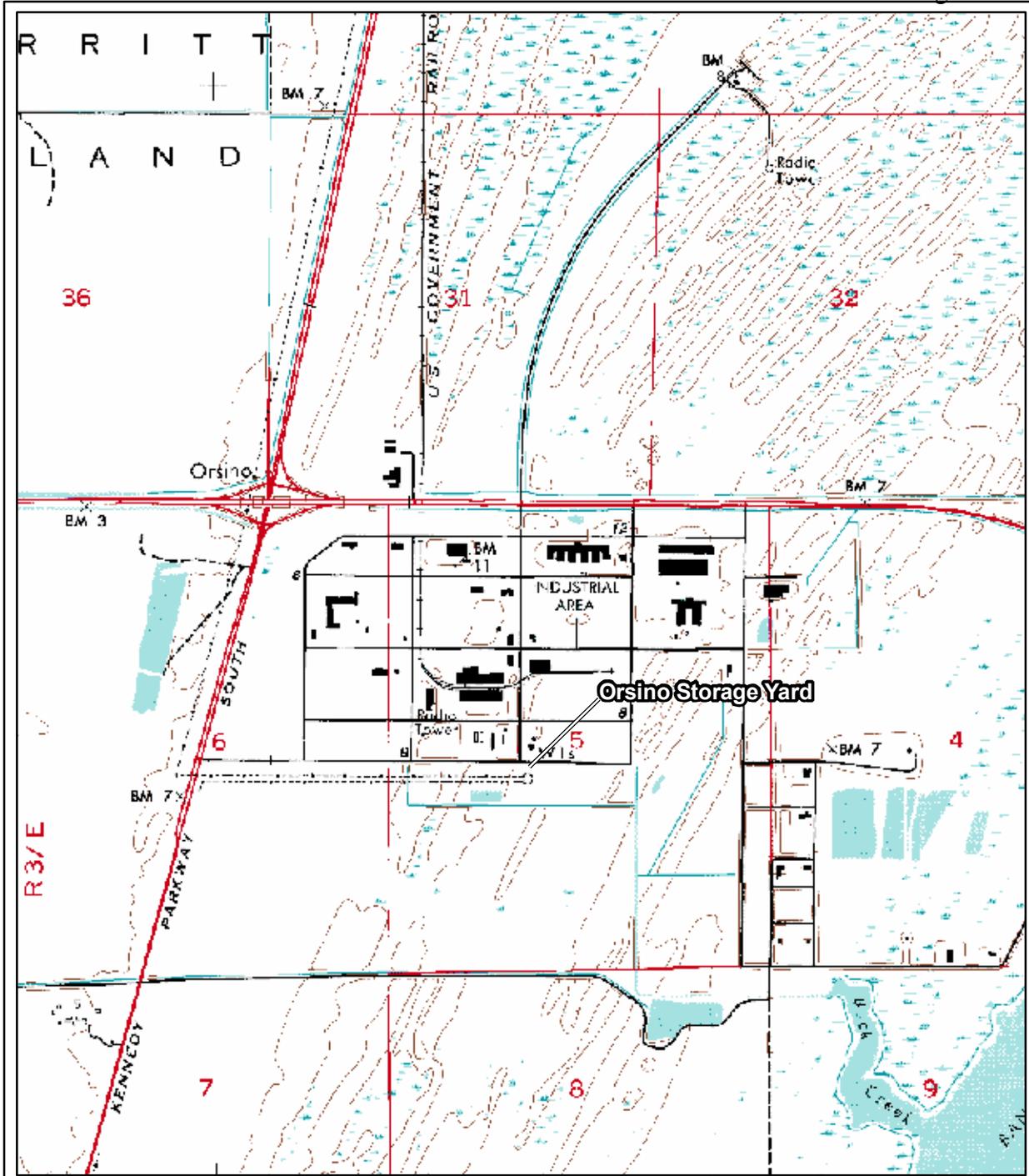
The team recommends the proposed remedy because the remedies selected are cost

effective means to remediate groundwater and prevent exposure to soil and groundwater contamination. Monitored natural attenuation will be used to monitor and document reduction in contamination concentrations to the cleanup target levels.

The proposed remedy meets the threshold and balancing criteria for corrective measures.

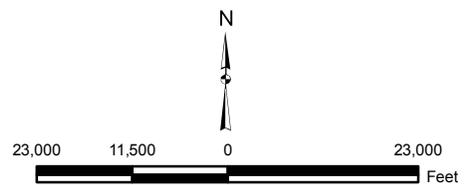
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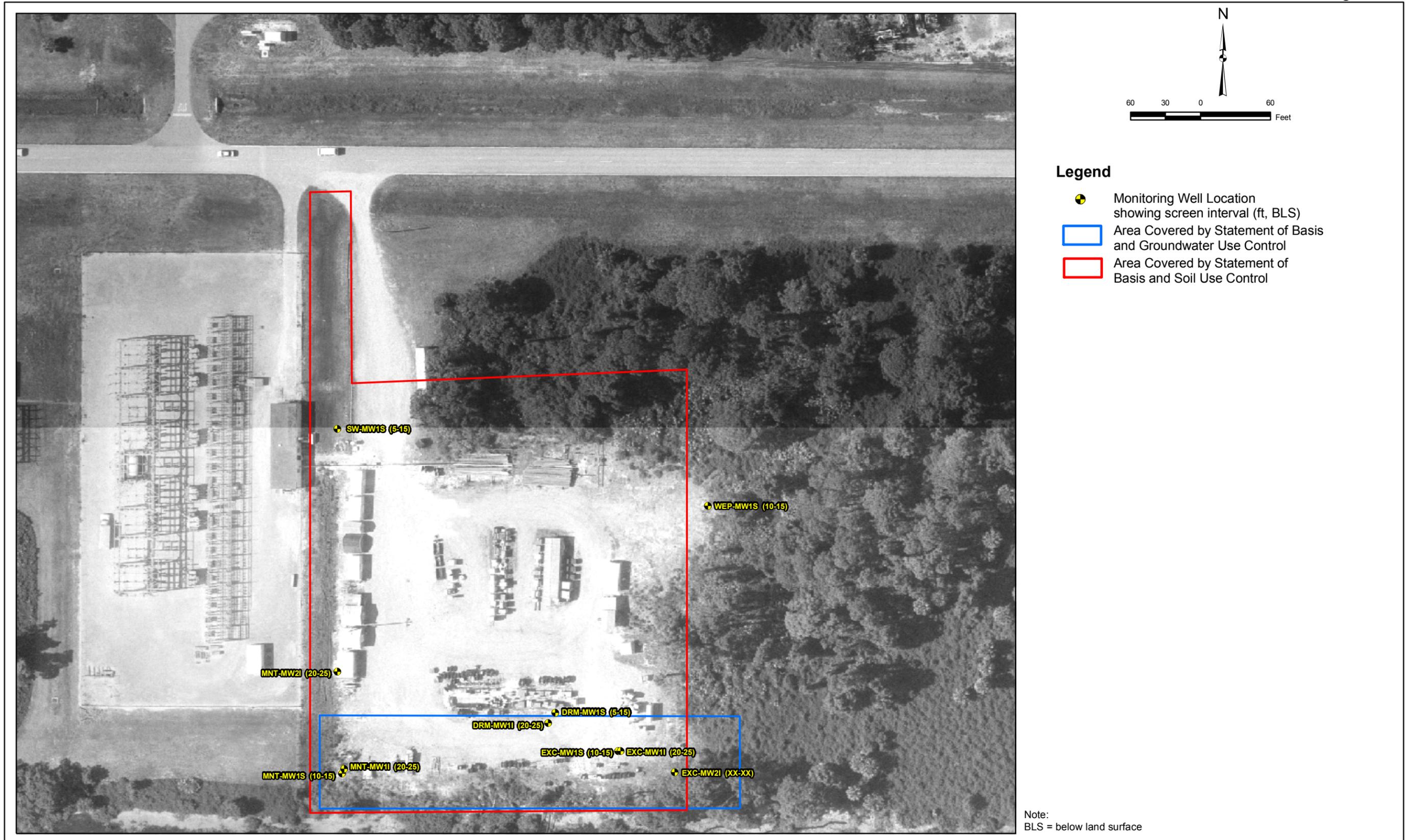
The KSC Remediation Team will review all comments on this SB to determine if the proposed remedy needs modification prior to implementation and prior to incorporating the proposed remedy into KSC's HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then a long term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



1976 USGS 7.5 Minute Orsino Quadrangle

Figure 1
Location Map
Orsino Storage Yard





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Figure 2
 Site Map of Orsino Storage Yard (SWMU 04) Area