NASA Technical Memorandum 2000-208583

Soil, Groundwater, Surface Water, and Sediments of Kennedy Space Center, Florida: Background Chemical and Physical Characteristics

June 2000

Soil, Groundwater, Surface Water, and Sediments of Kennedy Space Center, Florida: Background Chemical and Physical Characteristics

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Abstract

This study documents background chemical composition of soils, groundwater, surface water, and sediments of John F. Kennedy Space Center (KSC). Kennedy Space Center is a complex environment; the chemical composition of these media is a product of geologic history, climate, interactions with biota, and anthropogenic effects such as citrus agriculture and ranching.

Fifty-eight soil series and land types occur on KSC. We developed a classification of ten soil classes: coastal, acid scrub, coquina scrub, flatwoods, hammocks, freshwater wetland, saltwater wetlands, citrus scrub, citrus hammock, and disturbed. These classes represent major divisions including upland (well-drained, poorly drained, acid, circumneutral, alkaline), wetland (freshwater, saltwater), agriculture, and disturbed. We selected twenty sample locations in each soil class, a total of 200 locations. A 0-30 cm layer composite sample was collected for analysis. Samples were also collected for bulk density and soil texture analyses. Standard sampling protocols were followed.

Soil samples were analyzed for organochlorine pesticides, aroclors, chlorinated herbicides, polycyclic aromatic hydrocarbons (PAH), total metals, pH, cation exchange capacity (CEC), bulk density, resistivity, and soil texture. Sixteen organochlorine pesticides, all (6) aroclors, 15 chlorinated herbicides, one PAH, and four metals were below detection in all samples. Frequencies of organochlorine pesticides above detection limits in all soils were low; however, frequencies were higher in agricultural (citrus scrub, citrus hammock), disturbed, and saltwater wetland soil classes. This probably reflects past use for mosquito control and in citrus agriculture. Frequencies of chlorinated herbicides above detection limits were low. PAHs were above detection limits in relatively few soil samples; frequencies were greater in agricultural (citrus scrub, citrus hammock) and disturbed soil classes. However, PAH values above detection occurred in other soil classes. PAHs have both natural and anthropogenic origins. Among the metals, Ba, Cd, Se, Ag, and Tl occurred in few samples above detection limits. As, Cu, and Hg were above detection limits with an intermediate frequency, while the other metals were frequently above detection limits. Kruskal-Wallis tests indicated that all soil parameters differed among soil classes ($p < 0.001$). However, given the low frequency of detection of organics and some metals, analysis of variance (ANOVA) was conducted only for metals where >25 % of values were above detection and for pH, bulk density, resistivity, and CEC. All metals analyzed (Al, As, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Hg, K, Na, V, Zn) were significantly different among types ($p < 0.001$). Patterns of differences varied among metals. Metal concentrations in KSC soils reflected both the origins of the soils and subsequent changes from weathering and leaching. Concentrations of most metals were low compared to other regions. Cr, Cu, Mn, and Zn had higher values in agricultural soils probably from sources in fertilizers or pesticides. Soil pH was highest in coastal soils and lowest in flatwoods. Coastal, acid scrub, and coquina scrub soils had very low CEC values consistent

with the low organic matter content of these soils; values in hammocks and wetlands, where organic matter accumulates, were substantially higher. Bulk density was low where organic matter accumulates in surface soils. Soil texture analysis indicated that coastal and coquina scrub soil classes were medium sands in the Wentworth classification and the other soil classes were fine sands.

The aquifer of primary concern for contamination issues on KSC is the Surficial aquifer. The Surficial aquifer can be divided into four subsystems: Dune, Dune-Swale, West Plain, and Marsh that differ in area, amount of recharge, and degree of interaction with saline water of the Indian River Lagoon and Atlantic Ocean.

We located six sample sites in each subsystem, 24 total sites. The sampling plan designated that a shallow well (4.6 m) was to be installed at each site. Intermediate wells (10.7 m) were to be installed at four sites per subsystem (16 total); deep wells (15.2 m) were to be installed at three sites per subsystem (12 total). A total of 52 wells were planned. Due to the depth of the confining unit at one location, the deep well was not installed there. Therefore, a total of 51 wells were installed at varying depths. Groundwater samples were collected using standard protocols. Groundwater samples were analyzed for organochlorine pesticides, aroclors, chlorinated herbicides, PAH, total metals, dissolved oxygen (DO), turbidity, pH, specific conductivity, temperature, total dissolved solids (TDS), and total organic carbon (TOC).

All organochlorine pesticides (25), all aroclors (6), and all chlorinated herbicides (18) were below detection in all samples. Ten PAHs were above detection in one to four samples. Co and Hg were always below detection. Be, Ag, and Zn were above detection in just one sample each. For some parameters, frequency of occurrence above detection varied with subaquifer or depth. PAHs were above detection only in shallow wells of the Dune, Dune-Swale, and West Plain subaquifers. As and Cd were most frequently above detection in the Dune subaquifer.

Among metals only Al, Ca, Cl, Fe, Mg, Mn, K, and Na were above detection in sufficient samples to compare concentrations. In addition, TDS, TOC, specific conductivity, pH, DO, and field temperature could be compared. Univariate, two-way ANOVA where subaquifer and depth were fixed effects was conducted using temperature and log-transformed chemistry data. Models were not significant for Al and DO; the significance level for the model ($p=0.057$) for Fe was marginal. Interactions were significant for pH. TOC differed across subaquifers but not depths. Ca, Cl, Mg, Mn, K, Na, TDS, and conductivity differed with subaquifer and depth.

For screening purposes, a simpler classification of groundwater was desired. The regulatory criteria (Florida Department of Environmental Protection) for dividing groundwater into classes G2, with total dissolved solids <10,000 mg/L, and G3, with total dissolved solids >10,000 mg/L, were adopted. Some parameters were more frequently above detection in class G2 (Cd, Fe, Tl) and some were more frequently above detection in class G3 (Sb, As, Pb). Ca, Cl, Mg, K, Na, total dissolved solids, and conductivity were substantially higher in class G3, as would be expected.

The baseline data suggest that widespread contamination of the Surficial aquifer on KSC has not occurred. The chemical parameters varying most with subaquifer and depth were Ca, Cl, Mg, K, and Na, and conductivity and total dissolved solids that are related to these cations and anions. Concentrations increased with depth within a subaquifer. At a given depth, concentrations in the Dune-Swale and West Plain subaquifers were lower than in the Dune and Marsh subaquifers. These trends reflect increased mineralization with depth and differences between the fresh water Dune-Swale and West Plain subaquifers and the more saline Dune and Marsh systems.

KSC is surrounded by the Indian River Lagoon System that extends along the East Coast of Florida from Ponce de Leon Inlet to St. Lucie Inlet near Stuart. This system includes the Indian River, Banana River, and Mosquito Lagoon. These basins are shallow, aeolian, lagoons with depths averaging 1.5 m; maximums of 9 m are restricted generally to dredged basins and channels.

Location of the surface water sampling stations was determined based on the watershed basins. Forty stations were selected to incorporate samples from open lagoonal water, rivers, creeks, ditches, borrow pits, and impoundments. Samples were collected using standard sampling protocols. Basins included Banana Creek, Banana River, Indian River Lagoon, Mosquito Lagoon, saline ditches (salinity > 6 ppt), and freshwater ditches (salinity < 6 ppt).

Surface water was analyzed for organochlorine pesticides, aroclors, chlorinated herbicides, polycyclic aromatic hydrocarbons, and metals. Field parameters such as pH, temperature, turbidity, DO, and conductivity were also measured at each sampling location.

All of the aroclors (6) and chlorinated herbicides (18) were below detection. One of 25 organochlorine pesticides (Dieldrin) was above detection as were five of 17 PAHs. The occurrence of Dieldrin is probably related to past agricultural use. Concentrations of PAHs were low; these may result from natural sources or regional deposition. Sixteen of 24 metals were above detection limits; eight (Ba, Cd, Cr, Co, Hg, Ni, Vn, and Zn) were always below detection. Two PAHs (naphthalene, fluorene) and one metal (Cu) were above detection in only one sample. Nine metals (Sb, As, Be, Cu, Pb, Mn, Se, Ag, and Tl) were above detection in too few samples to test for differences among watershed basins. Seven metals commonly above detection limits (Al, Ca, Cl, Mg, Fe, K, and Na) differed among basins (ANOVA, $p<0.05$).

Sediment sampling stations were co-located with surface water sampling locations. A total of 40 stations were selected to incorporate samples from open lagoonal water, rivers, creeks, ditches, burrow pits, and impoundments. Stations included 18 ditches with five located near KSC's industrial areas.

Sediments were analyzed for for organochlorine pesticides, aroclors, chlorinated herbicides, PAH, and metals. Other parameters such as percent solids, pH, resistivity, texture, and TOC were also analyzed.

All of the aroclors (6), 16 of 18 chlorinated herbicides, 24 of 25 organochlorine pesticides, 6 of 18 PAHs, and 7 of 23 metals were always below detection. Chlorinated herbicides, organochlorine pesticides, and PAHs that were above detection were at low to very low frequencies. Ten metals (Al, Ca, Cr, Fe, Pb, Mg, Mn, K, Na, and V) were above detection in sufficient samples to analyze for difference among watershed basins; none were significant (ANOVA, $p < 0.05$).

An extensive evaluation and validation of the data was conducted. Metal analyses were of high quality with few problems noted. Organic analyses were more variable than metals. However, the organic analyses results were of generally good quality, and most organics were below detection.

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List of Acronyms

Ag	Silver
Al	Aluminum
ANOVA	Analysis of variance
As	Arsenic
Ba	Barium
BDDP	Baseline Data Development Program
Be	Beryllium
Ca	Calcium
CCAFS	Cape Canaveral Air Force Station
CCF	Component Cleaning Facility
Cd	Cadmium
CEC	Cation exchange capacity
CNS	Canaveral National Seashore
Co	Cobalt
COPC	Chemical of Potential Concern
Cr	Chromium
Cu	Copper
DO	Dissolved oxygen
DS	Dune- Swale
EPA	U. S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
Fe	Iron
FWS	Fish and Wildlife Service
GIS	Geographic Information System
GPS	Global Positioning System
Hg	Mercury
IRL	Indian River Lagoon
ITL	Integrate, Transfer, and Launch area (on CCAFS)
K	Potassium
KSC	John F. Kennedy Space Center
Mg	Magnesium
MINWR	Merritt Island National Wildlife Refuge
Mn	Manganese
Na	Sodium
NASA	National Aeronautics and Space Administration
Ni	Nickel
NPS	National Park Service
PAPI	Precision Approach Path Indicator
Pb	Lead
PC	Personal computer
PRL	Potential Release Location
PS7	Pump Station 7

List of Acronyms
(continued)

RCRA	Resource Conservation and Recovery Act
SAP	"NASA/KSC Sampling and Analysis Plan for RCRA Facility Investigations at Kennedy Space Center, Florida and Cape Canaveral Air Station, Florida, Volume 4" of the Generic Work Plans
Sb	Antimony
Se	Selenium
SLF	Shuttle Landing Facility
SWMU	Solid Waste Management Unit
TDS	Total dissolved solids
TOC	Total Organic Carbon
Tl	Thallium
V	Vanadium
VAB	Vertical Assembly Building
yr B P	years before present
Zn	Zinc

Acknowledgements

This study was conducted under NASA contract NAS10-12180 and supported by the NASA Environmental Program Office Remediation Project. We thank Mike Anders and Vickie Anders of ENCO for field sampling, Russ Erickson and Marcia Terlep of ENCO for chemistry and database information, and Venu Oddiraju and Billy Paine for database assistance. We thank Rosaly Santos-Ebaugh, Harold Williams, Burton Summerfield, and Dr. William Knott of the NASA Biomedical Office for their assistance. Trade names and commercial enterprises or products are mentioned only for information. No endorsement by NASA is implied.

Executive Summary

This study documents background chemical composition of soils, groundwater, surface water, and sediments of John F. Kennedy Space Center (KSC). Kennedy Space Center is a complex environment; the chemical composition of these media is a product of geologic history, climate, interactions with biota, and anthropogenic effects such as citrus agriculture and ranching.

KSC has been the primary launch complex for the United States Space program since the 1960's. In this time, many industrial practices have required use of hazardous materials; these uses have lead to potential contamination concerns center-wide. Currently, data collected during investigation of areas that may have been contaminated are compared to regulatory, risk-based screening values. The purpose of this study was to develop the baseline (background) values specific to KSC. Current screening values may be extremely conservative and may actually represent values that are lower than naturally exist within this landscape.

Soil

The soils of KSC are mapped in the soil surveys for Brevard County (Huckle et al. 1974) and Volusia County (Baldwin et al. 1980), and the resulting soil pattern is complex. Fifty-eight soil series and land types are represented. The primary source of parent material for KSC soils are sands of mixed terrestrial and biogenic origin. Soils differ in age across the KSC landscape. Differences in soil drainage affect the accumulation of organic matter, which influences many soil properties. In addition, proximity to the lagoon systems influences soil salinity.

We divided soils first into four groups: Upland, Wetland, Agricultural, and Disturbed. We divided Upland soils into well-drained and poorly drained categories. We divided well-drained, upland soils into three classes: 1) geologically recent, alkaline, sandy soils of coastal dunes where the vegetation is coastal dunes, coastal strand, or coastal scrub; 2) old, inland, leached, acid, sandy soils where the vegetation is oak-saw palmetto scrub or scrubby flatwoods; and 3) inland, circumneutral soils formed over coquina where the vegetation is oak-saw palmetto scrub or xeric hammock. We divided poorly-drained, upland soils into two classes: 1) acid, sandy soils with flatwoods vegetation; and 2) circumneutral to alkaline soils formed over coquina or limestone where the vegetation is mesic hammock. The primary division of wetland soils was between: 1) inland, freshwater wetlands where the vegetation was freshwater marshes or hardwood swamps; and 2) coastal, brackish to saline wetlands where the vegetation was salt marshes or mangroves. Agricultural soils were of two types: 1) active or abandoned citrus on scrub soils; and 2) active or abandoned citrus on hammock soils. Disturbed soils included various types modified by construction. This group could be heterogeneous, but there was no apparent division into homogeneous subgroups.

This classification resulted in ten groups. We selected twenty sample locations in each soil class, a total of 200 locations. A 0-30 cm layer composite sample was collected for analysis. Samples were also collected for bulk density and soil texture analyses. Standard sampling protocols were followed.

Samples were analyzed for organochlorine pesticides, aroclors, chlorinated herbicides, polycyclic aromatic hydrocarbons (PAH), total metals, pH, cation exchange capacity (CEC), bulk density, resistivity, and soil texture.

Sixteen organochlorine pesticides, all (6) aroclors, 15 chlorinated herbicides, one PAH, and four metals were below detection in all samples. Frequencies of organochlorine pesticides above detection limits in all soils were low; however, frequencies were higher in agricultural (citrus scrub, citrus hammock), disturbed, and saltwater wetland soil classes. This probably reflects past use for mosquito control and in citrus agriculture.

Frequencies of chlorinated herbicides above detection limits were low; frequencies were slightly higher in agricultural (citrus scrub, citrus hammock), disturbed, and saltwater wetland soil classes. The low frequency of detection of chlorinated herbicides indicates that contamination by them has not been widespread in the KSC environment.

PAHs were above detection limits in relatively few soil samples; frequencies were greater in agricultural (citrus scrub, citrus hammock) and disturbed soil classes. However, PAH values above detection occurred in other soil classes. PAH have both natural and anthropogenic origins. Natural sources include synthesis by microorganisms, phytoplankton, algae, and higher plants, wildfires, volcanic activity, and sediment diagenesis. PAH are produced by a variety of industrial combustion processes.

Among the metals, Ba, Cd, Se, Ag, and Tl occurred in few samples above detection limits. As, Cu, and Hg were above detection limits with an intermediate frequency, while the other metals were frequently above detection limits.

Kruskal-Wallis tests indicated that all soil parameters differed among soil classes ($p < 0.001$). However, given the low frequency of detection of organics and some metals, analysis of variance (ANOVA) was conducted only for metals where >25 % of values were above detection and for pH, bulk density, resistivity, and CEC. All metals analyzed (Al, As, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Hg, K, Na, V, Zn) were significantly different among types ($p < 0.001$). Variances were not homogeneous (Levene test, $p<0.05$) except for Zn; thus, the Games-Howell test was appropriate for examining multiple comparisons.

Patterns of differences varied among metals. Al had low values in flatwoods, acid scrub, and coastal soils and higher values in other types. As had higher values in coastal and saltwater wetland soils and lower values elsewhere. Ca was high in coastal and disturbed soils, low in acid scrub and flatwoods, and intermediate in other types. Cr, Cu, Mn, and Zn had higher values in citrus scrub and citrus hammock soils and lower values elsewhere. Fe was low in acid scrub and flatwoods soils and higher in other types. Pb values were low in acid scrub, coastal, and flatwoods soils, high in saltwater wetlands, and intermediate in other types. Mg, K, and Na levels were lowest in acid scrub and highest in saltwater wetlands. Hg was low in acid scrub and coastal soils and high in hammocks and freshwater wetlands. V was low in acid scrub and flatwoods, high in saltwater wetlands, and intermediate in other types.

Metal concentrations in KSC soils reflect both the origins of the soils and subsequent changes from weathering and leaching. Concentrations of most metals were low compared to other regions. Cr, Cu, Mn, and Zn had higher values in agricultural soils probably from sources in fertilizers or pesticides.

Soil pH was highest in coastal soils and lowest in flatwoods. Calcium carbonate shell material is abundant in coastal soils making them alkaline, while other types are slightly to strongly acid. Leaching of basic cations from older soils has contributed to their acidity. Coquina scrub soils that have shell material deeper in the soil profile were less acid than acid scrub soils that lack this buffering. The agricultural types (citrus scrub, citrus hammock) were less acidic than the original soil types. This may be due to liming (Brady 1974) or to irrigation with groundwater high in carbonates.

Coastal, acid scrub, and coquina scrub soils had very low CEC values consistent with the low organic matter content of these soils; values in hammocks and wetlands, where organic matter accumulates, were substantially higher. Bulk density was low in flatwoods, hammock, freshwater wetland, and saltwater wetland soils where organic matter accumulates in surface soils and higher in the other types with little organic matter accumulation.

Resistivity was low in saltwater wetland soils that had high concentrations of Na and K as well as Cl^-.

Soil texture analysis indicated that coastal and coquina scrub soil classes were medium sands in the Wentworth classification and the other soil classes were fine sands. Shell fragments in coastal and coquina scrub soils result in larger mean grain size than other soils that are composed mainly of quartz grains.

KSC Background screening values for soil are given in Appendix A, Table A-1. Screening values are calculated as twice the mean. Values are given for all soils and by soil classes (11 classes total). The NASA/KSC Remediation Team decision for screening allows only inorganic data to be used as a screening tool. Organic data should be discussed in the uncertainty section of reports. Combined values for pesticides (as noted on table) can only be used for the following classes: saltwater wetland, citrus hammock, citrus scrub, and disturbed. To use the screening tables: 1) screen site data against the combined mean; 2) if the site value is higher than the combined mean, go to the soil class that corresponds to site data sampling locations. Figure 2.2 illustrates KSC background classification information. Individual site maps can be obtained, upon reqest, from NASA support contractor when additional site details are needed.

Groundwater

Several groundwater aquifers occur beneath the surface of KSC (Clark, 1987c). The aquifer of primary concern for contamination issues is the Surficial aquifer that occurs in the saturated part of the moderately permeable Pleistocene and Holocene deposits of fine to medium sand, shell, coquina, silts, and marl. The Surficial aquifer can be divided into four subsystems: Dune, Dune-Swale, West Plain, and Marsh. These subaquifers differ in area, amount of recharge, and degree of interaction with saline water of the Indian River Lagoon and Atlantic Ocean.

We located six sample sites in each subsystem, 24 total sites. The sampling plan designated that a shallow well (4.6 m) was to be installed at each site. Intermediate wells (10.7 m) were to be installed at four sites per subsystem (16 total); deep wells (15.2 m) were to be installed at three sites per subsystem (12 total). A total of 52 wells were planned. Due to the depth of the confining unit at one location, the deep well was not installed there. Therefore, a total of 51 wells were installed at varying depths.

Groundwater samples were collected using standard protocols. Groundwater samples were analyzed for organochlorine pesticides, aroclors, chlorinated herbicides, PAH, total metals, dissolved oxygen (DO), turbidity, pH, specific conductivity, temperature, total dissolved solids (TDS), and total organic carbon (TOC).

All organochlorine pesticides (25), all aroclors (6), and all chlorinated herbicides (18) were below detection in all samples. Ten PAHs were above detection in one to four samples. Four PAHs were above detection limits in only one sample each, and these values were between the method detection limit and the practical quantitation level; therefore, the Remediation team decided to treat these as below detection. Co and Hg were always below detection. Be, Ag, and Zn were above detection in just one sample each.

For some parameters, frequency of occurrence above detection varied with subaquifer or depth. PAHs were above detection only in shallow wells of the Dune, Dune-Swale, and West Plain subaquifers. As and Cd were most frequently above detection in the Dune subaquifer.

Among metals only Al, Ca, Cl, Fe, Mg, Mn, K, and Na were above detection in sufficient samples to compare concentrations. In addition, total dissolved solids (TDS), total organic carbon (TOC), specific conductivity, pH, dissolved oxygen (DO), and field temperature could be compared.

Univariate, two-way ANOVA where subaquifer and depth were fixed effects was conducted using temperature and log-transformed chemistry data. Models were not significant for Al and DO; the significance level for the model ($p=0.057$) for Fe was marginal. Interactions were significant for pH. TOC differed across subaquifers but not depths. Ca, Cl, Mg, Mn, K, Na, TDS, and conductivity differed with subaquifer and depth.

For screening purposes, a simpler classification of groundwater was desired. The regulatory criteria (Florida Department of Environmental Protection [FDEP]) for dividing groundwater into classes G2, with TDS <10000 mg/L, and G3, with TDS >10000 mg/L, were adopted. Some parameters were more frequently above detection in class G2 (Cd, Fe, Tl) and some were more frequently above detection in class G3 (Sb, As, Pb). Ca, Cl, Mg, K, Na, TDS, and conductivity were substantially higher in class G3, as would be expected.

The baseline data suggest that widespread contamination of the Surficial aquifer on KSC has not occurred. No organochlorine pesticides, aroclors, or chlorinated herbicides occurred above detection limits. Although pesticide residues or degradation products and chlorinated herbicides occurred in some soils, those concentrations were low and migration into the aquifer either has not occurred or has not been widespread. Some PAHs occurred in the shallow wells. PAHs occur in a variety of KSC soils at relatively low concentrations. Some occurrence in shallow wells is not surprising. PAHs have both natural and anthropogenic sources (e.g., Suess 1976, Standley and Simoneit 1987, Jones et al. 1989b, c).

Most trace metals were in low concentrations in KSC groundwater if they occur above detection levels. This is consistent with the low concentrations of most trace metals in KSC soils and the primarily quartz composition of the terrigenous deposits comprising the surficial sediments of Merritt Island (Brown et al. 1962, Milliman 1972, Field and Duane 1974). Al, Fe, and Mn occurred above detection limits more frequently than other trace metals. Al and Fe are abundant crustal components and are present in KSC soils. Intense leaching, particularly in acid scrub and flatwoods soils, mobilizes Al and Fe (Paton et al. 1995). Iron is a typical constituent of groundwater in the Surficial aquifer in Florida (Miller 1997). Mn is one of the most abundant trace elements (Kabata-Pendias and Pendias 1984); it is present in KSC soils but the concentrations are relatively low. Solution and precipitation of Fe and Mn are affected by pH and oxidation-reduction conditions.

The chemical parameters varying most with subaquifer and depth were Ca, Cl^-, Mg, K, and Na, and conductivity and TDS that are related to these cations and anions. The trends were generally consistent among these; the shallow wells in the Dune-Swale subaquifer had the lowest values. Concentrations increased with depth within a subaquifer. At a given depth, concentrations in the Dune-Swale and West Plain subaquifers were lower than in the Dune and Marsh subaquifers. These trends reflect increased mineralization with depth and differences between the freshwater Dune-Swale and West Plain subaquifers and the more saline Dune and Marsh systems. The Dune and Marsh subaquifers interact with saline water of the Atlantic Ocean and Indian River Lagoon system, respectively (Clark 1987c).

The screening table for groundwater is given in Appendix A, Table A-2. Screening values are calculated as twice the mean. The NASA/KSC Remediation Team decision on groundwater was to separate the groundwater into FDEP G2 and G3 groundwater classes. To use the screening table for groundwater: 1) collect TDS data at all groundwater sampling locations; 2) determine proper groundwater class for site data based on TDS data collected. FDEP G2 groundwater class is TDS less than 10,000 mg/L. FDEP G3 groundwater class is TDS greater than 10,000 mg/L.

Surface Water

KSC is surrounded by the Indian River Lagoon (IRL) System that extends along the East Coast of Florida from Ponce de Leon Inlet to St. Lucie Inlet near Stuart. This is system includes the Indian River, Banana River, and Mosquito Lagoon. These basins are shallow, aeolian, lagoons with depths averaging 1.5 m and maximums of 9 m, which are generally restricted to dredged basins and channels. The major freshwater body within KSC property is Banana Creek, which drains the numerous estuaries adjacent to the Space Shuttle launch pads.

Location of the surface water sampling stations was determined based on the watershed basins. Forty stations were selected to incorporate samples from open lagoonal water, rivers, creeks, ditches, borrow pits, and impoundments. Samples were collected using standard sampling protocols. Basins included Banana Creek, Banana River, Indian River Lagoon, Mosquito Lagoon, saline ditches (salinity > 6 ppt), and freshwater ditches (salinity < 6 ppt).

Surface water was analyzed for organochlorine pesticides, aroclors, chlorinated herbicides, PAH, and metals. Field parameters such as pH, temperature, turbidity, DO, and conductivity were also measured at each sampling location.

All of the aroclors (6) and chlorinated herbicides (18) were below detection. One of 25 organochlorine pesticides (Dieldrin) was above detection as were five of 17 PAHs. Sixteen of 24 metals were above detection limits; eight (Ba, Cd, Cr, Co, Hg, Ni, Vn, and Zn) were always below detection. Two PAHs (naphthalene, fluorene) and one metal (Cu) were above detection in only one sample. These were treated as always below detection by the Remediation team.

The occurrence of Dieldrin is probably related to past agricultural use. Concentrations of PAHs were low; these may result from natural sources or regional deposition.

Nine metals (Sb, As, Be, Cu, Pb, Mn, Se, Ag, and Tl) were above detection in too few samples to test for differences among watershed basins. Seven metals commonly above detection limits (Al, Ca, Cl, Mg, Fe, K, and Na) differed among basins (ANOVA, $p<0.05$). Patterns of differences varied among metals. For Al, Banana Creek was higher than the other basins. Fe was higher in Banana Creek, saline ditches, and freshwater ditches compared to Banana River, Indian River Lagoon, and Mosquito Lagoon. Values of Ca, Cl^-, and Mg occurred in three classes with Banana Creek, Mosquito Lagoon, and Indian River Lagoon the highest, Banana River and saline ditches intermediate, and freshwater ditches low. K was highest in Mosquito Lagoon, intermediate in Banana Creek, Indian River Lagoon, Banana River, and saline ditches, and lowest in freshwater ditches. Na was highest in Mosquito Lagoon and the Indian River Lagoon, intermediate in Banana Creek, Banana River, and saline ditches, and lowest in freshwater ditches.

Screening tables for surface water are given in Appendix A, Table A-3. Screening values are calculated as twice the mean. The screening table for surface water has eight classes. To use the screening table for surface water: 1) collect salinity measurements at all surface water sampling locations; 2) compare site sample data to the surface water combined values based on the appropriate salinity ranges. If the site value is higher than the KSC Background combined salinity value, go to the appropriate surface water basin class for site data in the surface water table and compare site value to that.

Sediment

Approximately 90% of the IRL bottom area is believed to be flat, exposed substrate, and consist primarily of sand and shell fragments (Gilmore 1977). A thin layer of silt often overlays the bottom in the more open portions of the estuary while a surficial layer of organic detrital material is usually present in portions adjacent to shore areas (Woodward-Clyde Consultants 1994). However, fine-grained, organic-rich mucky sediment occurs in about 10% of the Lagoon in deposits ranging up to more than 2 m thick.

Sediments may have been affected by anthoropogenic modifications including dredging the Intercoastal Waterway and Haulover Canal, stabilization of inlets, construction of causeways, land filling, agricultural development, diking, impoundment for mosquito control, and modifications related to the space program.

Sediment sampling stations were co-located with surface water sampling locations. A total of 40 stations were selected to incorporate samples from open lagoonal water, rivers, creeks, ditches, burrow pits, and impoundments. Stations included 18 ditches with five located near KSC's industrial areas.

Sediments were analyzed for organochlorine pesticides, aroclors, chlorinated herbicides, PAH, and metals. Other parameters such as percent solids, pH, resistivity, texture, and TOC were also analyzed.

All of the aroclors (6), 16 of 18 chlorinated herbicides, 24 of 25 organochlorine pesticides, 6 of 18 PAHs, and 7 of 23 metals were always below detection. Chlorinated herbicides, organochlorine pesticides, and PAHs that were above detection were at low to very low frequencies. Ten metals (Al, Ca, Cr, Fe, Pb, Mg, Mn, K, Na, and V) were above detection in sufficient samples to analyze for difference among watershed basins; none were significant (ANOVA, $p < 0.05$).

The screening table for sediment is given in Appendix A, Table A-4. Screening values are calculated as twice the mean. There is only one class for sediment.

<u>Database Evaluation and Validation</u>

An extensive evaluation and validation of the database was conducted. Data collection efficiency was 99.99%. Field methods followed Florida Department of Environmental Protection (DEP) and NASA/KSC procedures. All analyses used methods approved by the Environmental Protection Agency (EPA). All sample-holding times were met. Chain of custody records were maintained with only minor errors. Results of equipment blank analyses indicated no significant procedural contamination of field samples. Results of method blank analyses indicated possible metal contamination in five sample runs. Low level sodium and calcium contamination did not meaningfully impact estimated means. Aluminum contamination in the laboratory may have produced a positive 4.25% bias in the estimated mean for coastal soils. Assessment of surrogate and spike recovery indicated good laboratory quality control. Metal analyses were of high quality with few problems noted. Matrix interferences were an issue in several coastal soil samples. Organic analyses were more variable than metals; this is expected given the more complex methodologies. However, the organic analyses results were of generally good quality, and most organics were below detection.

SECTION 1
Introduction

This report documents background chemical composition of pristine soils, groundwater, surface water, and sediments of John F. Kennedy Space Center (KSC). Kennedy Space Center is a complex environment; the chemical composition of these media is a product of geologic history, climate, interactions with biota, and anthropogenic effects (such as citrus, agriculture, and ranching).

The Landscape of Kennedy Space Center

1.1. Location

Kennedy Space Center is located on the east coast of central Florida in Brevard County, at approximately 28.5 degrees north latitude and 81.7 degrees west longitude (Figure 1.1). KSC is located on Merritt Island, a relict barrier island. Cape Canaveral Air Force Station (CCAFS) occupies the adjacent Cape Canaveral barrier island. Large water bodies surround these lands: the Atlantic Ocean, Banana River, Indian River, and Mosquito Lagoon.

1.2. Climate

Merritt Island experiences a warm, humid climate. Long-term precipitation records (1888-1987) give a mean annual precipitation of 136.6 cm (53.8 in) for Titusville, but annual rainfall varies widely (low: 84.8 cm – high: 207.5 cm) (Mailander, 1990). There is also seasonal variation in precipitation with a wet season from May to October and the rest of the year relatively dry. January is typically the coldest month with a mean minimum temperature of 9.6 C (49.2 F) and a mean maximum temperature of 22.3 C (72.2 F). July is typically the hottest month with a mean minimum temperature of 71.4 F (21.9 C) and a mean maximum temperature of 33.3 C (91.9 F) (Mailander 1990).

1.3. Geology

Florida has a complex geologic history with repeated periods of deposition when the Florida Plateau was submerged and erosion when the seas recessed (Randazzo 1997, Scott 1997). The oldest formation known to occur beneath Brevard County and KSC, the Avon Park limestone, was deposited in the early Eocene in an open ocean (Cooke 1945). This was followed by a withdrawal of the sea and a period of erosion. In the late Eocene, the seas advanced and limestones of the Ocala group were deposited (Cooke 1945). Following another period of recession of the sea and erosion of the land surface, the Hawthorn formation of calcareous clay, phosphatic limestone, phosphorite, and radiolarian clay was deposited in the late Miocene (Cooke 1945, Brown et al. 1962). Overlying this are unconsolidated beds of fine sand, shells, clay, and calcareous clay of late Miocene or Pliocene age (Brown et al. 1962). Surface strata in

Brevard County are primarily unconsolidated white to brown quartz sand containing beds of sandy coquina of Pleistocene and Holocene age (Brown et al. 1962). See Figure 1.2.

In addition to the sequences of sediments of varying age, the surface of Florida is marked by a series of terraces and former shorelines of varying ages. In Brevard County, two terraces have been recognized, the Silver Bluff Terrace on Cape Canaveral and Merritt Island and the Pamlico Terrace on the mainland (Healy 1975).

During the Pleistocene (ca. 1.6 million years before present [yr B.P.] to 13,000 yr B.P.), repeated glaciation of the northern hemisphere produced fluctuations in sea level (Bowen 1978). At the maximum of the Wisconsinan glaciation (ca. 18,000 yr B.P.), sea levels were on the order of 100 m lower than at present, and substantial additional areas were exposed along the Atlantic and Gulf coasts, including Florida (Field and Duane 1974, Delcourt and Delcourt 1981).

The alternating high and low sea stands of the Pleistocene and Holocene (since ca. 13,000 yr B.P.) shaped the surface of Brevard County. The outer barrier island and Cape Canaveral formed after sea levels rose when the Wisconsinan glaciers retreated (Davis 1997). Cape Canaveral is mapped as Holocene in age (Brooks 1981). Brooks (1972) suggested that the formation of the Cape Canaveral peninsula began about 7,000 years ago. Cape Canaveral is part of a prograding barrier island complex, the result of southward growth of an original cape at the site of the present False Cape (White 1958, 1970). Multiple dune ridges on Cape Canaveral suggest that periods of deposition and erosion alternated (Chaki 1974). The barrier island separating Mosquito Lagoon from the Atlantic Ocean also originated about 7,000 years ago (Mehta and Brooks 1973). However, its history has been marked by erosion, overwash, and landward migration rather than progradation; these processes continue today (Mehta and Brooks 1973). Some areas of the barrier island south of Cape Canaveral have a history of overwash, while others have been more stable (Bader and Parkinson 1990).

Merritt Island also formed as a prograding barrier island complex; the eastern edge of Merritt Island at its contact with the Mosquito Lagoon and the Banana River forms a relict cape aligned with False Cape (White 1958, 1970). Multiple dune ridges apparently represent successive stages in this growth. Brooks (1972) suggested that the geologic history of the Merritt Island-Cape Canaveral barrier island was complex. The western portion of Merritt Island is substantially older than the east (Brooks 1972, Clapp 1987). Erosion has reduced the western side to a nearly level plain (Brown et al. 1962).

1.4. Soils

Soils differ through the interaction of several factors: climate, parent material, topography, organisms, and time (Jenny 1941, 1980). The soils of KSC are mapped in the soil surveys for Brevard County (Huckle et al. 1974) and Volusia County (Baldwin et al. 1980), and the resulting soil pattern is complex. Numerous soil series and land types are represented, and these include representatives of many of the major soil groups (Schmalzer and Hinkle 1990). This is interesting since Merritt Island is a relatively young landscape and one formed from coastal plain deposits. Some differences in soil parent material do occur. In particular, soils that formed in deposits over limestone, coquina, or other alkaline material differ greatly in properties from those formed in sand. Textural differences in parent material such as that between loam or clay material and sand also influence soil properties.

The primary source of parent material for KSC soils are sands of mixed terrestrial and biogenic origin. The terrestrial material originated from southern rivers carrying sediments eroded from highly weathered Coastal Plain and Piedmont soils; these sediments are quartzose with low feldspar content (Milliman 1972). These sediments moved south through long-shore transport and may have been reworked repeatedly. The biogenic carbonate fraction of the sand is primarily of mollusk or barnacle origin with lesser contributions of coralline algae and lithoclasts; some may be reworked from offshore deposits of coquina and oolitic limestone (Milliman 1972).

The Cape Canaveral-Merritt Island complex is not all of the same age, as discussed earlier. Soils on Cape Canaveral, False Cape, and the barrier island section on the east side of Mosquito Lagoon are younger than those of Merritt Island and therefore have had less time to weather. Well drained soil series (e.g., Palm Beach, Canaveral) in these areas still retain shell fragments in the upper layers, while those inland on Merritt Island (e.g., Paola, Pomello) do not. The presence of shell fragments influences soil nutrient levels, particularly calcium and magnesium, and pH. The eastern and western sections of Merritt Island differ in age. The eastern section of Merritt Island inland to about State Route 3 has a marked ridge-swale topography presumably retained from its formation as a barrier island, while west of State Route 3, the island is flatter, without obvious ridges and swales probably due to the greater age of this topography.

Differences in age and parent material account for some soil differences, but on landscapes of Merritt Island with similar age, topography has a dramatic effect on soil formation. Relatively small elevation changes cause dramatic differences in the position of the water table that, in turn, affect leaching, accumulation of organic matter, and formation of soil horizons. In addition, proximity to the lagoon systems influences soil salinity.

1.5. Groundwater

The geologic structure and composition of the Merritt Island-Cape Canaveral barrier island complex together with climatic conditions form the basis for the hydrology of the system. Groundwater hydrology of KSC has been the subject of several studies (e.g., Edward E. Clark Engineers-Scientists, Inc., 1985; 1987a; b; c) [hereafter referenced as Clark]; the discussion that follows is based primarily on the areawide survey (Clark, 1987c). See Schmalzer and Hinkle (1990) for additional details.

The principal artesian aquifer beneath KSC is the Floridan aquifer, which occurs within the Ocala limestones (Figure 1.3). Recharge areas for this aquifer are the high ridges of central Florida. This is a large and productive aquifer; however, in the coastal areas, as beneath KSC, the water is highly mineralized. This aquifer is confined by the silts and clays of the Hawthorn formation in most places. Secondary artesian aquifers occur within the Hawthorn formation and the Caloosahatchee Marl Equivalent. The Hawthorn Limestone aquifer is associated with thin, discontinuous beds of limestone, sandstone, and sand within the silts and clays of the Hawthorn formation. It is recharged by upward leakage from the Floridan aquifer. The Shallow Rock aquifer is associated with beds of partially consolidated shelly quartz sand with silt and grey clay and some medium hard limestone of the Tamiami formation or Caloosahatchee Marl Equivalent. Recharge is by upward leakage from the Floridan aquifer. The Semi-artesian Shell and Sand Bed aquifer is associated with minor, discontinuous sand and shell beds within the Caloosahatchee Marl Equivalent. There is little freshwater recharge of this aquifer, and it may act as a conduit for seawater intrusion. Both the Shallow Rock and Sand and Shell Bed aquifers are confined by less permeable sediments of the Caloosahatchee Marl Equivalent. The artesian aquifers have little direct influence on surface vegetation; however, artesian wells have been used to irrigate orange groves and previously to maintain water levels in some mosquito impoundments on Merritt Island (Clark 1987c).

The Surficial aquifer occurs in the saturated part of the moderately permeable Pleistocene and Holocene deposits of fine to medium sand, shell, coquina, silts, and marl. Its upper boundary is the water table and the lower boundary is the confining unit at the base of the Pleistocene and Holocene deposits. Recharge is by direct infiltration of rainfall. The higher sand ridges in the center of the island are particularly important for recharge. These ridges are relatively high, are composed of permeable sands, and infiltration is less restricted by subsurface hardpans than in other areas. Two important areas of sand ridges have been distinguished: the Happy Creek Sand Ridges north of Banana Creek and the Schwartz Road Sand Ridges south of Banana Creek. From these prime recharge areas, groundwater flows east and west toward the lagoon systems and the ocean. Discharge from the surface aquifer is from evapotranspiration, seepage into canals and ditches, seepage into interior wetland swales, and seepage into impoundments, lagoons, and the ocean. Most of the seepage into interior wetland swales is subsequently lost to evapotranspiration. Seasonal fluctations in the water table occur with changes in precipitation and evapotranspiration. The water table is highest late in the wet season (typically September-October) and drops as precipitation declines. In the winter, evapotranspiration is low as temperatures decline and some of the vegetation is dormant. In spring, evapotranspiration increases and the water table may decline during spring droughts. See Mailander (1990) for further discussion of precipitation and evapotranspiration patterns. The Surficial aquifer is extremely important since it supports the freshwater wetlands and provides fresh groundwater discharge to the surrounding subsaline lagoons (Clark 1987c).

The Surficial aquifer can be divided into several subsystems (Figure 1.4). The Dune (Barrier Island) subsystem has a lens of freshwater less than 3 m (10 ft) thick on top of intruded saline water. The primary dune acts as the prime recharge area. Shallow groundwater flows east of the ridge to the Atlantic Ocean and west to Banana River, Mosquito Lagoon, or swales; at depth (> 6.1 m [20 ft]) flow is to the Atlantic Ocean. The Dune-Swale subsystem includes the high ridges with permeable sand that favor recharge. This is the only area where the freshwater recharge of the deeper layers of the surficial aquifer occurs. During most of the year, shallow groundwater discharges to the swales. At the beginning of the rainy season after the spring drought, swales collect water and remain flooded; lateral and downward seepage from the swales helps to recharge the groundwater. In areas of pine flatwoods and swales, topography is lower and most soils have well-developed humic hardpans (spodic horizon, Bh layer) that restrict infiltration. During heavy rains, water perches above the hardpan and infiltrates slowly into the Surficial aquifer. This increases evapotranspiration and reduces recharge relative to the prime recharge areas. In the West Plain and Marsh (Lowland) subsystems, the water table is typically within 0.9 m (3 ft) of the land surface, evapotranspiration losses are high, and the dispersed saline water interface renders water quality variable. In the West Plain south of Banana Creek, a limerock "hardpan" replaces the humic hardpan of the Dune-Swale flatwoods. Along the coastlines, the Surficial aquifer contacts the saline water of the Atlantic Ocean and the brackish lagoons. Seawater intrusion occurs as a wedge at the base of the Surficial aquifer since seawater is denser than fresh. The position of the fresh-saline water interface fluctuates; when water levels are low saline water moves inland, and when water levels are high saline water is forced out, producing a dynamic system.

1.6. Surface Water

Kennedy Space Center is surrounded by the Indian River Lagoon System that extends along the East Coast of Florida from Ponce de Leon Inlet to St. Lucie Inlet near Stuart, Florida. This System was formed by changing sea levels, and its prominent features are the southern barrier islands, the Cape Canaveral foreland formation, the western mainland ridges, and the valleys and sloughs between the ridges (Head 1981).

This area is very biologically diverse as it includes the temperate Carolinian and the subtropical Caribbean zoogeographic Provinces. KSC is located in the transition zone between these two Provinces and is bordered by Mosquito Lagoon to the north, Banana River to the south, Indian River to the west, and the Atlantic Ocean to the east. These basins are shallow, aeolian, lagoons with depths averaging 1.5 m and maximums of 9 m generally restricted to dredged basins and channels.

Mosquito Lagoon and the Indian River are connected by Haulover Canal and the Intercoastal Waterway. Water flow between these two systems is primarily wind-driven. Because of the various anthoropogenic modifications related to the space program and mosquito control, circulation between Mosquito Lagoon and the Banana River was blocked in the earlier 1960s.

The Indian and Banana Rivers mix in the southern region near Eau Gallie, and through a man-made canal located just south of KSC. This navigation canal accesses the Atlantic Ocean through the Port Canaveral Locks, whose oceanic waters influence surface water quality in the northern Banana River. The northern-most Banana River is inside KSC property and closed to motorized boat traffic. It is part of the Merritt Island National Wildlife Refuge and its water quality is one of the best in the Indian River Lagoon System (Woodward-Clyde Consultants 1994). The region of the Banana River north of the NASA Causeway includes Pintail Creek and Max Hoeck Back Creek. Very little tidal fluctuation occurs, and the water movement in this location is influenced primarily by wind and evaporation.

The major fresh-water body within KSC property is Banana Creek, which drains the numerous estuaries adjacent to the Space Shuttle launch pads via a canal located northwest of the Vehicle Assembly Building to the Indian River. Salinity usually increases in a westward direction, but depending on wind direction, the Indian River system can have a greater or lesser affect on the Banana Creek water quality. Other freshwater inputs to the estuarine system surrounding KSC include direct precipitation, stormwater runoff, discharges from impoundments, and groundwater seepage.

1.7. Sediment

Numerous anthoropogenic modifications changed the natural ecosystem surrounding KSC. These included dredging the Intercoastal Waterway and Haulover Canal, stabilization of inlets, construction of causeways, land filling, agricultural development, diking, impoundment for mosquito control, and modifications primarily related to the space program.

These modifications led to the fragmentation of the native landscape that inherently changed sediment quality and characteristics. Because sediments are important for organic decomposition in both freshwater and marine systems

(Hargrave 1973, Nixon 1981), these landscape modifications inevitably affected sediment ecology surrounding KSC.

Within KSC property, the construction of roads, causeways, buildings, launchpads, and the Space Shuttle runway required additional soil. This land filling led to the formation of several burrow pits and relatively deep basins in the Banana River. The Banana River bottom topography was also modified to accomodate the Intercoastal Waterway and to create a navigable channel to access the Vehicle Assembly Building.

Numerous alteration to the marsh communities occurred in the late 1950 earlier 1960, the most prevalent being impoundment and diking as a control method for mosquitoes (Rey and Kain 1989). Most of them created numerous shallow pond-like features along the margins of the Indian River Lagoon System. These impoundments usually have a mucky substrate that is not directly exported to the lagoon.

Approximately 90% of the IRL bottom area is believed to be flat, exposed substrate, and consist primarily of sand and shell fragments (Gilmore 1977). A thin layer of silt often overlays the bottom in the more open portions of the estuary while a surficial layer of organic detrital material is usually present in portions adjacent to shore areas (Woodward-Clyde Consultants 1994). However, fine-grained, organic-rich mucky sediment occurs in about 10% of the Lagoon in deposits ranging up to more than 6 feet thick. These tend to be found in the mounths of tributary creeks, sheltered areas near harbors and causeways, and in the deeper parts of the Intercoastal Waterway (Woodward-Clyde Consultants 1994). These muck deposits tend to have high oxygen demand, particle-reactive metals and, synthetic organic compunds (Schropp et al. 1990).

1.8. <u>Human History</u>

Humans have occupied central Florida for thousands of years and interacted with the environment (Davison and Bratton 1986, Bense 1994). Activities that would effect background chemical composition of soil, groundwater, surface water, and sediment are relatively recent. Euro-American settlement in the 19th and early 20th centuries included logging, citrus agriculture, and free-range grazing of cattle (Davison and Bratton 1986). Use of chemical fertilizers and pesticides developed over time in agriculture, particularly citrus.

Organized efforts at mosquito control in the northern Indian River Lagoon (IRL) began in the 1940s and intensified after World War II (Provost 1959, 1977). Massive quantities of DDT were applied between 1946 and 1951; other insecticides were then adopted, because salt marsh mosquitos had become resistant to DDT. There was no documentation of the effects of insecticide applications on marsh ecosystems. Effects on non-target insects, arthropods, and birds must have been substantial (Sykes 1980). The population of the Dusky Seaside Sparrow (*Ammodramus maritimus nigrescens*) on Merritt Island was estimated to have declined by 70% by 1957 due to aerial spraying of insecticides (Nicholson in Trost, 1968). DDT metabolites and other organochlorines were detected in fish (Thompson et al., 1977) and in the eggs (Blus et al. 1974, Thompson et al. 1977) and tissue samples (Nesbitt et al. 1981) of Brown Pelicans (*Pelecanus occidentalis carolinensis*) collected in the vicinity of Merritt Island in the late 1960s and early 1970s. DDT levels were generally low, and thinning of egg shells was slight (Blus et al. 1974).

Concerns over massive insecticide application and development of insecticide resistance by mosquitos spurred consideration of alternative control measures (Provost 1959, 1977). The life cycle of salt marsh mosquitos could be interrupted by maintaining flooded conditions in the irregularly flooded marshes that were primary breeding areas (Provost 1959, Clements and Rogers 1964). This was achieved by building perimeter dikes around salt marshes and flooding the marsh by either trapping rain water and runoff, pumping water from the lagoon, or tapping artesian wells (Provost 1959). Although flooding was necessary only in the mosquito breeding season, continuous flooding was common early in the use of impoundments (Provost 1959). The construction of higher, permanent dikes began in 1959, and most marshes were impounded by 1970 (Rey and Kain 1989). This reduced the widespread use of insecticides.

1.9. Reasons for Study

KSC has been the primary launch complex for the United States Space program since the 1960's. In this time, many industrial practices have required use of hazardous materials for day to day operation of this launch complex. The uses of these hazardous commodities have lead to potential contamination concerns center wide. The NASA/KSC Environmental Program Office Remediation Program Group is charged with investigating areas that may be contaminated. The remediation group is required by their Resource Conservation and Recovery Act (RCRA) permit to investigate potential release locations (PRLs). The group compiled a list of PRLs based on past industrial practices suspected to occur at each site. Each PRL is investigated to determine if contamination is present. If contamination is found, the horizontal and vertical extent and the source of the contamination are determined as well as any impacts to human health and the environment.

Data collected during the various stages of the process are screened against current regulatory risk-based screening values. These screening values include values for human health (residential and industrial) and ecological scenarios. CCAFS developed the Baseline Data Development Program (BDDP) in 1996 to develop background numbers which would be used in assisting the clean up of their remediation sites (O'Brien and Gere Engineers, Inc. 1996). At that time, KSC adopted those numbers. Due to the differences in the landscape (age, vegetation types, etc. discussed previously), KSC needed to develop baseline (background) numbers specific to KSC. The purpose of this study was to develop the baseline (background) values specific to KSC.

When the subject of remediating a site is reached in the investigation process, the current screening values may be extremely conservative and may actually represent values that are lower than naturally exist within the landscape. In this study, areas of the landscape with little direct impact by industrial or launch operations were sampled. Sample locations were chosen away from known Solid Waste Management Units (SWMU). It should be noted that some soil, surface water, and sediment samples were collected within the industrial areas of KSC. Soil samples were collected as part of the disturbed soil class. Surface water and sediment samples were collected within the industrial area as requested by remediation team members to reflect background concentrations as part of the stormwater drainage systems as well as daily activities occurring on KSC. No sample was collected from any obvious release location. Potential impacts of site operations on these samples may include contamination by vehicles to include parking lot run-off and stormwater drainage. The data developed during this effort will be used to assist with clean up of remediation sites on KSC. The goal is to use the data as a screening tool, i.e. contaminant concentrations that exceeded risk-based screening values but are below background numbers would not force clean up at a given site.

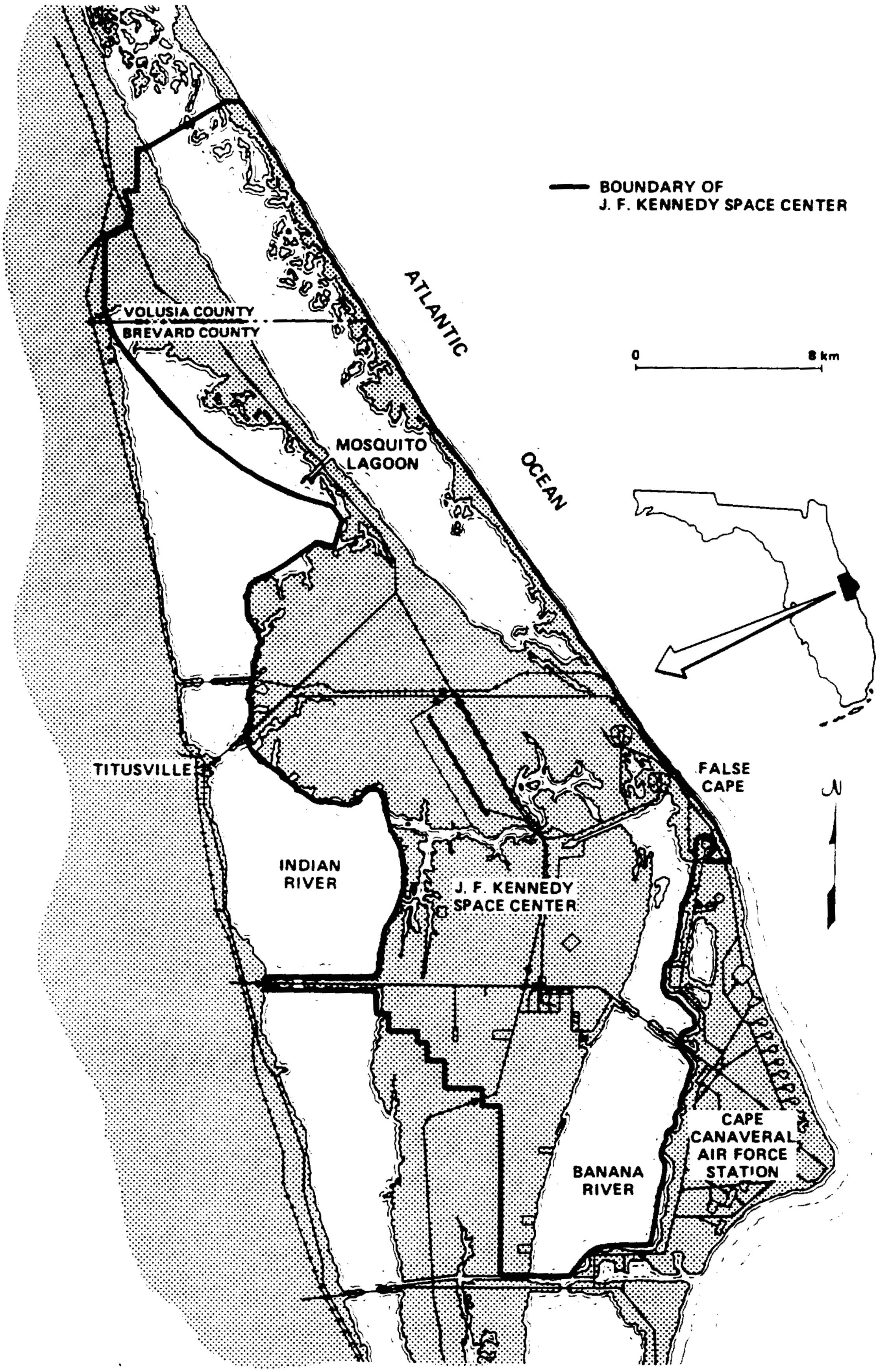

Figure 1.1. Location of Kennedy Space Center.

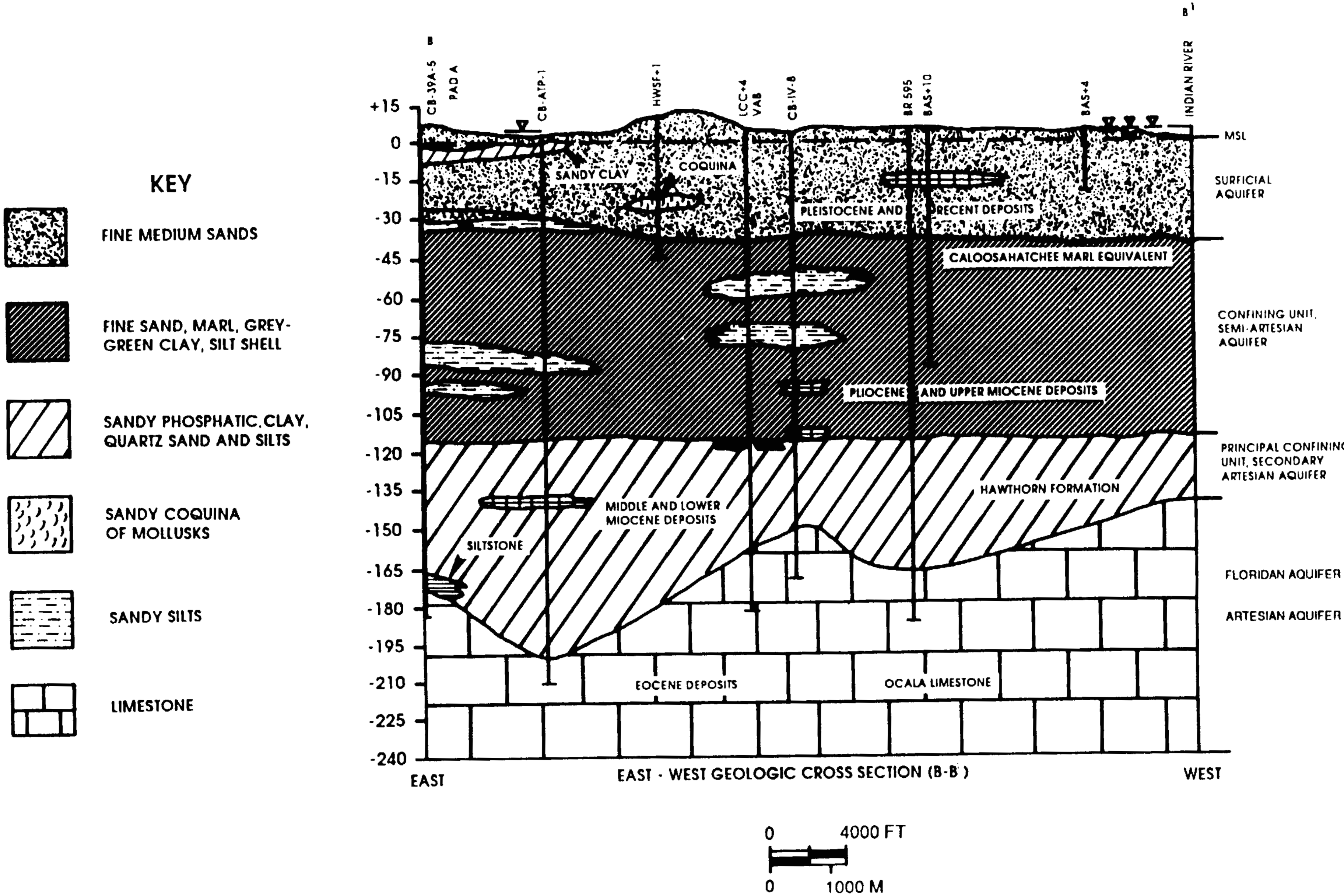

Figure 1.2. East-west geologic cross section, Kennedy Space center (redrafted from Clark 1987c). Veritcal scale is elevation in feet relative to mean sea level.

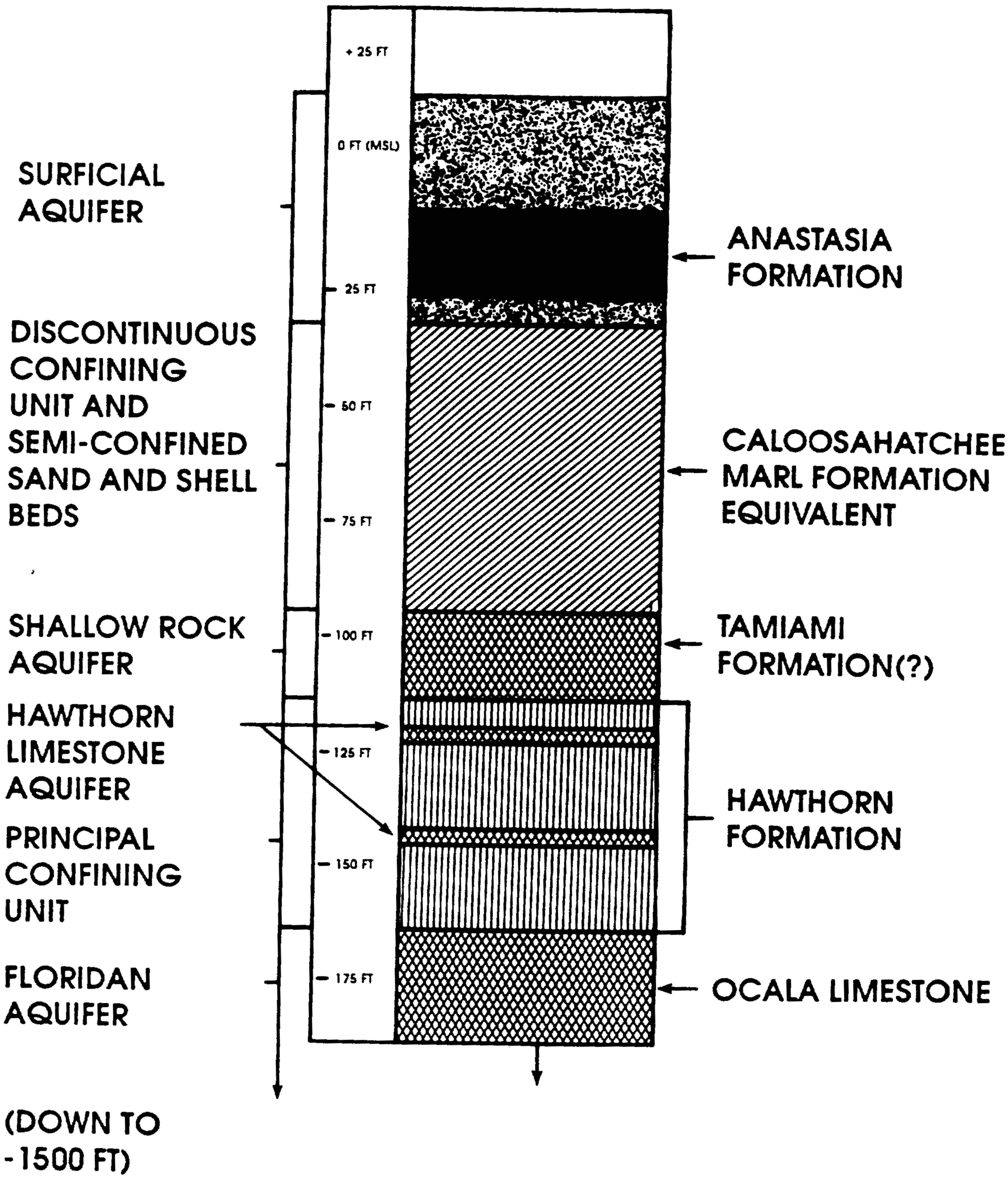

Figure 1.3. Geohydrological units on Kennedy Space Center (redrafted from Clark 1987c).

Groundwater Subaquifers

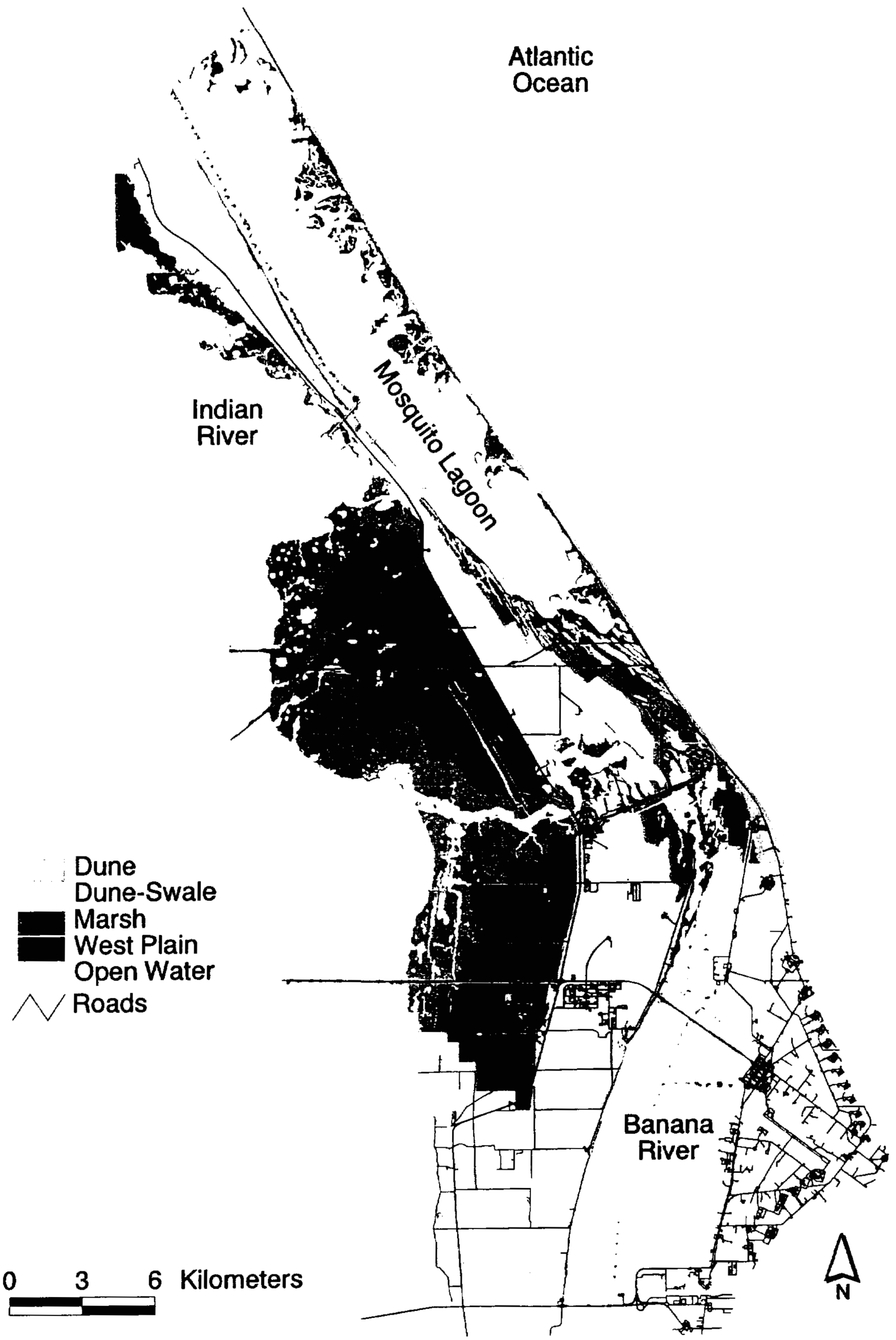

Figure 1.4. Groundwater subaquifers of Kennedy Space Center.

SECTION 2
Soil

2.1 Methods

2.1.1 Site selection

Numerous soil series occur on Kennedy Space Center (Huckle et al. 1974, Baldwin et al. 1980, Schmalzer and Hinkle 1990); 58 series or land types occur (Table 2.1). Chemical and physical characteristics of these soils vary (Madsen 1980, Schmalzer and Hinkle 1987, 1992a, 1992b). Sampling all these soil types adequately was impossible. Therefore, it was necessary to group soil series into similar classes before sampling.

We divided soils first into four groups: Upland, Wetland, Agricultural, and Disturbed. Upland soils are not flooded for substantial periods, while Wetland soils have standing water for substantial periods. Flooding affects organic matter accumulation, oxidation-reduction conditions, and other chemical properties of soils (Ponnamperuma 1972). We divided Upland soils into well-drained and poorly drained categories. Poorly drained soils accumulate more organic matter, which forms the cation exchange capacity in these soils retaining nutrients and metals (Schmalzer and Hinkle 1987, 1992b, 1996). We divided well-drained, upland soils into three classes: 1) geologically recent, alkaline, sandy soils of coastal dunes where the vegetation is coastal dunes, coastal strand, or coastal scrub; 2) old, inland, leached, acid, sandy soils where the vegetation is oak-saw palmetto scrub or scrubby flatwoods; and 3) inland, circumneutral soils formed over coquina where the vegetation is oak-saw palmetto scrub or xeric hammock. We divided poorly-drained, upland soils into two classes: 1) acid, sandy soils with flatwoods vegetation; and 2) circumneutral to alkaline soils formed over coquina or limestone where the vegetation is mesic hammock (Table 2.1).

The primary division of wetland soils was between: 1) inland, freshwater wetlands where the vegetation was freshwater marshes or hardwood swamps; and 2) coastal, brackish to saline wetlands where the vegetation was salt marshes or mangroves (Table 2.1).

Agricultural soils were of two types: 1) active or abandoned citrus on scrub soils; and 2) active or abandoned citrus on hammock soils (Table 2.1).

Disturbed soils included various types modified by construction (Table 2.1). This group could be heterogeneous, but there was no apparent division into homogeneous subgroups.

This classification resulted in ten groups. We selected twenty sample locations in each for a total of 200 locations. Sample number per group was determined based on variation in soil chemistry found in previous studies (Schmalzer and Hinkle 1992a, 1992b).

A Trimble Pathfinder Professional XL Geographic Positioning System (GPS) unit was used to collect soil sampling locations using real-time differentially-corrected methods (Trimble Navigation Limited 1994). Locations were exported to North American Datum 1927 (NAD27) State Plane coordinates for overlay in a Geographic Information System (GIS).

2.1.2 Sampling

Soil sampling was conducted at 200 locations (Figure 2.1). A 0-1ft (0-30.8 cm) layer composite sample was collected with a stainless steel scoop and bowl and placed in the appropriate containers for analysis. Preservatives for each analysis were used, as appropriate. Samples for bulk density were collected using a stainless steel ring, which was hammered into the ground. The bulk density-sampling ring was carefully collected to keep as much volume as possible inside the ring and was then placed in a plastic bag for analysis. Latex gloves were worn during sample collection and replaced for each sample collected. Proper decontamination procedures were conducted after each sample was collected. Environmental Conservation Laboratories (ENCO) was subcontracted for sample collection and analysis. ENCO followed sampling methods required by the "NASA/KSC Sampling and Analysis Plan for RCRA Facility Investigations at Kennedy Space Center, Florida and Cape Canaveral Air Station, Florida, Volume 4" of the Generic Work Plans (SAP) (NASA 1996). Quality assurance/quality control samples were collected as required by the SAP.

2.1.3 Chemical Analysis

Table 2.2 lists the analyses that were conducted on each soil sample: organochlorine pesticides (EPA method 8081), aroclors (EPA method 8082), chlorinated herbicides (EPA method 8151), and polycyclic aromatic hydrocarbons (PAH) (EPA method 8310) were analyzed. Methods for organochlorine pesticides, aroclors, and chlorinated herbicides use gas chromatography (USEPA, 1996). Polycyclic aromatic hydrocarbons were analyzed by high-pressure liquid chromatography (USEPA 1996). Metals were analyzed using one of the following EPA method numbers appropriate for the specific metal: 200.7, 204.2, 6010, 7210, 7471, 7520, 7610, 7770, or 7950 (Table 2). Methods 200.7 (aluminum [Al]) and 6010 (arsenic [As], barium [Ba], beryllium [Be], cadmium [Cd], calcium [Ca], chromium [Cr], cobalt [Co], copper [Cu], iron [Fe], lead [Pb], magnesium [Mg], manganese [Mn], nickel [Ni], potassium [K], selenium [Se], silver [Ag], thallium [Tl], vanadium [V], and zinc [Zn] use inductively coupled plasma-atomic emission spectrometry (USEPA 1983, 1996).

Methods 7210 (Cu), 7520 (Ni), 7610 (K), 7770 (sodium [Na]), 7950 (Zn) use atomic absorption, direct aspiration techniques (USEPA 1996). Method 204.2

(antimony [Sb]) uses an atomic absorption, furnace technique (USEPA 1983). Mercury (Hg) was analyzed using method 7471, a cold-vapor, atomic absorption technique (USEPA 1996).

Soil samples were also analyzed for cation exchange capacity (CEC) using EPA method 9081 (USEPA 1996); this technique is based on Chapman (1965). Soil pH was determined on a 1:1 soil/water slurry by electrode using EPA method 9045 (USEPA 1996). Total organic carbon was determined by wet combustion (Nelson and Sommers 1982). Total percent solids was determined by drying to constant weight at 103-105 C [Standard Methods for the Examination of Water and Wastewate, 2540G(Clercerl et al. 1998)]. Bulk density was determined by the core method (Blake 1965). Soil texture was determined by sieving through a series of standard sieves (Day 1965, McLane 1995). Resitivity of a soil water extract was measured using a M.C. Miller Company Soil Box; resistivity is the reciprocal of conductivity (Bower and Wilcox 1965), which is often reported.

The documents "Test Methods for Evaluating Solid Waste" SW-846, (USEPA 1996) and "Standard Methods for the Examination of Water and Wastewater" (Clercerl et al. 1998) were used by ENCO for analysis protocols.

ENCO posses a Florida Department of Environmental Protection (FDEP) approved Comprehensive Quality Assurance Plan No. 960038. A data validation report was completed, see Appendix G.

2.1.4 Data Analysis

Data analyses was conducted using SPSS Version 9 (SPSS Inc., 1999) using the following approach.

- Frequency of parameters occurring above the detection limits were determined. Where most of the data are below detection, intensive data analyses cannot be justified.
- Box plots were used to scan for obvious outliers in the data. Outliers could arise from a contaminated sample or local, anomolous site conditions. Inclusion of outliers can skew the mean and standard deviation of a parameter.
- Tests for normality of distributions were done using normality plots and Kolmogorov-Smirnov statistics with Lilliefors significance levels. Normality of distribution determines whether parametric or nonparametric analyses should be used or whether transformations are required.
- Kruskal-Wallis nonparametric analog of one-way analysis of variance was used to test whether parameters differed among soil classes. Where the sample size of data above detection was sufficient, one-way analysis of variance (ANOVA) of transformed data ($\log_{10}$) followed by Games-Howell post hoc tests was used to determined how parameters differed among soil classes. Games-Howell tests do not assume equal variances (Ray and Quinn 1989). These tests determine whether soil classes were the same for

a given parameter and the patterns of variation if differences were significant. If soil classes are not the same, then the use of a single mean (or screening value) to represent all soils may not be appropriate.

The occurrence of data below detection levels is a complication for data analysis and interpretation. Various approaches can be taken (e.g., Breckenridge and Crockett 1995); here one-half the detection level was substituted for values below detection (USEPA 1998). No summary statistics are reported where all values are below detection.

For screening purposes, data are given as twice the mean (USEPA 1998). The KSC Background Screening table for soil is located in Appendix A, Table A-1.

2.2 Results

2.2.1 Soil Distribution

Soil classes were distributed across the landscape in patterns related to topography, geology, landscape age, and human influences (Figure 2.2). Soil classes differ in extent (Table 2.3). Flatwoods, saltwater wetlands, and freshwater wetlands soils were the largest classes.

Sample sites were distributed within these types (Figure 2.1). See Appendix B, Table B-1 for sample site descriptions and Table B-2 for sample site coordinates.

2.2.2 Soil Chemistry

Sixteen organochlorine pesticides, all (six) aroclors, fifteen chlorinated herbicides, one polycyclic aromatic hydrocarbon, and four metals were below detection in all samples (Table 2.4). Frequencies of organochlorine pesticides above detection limits in all soils were low (Table 2.5); however, frequencies were higher in agricultural (citrus scrub, citrus hammock), disturbed, and saltwater wetland soil classes. Frequencies of chlorinated herbicides above detection limits were low (Table 2.5); frequencies were slightly higher in agricultural (citrus scrub, citrus hammock), disturbed, and saltwater wetland soil classes. PAHs were above detection limits in relatively few soil samples (Table 2.5); frequencies were greater in agricultural (citrus scrub, citrus hammock) and disturbed soil classes. However, PAH values above detection occurred in other soil classes. Among the metals, barium, cadmium, selenium, silver, and thallium occurred in few samples above detection limits (Table 2.5). Arsenic, copper, and mercury were above detection limits with an intermediate frequency, while the other metals were frequently above detection limits (Table 2.5).

The Remediation team decided to treat five organochlorine pesticides as below detection in all samples based on their low frequency of detection (Table 2.6).

There was considerable variation among many soil parameters indicated in box plots and other exploratory analyses. We considered only one metal value to be an outlier. One value of arsenic was 140 mg/kg, while the next highest value was 8.5 mg/kg. This value was deleted from further analyses.

Preliminary analysis of total organic carbon (TOC) data indicated that most values (186/220, 84.5%) were reported as >26,700 ppm (2.67%). These data provide little useful information on differences among KSC soils and were not analyzed further.

Preliminary analysis of cation exchange capacity (CEC) data indicated a bimodal distribution with most of the data <80 meq/100g and a second group between 500-1000 meq/100g. Mineral soils have CEC values typically <80 meq/100g; highly organic soils might have CEC = 180 meq/100g (Brady 1974). The 18 high values cannot be valid for KSC soils and were excluded from further analyses.

KSC Background Screening values for soil are given in Appendix A, Table A-1. Summary data are given in Table 2.7. Detailed summary statistics are given in Appendix B, Tables B-3 through B-13.

All soil parameters had distributions that differed from normality (Kolmogorov-Smirnov test, $p < 0.001$). Transformed values ($\log_{10}$) of Al, As, Ca, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, V, and Zn still differed from normality ($p < 0.05$); however, normality plots showed that the distributions were much improved such that analysis of variance could be conducted. One-way ANOVA is robust to modest departures from normality (Ray and Quinn 1989).

Normality of distribution of resistivity and CEC was improved by transformation ($\log_{10}$); however, normality plots indicated that bulk density was closer to normality than transformed values. Therefore, ANOVA was conducted on transformed values of resistivity and CEC but on untransformed bulk density data. pH is expressed on a log scale and was not transformed further.

Kruskal-Wallis tests indicated that all soil parameters differed among soil classes ($p< 0.001$). However, given the low frequency of detection of organics and some metals, ANOVA was conducted only for metals where >25 % of values were above detection and for pH, bulk density, resistivity, and CEC. All metals analyzed (Al, As, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Hg, K, Na, V, Zn) were significantly different among types ($p < 0.001$) (Table 2.8). Variances were not homogeneous except for Zn (Levene test, $p<0.05$); thus, the Games-Howell test was appropriate for examining multiple comparisons (Table 2.8).

Patterns of differences varied among metals (Table 2.8). Aluminum had low values in flatwoods, acid scrub, and coastal soils and higher values in other types. Arsenic had higher values in coastal and saltwater wetland soils and lower values elsewhere. Calcium was high in coastal and disturbed soils, low in acid scrub and flatwoods, and intermediate in other types. Chromium, copper, manganese, and zinc had higher values in citrus scrub and citrus hammock soils and lower values elsewhere. Iron was low in acid scrub and flatwoods soils and higher in other types. Lead values were low in acid scrub, coastal, and flatwoods soils, high in saltwater wetlands, and intermediate in other types. Magnesium, potassium, and sodium levels were lowest in acid scrub and highest in saltwater wetlands. Mercury was low in acid scrub and coastal soils and high in hammocks and freshwater wetlands. Vanadium was low in acid scrub and flatwoods, high in saltwater wetlands, and intermediate in other types.

Soil pH was highest in coastal soils and lowest in flatwoods (Table 2.9). CEC was low in coastal, acid scrub, and coquina scrub soils and high in freshwater wetlands and hammocks.

2.2.3 Soil Physical Parameters

Bulk density was low in flatwoods, hammock, freshwater wetland, and saltwater wetland soils and higher in the other types (Table 2.9). Resistivity was low in saltwater wetland soils.

Texture

The graphic mean grain size of each soil type was calculated according to the method defined by Folk and Ward (1957). This method involves the use of grain size frequency data obtained from sieve analysis. Grain size in mm is converted to phi units (ϕ) using the equation $\phi = -\log_2 \text{mm}$. (This conversion creates a logarithmic scale and allows a wide range of grain sizes to be graphically displayed on a smaller scale.) In order to obtain the graphic mean, cumulative percentage of grain size is plotted on a probability y-axis and phi size is plotted against the x-axis. (see Figure 2.3) The phi size of the 16, 50, and 84 percentage is marked and used in the following equation:

$$\frac{16\,\phi + 50\,\phi + 84\,\phi}{3} = \text{mean grain size in } \phi \text{ (Folk and Ward 1957)}$$

Phi size can then be converted to millimeters and assigned to the appropriate size class in the Wentworth (1922) ratio scale preferred by most sedimentologists. Each sand grain size class in the Wentworth scale is one half the size of the next largest class in the scale. Therefore, the divisions are consecutive whole numbers on the phi scale. (The division between coarse sand and medium sand is 1 ϕ; the division between medium sand and fine sand is 2 ϕ, etc.).

2.3 Discussion

2.3.1 Soil Distribution

Soil classes vary substantially in their extent across the KSC landscape. Flatwoods and wetlands predominate, reflecting the low, poorly drained topography of KSC. Current or past citrus agriculture has affected about 3% of the soil area and disturbed soils constitute about another 3.6%.

The differing extent of soil classes affects the interpretation of quantitative soil data. In this study, each class was sampled equally. Therefore, the mean of a given soil parameter will not be the same as an area-weighted mean.

2.3.2 Soil Chemistry

Organochlorine Pesticides.
Organochlorine pesticides have no natural sources and their presence in the environment comes from past human use. Due to their persistence in the environment, tendency to bioaccumulate, and deleterious effects on non-target species, their use in the U.S. has been discontinued. However, residual amounts persist from their former use (Kuhnt 1995, Kolpin et al. 1998). In KSC soils, DDT and its degradation products (DDD and DDE) and Dieldrin are most common in occurrence. DDT, DDD, DDE, and Dieldrin are among the most persistent organochlorine pesticides in the environment (Kuhnt 1995).

On KSC, these pesticides were detected most often in the agricultural types (citrus scrub and citrus hammock), saltwater wetlands, and disturbed areas. Application of DDT and other organochorine pesticides for mosquito control was common in the 1940s and 1950s (Provost 1959, 1977). Saltwater wetlands received high levels of pesticide application. High levels of organic matter enhance retention and persistence of these pesticides (Senesi and Chen 1989) and may enhance persistence in these marshes. Organochlorine pesticides were probably used in citrus agriculture during this period (1940s - 1950s) and perhaps into the 1970s when their widespread use was curtailed.

Parkinson et al. (1993) found DDE, Dieldrin, or Lindane in soils of 16 (out of 18) mosquito control impoundments in St. Lucie County where DDT, Lindane, Dieldrin, and Chlordane had been applied for mosquito control in the 1940s and 1950s (see also Wang et al. 1992). Minimum detectable concentrations in that study were DDE - 0.24 μg/kg, Dieldrin - 0.32 μg/kg, and Lindane - 0.18 μg/kg. Detection limits in the current study were higher by a factor of ten (Table 2.2). Lower detection limits often increase frequency of detection (Kolpin et al. 1995).

Chlorinated Herbicides
The chlorinated herbicides surveyed belong to several different chemical classes; however, the only ones above detection limits (Silvex, 2,4-D, 2,4-DB) are all chlorinated phenoxy acids (Ashton and Craft 1981). Chlorinated herbicides are

less persistent in the environment than the organochlorine pesticides (Kuhnt 1995); however, they can persist long enough to move from the soil into the groundwater in some areas (Kolpin et al. 1995, Barbash and Resek 1996).

The low frequency of detection indicates that contamination by chlorinated herbicides has not been widespread in the KSC environment.

Polycyclic Aromatic Hydrocarbons

Polycyclic (or polynuclear) aromatic hydrocarbons (PAH) are a class of compounds containing two or more fused benzene rings that are of both natural and anthropogenic origin (Suess 1976). They include many mutagenic and some carcinogenic compounds. Natural sources include synthesis by microorganisms, phytoplankton, algae, and higher plants, wildfires, volcanic activity, and sediment diagenesis (Suess 1976, Wickstrom and Tolonen 1987). PAH are produced by a variety of industrial combustion processes including heating and power generation, internal combustion engines, coke production in the iron and steel industry, catalytic cracking in the petroleum industry, and refuse incineration (Suess 1976). Coal tar, carbon black, asphalt, and creosote contain high concentrations of PAH (Suess 1976).

Biomass burning, including wildfires and prescribed burning, produces PAH (Standley and Simoneit 1987, Balletine et al. 1996, Simoneit et al. 1996). Different conditions of fuels, combustion conditions, temperature, and oxygen levels produce different suites of PAH (Standley and Simoneit 1987, Balletine et al. 1996). Generation of PAH is greater during active combustion than smoldering combustion (Standley and Simoneit 1987). Levels of individual PAHs in smoke from wildland fires can be 10-1000 times greater than ambient rural conditions but still 10-1000 times less than urban atmospheres (Standley and Simoneit 1987).

In the atmosphere, PAH are adsorbed on aerosols. They are removed from the atmosphere by photochemical oxidation and by thermal reactions occurring in darkness (Suess 1976, Behymer and Hites 1985, Masclet et al. 1986). Wet and dry deposition transport PAH to soil and water surfaces (Suess 1976). Regional deposition occurs distant from point sources (Jones et al. 1989c).

PAH deposited to soil surfaces are additions to those produced from decayed plants and the activity of soil bacteria (Suess 1976). In soils, PAH are thermodynamically stable, have low aqueous solubilities, and adsorb to soil particles; these properties allow long-term persistence (Pothuluri and Ceniglia 1998). Microorganisms including bacteria, fungi, cyanobacteria, and green algae can degrade PAH (Pothuluri and Ceniglia 1998). Compounds with four or more fused rings degrade slowly, but lower molecular weight, more water soluble compounds such as naphthalene are more readily biodegraded (Pothuluri and Ceniglia 1998).

Increased combustion of fossil fuels since the middle of the 19th century has caused increases in PAH levels in soil (Jones et al. 1989b, c) and sediments (Wickstrom and Tolonen 1987) distant from local sources. PAH levels in soils tend to decline along a gradient away from urban areas or point sources (Vogt et al. 1987, Jones et al. 1989d). Soils high in organic matter in rural areas have higher PAH levels than mineral soils in the same region (Vogt et al. 1987, Jones et al. 1989d). Not all PAHs follow the same pattern; Vogt et al. (1987) found naphthalene levels the same near and distant from point sources of PAH contamination suggesting either that it was primarily of natural origin or degraded quickly enough not to accumulate. In industrialized areas, levels of PAH in the soil can become quite high; Bodzek et al. (1998) reported ΣPAH > 4000 µg/kg in an industrial region of Poland. Even in a semi-rural area of England ΣPAH = 1000 µg/kg have been reported (Jones et al. 1989b).

Metals

Metal concentrations in KSC soils reflect both the origins of the soils and subsequent changes from weathering and leaching. Sands of coastal dunes are mixtures of terrigenous and biogenic deposits. The terrigenous deposits are primarily quartz with small amounts of feldspar, heavy minerals, and phosphorite, while the biogenic deposits are carbonates, primarily shell material (Field and Duane 1974). The terrigenous, siliciclastic deposits originated from rivers draining the Appalachians and Piedmont that moved south from longshore drift; however, they have been reworked repeatedly from older Quaternary sediments (Davis 1997, Scott 1997). Florida soils have low concentrations of many elements (Shacklette and Boerngen 1984).

Metals: Macronutrients

Six elements are required by plants in relatively large amounts and are termed macronutrients: nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur (Brady 1974). Of these, Ca, Mg, and K are considered here.

Calcium. Ca comprises about 3.6 % of the earth's crust; however, Ca is mobile in the soil and readily leached (Paton et al. 1995). Calcium carbonate shell material is the initial source for most of the Ca in these soils. Thus, the young, coastal dune soils have the highest Ca levels (Tables 2.7, 2.8). Disturbed soils often include dredged material high in shell material accounting for their high levels. Soils associated with coquina (coquina scrub, hammocks) also have relatively high Ca levels. Those soils most thoroughly leached, acid scrub and flatwoods, have the lowest Ca levels (Tables 2.7, 2.8). Ca is abundant in seawater (Mitsch and Gosselink 1986) explaining the relatively high levels in saltwater wetland soils. Ca, an important structural element in plants, is involved in some enzyme systems, and is important to osmoregulation (Marschner 1986).

Magnesium. Mg makes up about 2.1 % of the earth's crust (Paton et al. 1995) and is abundant in seawater (Mitsch and Gosselink 1986). The highest levels of

Mg were in saltwater marshes reflecting the seawater source (Tables 2.7, 2.8). Magnesium carbonate shell material is another source for Mg in these soils. Mg is mobile in the soil and readily leached. The highly leached, acid scrub soils have the lowest Mg levels (Tables 2.7, 2.8). In plants, Mg is required for photosynthesis, protein synthesis, and many enzyme systems (Marschner 1986).

Potassium. K comprises about 2.6 % of the earth's crust (Paton et al. 1995) and is abundant in seawater (Mitsch and Gosselink 1986). The highest levels were in saltwater marshes, reflecting the seawater source (Tables 2.7, 2.8). K is highly mobile and readily leached. In plants, K is required for osmotic regulation, enzyme activation, membrane transport, and other physiological processes (Marschner 1986).

Metals: Trace Elements

Aluminum. Al is one of the main constituents of the earth's crust (Kabata-Pendias and Pendias 1984). Alumino-silicate clays are produced by weathering and are a major constituent of many soils (Brady 1974, Birkeland 1999). Although the clay fraction of KSC soils is small (Huckle et al. 1974, Baldwin et al. 1980), Al is present throughout. The lowest levels of total Al in KSC soils were in flatwoods and acid scrub (Tables 2.7, 2.8) perhaps due to intense weathering (Birkeland 1999). Low levels of Al in coastal soils may reflect low amounts in the original sediments. KSC soils are low in Al relative to other Florida soils (Shacklette and Boerngen 1984, Table 2.11). Availability of Al in soil is pH dependent, with its mobility increasing below a pH of 5.5 (Brady 1974). Al toxicity to crop plants is a problem in acid soils; however, low levels of Al may be beneficial for some species and genotypes (Marschner 1986).

Antimony. The crustal abundance of Sb is low (Kabata-Pendias and Pendias 1984) as are its levels in sandy soils (Table 2.12) and in Florida soils (Table 2.11); it is usually associated with sulfides in rocks, sediments, and soils (McBride 1994). Sb is not essential to plant growth but is taken up by plants if present in a soluble form; plant toxicity from Sb appears uncommon (Kabata-Pendias and Pendias 1984). Sources of Sb contamination include industrial pollution and coal combustion. Sb was never above detection limits in KSC soils (Table 2.4) reflecting low background levels and no widespread contamination.

Arsenic. As is widely distributed in rock types (Kabata-Pendias and Pendias 1984). The range of background concentrations in soils is fairly wide (Table 2.12). Levels in KSC soils (Table 2.7) are toward the low end of the range of As values for sandy soils but within typical Florida values (Table 2.11). Values in coastal and saltwater wetland soils are higher than the other types (Table 2.7, 2.8). As is associated with organic matter in soil (Kabata-Pendias and Pendias 1984) which may explain the higher values in saltwater wetlands. Significant contamination sources include industrial pollution, coal combustion, mining and metal processing, arsenic pesticides, and wood preservatives (Kabata-Pendias and Pendias 1984, Evangelou 1988); As also occurs in some phosphate fertilizers (Kabata-Pendias and Pendias 1984). As was once used in livestock dips to control ticks, and this resulted in local contamination (Upchurch and Randazzo 1997). As is not essential to plants and little is known of its biochemical role, but plants take it up. It can be phytotoxic, but some plants accumulate large amounts with no apparent harm.

Barium. Ba is frequently present in soils at varying levels (Table 2.12); Florida soils are typically toward the low end of this range (Table 2.11). In rocks it is associated with feldspars and mica (McBride 1994). It is commonly reported in plants, but has no known function; there are only a few reports of toxicity (Kabata-Pendias and Pendias 1984). Ba is present in sewage sludge, fossil fuel, and peat (Kabata-Pendias and Pendias 1984, Evangelou 1988). Ba was above detection limits in only a few KSC soils (Table 2.5), reflecting low background levels and no widespread contamination.

Beryllium. Be is widely distributed but in low concentrations in rock types and soils (Kabata-Pendias and Pendias 1984, Table 2.12). Sources of Be contamination include smelters and coal combustion. Be has no clear physiological function in plants and is toxic in solution to plants (Kabata-Pendias and Pendias 1984). Be was never above detection limits in KSC soils (Table 2.4), reflecting low background levels and no widespread contamination.

Cadmium. Cd tends to be concentrated in clay and shale deposits (Kabata-Pendias and Pendias 1984), and it is associated with zinc in sulfide minerals (McBride 1994). Typical background values of Cd in soil are < 0.5 ppm (Kabata-Pendias and Pendias 1984, Table 2.12). Mining, smelting, phosphate fertilizers, automobile tires, fossil fuels, and sewage sludge are primary sources of Cd; atmospheric inputs exceed losses of Cd in many areas (Kabata-Pendias and Pendias 1984, Stevenson 1986, McBride 1994). Cd is not an essential plant nutrient but is taken up by plants and becomes phytotoxic at elevated levels. Cd was above detection limits in only a few soil samples on KSC (Table 2.5), reflecting low background levels and no widespread contamination.

Chromium. Cr occurs in a variety of rock types but is most abundant in serpentine (Kabata-Pendias and Pendias 1984); Cr has generally low values in sandy soils (Table 2.12) and in Florida soils (Table 2.11). Most KSC soils have low to very low values of Cr (Table 2.7, 2.8). Cr values in agricultural types (citrus scrub, citrus hammock) are higher; Cr occurs in phosphate fertilizers, and this may account for its greater values in agricultural soils here. Sources of Cr contamination include industrial wastes, mining and metal processing, wood preservatives, and sewage sludge (Kabata-Pendias and Pendias 1984, Evangelou 1988). Most Cr in soil is not readily available to plants. Cr has no established role in plant nutrition, and soluble Cr^{6+} is toxic to plants (Kabata-Pendias and Pendias 1984). However, Cr is an essential micronutrient for man and animals.

Cobalt. Co is most abundant in ultramafic rocks such as serpentine (Kabata-Pendias and Pendias 1984). Co levels in sandy soils are typically low (Table 2.12). Co levels in soils of the Atlantic Coastal Plain (Kabata-Pendias and Pendias 1984) and in Florida (Table 2.11) are particularly low. Co is an essential mineral element for ruminants and is required by nitrogen-fixing microorganisms (Marschner 1986). Sources of Co contamination include metal smelting, paint, and combustion of oil and coal (Kabata-Pendias and Pendias 1984, Evangelou 1988). Co was below detection limits in KSC soils (Table 2.4), reflecting low background values and no widespread contamination.

Copper. Cu is most abundant in mafic rocks. Worldwide mean background values of Cu in soil range between 6-60 ppm (Kabata-Pendias and Pendias 1984) with sandy soils at the low end of the range (Table 2.12). Values in Florida soils are typically low (Table 2.11). Cu is concentrated in surface soils due to bioaccumulation and recent anthropogenic sources; these sources include mining and smelting emissions, fertilizers, fungicide sprays, algicides, wood preservatives, and municipal and agricultural wastes (Kabata-Pendias and Pendias 1984, Evangelou 1988). Cu is an essential plant micronutrient, involved in several important enzyme systems, but also becomes phytotoxic above certain levels (Marschner 1986). Cu levels in KSC soils are low, but the agricultural types (citrus scrub, citrus hammock) have higher values probably due to past applications of Cu-containing fungicides or fertilizers (Tables 2.7, 2.8). Cu is relatively immobile in the soil (Kabata-Pendias and Pendias 1984, McBride 1994), so elevated levels in agricultural soils may persist.

Iron. Fe is a major constituent of the lithosphere; its abundance in rock types ranges from 0.4 % of limestones to 10.0 % of ultramafic rocks (Kabata-Pendias and Pendias 1984). Typical values in soils range from 0.5 % to 5.0 % (5,000-50,000 ppm) (Brady 1974). KSC soils have relatively low levels of Fe compared to this and compared to other Florida soils (Table 2.11). Acid scrub and flatwoods are much lower than other types (Tables 2.7, 2.8). Soils of these types are mainly podzols (spodosols) (Huckle et al. 1974). Formation of podzols involves intense leaching of the surface horizon removing iron and transporting it to deeper soil layers (Paton et al. 1995). Fe is an essential plant micronutrient, involved in critical enzyme systems (Marschner 1986). Soluble iron, available to plants, is controlled by pH and oxidation-reduction conditions. Iron deficiency usually occurs in alkaline, well-aerated soils, but iron toxicity can occur in acid, anaerobic soils (Kabata-Pendias and Pendias 1984, Marschner 1986).

Lead. Pb is concentrated in acid magmatic rocks and clay sediments. Pb content of U.S. soils averages 20 ppm with similar ranges in a variety of soils (Kabata-Pendias and Pendias 1984, Table 2.12). Typical Florida soils range lower than 10 ppm (Table 2.11). Pb is widely distributed in KSC soils, but Pb levels are relatively low (Table 2.7, 2.8). Levels in saltwater wetlands are higher than other types. In surface soils, Pb is associated with organic matter; saltwater wetlands tend to accumulate organic matter at the surface. Pb contamination is widespread, particularly in surface soils; sources of contamination have included mining and smelting, fossil fuels, paint, automobile exhaust, sewage sludge, pesticides, and fertilizers (Kabata-Pendias and Pendias 1984, Evangelou 1988). Plants take up Pb, both from the soil and air, although it has no physiological function; it may become phytotoxic at higher levels (Kabata-Pendias and Pendias 1984).

Manganese. Mn is one of the most abundant trace elements but has its greatest concentrations in mafic rocks (Kabata-Pendias and Pendias 1984). Soil levels of Mn vary, although those reported for sandy soils (Table 2.12) are lower than in soils from mafic rocks (Kabata-Pendias and Pendias 1984). Tyical values for Florida soils are relatively low (Table 2.11). KSC soils are relatively low in Mn (Table 2.7, 2.8); however, agricultural soils (citrus scrub, citrus hammock) are higher than other types. Mn is found in sewage sludge and phosphate fertilizers (Kabata-Pendias and Pendias 1984), suggesting a fertilizer source of Mn for the agricultural soils. Other sources include mining and smelting (Evangelou 1988). Mn levels in coquina scrub soils are also relatively high. The chemistry of Mn in the soil is complex with cycles of oxidation and reduction, solution and reprecipitation under varying soil conditions (Kabata-Pendias and Pendias 1984, McBride 1994). Mn is often associated with Fe in soils, and Fe is also high in coquina scrub soils. Mn is an essential plant micronutrient, involved in a number of enzyme systems and physiological processes (Marschner 1986). Levels of Mn that are toxic to plants vary among plant species and with environmental conditions.

Mercury. Hg concentrations in rock types are greatest in organic-rich shales. In soils, concentrations are greatest in organic soils (Kabata-Pendias and Pendias 1984) with lower levels in acid, sandy soils (Table 2.12). Florida soils are generally low in Hg (Table 2.11). KSC soils are low in Hg (Tables 2.7, 2.8); types with more organic matter (hammocks, wetlands) tend to have higher Hg values, consistent with its affinity for organic matter. Sources of mercury contamination include mining and metal processing, some chemical industry, sewage sludge, coal combustion, and formerly the application of fungicides containing Hg (Kabata-Pendias and Pendias 1984, Stevenson 1986). The formation of organomercury compounds, particularly methyl mercury, is important to the distribution and cycling of Hg. Plants take up and translocate Hg, but it has no physiological function and is phytotoxic (Kabata-Pendias and Pendias 1984).

Nickel. Ni concentrations are greatest in ultramafic rocks (Kabata-Pendias and Pendias 1984). Ni levels in sandy soils are typically low (Table 2.12) as are levels in Florida soils (Table 2.11). Sources of Ni contamination include metal processing and combustion of oil and coal; some phosphate fertilizers and sewage sludge are also sources (Kabata-Pendias and Pendias 1984). Plants take up Ni; it has no established general function in plant metabolism but is involved in nitrogen metabolism of certain legumes (Marschner 1986). However, it becomes toxic at higher levels. Ni was below detection limits in all KSC soils (Table 2.4), reflecting low background values and no widespread contamination.

Selenium. Se is present at low levels in many rock types but is most associated with the clay fraction of sedimentary rocks (Kabata-Pendias and Pendias 1984) and with sulfide minerals (McBride 1994). Levels in sandy soils are typically low (Table 2.12) as are levels in Florida soils (Table 2.11). KSC soils are consistent with this, with Se above detection limits in only a few samples (Table 2.5). Se is taken up by plants, and some species accumulate large quantities (Marschner 1986). Se is a required micronutrient for ruminants but is toxic at high levels.

Silver. The occurrence of Ag is similar to Cu but at much lower concentrations (Kabata-Pendias and Pendias 1984). Background values of Ag in soil can range from 0.03 to 3.2 ppm (Kabata-Pendias and Pendias 1984). Mining, metal processing, and film processing are the major sources of Ag contamination (Kabata-Pendias and Pendias 1984, Evangelou 1988). Plant toxicity appears uncommon. Ag was above detection limits in only a few KSC soil samples (Table 2.5), reflecting low background values and no widespread contamination.

Sodium. The Na content of the earth's crust is about 2.8% (Marschner 1986). Na is the most abundant cation in seawater (Mitsch and Gosselink 1986). The highest levels in KSC soils (Tables 2.7, 2.8) were in saltwater marshes, reflecting that seawater source. The next highest, although much lower, levels were in coastal dune soils (Tables 2.7, 2.8) where salt spray provides a continuing input of Na (Ranwell 1972). Na is highly mobile and readily leached from surface soils where precipitation is abundant (Paton et al. 1995). The lowest levels in KSC soils were in the highly leached, acid scrub soils (Tables 2.7, 2.8). Na is not required by most plants, but it is by some halophytes (Marschner 1986). High concentrations of Na limit the growth of non-halophytic plants (Haines and Dunn 1985).

Thallium. Background levels of Tl range between 0.02 to 2.8 ppm in surface soils of the U.S. (Kabata-Pendias and Pendias 1984). Anthropogenic sources are coal combustion and metal smelting. Tl is toxic to plants and animals at high levels (Kabata-Pendias and Pendias 1984). Tl was above detection limits in only a few KSC soil samples (Table 2.5), reflecting low background values and no widespread contamination.

Vanadium. V content of rock types varies widely but is most abundant in mafic rocks (Kabata-Pendias and Pendias 1984). Sandy soils contain relatively low amounts of V (Table 2.12, Kabata-Pendias and Pendias 1984) as do Florida soils (Table 2.11). V tends to be associated with organic matter in soil (McBride 1994). KSC soils are consistent with this with generally low values (Tables 2.7, 2.8), and somewhat higher ones in soils with more organic matter (wetlands, hammocks). Sources of V contamination include processing of mineral ores and combustion of coal and fuel oil; it also occurs in some phosphate fertilizers

(Kabata-Pendias and Pendias 1984). V is essential for the growth of freshwater algae, but its physiological role, if any, in higher plants is unclear (Marschner 1986).

Zinc. Zn is widely distributed in rock types and soils (Kabata-Pendias and Pendias 1984, Table 2.12) but is usually associated with sulfide minerals (McBride 1994). Concentrations in Florida soils are typically low (Table 2.11). Zn is an essential plant micronutrient involved in numerous enzyme systems but becomes toxic at high levels (Marschner 1986). Zn may be deficient in acid, leached soils (McBride 1994). Zinc contamination is related to mining and smelting, wood preservatives, and to agriculture where it is a component of fertilizers and some pesticides (Kabata-Pendias and Pendias 1984, Evangelou 1988). KSC soils have generally low levels of Zn (Tables 2.7, 2.8), but levels in the agricultural types (citrus scrub, citrus hammock) are higher suggesting sources in fertilizers or pesticides.

Physical and Other Soil Parameters

pH. Soil pH is a measure of the abundance of hydrogen (H^+) ions in soil solution (Brady 1974). H^+ ions are derived from rainfall, from carbonic acid formed by carbon dioxide and water in the soil environment, and from organic acids produced by decomposition (Brady 1974, Birkeland 1999). Soluble aluminum (Al^{3+}) also affects soil pH, particularly under acidic conditions. Sources of hydroxyl ions (OH^-) include reactions with cations, Ca^{2+}, Mg^{2+}, K^+, and Na^+ (Brady 1974, Birkeland 1999). Coastal soils of KSC, where calcium carbonate shell material is abundant, are alkaline, while other types are slightly to strongly acid (Tables 2.7, 2.9). Leaching of basic cations from older soils has contributed to their acidity. Coquina scrub soils that have shell material deeper in the soil profile are less acid than acid scrub soils that lack this buffering. The agricultural types (citrus scrub, citrus hammock) are less acidic than the original soil types. This may be due to liming (Brady 1974) or to irrigation with groundwater high in carbonates.

Cation Exchange Capacity. Colloidal material in soil is important to soil structure and ability to supply nutrients to plants. Soil colloids include clay minerals and organic (humic) matter (Brady 1974). Soil colloids carry negative electrical charges, and this negative charge is approximated by the cation exchange capacity (CEC) (Birkeland 1999). CEC varies with clay content and mineral species and organic matter content (Birkeland 1999). KSC soils have little clay content, so organic matter is the main determinant of CEC. Coastal, acid scrub, and coquina scrub soils have very low CEC values (Tables 2.7, 2.9) consistent with the low organic matter content of these soils, while values in hammocks and wetlands, where organic matter accumulation is greater, are substantially higher.

Bulk Density. Bulk density is a measure of the weight of soil per unit volume. It varies with the relative proportion of solid organic matter in the soil and with soil porosity. Typical values for soil surface (A) horizons range from 0.7-2.0

(Birkeland 1999). High organic matter decreases bulk density, but intense cultivation increases bulk density through loss of organic matter (Brady 1974). In KSC soils, bulk density is lowest in wetland soils, hammocks, and flatwoods where organic matter accumulates in surface soils and is highest in coastal and scrub soils with little organic matter accumulation (Tables 2.7, 2.9). Cultivation of citrus hammock soils appears to have increased bulk density, probably through loss of organic matter.

Resistivity. Electrical conductivity increases with the concentration of ionized constituents in soil solution. The predominant cations and anions in most soils are Ca^{2+}, Mg^{2+}, K^{+}, Na^{+}, CO_3^{2-}, HCO^{3-}, SO_4^{2-}, Cl^{-}, and boron (Bower and Wilcox 1965). Resistivity follows the reciprocal relationship of conductivity. Thus, resistivity is low in saltwater wetland soils (Table 2.7, 2.9) that have high concentrations of Na, K (Table 2.7) as well as Cl^{-} (not measured).

Soil Texture. Mean grain size was greatest in coastal and coquina scrub soils reflecting the shell fragments in these soils that are larger than the quartz grains that comprise much of the rest of the soil. The Wentworth classification reflects these differences better than the Unified Soil classification (Table 2.10). Grain size is less in acid scrub soils where weathering has removed shell fragments. Hammocks and wetlands have the smallest mean grain size, perhaps reflecting accumulation of finer grain material in these types.

2.3.3 Subsurface Soils

The data of this survey apply to surface soils (0-30 cm). Subsurface soil does not have background numbers for comparision and will follow the appropriate screening criteria found in the KSC Decision Process Document.

Soil Sampling Locations

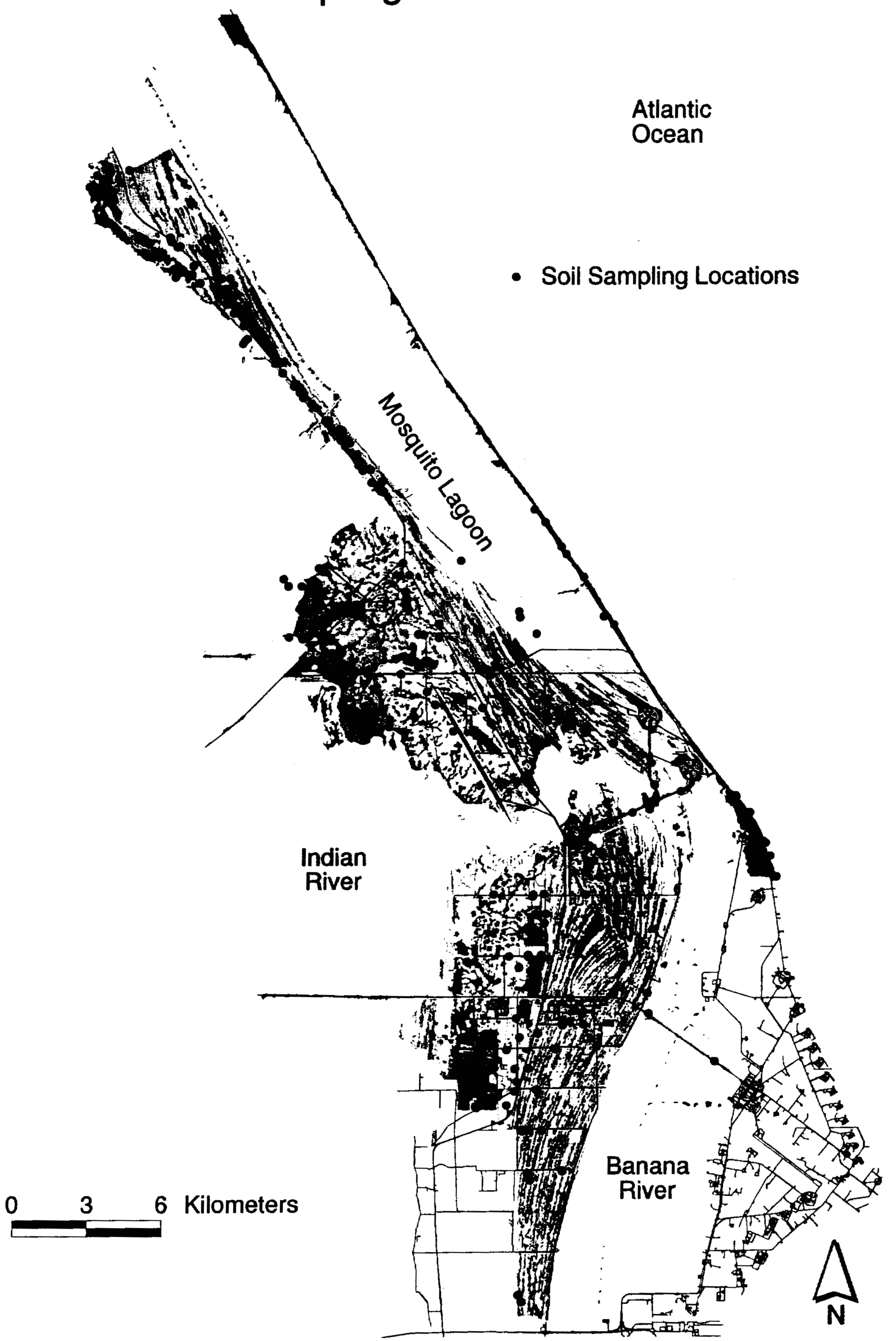

Figure 2.1. Soil sampling locations, Kennedy Space Center. Points may represent more than one sample location.

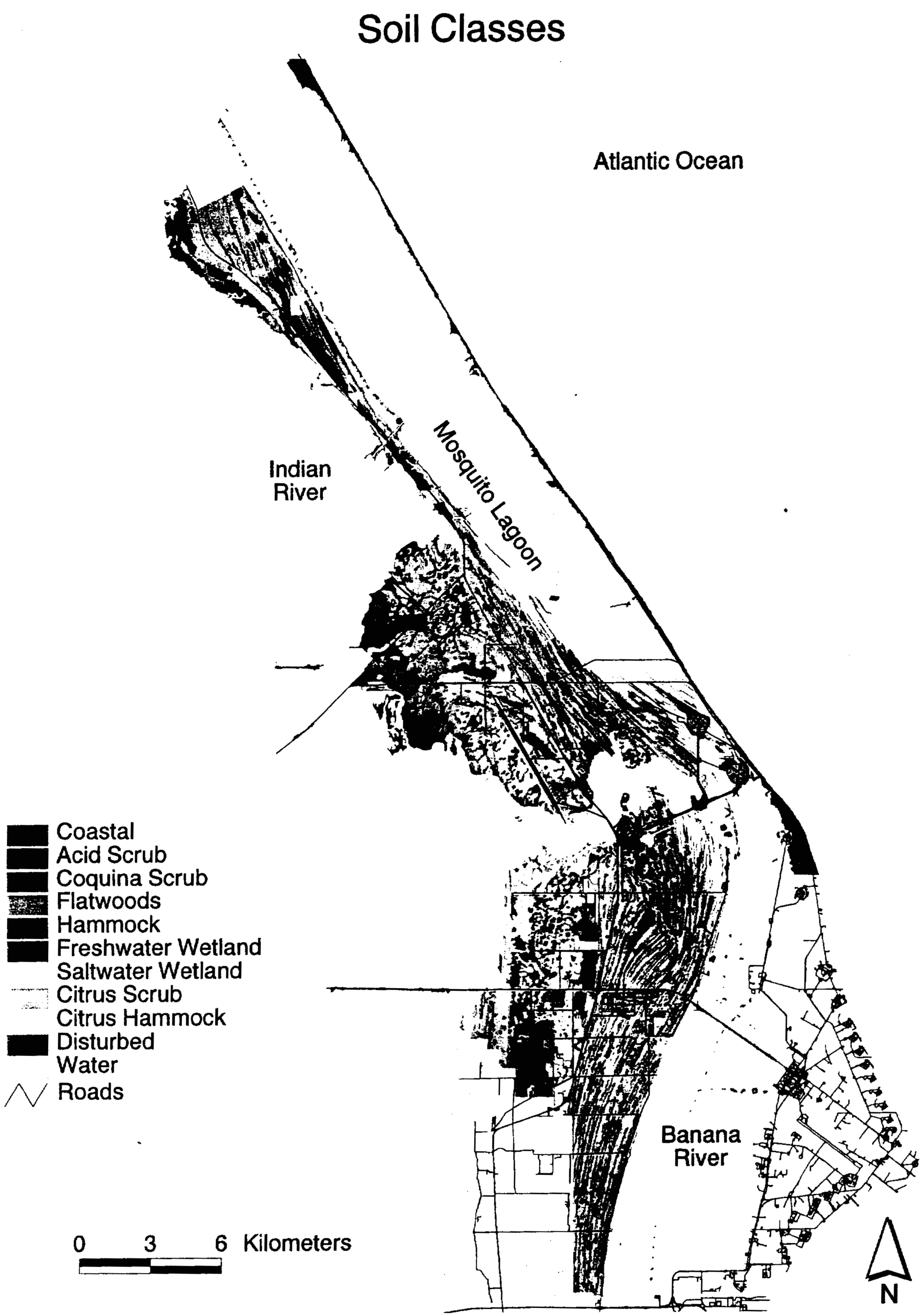

Figure 2.2. Distribution of soil classes on Kennedy Space Center.

Figure 2.3. Phi size distribution for coastal soils.

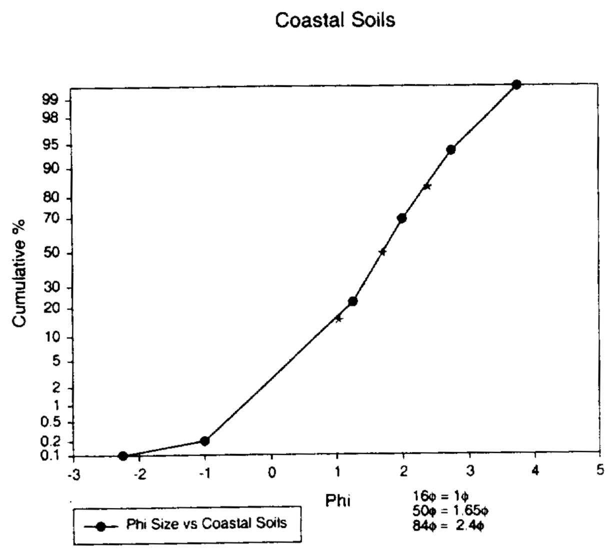

Table 2.1. Soil classification for Kennedy Space Center. Soil series are grouped into ten classes (indicated in bold) based on similarities.

1. Upland
    - 1.1 Well-drained
        - **1.1.1. Recent, coastal, alkaline; vegetation = coastal dunes, coastal strand, coastal scrub**
            - Palm Beach
            - Canaveral
            - Welaka
        - **1.1.2. Old, inland, acid; vegetation = scrub, scrubby flatwoods**
            - St. Lucie
            - Paola
            - Astatula
            - Orsino
            - Pomello
            - Tavares
            - Daytona
            - Cassia
            - Satellite
        - **1.1.3. Inland, circumneutral, over coquina; vegetation = scrub, xeric hammock**
            - Cocoa
            - Bulow
    - 1.2. Poorly drained
        - **1.2.1. Acid, sandy; vegetation = flatwoods**
            - Immokalee
            - Myakka
            - Myakka variant
            - St. Johns
            - Pompano
            - Wabasso
            - Winder
            - Holopaw
            - Smyrna
        - **1.2.2. Circumneutral to alkaline, over coquina or limestone; vegetation = hammocks**
            - Copeland
            - Parkwood
            - Bradenton, shallow variant
            - Tuscawilla

Table 2.1 (cont.).

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2. Wetland

2.1. Inland, freshwater; vegetation = fresh water marshes, hardwood swamps

Myakka, ponded
St. Johns, ponded
Felda & Winder, ponded
Immokalee, depressional
Placid, depressional
Floridana
Swamp
Anclote
Basinger
Canova
Chobee
Felda & Winder
Pineda
Riviera
Samsula muck
Tequesta muck
Valkaria

2.2. Coastal, brackish to saline; vegetation = saltmarshes, mangroves

Submerged marsh
Tidal marsh
Tidal swamp
Hydraquents
Turnbull muck

3. Agricultural

3.1. Active or abandoned citrus on scrub soils (1.1.2, 1.1.3)

3.2. Active or abandoned citrus on hammock soils (1.2.2)

4. Disturbed

Canaveral-urban land
Galveston-urban land
Urban land
Quartzipsamments
Arents
Spoil banks
Dikes
Made land
Turnbull variant

Table 2.2. List of parameters, the EPA methods used to analyze each, and detection limits, in soil samples collected for the KSC Background Study.

	EPA Method	Lab Reporting Limit for soil
Organochlorine Pesticides		
4,4' - DDD	8081	3.3 µg/kg
4,4' - DDE	8081	3.3 µg/kg
4,4' - DDT	8081	3.3 µg/Kg
Aldrin	8081	3.3 µg/kg
Alpha - BHC	8081	3.3 µg/kg
Beta - BHC	8081	3.3 µg/kg
Chlordane, alpha or gamma	8081	1 µg/kg
Chlordane (Total)	8081	3.3 µg/kg
Delta - BHC	8081	3.3 µg/kg
Dieldrin	8081	3.3 µg/kg
Endosulfan I	8081	3.3 µg/kg
Endosulfan II (beta)	8081	3.3 µg/kg
Endosulfan Sulfate	8081	3.3 µg/kg
Endrin	8081	3.3 µg/kg
Endrin Aldehyde	8081	3.3 µg/kg
Endrin Ketone	8081	3.3 µg/kg
Gamma - BHC (Lindane)	8081	3.3 µg/kg
Heptachlor	8081	3.3 µg/kg
Heptachlor Epoxide(a)	8081	3.3 µg/kg
Heptachlor Epoxide(b)	8081	3.3 µg/kg
Isodrin	8081	3.3 µg/kg
Methoxychlor	8081	3.3 µg/kg
Mirex	8081	3.3 µg/kg
Toxaphene	8081	2 µg/kg
Aroclors		
PCB-1016/1242	8082	33 µg/kg
PCB-1221	8082	33 µg/kg
PCB-1232	8082	33 µg/kg
PCB-1248	8082	33 µg/kg
PCB-1254	8082	33 µg/kg
PCB-1260	8082	33 µg/kg
Chlorinated Herbicides		
2-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	8151	10 µg/kg
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	8151	10 µg/kg

Table 2.2 (cont.).

	EPA Method	Lab Reporting Limit for soil
Chlorinated Herbicides (cont.)		
2,4-Dichlorophenoxy acetic acid (2,4 - D)	8151	10 μg/kg
3,5-DCBA	8151	10 μg/kg
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	8151	10 μg/kg
4 - Nitrophenol	8151	10 μg/kg
Acifluorfen	8151	10 μg/kg
Bentazon	8151	10 μg/kg
Chloramben	8151	10 μg/kg
Dacthal	8151	10 μg/kg
Dalapon	8151	10 μg/kg
Dicamba	8151	10 μg/kg
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	8151	10 μg/kg
Dinoseb	8151	10 μg/kg
MCPA	8151	100 μg/kg
MCPP	8151	100 μg/kg
Pentachlorophenol	8151	10 μg/kg
Picloram	8151	10 μg/kg
PAHs		
1 - Methylnaphthalene	8310	17 μg/kg
2 - Methylnaphthalene	8310	17 μg/kg
Acenaphthene	8310	17 μg/kg
Acenaphthylene	8310	3.3 μg/kg
Anthracene	8310	17 μg/kg
Benzo(a)anthracene	8310	1.7 μg/kg
Benzo(a)pyrene	8310	2.0 μg/kg
Benzo(b)fluoranthene	8310	3.0 μg/kg
Benzo(g,h,i)perylene	8310	3.3 μg/kg
Benzo(k)fluoranthene	8310	2.0 μg/kg
Chrysene	8310	1.7 μg/kg
Dibenzo(a,h)anthracene	8310	3.3 μg/kg
Fluoranthene	8310	3.3 μg/kg
Fluorene	8310	3.3 μg/kg
Indeno(1,2,3-cd)pyrene	8310	1.7 μg/kg
Naphthalene	8310	17 μg/kg
Phenanthrene	8310	1.7 μg/kg
Pyrene	8310	1.7 μg/kg

Table 2.2 (cont.).

	EPA Method	Lab Reporting Limit for soil
Metals		
Aluminum	200.7	20 mg/kg
Antimony	204.2	2 mg/kg
Arsenic	6010	0.5 mg/kg
Barium	6010	20 mg/kg
Beryllium	6010	1 mg/kg
Cadmium	6010	1 mg/kg
Calcium	6010	25 mg/kg
Chromium (total)	6010	1 mg/kg
Cobalt	6010	5 mg/kg
Copper	6010/7210	5 mg/kg
Iron	6010	10 mg/kg
Lead	6010	1 mg/kg
Magnesium	6010	25 mg/kg
Manganese	6010	1 mg/kg
Mercury	7471	0.01 mg/kg
Nickel	6010/7520	5 mg/kg
Potassium	6010/7610	25 mg/kg
Selenium	6010	2 mg/kg
Silver	6010	2 mg/kg
Sodium	7770	25 mg/kg
Thallium	6010	1 mg/kg
Vanadium	6010	1 mg/kg
Zinc	6010/7950	5 mg/kg
Other Parameters		
pH	9045	NA
Percent Solids	SM2540G	NA
Resistivity	Miller	NA
Cation Ion Exchange Capacity	9081	NA
Bulk Density	Core Method	NA
Total Organic Carbon	MSA Part2, 29-3	NA
Texture (No. 4,10,40,60,100,200)	Sieve Method	NA

Table 2.3. Area of soil classes.

Soil Class	Area (acres)	Area (hectares)	Percent of Soil Area
Coastal	2714.0	1098.3	3.30
Acid Scrub	3847.2	1556.9	4.76
Coquina Scrub	668.2	270.4	0.81
Flatwoods	25779.5	10432.6	31.32
Hammocks	4917.7	1990.1	5.97
Freshwater Wetlands	15207.5	6154.3	18.48
Saltwater Wetlands	23786.8	9626.2	28.90
Citrus Scrub	863.1	349.3	1.05
Citrus Hammock	1581.6	640.0	1.92
Disturbed	2946.4	1192.4	3.58

Table 2.4. Parameters that were below detection limits (non-detect) in all soil samples.

ORGANOCHLORINE PESTICIDES (8081)	**CHLORINATED HERBICIDES (8151)**
Aldrin	2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)
Alpha-BHC	3,5-DCBA
Beta-BHC	4-Nitrophenol
Delta-BHC	Acifluorfen
Endosulfan I	Bentazon
Endosulfan II (beta)	Chloramben
Endosulfan Sulfate	Dacthal
Endrin	Dalapon
Endrin Aldehyde	Dicambia
Heptachlor	Dichloroprop [2-(2-Dichlorophenoxy) proponic acid]
Heptachlor Epoxide (a)	Dinoseb
Heptachlor Epoxide (b)	MCPA
Isodrin	MCPP
Methoxychlor	Pentachlorophenol
Mirex	Picloram
Toxaphene	
AROCLORS (8082)	**PAHs (8310)**
PCB-1016/1242	Acenaphthene
PCB-1221	**METALS**
PCB-1232	Antimony
PCB-1248	Beryllium
PCB-1254	Cobalt
PCB-1260	Nickel

Table 2.5. Frequency (percent) of values greater than detection limits for chemical parameters in soils. Only parameters greater than detection limits in at least one sample are shown.

Parameter	All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
Sample Size	220	23	22	22	21	20	22	21	23	23	23
Organochlorine Pesticides (8081)											
4,4' - DDD	1.4	0	0	0	4.8	0	0	4.8	0	0	4.3
4,4' - DDE	10.5	0	0	0	4.8	0	0	9.5	56.5	17.4	13.0
4,4' - DDT	4.1	0	0	0	0	0	0	4.8	21.7	4.3	8.7
Chlordane, alpha or gamma	0.9	0	0	0	0	0	0	0	4.3	0	4.3
Chlordane, alpha	0.5	0	0	0	0	0	0	0	4.3	0	0
Chlordane, gamma	0.9	0	0	0	0	0	0	0	4.3	0	4.3
Chlordane (Total)	0.5	0	0	0	0	0	0	0	4.3	0	0
Dieldrin	4.1	4.3	0	0	0	0	0	4.8	21.7	4.3	4.3
Endrin Ketone	0.5	0	0	0	4.8	0	0	0	0	0	0
Gamma - BHC (Lindane)	0.9	0	0	0	0	0	0	4.8	0	0	4.3
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	2.7	0	0	0	0	5.0	0	0	0	8.7	13.0
2,4-Dichlorophenoxy acetic acid (2,4 - D)	2.7	0	4.5	0	0	0	0	14.3	0	8.7	0
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	2.7	4.3	4.5	0	0	0	0	0	13.0	0	4.3

Table 2.5 (cont.).

Parameter	All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
PAHs (8310)											
1 - Methylnaphthalene	2.3	0	4.5	4.5	0	5.0	0	0	0	4.3	4.3
2 - Methylnaphthalene	2.7	4.3	4.5	4.5	0	0	0	0	4.3	4.3	4.3
Acenaphthylene	0.9	4.3	0	0	0	0	0	0	4.3	0	0
Anthracene	0.5	0	0	0	0	0	0	0	4.3	0	0
Benzo(a)anthracene	9.5	4.3	0	4.5	4.8	10.0	0	0	13.0	8.7	47.8
Benzo(a)pyrene	14.1	26.1	9.1	0	0	5.0	4.5	0	26.1	17.4	47.8
Benzo(b)fluoranthene	8.6	8.7	0	0	0	15.0	0	0	13.0	13.0	34.8
Benzo(g,h,i)perylene	7.3	0	0	0	0	10.0	0	0	4.3	13.0	43.5
Benzo(k)fluoranthene	10.0	13.0	0	0	0	20.0	0	0	21.7	4.3	39.1
Chrysene	13.6	13.0	9.1	4.5	4.8	10.0	0	0	39.1	4.3	47.8
Dibenzo(a,h)anthracene	1.8	0	0	0	0	0	0	0	0	0	17.4
Fluoranthene	5.9	0	0	4.5	0	20.0	0	0	4.3	0	30.4
Fluorene	0.5	0	0	0	0	5.0	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	7.7	4.3	0	0	0	10.0	0	0	4.3	13.0	43.5
Naphthalene	6.8	4.3	4.5	0	9.5	5.0	0	0	30.4	13.0	0
Phenanthrene	5.9	4.3	4.5	0	0	5.0	0	0	4.3	0	39.1
Pyrene	5.5	0	0	4.5	0	20.0	0	0	4.3	0	26.1

Table 2.5 (cont.).

Parameter	All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
Metals											
Aluminum	99.1	91.3	100	100	100	100	100	100	100	100	100
Arsenic (as carcinogen)	30.0	95.6	9.1	9.1	4.8	10.0	13.6	71.4	21.7	21.7	39.1
Barium	1.4	4.3	0	0	0	0	0	0	0	0	8.7
Cadmium	1.8	4.3	0	0	0	0	0	0	13.0	0	0
Calcium	100	100	100	100	100	100	100	100	100	100	100
Chromium (total)	65.9	100	13.6	86.4	0	70.0	45.5	76.2	100.0	91.3	69.6
Copper	27.3	17.4	4.5	0	9.5	5.0	9.1	0	100	95.7	21.7
Iron	100	100	100	100	100	100	100	100	100	100	100
Lead	91.8	91.3	72.7	100	76.2	100	86.4	100	100	95.7	95.7
Magnesium	92.7	100	40.9	95.5	95.2	100	100	100	100	100	95.7
Manganese	84.5	100	77.3	100	19.0	95.0	59.1	90.5	100	100	100
Mercury (inorganic)	31.8	0	0	31.8	19.0	75.0	54.5	33.3	39.1	52.2	17.4
Potassium	64.5	91.3	13.6	59.1	33.3	70.0	45.5	100	87.0	69.6	73.9
Selenium	1.8	0	0	0	0	5.0	4.5	0	0	0	8.7
Silver	1.8	4.3	0	4.5	0	0	0	0	0	0	8.7
Sodium	89.5	100	72.7	100	85.7	85.0	95.5	100	91.3	91.3	73.9
Thallium	2.7	13.0	0	0	0	0	0	0	4.3	8.7	0
Vanadium	70.9	100	22.7	90.9	14.3	85.0	54.5	100	82.6	82.6	73.9
Zinc	59.1	56.5	31.8	45.5	38.1	55.0	59.1	28.6	100	91.3	78.3

Table 2.6. Parameters that were determined by the Remediation team to be treated as below detection limits (non-detect) for all soil locations based on low frequency of detection.

ORGANOCHLORINE PESTICIDES (8081)
Chlordane alpha
Chlordane gamma
Chlordane (total)
Endrin Ketone
Gamma –BHC (Lindane)

Table 2.7. Means and standard deviations (in parenthesis) of chemical parameters in soils. Only parameters greater than detection limits in at least one sample are shown. ND = below detection limits.

Parameter	All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
Sample Size	220	23	22	22	21	20	22	21	23	23	23
Organochlorine Pesticides (8081)											
4,4' – DDD (μg/kg)	2.6 (6.4)	ND	ND	ND	2.3 (1.4)	ND	ND	7.9 (20.3)	ND	ND	2.2 (1.7)
4,4' – DDE (μg/kg)	4.5 (11.8)	ND	ND	ND	2.1 (0.7)	ND	ND	5.3 (6.9)	14.1 (22.9)	5.4 (13.6)	7.3 (22.6)
4,4' – DDT (μg/kg)	4.1 (11.0)	ND	ND	ND	ND	ND	ND	7.9 (20.3)	12.0 (22.5)	1.9 (0.8)	6.0 (14.7)
Chlordane (Total) (μg/kg)	2.4 (3.2)	ND	ND	ND	ND	ND	ND	ND	4.4 (12.6)	ND	ND
Chlordane (alpha) (μg/kg)	2.4 (3.2)	ND	ND	ND	ND	ND	ND	ND	2.0 (1.2)	ND	ND
Chlordane (gamma) (μg/kg)	2.4 (7.1)	ND	ND	ND	ND	ND	ND	ND	1.9 (0.7)	ND	2.0 (0.8)
Dieldrin (μg/kg)	4.3 (17.4)	1.8 (0.3)	ND	ND	ND	ND	ND	3.9 (2.5)	13.9 (36.1)	10.0 (39.3)	2.0 (0.7)
Endrin Ketone (μg/kg)	2.2 (1.1)	ND	ND	ND	2.2 (0.9)	ND	ND	ND	ND	ND	ND
Gamma - BHC (Lindane) (μg/kg)	2.2 (1.3)	ND	ND	ND	ND	ND	ND	4.0 (3.2)	ND	ND	2.0 (0.8)
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex) (μg/kg)	9.2 (22.4)	ND	ND	ND	ND	8.2 (5.2)	ND	ND	ND	9.6 (12.3)	22.6 (66.0)
2,4-Dichlorophenoxy acetic acid (2,4 - D) (μg/kg)	8.0 (8.6)	ND	7.0 (7.4)	ND	ND	ND	ND	17.6 (15.3)	ND	9.1 (11.1)	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4 - DB)(μg/kg)	7.9 (7.7)	5.8 (2.9)	6.7 (5.9)	ND	ND	ND	ND	ND	9.4 (10.9)	ND	9.0 (12.5)

Table 2.7 (cont).

Parameter	All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
PAHs (8310)											
1 – Methylnaphthalene (µg/kg)	14.1 (15.8)	ND	17.9 (20.9)	14.8 (16.7)	ND	13.6 (7.8)	ND	ND	ND	9.4 (2.4)	12.4 (10.2)
2 – Methylnaphthalene (µg/kg)	16.4 (27.9)	21.0 (58.6)	21.8 (37.4)	12.6 (10.5)	ND	ND	ND	ND	20.6 (36.7)	10.4 (6.9)	13.3 (13.9)
Acenaphthylene (µg/kg)	2.9 (4.3)	3.8 (9.9)	ND	ND	ND	ND	ND	ND	3.6 (5.2)	ND	ND
Anthracene (µg/kg)	13.3 (13.4)	ND	ND	ND	ND	ND	ND	ND	14.2 (17.1)	ND	ND
Benzo(a)anthracene (µg/kg)	2.4 (9.0)	1.0 (0.5)	ND	1.7 (2.3)	2.1 (3.2)	1.9 (2.5)	ND	ND	1.9 (2.4)	1.1 (0.5)	9.7 (26.9)
Benzo(a)pyrene (µg/kg)	3.4 (17.2)	1.4 (0.7)	1.8 (1.5)	ND	ND	1.8 (1.7)	2.4 (4.4)	ND	2.5 (2.6)	1.4 (1.1)	16.3 (51.9)
Benzo(b)fluoranthene (µg/kg)	3.8 (15.1)	1.9 (1.2)	ND	ND	ND	3.1 (2.4)	ND	ND	2.9 (3.5)	2.0 (1.3)	13.9 (45.4)
Benzo(g,h,i)perylene (µg/kg)	4.8 (14.1)	ND	ND	ND	ND	4.8 (7.0)	ND	ND	3.5 (4.7)	3.1 (3.4)	19.0 (40.2)
Benzo(k)fluoranthene (µg/kg)	2.9 (10.4)	1.4 (1.1)	ND	ND	ND	2.7 (3.0)	ND	ND	2.8 (3.6)	1.1 (0.4)	12.2 (30.7)
Chrysene (µg/kg)	3.1 (13.9)	1.1 (0.5)	1.9 (1.9)	1.4 (1.2)	2.2 (3.2)	1.9 (2.0)	ND	ND	2.9 (3.2)	1.1 (0.6)	15.0 (41.4)
Dibenz(a,h)anthracene (µg/kg)	3.1 (4.9)	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.2 (12.5)
Fluoranthene (µg/kg)	7.2 (39.2)	ND	ND	2.7 (2.6)	ND	13.2 (39.6)	ND	ND	3.5 (4.7)	ND	35.1 (113.4)
Fluorene (µg/kg)	3.4 (11.6)	ND	ND	ND	ND	10.9 (37.5)	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene (µg/kg)	2.9 (14.3)	1.1 (0.9)	ND	ND	ND	1.9 (2.0)	ND	ND	2.1 (3.7)	2.1 (3.5)	13.2 (43.3)

Table 2.7 (cont.).

Parameter	All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
PAHs (cont.)											
Naphthalene (µg/kg)	29.4 (99.3)	9.3 (2.4)	15.2 (12.7)	ND	74.2 (217.3)	13.2 (6.9)	ND	ND	107.9 (209.1)	18.6 (25.9)	ND
Phenanthrene (µg/kg)	4.1 (19.5)	1.6 (3.1)	2.5 (5.2)	ND	ND	5.6 (19.4)	ND	ND	11.0 (47.7)	ND	12.2 (31.2)
Pyrene (µg/kg)	5.1 (28.6)	ND	ND	1.4 (1.3)	ND	21.7 (71.4)	ND	ND	1.5 (1.7)	ND	18.8 (56.2)
Metals											
Aluminum (mg/kg)	1444.6 (2576.4)	282.6 (262.7)	202.8 (306.8)	1001.6 (678.2)	164.7 (84.6)	2395.0 (2382.4)	2315.9 (3148.0)	2683.8 (1997.6)	1172.2 (919.4)	1821.3 (1768.2)	2491.3 (5863.6)
Arsenic (as carcinogen) (mg/kg)	0.8 (1.1)	2.3 (1.3)	0.6 (1.8)	0.3 (0.5)	0.3 (0.1)	0.4 (0.4)	0.6 (0.6)	1.3 (1.1)	0.4 (0.3)	0.5 (0.7)	0.7 (0.7)
Barium (mg/kg)	13.1 (6.7)	10.0 (1.9)	ND	ND	ND	ND	ND	ND	ND	ND	13.0 (6.8)
Cadmium (mg/kg)	0.6 (0.3)	0.5 (0.1)	ND	ND	ND	ND	ND	ND	0.6 (0.4)	ND	ND
Calcium (mg/kg)	16446 (36190)	50044 (18497)	150 (135)	22057 (65351)	383 (211)	11278 (20935)	9609 (29489)	11627 (18373)	2100 (3060)	11099 (24043)	43053 (60942)
Chromium (total) (mg/kg)	4.6 (6.3)	2.1 (0.6)	0.8 (1.2)	2.3 (1.3)	ND	3.5 (3.2)	3.1 (4.3)	4.5 (3.3)	12.2 (7.8)	11.8 (9.5)	3.9 (6.1)
Copper (mg/kg)	13.9 (27.0)	1.8 (1.0)	3.2 (2.4)	ND	2.8 (0.7)	4.3 (3.8)	4.7 (4.8)	ND	53.5 (36.4)	54.0 (40.6)	2.6 (0.8)
Iron (mg/kg)	1283.5 (1909.3)	1063.0 (209.6)	240.4 (421.5)	1511.8 (883.9)	144.1 (81.3)	1717.5 (1716.3)	1326.1 (2361.4)	1504.8 (1091.3)	1502.2 (900.4)	1984.8 (2368.4)	1783.4 (4059.3)
Lead (mg/kg)	5.8 (11.3)	2.2 (0.9)	1.5 (0.8)	4.0 (1.6)	2.4 (2.5)	6.2 (4.5)	5.1 (4.9)	16.6 (33.8)	9.7 (4.8)	5.8 (3.8)	5.1 (4.6)
Magnesium (mg/kg)	549.2 (1354.4)	370.0 (131.6)	28.0 (18.8)	87.6 (37.7)	112.3 (60.5)	534.1 (836.0)	316.0 (468.5)	3291.0 (3151.2)	232.6 (189.3)	377.4 (328.3)	288.9 (343.3)
Manganese (mg/kg)	25.8 (39.5)	11.3 (2.3)	2.5 (1.8)	54.2 (44.3)	0.9 (0.8)	14.7 (17.5)	9.6 (20.4)	10.1 (10.5)	82.0 (52.1)	58.7 (51.1)	7.9 (6.4)

Table 2.7 (cont.).

Parameter	All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
Metals (cont.)											
Mercury (inorganic) (mg/kg)	0.157 (0.262)	ND	ND	0.008 (0.005)	0.007 (0.003)	0.0396 (0.0523)	0.0375 (0.0471)	0.0179 (0.0162)	0.012 (0.0116)	0.0161 (0.0158)	0.0108 (0.0166)
Potassium (mg/kg)	229.0 (673.7)	58.4 (37.8)	42.6 (33.1)	74.0 (39.3)	57.0 (41.8)	114.6 (113.8)	95.2 (65.6)	1631.0 (1620.5)	94.6 (110.7)	121.7 (121.0)	72.7 (54.6)
Selenium (mg/kg)	1.2 (0.8)	ND	ND	ND	ND	1.5 (1.0)	1.7 (1.1)	ND	ND	ND	1.2 (0.6)
Silver (mg/kg)	1.3 (0.7)	1.0 (0.1)	ND	1.1 (0.5)	ND	ND	ND	ND	ND	ND	1.1 (0.4)
Sodium (mg/kg)	1459.3 (6852.2)	461.3 (169.3)	12.6 (5.1)	174.0 (471.8)	48.7 (34.6)	168.5 (227.8)	169.4 (311.2)	13771 (18366)	17.0 (21.6)	38.3 (67.2)	336.3 (444.0)
Thallium (mg/kg)	0.7 (0.5)	0.8 (0.8)	ND	ND	ND	ND	ND	ND	0.6 (0.4)	0.9 (1.0)	ND
Vanadium (mg/kg)	3.2 (4.5)	2.4 (0.5)	0.7 (0.5)	2.2 (1.0)	0.8 (0.6)	5.2 (5.5)	3.7 (5.6)	7.4 (6.3)	2.0 (1.1)	4.5 (5.1)	3.4 (6.3)
Zinc (mg/kg)	15.1 (21.2)	6.6 (5.1)	5.2 (3.8)	5.0 (3.1)	7.7 (5.9)	12.8 (23.7)	13.6 (11.1)	7.7 (4.8)	49.2 (36.3)	29.2 (23.1)	11.8 (11.4)
Other Parameters											
pH	5.1	8.1	5.2	5.8	4.4	4.9	4.8	6.3	6.5	6.1	5.8
Bulk density (g/cm3)	0.96 (0.27)	1.19 (0.13)	0.99 (0.14)	1.05 (0.16)	0.72 (0.15)	0.74 (0.24)	0.72 (0.26)	0.71 (0.33)	1.13 (0.15)	1.18 (0.09)	1.11 (0.21)
Resistivity (ohm-cm)	614762 (792326)	586261 (660162)	681467 (806088)	1712941 (599591)	473600 (368519)	440645 (866900)	151027 (265841)	173 (184)	870130 (855419)	749750 (910291)	722345 (891528)
Cation exchange capacity (meq/100g)	14.0 (14.2) [n=202]	2.5 (1.5) [n=16]	2.9 (1.6) [n=22]	3.8 (2.3) [n=22]	17.8 (7.4) [n=21]	23.5 (18.6) [n=20]	28.7 (19.7) [n=22]	18.3 (9.0) [n=21]	19.4 (17.2) [n=17]	11.3 (8.1) [n=23]	10.6 (9.6) [n=18]

Table 2.8. Analysis of variance of soil metals among soil classes. Only metals above detection limits in sufficient samples were analyzed. Data were transformed ($\log_{10}$) before analysis. All ANOVAs were significant at $p < 0.001$. Table shows means (mg/kg) and multiple comparisons made using Games-Howell test. Soil classes not significantly different ($p > 0.05$) are indicated by the same letter following the mean.

Parameter	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
Aluminum	282.6 A	202.8 A	1001.6 C	164.7 A	2395.0 BC	2315.9 BC	2683.8 B	1172.2 C	1821.3 BC	2491.3 BC
Arsenic (as carcinogen)	2.33 A	0.63 B	0.31 B	0.30 B	0.44 B	0.56 B	1.32 AC	0.36 B	0.53 B	0.70 BC
Calcium	50043.5 E	150.4 A	22056.8 BCD	383.1 B	11278.0 CD	9609.5 CD	11627.1 CD	2100.9 D	11099.1 CD	43053.5 CE
Chromium (total)	2.11 A	0.84 BE	2.26 A	0.57 B	3.47 A	3.07 AE	4.51 AC	12.18 D	11.79 DC	3.85 A
Copper	1.84 A	3.25 B	2.55 AB	2.82 B	4.33 BC	4.70 BC	5.48 C	53.55 D	54.04 D	2.55 AB
Iron	1063.0 B	240.4 A	1511.8 B	144.1 A	1717.5 B	1326.1 B	1504.8 B	1502.2 B	1984.8 B	1783.4 B
Lead	2.16 AB	1.53 A	4.00 C	2.44 AB	6.24 CD	5.06 BC	16.58 CD	9.70 D	5.84 CD	5.06 BC
Magnesium	370.0 D	28.0 A	87.6 B	112.3 BC	534.1 DE	316.0 BDC	3291.0 F	232.57 CEG	377.4 DG	288.8 BD
Manganese	11.34 C	2.53 B	54.2 A	0.93 E	14.7 C	9.61 BC	10.10 C	82.0 A	58.8 A	7.9 C
Mercury (inorganic)	0.0059 A	0.005 A	0.008 AB	0.0065 AE	0.0396 C	0.0375 CD	0.01786 BCD	0.01204 ACD	0.01613 BCDE	0.0108 AD
Potassium	58.4 ABC	42.6 A	74.0 B	57.0 ABC	114.6 BC	95.2 AB	1631.0 D	94.57 AB	121.7 AB	72.7 AB
Sodium	461.3 D	12.6 A	174.0 ABCG	48.7 BCG	168.5 C	169.5 BC	13771.4 E	17.0 AF	38.3 FG	336.3 BC
Vanadium	2.36 B	0.72 A	2.21 B	0.79 A	5.16 BC	3.65 B	7.35 C	2.02 B	4.46 BC	3.44 B
Zinc	6.60 AB	5.24 A	5.00 A	7.70 AD	12.77 AB	13.60 BDEF	7.73 AE	49.23 C	29.20 CF	11.79 ABEF

Table 2.9. Analysis of variance among soil classes for pH, bulk density, resistivity, and CEC. Data for resistivity and CEC were transformed (log_{10}) before analysis. All ANOVAs were significant at $p < 0.001$. Table shows means and multiple comparisons made using Games-Howell test. Soil classes not significantly different ($p > 0.05$) are indicated by the same letter following the mean.

Parameter	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetlands	Saltwater Wetlands	Citrus Scrub	Citrus Hammock	Disturbed
pH	8.1 A	5.2 C	5.8 DE	4.4 B	4.9 DE	4.8 CE	6.3 D	6.5 DE	6.1 DE	5.8 D
Bulk density (g/cm^3)	1.19 A	0.99 B	1.05 AB	0.72 C	0.74 C	0.72 C	0.71 C	1.13 AB	1.18 A	1.11 AB
Resistivity (ohm-cm)	586261 AD	681467 A	1712941 B	473600 A	440645 AD	151027 D	173 C	870130 A	749750 A	722345 AD
Cation exchange capacity (meq/100g)	2.5 A	2.9 A	3.8 AD	17.8 BC	23.5 BC	28.7 C	18.3 BC	19.4 BC	11.3 B	10.6 BD

Table 2.10. Mean grain size and classification of soil types.

Soil Class	Mean Grain Size (Phi)	Mean Grain Size (mm)	Wentworth Classification	Unified Soil Classification
Coastal	1.7	0.31	Medium Sand	Fine Sand
Acid Scrub	2.6	0.17	Fine Sand	Fine Sand
Coquina Scrub	1.7	0.31	Medium Sand	Fine Sand
Flatwoods	2.2	0.22	Fine Sand	Fine Sand
Hammocks	2.8	0.14	Fine Sand	Fine Sand
Freshwater Wetlands	2.6	0.17	Fine Sand	Fine Sand
Saltwater Wetlands	2.85	0.14	Fine Sand	Fine Sand
Citrus Scrub	2.2	0.22	Fine Sand	Fine Sand
Citrus Hammock	2.65	0.16	Fine Sand	Fine Sand
Disturbed Soils	2.45	0.18	Fine Sand	Fine Sand

Table 2.11. Concentrations of selected elements in typical surface soils of Florida (Shacklette and Boerngen 1984). Samples were taken at 20 cm below the surface.

Element	Concentration (ppm)
Aluminum	<20,000
Antimony	<1
Arsenic	<3
Barium	<200
Beryllium	<1
Calcium	<3000
Chromium	<20
Cobalt	<3
Copper	<10
Iron	<10,000
Lead	<10
Magnesium	<1500
Manganese	<150
Mercury	<0.032
Nickel	<5
Potassium	<6800
Selenium	<0.2
Sodium	<2000
Vanadium	<20
Zinc	<17

Table 2.12. Background levels of trace elements in surface soils. Data are from Kabata-Pendias and Pendias (1984). Units are ppm/dry weight. – indicates no data reported.

	Sandy Soils- United States		Podzols and Sands – Different Countries	
Element	*Range*	Mean	Range	Mean
Antimony	-	-	0.05-1.33	0.19
Arsenic	<0.1-30.0	5.1	1.1-28.9	2.4-5.8
Barium	20-1500	400	180-780	-
Beryllium	<1-3	1.9	-	-
Cadmium	-	-	0.01-1.80	0.07-0.43
Chromium	3-200	40	1.4-530	21-110
Cobalt	0.4-20	3.5	0.1-65	-
Copper	1-70	14	1-52	8-16
Lead	<10-70	17	2.3-47.5	10.4-57.0
Manganese	7-2000	345	9-1900	-
Mercury	<0.01-0.54	0.08	0.01-0.70	0.04-0.06
Nickel	<5-70	13.0	1-52	7-11
Selenium	0.005-3.5	0.5	0.05-1.32	0.14-0.27
Vanadium	7-150	47	10-91	-
Zinc	<5-164	40.0	3.5-146	24-42

SECTION 3
Groundwater

3.1 Methods

3.1.1 Site selection

We used the four subsystems of the Surficial aquifer (Figure 1.4), originally delineated by Clark (1987c), as the basis for sample site locations. We located six sample sites in each subsystem, 24 total sites (Figure 3.1). We chose sites away from known contamination. One to three wells were installed at these sites. The sampling plan designated that a shallow well was to be installed at each site. Intermediate wells were to be installed at four sites per subsystem (16 total); deep wells were to be installed at three sites per subsystem (12 total). A total of 52 wells were planned.

A Trimble Pathfinder Professional XL Geographic Positioning System (GPS) unit was used to collect groundwater well locations using real-time differentially corrected methods (Trimble Navigation Limited 1994). Locations were exported to North American Datum 1927 (NAD27) State Plane coordinates for overlay in a Geographic Information System (GIS). Sample site descriptions of well locations are given in Appendix C, Table C-1, and coordinates of sites in Table C-2.

3.1.2 Sampling

The NASA/KSC Remediation Program Office contracted groundwater well installation to Universal Engineering Sciences, Inc. [Appendix D (Universal Engineering Sciences, Inc. 1998)]. Universal was contracted to install 52 wells, due to the depth of the confining unit at one location the deep well was not installed. Therefore, a total of 51 wells were installed at varying depths.

Groundwater samples were collected from 51 wells (Figure 3.1). Twenty-four wells were shallow (15 ft.), 16 wells were intermediate (35 ft.), and 11 wells were deep (50 ft.). Shallow and intermediate wells were screened for 10 ft (3 m) and deep wells for 5 ft. (1.5 m) (Universal Engineering Sciences, Inc. 1998). ENCO was subcontracted for sample collection and chemical analysis since they have the required certifications. ENCO followed the requirements of the "NASA/KSC Sampling and Analysis Plan for RCRA Facility Investigations at Kennedy Space Center, Florida and Cape Canaveral Air Station, Florida, Volume 4" of the Generic Work Plans (SAP) (NASA 1996) and ENCO's FLDEP Comprehensive Quality Assurance Plan No. 960038. Based on requirements in the SAP, organic vapor and explosimeter readings were collected from every well. All wells had a reading of zero for both measurements.

Well construction information (Universal Engineering Sciences, Inc. 1998) was consistent with well placement in the Surficial Aquifer; no confining layers were encountered in completed wells.

All well sampling was done using a low flow peristaltic pump (with Teflon check valves) and silicon and Tigon tubing. All sampling protocols in the SAP were followed. Turbidity was measured in the field throughout purging, and sample collection occurred when turbidity was <10 NTU). Quality assurance/quality control samples were collected in accordance with the requirements of the SAP. A data validation report was completed, see Appendix G.

3.1.3 Chemical Analysis

Table 3.1 lists the analyses that were conducted on each groundwater sample. Organochlorine pesticides (EPA method 8081), aroclors (EPA method 8082), chlorinated herbicides (EPA method 8151), and polycyclic aromatic hydrocarbons (EPA method 8310) were analyzed. Methods for organochlorine pesticides, aroclors, and chlorinated herbicides use gas chromatography (USEPA, 1996). Polycyclic aromatic hydrocarbons were analyzed by high-pressure liquid chromatography (USEPA 1996). Target analyte list (TAL) metals were analyzed using one of the following EPA method numbers appropriate for the specific metal: 200.7, 204.2, 220.1, 245.1, 258.1, 273.1, 279.2 (Table 3.1). Method 200.7 uses inductively coupled plasma-atomic emission spectrometry (USEPA 1983). Method 204.2 (Sb) uses an atomic absorption, furnace technique (USEPA 1983). Methods 220.1, 258.1, and 273.1 use atomic absorption, direct aspiration techniques (USEPA 1983). Mercury (Hg) was analyzed using method 245.1, a cold-vapor, atomic absorption technique (USEPA 1983). Chloride was analyzed using EPA method number 325.3, a titrimetric mercuric nitrate technique (USEPA 1983).

Field analysis of groundwater samples for dissolved oxygen, turbidity, pH, specific conductivity, and temperature were conducted with calibrated instruments. Total dissolved solids was determined by method 160.1 using filtration followed by drying at 180 C (USEPA 1983). Total organic carbon was determined by method 415.1 (USEPA 1983) using catalytic combustion or wet chemical oxidation.

3.1.4 Data Analysis

Data analyses was conducted using SPSS Version 9 (SPSS Inc., 1999) using the following approach.

- Frequency of parameters occurring above the detection limits were determined. Where most of the data are below detection, intensive data analyses cannot be justified.
- Boxplots were used to scan for obvious outliers in the data. Outliers could arise from a contaminated sample or a local, anomolous site conditions. Inclusion of outliers can skew the mean and standard deviation of a parameter.
- Normality of distributions were tested for using normality plots and the Kolmogorov-Smirnov statistics with Lilliefors significance levels. Normality of

distribution determines whether parametric or nonparametric analyses should be used or whether transformations are required.

- Where the sample size of data above detection was sufficient, two-way analysis of variance (ANOVA) of transformed data ($\log_{10}$) were used to test for differences related to aquifer subsystem and depth. Replicate samples were excluded from ANOVA. These tests determined whether parameters differed among subaquifers and depths. If such differences exist, then use of a single mean (or screening value) to represent all groundwater may not be appropriate.

For screening purposes, data are given as twice the mean (USEPA 1998). The KSC Background Screening table for groundwater is located in Appendix A, Table A-2.

3.2 Results

3.2.1 Groundwater Chemistry

Frequency of groundwater parameters above detection is given in Table 14. All organochlorine pesticides (25), all aroclors (6), and all chlorinated herbicides (18) were below detection in all samples (Table 3.3). Ten PAHs were above detection in one to four samples. Four PAHs were above detection limits in only one sample each, and these values were between the method detection limit and the practical quantitation level; therefore, the Remediation team decided to treat these as below detection (Table 3.4). Cobalt and mercury were always below detection (Table 3.3). Beryllium, silver, and zinc were above detection in just one sample each (Table 3.2).

For some parameters, frequency of occurrence above detection varied with subaquifer or depth (Table 3.5). PAHs were above detection only in shallow wells of the dune, dune-swale, and west plain subaquifers (Table 3.5). Arsenic and cadmium were most frequently above detection in the dune subaquifer.

Summary data by aquifer and depth are given in Table 3.6. Among metals only Al, Ca, Cl, Fe, Mg, Mn, K, and Na were above detection in sufficient samples to compare concentrations. In addition, total dissolved solids (TDS), total organic carbon (TOC), specific conductivity, pH, dissolved oxygen (DO), and field temperature could be compared. The distributions of all parameters except temperature were not normal (Kolmogorov-Smirnov tests, $p<0.001$). Transformations ($\log_{10}$) improved normality of distribution. Transformed values of Mg, K, Na, TOC, TDS, and conductivity did not differ from normal ($p>0.05$). Although distributions of Al, Ca, Cl, Fe, Mn, and DO still differed from normal, normality plots showed that transformation improved the distributions such that ANOVA could be conducted.

Univariate, two-way ANOVA where subaquifer and depth were fixed effects was conducted using temperature and log-transformed chemistry data. Models were not significant for Al and DO; the significance level for the model ($p=0.057$) for Fe was marginally above the usual decision point. Interactions were significant for pH. TOC differed across subaquifers but not depths. Ca, Cl, Mg, Mn, K, Na, TDS, and conductivity differed with subaquifer and depth (Table 3.7).

For screening purposes, a simpler classification of groundwater was desired. The NASA/KSC Remediation team adopted Rule 62-520.410 Florida Administrative Code (F.A.C) groundwater classifications Class G-II and Class G-III. Class G-II is defined as groundwater with total dissolved solids <10000 mg/L and Class G-III is defined as groundwater with total dissolved solids >10000 mg/L. Some parameters (Table 3.8) were more frequently above detection in Class G-II (Cd, Fe, Tl) and some were more frequently above detection in Class G-III (Sb, As, Pb). Ca, Cl, Mg, K, Na, total dissolved solids, and conductivity were substantially higher in Class G-III (Table 3.9), as would be expected. The KSC Background screening table for groundwater is given in Appendix A, Table A-2. Detailed data for Class G-II and Class G-III are given in Appendix C, Table C-3 and C-4.

3.3 Discussion

Unconsolidated, surficial aquifers are subject to contamination from point sources and from general land use, and contaminants may include trace elements, pesticides, herbicides, and other organics (Page 1981, Burkart and Kolpin 1993, Kolpin et al. 1995, 1998, Barbash et al. 1999). Urban and agricultural land uses have affected some Florida aquifers (Rutledge 1987, Barbash and Resek 1996). Point source contamination to the KSC aquifer has occurred at certain facilities (Clark 1985, 1987a, b).

However, the baseline data presented here suggest that widespread contamination of the Surficial aquifer on KSC has not occurred. No organochlorine pesticides, aroclors, or chlorinated herbicides occurred above detection limits. Although pesticide residues or degradation products and chlorinated herbicides occurred in some soils, those concentrations were low and migration into the aquifer either has not occurred or has not been widespread.

Some PAHs occurred in the shallow wells. Earlier we showed that PAHs occur in a variety of KSC soils at relatively low concentrations. Some occurrence in shallow wells is not surprising. PAHs have both natural and anthropogenic sources (e.g., Suess 1976, Standley and Simoneit 1987, Jones et al. 1989b, c).

Clark (1987c) tested background groundwater wells for a smaller number of organochlorine pesticides and chlorinated herbicides including 2,4-D, 2,4,5-TP, Endrin, Lindane, Methoxychlor, and Toxaphene and found none above detection limits.

Most trace metals are in low concentrations in KSC groundwater if they occur above detection levels. This is consistent with the low concentrations of most trace metals in KSC soils and the primarily quartz composition of the terrigenous deposits comprising the surficial sediments of Merritt Island (Brown et al. 1962, Milliman 1972, Field and Duane 1974). Al, Fe, and Mn occur above detection limits more frequently than other trace metals. Al and Fe are abundant crustal components and are present in KSC soils. Intense leaching, particularly in acid scrub and flatwoods soils, mobilizes Al and Fe (Paton et al. 1995). Iron is a typical constituent of groundwater in the Surficial aquifer in Florida (Miller 1997). Mn is one of the most abundant trace elements (Kabata-Pendias and Pendias 1984); it is present in KSC soils but the concentrations are relatively low. Solution and precipitation of Fe and Mn are affected by pH and oxidation-reduction conditions.

The chemical parameters varying most with subaquifer and depth are Ca, Cl, Mg, K, and Na, and conductivity and total dissolved solids that are related to these cations and anions. The trends are generally consistent among these; the shallow wells in the Dune-Swale subaquifer have the lowest values. Concentrations increase with depth within a subaquifer. At a given depth, concentrations in the Dune-Swale and West Plain subaquifers are lower than in the Dune and Marsh subaquifers. These trends reflect increased mineralization with depth and differences between the fresh water Dune-Swale and West Plain subaquifers and the more saline Dune and Marsh systems. The Dune and Marsh subaquifers interact with saline water of the Atlantic Ocean and Indian River Lagoon system, respectively (Clark 1987c).

These data are generally consistent with the previous study of Clark (1987c) (Table 3.10), although there were differences in sampling and analysis.

Groundwater Well Locations

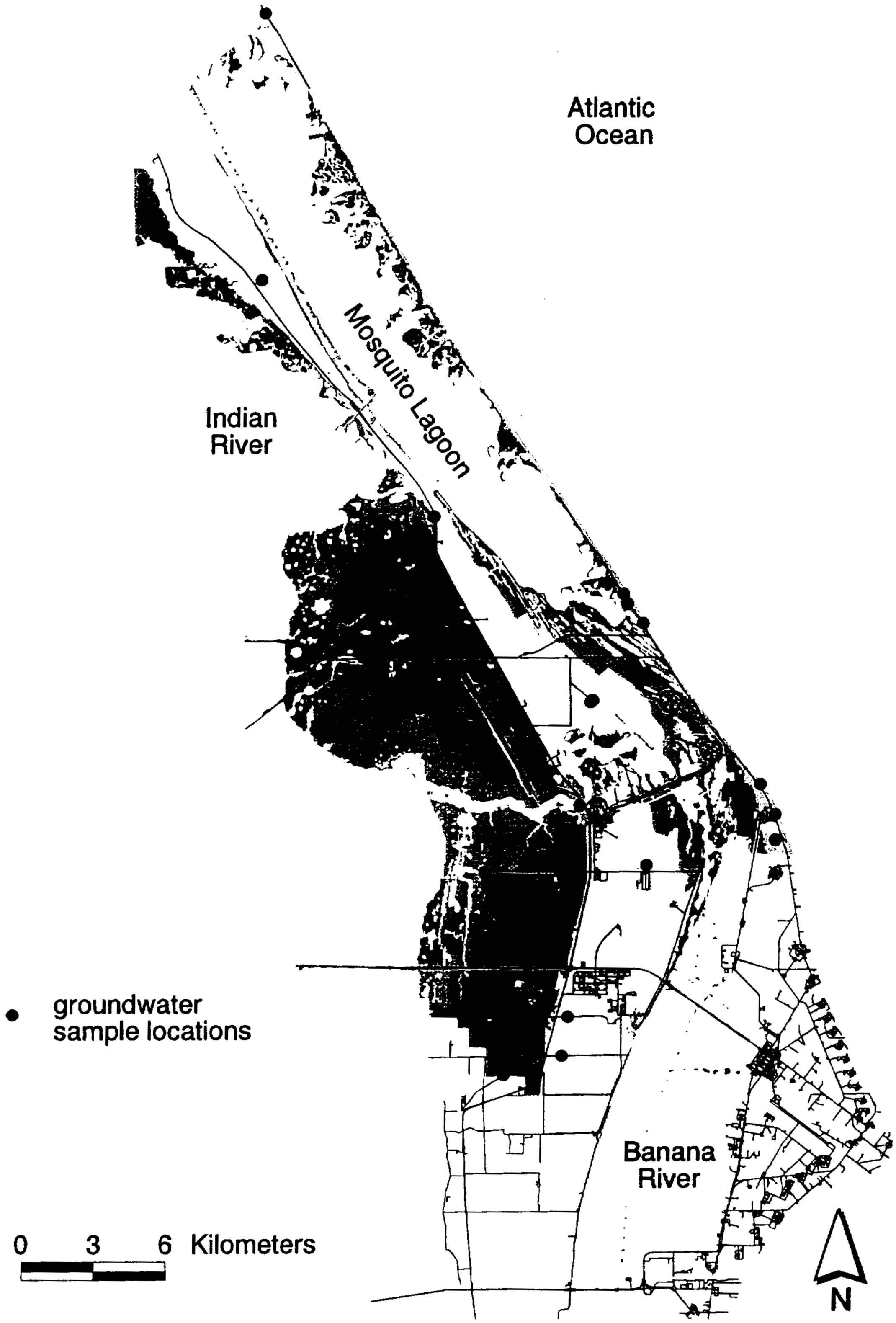

Figure 3.1. Groundwater well sampling locations, Kennedy Space Center. Points may represent more than one well.

Table 3.1. List of parameters, EPA method number, and lab reporting limit for parameters analyzed for all groundwater samples. Lab reporting limit values are based on pure samples. * = measurement made with a calibrated field instrument (YSI).

	EPA Method	Lab Reporting Limit for groundwater
Organochlorine Pesticides		
4,4' – DDD	8081	0.05 µg/L
4,4' – DDE	8081	0.05 µg/L
4,4' – DDT	8081	0.05 µg/L
Aldrin	8081	0.05 µg/L
Alpha – BHC	8081	0.05 µg/L
Beta – BHC	8081	0.05 µg/L
Chlordane (alpha)	8081	0.05 µg/L
Chlordane (gamma)	8081	0.05 µg/L
Chlordane (Total)	8081	1 µg/L
Delta – BHC	8081	0.05 µg/L
Dieldrin	8081	0.05 µg/L
Endosulfan I	8081	0.05 µg/L
Endosulfan II (beta)	8081	0.05 µg/L
Endosulfan Sulfate	8081	0.05 µg/L
Endrin	8081	0.05 µg/L
Endrin Aldehyde	8081	0.05 µg/L
Endrin Ketone	8081	0.05 µg/L
Gamma – BHC (Lindane)	8081	0.05 µg/L
Heptachlor	8081	0.05 µg/L
Heptachlor Epoxide(a)	8081	0.05 µg/L
Heptachlor Epoxide(b)	8081	0.05 µg/L
Isodrin	8081	0.05 µg/L
Methoxychlor	8081	0.05 µg/L
Mirex	8081	0.05 µg/L
Toxaphene	8081	2 µg/L
Aroclors		
PCB-1016/1242	8082	1 µg/L
PCB-1221	8082	1 µg/L
PCB-1232	8082	1 µg/L
PCB-1248	8082	1 µg/L
PCB-1254 (noncarcinogenic)	8082	1 µg/L
PCB-1260	8082	1 µg/L

Table 3.1 (cont.).

	EPA Method	Lab Reporting Limit for groundwater
Chlorinated Herbicides		
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	8151	0.5 µg/L
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	8151	0.5 µg/L
2,4-Dichlorophenoxy acetic acid (2,4 - D)	8151	0.5 µg/L
3,5-DCBA	8151	0.5 µg/L
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	8151	0.5 µg/L
4 – Nitrophenol	8151	0.5 µg/L
Acifluorfen	8151	0.5 µg/L
Bentazon	8151	0.5 µg/L
Chloramben	8151	0.5 µg/L
Dacthal	8151	0.5 µg/L
Dalapon	8151	0.5 µg/L
Dicamba	8151	0.5 µg/L
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	8151	0.5 µg/L
Dinoseb	8151	0.5 µg/L
MCPA	8151	5 µg/L
MCPP	8151	5 µg/L
Pentachlorophenol	8151	0.5 µg/L
Picloram	8151	0.5 µg/L
PAHs		
1 – Methylnaphthalene	8310	0.5 µg/L
2 – Methylnaphthalene	8310	0.5 µg/L
Acenaphthene	8310	0.5 µg/L
Acenaphthylene	8310	0.1 µg/L
Anthracene	8310	0.5 µg/L
Benzo(a)anthracene	8310	0.05 µg/L
Benzo(a)pyrene	8310	0.05 µg/L
Benzo(b)fluoranthene	8310	0.1 µg/L
Benzo(g,h,i)perylene	8310	0.1 µg/L
Benzo(k)fluoranthene	8310	0.05 µg/L
Chrysene	8310	0.05 µg/L
Dibenz(a,h)anthracene	8310	0.1 µg/L
Fluoranthene	8310	0.1 µg/L
Fluorene	8310	0.1 µg/L
Indeno(1,2,3-cd)pyrene	8310	0.05 µg/L
Naphthalene	8310	0.5 µg/L

Table 3.1 (cont.).

	EPA Method	Lab Reporting Limit for groundwater
PAHs (cont.)		
Phenanthrene	8310	0.05 µg/L
Pyrene	8310	0.05 µg/L
Metals		
Aluminum	200.7	0.05 mg/L
Antimony	204.2	0.006 mg/L
Arsenic	200.7	0.01 mg/L
Barium	200.7	0.1 mg/L
Beryllium	200.7	0.001 mg/L
Cadmium	200.7	0.001 mg/L
Calcium	200.7	0.5 mg/L
Chloride (total)	325.3	1 mg/L
Chromium (total)	200.7	0.01 mg/L
Cobalt	200.7	0.05 mg/L
Copper	200.7 / 220.1	0.05 mg/L
Iron	200.7	0.05 mg/L
Lead	200.7	0.005 mg/L
Magnesium	200.7	0.5 mg/L
Manganese	200.7	0.01 mg/L
Mercury	245.1	0.0002 mg/L
Nickel	200.7	0.01 mg/L
Potassium	258.1	0.5 mg/L
Selenium	200.7	0.01 mg/L
Silver	200.7	0.01 mg/L
Sodium	273.1	0.5 mg/L
Thallium	279.2	0.004 mg/L
Vanadium	200.7	0.01 mg/L
Zinc	200.7	0.1 mg/L
Other Parameters		
Dissolved oxygen	*	0.4 mg/L
pH (converted to hydrogen ion for analysis)	*	na
Specific conductivity	*	na
Temperature	*	na
Total dissolved solids	160.1	1 mg/L
Total organic carbon	415.1	1 mg/L

Table 3.2. Frequency (percent) of values greater than detection limits for chemical parameters in groundwater.

Parameter	Frequency (%)
Sample Size	57
Organochlorine Pesticides (8081)	
4,4' - DDD	0
4,4' - DDE	0
4,4' - DDT	0
Aldrin	0
Alpha - BHC	0
Beta - BHC	0
Chlordane (Total)	0
Chlordane alpha	0
Chlordane gamma	0
Delta - BHC	0
Dieldrin	0
Endosulfan i	0
Endosulfan ii (beta)	0
Endosulfan sulfate	0
Endrin	0
Endrin aldehyde	0
Endrin Ketone	0
Gamma - BHC (Lindane)	0
Heptachlor	0
Heptachlor Epoxide (a)	0
Heptachlor Epoxide (b)	0
Isodrin	0
Methoxychlor	0
Mirex	0
Toxaphene	0
Aroclors (8082)	
PCB-1254 (noncarcinogenic)	0
PCB-1016/1242	0
PCB-1221	0
PCB-1232	0
PCB-1248	0
PCB-1260	0
Chlorinated Herbicides (8151)	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	0
2,4,5-Trichlorophenoxy acetic acid (2,4,5 -T)	0
2,4-Dichlorophenoxy acetic acid (2,4 - D)	0
3,5-DCBA	0
4-(2,4-Dichlorophenoxy)butyric acid (2,4 -DB)	0

Table 3.2. (cont.).

Parameter	Frequency (%)
Chlorinated Herbicides (cont.)	0
4 - Nitrophenol	0
Acifluorfen	0
Bentazon	0
Chloramben	0
Dacthal	0
Dalapon	0
Dicamba	0
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	0
Dinoseb	0
MCPA	0
Pentachlorophenol	0
Picloram	0
PAHs (8310)	
1 - Methylnaphthalene	0
2 - Methylnaphthalene	0
Acenaphthene	0
Acenaphthylene	0
Anthracene	0
Benzo(a)anthracene	7.0
Benzo(a)pyrene	7.0
Benzo(b)fluoranthene	1.8
Benzo(g,h,i)perylene	0
Benzo(k)fluoranthene	5.3
Chrysene	5.3
Dibenz(a,h)anthracene	0
Fluoranthene	3.5
Fluorene	1.8
Indeno(1,2,3-cd)pyrene	3.5
Naphthalene	0
Phenanthrene	1.8
Pyrene	1.8
Metals	
Aluminum	66.7
Antimony	8.8
Arsenic (as carcinogen)	22.8
Barium	5.3
Beryllium	1.8
Cadmium	7.0
Calcium	98.2
Chloride	100.0
Chromium (total)	5.3

Table 3.2. (cont.).

Parameter	Frequency (%)
Metals (cont.)	
Cobalt	0
Copper	7.0
Iron	77.2
Lead	14.0
Magnesium	96.5
Manganese	70.2
Mercury (inorganic)	0
Nickel	3.5
Potassium	87.7
Selenium	7.0
Silver	1.8
Sodium	100.0
Thallium	12.3
Vanadium	7.0
Zinc	1.8
Other Parameters	
Total Dissolved Solids	100.0
Total Organic Carbon	93.0

Table 3.3. List of parameters that were below detection limits (non-detect) for all groundwater wells.

Organochlorine Pesticides (8081)	**Chlorinated Herbicides (8151)**
4,4' - DDD	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)
4,4' - DDE	2,4,5–Tricholorophenoxy acetic acid (2,4,5 –T)
4,4' - DDT	2,4-Dichlorophenoxy acetic acid (2,4-D)
Aldrin	3,5-DCBA
Alpha - BHC	4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)
Beta - BHC	4 - Nitrophenol
Chlordane (Total)	Acifluorfen
Chlordane, alpha	Bentazon
Chlordane, gamma	Chloramben
Delta- BHC	Dacthal
Dieldrin	Dalapon
Endosulfan I	Dicamba
Endosulfan II (beta)	Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]
Endosulfan Sulfate	Dinoseb
Endrin	MCPA
Endrin Aldehyde	MCPP
Endrin Ketone	Pentachlorophenol
Gamma - BHC (Lindane)	Picloram
Heptachlor	**PAHs (8310)**
Heptachlor Epoxide(a)	1 - Methylnaphthalene
Heptachlor Epoxide(b)	2 - Methylnaphthalene
Isodrin	Acenaphthene
Methoxychlor	Acenaphthylene
Mirex	Anthracene
Toxaphene	Benzo(g,h,i)perylene
Aroclors (8082)	Dibenz(a,h)anthracene
PCB-1016/1242	Naphthalene
PCB-1221	**Metals**
PCB-1232	Cobalt
PCB-1248	Mercury
PCB-1254	
PCB-1260	

Table 3.4. List of parameters that were determined by Remediation team consensus to be treated as below detection limits (non-detect) for all groundwater locations based on low frequency of detection. These parameters had one value between the method detection level and the practical quantitation level.

PAHs (8310)
Fluorene
Phenanthrene
Pyrene

Table 3.5. Frequency (percent) of values greater than detection limits for chemical parameters in groundwater by subaquifer and depth. Only parameters greater than detection limits in at least one sample are shown.

Parameter	All Ground-water	Dune Shallow	Dune Intermediate	Dune Deep	Dune-Swale Shallow	Dune-Swale Intermediate	Dune-Swale Deep	West Shallow	West Intermediate	West Deep	Marsh Shallow	Marsh Intermediate	Marsh Deep
Sample Size	57	6	5	3	7	4	3	7	5	3	7	5	2
PAHs (8310)													
Benzo(a)anthracene	7.0	16.7	0	0	14.3	0	0	28.6	0	0	0	0	0
Benzo(a)pyrene	7.0	16.7	0	0	14.3	0	0	28.6	0	0	0	0	0
Benzo(b)fluoranthene	1.8	0	0	0	0	0	0	14.3	0	0	0	0	0
Benzo(k)fluoranthene	5.3	33.3	0	0	0	0	0	14.3	0	0	0	0	0
Chrysene	5.3	16.7	0	0	14.3	0	0	14.3	0	0	0	0	0
Fluoranthene	3.5	0	0	0	14.3	0	0	14.3	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	3.5	16.7	0	0	0	0	0	14.3	0	0	0	0	0
Metals													
Aluminum	66.7	66.7	100.0	33.3	57.1	75.0	33.3	71.4	40.0	0	85.7	100.0	100.0
Antimony	8.8	0	40.0	0	0	0	33.3	0	0	0	28.6	0	0
Arsenic (as carcinogen)	22.8	50.0	60.0	66.7	0	0	0	14.3	20.0	0	42.9	0	0
Barium	5.3	0	0	0	0	0	0	0	0	0	28.6	20.0	0
Beryllium	1.8	0	20.0	0	0	0	0	0	0	0	0	0	0
Cadmium	7.0	16.7	20.0	33.3	14.3	0	0	0	0	0	0	0	0
Calcium	98.2	100.0	100.0	100.0	85.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chloride	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chromium (total)	5.3	0	20.0	0	0	0	0	0	0	0	28.6	0	0
Copper	7.0	0	20.0	0	0	0	0	0	0	33.3	14.3	20.0	0
Iron	77.2	16.7	60.0	100.0	100.0	100.0	66.7	85.7	100.0	100.0	71.4	80.0	50.0

Table 3.5. (cont.).

Parameter	All Ground-water	Dune Shallow	Dune Intermediate	Dune Deep	Dune-Swale Shallow	Dune-Swale Intermediate	Dune-Swale Deep	West Shallow	West Intermediate	West Deep	Marsh Shallow	Marsh Intermediate	Marsh Deep
Metals (cont.)													
Lead	14.0	0	60.0	33.3	0	0	0	0	0	33.3	14.3	40.0	0
Magnesium	96.5	100.0	100.0	100.0	71.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Manganese	70.2	33.3	80.0	66.7	14.3	50.0	66.7	100.0	100.0	100.0	71.4	100.0	100.0
Nickel	3.5	0	20.0	0	0	0	0	0	0	33.3	0	0	0
Potassium	87.7	83.3	100.0	100.0	71.4	50.0	33.3	100.0	100.0	100.0	100.0	100.0	100.0
Selenium	7.0	0	40.0	0	28.6	0	0	0	0	0	0	0	0
Silver	1.8	0	0	33.3	0	0	0	0	0	0	0	0	0
Sodium	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Thallium	12.3	0	0	0	0	0	33.3	0	40.0	0	14.3	40.0	50.0
Vanadium	7.0	0	20.0	0	0	0	0	14.3	0	0	28.6	0	0
Zinc	1.8	0	0	0	0	0	0	0	0	33.3	0	0	0
Other Parameters													
Total Dissolved Solids	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Organic Carbon	93.0	66.7	80.0	66.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.6. Chemical parameters in groundwater by subaquifer and depth. Data are means with standard deviations in parentheses. Field parameters were not measured on replicate samples. ND indicates all samples below detection limits.

Parameter	All Ground-water	Dune Shallow	Dune Intermediate	Dune Deep	Dune-Swale Shallow	Dune-Swale Intermediate	Dune-Swale Deep	West Shallow	West Intermediate	West Deep	Marsh Shallow	Marsh Intermediate	Marsh Deep
Sample Size	57	6	5	3	7	4	3	7	5	3	7	5	2
PAHs (8310)													
Benzo(a)anthracene (µg/L)	0.035 (0.02)	0.047 (0.041)	ND	ND	0.036 (0.015)	ND	ND	0.051 (0.048)	ND	ND	ND	ND	ND
Benzo(a)pyrene (µg/L)	0.029 (0.017)	0.031 (0.014)	ND	ND	0.031 (0.013)	ND	ND	0.048 (0.044)	ND	ND	ND	ND	ND
Benzo(b)fluoranthene (µg/L)	0.05 (0.02)	ND	ND	ND	ND	ND	ND	0.067 (0.045)	ND	ND	ND	ND	ND
Benzo(k)fluoranthene (µg/L)	0.028 (0.019)	0.037 (0.019)	ND	ND	ND	ND	ND	0.036 (0.028)	ND	ND	ND	ND	ND
Chrysene (µg/L)	0.03 (0.03)	0.05 (0.06)	ND	ND	0.031 (0.013)	ND	ND	0.046 (0.055)	ND	ND	ND	ND	ND
Fluoranthene (µg/L)	0.06 (0.08)	ND	ND	ND	0.06 (0.03)	ND	ND	0.14 (0.23)	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene (µg/L)	0.03 (0.01)	0.04 (0.03)	ND	ND	ND	ND	ND	0.034 (0.025)	ND	ND	ND	ND	ND

Table 3.6. (cont.).

Parameter	All Ground-water	Dune Shallow	Dune Intermediate	Dune Deep	Dune-Swale Shallow	Dune-Swale Intermediate	Dune-Swale Deep	West Shallow	West Intermediate	West Deep	Marsh Shallow	Marsh Intermediate	Marsh Deep
Metals													
Aluminum (mg/L)	0.16 (0.27)	0.083 (0.098)	0.105 (0.025)	0.05 (0.04)	0.298 (0.481)	0.117 (0.136)	0.049 (0.041)	0.143 (0.175)	0.057 (0.054)	0.033 (0.014)	0.44 (0.50)	0.15 (0.08)	0.066 (0.020)
Antimony (mg/L)	0.003 (0.002)	ND	0.007 (0.004)	ND	ND	ND	0.0053 (0.0049)	ND	ND	ND	0.0038 (0.0025)	ND	ND
Arsenic (as carcinogen) (mg/L)	0.011 (0.016)	0.015 (0.02)	0.028 (0.039)	0.021 (0.014)	ND	ND	ND	0.006 (0.002)	0.008 (0.007)	ND	0.025 (0.029)	ND	ND
Barium (mg/L)	0.06 (0.05)	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11 (0.13)	0.06 (0.03)	ND
Beryllium (mg/L)	0.0005 (0.0003)	ND	0.001 (0.001)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium (mg/L)	0.0007 (0.0011)	0.0008 (0.0006)	0.002 (0.004)	0.0007 (0.0003)	0.0006 (0.0002)	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (mg/L)	242.4 (201.2)	148.8 (75.5)	322.4 (189.2)	336.7 (200.3)	56.1 (43.6)	97.6 (74.4)	254.0 (265.7)	144.3 (51.3)	192.0 (47.6)	246.7 (73.7)	262.7 (238.9)	594.0 (98.4)	620.0 (70.7)
Chloride (mg/L)	4545 (7272)	2995 (4114)	12340 (8322)	7433 (7420)	27 (33)	102 (139)	3707 (6316)	404 (669)	1099 (618)	1127 (1016)	4251 (3293)	14860 (11870)	14800 (15839)
Chromium (total) (mg/L)	0.006 (0.003)	ND	0.006 (0.002)	ND	ND	ND	ND	ND	ND	ND	0.009 (0.007)	ND	ND
Copper (mg/L)	0.031 (0.035)	ND	0.04 (0.03)	ND	ND	ND	ND	ND	ND	0.110 (0.147)	0.022 (0.006)	0.028 (0.006)	ND
Iron (mg/L)	1.12 (1.76)	0.058 (0.08)	0.77 (0.99)	2.06 (3.24)	0.36 (0.59)	1.28 (0.53)	1.21 (1.50)	0.81 (0.94)	1.60 (0.20)	2.00 (0.97)	1.60 (3.71)	2.31 (2.38)	1.21 (1.68)

Table 3.6. (cont.).

Parameter	All Ground-water	Dune Shallow	Dune Intermediate	Dune Deep	Dune-Swale Shallow	Dune-Swale Intermediate	Dune-Swale Deep	West Shallow	West Intermediate	West Deep	Marsh Shallow	Marsh Intermediate	Marsh Deep
Metals (cont.)													
Lead (mg/L)	0.004 (0.005)	ND	0.009 (0.10)	0.004 (0.003)	ND	ND	ND	ND	ND	0.011 (0.015)	0.003 (0.001)	0.006 (0.005)	ND
Magnesium (mg/L)	307.4 (493.8)	201.1 (267.6)	847.6 (571.1)	1036.7 (845.6)	2.2 (2.6)	10.0 (13.5)	244.9 (420.1)	32.6 (31.7)	73.0 (19.4)	98.7 (28.7)	248.6 (211.6)	796.8 (734.0)	782.5 (1014.7)
Manganese (mg/L)	0.068 (0.098)	0.02 (0.023)	0.075 (0.072)	0.114 (0.162)	0.015 (0.026)	0.022 (0.02)	0.057 (0.08)	0.024 (0.095)	0.046 (0.019)	0.070 (0.007)	0.062 (0.079)	0.284 (0.146)	0.141 (0.112)
Nickel (mg/L)	0.006 (0.004)	ND	0.006 (0.003)	0.007 (0.003)	ND	ND	ND	ND	ND	0.015 (0.014)	ND	ND	ND
Potassium (mg/L)	89.2 (150.6)	66.0 (91.3)	274.2 (177.6)	316.7 (211.3)	1.1 (0.6)	1.2 (1.7)	31.5 (54.1)	8.1 (8.1)	17.0 (13.2)	13.3 (0.6)	74.8 (63.7)	215.6 (241.7)	239.4 (326.2)
Selenium (mg/L)	0.006 (0.007)	ND	0.01 (0.01)	ND	0.007 (0.003)	ND	ND	ND	ND	ND	ND	ND	ND
Silver (mg/L)	0.005 (0.007)	ND	ND	0.007 (0.003)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (mg/L)	2670 (4011)	1510 (2011)	6720 (4342)	8167 (6526)	13.1 (11.9)	53.6 (59.5)	1875 (3226)	240 (318)	560 (399)	883 (196)	3121 (3030)	7360 (5280)	6650 (7566)
Thallium (mg/L)	0.001 (0.0005)	ND	ND	ND	ND	ND	0.001 (0.0006)	ND	0.001 (0.0005)	ND	0.001 (0.0008)	0.001 (0.002)	0.002 (0.001)
Vanadium (mg/L)	0.005 (0.002)	ND	0.007 (0.004)	ND	ND	ND	ND	0.006 (0.002)	ND	ND	0.007 (0.003)	ND	ND
Zinc (mg/L)	0.053 (0.024)	ND	ND	ND	ND	ND	ND	ND	ND	0.11 (0.10)	ND	ND	ND

Table 3.6. (cont.).

Parameter	All Ground-water	Dune Shallow	Dune Intermediate	Dune Deep	Dune-Swale Shallow	Dune-Swale Intermediate	Dune-Swale Deep	West Shallow	West Intermediate	West Deep	Marsh Shallow	Marsh Intermediate	Marsh Deep
Other Parameters													
Total Dissolved Solids (mg/L)	8066 (11275)	5455 (6845)	21564 (13441)	22133 (19535)	156 (86)	608 (463)	6987 (11270)	1164 (1298)	2760 (1228)	3900 (1375)	8214 (5227)	19020 (13951)	21050 (22557)
Total Organic Carbon (mg/L)	18.9 (23.4)	1.83 (1.29)	4.70 (7.46)	11.83 (15.11)	19.14 (17.97)	6.5 (4.1)	12.3 (2.5)	31.4 (30.0)	9.2 (8.9)	7.3 (3.5)	51.3 (35.5)	26.4 (18.9)	15.5 (6.4)
Sample Size (field)	51	6	4	3	6	4	3	6	4	3	6	4	2
Hydrogen Ion	8.80E-6 (5.46E-5)	3.49E-8 (2.46E-8)	4.41E-8 (4.27E-8)	7.34E-8 (8.35E-8)	7.40E-5 (1.55E-4)	1.25E-7 (4.91E-8)	1.06E-7 (7.97E-8)	1.09E-7 (4.29E-8)	6.16E-8 (4.93E-8)	1.04E-7 (1.38E-9)	2.13E-7 (2.62E-7)	1.55E-7 (4.00E-8)	5.20E-8 (2.89E-8)
pH	5.06	7.46	7.36	7.13	4.13	6.90	6.97	6.96	7.21	6.98	6.67	6.80	7.28
Dissolved Oxygen (mg/L)	1.82 (1.44)	2.79 (1.24)	1.97 (1.10)	2.88 (2.78)	1.57 (0.83)	2.23 (1.42)	3.27 (2.55)	1.00 (0.64)	0.51 (0.37)	1.18 (0.16)	2.21 (1.48)	0.76 (0.50)	1.79 (2.40)
Temperature (C)	25.7 (1.3)	26.8 (0.8)	26.2 (0.6)	26.0 (0.3)	26.7 (1.1)	24.8 (0.5)	26.1 (1.4)	25.7 (1.1)	24.1 (0.9)	23.1 (0.2)	26.9 (0.5)	24.9 (0.2)	24.9 (1.8)
Specific Conductivity (umhos/cm)	10012 (13156)	6607 (7368)	24875 (18001)	22507 (18314)	267 (171)	872 (620)	7037 (10880)	2242 (2119)	3715 (1482)	5770 (1440)	11897 (7147)	27210 (18546)	25955 (23257)

Table 3.7. Summary of two-way analysis of variance of selected groundwater parameters. Shown are the significance levels for the overall model, effects due to subaquifer, effects due to depth, and subaquifer * depth interactions. NS = not significant.

Parameter	Model	Subaquifer	Depth	Interactions (Subaquifer * Depth)
Aluminum	NS	-	-	-
Calcium	0.02	<0.001	0.006	NS
Chloride	<0.001	<0.001	<0.001	NS
Iron	0.057	0.047	0.029	NS
Magnesium	<0.001	<0.001	0.003	NS
Manganese	0.006	0.002	0.009	NS
Potassium	<0.001	<0.001	0.032	NS
Sodium	<0.001	<0.001	0.003	NS
Total Organic Carbon	<0.001	<0.001	NS	NS
Total Dissolved Solids	<0.001	<0.001	0.001	NS
Specific Conductivity	<0.001	<0.001	0.001	NS
pH	0.001	0.008	NS	0.037
Temperature	<0.001	<0.001	<0.001	NS
Dissolved Oxygen	NS	-	-	-

Table 3.8. Frequency (percent) of values greater than detection limits for chemical parameters in groundwater with one or more samples above detection limits by groundwater class. Values are for all samples (N=57), samples with total dissolved solids <10000 mg/L (Class G-II, N=41), and samples with total dissolved solids >10000 mg/L (Class G-III, N=16).

Parameter	Groundwater (%)	Class G-II (%)	Class G-III (%)
Sample Size	57	41	16
PAHs (8310)			
Benzo(a)anthracene	7.0	7.3	6.3
Benzo(a)pyrene	7.0	7.3	6.3
Benzo(b)fluoranthene	1.8	2.4	0
Benzo(k)fluoranthene	5.3	2.4	12.5
Chrysene	5.3	4.9	6.3
Fluoranthene	3.5	4.9	0
Fluorene*	1.8	2.4	0
Indeno(1,2,3-cd)pyrene	3.5	2.4	6.3
Phenanthrene*	1.8	2.4	0
Pyrene*	1.8	2.4	0
Metals			
Aluminum	66.7	61.0	81.2
Antimony	8.8	2.4	25.0
Arsenic (as carcinogen)	22.8	17.1	37.5
Barium	5.3	0	18.7
Beryllium	1.8	2.4	0
Cadmium	7.0	9.8	0
Calcium	98.2	97.6	100.0
Chloride	100.0	100.0	100.0
Chromium (total)	5.3	7.3	0
Copper	7.0	2.4	18.7
Iron	77.2	85.4	56.2
Lead	14.0	4.9	37.5
Magnesium	96.5	95.1	100
Manganese	70.2	68.3	75.0
Nickel	3.5	4.9	0
Potassium	87.7	82.9	100.0
Selenium	7.0	7.3	6.3
Silver	1.8	0	6.3
Sodium	100.0	100.0	100.0
Thallium	12.3	17.1	0
Vanadium	7.0	9.8	0
Zinc	1.8	2.4	0
Other Parameters			
Total Dissolved Solids	100.0	100.0	100.0
Total Organic Carbon	93.0	92.7	93.7

*These parameters had one value above the method detection level but below the practical quantitation level.

Table 3.9. Means and standard deviations (in parenthesis) for chemical parameters in groundwater by groundwater class. Values are for all samples (N=57), samples with total dissolved solids <10000 mg/L (Class G-II, N=41), and samples with total dissolved solids >10000 mg/L (Class G-III, N=16). ND = below detection.

Parameter	Groundwater	Class G-II	Class G-III
Sample Size	57	41	16
PAHs (8310)			
Benzo(a)anthracene (µg/L)	0.035 (0.02)	0.035 (0.02)	0.036 (0.025)
Benzo(a)pyrene (µg/L)	0.029 (0.017)	0.03 (0.02)	0.027 (0.009)
Benzo(b)fluoranthene (µg/L)	0.05 (0.02)	0.05 (0.02)	ND
Benzo(k)fluoranthene (µg/L)	0.028 (0.019)	0.027 (0.012)	0.03 (0.013)
Chrysene (µg/L)	0.03 (0.03)	0.03 (0.02)	0.03 (0.04)
Fluoranthene (µg/L)	0.06 (0.08)	0.07 (0.10)	ND
Indeno(1,2,3-cd)pyrene (µg/L)	0.03 (0.01)	0.03 (0.01)	0.03 (0.02)
Metals			
Aluminum (mg/L)	0.16 (0.27)	0.18 (0.32)	0.11 (0.07)
Antimony (mg/L)	0.003 (0.002)	0.003 (0.0004)	0.006 (0.0004)
Arsenic (as carcinogen) (mg/L)	0.011 (0.016)	0.013 (0.02)	0.0097 (0.008)
Barium (mg/L)	0.06 (0.05)	ND	0.08 (0.09)
Beryllium (mg/L)	0.0005 (0.0003)	0.0006 (0.0004)	ND
Cadmium (mg/L)	0.0007 (0.0011)	0.0008 (0.0013)	ND
Calcium (mg/L)	242.4 (201.2)	168.8 (164.3)	431.3 (161.9)
Chloride (mg/L)	4545 (7272)	911 (1331)	13856 (8011)
Chromium (total) (mg/L)	0.006 (0.003)	0.006 (0.003)	ND
Copper (mg/L)	0.031 (0.035)	0.031 (0.04)	0.03 (0.02)
Iron (mg/L)	1.12 (1.76)	0.84 (0.84)	2.00 (2.96)
Lead (mg/L)	0.004 (0.005)	0.004 (0.005)	0.005 (00.3)
Magnesium (mg/L)	307.4 (493.8)	47.6 (53.8)	973.1 (495.5)

Table 3.9. (cont.).

Parameter	Groundwater	Class G-II	Class G-III
Metals (cont.)			
Manganese (mg/L)	0.068 (0.098)	0.045 (0.062)	0.130 (0.142)
Nickel (mg/L)	0.006 (0.004)	0.006 (0.004)	ND
Potassium (mg/L)	89.2 (150.6)	12.5 (20.9)	285.9 (161.6)
Selenium (mg/L)	0.006 (0.007)	0.006 (0.004)	0.008 (0.011)
Silver (mg/L)	0.005 (0.007)	ND	0.005 (0.001)
Sodium (mg/L)	2670 (4011)	509 (713)	8206 (3638)
Thallium (mg/L)	0.001 (0.0005)	0.001 (0.0006)	ND
Vanadium (mg/L)	0.005 (0.002)	0.006 (0.002)	ND
Zinc (mg/L)	0.053 (0.024)	0.054 (0.028)	ND
Other Parameters			
Total Dissolved Solids (mg/L)	8066 (11275)	2019 (2202)	23563 (10276)
Total Organic Carbon (mg/L)	18.9 (23.4)	19.5 (26.0)	17.5 (15.6)
Sample Size (field)	51	36	15
Hydrogen Ion	8.80E-6 (5.46E-5)	1.24E-5 (6.49E-5)	1.47E-7 (1.74E-7)
Dissolved Oxygen (mg/L)	1.8 (1.4)	1.7 (1.2)	2.2 (1.9)
Temperature (C)	25.7 (1.3)	25.5 (1.4)	26.3 (1.0)
Specific Conductivity (umhos/cm)	10012 (13156)	2866 (2935)	27162 (12253)

Table 3.10. Groundwater chemistry data for the Surficial Aquifer on KSC from Clark (1987c). Upper includes wells from 3-20 ft (0.9-6.1 m), Intermediate- wells between 21-30 ft (6.4-9.1 m) and Lower- wells between 31-45 ft (9.4-13.7 m).

	Coastal Subaquifer			Prime Recharge Area			Dune-Swale Subaquifer		
	Upper	Inter-mediate	Lower	Upper	Inter-mediate	Lower	Upper	Inter-mediate	Lower
Sample Size	40	5	10	3	6	11	57	12	21
Total Dissolved Solids (mg/L)	4426	1820	70868	167	868	559	550	1361	6046
pH	7.50	7.50	7.40	6.70	7.57	7.49	7.26	7.62	7.60
Sodium (mg/L)	1059	183	10971	14	128	39.6	79	265	1936
Chloride (mg/L)	1854	307	24417	28	232	80	102.8	317	3734
Arsenic (mg/L)	<0.08	<0.05*	<0.05*	<0.05*	<0.05*	<0.05*	<0.64	<0.05*	<0.05
Barium (mg/L)	<0.03*	<0.28*	<0.10*	<0.70*	<0.07*	<0.70*	<1.0*	<1.0*	<0.7*
Cadmium (mg/L)	<0.013	<0.01	0.03	<0.012*	<0.012*	<0.17*	<0.01*	<0.01*	<0.017*
Chromium (mg/L)	<0.037*	<0.03*	<0.045	<0.04*	<0.04*	<0.02*	<0.05*	<0.04*	<0.02*
Copper (mg/L)	<0.06	<0.03*	0.07	<0.05*	<0.02*	<0.03*	<0.10*	<0.04*	<0.03*
Iron (mg/L)	4.38	1.84	0.86	<0.62	6.10	1.58	3.35	4.50	1.50
Lead (mg/L)	<0.06	<0.06	0.17	<0.05*	<0.05*	<0.05*	<0.05*	<0.05*	<0.05*
Manganese (mg/L)	<0.09	0.15	0.09	<0.03*	<0.042	<0.037*	<0.03	<0.04	<0.04
Selenium (mg/L)	0.08	<0.05*	<0.006*	<0.02	<0.03	0.02	<0.05	<0.044	<0.04
Zinc (mg/L)	<0.07	<0.06	0.22	<0.14	<0.032*	<0.03*	<0.04	<0.03*	0.036

Table 3.10. (cont.)

	West Plain Subaquifer Upper	Inter-mediate	Lower	Marsh Subaquifer Upper	Inter-mediate	Lower
Sample Size	10	13	11	9	6	5
Total Dissolved Solids (mg/L)	403	1071	2544	5501	8208	3812
pH	7.18	7.65	7.55	7.50	7.50	7.43
Sodium (mg/L)	31.1	104.6	407	1469	3095	1145
Chloride (mg/L)	41.5	307	1020	2563	3628	2136
Arsenic (mg/L)	<0.056	0.06	<0.05*	<0.07	<0.05*	<0.05*
Barium (mg/L)	<0.01*	<1.0*	<0.7*	<1.0*	<1.0*	<0.045
Cadmium (mg/L)	<0.01*	<0.01*	<0.014*	<0.014*	<0.01	<0.014*
Chromium (mg/L)	<0.05*	<0.05*	<0.04*	<0.05*	<0.04*	<0.03*
Copper (mg/L)	<0.10*	<0.02*	<0.05*	<0.02*	<0.047*	<0.04
Iron (mg/L)	5.88	3.20	5.20	0.30	1.90	0.65
Lead (mg/L)	<0.05*	<0.05*	<0.05*	<0.056	<0.06	<0.05
Manganese (mg/L)	<0.05*	<0.05*	0.08	<0.05*	0.11	0.06
Selenium (mg/L)	0.04	<0.01	0.07	<0.12	<0.04	<0.01
Zinc (mg/L)	<0.05	<0.05*	<0.03*	<0.046	<0.04*	<0.05

*all values below detection limits

SECTION 4
Surface water

4.1 Methods

4.1.1 Sampling Site Selection

Location of the surface water sampling stations was determined based on the watershed basins surrounding Kennedy Space Center. A total of 40 stations were selected to incorporate samples from open lagoonal water, rivers, creeks, ditches, burrow pits, and impoundments (Figure 4.1). Sampling sites were chosen away from known SWMU sites. Because 1998 was a year of the "El Nino" weather phenomenon, the climate in Florida was very hot and dry. The resulting drought reduced the number of ditches available for sampling. A total of 18 ditches were sampled, with 5 located near KSC's industrial areas. Location and description of each sampling station are given in Appendix E, Table E-1.

The geographical location of all sampling stations was recorded using a Trimble Pathfinder Professional XL Geographic Positioning System (GPS) unit using real time differentially corrected methods (Trimble Navigation Limited 1994). Data were exported to North American Datum 1927 (NAD27) State Plane coordinates and overlayed in a Geographic Information System (GIS). Coordinate data of each sampling station are given in Appendix E, Table E-2.

4.1.2 Sampling

Surface water sampling and analysis were subcontracted by Dynamac to Environmental Conservation Laboratories (ENCO), in Orlando, Florida. ENCO technicians followed the requirements of the "NASA/KSC Sampling and Analysis Plan for RCRA Facility Investigations at Kennedy Space Center, Florida and Cape Canaveral Air Station, Florida, Volume 4" of the Generic Work Plans (SAP) (NASA 1996) and ENCO's FLDEP Comprehensive Quality Assurance Plan No. 960038.

Sample collection was done from shore, by wading, or in deeper water, by boat. Care was taken not to disturb sediments in the immediate area, and collection was done upstream of the sampler. A total of 46 samples (includes 6 duplicates) were collected with decontaminated equipment, using latex gloves, and in the appropriate order as not to cause cross-contamination.

Surface water was collected directly into sample bottles that contained the proper preservative. Sample bottles were kept on ice and transported to the lab for analysis. Field parameters such as pH, temperature, turbidity, dissolved oxygen, and conductivity were also measured at each sampling location.

4.1.3 Chemical Analysis

Surface water was analyzed for 94 parameters that included organochlorine pesticides (EPA method 8081), aroclors (EPA method 8082), chlorinated herbicides (EPA method 8151), and polyaromatic hydrocarbons (EPA method 8310), and metals. The EPA methods used for metal analyses varied according to the appropriate analyte and included EPA methods: 200.7, 204.2, 258.1, 279.2, 7211, 7470, 7761, and 7770. Other miscellaneous parameters such as total chloride was analyzed using EPA method number 325.3, total dissolved solids was determined by method 160.1, and total organic carbon was determined by method 415.1 (Table 4.1). Field analysis of surface water samples for specific conductivity, dissolved oxygen, pH, turbidity, and temperature were conducted with calibrated instruments.

4.1.4 Data Analysis

Analyses were conducted using SPSS Version 9 (SPSS Inc., 1999), and SAS Version 6.02 (SAS Institute, 1998).

The frequency of analytes occurring above the detection limits was determined (Table 4.2). The NASA/KSC Remediation Program Team agreed that only those parameters with more than one detection would be used for analysis. Three analytes (naphthalene, fluorene, and copper) had only one detection and were, therefore, treated as non-detect (Appendix E, Table E-3). These results, however, are given in Appendix E, Table E-10. Those with more than one detection were analyzed, but their non-detect values were substituted by one-half the reported level.

Basic statistic analyses, such as normal probability plots, Shapiro-Wilks, and the Lilliefors tests, were conducted using SPSS to check for normality of distribution. The presence of significant outliers was also tested in SPSS by using histograms, stem-and-leaf plots, and boxplots. Extreme outliers were removed, however, in situations where a particular parameter had very few detection hits, these hits were erroneously flagged as outliers and were therefore, not removed. These will be discussed in detail on an individual basis.

For those parameters with sufficient sample size ($n>30$), multiple statistical comparisons were done using SAS. Non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences ($\alpha = 0.05$) between the different basin groups. This analysis was able to subdivide the basins and ditches into groups that were statistically similar. These data were then combined and an overall mean reported. For the screening background values table, data are given as twice the mean (Appendix A, Table A-3).

4.2 Results and Discussion

Of the 94 surface water parameters sampled, only 27 were detected. One organochlorine pesticide (Dieldrin) out of the 25 sampled, and none of the aroclors (6), or chlorinated herbicides (18) were detected. Polyaromatic hydrocarbons (17) had 5 parameters that were detected in at least one station, and the 24 metals tested were detected in high frequency except for eight (Ba, Cd, Cr, Co, Hg, Ni, Vn, and Zn), these were always below detection (Table 4.2). Screening background tables are given in Appendix A, Table A-3.

Organochlorine Pesticides

Dieldrin is a chlorinated cyclodiene that was used as a pesticide in crops such as corn and cotton and as an insecticide to control root worms, beetles, and termites in the 1950s-1970. The Environmental Protection Agency banned all uses of Dieldrin in 1974 with the exception of termite control, although it is no longer registered for general use (Parrish et al., 1979).

Dieldrin is extremely persistent, but it slowly photorearranges to photodieldrin (water half-life is 4 months), and photodegrades. When released in soil, it persists for longer periods (> 7 yrs.), and reaches the air either through slow evaporation or adsorption on dust particles (Parrish et al., 1979). Dieldrin does not leach, and enters surface water from runoff. Once dieldrin reaches surface waters it adsorbs strongly to sediments, bioconcentrates in fish, other aquatic organisms, wildlife, foods, and humans (Chadwick and Brockson, 1969; Epifanio, 1973; Lane and Livingston, 1970; Murphy and Korschgen, 1970; Reinert, 1972; Tarzwell and Henderson, 1956). Human exposure to dieldrin appears to come mostly from food (Parrish et al., 1979; Walker et al., 1973).

The two surface water quality sampling stations with dieldrin were IRL001, located in the northern Indian River Lagoon, and SR3-D2, a saline-water ditch located on Route 3 just south of Haulover Canal (Figure 4.2). Measured concentrations were 0.39 μg/L at IRL001 and 0.07 μg/L at SR3-D2. Station IRL001 is located in the north of Haulover Canal and on the east coast of the Indian River Lagoon, while station SR3-D2 is on the east side of Route 3 south of Haulover Canal. This region has numerous citrus groves, and these levels of dieldrin might be related to past usage.

When analyzing these data, statistical analyses were restricted to those stations that were part of the same watershed basins as IRL001 and SR3-D2. Station IRL001 is part of the Indian River Lagoon basin, and SR3-D2 is a saline (sal $\geq$6 ppt) ditch. These two values, along with one-half the reported non-detection level of the other stations were used to compute the mean, minimum, maximum, and standard deviation of the corresponding watershed basins (Appendix E, Tables E-8 and E-9). Screening Table "Combined Water (sal >6 ppt)", values were calculated by averaging these two data points with those stations with the appropriate salinity (Appendix A, Table A-3).

Polycyclic Aromatic Hydrocarbons
Benzo(a)anthracene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and indeno(1,2,3-cd)pyrene are all polycyclic aromatic hydrocarbons (PAHs). The name PAH generally refers to hydrocarbons containing two or more fused benzene rings that form as a result of incomplete combustion of organic compounds, by diagenesis, or by biosynthesis (Varanasi, 1989).

PAHs occur as needles, plates, crystals, leaflets, or prisms ranging from colorless to pale yellow to golden yellow. Benzo(a)anthracene and indeno(1,2,3-cd)pyrene show fluorescence ranging from greenish yellow to brilliant bluish violet to brown (Varanasi, 1989). PAHs are found in gasoline and diesel motor vehicle exhaust, by-products of open fires or refuse burning, coal tar, coal tar pitch, coke tars or coke oven emissions, creosote, mineral oils, bitumens, industrial smoke and soot, cigarette and cigar tobacco, tar, or smoke condensates, and charcoal-broiled foods. (ATSDR, 1989; Cerniglia et al., 1980; Farrington et al., 1983; Healy and Young, 1979 NAS, 1983; Varanasi, 1989).

Levels of individual PAH have been measured in aquatic organisms worldwide. Reported values range from undetectable quantities (approximately 0.01 μg/kg dry weight) to values in excess of 5000 μg/kg dry weight for individual PAH in tissues of aquatic organisms (Pancirov and Brown, 1977; Varanasi, 1989).

Generally elevated concentrations of PAH can be correlated with the proximity of the organism to areas receiving chronic hydrocarbon discharge (Cerniglia et al., 1980; Clark et al., 1978; Farrington et al., 1983; Healy and Young, 1979; Varanasi, 1989). The majority of PAH measurements have been made on bivalve mollusks. Bivalves are sessile, can rapidly accumulate PAHs, and have little capacity for PAH metabolism (Clark et al., 1978; Cross et al., 1978; Pancirov and Brown, 1977). PAH concentrations in fish have been less well surveyed, but are usually low relative to invertebrates inhabiting the same environment. The low body burdens of PAH to fish are believed to be due to their ability to rapidly metabolize PAH. Although PAHs are metabolized and eliminated in fish, it is not known how they interact with birds, mammals, or humans. Dermal contact with high concentrations of PAHs may cause irritation, burning, inflammatory spots on the skin, eruption of blood vessels and sensitivity to sunlight. However, there are a number of epidemiologic and mortality studies that show increased incidences of cancer in humans exposed to mixtures of PAHs (ATSDR, 1989; Varanasi, 1989).

Benzo(a)anthracene. Benzo(a)anthracene was detected at two surface water sampling stations, both located in the southern Mosquito Lagoon. The first station was MLS03 (duplicate sample) with 0.12 μg/L, and the second was SJML02 with 0.13 μg/L. The former station is located in the southern portion of Mosquito Lagoon, east of Gallinipper Point, and the latter southeast of Haulover Canal, north of Cucumber Island. Both stations are located approximately halfway across the lagoon. MLS03 is in the Middle Banks, a relatively shallow (0.60m) region with abundant seagrass beds. SJML02 is in approximately 2 meters of water with sparse seagrass. Both stations are located away from the intercoastal navigation channel in regions used mainly by recreational fishermen (Figure 4.2).

Data analyses for benzo(a)anthracene were restricted to those stations that were part of the Mosquito Lagoon basin group. These two values, along with one-half the reported non-detection level of the other stations were used to compute the mean, minimum, maximum, and standard deviation of the corresponding watershed basin (Appendix E, Table E-9). Screening Table "Combined Water (sal >6 ppt)" values, were calculated by averaging these two data points with those stations with the appropriate salinity (Appendix A, Table A-3).

Benzo(k)fluoranthene. Benzo(k)fluoranthene was detected at two surface water sampling stations, located in the Banana River and in a saline ditch (sal $\geq$6 ppt). The first station was PEF20 with 0.13 μg/L, and the second was MAX01 with 0.21 μg/L. Station PEF20 is located in the Pepper Flats region of the northern Banana River, east of the Turn Basin and near a security boat dock. This region is relatively shallow and has abundant seagrass. MAX01 is an impoundment located on the south side of Beach Road approximately 0.5 Km west of the ocean. This impoundment has a soft muddy bottom with very sparse seagrass (Figure 4.2).

Data analyses for benzo(k)fluoranthene were restricted to those stations that were part of the Mosquito Lagoon and Banana River basins. These two values, along with one-half the reported non-detection level of the other stations were used to compute the mean, minimum, maximum, and standard deviation for each corresponding basin (Appendix E, Tables E-5 and E-9). Screening Table "Combined Water (sal $\geq$6 ppt)" values, were calculated by averaging these two data points with those stations with the appropriate salinity (Appendix A, Table A-3).

Benzo(a)pyrene. Benzo(a)pyrene was detected at three surface water sampling stations, located in the Banana River and in Mosquito Lagoon. The first station was PEF20 with 0.18 μg/L, the second was MLS03 (duplicate sample) with 0.13 μg/L, and the third was SJML02 with 0.22 μg/L. Station PEF20 is located in the Pepper Flats region of the northern Banana River, east of the Turn Basin and near a security boat dock. This region is relatively shallow and has abundant seagrass. MLS03 is in the southern portion of Mosquito Lagoon, east of Gallinipper Point, and SJML02 is southeast of Haulover Canal, north of Cucumber Island. MLS03 is in the Middle Banks, a relatively shallow (0.60m) region with abundant seagrass beds, and SJML02 is in approximately 2 meters of water with sparse seagrass (Figure 4.2).

Data analyses for benzo(a)pyrene were restricted to those stations that were part of the Mosquito Lagoon and Banana River basins. These three values, along with one-half the reported non-detection level of the other stations were used to compute the mean, minimum, maximum, and standard deviation for each corresponding basin (Appendix E, Tables E-5 and E-9). Screening Table "Combined Water (sal $\geq$6 ppt)" values, were calculated by averaging these three data points with those stations with the appropriate (Appendix A, Table A-3).

<u>Chrysene</u>. Chrysene was detected at two surface water sampling stations located in the southern Mosquito Lagoon and in a saline ditch (sal $\geq$6 ppt). The first station was SJML02 with 0.21 μg/L, and the second was MAX01 with 0.07 μg/L. Station SJML02 is southeast of Haulover Canal, north of Cucumber Island, and MAX01 is an impoundment located on the south side of Beach Road approximately 0.5 Km west of the ocean. SJML02 is in approximately 2 meters of water with sparse seagrass, and MAX01 is an impoundment with a soft muddy bottom and very sparse seagrass (Figure 4.2).

Data analyses for chrysene were restricted to those stations that were part of the Mosquito Lagoon basin. These two values, along with one-half the reported non-detection level of the other stations were used to compute the mean, minimum, maximum, and standard deviation of the corresponding watershed basin (Appendix E, Table E-9). Screening Table "Combined Water (sal >6 ppt)" values, were calculated by averaging these two data points with those stations with the appropriate salinity (Appendix A, Table A-3).

<u>Indeno(1,2,3-cd)pyrene</u>. Indeno(1,2,3-cd)pyrene was detected at two surface water sampling stations located in southern Mosquito Lagoon. The first station was SJML02 with 0.13 μg/L, and the second was MLS03 (duplicate sample) with 0.12 μg/L. MLS03 is in the southern portion of Mosquito Lagoon, east of Gallinipper Point, and SJML02 is southeast of Haulover Canal, north of Cucumber Island. MLS03 is in the Middle Banks, a relatively shallow (0.60m) region with abundant seagrass beds, and SJML02 is in approximately 2 meters of water with sparse seagrass (Figure 4.2).

Data analyses for indeno(1,2,3-cd)pyrene were restricted to those stations that were part of the Mosquito Lagoon basin. These two values, along with one-half the reported non-detection level of the other stations were used to compute the mean, minimum, maximum, and standard deviation of this watershed basin (Appendix E, Table E-9). Screening Table "Combined Water (sal >6 ppt)" values, were calculated by averaging these two data points with those with the appropriate salinity (Appendix A, Table A-3).

<u>Fluorene and Naphthalene</u>. Fluorene and naphthalene were each detected in only one surface water sampling station. Fluorene was detected at BPD002 with 0.23 μg/L and naphthalene was detected at SR3-D2 with 1.6 μg/L. Station BPD002 is a fresh-water impoundment located in a wildlife observation area

known as Black Point Drive, and SR3-D2 is a saline-water ditch located on Route 3 just south of Haulover Canal (Figure 4.2). Because these stations only had one detection (out of 46 samples), the NASA/KSC Remediation Program Team agreed to treat these parameters as non-detect.

Metals

Aluminum. Aluminum is the third most abundant element in the earth's crust, exceeded by oxygen (47%) and silicon (28%). Because of its strong affinity to oxygen, aluminum never occurs as a metal in nature, and is found in the form of alumina. Aluminum is commonly distributed throughout rocks and soils such as silicates and clays. It is ductile, nonmagnetic, and an excellent conductor of heat and electricity (Brown et al., 1962; Thurston et al., 1979).

Aluminum is widely used in many kinds of products because it's properties give it special advantages over other materials. Aluminum is a major factor in the human diet, and is found in buffered aspirin, antacids, antidiarrheal drugs, cake mixes, self-rising flour, processed cheese, baking powder, food starch modifiers, pickling salts, and anti-caking agents. It can also be acquired from beverage cans, aluminum foil, and aluminum pots and pans. Aluminosilicates are found in the dust from talcum powder, baby powder, cat-box litter, cement, asphalt mixes, tobacco smoke and ash (Brown et al., 1962; Faust and Aly, 1981; Moore and Ramamoorthy, 1947).

Aluminum was detected at 36 surface water sampling stations that included representatives from all six watershed basin groups. This sample size allowed more intricate statistical analysis. One outlier was detected at station BCE004 (1.9 mg/L), but it was not removed because it wasn't extreme.

Data values, along with one-half the detection level of the other stations, were used to compute the mean, minimum, maximum, and standard deviation of each watershed basin (Appendix E, Tables E-4 through E-9). Multiple statistical comparisons were done using a non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for Post Hoc multiple comparisons ($\propto = 0.05$). This analysis compared the mean of each watershed and ditch and was able to subdivide and combine them into groups that were statistically similar.

Results showed that aluminum data from the Banana Creek basin were significantly different than all others ($p < 0.05$). Aluminum concentrations in the Banana Creek stations were higher than at other basins (1.1 mg/L vs. 0.3 μg/L). Therefore, in order to calculate the screening table values for aluminum, data were separated into two groups. The first group included the average of only the Banana Creek basin stations, while the second included the combined average of all other remaining surface water stations. Screening table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

Antimony. Antimony is a brittle, hard metal that is obtained as a byproduct or coproduct of base metals and ores. It is found primarily in stibnite, silver and lead ores, but it is also associated with mercury and gold-bearing ores (Thurston et al., 1979).

It is present in mining and smelting wastewaters, in the manufacturing of bearings, storage batteries, pewter, lead electrodes, tanks, pipes, pumps, glass, and paint industries. It is used in semiconductors and thermoelectric devices, in dyes, glass, metalware and enamels (Thurston et al., 1979). It gets into water from corrosion of lead pipes and fittings, but even then it is rarely detectable. More antimony is found in food than water (Faust and Aly, 1981). Antimony also has a therapeutic use in the treatment of tropical diseases such as schistosomiasis, bilharziasis, and leishmaniasis. Antimony and many of its compounds are toxic (Brown et al., 1962; Faust and Aly, 1981).

Antimony was detected in 19 surface water sampling stations, that included representatives from all six watershed basin groups. This sample size did not allow for intricate statistical analysis. Data were separated into their corresponding watershed and ditch groups, and along with one-half the reported non-detection level of the other stations were used to compute the mean, minimum, maximum, and standard deviation (Appendix E, Tables E4 through E-9). Screening Table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

Arsenic. Arsenic is a shiny, gray, brittle element and one of the most widely distributed in the earth's crust and in the biosphere. It possesses both metallic and non-metallic properties. Its compounds may be organic or inorganic, are present everywhere in nature, are insoluble in water, and occur mostly as arsenides and arsenopyrites (Thurston et al., 1979).

Arsenic is very poisonous and can kill in relatively small amounts. It is absorbed in the gastrointestinal tract, lungs, or skin. The systemic effects of arsenic poisoning include pain, nausea, diarrhea, abnormal heart function, impaired nerve function, blood-vessel damage, liver or kidney damage, and a pattern of skin abnormalities (Faust and Aly, 1981; Thurston et al., 1979). It distributes itself throughout the body and is excreted via urine, feces, sweat, or skin epithelium (Faust and Aly, 1981).

Arsenic, like mercury, undergoes transformation in the environment through the metabolic activities of microorganisms, especially bacteria and fungi. This indicates that there is a biological cycle for arsenic in the aquatic environment. (Moore and Ramamoorthy, 1947).

Arsenic was detected in 9 surface water sampling stations and did not include any samples from Mosquito Lagoon or fresh water ditches. This sample size did not allow for intricate statistical analysis. Data were separated into their corresponding watershed and ditch groups, and along with one-half the reported non-detection level of the other stations were used to calculate the mean, minimum, maximum, and standard deviation (Appendix E, Tables E-4, E-5, E-7, and E-8). Screening Table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

Beryllium. Beryllium is present in a variety of compounds such as chlorides, nitrate salts, sulfates, carbonates, and hydroxides. The solubility of these compounds varies depending on such factors as hardness and pH (Thurston et al., 1979).

Beryllium and its alloys are extensively used in the manufacturing of springs, gyroscopes, computer parts, electrical contacts, spot-welding electrodes, and nonsparking tools. As a structural material, beryllium is used for communication satellites, missiles, high-speed aircraft, and spacecraft (Thurston et al., 1979).

Beryllium enters the water supply mainly from effluents of certain metallurgical industries such as atomic reactors, aircraft, rockets and missile fuels. The major toxic potential of beryllium to humans is by inhaling beryllium-containing fumes. Beryllium metal dust can cause major lung damage and beryllium salts are very toxic. Once exposed to the skin, beryllium causes dermatitis, conjunctivitis, acute pneumonitis, chronic pulmonary berylliosis, and burns (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Beryllium was detected in 5 surface water sampling stations that were all located in the Banana River basin. This sample size did not allow for intricate statistical analysis, and these data, along with one-half the reported non-detection level of the other stations were used to calculate the mean, minimum, maximum, and standard deviation (Appendix E, Table E-5). Screening Table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

Calcium. Calcium is the fifth most common element in order of abundance in the earth's crust. It is present in water supplies as a result of its passage through or over deposits of limestone, marble, chalk, calcite, alabaster, selenite, dolomite, gypsum, and gypsiferous shale. It can also be found in natural brines, salt beds, and as a byproduct of chemical industries (Thurston et al., 1979).

Calcium is the most abundant mineral (90%) in the body, and is found mostly in bones and teeth. A diet rich in calcium is very important when bones are growing and developing. Even after full bone development, an adequate calcium intake is necessary to keep bones strong and healthy. When calcium is low, the blood tends to become overly acidic. This promotes disease conditions such as: cancer, arthritis, heart disease, Alzheimer's, Parkinson's, colitis, asthma, muscle pains, bursitis, sinusitis, diabetes, migraine and even depression (Brown et al., 1962; Thurston et al., 1979).

Calcium was detected in all 46 surface water sampling stations, which allowed more intricate statistical analysis. Data were separated into their corresponding watershed basins and ditch groups, and their mean, minimum, maximum, and standard deviation computed (Appendix E, Tables E-4 through E-9). Multiple statistical comparisons were done using a non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for Post Hoc multiple comparisons (α= 0.05). This analysis was able to subdivide and combine the different watershed basins and ditches into groups that were statistically similar.

Calcium data showed that there were significant differences ($p < 0.05$), and three distinct groups existed. The first, with the highest calcium average concentration (345 mg/L) included those stations from Banana Creek, Indian River Lagoon, and Mosquito Lagoon basins. The second, with a combined average of 242 mg/L, included those stations from the Banana River and saline (sal $\geq$6 ppt) ditches. The third, had the lowest calcium average (98 mg/L), and included the stations from fresh water ditches. These three groups were, therefore, used to compute the Screening Table values for calcium. "Combined Background Water" values were calculated by averaging only those stations with the appropriate salinity (Appendix A, Table A-3).

<u>Chloride</u>. Chloride (Cl^-), is found in nature in the combined state, chiefly with sodium as common salt (NaCl), carnallite, and sylvite (Thurston et al., 1979). Chlorides in solid form are salts containing chloride and a metal. In water, these salts dissolve forming chloride ions and metal ions. Some common chlorides are sodium chloride (table salt), calcium chloride and magnesium chloride (Brown et al., 1962; Thurston et al., 1979).

Chlorides are found in nearly all rivers, lakes and streams. They may get into the water from chloride-containing rocks, seawater, farm fertilizer runoff, halite, sea spray, brines, hot springs, papermaking and galvanizing processes, softening operations, oil wells and refineries (Brown et al., 1962; Thurston et al., 1979).

Chloride was detected in 45 surface water sampling stations, which allowed more intricate statistical analysis. The only station that did not have detectable concentrations of chloride was KPI001, located in an impoundment at Kars Park II recreational area (Figure 4.2).

Data were separated into their corresponding watershed basins and ditch groups, and their mean, minimum, maximum, and standard deviation computed (Appendix E, Tables E-4 through E-9). Multiple statistical comparisons were done using a non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for Post Hoc multiple comparisons (α= 0.05). This analysis was able to subdivide and combine the different watershed basins and ditches into groups that were statistically similar.

Chloride data showed that there were significant differences ($p < 0.05$), and three distinct groups existed. The first, with the highest chloride average concentration (14295 mg/L) included those stations from Banana Creek, Indian River Lagoon, and Mosquito Lagoon basins. The second, with a combined average of 8715 mg/L, included those stations from the Banana River and saline (sal $\geq$6 ppt) ditches. The third, had the lowest chloride average (1527 mg/L), and included the stations from fresh water ditches. These three groups were, therefore, used to compute the Screening Table values for chloride. "Combined Background Water" values, were calculated by averaging only those stations with the appropriate salinity (Appendix A, Table A-3).

Copper. Copper is a trace element that is usually present in the divalent state as a natural or native metal. It is reddish, malleable, ductile, and a good conductor of heat and electricity. Primary copper ores are sulfides, oxides, and carbonates. Copper is often alloyed with other metals to form brasses and bronzes. Copper is used extensively in electrical wire, coinage metal, as an agricultural poison, and water purifier (Brown et al., 1962; Thurston et al., 1979).

Copper is an essential trace mineral that is present in all of the body tissues. Good sources of copper are oysters and other shellfish, whole grains, beans, nuts, potatoes, dark leafy greens, dried fruits such as prunes, cocoa, black pepper, and yeast (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Copper is essential for the synthesis of chlorophyll and the propagation of leaves in plants. In animals, it is necessary for metabolism, blood chemistry, and keeping the blood vessels, nerves, immune system, and bones healthy. The toxicity of copper to aquatic life depends strongly on pH. At lower alkalinity, copper toxicity is greater to aquatic life depending on species, size, and type of exposure. Waters with high copper concentration are tolerated by many species, depending on the species and amount of exposure (Brown et al., 1962; Tchobanoglous and Schroeder, 1985, Thurston et al., 1979).

Copper was detected in only one surface water sampling station (0.007 mg/L at ROB001). This station was a fresh-water ditch located on Robert's Road, west of Route 3 (Figure 4.2). Because this station only had one detection hit (out of 46 samples), the NASA/KSC Remediation Program Team agreed to treat it as non-detect (Appendix E, Table E-3).

Iron. The fourth most abundant metal in the earth's crust is common in many types of rocks and soils, particularly clays. Major sources of Fe pollution are industrial waste waters, mines, and iron-bearing groundwaters. Iron is present as insoluble ferric salts and pyrite, in natural organometallic or humic compounds, and in colloidal forms (Thurston et al., 1979).

Ferrous Fe^{+2} and ferric Fe^{+3} ions are the primary forms of concern in the aquatic environment. When found in high concentrations in the water, Fe produces a distinguishing color that serves as a good pollution indicator. Iron also forms hydroxide or oxide precipitates which, if they flocculate or gelatinize, can be detrimental to benthic species and fish eggs. Iron is a trace element that is a very important component of vertebrate erythrocytes and of the blood of some invertebrates. It is also a limiting factor in the growth of anaerobic bacteria, algae, and other plants (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Iron was detected in 35 surface water sampling stations, that included representatives from all six watershed basin groups. This sample size allowed more intricate statistical analysis. Two outliers were detected at stations TEL004 (2.3 mg/L), and at HPC001-duplicate (1.2 mg/L). Station TEL004 was considered a serious outlier and was removed (Figure 4.2).

Data were separated into their corresponding watershed basins and ditch groups, and their mean, minimum, maximum, and standard deviation computed (Appendix E, Tables E-4 through E-9). Multiple statistical comparisons were done using a non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for Post Hoc multiple comparisons ($\alpha = 0.05$). This analysis was able to subdivide and combine the different watershed basins and ditches into groups that were statistically similar.

Iron data showed that there were statistical differences ($p < 0.05$), and two distinct groups existed. The first, and with the highest iron average concentration (0.5 mg/L) included those stations from Banana Creek and both ditches. The second, with a combined average of 0.1 mg/L, included those stations from the Banana River, Indian River Lagoon, and Mosquito Lagoon. These two groups were used to compute the Screening Table values for iron. "Combined Background Water" values were calculated by averaging only those stations with the appropriate salinity (Appendix A, Table A-3).

Lead. Lead is widely distributed in the earth's crust, in the atmosphere and in the hydrosphere. Lead is present in natural waters as hydroxide, sulfide, chloride, carbonate complexes, complexed with organic molecules or adsorbed on particulate matter (Thurston et al., 1979). It enters water supplies at a multitude of stages such as: mining, smelting, precipitation, lead dust fallout, erosion and leaching of soil, industrial waste, engine exhaust, and the runoff of surfaces painted with lead-based products. Lead has been used in the manufacture of metal products for thousands of years, and a considerable amount of information is available regarding its harmful effects in living organisms (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Lead is not considered an essential element, and has no beneficial nutritional qualities. It is a serious cumulative body poison that tends to deposit in bone, but is also found in the brain, liver, kidney, aorta, and muscles. In humans, lead toxicity is known to cause brain damage, anemia, neurological and renal disorders, and even death. This biotoxicity results from long-term consumption rather than from occasional small doses (Faust and Aly, 1981; James and Evison, 1989; Thurston et al., 1979).

Lead was detected in 15 surface water sampling stations, that included representatives from Mosquito Lagoon, Banana River and fresh water ditches. This sample size did not allow for intricate statistical analysis. Data were separated into their corresponding watershed and ditch groups, and along with one-half the reported non-detection level of the other stations from the same group, were used to calculate the mean, minimum, maximum, and standard deviation (Appendix E, Tables E-5, E-6, and E-9). Screening Table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

<u>Magnesium</u>. Magnesium is the eighth most abundant element and occurs naturally in a variety of minerals as mica, chlorites, amphiboles, dolomites, augites, pyroxenes, granites, talc, silicates, and serpentines (Thurston et al., 1979).

Magnesium is a common constituent of natural waters and is an important contributor to its hardness. Its concentration can vary from zero to several hundred milligrams per liter, depending on the source and treatment of the water. Magnesium concentration has to be carefully monitored in drinking water because more than 125 mg/L can be cathartic or diuretic (Brown et al., 1962; Cowan, 1995).

Primary sources of magnesium for biological organisms are rocks, soils, air, and water. Plants and animals absorb magnesium from these primary sources and after dying, return it to the environment, creating a magnesium cycle in the food web (Thurston et al., 1979).

Magnesium was detected in all 46 surface water sampling stations, which allowed more intricate statistical analysis. Station NSC001, a fresh water ditch along NASA Causeway, was considered a serious outlier (5200 mg/L), and was removed from analysis (Figure 4.2).

Data were separated into their corresponding watershed basins and ditch groups, and their mean, minimum, maximum, and standard deviation computed (Appendix E, Tables E4 through E-9). Multiple statistical comparisons were done using a non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for Post Hoc multiple comparisons ($\alpha = 0.05$). This analysis was able to subdivide and combine the different watershed basins and ditches into groups that were statistically similar.

Magnesium data showed that there were statistical differences ($p< 0.05$), and two distinct groups existed. The first, and with the highest magnesium average concentration (1147 mg/L) included those stations from Banana Creek, saline (sal $\geq$6 ppt) ditches, Indian River Lagoon, and Mosquito Lagoon basins. The second, with a combined average of 317 mg/L, included those stations from the Banana River and fresh water ditches. These two groups were used to compute the Screening Table values for magnesium. "Combined Background Water" values were calculated by averaging only those stations with the appropriate salinity (Appendix A, Table A-3).

Manganese. Manganese is found in salts and minerals such as manganese dioxide, carbonate and silicate. It occurs in domestic water, industrial effluents and receiving streams. Its primary sources are soils, where it is present as manganese oxide, and acid discharges of industrial wastes and mines. It is harmlessly ingested by humans as a trace nutrient in food, but high concentrations can cause liver damage (Thurston et al., 1979).

In marine waters, manganese is known to rapidly assimilate and bioaccumulate in shellfish, leading to a potential vector for human contamination. It is not a problem in domestic waters and the primary concerns associated with its high concentrations are the brown color and bad taste of water (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

It is a vital micronutrient for flora and fauna, and its absence may cause leafing disorders in plants and reproductive problems in animals (Faust and Aly, 1981; Thurston et al., 1979).

Manganese was detected in 15 surface water sampling stations that included representatives from Banana Creek and both saline and fresh water ditches. This sample size did not allow for intricate statistical analysis. Data were separated into their corresponding watershed and ditch groups, and along with one-half the reported non-detection level of the other stations from the same group, were used to calculate the mean, minimum, maximum, and standard deviation (Appendix E, Tables E-4, E-6, and E-7). Screening Table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

Potassium. Potassium, a silvery white metal, is the seventh most abundant element on earth. It is present in natural waters, but usually less than magnesium, sodium or calcium. The principal sources of potassium are silicates, igneous, and sedimentary rocks. Potassium has no special significance in natural water quality and is generally used as a tracer element and an indicator of the geological origin of the water (Thurston et al., 1979).

Potassium metal may ignite spontaneously on contact with air at room temperature and reacts explosively with water to form potassium hydroxide and/or potassium oxide. It reacts with the moisture on skin and other tissues to form highly corrosive potassium hydroxide. Contact of metallic potassium with the skin, eyes, or mucous membranes causes severe burns, and thermal burns may occur due to ignition of the metal and liberated hydrogen. Potassium salts are essential for life. The potassium cation is the major cation in intracellular fluids, and is essential for nerve and heart function (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Potassium was detected in 45 surface water sampling stations, which allowed more intricate statistical analysis. The only station that did not have detectable concentrations of potassium was IRL03, located in the Indian River Lagoon (Figure 4.2).

Data were separated into their corresponding watershed basins and ditch groups, and their mean, minimum, maximum, and standard deviation computed (Appendix E, Tables E-4 through E-9). Multiple statistical comparisons were done using a non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for Post Hoc multiple comparisons ($\alpha = 0.05$). This analysis was able to subdivide and combine the different watershed basins and ditches into groups that were statistically similar.

Potassium data showed that there were statistical differences ($p < 0.05$), and three distinct groups existed. The first, and with the highest potassium average concentration (523 mg/L) included those stations from the Mosquito Lagoon basin. The second, with a combined average of 264 mg/L, included those stations from the Banana Creek, Indian River Lagoon, Banana River, and saline (sal $\geq$6 ppt) ditches. The third, had the lowest potassium average (33 mg/L), and included the stations from fresh water ditches. These three groups were used to compute the Screening Table values for potassium. "Combined Background Water" values, were calculated by averaging only those stations with the appropriate salinity (Appendix A, Table A-3).

Selenium. Chemical sources of selenium are rarely found in nature, but selenium is closely associated with sulfur, sulfides, and trace amounts are found in igneous rocks. Depending on its concentration, selenium can range from being an essential nutrient to being highly toxic to biological species. It is considered to be toxic to humans because its symptoms are similar to those of arsenic (Thurston et al., 1979).

Selenium is found in low concentrations in standing and marine waters, except for polluted or seleniferous soils where its concentration is higher. Pollution sources that commonly include selenium wastes are industries related to glass-making, electronics, ceramics, and xerography. Selenium is present in soils as ferric selenite, calcium selenate, and in the elemental state which must be oxidized to be soluble in water (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Selenium enters the food chain almost exclusively via plants. It is passed through the food chain to fish, increasing its bioaccumulative toxicity to higher levels (Brown et al., 1962; Thurston et al., 1979).

Selenium was detected in 3 surface water sampling stations, that were all part of the Indian River Lagoon basin. These stations were IRL004 with 0.024 mg/L, IRL005 with 0.012 mg/L, and REF001 with 0.018 mg/L. This sample size did not allow for intricate statistical analysis. Data from this basin were separated, and along with one-half the reported non-detection level of the other stations from the same group, were used to calculate the mean, minimum, maximum, and standard deviation (Appendix E, Table E-8). Screening Table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

Silver. Silver is a brilliant white metal that is rare and expensive. It occurs in ores such as argentite, lead, lead-zinc, copper and gold. It is harder than gold and is very ductile and malleable. Pure silver has the highest electrical and thermal conductivity of all metals, and possesses the lowest contact resistance. Silver is stable in pure air and water, but tarnishes when exposed to ozone, hydrogen sulphide, or air containing sulfur (Thurston et al., 1979).

Silver has no biological role, and it is a non-essential, non-beneficial element, that is toxic to aquatic life. Silver is toxic because once it is absorbed, it accumulates indefinitely in tissues particularly the skin, eyes, and mucus membranes. Silver also has a bacteriological action and has been added to water as a disinfectant, at concentrations that do not harm human health. The toxicity and the degree of dissociation of silver compounds to aquatic life varies depending on species (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Silver was detected in 2 surface water sampling stations, that were all part of the Indian River Lagoon basin. These stations were IRL004 with 0.0014 mg/L and IRL005 with 0.0015 mg/L. This sample size did not allow for intricate statistical analysis. Data from this basin were separated, and along with one-half the reported non-detection level of the other stations from the same group, were used to calculate the mean, minimum, maximum, and standard deviation (Appendix E, Table E-8). Screening Table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

Sodium. Sodium, a soft, bright, silvery metal, is the fourth most abundant element on earth, comprising about 2.6% of the earth's crust. It is a very reactive element, and it is never found free in nature. (Thurston et al., 1979).

The most common compound is sodium chloride, but it occurs in many other minerals, such as soda ash (Na_2CO_3), baking soda ($NaHCO_3$), caustic soda ($NaOH$), Chile saltpeter ($NaNO_3$), di- and tri-sodium phosphates, sodium thiosulfate (hypo, $Na_2S_2O_3 \cdot 5H_2O$), and borax ($Na_2B_4O_7 \cdot 10H_2O$) (Faust and Aly, 1981; Thurston et al., 1979).

Sodium compounds are important to the paper, glass, soap, textile, petroleum, chemical, and metal industries. Soap is generally a sodium salt of certain fatty acids. The importance of common salt to animal nutrition has been recognized since prehistoric times (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Sodium was detected in all 46 surface water sampling stations, which allowed more intricate statistical analysis. Data were separated into their corresponding watershed basins and ditch groups, and their mean, minimum, maximum, and standard deviation computed (Appendix E, Tables E-4 through E-9). Multiple statistical comparisons were done using a non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for Post Hoc multiple comparisons (α= 0.05). This analysis was able to subdivide and combine the different watershed basins and ditches into groups that were statistically similar.

Sodium data showed that there were statistical differences ($p< 0.05$), and three distinct groups existed. The first, and with the highest sodium average concentration (9031 mg/L) included those stations from the Mosquito Lagoon and the Indian River Lagoon basins. The second, with a combined average of 5690 mg/L, included those stations from the Banana Creek, Banana River, and saline (sal $\geq$6 ppt) ditches. The third, had the lowest sodium average (895 mg/L), and included the stations from fresh water ditches. These three groups were used to compute the Screening Table values for sodium. "Combined Background Water" values were calculated by averaging only those stations with the appropriate salinity (Appendix A, Table A-3).

Thallium. Thallium is a soft, malleable, lustrous, silver-gray metal, that resembles aluminum chemically and lead physically. A heavy oxide builds up on thallium if exposed to air, and in the presence of water, the hydroxide is formed (Thurston et al., 1979).

Thallium occurs in crooksite, lorandite, and hutchinsonite. It is also present in pyrites and is recovered from the roasting of this ore in connection with the production of sulfuric acid (Thurston et al., 1979).

Natural thallium is a mixture of two isotopes. The element and its compounds are toxic and should be handled carefully. Contact of the metal with skin is dangerous, and when melting the metal adequate ventilation should be provided. Thallium is suspected of having a carcinogenic potential for humans. Thallium sulfate has been widely employed as a rodenticide and ant killer (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Thallium was detected in 2 surface water sampling stations, that were in the Mosquito Lagoon Indian River Lagoon basins. These stations were IRL003 with 0.003 mg/L and SJML02 with 0.002 mg/L. This sample size did not allow for intricate statistical analysis. Data from these basins were separated, and along with one-half the reported non-detection level of the other stations from the same group were used to calculate the mean, minimum, maximum, and standard deviation (Appendix E, Tables E-8 and E-9). Screening Table "Combined Background Water" values, were calculated by averaging those stations with the appropriate salinity (Appendix A, Table A-3).

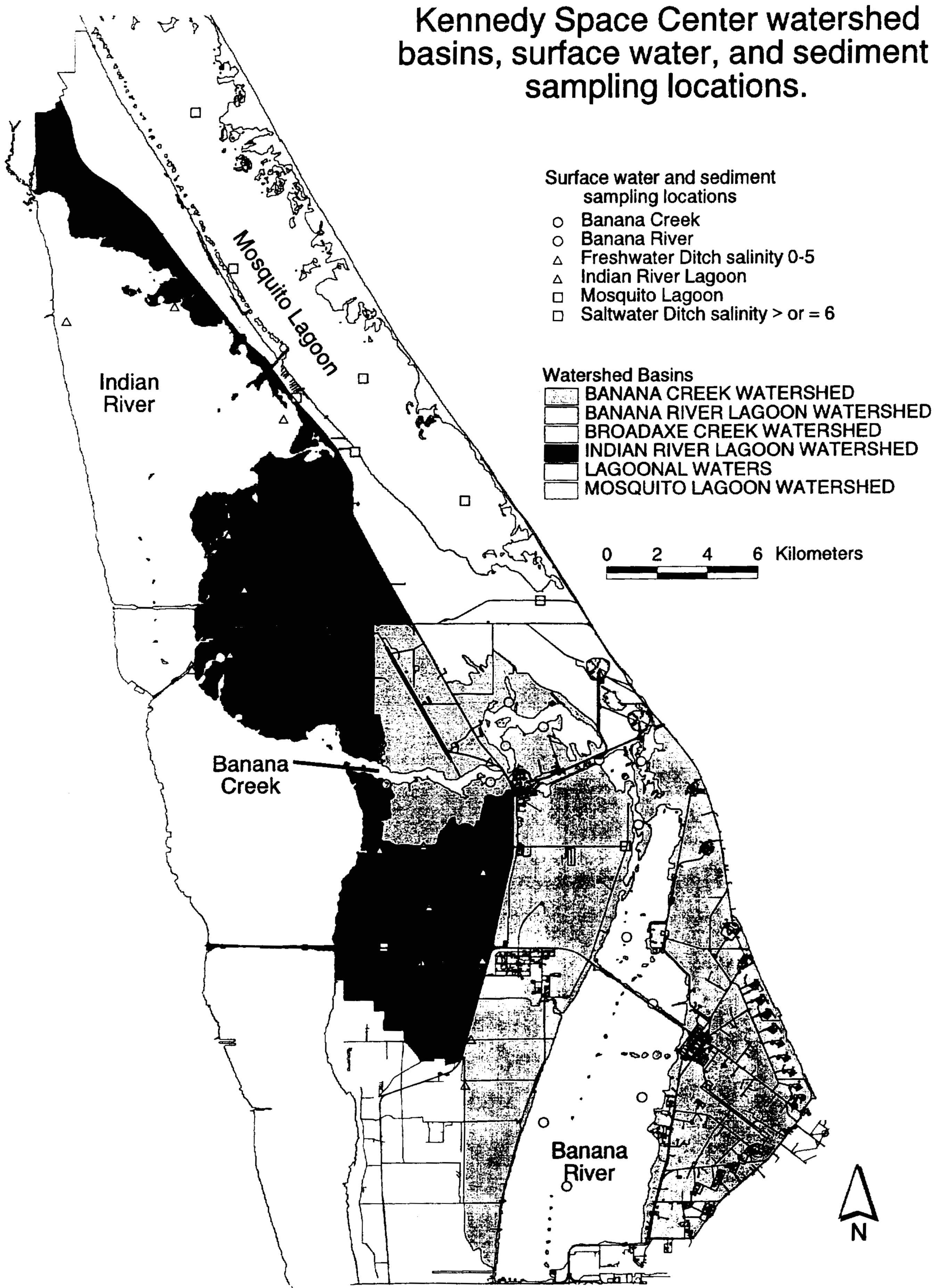

Figure 4.1. KSC Background surface water and sediment sampling locations in relation to watershed basins existing on Kennedy Space Center, FL. Symbols may represent more than one sample location.

KSC Background Surface Water and Sediment Sampling Locations.

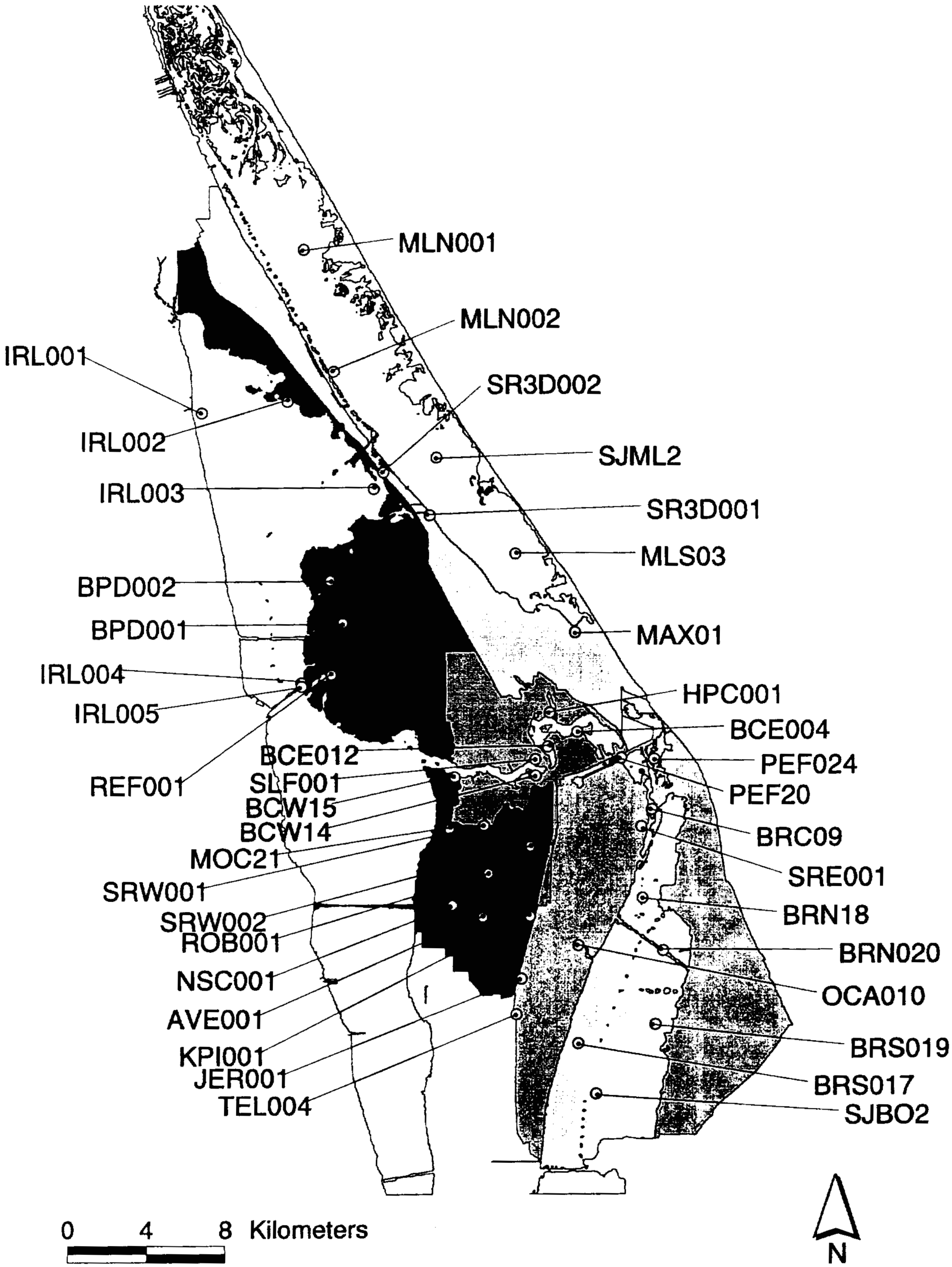

Figure 4.2. Surface water and sediment sampling locations for the KSC Background Study.

Table 4.1. List of parameters, EPA methods, and detection limits used to analyze surface water samples collected for the 1998 KSC Background Study.
* = measurement made with a calibrated field instrument (YSI).

	EPA Method	Lab Reporting Limit for surface water
Organochlorine pesticides		
4,4' - DDD	8081	0.05 μg/L
4,4' - DDE	8081	0.05 μg/L
4,4' - DDT	8081	0.05 μg/L
Aldrin	8081	0.05 μg/L
Alpha - BHC	8081	0.05 μg/L
Beta - BHC	8081	0.05 μg/L
Chlordane (alpha)	8081	0.05 μg/L
Chlordane (gamma)	8081	0.05 μg/L
Chlordane (Total)	8081	1 μg/L
Delta - BHC	8081	0.05 μg/L
Dieldrin	8081	0.05 μg/L
Endosulfan I	8081	0.05 μg/L
Endosulfan II (beta)	8081	0.05 μg/L
Endosulfan Sulfate	8081	0.05 μg/L
Endrin	8081	0.05 μg/L
Endrin Aldehyde	8081	0.05 μg/L
Endrin Ketone	8081	0.05 μg/L
Gamma - BHC (Lindane)	8081	0.05 μg/L
Heptachlor	8081	0.05 μg/L
Heptachlor Epoxide(a)	8081	0.05 μg/L
Heptachlor Epoxide(b)	8081	0.05 μg/L
Isodrin	8081	0.05 μg/L
Methoxychlor	8081	0.05 μg/L
Mirex	8081	0.05 μg/L
Toxaphene	8081	2 μg/L
Aroclors		
PCB-1016/1242	8082	1 μg/L
PCB-1221	8082	1 μg/L
PCB-1232	8082	1 μg/L
PCB-1248	8082	1 μg/L
PCB-1254	8082	1 μg/L
PCB-1260	8082	1 μg/L
Chlorinated Herbicides		
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	8151	0.5 μg/L
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	8151	0.5 μg/L

Table 4.1. (cont.)

	EPA Method	Lab Reporting Limit for surface water
Chlorinated Herbicides (cont.)		
2,4-Dichlorophenoxy acetic acid (2,4 - D)	8151	0.5 µg/L
3,5-DCBA	8151	0.5 µg/L
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	8151	0.5 µg/L
4 - Nitrophenol	8151	0.5 µg/L
Acifluorfen	8151	0.5 µg/L
Bentazon	8151	0.5 µg/L
Chloramben	8151	0.5 µg/L
Dacthal	8151	0.5 µg/L
Dalapon	8151	0.5 µg/L
Dicamba	8151	0.5 µg/L
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	8151	0.5 µg/L
Dinoseb	8151	0.5 µg/L
MCPA	8151	5 µg/L
MCPP	8151	5 µg/L
Pentachlorophenol	8151	0.5 µg/L
Picloram	8151	0.5 µg/L
Polyaromatic Hydrocarbons		
1 - Methylnaphthalene	8310	0.5 µg/L
2 - Methylnaphthalene	8310	0.5 µg/L
Acenaphthene	8310	0.5 µg/L
Acenaphthylene	8310	0.1 µg/L
Anthracene	8310	0.5 µg/L
Benzo(a)anthracene	8310	0.05 µg/L
Benzo(a)pyrene	8310	0.05 µg/L
Benzo(b)fluoranthene	8310	0.1 µg/L
Benzo(g,h,i)perylene	8310	0.1 µg/L
Benzo(k)fluoranthene	8310	0.05 µg/L
Chrysene	8310	0.05 µg/L
Dibenzo(a,h)anthracene	8310	0.1 µg/L
Fluoranthene	8310	0.1 µg/L
Fluorene	8310	0.1 µg/L
Indeno(1,2,3-cd)pyrene	8310	0.05 µg/L
Naphthalene	8310	0.5 µg/L
Phenanthrene	8310	0.05 µg/L
Pyrene	8310	0.05 µg/L

Table 4.1. (cont.)

	EPA Method	Lab Reporting Limit for surface water
Metals		
Aluminum	200.7	0.05 mg/L
Antimony	200.7/ 204.2	0.006 mg/L
Arsenic (as carcinogen)	200.7	0.01 mg/L
Barium	200.7	0.1 mg/L
Beryllium	200.7	0.001 mg/L
Cadmium	200.7	0.001 mg/L
Calcium	200.7	0.5 mg/L
Chloride, Total	325.3	1 mg/L
Chromium (total)	200.7	0.01 mg/L
Cobalt	200.7	0.05 mg/L
Copper	200.7/ 7211	0.05 mg/L
Iron	200.7	0.05 mg/L
Lead	200.7	0.005 mg/L
Magnesium	200.7	0.5 mg/L
Manganese	200.7	0.01 mg/L
Mercury (inorganic)	7470	0.0002 mg/L
Nickel	200.7	0.01 mg/L
Potassium	200.7/ 258.1	0.5 mg/L
Selenium	200.7	0.01 mg/L
Silver	200.7/ 7761	0.01 mg/L
Sodium	7770	0.5 mg/L
Thallium	279.2	0.004 mg/L
Vanadium	200.7	0.01 mg/L
Zinc	200.7	0.1 mg/L
Other Parameters		
Dissolved Oxygen	*	na
pH	*	na
Specific Conductivity	*	na
Temperature	*	na
Total dissolved solids	160.1	na
Total organic carbon	415.1	1 mg/L
Turbidity	180.1	na

Table 4.2. Name, number of hits, and frequency of analytes occurring above detection limits. For screening table values, the three parameters with only one hit out of 46 samples were considered as non-detect by the NASA/KSC Remediation Program Team.

Parameter	Number of Hits	Frequency %
Organochlorine pesticides		
4,4' - DDD	0	0
4,4' - DDE	0	0
4,4' - DDT	0	0
Aldrin	0	0
Alpha - BHC	0	0
Beta - BHC	0	0
Chlordane (alpha)	0	0
Chlordane (gamma)	0	0
Chlordane (Total)	0	0
Delta – BHC	0	0
Dieldrin	2	4.35
Endosulfan I	0	0
Endosulfan II (beta)	0	0
Endosulfan Sulfate	0	0
Endrin	0	0
Endrin Aldehyde	0	0
Endrin Ketone	0	0
Gamma – BHC (Lindane)	0	0
Heptachlor	0	0
Heptachlor Epoxide(a)	0	0
Heptachlor Epoxide(b)	0	0
Isodrin	0	0
Methoxychlor	0	0
Mirex	0	0
Toxaphene	0	0
Aroclors		
PCB-1016/1242	0	0
PCB-1221	0	0
PCB-1232	0	0
PCB-1248	0	0
PCB-1254	0	0
PCB-1260	0	0

Table 4.2. (cont.).

Parameter	Number of Hits	Frequency %
Chlorinated Herbicides		
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	0	0
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	0	0
2,4-Dichlorophenoxy acetic acid (2,4 - D)	0	0
3,5-DCBA	0	0
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	0	0
4 - Nitrophenol	0	0
Acifluorfen	0	0
Bentazon	0	0
Chloramben	0	0
Dacthal	0	0
Dalapon	0	0
Dicamba	0	0
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	0	0
Dinoseb	0	0
MCPA	0	0
MCPP	0	0
Pentachlorophenol	0	0
Picloram	0	0
Polyaromatic Hydrocarbons		
1 - Methylnaphthalene	0	0
2 - Methylnaphthalene	0	0
Acenaphthene	0	0
Acenaphthylene	0	0
Anthracene	0	0
Benzo(a)anthracene	2	4.35
Benzo(a)pyrene	3	6.52
Benzo(b)fluoranthene	0	0
Benzo(g,h,i)perylene	0	0
Benzo(k)fluoranthene	2	4.35
Chrysene	2	4.35
Dibenzo(a,h)anthracene	0	0
Fluoranthene	0	0
Fluorene	1	2.17

Table 4.2. (cont.).

Parameter	Number of Hits	Frequency %
Polyaromatic Hydrocarbons (cont.)		
Indeno(1,2,3-cd)pyrene	2	4.35
Naphthalene	1	2.17
Phenanthrene	0	0
Pyrene	0	0
Metals		
Aluminum	36	78.26
Antimony	19	41.30
Arsenic (as carcinogen)	9	19.57
Barium	0	0
Beryllium	5	10.87
Cadmium	0	0
Calcium	46	100.00
Chloride, Total	45	97.83
Chromium (total)	0	0
Cobalt	0	0
Copper	1	2.17
Iron	35	76.09
Lead	15	32.61
Magnesium	46	100.00
Manganese	15	32.61
Mercury (inorganic)	0	0
Nickel	0	0
Potassium	45	97.83
Selenium	3	6.52
Silver	2	4.35
Sodium	46	100
Thallium	2	4.35
Vanadium	0	0
Zinc	0	0
Other Parameters		
Dissolved Oxygen	41	89.13
Total Dissolved Solids	43	93.48
Total Organic Carbon	46	100

Table 4.3. List of parameters that were below detection limits (non-detect) for all surface water locations.

Organochlorine pesticides (8081)
4,4' - DDD
4,4' - DDE
4,4' - DDT
Aldrin
Alpha - BHC
Beta - BHC
Chlordane (alpha)
Chlordane (gamma)
Chlordane (Total)
Delta - BHC
Endosulfan I
Endosulfan II (beta)
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Endrin Ketone
Gamma - BHC (Lindane)
Heptachlor
Heptachlor Epoxide(a)
Heptachlor Epoxide(b)
Isodrin
Methoxychlor
Mirex
Toxaphene
Aroclors (8082)
PCB-1016/1242
PCB-1221
PCB-1232
PCB-1248
PCB-1254
PCB-1260
Metals
Barium
Cadmium
Chromium (total)
Cobalt
Mercury (inorganic)
Nickel
Vanadium
Zinc

Chlorinated Herbicides (8151)
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)
2,4-Dichlorophenoxy acetic acid (2,4 - D)
3,5-DCBA
4 - Nitrophenol
Acifluorfen
Bentazon
Chloramben
Dacthal
Dalapon
Dicamba
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]
Dinoseb
MCPA
MCPP
Pentachlorophenol
Picloram
Polyaromatic Hydrocarbons (8310)
1 - Methylnaphthalene
2 - Methylnaphthalene
Acenaphthene
Acenaphthylene
Anthracene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Dibenzo(a,h)anthracene
Fluoranthene
Phenanthrene
Pyrene

SECTION 5
Sediment

5.1 Methods

5.1.1 Sample Site Selection

Location of the sediment sampling stations was determined based on the watershed basins surrounding Kennedy Space Center. A total of 40 stations were selected to incorporate samples from open lagoonal water, rivers, creeks, ditches, burrow pits, and impoundments (Figure 4.1). Sampling sites were chosen away from known SWMU sites. Because 1998 was a year of the "El Nino" weather phenomenon, the climate in Florida was very hot and dry. The resulting drought reduced the number of ditches available for sampling. A total of 18 ditches were sampled, with five located near KSC's industrial areas. Location and description of each sampling station are given in Appendix E, Table E-1.

The geographical location of all sampling stations was recorded using a Trimble Pathfinder Professional XL Geographic Positioning System (GPS) unit using real time differentially corrected methods (Trimble Navigation Limited 1994). Data were exported to North American Datum 1927 (NAD27) State Plane coordinates and overlayed in a Geographic Information System (GIS). Coordinate data of each sampling station are given in Appendix E, Table E-2.

5.1.2 Sampling

Sediment sampling and analysis were subcontracted by Dynamac to Environmental Conservation Laboratories (ENCO), in Orlando, Florida. ENCO technicians followed the requirements of the "NASA/KSC Sampling and Analysis Plan for RCRA Facility Investigations at Kennedy Space Center, Florida and Cape Canaveral Air Station, Florida, Volume 4" of the Generic Work Plans (SAP) (NASA 1996) and ENCO's FLDEP Comprehensive Quality Assurance Plan No. 960038.

Sample collection was done from shore, by wading, or in deeper water, by boat (dredging or coring). A total of 46 samples (includes 6 duplicates) were collected with decontaminated stainless steel equipment using latex gloves.

5.1.3 Chemical Analysis

Sediment was analyzed for 96 parameters that included organochlorine pesticides (EPA method 8081), aroclors (EPA method 8082), chlorinated herbicides (EPA method 8151), and polycyclic aromatic hydrocarbons (EPA method 8310), and metals. The EPA methods used for metal analyses varied according to the appropriate analyte and included EPA methods: 200.7, 204.2, 6010, 7210, 7471, 7520, 7610, 7770, and 7950. Other miscellaneous parameters such as percent solids were analyzed using SM 2540G, pH by EPA method 9045, resistivity by Miller, texture by the sieve method, and total organic carbon was determined by MSA Part2, 29-3 (Table 5.1).

5.1.4 Data Analysis

Analysis were conducted using SPSS Version 9 (SPSS Inc., 1999), and SAS Version 6.02 (SAS Institute, 1998).

Frequency of analytes occurring above the detection limits was determined (Table 5.2). The NASA/KSC Remediation Program Team agreed that only those parameters with more than one detection would be used for analysis. Four analytes (dieldrin, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, and 2 - Methylnaphthalene) had only one detection and were, therefore, treated as non-detect (Table 5.4). These values, however, are given in Appendix F, Table F-5. Those with more than one detection were analyzed, but their non-detect values were substituted by one-half the reported level.

Basic statistic analyses, such as Normal Probability Plots, Shapiro-Wilks, and the Lilliefors tests, were used in SPSS to check for normality of distribution (α =0.05). The presence of significant outliers was also tested in SPSS using histograms, stem-and-leaf plots, and boxplots. Extreme outliers were removed, however, in situations where a particular parameter had very few hits, these hits were erroneously flagged as outliers and were therefore, not removed. These will be discussed in detail on an individual basis.

For those parameters with sufficient sample size (n>30), multiple statistical comparisons were done using SAS. Non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences between all watershed basins and data were combined. For the screening values table, data are given as twice the mean, and the "Combined Background Sediment" column includes the overall mean of all 46 sediment stations (Appendix A, Table A-4).

5.2 Results and Discussion

Of the 96 sediment parameters sampled, only 31 were detected. One organochlorine pesticide (Dieldrin) out of the 25 sampled, none of the six aroclors, and two chlorinated herbicides were detected (out of 18). Polyaromatic hydrocarbons (18) had 12 parameters that were detected in at least one station. The 23 metals tested were detected in high frequency except for seven (As, Ba, Be, Cd, Co, Ni, Se), that were always below detection (Table 5.3). Screening background tables are given in Appendix A, Table A-4.

Organochlorine Pesticides
Dieldrin was detected in only one sediment sampling station (7.9 µg/kg at BRS017) located on the west side of the northern Banana River south of the NASA causeway (Figure 4.2). Because Dieldrin only had one detection (out of 46 samples), the NASA/KSC Remediation Program Team agreed to treat it as non-detect.

Chlorinated Herbicides
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T). 2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T) was detected at two sediment sampling stations, both located in the Banana River. The first station was BRS019 with 17 µg/kg, and the second was PEF024 with 27 µg/kg. BRS019 is located in the east Banana River south of the NASA causeway, and PEF024 is in the northern Banana River in a region known as Pepper Flats. Both regions are relatively shallow with abundant seagrass beds (Figure 4.2).

Because 2,4,5-trichlorophenoxy acetic acid only had two detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these two 2,4,5-trichlorophenoxy acetic acid values, along with one-half the reported non-detection level of the other Banana River stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Table F-2). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

2,4-Dichlorophenoxy acetic acid (2,4 - D). 2,4-dichlorophenoxy acetic acid (2,4 - D) was detected at two sediment sampling stations, both located in the Banana River. The first station was BRS019 with 19 µg/kg, and the second was PEF024 with 21 µg/kg. BRS019 is located in the east Banana River south of the NASA causeway, and PEF024 is in the northern Banana River in a region known as Pepper Flats. Both regions are relatively shallow with abundant seagrass beds (Figure 4.2).

Because 2,4-dichlorophenoxy acetic acid (2,4 - D) only had two detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these two 2,4-dichlorophenoxy acetic acid (2,4 - D) values, along with one-half the reported non-detection level of the other Banana River stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Table F-2). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Polycyclic Aromatic Hydrocarbons
2 –Methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene are all polycyclic aromatic hydrocarbons (PAHs). The name PAH generally refers to hydrocarbons containing two or more fused benzene rings that form as a result of incomplete combustion of organic compounds, by diagenesis, or by biosynthesis (Varanasi, 1989).

PAHs occur as needles, plates, crystals, leaflets, or prisms ranging from colorless to pale yellow to golden yellow. PAHs are found in gasoline and diesel motor vehicle exhaust, by-products of open fires or refuse burning, coal tar, coal tar pitch, coke tars or coke oven emissions, creosote, mineral oils, bitumens, industrial smoke and soot, cigarette and cigar tobacco and smoke, tar, or smoke condensates, and charcoal-broiled foods. (ATSDR, 1989; Cerniglia et al., 1980; Farrington et al., 1983; Healy and Young, 1979; NAS, 1983; Varanasi, 1989).

Levels of individual PAH have been measured in aquatic organisms worldwide. Reported values range from undetectable quantities (approximately 0.01 µg/kg dry weight) to values in excess of 5000 µg/kg dry weight for individual PAH in tissues of aquatic organisms (Pancirov and Brown, 1977; Varanasi, 1989).

Generally elevated concentrations of PAH can be correlated with the proximity of the organism to areas receiving chronic hydrocarbon discharge (Cerniglia et al., 1980; Clark et al., 1978; Farrington et al., 1983; Healy and Young, 1979; Varanasi, 1989). The majority of PAH measurements have been made on bivalve mollusks. Bivalves are sessile, can rapidly accumulate PAHs, and have little capacity for PAH metabolism (Clark et al., 1978; Cross et al., 1978; Pancirov and Brown, 1977). PAH concentrations in fish have been less well surveyed, but are usually low relative to invertebrates inhabiting the same environment. The low body burdens of PAH to fish are believed to be due to their ability to rapidly metabolize PAH. Although PAHs are metabolized and eliminated in fish, it is not known how they interact with birds, mammals, or humans. Dermal contact with high concentrations of PAHs may cause irritation, burning, inflammatory spots on the skin, eruption of blood vessels and sensitivity to sunlight. However, there are a number of epidemiologic and mortality studies that show increased incidences of cancer in humans exposed to mixtures of PAHs (ATSDR, 1989; Varanasi, 1989).

2 –Methylnaphthalene. 2 –Methylnaphthalene was detected in only one sediment sampling station (140 μg/kg at SR3-D2), a saline-water ditch located on State Route 3 just south of Haulover Canal (Figure 4.2). Because 2 – Methylnaphthalene only had one detection (out of 46 samples), the NASA/KSC Remediation Program Team agreed to treat it as non-detect.

Benzo(a)anthracene. Benzo(a)anthracene was detected at three sediment sampling stations, located in the Mosquito Lagoon, Indian River Lagoon, and Banana River watershed basins. The first station was SR3-D1 with 5.9 μg/kg, the second was PEF20 with 4.7 μg/kg, and the third was IRL004 with 12 μg/kg. SR3-D1 is a ditch located on State Route 3 approximately three miles north of the State Route 406 intersection, PEF20 is in the northern Banana River in a region known as Pepper Flats, and IRL004 is in the Indian River Lagoon just north of the State Route 406 causeway (Figure 4.2).

Because benzo(a)anthracene only had three detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these three benzo(a)anthracene values, along with one-half the reported non-detection level of the other stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-2 through F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Benzo(a)pyrene. Benzo(a)pyrene was detected at four sediment sampling stations located in the Indian River Lagoon (three stations) and Banana River (one station) watershed basins. The Indian River Lagoon stations were IRL001, IRL002, and IRL 003 with 3 μg/kg, 11 μg/kg, and 5 μg/kg respectively. Station BRN18 had 3 μg/kg and is located north of the NASA causeway across from the Integrate, Transfer, and Launch (ITL) area on CCAFS(Figure 4.2).

Because benzo(a)pyrene only had four detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these four benzo(a)pyrene values, along with one-half the reported non-detection level of the other Banana River and Indian River Lagoon stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basins (Appendix F, Tables F-2 and F-3). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Benzo(b)fluoranthene. Benzo(b)fluoranthene was detected at five sediment sampling stations located in the Mosquito Lagoon, Indian River Lagoon, and Banana River watershed basins. The first station was IRL004 with 12 μg/kg, the second was IRL005 with 13 μg/kg, the third was OCA010 with 4.0 μg/kg, the fourth was SLF001 with 4 μg/kg, and the fifth was SRE001 with 14 μg/kg. Stations IRL004 and IRL005 are located in the Indian River Lagoon north and south of the State Route 406 causeway, respectively. OCA010 is a fresh-water ditch located on Avenue 10 south of NASA's Occupational & Checkout building, SLF001 is a fresh-water ditch southeast of NASA's Shuttle Landing Facility, and SRE001 is a ditch located on Schwartz Road east of State Route 3 (Figure 4.2).

Because benzo(b)fluoranthene only had five detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these five benzo(b)fluoranthene values, along with one-half the reported non-detection level of the other Mosquito Lagoon, Indian River Lagoon, and Banana River stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basins (Appendix F, Tables F-2 through F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Benzo(g,h,i)perylene. Benzo(g,h,i)perylene was detected at only one sediment sampling station (11 µg/kg at IRL004). This station is located in the Indian River Lagoon just north of the State Route 406 causeway (Figure 4.2). Because benzo(g,h,i)perylene only had one detection (out of 46 samples), the NASA/KSC Remediation Program Team agreed to treat it as non-detect.

Benzo(k)fluoranthene. Benzo(k)fluoranthene was detected at four sediment sampling stations located in the Indian River Lagoon (two stations), and in two ditches near the KSC industrial areas, part of the Banana River watershed basin. The Indian River Lagoon stations were IRL004 and IRL005 with 10 µg/kg and 2 µg/kg, respectively. Station OCA010 (duplicate) had 3 µg/kg and SRE001 had 9 µg/kg. Indian River Lagoon stations are located north and south of the State Route 406 causeway, respectively. OCA010 is a fresh-water ditch located on Avenue 10 south of NASA's Occupational & Checkout building, and SRE001 is a ditch located on Schwartz Road east of State Route 3 (Figure 4.2).

Because benzo(k)fluoranthene only had four detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these four benzo(k)fluoranthene values, along with one-half the reported non-detection level of the other Banana River and Indian River Lagoon stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basins (Appendix F, Tables F-2 and F-3). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Chrysene. Chrysene was detected at six sediment sampling stations located in the Indian River Lagoon (two stations), the Banana River, and in two ditches (plus duplicate) near the KSC industrial areas. The Indian River Lagoon stations were IRL004 and IRL005 with 42 µg/kg and 6.9 µg/kg, respectively. Station OCA010 had 5.3 µg/kg and its duplicate sample had 3.6 µg/kg, SRE001 had 13 μg/kg, and PEF20 had 4.3 μg/kg. Indian River Lagoon stations are located north and south of the State Route 406 causeway, respectively. OCA010 is a fresh-water ditch located on Avenue 10 south of NASA's Occupational & Checkout building, and SRE001 is a ditch located on Schwartz Road east of State Route 3. These three stations are part of the Banana River watershed basin. PEF20 is in the northern Banana River, east of the Turn Basin in a region known as Pepper Flats (Figure 4.2).

Because chrysene only had six detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these six chrysene values, along with one-half the reported non-detection level of the other Banana River and Indian River Lagoon stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-2 and F-3). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Fluoranthene. Fluoranthene was detected at three sediment sampling stations located in three ditches near the KSC industrial areas. Station SLF001 had 9.6 μg/kg, SRE001 had 67 μg/kg, and SRW001 had 4.5 μg/kg. SLF001 is a fresh-water ditch located southeast of NASA's Shuttle Landing Facility, and SRE001 and SRW001 are ditches located on Schwartz Road. The former ditch is east of State Route 3, while the latter is west (Figure 4.2). Stations SLF001 and SRW001 are part of the Banana Creek watershed basin, and SRE001 part of the Banana River basin.

Because fluoranthene only had three detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these three fluoranthene values, along with one-half the reported non-detection level of the other Banana River and Banana Creek stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basins (Appendix F, Tables F-1 and F-2). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Indeno(1,2,3-cd)pyrene. Indeno(1,2,3-cd)pyrene was detected at only one sediment sampling station (9 μg/kg at IRL004). This station is located in the Indian River Lagoon just north of the State Route 406 causeway (Figure 4.2). Because indeno(1,2,3-cd)pyrene only had one detection (out of 46 samples), the NASA/KSC Remediation Program Team agreed to treat it as non-detect.

Naphthalene. Naphthalene was detected at four sediment sampling stations located in four ditches near the KSC industrial areas. Station SR3-D1 had 54 μg/kg, its duplicate had 24 μg/kg, SR3-D2 had 47μg/kg, and SRW001 had 67μg/kg. SR3-D1 is a ditch located on State Route 3 approximately 3 miles north of the State Route 406 intersection, SR3-D2 is a saline-water ditch also located on State Route 3 just south of Haulover Canal, and SLF01 is a fresh-water ditch located southeast of NASA's Shuttle Landing Facility (Figure 4.2). Stations SR3-D1 and SR3-D2 are part of the Mosquito Lagoon watershed basin, and SLF01 is part of the Banana Creek watershed basin.

Because naphthalene only had four detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these four naphthalene values, along with one-half the reported non-detection level of the other Mosquito Lagoon and Banana Creek stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-1 and F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Phenanthrene. Phenanthrene was detected at three sediment sampling stations located in three ditches near the KSC industrial areas. Station BRN18 had 7.3 μg/kg, SRE001 had 7.5 μg/kg, and SJML02 had 10 μg/kg x 10^{-3} mg/kg. BRN18 is located north of the NASA causeway across from the ITL area, SRE001 is a ditch located on Schwartz Road, and SJML02 is southeast of Haulover Canal, north of Cucumber Island (Figure 4.2). Stations SRE001 and BRN18 are part of the Banana River basin, and SJML02 is part of the Mosquito Lagoon basin.

Because phenanthrene only had three detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these three phenanthrene values, along with one-half the reported non-detection level of the other Mosquito Lagoon and Banana River stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-2 and F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Pyrene. Pyrene was detected at two sediment sampling stations located in a fresh-water ditch (SRE001) and in Mosquito Lagoon (SJML02). Station SRE001 had 34 μg/kg, and SJML02 had 15 μg/kg. SRE001 is a fresh-water ditch located on Schwartz Road east of State Route 3, and SJML02 is southeast of Haulover Canal, north of Cucumber Island (Figure 4.2). Station SRE001 is part of the Banana River basin, and SJML02 is part of the Mosquito Lagoon basin.

Because pyrene only had two detection hits, statistical comparisons between the different watershed basins could not be done. Therefore, these two pyrene values, along with one-half the reported non-detection level of the other Mosquito Lagoon and Banana River stations were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-2 and F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Metals

Aluminum. Aluminum is the third most abundant element in the earth's crust, exceeded by oxygen (47%) and silicon (28%). Because of its strong affinity to oxygen, aluminum never occurs as a metal in nature, and is found in the form of alumina. Aluminum is commonly distributed throughout rocks and soils such as silicates and clays. It is ductile, nonmagnetic, and an excellent conductor of heat and electricity (Brown et al., 1962; Thurston et al., 1979).

Aluminum is widely used in many kinds of products because its properties give it special advantages over other materials. Aluminum is a major factor in the human diet, and is found in buffered aspirin, antacids, antidiarrheal drugs, cake mixes, self-rising flour, processed cheese, baking powder, food starch modifiers, pickling salts and anti-caking agents. It can also be acquired from beverage cans, aluminum foil, and aluminum pots and pans. Aluminosilicates are found in the dust from talcum powder, baby powder, cat-box litter, cement, asphalt mixes, tobacco smoke, and ashes (Brown et al., 1962; Faust and Aly, 1981; Moore and Ramamoorthy, 1947).

Aluminum was detected at all sediment sampling stations, which allowed more intricate statistical analysis. Two extreme outliers were detected at stations SRW002 (5300 mg/kg) and MLN002 (4500 mg/kg), and were removed from data analyses.

The mean, minimum, maximum, and standard deviation of each watershed basin was calculated and results are given in Appendix F, Tables F-1 through F-4. A Non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Arsenic. Arsenic is a shiny, gray, brittle element and one of the most widely distributed in the earth's crust and in the biosphere. It possesses both metallic and non-metallic properties. Its compounds may be organic or inorganic, are present everywhere in nature, are insoluble in water, and occur mostly as arsenides and arsenopyrites (Thurston et al., 1979).

Arsenic is very poisonous and can kill in relatively small amounts. It is absorbed in the gastrointestinal tract, lungs, or skin. The systemic effects of arsenic poisoning include pain, nausea, diarrhea, abnormal heart function, impaired nerve function, blood-vessel damage, liver or kidney damage, and a pattern of skin abnormalities (Faust and Aly, 1981; Thurston et al., 1979). It distributes itself throughout the body and is excreted via urine, feces, sweat, or skin epithelium (Faust and Aly, 1981).

Arsenic, like mercury, undergoes transformation in the environment through the metabolic activities of microorganisms, especially bacteria and fungi. This indicates that there is a biological cycle for arsenic within the aquatic environment (Moore and Ramamoorthy, 1947).

Arsenic was detected in 20 sediment sampling stations, which did not allow for more intricate statistical analysis. One extreme outlier was detected at station TEL004 (5.4 mg/kg), and was removed from data analyses.

Because arsenic had a relatively low number of hits, statistical comparisons between the different watershed basins could not be done. Therefore, these data values, along with one-half the reported non-detection levels were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-1 through F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Calcium. Calcium is the fifth most common element in order of abundance in the earth's crust. It is present in water supplies as a result of its passage through or over deposits of limestone, marble, chalk, calcite, alabaster, selenite, dolomite, gypsum, and gypsiferous shale. It can also be found in natural brines, salt beds, and as a byproduct of chemical industries (Thurston et al., 1979).

Calcium is the most abundant mineral (90%) in the body, and is found mostly in bones and teeth. That's why a diet rich in calcium is so important, particularly when bones are growing and developing. Even after full bone development, an adequate calcium intake is necessary to keep bones strong and healthy. When calcium is low, the blood tends to become overly acidic. This promotes disease conditions such as: cancer, arthritis, heart disease, Alzheimer's, Parkinson's, colitis, asthma, muscle pains, bursitis, sinusitis, diabetes, migraine, and even depression (Brown et al., 1962; Thurston et al., 1979).

Calcium was detected in 45 sediment sampling stations, which allowed more intricate statistical analyses. Data were first separated into their corresponding watershed, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled

"Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Chromium. Chromium, the seventeenth most abundant non-gaseous substance on earth, is found in air, soil, some foods, and biological systems, but is rare in natural waters (Brown et al., 1962; Faust and Aly, 1981).

It occurs in nature mainly in chromite or the red lead ore, crocoite. Chromium occurs in oxidation states 0, 2^+, 3^+, and 6^+, but only the hexavalent is toxic. It is stable and soluble in sea waters by forming a complex with other compounds such as amino acids and polybasic organic acids. Complex formation with organic compounds is affected by chloride in acidic solutions, and by magnesium and calcium ions in alkaline solutions (Brown et al., 1962).

Chromium is widely used in industries such as metallurgy and the manufacture of leather tanning and pigments, as a coloring agent in ceramic glazes, in glass making, fungicides, wood preservatives, and as a rust inhibitor in cooling-tower recirculating water systems (Faust and Aly, 1981; Thurston et al., 1979).

Chromium plays an essential role in some metabolic processes, but it is toxic in high concentrations. This toxicity can affect the metabolization of insulin and glucagon, the mucous membranes, respiratory disorders, and lung cancer. This toxicity also affects fishes and aquatic invertebrates, depending on species, pH, temperature, and chromium oxidation state (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Chromium was detected in 37 sediment sampling stations, which allowed for more intricate statistical analysis. Two extreme outliers were detected at stations MLN002 (11 mg/kg) and SRW002 (13 mg/kg), and were removed from data analyses.

Data were first separated into their corresponding watershed, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Copper. Copper is a trace element that is usually present in the divalent state as a natural or native metal. It is reddish, malleable, ductile, and a good conductor of heat and electricity. Primary copper ores are sulfides, oxides, and carbonates. Copper is often alloyed with other metals to form brasses and bronzes. Copper is used extensively in electrical wire, coinage metal, as an agricultural poison, and water purifier (Brown et al., 1962; Thurston et al., 1979).

Copper is an essential trace mineral that is present in all of the body tissues. Good sources of copper are oysters and other shellfish, whole grains, beans, nuts, potatoes, dark leafy greens, dried fruits such as prunes, cocoa, black pepper, and yeast (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Copper is essential for the synthesis of chlorophyll and the propagation of leaves in plants. In animals, it is necessary for metabolism, blood chemistry, and keeping the blood vessels, nerves, immune system, and bones healthy. The toxicity of copper to aquatic life depends strongly on pH. At lower alkalinity, copper toxicity is greater to aquatic life depending on species, size, and type of exposure. Waters with high copper concentration are tolerated by many species, depending on the species and amount of exposure (Brown et al., 1962; Tchobanoglous and Schroeder, 1985, Thurston et al., 1979).

Copper was detected in only six sediment sampling stations, which did not allow for intricate statistical analysis. Two extreme outliers were detected at stations IRL005 (380 mg/kg) and TEL004 (18 mg/kg), and were removed from data analyses.

Because copper had a relatively low number of hits, statistical comparisons between the different watershed basins could not be done. Therefore, these data values, along with one-half the reported non-detection levels were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-1 through F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Iron. Iron is the fourth most abundant metal in the earth's crust common in many types of rocks and soils, particularly clays. Major sources of iron pollution are industrial wastewaters, mines, and iron-bearing groundwaters. Iron is present as insoluble ferric salts and pyrite, in natural organometallic or humic compounds, and in colloidal forms (Thurston et al., 1979).

Ferrous Fe^{+2} and ferric Fe^{+3} ions are the primary forms of concern in the aquatic environment. When found in high concentrations in the water, iron produces a distinguishing color that serves as a good pollution indicator. Iron also forms hydroxide or oxide precipitates which, if they flocculate or gelatinize, can be detrimental to benthic species and fish eggs. Iron is a trace element that is a very important component of vertebrate erythrocytes and of the blood of some invertebrates. It is also a limiting factor in the growth of anaerobic bacteria, algae, and other plants (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Iron was detected in all 46 sediment sampling stations, which allowed more intricate statistical analysis. Two outliers were detected at stations SRW002 (5600 mg/L), and at MLN002 (5400 mg/L), and were removed from data analyses.

Data were first separated into their corresponding watershed, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Lead. Lead is widely distributed in the earth's crust, in the atmosphere and in the hydrosphere. Lead is present in natural waters as hydroxide, sulfide, chloride, carbonate complexes, complexed with organic molecules or adsorbed on particulate matter (Thurston et al., 1979). It enters water supplies at a multitude of stages such as: mining, smelting, precipitation, lead dust fallout, erosion and leaching of soil, industrial waste, engine exhaust, and the runoff of surfaces painted with lead-based products. Lead has been used in the manufacture of metal products for thousands of years, and a considerable amount of information is available regarding its harmful effects in living organisms (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Lead is not considered an essential element, and has no beneficial nutritional qualities. It is a serious cumulative body poison that tends to deposit in bone, but is also found in the brain, liver, kidney, aorta, and muscles. In humans, lead toxicity is known to cause brain damage, anemia, neurological and renal disorders, and even death. This biotoxicity results from long-term consumption rather than from occasional small doses (Faust and Aly, 1981; James and Evison, 1989; Thurston et al., 1979).

Lead was detected in 37 sediment sampling stations, which allowed for intricate statistical analysis. Data were first separated into their corresponding watershed, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Magnesium. Magnesium is the eighth most abundant element and occurs naturally in a variety of minerals as mica, chlorites, amphiboles, dolomites, augites, pyroxenes, granites, talc, silicates, and serpentines (Thurston et al., 1979).

Magnesium is a common constituent of natural waters and is an important contributor to its hardness. Its concentration can vary from zero to several hundred milligrams per liter, depending on the source and treatment of the water. Magnesium concentration has to be carefully monitored because more than 125 mg/L can be cathartic or diuretic (Brown et al., 1962; Cowan, 1995).

Primary sources of magnesium for biological organisms are rocks, soils, air, and water. Plants and animals absorb magnesium from these primary sources and after dying, return it to the environment, creating a magnesium cycle in the food web (Thurston et al., 1979).

Magnesium was detected in all 46 sediment sampling stations, which allowed more intricate statistical analysis. Station MLN02 was considered a serious outlier (6500 mg/L), and was removed from analysis (Figure 4.2).

Data were first separated into their corresponding watershed, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences ($\alpha = 0.05$) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Manganese. Manganese is found in salts and minerals such as manganese dioxide, carbonate, and silicate. It occurs in domestic water, industrial effluents, and receiving streams. Its primary sources are soils, where it is present as manganese oxide, and acid discharges of industrial wastes and mines. It is harmlessly ingested by humans as a trace nutrient in food, but high concentrations can cause liver damage (Thurston et al., 1979).

In marine waters, manganese is known to rapidly assimilate and bioaccumulate in shellfish, leading to a potential vector for human contamination. It is not a problem in domestic waters and the primary concerns associated with its high concentrations are the brown color and bad taste of water (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

It is a vital micronutrient for flora and fauna, and its absence may cause leafing disorders in plants and reproductive problems in animals (Faust and Aly, 1981; Thurston et al., 1979).

Manganese was detected in 44 sediment sampling stations, allowed for intricate statistical analysis. Data were first separated into their corresponding watershed, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Mercury. Mercury is a silver-white liquid metal that is non-essential and non-beneficial. There are several mercury-bearing minerals in nature, but sulfides, cinnabar, and metacinnabar, are the most common. Because of its tendency to vaporize, strong ligand affinity and ease of adsorption onto surfaces, mercury is widely distributed in rocks, soils, air and water. It enters aquatic systems through runoff of mining, agriculture, and waste discharges. Its concentration in unpolluted waters is less than 0.1 μg/L, and in marine waters it ranges from 0.03 to 0.2 μg/L. It is present in natural waters as simple chloride and hydroxide complexes, depending on pH and chloride ion concentrations (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

It may be methylated in aquatic environments by both biological and non-biological processes, and it is commonly present as monomethylmercury and dimethylmercury. Certain microorganisms, depending on pH and temperature, have the ability to convert inorganic forms of mercury to the highly toxic monomethyl or dimethyl compounds, thus making any mercury isotope potentially harmful to the environment (Faust and Aly, 1981; Thurston et al., 1979).

Because of its toxic nature, mercury has been extensively studied. Toxicity may be acute or chronic varying with the form of mercury and its mode of entry into the organism. The majority of mercury present in an aquatic system will be found in the sediment where it is easily bioconcentrated in shellfish and fish. Because of methylation and bioconcentration of methylmercury, its limits must take into consideration the food chain path from aquatic organisms to humans. For humans, the maximum daily intake levels from all sources (air, water, and food) should not exceed 30 μg/day (Brown et al., 1962; Thurston et al., 1979).

Mercury was detected in only five sediment sampling stations, which did not allow for statistical comparisons between the different watershed basins. Therefore, these data values, along with one-half the reported non-detection levels were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-1 through F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Potassium. Potassium, a silvery white metal, is the seventh most abundant element on earth. It is present in natural waters, but usually less than magnesium, sodium, or calcium. The principal sources of potassium are silicates, igneous, and sedimentary rocks. Potassium has no special significance in natural water quality and is generally used as a tracer element and an indicator of the geological origin of the water (Thurston et al., 1979).

Potassium metal may ignite spontaneously on contact with air at room temperature, and reacts explosively with water to form potassium hydroxide and/or potassium oxide. It reacts with the moisture on skin and other tissues to form highly corrosive potassium hydroxide. Contact of metallic potassium with the skin, eyes, or mucous membranes causes severe burns, and thermal burns may occur due to ignition of the metal and liberated hydrogen. Potassium salts are essential for life. The potassium cation is the major cation in intracellular fluids, and is essential for nerve and heart function (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Potassium was detected in 42 sediment sampling stations, which allowed more intricate statistical analysis. One extreme outlier was detected at station MLN002 (2100 mg/kg), and were removed from data analyses.

Data were first separated into their corresponding watersheds, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Silver. Silver is a brilliant white metal that is rare and expensive. It occurs in ores such as argentite, lead, lead-zinc, copper and gold. It is harder than gold and is very ductile and malleable. Pure silver has the highest electrical and thermal conductivity of all metals, and possesses the lowest contact resistance. Silver is stable in pure air and water, but tarnishes when exposed to ozone, hydrogen sulphide, or air containing sulfur (Thurston et al., 1979).

Silver has no biological role, and it is a non-essential, non-beneficial element, that is toxic to aquatic life. Silver is toxic because once it is absorbed, it accumulates indefinitely in tissues particularly the skin, eyes, and mucus membranes. Silver also has a bacteriological action and has been added to water as a disinfectant, at concentrations that do not harm human health. The toxicity and the degree of dissociation of silver compounds to aquatic life varies depending on species (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Silver was detected in 5 sediment sampling stations. Because of this relatively low number of hits, statistical comparisons between the different watershed basins could not be done. Therefore, these data values, along with one-half the reported non-detection levels were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-1 through F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

<u>Sodium</u>. Sodium, a soft, bright, silvery metal, is the fourth most abundant element on earth, comprising about 2.6% of the earth's crust. It is a very reactive element, and it is never found free in nature. (Thurston et al., 1979).

The most common compound is sodium chloride, but it occurs in many other minerals, such as soda ash (Na_2CO_3), baking soda ($NaHCO_3$), caustic soda ($NaOH$), Chile saltpeter ($NaNO_3$), di- and tri-sodium phosphates, sodium thiosulfate ((hypo, $Na_2S_2O_3$) . $5H_2O$), and borax ($Na_2B_4O_7$. $10H_2O$) (Faust and Aly, 1981; Thurston et al., 1979).

Sodium compounds are important to the paper, glass, soap, textile, petroleum, chemical, and metal industries. Soap is generally a sodium salt of certain fatty acids. The importance of common salt to animal nutrition has been recognized since prehistoric times (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Sodium was detected in 42 sediment sampling stations, which allowed more intricate statistical analysis. One extreme outlier was detected at station MLN001 (12000 mg/kg), and was removed from data analyses.

Data were first separated into their corresponding watersheds, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

<u>Thallium</u>. Thallium is a soft, malleable, lustrous, silver-gray metal, that resembles aluminum chemically and lead physically. A heavy oxide builds up on

thallium if exposed to air, and in the presence of water, the hydroxide is formed (Thurston et al., 1979).

Thallium occurs in crooksite, lorandite, and hutchinsonite. It is also present in pyrites and is recovered from the roasting of this ore in connection with the production of sulfuric acid (Thurston et al., 1979).

Natural thallium is a mixture of two isotopes, and it is suspected of carcinogenic potential for humans. Thallium sulfate has been widely employed as a rodenticide and ant killer (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Thallium was detected in three sediment sampling stations, which did not allow for intricate statistical analysis. Two extreme "outliers" were detected at stations TEL004 (5.4 mg/kg) and NSC001 (2.9 mg/kg), but they were not removed from data analyses.

Because thallium had a relatively low number of hits, statistical comparisons between the different watershed basins could not be done. Therefore, these data values, along with one-half the reported non-detection levels were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-1 through F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Vanadium. Pure vanadium is a silvery metal, and is soft and ductile. It has good corrosion resistance to alkalis, sulfuric and hydrochloric acid, and salt water. It is found in numerous minerals such as carnotite, roscoelite, vanadinite, and patronite. Vanadium is also found in phosphate rock, certain iron ores, meteorites, and in some crude oils in the form of organic complexes (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

Vanadium metal is important in a number of areas. Its structural strength and neutron cross section properties makes it useful in nuclear applications. The metal is used for producing rust-resistant springs and steels used for making tools. About 80% of the vanadium now produced is used as ferrovanadium or as a steel additive. The metal oxidizes readily above 660°C to form V_2O_5, and this pentoxide is used in ceramics and as a chemical catalyst. Vanadium compounds are also used for dyeing and printing fabrics (Faust and Aly, 1981; Thurston et al., 1979).

Vanadium and its compounds are toxic and should be handled with care. However, vanadium is essential to sea squirts that can bioaccumulate concentrations a million times higher than that of sea water. Vanadium is also a necessary part of the diet of rats and chicks, but only in very small amounts.

Deficiencies cause reduced growth and impair reproduction (Thurston et al., 1979).

Vanadium was detected in 37 sediment sampling stations, which allowed more intricate statistical analyses. Two extreme outliers were detected at stations SRW002 (11 mg/kg) and MLN002 (12 mg/kg), and were removed from data analyses.

Data were first separated into their corresponding watershed, and their mean, minimum, maximum, and standard deviation computed (Appendix F, Tables F-1 through F-4). A non-parametric analysis of variance (ANOVA) with the Bonferroni procedure for multiple comparisons was used to check if there were statistically significant differences (α =0.05) between the different basin groups. Results did not provide enough evidence for statistically significant differences. Therefore, for screening background values (Appendix F, Table F-4), all sediment data were averaged into a group labeled "Combined Background Sediment", and data are given as twice the mean (USEPA, 1998).

Zinc. Zinc is present in natural waters mainly as hydroxide, chloride, and carbonate depending on pH and other factors. The hydroxides are usually in the form of colloids or adsorbed on particulate matter. There is also evidence to suggest that much of the zinc in natural waters is contained in organic complexes. Zinc is essential for human growth, but can be toxic to lower organisms. Its toxicity to aquatic organisms depends on various factors such as temperature, pH , and dissolved oxygen (Brown et al., 1962; Faust and Aly, 1981; Thurston et al., 1979).

The natural concentration of zinc in uncontaminated water is between 0.2-5.0 μg dm^{-3}, the average concentration in US drinking waters is between 0.06 and 7.0 mg/L, and oceanic surface waters contain between 0.4 and 12.6 μg dm^{-3}. Zinc enters the water supply from sources including industrial waste products, the deterioration of galvanized pipes, and from the dezincification of brass (Faust and Aly, 1981; Thurston et al., 1979).

Zinc was detected in only ten sediment sampling stations, and because of this relatively low number of hits, statistical comparisons between the different watershed basins could not be done. Therefore, these data values, along with one-half the reported non-detection levels were used to compute the mean, minimum, maximum, and standard deviation for the corresponding basin (Appendix F, Tables F-1 through F-4). The Screening table "Combined Background Sediment" values were computed by averaging all hits and one-half the reported non-detections (Appendix A, Table A-4).

Table 5.1. List of parameters, the EPA methods used to analyze each, and detection limits, in sediment samples collected for the KSC Background Study.

	EPA Method	Lab Reporting Limit for sediment
Organochlorine Pesticides		
4,4' - DDD	8081	3.3 µg/kg
4,4' - DDE	8081	3.3 µg/kg
4,4' - DDT	8081	3.3 µg/kg
Aldrin	8081	3.3 µg/kg
Alpha - BHC	8081	3.3 µg/kg
Beta - BHC	8081	3.3 µg/kg
Chlordane, alpha or gamma	8081	1 µg/kg
Chlordane (Total)	8081	3.3 µg/kg
Delta - BHC	8081	3.3 µg/kg
Dieldrin	8081	3.3 µg/kg
Endosulfan I	8081	3.3 µg/kg
Endosulfan II (beta)	8081	3.3 µg/kg
Endosulfan Sulfate	8081	3.3 µg/kg
Endrin	8081	3.3 µg/kg
Endrin Aldehyde	8081	3.3 µg/kg
Endrin Ketone	8081	3.3 µg/kg
Gamma - BHC (Lindane)	8081	3.3 µg/kg
Heptachlor	8081	3.3 µg/kg
Heptachlor Epoxide(a)	8081	3.3 µg/kg
Heptachlor Epoxide(b)	8081	3.3 µg/kg
Isodrin	8081	3.3 µg/kg
Methoxychlor	8081	3.3 µg/kg
Mirex	8081	3.3 µg/kg
Toxaphene	8081	2 µg/kg
Aroclors		
PCB-1016/1242	8082	33 µg/kg
PCB-1221	8082	33 µg/kg
PCB-1232	8082	33 µg/kg
PCB-1248	8082	33 µg/kg
PCB-1254	8082	33 µg/kg
PCB-1260	8082	33 µg/kg
Chlorinated Herbicides		
2-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	8151	10 µg/kg
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	8151	10 µg/kg

Table 5.1. (cont.).

	EPA Method	Lab Reporting Limit for sediment
Chlorinated Herbicides (cont.)		
2,4-Dichlorophenoxy acetic acid (2,4 - D)	8151	10 µg/kg
3,5-DCBA	8151	10 µg/kg
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	8151	10 µg/kg
4 - Nitrophenol	8151	10 µg/kg
Acifluorfen	8151	10 µg/kg
Bentazon	8151	10 µg/kg
Chloramben	8151	10 µg/kg
Dacthal	8151	10 µg/kg
Dalapon	8151	10 µg/kg
Dicamba	8151	10 µg/kg
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	8151	10 µg/kg
Dinoseb	8151	10 µg/kg
MCPA	8151	100 µg/kg
MCPP	8151	100 µg/kg
Pentachlorophenol	8151	10 µg/kg
Picloram	8151	10 µg/kg
PAHs		
1 - Methylnaphthalene	8310	17 µg/kg
2 - Methylnaphthalene	8310	17 µg/kg
Acenaphthene	8310	17 µg/kg
Acenaphthylene	8310	3.3 µg/kg
Anthracene	8310	17 µg/kg
Benzo(a)anthracene	8310	1.7 µg/kg
Benzo(a)pyrene	8310	2.0 µg/kg
Benzo(b)fluoranthene	8310	3.0 µg/kg
Benzo(g,h,i)perylene	8310	3.3 µg/kg
Benzo(k)fluoranthene	8310	2.0 µg/kg
Chrysene	8310	1.7 µg/kg
Dibenzo(a,h)anthracene	8310	3.3 µg/kg
Fluoranthene	8310	3.3 µg/kg
Fluorene	8310	3.3 µg/kg
Indeno(1,2,3-cd)pyrene	8310	1.7 µg/kg
Naphthalene	8310	17 µg/kg
Phenanthrene	8310	1.7 µg/kg
Pyrene	8310	1.7 µg/kg

Table 5.1. (cont.).

	EPA Method	Lab Reporting Limit for sediment
Metals		
Aluminum	200.7	20 mg/kg
Antimony	204.2	2 mg/kg
Arsenic	6010	0.5 mg/kg
Barium	6010	20 mg/kg
Beryllium	6010	1 mg/kg
Cadmium	6010	1 mg/kg
Calcium	6010	25 mg/kg
Chromium (total)	6010	1 mg/kg
Cobalt	6010	5 mg/kg
Copper	6010/7210	5 mg/kg
Iron	6010	10 mg/kg
Lead	6010	1 mg/kg
Magnesium	6010	25 mg/kg
Manganese	6010	1 mg/kg
Mercury	7471	0.01 mg/kg
Nickel	6010/7520	5 mg/kg
Potassium	6010/7610	25 mg/kg
Selenium	6010	2 mg/kg
Silver	6010	2 mg/kg
Sodium	7770	25 mg/kg
Thallium	6010	1 mg/kg
Vanadium	6010	1 mg/kg
Zinc	6010/7950	5 mg/kg
Other Parameters		
pH	9045	NA
Percent Solids	SM2540G	NA
Resistivity	Miller	NA
Total Organic Carbon	MSA Part2, 29-3	NA
Texture (No. 4,10,40,60,100,200)	Sieve Method	NA

Table 5.2. Name, number of hits, and frequency of analytes occurring above detection limits occuring in sediment samples. For screening table values, the four parameters with only one hit out of 46 samples were considered as non-detect by the NASA/KSC Remediation Program Team.

Parameter	Number of Hits	Frequency %
Organochlorine pesticides		
4,4' - DDD	0	0
4,4' - DDE	0	0
4,4' - DDT	0	0
Aldrin	0	0
Alpha - BHC	0	0
Beta - BHC	0	0
Chlordane (alpha)	0	0
Chlordane (gamma)	0	0
Chlordane (Total)	0	0
Delta – BHC	0	0
Dieldrin	1	2.17
Endosulfan I	0	0
Endosulfan II (beta)	0	0
Endosulfan Sulfate	0	0
Endrin	0	0
Endrin Aldehyde	0	0
Endrin Ketone	0	0
Gamma – BHC (Lindane)	0	0
Heptachlor	0	0
Heptachlor Epoxide(a)	0	0
Heptachlor Epoxide(b)	0	0
Isodrin	0	0
Methoxychlor	0	0
Mirex	0	0
Toxaphene	0	0
Aroclors		
PCB-1016/1242	0	0
PCB-1221	0	0
PCB-1232	0	0
PCB-1248	0	0
PCB-1254	0	0
PCB-1260	0	0

Table 5.2. (cont.).

Parameter	Number of Hits	Frequency %
Chlorinated Herbicides		
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	0	0
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	2	4.35
2,4-Dichlorophenoxy acetic acid (2,4 - D)	2	4.35
3,5-DCBA	0	0
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	0	0
4 – Nitrophenol	0	0
Acifluorfen	0	0
Bentazon	0	0
Chloramben	0	0
Dacthal	0	0
Dalapon	0	0
Dicamba	0	0
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	0	0
Dinoseb	0	0
MCPA	0	0
MCPP	0	0
Pentachlorophenol	0	0
Picloram	0	0
Polyaromatic Hydrocarbons		
1 – Methylnaphthalene	0	0
2 – Methylnaphthalene	1	2.17
Acenaphthene	0	0
Acenaphthylene	0	0
Anthracene	0	0
Benzo(a)anthracene	3	6.52
Benzo(a)pyrene	4	8.70
Benzo(b)fluoranthene	5	10.87
Benzo(g,h,i)perylene	1	2.17
Benzo(k)fluoranthene	4	8.70
Chrysene	6	13.04
Dibenzo(a,h)anthracene	0	0
Fluoranthene	3	6.52
Fluorene	0	0

Table 5.2. (cont.).

Parameter	Number of Hits	Frequency %
Polyaromatic Hydrocarbons (cont.)		
Indeno(1,2,3-cd)pyrene	1	2.17
Naphthalene	4	8.70
Phenanthrene	3	6.52
Pyrene	2	4.35
Metals		
Aluminum	46	100
Antimony	0	0
Arsenic (as carcinogen)	20	43.48
Barium	0	0
Beryllium	0	0
Cadmium	0	0
Calcium	45	97.83
Chromium (total)	37	80.43
Cobalt	0	0
Copper	6	13.04
Iron	46	100
Lead	37	80.43
Magnesium	46	100.00
Manganese	44	95.65
Mercury (inorganic)	5	10.87
Nickel	0	0
Potassium	42	91.30
Selenium	0	0
Silver	5	10.87
Sodium	45	97.83
Thallium	3	6.52
Vanadium	37	80.43
Zinc	10	21.74
Other Parameters		
Percent Solids	46	100
Total Organic Carbon	38	82.61

Table 5.3 Parameters that were below detection limits (non-detect) in all sediment samples.

Organochlorine pesticides (8081)
4,4' - DDD
4,4' - DDE
4,4' - DDT
Aldrin
Alpha - BHC
Beta - BHC
Chlordane (Total)
Chlordane, alpha
Chlordane,gamma
Delta - BHC
Endosulfan I
Endosulfan II (beta)
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Endrin Ketone
Gamma - BHC (Lindane)
Heptachlor
Heptachlor Epoxide(a)
Heptachlor Epoxide(b)
Isodrin
Methoxychlor
Mirex
Toxaphene
Aroclors (8082)
PCB-1016/1242
PCB-1221
PCB-1232
PCB-1248
PCB-1254
PCB-1260

Chlorinated Herbicides (8151)
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)
3,5-DCBA
4-(2,4-Dichlorophenoxy)butyrica acid (2,4 - DB)
4 - Nitrophenol
Acifluorfen
Bentazon
Chloramben
Dacthal
Dalapon
Dicamba
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]
Dinoseb
MCPA
MCPP
Pentachlorophenol
Picloram
Polyaromatic Hydrocarbons (8310)
1 – Methylnaphthalene
Acenaphthene
Acenaphthylene
Anthracene
Dibenzo(a,h)anthracene
Fluorene
Metals
Antimony
Barium
Beryllium
Cadmium
Cobalt
Nickel
Selenium

Table 5.4 Parameters that were determined by the NASA/KSC Remediation team to be below detection limits (non-detect) for all sediment samples based on low frequency of detection.

Organochlorine pesticides (8081)
Dieldrin
Polyaromatic Hydrocarbons (8310)
2-Methylnapthalene
Benzo(g,h,I)perylene
Indeno(1,2,3-cd)pyrene

SECTION 6
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Appendix A

KSC Background Screening Tables for Soils, Groundwater, Surface Water, and Sediments of Kennedy Space Center

How to use the KSC Background Screening Tables provided in this Appendix.

Soil:

The KSC Background soil screening table has 11 classes. The NASA/KSC Remediation Team decision for screening purposes only allows inorganic data to be used as a screening tool. Organic data should be discussed in the uncertainity section of reports. Combined values for pesticides (as noted on table) can be used for the following classes: saltwater wetland, citrus hammock, citrus scrub, and disturbed.

Steps for screening your data against the KSC Background soil screening table (Appendix A, Table A-1) as determined by the NASA/KSC Remediation Team:

1. Screen site data against the combined mean.

2. If the site value is higher than the combined mean, go to the soil class that corresponds to site data sampling locations. Figure 2.2 illustrates KSC Background classification information. Individual site maps can be obtained, upon reqest, from NASA support contractor when additional site details are needed.

Groundwater:

The NASA/KSC Remediation Team decision on groundwater was to separate the groundwater according to Rule 62-520.410 F.A.C. Class G-II and Class G-III. The NASA/KSC Remediation Team decision for screening purposes only allows inorganic data to be used as a screening tool. Organic data should be discussed in the uncertainity section of reports

Steps for screening your data against the KSC Background groundwater screening table (AppenidxA, Table A-2) as determined by the NASA/KSC Remediation Team:

1. Collect total dissolved solid data at all groundwater sampling locations.

2. Determine proper groundwater class for site data based on total dissolved solid data.
   Class G-II defined as total dissolved solids less than 10,000 mg/L.
   Class G-III defined as total dissolved solids greater than 10,000 mg/L.

Surface Water:

The NASA/KSC Remediation Team decision for surface water resulted in eight classes. The NASA/KSC Remediation Team decision for screening purposes only allows inorganic data to be used as a screening tool. Organic data should be discussed in the uncertainity section of reports

Steps for screening your data against the KSC Background surface water screening table (Appendix A, Table A-3) as determined by the NASA/KSC Remediation Team:

1. Collect salinity measurements at all surface water sampling locations.
2. Compare site sample data to the surface water combined values based on the appropriate salinity ranges. If the site value is higher than the KSC Background combined salinity value, go to the appropriate surface water basin class for site data in the KSC Background surface water table and compare site value to that. Refer to Figure 4.1, for basin classes.

Sediment:

The NASA/KSC Remediation Team decision was to have only one class for sediment (AppendixA, Table A-4). The NASA/KSC Remediation Team decision for screening purposes only allows inorganic data to be used as a screening tool. Organic data should be discussed in the uncertainity section of reports

Table A-1. KSC Background screening tables for soils. Only metals values can be used as a screening tool. Organic values may not be used as a screening tool. Organics should be discussed in the uncertainty section of reports. * Combined mean for these pesticides can only be used for the following classes: saltwater wetland, citrus hammock, citrus scrub, and disturbed. All other classes are non detect for these pesticides. * * Team consensus determined that these parameters are non-detect based on frequency of detection. ND = non-detect

		All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetland	Saltwater Wetland	Citrus Scrub	Citrus Hammock	Disturbed
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Organochlorine Pesticides (8081)												
4,4'-DDD *	mg/kg	0.0066	ND	ND	ND	0.0046	ND	ND	0.016	ND	ND	0.0044
4,4'-DDE *	mg/kg	0.016	ND	ND	ND	0.0043	ND	ND	0.011	0.028	0.011	0.015
4,4'-DDT *	mg/kg	0.014	ND	ND	ND	ND	ND	ND	0.016	0.024	0.0039	0.012
Sum 4,4'-DDD +4,4'-DDE + 4,4'-DDT *	mg/kg	0.037	ND	ND	ND	0.013	ND	ND	0.042	0.056	0.018	0.031
Aldrin	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alpha - BHC	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Beta - BHC	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (alpha)**	mg/kg	0.0048	ND	ND	ND	ND	ND	ND	ND	0.004	ND	ND
Chlordane (gamma) * *	mg/kg	0.0048	ND	ND	ND	ND	ND	ND	ND	0.0038	ND	0.004
Chlordane (total) * *	mg/kg	0.0048	ND	ND	ND	ND	ND	ND	ND	0.0087	ND	ND
Delta – BHC	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin*	mg/kg	0.015	0.0036	ND	ND	ND	ND	ND	0.0079	0.028	0.02	0.004
Endosulfan I	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II (beta)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Ketone * *	mg/kg	0.0043	ND	ND	ND	0.0044	ND	ND	ND	ND	ND	ND
Gamma -BHC (Lindane) * *	mg/kg	0.0044	ND	ND	ND	ND	ND	ND	0.008	ND	ND	0.004
Heptachlor	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (a)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (b)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isodrin	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table A-1 (cont.). KSC Background screening tables for soils on KSC. Only metals values can be used as a screening tool. Organic values may not be used as a screening tool. Organics should be discussed in the uncertainty section of reports. * Combined mean for these pesticides can only be used for the following classes: saltwater wetland, citrus hammock, citrus scrub, and disturbed. All other classes are non detect for these pesticides. * * Team consensus determined that these parameters are non-detect based on frequency of detection. ND = non-detect

		All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetland	Saltwater Wetland	Citrus Scrub	Citrus Hammock	Disturbed
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Organochlorine Pesticides (8081) (cont.)												
Methoxychlor	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mirex	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclors (8082)												
PCB - 1016/1242	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1221	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1232	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1248	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1254	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1260	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorinated Herbicides (8151)												
2-(2,4,5 - Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	mg/kg	0.018	ND	ND	ND	ND	0.016	ND	ND	ND	0.019	0.045
2,4,5 - Trichlorophenoxy acetic acid (2,4,5 – T)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4 – Dichlorophenoxy acetic acid (2,4 – D)	mg/kg	0.016	ND	0.014	ND	ND	ND	ND	0.035	ND	0.018	ND
3,5 - DCBA	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-(2,4 - Dichlorophenoxy) butyric acid (2,4 – DB)	mg/kg	0.016	0.012	0.013	ND	ND	ND	ND	ND	0.019	ND	0.018
4 - Nitrophenol	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acifluorfen	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bentazon	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloramben	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table A-1 (cont.). KSC Background screening tables for soils. Only metals values can be used as a screening tool. Organic values may not be used as a screening tool. Organics should be discussed in the uncertainty section of reports. * Combined mean for these pesticides can only be used for the following classes: saltwater wetland, citrus hammock, citrus scrub, and disturbed. All other classes are non detect for these pesticides. * * Team consensus determined that these parameters are non-detect based on frequency of detection. ND = non-detect

		All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetland	Saltwater Wetland	Citrus Scrub	Citrus Hammock	Disturbed
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Chlorinated Herbicides (8151) (cont.)												
Dacthal	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dalapon	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dicambia	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MCPA	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MCPP	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Picloram	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sum of Chlorinated Herbicides	mg/kg	0.05	0.032	0.038	0.03	0.036	0.046	0.072	0.093	0.048	0.052	0.079
Polyaromatic Hydrocarbons (8310)												
1-Methylnaphthalene	mg/kg	0.028	ND	0.036	0.030	ND	0.027	ND	ND	ND	0.019	0.025
2-Methylnaphthalene	mg/kg	0.033	0.042	0.044	0.025	ND	ND	ND	ND	0.041	0.021	0.027
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	mg/kg	0.0058	0.0076	ND	ND	ND	ND	ND	ND	0.0072	ND	ND
Anthracene	mg/kg	0.027	ND	ND	ND	ND	ND	ND	ND	0.028	ND	ND
Benzo(a)anthracene	mg/kg	0.0049	0.002	ND	0.0034	0.0042	0.0038	ND	ND	0.0039	0.0022	0.019
Benzo(a)pyrene	mg/kg	0.0067	0.0028	0.0036	ND	ND	0.0036	0.0084	ND	0.0049	0.0029	0.033
Benzo(b)fluoranthene	mg/kg	0.0076	0.0037	ND	ND	ND	0.0061	ND	ND	0.0059	0.004	0.028
Benzo(g,h,i)perylene	mg/kg	0.0096	ND	ND	ND	ND	0.0096	ND	ND	0.0069	0.0061	0.038
Benzo(k)fluoranthene	mg/kg	0.0058	0.0027	ND	ND	ND	0.0055	ND	ND	0.0056	0.0022	0.024
Chrysene	mg/kg	0.0062	0.0022	0.0038	0.0028	0.0045	0.0038	ND	ND	0.0057	0.0021	0.030

Table A-1 (cont.). KSC Background screening tables for soils. Only metals values can be used as a screening tool. Organic values may not be used as a screening tool. Organics should be discussed in the uncertainty section of reports. * Combined mean for these pesticides can only be used for the following classes: saltwater wetland, citrus hammock, citrus scrub, and disturbed. All other classes are non detect for these pesticides. * * Team consensus determined that these parameters are non-detect based on frequency of detection. ND = non-detect

		All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetland	Saltwater Wetland	Citrus Scrub	Citrus Hammock	Disturbed
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Polyaromatic Hydrocarbons (8310) (cont.)												
Dibenzo(a,h)anthracene	mg/kg	0.0061	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.012
Fluoranthene	mg/kg	0.014	ND	ND	0.0055	ND	0.026	ND	ND	0.0069	ND	0.070
Fluorene	mg/kg	0.0068	ND	ND	ND	ND	0.022	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	mg/kg	0.0058	0.0022	ND	ND	ND	0.0038	ND	ND	0.0042	0.004	0.026
Naphthalene	mg/kg	0.059	0.019	0.03	ND	0.15	0.026	ND	ND	0.22	0.037	ND
Phenanthrene	mg/kg	0.0082	0.0032	0.0051	ND	ND	0.011	ND	ND	0.022	ND	0.024
Pyrene	mg/kg	0.01	ND	ND	0.0028	ND	0.043	ND	ND	0.003	ND	0.038
Sum of PAHs	mg/kg	0.24	0.14	0.20	0.15	0.34	0.25	0.69	0.22	0.40	0.14	0.45
Metals												
Aluminum	mg/kg	2889.23	565.22	405.6	2003.2	329.4	4790	658.9	5367.6	2344.3	3642.6	4982.5
Antimony	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	mg/kg	1.51	4.67	1.26	0.63	0.61	0.87	1.22	2.64	0.72	1.05	1.41
Barium	mg/kg	26.14	19.94	ND	ND	ND	ND	ND	ND	ND	ND	26
Beryllium	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	mg/kg	1.24	0.97	ND	ND	ND	ND	ND	ND	1.28	ND	ND
Calcium	mg/kg	32932.47	100087	300.7	44113.5	766.2	22556	1532.4	23254.3	4201.7	22198.3	86107
Chromium	mg/kg	9.09	4.22	1.67	4.51	ND	6.93	2.28	9.01	24.37	23.57	7.7
Cobalt	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	mg/kg	27.88	3.69	6.5	ND	5.6	8.65	11.3	ND	107.1	108.07	5.1
Iron	mg/kg	2567	2126.1	480.8	3023.6	288.3	3435	576.6	3009.5	3004.3	3969.6	3566.8
Lead	mg/kg	11.64	4.31	3.06	8	4.88	12.48	9.75	33.2	19.41	11.68	10.12
Magnesium	mg/kg	1098.43	740	55.91	175.23	224.62	1068.2	449.2	6581.9	465.1	754.8	577.7
Manganese	mg/kg	51.5	22.7	5.05	108.37	1.87	29.5	3.73	20.2	164	117.48	15.79

Table A-1 (cont.). KSC Background screening tables for soils. Only metals values can be used as a screening tool. Organic values may not be used as a screening tool. Organics should be discussed in the uncertainty section of reports. * Combined mean for these pesticides can only be used for the following classes: saltwater wetland, citrus hammock, citrus scrub, and disturbed. All other classes are non detect for these pesticides. * * Team consensus determined that these parameters are non-detect based on frequency of detection. ND = non-detect

		All Soils	Coastal	Acid Scrub	Coquina Scrub	Flatwoods	Hammocks	Freshwater Wetland	Saltwater Wetland	Citrus Scrub	Citrus Hammock	Disturbed
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Metals (cont.)												
Mercury	mg/kg	0.31	ND	ND	0.016	0.013	0.079	0.026	0.036	0.024	0.032	0.022
Nickel	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	mg/kg	458.08	116.78	85.23	148.05	114	229.2	228	3261.9	189.13	243.39	145.43
Selenium	mg/kg	2.5	ND	ND	ND	ND	3.05	4.9	ND	ND	ND	2.4
Silver	mg/kg	2.54	2.04	ND	2.25	ND	ND	ND	ND	ND	ND	2.28
Sodium	mg/kg	2918.57	922.6	25.28	348	97.38	337	194.8	27542.9	34.03	76.5	672.7
Thallium	mg/kg	1.37	1.53	ND	ND	ND	ND	ND	ND	1.18	1.84	ND
Vanadium	mg/kg	6.37	4.71	1.45	4.43	1.57	10.31	3.14	14.7	4.04	8.91	6.87
Zinc	mg/kg	30.28	13.2	10.47	9.99	15.4	25.53	30.8	15.5	98.45	58.4	23.58

Table A-2. KSC Background screening tables for groundwater. Groundwater has been divided based on F.A.C. groundwater classifications Class G-II (total dissolved solids <10,000) and Class G-III (total dissolved solids >10,000). ND = non-detect

		Class G-II N = 41	Class G-III N = 16
Parameter	Units	Mean X 2	Mean X 2
Organochlorine pesticides (8081)			
4,4' –DDD	μg/L	ND	ND
4,4' –DDE	μg/L	ND	ND
4,4' –DDT	μg/L	ND	ND
Aldrin	μg/L	ND	ND
Alpha – BHC	μg/L	ND	ND
Beta – BHC	μg/L	ND	ND
Chlordane (alpha)	μg/L	ND	ND
Chlordane (gamma)	μg/L	ND	ND
Chlordane (total)	μg/L	ND	ND
Delta – BHC	μg/L	ND	ND
Dieldrin	μg/L	ND	ND
Endosulfan I	μg/L	ND	ND
Endosulfan II (beta)	μg/L	ND	ND
Endosulfan Sulfate	μg/L	ND	ND
Endrin	μg/L	ND	ND
Endrin Aldehyde	μg/L	ND	ND
Endrin Ketone	μg/L	ND	ND
Gamma - BHC (Lindane)	μg/L	ND	ND
Heptachlor	μg/L	ND	ND
Heptachlor Epoxide (a)	μg/L	ND	ND
Heptachlor Epoxide (b)	μg/L	ND	ND
Isodrin	μg/L	ND	ND
Methoxychlor	μg/L	ND	ND
Mirex	μg/L	ND	ND
Toxaphene	μg/L	ND	ND

Table A-2 (cont.). KSC Background screening tables for groundwater. Groundwater has been divided based on F.A.C. groundwater classifications Class G-II (total dissolved solids <10,000) and Class G-III (total dissolved solids >10,000). ND = non-detect

		Class G-II N = 41	Class G-III N = 16
Parameter	Units	Mean X 2	Mean X 2
Aroclors (8082)			
PCB - 1016/1242	µg/L	ND	ND
PCB – 1221	µg/L	ND	ND
PCB – 1232	µg/L	ND	ND
PCB – 1248	µg/L	ND	ND
PCB – 1254	µg/L	ND	ND
PCB – 1260	µg/L	ND	ND
Chlorinated Herbicides (8151)			
2-(2,4,5 - Trichlorophenoxy) propionic acid (2,4,5 – TP) Silvex	µg/L	ND	ND
2,4,5-Triclorophenoxy acetic acid (2,4,5–T)	µg/L	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 - D)	µg/L	ND	ND
3,5 – DCBA	µg/L	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4–DB)	µg/L	ND	ND
4 - Nitrophenol	µg/L	ND	ND
Acifluorfen	µg/L	ND	ND
Bentazon	µg/L	ND	ND
Chloramben	µg/L	ND	ND
Dacthal	µg/L	ND	ND
Dalapon	µg/L	ND	ND
Dicambia	µg/L	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	ND	ND
Dinoseb	µg/L	ND	ND
MCPA	µg/L	ND	ND
MCPP	µg/L	ND	ND

Table A-2 (cont.). KSC Background screening tables for groundwater. Groundwater has been divided based on F.A.C. groundwater classifications Class G-II (total dissolved solids <10,000) and Class G-III (total dissolved solids >10,000). ND = non-detect

		Class G-II N = 41	Class G-III N = 16
Parameter	Units	Mean X 2	Mean X 2
Chlorinated Herbicides (8151) (cont.)			
Pentachlorophenol	µg/L	ND	ND
Picloram	µg/L	ND	ND
Polyaromatics Hydrocarbons (8310)			
1 – Methylnapthalene	µg/L	ND	ND
2 – Methylnapthalene	µg/L	ND	ND
Acenaphthene	µg/L	ND	ND
Acenapththylene	µg/L	ND	ND
Anthracene	µg/L	ND	ND
Benzo(a)anthracene	µg/L	0.07	0.07
Benzo(a)pyrene	µg/L	0.06	0.05
Benzo(b)fluoranthene	µg/L	0.11	ND
Benzo(g,h,i)perylene	µg/L	ND	ND
Benzo(k)fluoranthene	µg/L	0.05	0.06
Chrysene	µg/L	0.06	0.07
Dibenz(a,h)anthracene	µg/L	ND	ND
Fluoranthene	µg/L	0.13	ND
Fluorene	µg/L	ND	ND
Indeno(1,2,3-cd)pyrene	µg/L	0.05	0.06
Napthalene	µg/L	ND	ND
Phenanthrene	µg/L	ND	ND
Pyrene	µg/L	ND	ND
Metals			
Aluminum	µg/L	370	210
Antimony	µg/L	10	10
Arsenic (as carcinogen)	µg/L	30	20
Barium	µg/L	ND	160

Table A-2 (cont.). KSC Background screening tables for groundwater. Groundwater has been divided based on F.A.C. groundwater classifications Class G-II (total dissolved solids <10,000) and Class G-III (total dissolved solids >10,000). ND = non-detect

		Class G-II N = 41	Class G-III N = 16
Parameter	Units	Mean X 2	Mean X 2
Metals (cont.)			
Beryllium	µg/L	1	ND
Cadmium	µg/L	2	ND
Calcium	µg/L	337530	862500
Chromium	µg/L	10	ND
Chloride	µg/L	1822240	27712500
Cobalt	µg/L	ND	ND
Copper	µg/L	60	60
Iron	µg/L	1680	4000
Lead	µg/L	7	9
Magnesium	µg/L	95290	1946250
Manganese	µg/L	90	260
Mercury	µg/L	ND	ND
Nickel	µg/L	12	ND
Potassium	µg/L	24930	571750
Selenium	µg/L	11.6	20
Silver	µg/L	ND	10
Sodium	µg/L	1017890	16412500
Thallium	µg/L	2	ND
Vanadium	µg/L	10	ND
Zinc	µg/L	110	ND

Table A-3. KSC Background Screening Tables for surface water. Certain values have combined means based on the frequency of detection which was <20*, <10**, or <4*** hits. ND = non-detect.

		Combined Water		Banana	Banana	Ditches		Indian	Mosquito
		Salinity 0-5 ppt	Salinity ≥ 6 ppt	Creek	River	Salinity 0-5 ppt	Salinity ≥ 6 ppt	River Lagoon	Lagoon
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Organochlorine Pesticides (8081)									
4,4'-DDD	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Alpha - BHC	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Beta - BHC	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (alpha)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (gamma)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (total)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Delta - BHC	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin * * *	μg/L	ND	0.074	ND	ND	ND	0.068	0.154	ND
Endosulfan I	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II (beta)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Ketone	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Gamma -BHC (Lindane)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (a)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (b)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Isodrin	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Mirex	μg/L	ND	ND	ND	ND	ND	ND	ND	ND

Table A-3 (cont.). KSC Background Screening Tables for surface water. Certain values have combined means based on the frequency of detection which was <20*, <10**, or <4*** hits. ND = non-detect.

		Combined Water		Banana Creek	Banana River	Ditches		Indian River Lagoon	Mosquito Lagoon
		Salinity 0-5 ppt	Salinity ≥ 6 ppt			Salinity 0-5 ppt	Salinity ≥ 6 ppt		
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Organochlorine Pesticides (8081) (cont.)									
Toxaphene	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Aroclors (8082)									
PCB - 1016/1242	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1221	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1232	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1248	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1254	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB - 1260	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorinated Herbicides (8151)									
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
3,5 - DCBA	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
4 - Nitrophenol	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Acifluorfen	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Bentazon	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chloramben	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Dacthal	μg/L	ND	ND	ND	ND	ND	ND	ND	ND

Table A-3 (cont.). KSC Background Screening Tables for surface water. Certain values have combined means based on the frequency of detection which was <20*, <10**, or <4*** hits. ND = non-detect.

		Combined Water		Banana Creek	Banana River	Ditches		Indian River Lagoon	Mosquito Lagoon
		Salinity 0-5 ppt	Salinity ≥ 6 ppt			Salinity 0-5 ppt	Salinity ≥ 6 ppt		
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Chlorinated Herbicides (8151) (cont.)									
Dalapon	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Dicambia	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
MCPA	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
MCPP	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Picloram	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)									
1-Methylnaphthalene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene * * *	µg/L	ND	0.101	ND	ND	ND	ND	ND	0.14
Benzo(a)pyrene * * *	µg/L	ND	0.115	ND	0.132	ND	ND	ND	0.174
Benzo(b)fluoranthene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene* * *	µg/L	ND	0.108	ND	0.14	ND	ND	ND	0.126
Chrysene * * *	µg/L	ND	0.104	ND	ND	ND	ND	ND	0.16
Dibenzo(a,h)anthracene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND

Table A-3 (cont.). KSC Background Screening Tables for surface water. Certain values have combined means based on the frequency of detection which was <20*, <10**, or <4*** hits. ND = non-detect.

		Combined Water		Banana Creek	Banana River	Ditches		Indian River Lagoon	Mosquito Lagoon
		Salinity 0-5 ppt	Salinity $\geq$ 6 ppt			Salinity 0-5 ppt	Salinity $\geq$ 6 ppt		
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Polyaromatic Hydrocarbons (8310) (cont.)									
Indeno(1,2,3-cd)pyrene * * *	µg/L	ND	0.101	ND	ND	ND	ND	ND	0.14
Naphthalene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Sum of Polyaromatic Hydrocarbons	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Metals									
Aluminum	µg/L	642	895	2200	642	642	642	642	642
Antimony *	µg/L	15	19	11.3	16	15	33	24	16
Arsenic * *	µg/L	ND	17	16	29	ND	14.8	13	ND
Barium	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Beryllium * *	µg/L	ND	1.3	ND	2.3	ND	ND	ND	ND
Cadmium	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	µg/L	196760	680484	690000	483060	196760	483060	690000	690000
Chloride	µg/L	3054300	24193940	28590000	17430760	3054300	17430760	28590000	28590000
Chromium	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Copper	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Iron	µg/L	996	520	996	242	996	996	242	242
Lead *	µg/L	8.6	7.7	ND	8.5	8.6	ND	ND	15
Magnesium	µg/L	634276	2031515	2293600	634276	634276	2293600	2293600	2293600
Manganese *	µg/L	78	23	26	ND	78	ND	48	ND
Mercury	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	µg/L	65184	622182	527852	527852	65184	527852	528	1046667

Table A-3 (cont.). KSC Background Screening Tables for surface water. Certain values have combined means based on the frequency of detection which was <20*, <10**, or <4*** hits. ND = non-detect.

		Combined Water		Banana Creek	Banana River	Ditches		Indian River Lagoon	Mosquito Lagoon
		Salinity 0-5 ppt	Salinity ≥ 6 ppt			Salinity 0-5 ppt	Salinity ≥ 6 ppt		
Parameter	Units	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2	Mean X 2
Metals (cont.)									
Selenium * * *	μg/L	ND	20	ND	ND	ND	ND	25	ND
Silver * * *	μg/L	ND	2.8	ND	ND	ND	ND	2.6	ND
Sodium	μg/L	1789353	14012121	11380000	11380000	1789353	11380000	18061540	18061540
Thallium * * *	μg/L	ND	2.9	ND	ND	ND	ND	4	2.6
Vanadium	μg/L	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	μg/L	ND	ND	ND	ND	ND	ND	ND	ND

Table A-4. KSC Background Screening Tables for sediment. ND = non-detect.

Parameter	Units	Combined Sediment Mean X 2
Organochlorine Pesticides (8081)		
4,4'-DDD	mg/kg	ND
4,4'-DDE	mg/kg	ND
4,4'-DDT	mg/kg	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	mg/kg	ND
Aldrin	mg/kg	ND
Alpha - BHC	mg/kg	ND
Beta - BHC	mg/kg	ND
Chlordane (alpha)	mg/kg	ND
Chlordane (gamma)	mg/kg	ND
Chlordane (total)	mg/kg	ND
Delta - BHC	mg/kg	ND
Dieldrin	mg/kg	ND
Endosulfan I	mg/kg	ND
Endosulfan II (beta)	mg/kg	ND
Endosulfan Sulfate	mg/kg	ND
Endrin	mg/kg	ND
Endrin Aldehyde	mg/kg	ND
Endrin Ketone	mg/kg	ND
Gamma -BHC (Lindane)	mg/kg	ND
Heptachlor	mg/kg	ND
Heptachlor Epoxide (a)	mg/kg	ND
Heptachlor Epoxide (b)	mg/kg	ND
Isodrin	mg/kg	ND
Methoxychlor	mg/kg	ND
Mirex	mg/kg	ND
Toxaphene	mg/kg	ND
Aroclors (8082)		
PCB - 1016/1242	mg/kg	ND
PCB - 1221	mg/kg	ND
PCB - 1232	mg/kg	ND

Table A-4(cont.). KSC Background Screening Tables for sediment. ND = non-detect.

Parameter	Units	Combined Sediment Mean X 2
Aroclors (8082) (cont.)		
PCB - 1248	mg/kg	ND
PCB - 1254	mg/kg	ND
PCB - 1260	mg/kg	ND
Chlorinated Herbicides (8151)		
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	mg/kg	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	mg/kg	0.017
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	mg/kg	0.017
3,5 - DCBA	mg/kg	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	mg/kg	ND
4 - Nitrophenol	mg/kg	ND
Acifluorfen	mg/kg	ND
Bentazon	mg/kg	ND
Chloramben	mg/kg	ND
Dacthal	mg/kg	ND
Dalapon	mg/kg	ND
Dicambia	mg/kg	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	mg/kg	ND
Dinoseb	mg/kg	ND
MCPA	mg/kg	ND
MCPP	mg/kg	ND
Pentachlorophenol	mg/kg	ND
Picloram	mg/kg	ND

Table A-4(cont.). KSC Background Screening Tables for sediment. ND = non-detect.

Parameter	Units	Combined Sediment Mean X 2
Polyaromatic Hydrocarbons (8310)		
1-Methylnaphthalene	mg/kg	ND
2-Methylnaphthalene	mg/kg	ND
Acenaphthene	mg/kg	ND
Acenaphthylene	mg/kg	ND
Anthracene	mg/kg	ND
Benzo(a)anthracene	mg/kg	0.003
Benzo(a)pyrene	mg/kg	0.004
Benzo(b)fluoranthene	mg/kg	0.006
Benzo(g,h,i)perylene	mg/kg	ND
Benzo(k)fluoranthene	mg/kg	0.004
Chrysene	mg/kg	0.005
Dibenzo(a,h)anthracene	mg/kg	ND
Fluoranthene	mg/kg	0.008
Fluorene	mg/kg	ND
Indeno(1,2,3-cd)pyrene	mg/kg	ND
Naphthalene	mg/kg	0.031
Phenanthrene	mg/kg	0.003
Pyrene	mg/kg	0.004
Metals		
Aluminum	mg/kg	1953.6
Antimony	mg/kg	ND
Arsenic	mg/kg	1.63
Barium	mg/kg	ND
Beryllium	mg/kg	ND
Cadmium	mg/kg	ND
Calcium	mg/kg	104416
Chloride, total	mg/kg	ND
Chromium	mg/kg	4.95
Cobalt	mg/kg	ND
Copper	mg/kg	6.5

Table A-4(cont.). KSC Background Screening Tables for sediment. ND = non-detect.

Parameter	Units	Combined Sediment Mean X 2
Metals (cont.)		
Iron	mg/kg	1934
Lead	mg/kg	4.7
Magnesium	mg/kg	1949
Manganese	mg/kg	22.6
Mercury	mg/kg	0.02
Nickel	mg/kg	ND
Potassium	mg/kg	708
Selenium	mg/kg	ND
Silver	mg/kg	3.2
Sodium	mg/kg	5730
Thallium	mg/kg	1.33
Vanadium	mg/kg	5.2
Zinc	mg/kg	14.5

Appendix B

Soil Data for Kennedy Space Center

Table B-1. List of sample site descriptions for KSC Background Study soil sampling locations.

Soil Class	Class Number	Site id	Site Description
Coastal	1	SSC001	Coastal scrub south of Pump Station 7 (PS7)
Coastal	1	SSC002	Coastal scrub south of PS7
Coastal	1	SSC003	Coastal scrub north of PS7
Coastal	1	SSC004	Coastal scrub west side of Beach Road, north of LC41, Fish and Wildlife Service (FWS) barricade, possible fire break
Coastal	1	SSC005	Coastal scrub west side of Beach Road, helicopter pad go in to the left
Coastal	1	SSC006	Coastal strand just north of fence line on CCAFS
Coastal	1	SSC007	Coastal strand north of Center Director's Conference Room (Beach House)
Coastal	1	SSC008	Coastal strand east of LC41
Coastal	1	SSC009	Coastal strand east of helicopter pad walk into palmettos from dune
Coastal	1	SSC010	Coastal strand north of LC41, east of Beach Road
Coastal	1	SSC011	Coastal dune just north of fence line on CCAFS
Coastal	1	SSC012	Coastal dune north of Center Director's Conference Room (Beach House)
Coastal	1	SSC013	Coastal dune east of LC41
Coastal	1	SSC014	Coastal dune east of helicopter pad walk in to the north
Coastal	1	SSC015	Coastal dune north of LC41, east of Beach Road
Coastal	1	SSC016	Playalinda parking 9
Coastal	1	SSC017	Playalinda parking 10
Coastal	1	SSC018	Playalinda walk up boardwalk to sea oat zone
Coastal	1	SSC019	Playalinda walk up boardwalk to sea oat zone
Coastal	1	SSC020	Playalinda walk up boardwalk to sea oat zone
Acid Scrub	2	SSC021	North of National Park Service (NPS) pay station at Playalinda entrance
Acid Scrub	2	SSC022	Shiloh 1 west of well location
Acid Scrub	2	SSC023	Shiloh 2 (south of Shiloh 1) firebreak
Acid Scrub	2	SSC024	KARS park, Hall Road, 1st Road to south just inside gate (head toward borrow pit area), stay in oaks
Acid Scrub	2	SSC025	Tel-IV use trail at Apiary 6
Acid Scrub	2	SSC026	Jerome Road east, Apiary 67
Acid Scrub	2	SSC027	Schwartz Road east, fire break to north
Acid Scrub	2	SSC028	Schwartz Road east, fire break to north
Acid Scrub	2	SSC029	Schwartz Road east, fire break turns to the west, on south side

Table B-1. (cont.).

Acid Scrub	2	SSC030	Happy Creek Road east of railroad tracks burned area (higher area), south side
Acid Scrub	2	SSC031	Happy Creek Road tower road on corner stay on higher ground
Acid Scrub	2	SSC032	Happy Creek Road at Y, recently burned scrub to the west
Acid Scrub	2	SSC033	Happy Creek south of camera pad, restoration site transect
Acid Scrub	2	SSC034	Happy Creek sand road, restoration site
Acid Scrub	2	SSC035	Happy Creek sand road, north side recent burn
Acid Scrub	2	SSC036	Shiloh 1 south of sand road, east
Acid Scrub	2	SSC037	Scrubby flatwoods south of Shiloh 1, west side SR3 FWS sign
Acid Scrub	2	SSC038	Farther in on same sand road as C37
Acid Scrub	2	SSC039	Shiloh 2, North side of sand road, recent burn
Acid Scrub	2	SSC040	Happy Creek sand road near sand pine
Coquina Scrub	3	SSC041	Haulover boat ramp just west of SR3
Coquina Scrub	3	SSC042	Haulover boat ramp just west of SR3
Coquina Scrub	3	SSC043	Haulover boat ramp east of SR3
Coquina Scrub	3	SSC044	Shiloh 4 site, xeric hammock area don't go into scrub area
Coquina Scrub	3	SSC045	Shiloh 4 scrub just past xeric hammock
Coquina Scrub	3	SSC046	Dummit Grove, south end, xeric hammock
Coquina Scrub	3	SSC047	South of Shiloh 1, on west side of SR3
Coquina Scrub	3	SSC048	East of SR3, FWS sign and road south of C47
Coquina Scrub	3	SSC049	South of C47, along west side of SR3
Coquina Scrub	3	SSC050	North of Haulover, west side of SR3, south of C49
Coquina Scrub	3	SSC051	South of Haulover, west side of SR3, north of guard shack

Table B-1. (cont.).

Coquina Scrub	3	SSC052	South of Haulover, north of guard shack, road to east turn left (north)
Coquina Scrub	3	SSC053	Continue north of C52, road turns to east, 2nd dirt road on the south side
Coquina Scrub	3	SSC054	Continue east of C53, turn left (north) on west side
Coquina Scrub	3	SSC055	South of Haulover, north of guard shack, road to east turn right (south)
Coquina Scrub	3	SSC056	South of Haulover, directly east of guard shack, south side of road
Coquina Scrub	3	SSC057	South of Haulover, south of guard shack, east side SR3, east of C58
Coquina Scrub	3	SSC058	South of Haulover, south of guard shack, west side SR3, west of C57
Coquina Scrub	3	SSC059	South of Haulover, south of guard shack, west side SR3, south of C58
Coquina Scrub	3	SSC060	South of Haulover, south of guard shack, east side SR3, south of C58, west of C59
Flatwoods	4	SSC061	KARS park Hall Road - south of powerline clearings, burned area
Flatwoods	4	SSC062	TEL-IV east of Apiary 6, (see flagging), gallberry, holly, & palmettos
Flatwoods	4	SSC063	Ransom Road, east, go in along pines and head south into small swale, go into palmettos from there
Flatwoods	4	SSC064	Schwartz Road East, fire break to the north off fire break to east across from C27
Flatwoods	4	SSC065	Happy Creek heading north just south of hammock
Flatwoods	4	SSC066	Apiary site 47, PAPI Lights Road, east of Apiary 47
Flatwoods	4	SSC067	Tel-IV Road, east, firebreak, south, go south east side go east to dead pine
Flatwoods	4	SSC068	Tel-IV Road, east, firebreak, south, go south west side go west 5 to 10 meters, palmetto-lyonia
Flatwoods	4	SSC069	Tel-IV Road, east "pavement ends" sign, south side go south, palmetto-lyonia
Flatwoods	4	SSC070	SR3 east side, north of Jerome Road new culvert, go east, palmetto-lyonia
Flatwoods	4	SSC071	SR3 east side, north of Ransom Road, go east
Flatwoods	4	SSC072	North end of SLF south side of entrance road, go south, palmetto-lyonia
Flatwoods	4	SSC073	West side of SLF, go to tower and north along SLF fence line, palmetto-lyonia
Flatwoods	4	SSC074	West side of SLF, go to tower and south along SLF fence line, palmetto-lyonia

Table B-1. (cont.).

Flatwoods	4	SSC075	West side of SLF, east side of road, palmetto-lyonia
Flatwoods	4	SSC076	SR406/SR3 south along powerline, west palmetto-lyonia, recent burn
Flatwoods	4	SSC077	South of C76 west of powerline
Flatwoods	4	SSC078	PAPI Lights Road, NW of Apiary 47, edge cut
Flatwoods	4	SSC079	West side SR3, north of Met Dome (east side of SLF) west of powerline
Flatwoods	4	SSC080	North of 79, west of powerline
Hammocks	5	SSC081	Off of SR3 (north), this is north of SR3 & 402 intersection
Hammocks	5	SSC082	Jerome Road west, west of citrus groves (north side of road, see flagging)
Hammocks	5	SSC083	Jerome Road west, west of C83 on south side of road
Hammocks	5	SSC084	Range Road (connects Ransom Road and Jerome Road on west), west of road into hammock
Hammocks	5	SSC085	Range Road, north of Ransom Road, narrow strip between road and grove towards end
Hammocks	5	SSC086	Roberts Road on south side across from grove go in a ways from disturbed area
Hammocks	5	SSC087	Same as C86, just farther up the road
Hammocks	5	SSC088	Happy Creek Road east side of hammock
Hammocks	5	SSC089	West Jerome Road, east of well site
Hammocks	5	SSC090	West Jerome Road, west of well site
Hammocks	5	SSC091	West Jerome north (2nd) pump station turn onto powerline
Hammocks	5	SSC092	West of C91 along powerline north side by the hog trap
Hammocks	5	SSC093	Oak hammock trail- MINWR, north of railroad tracks, Oak-Cabbage palm
Hammocks	5	SSC094	West along railroad north of 402 south side, go past wetter area- Live Oak
Hammocks	5	SSC095	East along railroad north of 402 south side near turn to the south, cabbage palm
Hammocks	5	SSC096	East along railroad north of 402 north side Oak-Cabbage Palm, east of "8E" sign
Hammocks	5	SSC097	East along railroad north of 402 south side Cabbage Palm, west of "8E" sign
Hammocks	5	SSC098	West of SR3, north of Shiloh 1 restoration site, west through old grove, 1st turn to left go straight at fork
Hammocks	5	SSC099	West of SR3, north of Shiloh 1 restoration site, to west through old grove, 1st turn to left go right at fork, west of hardwood swamp
Hammocks	5	SSC100	West of SR3 Turnbull drainage
Freshwater Wetlands	6	SSC101	Tel-IV, east of Apiary 6, see also C62
Freshwater Wetlands	6	SSC102	Tel-IV, east of Apiary 6

Table B-1. (cont.).

Freshwater Wetlands	6	SSC103	Happy Creek Road, hammock on west side walk in to the south, mucky bog area
Freshwater Wetlands	6	SSC104	Happy Creek sand road, marsh at turn
Freshwater Wetlands	6	SSC105	Happy Creek north of camera pad ignition strip swale
Freshwater Wetlands	6	SSC106	Tel-IV Road, east, firebreaks south, southwest side W Calamovilfa swale C68
Freshwater Wetlands	6	SSC107	Tel-IV Road, east, "pavement ends sign", go south past C69 Calamovilfa swale
Freshwater Wetlands	6	SSC108	Happy Creek sand road, hardwood swamp to southwest
Freshwater Wetlands	6	SSC109	North end of SLF entrance road, north side swale go north Spartina bakeri
Freshwater Wetlands	6	SSC110	North end of SLF entrance road north side swale Calamovilfa
Freshwater Wetlands	6	SSC111	PAPI Lights Road northwest Apiary 47, Calamovilfa swale
Freshwater Wetlands	6	SSC112	CNS entrance, KSC gate along railroad tracks, go west along powerline
Freshwater Wetlands	6	SSC113	MINWR, Oak Hammock Trail boardwalk
Freshwater Wetlands	6	SSC114	West along railroad tracks north of 402 south side, Cabbage palm
Freshwater Wetlands	6	SSC115	Firebreak north of NASA Causeway, Willow swamp
Freshwater Wetlands	6	SSC116	Firebreak north of NASA Causeway, west of Willow swamp (C115), Spartina
Freshwater Wetlands	6	SSC117	West of SR3, north of Shiloh 1 restoration, 1st turn to the left (west) turn right, barricade, either side of road
Freshwater Wetlands	6	SSC118	West SR3 Turnbull drainage west end, south side
Freshwater Wetlands	6	SSC119	West SR3 Turnbull drainage Spartina marsh, near well site

Table B-1. (cont.).

Freshwater Wetlands	6	SSC120	Road south of Turnbull drainage to the east, east of tower into south
Saltwater Wetlands	7	SSC121	Playalinda, Distichlis, southern camera pad, walk out past burn
Saltwater Wetlands	7	SSC122	Playalinda, Distichlis, northern camera pad, walk into from circle
Saltwater Wetlands	7	SSC123	Playalinda, north of beach access Road along dike Road
Saltwater Wetlands	7	SSC124	Black Point Drive, entrance Juncus marsh on left
Saltwater Wetlands	7	SSC125	Black Point Drive, stop 1, Juncus marsh
Saltwater Wetlands	7	SSC126	Black Point Drive, past C125, Distichlis marsh
Saltwater Wetlands	7	SSC127	Black Point Drive, stop 2, Distichlis marsh
Saltwater Wetlands	7	SSC128	Black Point Drive, stop 3, mixed marsh
Saltwater Wetlands	7	SSC129	T-10K beyond parking mixed marsh with mangroves
Saltwater Wetlands	7	SSC130	T-10K mixed marsh
Saltwater Wetlands	7	SSC131	T-10K Spartina
Saltwater Wetlands	7	SSC132	T-10K near end, mixed marsh, last impoundment on west side
Saltwater Wetlands	7	SSC133	Shiloh 1 impoundment dike road near well site, Spartina alterniflora
Saltwater Wetlands	7	SSC134	Shiloh 1 impoundment dike road east of well site, Black Rush
Saltwater Wetlands	7	SSC135	Shiloh 1 impoundment dike road east of well site, Distichlis/Borrichia/Mangrove
Saltwater Wetlands	7	SSC136	Shiloh 3, west of SR3, north of Shiloh 1 restoration area, 1st left (west) right at fork, marsh on left, Distichlis

Table B-1. (cont.).

Saltwater Wetlands	7	SSC137	Dike road east of Bio-lab, Spartina bakeri on west (this is the same dike road as C123, CNS entrance road)
Saltwater Wetlands	7	SSC138	Dike Road east of Bio-lab, mangrove area on east of dike road (this is the same dike road as C123, CNS entrance road)
Saltwater Wetlands	7	SSC139	Dike road east of Bio-lab, Distichlis south of C138, west side of dike road (this is the same dike road as C123, CNS entrance road)
Saltwater Wetlands	7	SSC140	T-16 near well site
Citrus Scrub	8	SSC141	Shiloh 1 restoration, east of well site
Citrus Scrub	8	SSC142	North of Shiloh 1 restoration, 1st road east of SR3, pine plantation
Citrus Scrub	8	SSC143	North of Shiloh 1 restoration, west of SR3 across from C142, oaks planted
Citrus Scrub	8	SSC144	West side of SR3, north of Shiloh 1 restoration
Citrus Scrub	8	SSC145	West of SR3 south of Shiloh 2 restoration
Citrus Scrub	8	SSC146	North of C145, pine plantation on west, south of Shiloh 2 restoration
Citrus Scrub	8	SSC147	South end of C145 grove, entrance to Shiloh 1 impoundment
Citrus Scrub	8	SSC148	Entrance to Shiloh 3 impoundment
Citrus Scrub	8	SSC149	Heading south towards Haulover, Road cuts off to west side parallel with SR3
Citrus Scrub	8	SSC150	Just north of Haulover on west side of SR3
Citrus Scrub	8	SSC151	South of Shiloh 4 restoration, south of Haulover, east side of SR3
Citrus Scrub	8	SSC152	Shiloh 1 restoration, east, abandoned grove, south of sand road, east of well site
Citrus Scrub	8	SSC153	Shiloh 1 restoration, northwest side of SR3 planted oaks
Citrus Scrub	8	SSC154	North of Shiloh 1 restoration, east side of SR3 old field, north of C142
Citrus Scrub	8	SSC155	South of Shiloh 2 restoration, east SR3, fishing access road
Citrus Scrub	8	SSC156	Young grove near radar site (empty) west of SR3
Citrus Scrub	8	SSC157	South of Shiloh 4, south of Haulover west of SR3
Citrus Scrub	8	SSC158	West of SR3 Griffis Cemetery, north of Shiloh 1 restoration, oak planted in rows
Citrus Scrub	8	SSC159	1st grove heading north towards Haulover on west side of road
Citrus Scrub	8	SSC160	North of C160 on east, same grove as C159
Citrus Hammock	9	SSC161	Jerome Road west, north of road
Citrus Hammock	9	SSC162	Jerome Road west, south of road

Table B-1. (cont.).

Citrus Hammock	9	SSC163	Range Road, 1/2 way down on west side, south of Ransom Road
Citrus Hammock	9	SSC164	Ransom Road on south side of road
Citrus Hammock	9	SSC165	Range Road, north of Ransom Road
Citrus Hammock	9	SSC166	Roberts Road, north end
Citrus Hammock	9	SSC167	Roberts Road, grove on north side of road
Citrus Hammock	9	SSC168	Same as C167
Citrus Hammock	9	SSC169	End of dirt road south of Robert's Road (1st dirt road)
Citrus Hammock	9	SSC170	Grove before second dirt road on Roberts Road, south side
Citrus Hammock	9	SSC171	Robert's Road heading north, young grove on east side of the road
Citrus Hammock	9	SSC172	1st grove north of Schwartz Road, west
Citrus Hammock	9	SSC173	2nd grove north of Schwartz Road, west
Citrus Hammock	9	SSC174	3rd grove north if Schwartz Road, west, grove after security training area
Citrus Hammock	9	SSC175	SR3 west side at Tel-IV Road
Citrus Hammock	9	SSC176	Jerome Road west of hammock sites, guinea grass
Citrus Hammock	9	SSC177	Jerome Road west, northeast well site
Citrus Hammock	9	SSC178	Schwartz Road west, east of tower
Citrus Hammock	9	SSC179	Fire break north of the NASA Causeway

Table B-1. (cont.).

Citrus Hammock	9	SSC180	Fire break north of the NASA Causeway
Disturbed	10	SSC181	Road side, south side of road, west of Oak Hammock Trail, Gate12, 4 roads east of FWS service area
Disturbed	10	SSC182	PAPI Lights Road, east of Apiary 47, borrow pond edge
Disturbed	10	SSC183	Schwartz Road west, borrow pit to west of road, just south of tower
Disturbed	10	SSC184	Saturn Causeway, south side of road, just east of Vertical Assembly Building (VAB), vegetation begins southeast of VAB, west of Component Clean Facility (CCF)
Disturbed	10	SSC185	Saturn Causeway, south side of road, east of CCF, west of East Crawlerway Park Site
Disturbed	10	SSC186	East of C186, west of boat dock, grassy area near river
Disturbed	10	SSC187	Road to Pad B, north of Saturn Causeway, east side of road
Disturbed	10	SSC188	Road to Pad B, north of Saturn Causeway, east side of road, north of C187
Disturbed	10	SSC189	Saturn Causeway heading east towards pad, past guard shack, south side of road
Disturbed	10	SSC190	Road side corner of C avenue and NASA Causeway
Disturbed	10	SSC191	Fifth street southeast, south side of road between B and C Avenue
Disturbed	10	SSC192	Corner of D Avenue and Fifth Street
Disturbed	10	SSC193	3rd Street and D Avenue southwest corner, field
Disturbed	10	SSC194	10th Street southeast on corner, near borrow pond
Disturbed	10	SSC195	North side of NASA Causeway, (Juliet parking area)
Disturbed	10	SSC196	South side of NASA Causeway, (5th pole west of CCAFS entrance gate)
Disturbed	10	SSC197	Static Test Road
Disturbed	10	SSC198	Schwartz Road east, north side of road
Disturbed	10	SSC199	Saturn Causeway, east of VAB, west of CCF, east of C184
Disturbed	10	SSC200	Grassy area behind headquarters building, clump of pines, south side of parking lot, west side of 3rd street entrance

Table B-2. List of X and Y coordinates for soil sampling locations. Coordinates were collected with a Global Positioning System (GPS) in Florida Sate Plane NAD27. SSC = surficial soil chemistry.

Soil ID	X	Y
SSC001	635,559.888	1,540,287.250
SSC002	636,876.886	1,540,496.158
SSC003	635,618.720	1,542,028.469
SSC004	634,292.390	1,547,413.397
SSC005	632,467.913	1,550,084.533
SSC006	637,724.871	1,539,773.513
SSC007	636,981.726	1,542,315.272
SSC008	636,323.234	1,544,442.330
SSC009	632,802.003	1,550,316.155
SSC010	634,396.327	1,548,079.570
SSC011	638,083.057	1,539,719.494
SSC012	637,196.803	1,542,455.578
SSC013	636,621.469	1,544,212.823
SSC014	632,787.067	1,550,456.732
SSC015	634,589.436	1,548,212.906
SSC016	610,558.575	1,582,221.149
SSC017	609,852.836	1,583,184.654
SSC018	607,789.661	1,586,402.850
SSC019	612,881.777	1,579,165.089
SSC020	616,828.370	1,572,917.021
SSC021	601,368.381	1,567,387.936
SSC022	565,059.649	1,618,388.874
SSC023	568,479.954	1,614,922.015
SSC024	604,238.632	1,484,851.910
SSC025	605,699.056	1,506,419.486
SSC026	606,666.112	1,511,719.630
SSC027	618,193.048	1,539,631.836
SSC028	617,638.209	1,543,048.246
SSC029	615,283.086	1,542,965.808
SSC030	603,460.023	1,557,327.261
SSC031	607,915.851	1,557,475.573
SSC032	607,553.829	1,563,242.767
SSC033	610,368.120	1,559,388.205
SSC034	613,195.871	1,558,821.731
SSC035	611,508.920	1,560,306.478
SSC036	566,740.056	1,617,585.098
SSC037	565,412.036	1,616,290.888
SSC038	567,162.953	1,616,347.737

Table B-2. (cont.).

Soil ID	X	Y
SSC039	566,282.627	1,615,158.454
SSC040	612,883.376	1,559,086.328
SSC041	578,778.740	1,599,758.815
SSC042	579,056.975	1,599,406.156
SSC043	579,222.770	1,599,789.408
SSC044	582,763.044	1,595,339.026
SSC045	582,911.112	1,595,346.487
SSC046	586,437.095	1,590,474.710
SSC047	574,652.265	1,604,299.356
SSC048	575,360.744	1,604,152.301
SSC049	575,422.411	1,603,457.248
SSC050	576,972.837	1,602,035.648
SSC051	580,813.829	1,597,173.634
SSC052	580,610.703	1,598,640.819
SSC053	580,985.758	1,598,537.794
SSC054	581,014.356	1,597,789.456
SSC055	581,406.979	1,597,061.068
SSC056	581,955.095	1,596,864.730
SSC057	582,692.023	1,595,145.655
SSC058	582,702.399	1,594,991.333
SSC059	583,193.730	1,594,316.131
SSC060	583,318.923	1,594,452.114
SSC061	604,750.886	1,483,915.221
SSC062	607,385.434	1,506,413.834
SSC063	609,264.988	1,517,079.898
SSC064	618,362.420	1,539,643.279
SSC065	608,016.025	1,560,315.807
SSC066	591,732.561	1,571,679.694
SSC067	605,845.344	1,499,896.502
SSC068	605,619.471	1,500,788.579
SSC069	610,125.060	1,501,152.663
SSC070	605,620.770	1,514,549.607
SSC071	606,894.556	1,519,117.401
SSC072	596,862.420	1,563,078.181
SSC073	593,221.534	1,562,494.984
SSC074	595,598.519	1,558,966.230
SSC075	592,177.277	1,564,223.758
SSC076	588,970.577	1,581,130.832
SSC077	589,808.804	1,579,502.607
SSC078	591,034.142	1,571,750.446
SSC079	600,588.594	1,560,098.305

Table B-2. (cont.).

Soil ID	X	Y
SSC080	599,502.216	1,562,058.338
SSC081	593,680.417	1,573,104.440
SSC082	601,068.864	1,510,630.436
SSC083	599,688.833	1,510,321.281
SSC084	604,149.007	1,512,750.057
SSC085	603,990.407	1,521,138.583
SSC086	607,422.567	1,529,211.500
SSC087	605,600.359	1,529,259.588
SSC088	607,872.768	1,561,257.939
SSC089	598,791.746	1,509,395.713
SSC090	598,611.669	1,509,591.517
SSC091	600,856.516	1,512,034.520
SSC092	600,368.755	1,512,004.113
SSC093	591,073.976	1,567,465.836
SSC094	584,310.646	1,567,110.967
SSC095	600,105.060	1,567,052.326
SSC096	599,650.813	1,567,242.093
SSC097	599,278.110	1,567,068.650
SSC098	562,335.619	1,617,813.418
SSC099	560,921.545	1,618,913.702
SSC100	547,797.338	1,630,366.314
SSC101	604,894.394	1,506,461.919
SSC102	604,845.132	1,506,310.755
SSC103	607,677.702	1,561,224.127
SSC104	616,782.497	1,557,346.864
SSC105	611,041.211	1,561,405.453
SSC106	605,554.265	1,500,773.887
SSC107	610,127.351	1,501,084.396
SSC108	611,363.006	1,559,995.106
SSC109	596,196.063	1,563,274.825
SSC110	596,270.592	1,563,189.280
SSC111	590,970.604	1,571,764.278
SSC112	600,484.174	1,566,396.276
SSC113	591,047.635	1,567,606.717
SSC114	584,289.438	1,566,721.891
SSC115	618,236.472	1,529,500.136
SSC116	618,186.283	1,529,483.522
SSC117	561,300.869	1,618,930.196
SSC118	550,593.438	1,632,365.086
SSC119	548,771.920	1,631,900.516
SSC120	553,015.327	1,632,565.757

Table B-2. (cont.).

Soil ID	X	Y
SSC121	615,473.842	1,573,996.947
SSC122	606,350.744	1,588,066.131
SSC123	606,596.614	1,571,720.061
SSC124	578,644.619	1,571,949.019
SSC125	578,116.633	1,571,672.979
SSC126	576,638.310	1,571,612.072
SSC127	575,847.309	1,571,212.803
SSC128	574,043.276	1,571,466.773
SSC129	573,332.913	1,579,103.081
SSC130	573,949.314	1,578,180.237
SSC131	575,688.091	1,578,153.860
SSC132	577,963.280	1,580,516.083
SSC133	567,963.565	1,609,866.779
SSC134	568,245.734	1,610,263.829
SSC135	568,476.199	1,610,470.354
SSC136	559,138.645	1,618,610.925
SSC137	596,635.658	1,581,364.153
SSC138	604,332.458	1,574,680.610
SSC139	604,477.377	1,573,920.625
SSC140	587,132.686	1,559,638.542
SSC141	565,184.173	1,618,420.660
SSC142	559,696.649	1,622,635.199
SSC143	559,381.024	1,622,517.272
SSC144	564,588.777	1,616,827.427
SSC145	566,765.694	1,613,843.567
SSC146	565,869.274	1,615,200.591
SSC147	568,077.297	1,612,188.361
SSC148	573,148.326	1,606,033.114
SSC149	575,879.833	1,602,809.141
SSC150	577,461.560	1,601,490.712
SSC151	584,713.075	1,593,348.901
SSC152	566,258.056	1,618,370.849
SSC153	558,547.745	1,623,263.768
SSC154	558,428.031	1,623,785.919
SSC155	573,121.840	1,607,411.617
SSC156	572,122.503	1,607,287.421
SSC157	583,696.670	1,593,307.977
SSC158	561,511.845	1,620,052.610
SSC159	584,828.988	1,591,680.751
SSC160	586,140.030	1,591,840.985
SSC161	603,727.823	1,511,525.195

Table B-2. (cont.).

Soil ID	X	Y
SSC162	601,603.380	1,510,858.552
SSC163	603,811.961	1,514,485.058
SSC164	602,715.129	1,516,998.316
SSC165	604,426.939	1,518,643.132
SSC166	607,690.082	1,533,694.904
SSC167	607,323.682	1,529,460.857
SSC168	605,579.040	1,529,466.689
SSC169	604,422.300	1,527,810.271
SSC170	603,023.851	1,529,254.024
SSC171	607,870.187	1,534,888.055
SSC172	607,634.377	1,537,475.273
SSC173	606,258.752	1,537,453.038
SSC174	601,022.518	1,537,456.719
SSC175	602,762.057	1,509,678.480
SSC176	600,270.364	1,510,578.584
SSC177	598,790.596	1,509,524.316
SSC178	606,199.740	1,537,201.713
SSC179	616,899.285	1,524,303.096
SSC180	616,977.207	1,524,556.431
SSC181	588,701.406	1,566,578.973
SSC182	593,695.436	1,571,302.690
SSC183	606,527.860	1,534,758.207
SSC184	614,405.086	1,546,039.397
SSC185	619,335.805	1,548,233.123
SSC186	621,532.653	1,548,640.011
SSC187	622,180.375	1,551,858.476
SSC188	621,731.107	1,554,776.027
SSC189	625,601.316	1,551,004.880
SSC190	611,195.005	1,523,787.431
SSC191	610,121.372	1,520,246.468
SSC192	612,851.045	1,520,360.862
SSC193	612,740.912	1,521,691.770
SSC194	614,627.624	1,517,427.239
SSC195	621,461.603	1,521,772.762
SSC196	630,075.048	1,515,425.024
SSC197	621,269.415	1,524,456.541
SSC198	613,171.689	1,537,425.035
SSC199	615,430.579	1,546,485.010
SSC200	611,873.442	1,522,200.218

Table B-3. Minimum, maximum, mean, and standard deviation for each parameter analyzed in all soil samples.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	220	1.7	96	2.61	6.44
4,4'-DDE	µg/kg	220	1.7	110	4.54	11.88
4,4'-DDT	µg/kg	220	1.7	96	4.06	11.03
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/kg	220	5.1	222	11.20	25.08
Aldrin	µg/kg	220	ND	ND	ND	ND
Alpha – BHC	µg/kg	220	ND	ND	ND	ND
Beta – BHC	µg/kg	220	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	220	1.7	41.0	2.4	3.2
Chlordane (gamma)	µg/kg	220	1.4	41.0	2.4	3.2
Chlordane (total)	µg/kg	220	1.7	62	2.41	4.17
Delta – BHC	µg/kg	220	ND	ND	ND	ND
Dieldrin	µg/kg	220	1.7	190	4.31	17.41
Endosulfan I	µg/kg	220	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	220	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	220	ND	ND	ND	ND
Endrin	µg/kg	220	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	220	ND	ND	ND	ND
Endrin Ketone	µg/kg	220	1.7	10.5	2.15	1.07
Gamma –BHC (Lindane)	µg/kg	220	1.7	14	2.18	1.29
Heptachlor	µg/kg	220	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	220	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	220	ND	ND	ND	ND
Isodrin	µg/kg	220	ND	ND	ND	ND
Methoxychlor	µg/kg	220	ND	ND	ND	ND
Mirex	µg/kg	220	ND	ND	ND	ND
Toxaphene	µg/kg	220	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	220	ND	ND	ND	ND
PCB - 1221	µg/kg	220	ND	ND	ND	ND
PCB - 1232	µg/kg	220	ND	ND	ND	ND
PCB - 1248	µg/kg	220	ND	ND	ND	ND
PCB - 1254	µg/kg	220	ND	ND	ND	ND
PCB - 1260	µg/kg	220	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
(2-(2,4,5 - Trichlorophenoxy)) propionic acid (2,4,5 - TP) (Silvex)	µg/kg	220	5	320	9.2	22.4
2,4,5 - Trichlorophenoxy acetic acid (2,4,5–T)	µg/kg	220	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 – D)	µg/kg	220	5	62	8.0	8.6
3,5 – DCBA	µg/kg	220	ND	ND	ND	ND
4-(2,4 - Dichlorophenoxy)butyric acid (2,4-DB)	µg/kg	220	5	60	7.9	7.7
4 – Nitrophenol	µg/kg	220	ND	ND	ND	ND
Acifluorfen	µg/kg	220	ND	ND	ND	ND
Bentazon	µg/kg	220	ND	ND	ND	ND
Chloramben	µg/kg	220	ND	ND	ND	ND
Dacthal	µg/kg	220	ND	ND	ND	ND

Table B-3. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dalapon	µg/kg	220	ND	ND	ND	ND
Dicambia	µg/kg	220	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	220	ND	ND	ND	ND
Dinoseb	µg/kg	220	ND	ND	ND	ND
MCPA	µg/kg	220	ND	ND	ND	ND
MCPP	µg/kg	220	ND	ND	ND	ND
Pentachlorophenol	µg/kg	220	ND	ND	ND	ND
Picloram	µg/kg	220	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/kg	220	15	440	25.1	34.7
PAHs (8310)						
1-Methylnaphthalene	µg/kg	220	8.5	115	14.08	15.22
2-Methylnaphthalene	µg/kg	220	8.5	290	16.36	27.86
Acenaphthene	µg/kg	220	ND	ND	ND	ND
Acenaphthylene	µg/kg	220	1.7	49	2.91	4.29
Anthracene	µg/kg	220	8.5	115	13.28	13.43
Benzo(a)anthracene	µg/kg	220	0.9	130	2.44	9.04
Benzo(a)pyrene	µg/kg	220	1	250	3.4	17.2
Benzo(b)fluoranthene	µg/kg	220	1.5	220	3.82	15.06
Benzo(g,h,i)perylene	µg/kg	220	1.7	190	4.80	14.11
Benzo(k)fluoranthene	µg/kg	220	1	120	2.9	10.4
Chrysene	µg/kg	220	0.9	200	3.12	13.87
Dibenzo(a,h)anthracene	µg/kg	220	1.7	59	3.05	4.87
Fluoranthene	µg/kg	220	1.7	540	7.16	39.18
Fluorene	µg/kg	220	1.7	170	3.39	11.60
Indeno(1,2,3-cd)pyrene	µg/kg	220	0.9	210	2.88	14.33
Naphthalene	µg/kg	220	8.5	930	29.36	99.33
Phenanthrene	µg/kg	220	0.9	230	4.08	19.51
Pyrene	µg/kg	220	0.9	320	5.07	28.59
Sum of PAHs	µg/kg	220	50.5	2397.5	122.06	230.11
Metals						
Aluminum	mg/kg	220	26	22000	1444.6	2576.4
Antimony	mg/kg	220	ND	ND	ND	ND
Arsenic	mg/kg	219	0.2	8.5	0.76	1.06
Barium	mg/kg	220	1.8	60	13.07	6.68
Beryllium	mg/kg	220	ND	ND	ND	ND
Cadmium	mg/kg	220	0.1	3	0.62	0.34
Calcium	mg/kg	220	38	260000	16466.2	36189.7
Chromium	mg/kg	220	0.5	34	4.55	6.25
Cobalt	mg/kg	220	ND	ND	ND	ND
Copper	mg/kg	220	0.5	130	13.94	26.97
Iron	mg/kg	220	24	16000	1283.5	1909.3
Lead	mg/kg	220	0.5	150	5.82	11.53
Magnesium	mg/kg	220	12.5	11000	549.22	1354.42
Manganese	mg/kg	220	0.5	200	25.75	39.52
Mercury	mg/kg	220	0.005	0.19	0.1570	0.2620
Nickel	mg/kg	220	ND	ND	ND	ND

Table B-3. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Potassium	mg/kg	220	12.5	6200	229.04	673.68
Selenium	mg/kg	220	0.02	6	1.248	0.774
Silver	mg/kg	220	0.95	6	1.270	0.658
Sodium	mg/kg	220	3.3	67000	1459.28	6852.24
Thallium	mg/kg	220	0.5	3.6	0.69	0.52
Vanadium	mg/kg	220	0.5	28	3.19	4.45
Zinc	mg/kg	220	1.2	140	15.14	21.28
Other Parameters						
Bulk density	g/cm^3	219	0.2	1.4	0.96	0.27
Cation exchange capacity (as Na)	meq/ 100g	202	0.5	85.0	14.0	14.2
Hydrogen ion		219	1.58E-08	2.51189E-04	7.29E-06	2.22E-05
Percent solids	%	220	16	100	85.5	17.6
Resistivity	ohm-cm	199	26	3100000	614762.4	792326.6
Texture (No. 4)	%	220	73.9	100	99.61	1.98
Texture (no. 10)	%	220	68.3	100	98.47	4.40
Texture (No. 40)	%	220	36.4	99.7	85.73	15.09
Texture (no. 60)	%	220	7.4	98.5	71.17	24.86
Texture (No. 100)	%	220	0.9	80.2	35.83	20.20
Texture (No. 200)	%	220	0	77	8.0	9.8

Table B-4. Minimum, maximum, mean, and standard deviation for each parameter analyzed in coastal soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	23	ND	ND	ND	ND
4,4'-DDE	µg/kg	23	ND	ND	ND	ND
4,4'-DDT	µg/kg	23	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4'4-DDT	µg/kg	23	ND	ND	ND	ND
Aldrin	µg/kg	23	ND	ND	ND	ND
Alpha - BHC	µg/kg	23	ND	ND	ND	ND
Beta - BHC	µg/kg	23	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	23	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	23	ND	ND	ND	ND
Chlordane (total)	µg/kg	23	ND	ND	ND	ND
Delta – BHC	µg/kg	23	ND	ND	ND	ND
Dieldrin	µg/kg	23	1.7	3.3	1.82	0.34
Endosulfan I	µg/kg	23	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	23	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	23	ND	ND	ND	ND
Endrin	µg/kg	23	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	23	ND	ND	ND	ND
Endrin Ketone	µg/kg	23	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	23	ND	ND	ND	ND
Heptachlor	µg/kg	23	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	23	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	23	ND	ND	ND	ND
Isodrin	µg/kg	23	ND	ND	ND	ND
Methoxychlor	µg/kg	23	ND	ND	ND	ND
Mirex	µg/kg	23	ND	ND	ND	ND
Toxaphene	µg/kg	23	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	23	ND	ND	ND	ND
PCB – 1221	µg/kg	23	ND	ND	ND	ND
PCB – 1232	µg/kg	23	ND	ND	ND	ND
PCB – 1248	µg/kg	23	ND	ND	ND	ND
PCB – 1254	µg/kg	23	ND	ND	ND	ND
PCB – 1260	µg/kg	23	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5 – Trichlorophenoxy) propionic acid (2,4,5 – TP) (Silvex)	µg/kg	23	ND	ND	ND	ND
2,4,5–Trichlorophenoxy acetic acid (2,4,5-T)	µg/kg	23	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 - D)	µg/kg	23	ND	ND	ND	ND
3,5 – DCBA	µg/kg	23	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy)butyric acid (2,4–DB)	µg/kg	23	5	19	5.8	2.9
4 – Nitrophenol	µg/kg	23	ND	ND	ND	ND
Acifluorfen	µg/kg	23	ND	ND	ND	ND
Bentazon	µg/kg	23	ND	ND	ND	ND
Chloramben	µg/kg	23	ND	ND	ND	ND

Table B-4. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dacthal	µg/kg	23	ND	ND	ND	ND
Dalapon	µg/kg	23	ND	ND	ND	ND
Dicambia	µg/kg	23	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	23	ND	ND	ND	ND
Dinoseb	µg/kg	23	ND	ND	ND	ND
MCPA	µg/kg	23	ND	ND	ND	ND
MCPP	µg/kg	23	ND	ND	ND	ND
Pentachlorophenol	µg/kg	23	ND	ND	ND	ND
Picloram	µg/kg	23	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	23	15	29	16.1	3.0
PAHs (8310)						
1-Methylnaphthalene	µg/kg	23	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	23	8.5	290	21.00	58.64
Acenaphthene	µg/kg	23	ND	ND	ND	ND
Acenaphthylene	µg/kg	23	1.7	49	3.81	9.85
Anthracene	µg/kg	23	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	23	0.9	3.2	1.02	0.48
Benzo(a)pyrene	µg/kg	23	1	3	1.4	0.7
Benzo(b)fluoranthene	µg/kg	23	1.5	7	1.87	1.24
Benzo(g,h,i)perylene	µg/kg	23	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	23	1	6	1.4	1.1
Chrysene	µg/kg	23	0.9	3.1	1.11	0.54
Dibenzo(a,h)anthracene	µg/kg	23	ND	ND	ND	ND
Fluoranthene	µg/kg	23	ND	ND	ND	ND
Fluorene	µg/kg	23	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	23	0.9	5.4	1.12	0.94
Naphthalene	µg/kg	23	8.5	20	9.26	2.42
Phenanthrene	µg/kg	23	0.9	16	1.58	3.14
Pyrene	µg/kg	23	ND	ND	ND	ND
Sum of PAHs	µg/kg	23	50.5	347.8	69.04	62.22
Metals						
Aluminum	mg/kg	23	120	1400	282.6	262.7
Antimony	mg/kg	23	ND	ND	ND	ND
Arsenic	mg/kg	23	0.2	6.4	2.33	1.28
Barium	mg/kg	23	1.8	13.5	9.97	1.94
Beryllium	mg/kg	23	ND	ND	ND	ND
Cadmium	mg/kg	23	0.1	0.5	0.48	0.08
Calcium	mg/kg	23	17000	92000	50043.5	18496.9
Chromium	mg/kg	23	1.2	3.3	2.11	0.57
Cobalt	mg/kg	23	ND	ND	ND	ND
Copper	mg/kg	23	0.5	3.5	1.84	1.01
Iron	mg/kg	23	650	1500	1063.0	209.6
Lead	mg/kg	23	0.5	3.5	2.16	0.90
Magnesium	mg/kg	23	140	640	370.0	131.6
Manganese	mg/kg	23	6	15	11.3	2.3

Table B-4 (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Mercury	mg/kg	23	ND	ND	ND	ND
Nickel	mg/kg	23	ND	ND	ND	ND
Potassium	mg/kg	23	12.5	200	58.39	37.77
Selenium	mg/kg	23	ND	ND	ND	ND
Silver	mg/kg	23	0.95	1.5	1.020	0.105
Sodium	mg/kg	23	180	920	461.3	169.3
Thallium	mg/kg	23	0.5	3.6	0.77	0.75
Vanadium	mg/kg	23	1.4	3.2	2.36	0.46
Zinc	mg/kg	23	1.2	19	6.6	5.1
Other Parameters						
Bulk density	g/cm^3	23	0.9	1.4	1.19	0.13
Cation exchange capacity	meq/ 100g	16	1	6.0	2.5	1.5
Hydrogen ion		23	3.98107E-09	1.99526E-08	8.03E-09	3.07E-09
Percent solids	%	23	75	99	96.3	5.7
Resistivity	ohm-cm	23	13000	2000000	586260.9	660162.2
Texture (No. 4)	%	23	99	100	99.9	0.2
Texture (no. 10)	%	23	97.9	100	99.82	0.44
Texture (No. 40)	%	23	50	97.9	78.15	12.97
Texture (no. 60)	%	23	7.4	70.4	31.49	16.50
Texture (No. 100)	%	23	0.9	28.4	6.44	6.25
Texture (No. 200)	%	23	0	4	0.6	0.8

Table B-5. Minimum, maximum, mean, and standard deviation for each parameter analyzed in acid scrub soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	22	ND	ND	ND	ND
4,4'-DDE	µg/kg	22	ND	ND	ND	ND
4,4'-DDT	µg/kg	22	ND	ND	ND	ND
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	µg/kg	22	ND	ND	ND	ND
Aldrin	µg/kg	22	ND	ND	ND	ND
Alpha – BHC	µg/kg	22	ND	ND	ND	ND
Beta – BHC	µg/kg	22	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	22	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	22	ND	ND	ND	ND
Chlordane (total)	µg/kg	22	ND	ND	ND	ND
Delta – BHC	µg/kg	22	ND	ND	ND	ND
Dieldrin	µg/kg	22	ND	ND	ND	ND
Endosulfan I	µg/kg	22	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	22	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	22	ND	ND	ND	ND
Endrin	µg/kg	22	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	22	ND	ND	ND	ND
Endrin Ketone	µg/kg	22	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	22	ND	ND	ND	ND
Heptachlor	µg/kg	22	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	22	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	22	ND	ND	ND	ND
Isodrin	µg/kg	22	ND	ND	ND	ND
Methoxychlor	µg/kg	22	ND	ND	ND	ND
Mirex	µg/kg	22	ND	ND	ND	ND
Toxaphene	µg/kg	22	ND	ND	ND	ND
Aroclors (8082)						
PCB – 1016/1242	µg/kg	22	ND	ND	ND	ND
PCB – 1221	µg/kg	22	ND	ND	ND	ND
PCB – 1232	µg/kg	22	ND	ND	ND	ND
PCB – 1248	µg/kg	22	ND	ND	ND	ND
PCB – 1254	µg/kg	22	ND	ND	ND	ND
PCB – 1260	µg/kg	22	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5 - Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	µg/kg	22	ND	ND	ND	ND
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/kg	22				
2,4 - Dichlorophenoxy acetic acid (2,4 - D)	µg/kg	22	5	40	7.0	7.4
3,5 - DCBA	µg/kg	22	ND	ND	ND	ND
4-(2,4- Dichlorophenoxy)butyric acid (2,4 -DB)	µg/kg	22	5	33	6.7	5.9
4 – Nitrophenol	µg/kg	22	ND	ND	ND	ND
Acifluorfen	µg/kg	22	ND	ND	ND	ND
Bentazon	µg/kg	22	ND	ND	ND	ND
Chloramben	µg/kg	22	ND	ND	ND	ND
Dacthal	µg/kg	22	ND	ND	ND	ND

Table B-5. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dalapon	µg/kg	22	ND	ND	ND	ND
Dicambia	µg/kg	22	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	22	ND	ND	ND	ND
Dinoseb	µg/kg	22	ND	ND	ND	ND
MCPA	µg/kg	22	ND	ND	ND	ND
MCPP	µg/kg	22	ND	ND	ND	ND
Pentachlorophenol	µg/kg	22	ND	ND	ND	ND
Picloram	µg/kg	22	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	22	15	50	19.1	9.3
PAHs (8310)						
1-Methylnaphthalene	µg/kg	22	8.5	94	17.86	20.90
2-Methylnaphthalene	µg/kg	22	8.5	180	21.77	37.37
Acenaphthene	µg/kg	22	ND	ND	ND	ND
Acenaphthylene	µg/kg	22	ND	ND	ND	ND
Anthracene	µg/kg	22	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	22	ND	ND	ND	ND
Benzo(a)pyrene	µg/kg	22	1	6	1.8	1.5
Benzo(b)fluoranthene	µg/kg	22	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/kg	22	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	22	ND	ND	ND	ND
Chrysene	µg/kg	22	0.9	7.6	1.90	1.88
Dibenzo(a,h)anthracene	µg/kg	22	ND	ND	ND	ND
Fluoranthene	µg/kg	22	ND	ND	ND	ND
Fluorene	µg/kg	22	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	22	ND	ND	ND	ND
Naphthalene	µg/kg	22	8.5	46	15.18	12.67
Phenanthrene	µg/kg	22	0.9	25	2.53	5.16
Pyrene	µg/kg	22	ND	ND	ND	ND
Sum of PAHs	µg/kg	22	50.5	343.3	97.89	89.50
Metals						
Aluminum	mg/kg	22	26	1200	202.8	306.8
Antimony	mg/kg	22	ND	ND	ND	ND
Arsenic	mg/kg	22	0.2	8.5	0.63	1.76
Barium	mg/kg	22	ND	ND	ND	ND
Beryllium	mg/kg	22	ND	ND	ND	ND
Cadmium	mg/kg	22	ND	ND	ND	ND
Calcium	mg/kg	22	38	580	150.4	135.1
Chromium	mg/kg	22	0.5	6	0.84	1.19
Cobalt	mg/kg	22	ND	ND	ND	ND
Copper	mg/kg	22	2.5	14	3.25	2.43
Iron	mg/kg	22	24	1500	240.4	421.5
Lead	mg/kg	22	0.5	3.5	1.53	0.83
Magnesium	mg/kg	22	12.5	65	27.96	18.79
Manganese	mg/kg	22	0.5	7.8	2.53	1.83
Mercury	mg/kg	22	ND	ND	ND	ND
Nickel	mg/kg	22	ND	ND	ND	ND

Table B-5. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Potassium	mg/kg	22	12.5	90	42.61	33.06
Selenium	mg/kg	22	ND	ND	ND	ND
Silver	mg/kg	22	ND	ND	ND	ND
Sodium	mg/kg	22	3.3	22	12.64	5.05
Thallium	mg/kg	22	ND	ND	ND	ND
Vanadium	mg/kg	22	0.5	2	0.72	0.47
Zinc	mg/kg	22	2.5	16	5.24	3.77
Other Parameters						
Bulk density	g/cm^3	22	0.7	1.2	0.99	0.14
Cation Exchange Capacity	meq/ 100g	22	0.5	6	2.93	1.60
Hydrogen ion		22	1.58489E-07	1.99526E-05	6.92E-06	6.65E-06
Percent solids	%	22	71	100	91.0	10.6
Resistivity	ohm-cm	15	45000	2400000	681466.7	806087.6
Texture (No. 4)	%	22	99.9	100	99.99	0.04
Texture (No. 10)	%	22	99.2	100	99.80	0.20
Texture (No. 40)	%	22	72.9	99.4	96.20	5.69
Texture (No. 60)	%	22	17.3	98.5	84.9	20.39
Texture (No. 100)	%	22	4.5	64.6	39.12	19.79
Texture (No. 200)	%	22	1.3	6.8	2.87	1.31

Table B-6. Minimum, maximum, mean, and standard deviation for each parameter analyzed in coquina scrub soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	22	ND	ND	ND	ND
4,4'-DDE	µg/kg	22	ND	ND	ND	ND
4,4'-DDT	µg/kg	22	ND	ND	ND	ND
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	µg/kg	22	ND	ND	ND	ND
Aldrin	µg/kg	22	ND	ND	ND	ND
Alpha – BHC	µg/kg	22	ND	ND	ND	ND
Beta – BHC	µg/kg	22	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	22	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	22	ND	ND	ND	ND
Chlordane (total)	µg/kg	22	ND	ND	ND	ND
Delta – BHC	µg/kg	22	ND	ND	ND	ND
Dieldrin	µg/kg	22	ND	ND	ND	ND
Endosulfan I	µg/kg	22	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	22	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	22	ND	ND	ND	ND
Endrin	µg/kg	22	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	22	ND	ND	ND	ND
Endrin Ketone	µg/kg	22	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	22	ND	ND	ND	ND
Heptachlor	µg/kg	22	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	22	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	22	ND	ND	ND	ND
Isodrin	µg/kg	22	ND	ND	ND	ND
Methoxychlor	µg/kg	22	ND	ND	ND	ND
Mirex	µg/kg	22	ND	ND	ND	ND
Toxaphene	µg/kg	22	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	22	ND	ND	ND	ND
PCB - 1221	µg/kg	22	ND	ND	ND	ND
PCB - 1232	µg/kg	22	ND	ND	ND	ND
PCB – 1248	µg/kg	22	ND	ND	ND	ND
PCB – 1254	µg/kg	22	ND	ND	ND	ND
PCB – 1260	µg/kg	22	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5 - Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	µg/kg	22	ND	ND	ND	ND
2,4,5-Trichlorophenoxy acetic acid (2,4,5–T)	µg/kg	22	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 – D)	µg/kg	22	ND	ND	ND	ND
3,5 DCBA	µg/kg	22	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4- DB)	µg/kg	22	ND	ND	ND	ND
4 – Nitrophenol	µg/kg	22	ND	ND	ND	ND
Acifluorfen	µg/kg	22	ND	ND	ND	ND
Bentazon	µg/kg	22	ND	ND	ND	ND
Chloramben	µg/kg	22	ND	ND	ND	ND
Dacthal	µg/kg	22	ND	ND	ND	ND
Dalapon	µg/kg	22	ND	ND	ND	ND

Table B-6. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dicambia	µg/kg	22	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	22	ND	ND	ND	ND
Dinoseb	µg/kg	22	ND	ND	ND	ND
MCPA	µg/kg	22	ND	ND	ND	ND
MCPP	µg/kg	22	ND	ND	ND	ND
Pentachlorophenol	µg/kg	22	ND	ND	ND	ND
Picloram	µg/kg	22	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	22	ND	ND	ND	ND
PAHs (8310)						
1-Methylnaphthalene	µg/kg	22	8.5	75	14.77	16.73
2-Methylnaphthalene	µg/kg	22	8.5	42.5	12.64	10.52
Acenaphthene	µg/kg	22	ND	ND	ND	ND
Acenaphthylene	µg/kg	22	ND	ND	ND	ND
Anthracene	µg/kg	22	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	22	0.9	11	1.68	2.31
Benzo(a)pyrene	µg/kg	22	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/kg	22	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/kg	22	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	22	ND	ND	ND	ND
Chrysene	µg/kg	22	0.9	4.4	1.38	1.20
Dibenzo(a,h)anthracene	µg/kg	22	ND	ND	ND	ND
Fluoranthene	µg/kg	22	1.7	10	2.73	2.57
Fluorene	µg/kg	22	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	22	ND	ND	ND	ND
Naphthalene	µg/kg	22	ND	ND	ND	ND
Phenanthrene	µg/kg	22	ND	ND	ND	ND
Pyrene	µg/kg	22	0.9	4.8	1.40	1.25
Sum of PAHs	µg/kg	22	50.5	250	74.76	61.64
Metals						
Aluminum	mg/kg	22	75	2500	1001.6	678.2
Antimony	mg/kg	22	ND	ND	ND	ND
Arsenic	mg/kg	21	0.2	2.5	0.31	0.50
Barium	mg/kg	22	ND	ND	ND	ND
Beryllium	mg/kg	22	ND	ND	ND	ND
Cadmium	mg/kg	22	ND	ND	ND	ND
Calcium	mg/kg	22	59	260000	22056.8	65351.1
Chromium	mg/kg	22	0.5	5	2.26	1.31
Cobalt	mg/kg	22	ND	ND	ND	ND
Copper	mg/kg	22	ND	ND	ND	ND
Iron	mg/kg	22	100	3200	1511.8	883.9
Lead	mg/kg	22	1.5	8	4.00	1.56
Magnesium	mg/kg	22	12.5	180	87.61	37.74
Manganese	mg/kg	22	3.4	150	54.19	44.27
Mercury	mg/kg	22	0.005	0.019	0.0080	0.0047
Nickel	mg/kg	22	ND	ND	ND	ND
Potassium	mg/kg	22	12.5	200	74.02	39.26

Table B-6. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Selenium	mg/kg	22	ND	ND	ND	ND
Silver	mg/kg	22	1	3.2	1.12	0.48
Sodium	mg/kg	22	11	1900	174.0	471.8
Thallium	mg/kg	22	ND	ND	ND	ND
Vanadium	mg/kg	22	0.5	4.2	2.21	1.04
Zinc	mg/kg	22	2.5	12	5.00	3.06
Other Parameters						
Bulk density	g/cm^3	22	0.9	1.4	1.05	0.16
Cation exchange capacity	meq/ 100g	22	1	8	3.8	2.3
Hydrogen ion		22	5.01E-09	2E-05	1.77E-06	4.57E-06
Percent solids	%	22	73	99	96.6	5.5
Resistivity	ohm-cm	17	730000	2500000	1712941.2	599591.2
Texture (No. 4)	%	22	92.4	100	99.29	1.94
Texture (no. 10)	%	22	68.3	100	97.01	8.09
Texture (No. 40)	%	22	36.4	97.3	63.01	16.50
Texture (no. 60)	%	22	28.9	91.6	50.90	15.70
Texture (No. 100)	%	22	13.9	49.7	20.64	7.52
Texture (No. 200)	%	22	1.3	5.8	3.80	1.19

Table B-7. Minimum, maximum, mean, and standard deviation for each parameter analyzed in flatwoods soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	μg/kg	21	1.7	8.3	2.31	1.40
4,4'-DDE	μg/kg	21	1.7	5	2.14	0.70
4,4'-DDT	μg/kg	21	ND	ND	ND	ND
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	μg/kg	21	5.1	12.3	6.47	1.73
Aldrin	μg/kg	21	ND	ND	ND	ND
Alpha – BHC	μg/kg	21	ND	ND	ND	ND
Beta – BHC	μg/kg	21	ND	ND	ND	ND
Chlordane (alpha)	μg/kg	21	ND	ND	ND	ND
Chlordane (gamma)	μg/kg	21	ND	ND	ND	ND
Chlordane (total)	μg/kg	21	ND	ND	ND	ND
Delta – BHC	μg/kg	21	ND	ND	ND	ND
Dieldrin	μg/kg	21	ND	ND	ND	ND
Endosulfan I	μg/kg	21	ND	ND	ND	ND
Endosulfan II (beta)	μg/kg	21	ND	ND	ND	ND
Endosulfan Sulfate	μg/kg	21	ND	ND	ND	ND
Endrin	μg/kg	21	ND	ND	ND	ND
Endrin Aldehyde	μg/kg	21	ND	ND	ND	ND
Endrin Ketone	μg/kg	21	1.7	6	2.21	0.91
Gamma-BHC (Lindane)	μg/kg	21	ND	ND	ND	ND
Heptachlor	μg/kg	21	ND	ND	ND	ND
Heptachlor Epoxide (a)	μg/kg	21	ND	ND	ND	ND
Heptachlor Epoxide (b)	μg/kg	21	ND	ND	ND	ND
Isodrin	μg/kg	21	ND	ND	ND	ND
Methoxychlor	μg/kg	21	ND	ND	ND	ND
Mirex	μg/kg	21	ND	ND	ND	ND
Toxaphene	μg/kg	21	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	μg/kg	21	ND	ND	ND	ND
PCB - 1221	μg/kg	21	ND	ND	ND	ND
PCB - 1232	μg/kg	21	ND	ND	ND	ND
PCB - 1248	μg/kg	21	ND	ND	ND	ND
PCB - 1254	μg/kg	21	ND	ND	ND	ND
PCB - 1260	μg/kg	21	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5-Trichlorophenoxy propionic acid (2,4,5 - TP) Silvex	μg/kg	21	ND	ND	ND	ND
2,4,5-Trichlorophenoxy acetic acid (2,4,5–T)	μg/kg	21	ND	ND	ND	ND
2,4-Dichlorophenoxy acetic acid (2,4-D)	μg/kg	21	ND	ND	ND	ND
3,5 DCBA	μg/kg	21	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4–DB)	μg/kg	21	ND	ND	ND	ND
4 - Nitrophenol	μg/kg	21	ND	ND	ND	ND
Acifluorfen	μg/kg	21	ND	ND	ND	ND
Bentazon	μg/kg	21	ND	ND	ND	ND
Chloramben	μg/kg	21	ND	ND	ND	ND
Dacthal	μg/kg	21	ND	ND	ND	ND
Dalapon	μg/kg	21	ND	ND	ND	ND

Table B-7. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dicambia	µg/kg	21	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	21	ND	ND	ND	ND
Dinoseb	µg/kg	21	ND	ND	ND	ND
MCPA	µg/kg	21	ND	ND	ND	ND
MCPP	µg/kg	21	ND	ND	ND	ND
Pentachlorophenol	µg/kg	21	ND	ND	ND	ND
Picloram	µg/kg	21	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	21	ND	ND	ND	ND
PAHs (8310)						
1-Methylnaphthalene	µg/kg	21	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	21	ND	ND	ND	ND
Acenaphthene	µg/kg	21	ND	ND	ND	ND
Acenaphthylene	µg/kg	21	ND	ND	ND	ND
Anthracene	µg/kg	21	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	21	0.9	11.5	2.08	3.15
Benzo(a)pyrene	µg/kg	21	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/kg	21	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/kg	21	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	21	ND	ND	ND	ND
Chrysene	µg/kg	21	0.9	11.5	2.22	3.24
Dibenzo(a,h)anthracene	µg/kg	21	ND	ND	ND	ND
Fluoranthene	µg/kg	21	ND	ND	ND	ND
Fluorene	µg/kg	21	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	21	ND	ND	ND	ND
Naphthalene	µg/kg	21	8.5	930	74.21	217.34
Phenanthrene	µg/kg	21	ND	ND	ND	ND
Pyrene	µg/kg	21	ND	ND	ND	ND
Sum of PAHs	µg/kg	21	50.5	1494.5	172.24	366.25
Metals						
Aluminum	mg/kg	21	43	360	164.7	84.6
Antimony	mg/kg	21	ND	ND	ND	ND
Arsenic	mg/kg	21	0.2	0.8	0.30	0.14
Barium	mg/kg	21	ND	ND	ND	ND
Beryllium	mg/kg	21	ND	ND	ND	ND
Cadmium	mg/kg	21	ND	ND	ND	ND
Calcium	mg/kg	21	53	780	383.1	211.3
Chromium	mg/kg	21	ND	ND	ND	ND
Cobalt	mg/kg	21	ND	ND	ND	ND
Copper	mg/kg	21	1	4	2.8	0.7
Iron	mg/kg	21	36	320	144.1	81.3
Lead	mg/kg	21	0.5	12	2.44	2.45
Magnesium	mg/kg	21	12.5	270	112.31	60.51
Manganese	mg/kg	21	0.5	3	0.93	0.80
Mercury	mg/kg	21	0.005	0.017	0.0065	0.0031
Nickel	mg/kg	21	ND	ND	ND	ND
Potassium	mg/kg	21	12.5	140	57.00	41.80

Table B-7. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Selenium	mg/kg	21	ND	ND	ND	ND
Silver	mg/kg	21	ND	ND	ND	ND
Sodium	mg/kg	21	12.5	140	48.69	34.63
Thallium	mg/kg	21	ND	ND	ND	ND
Vanadium	mg/kg	21	0.5	2.9	0.79	0.60
Zinc	mg/kg	21	2.5	28	7.70	5.90
Other Parameters						
Bulk density	g/cm^3	21	0.4	1	0.72	0.15
Cation exchange capacity	meq/ 100g	21	4	28	17.8	7.4
Hydrogen ion		21	2.51189E-08	7.94328E-05	3.57E-05	2.48E-05
Percent solids	%	21	59	98	84.4	9.9
Resistivity	ohm-cm	20	27000	1500000	473600.0	368518.7
Texture (No. 4)	%	21	99.4	100	99.94	0.14
Texture (no. 10)	%	21	98.4	99.9	99.41	0.46
Texture (No. 40)	%	21	67.2	98.7	89.68	9.42
Texture (no. 60)	%	21	12.2	97.1	73.16	26.71
Texture (No. 100)	%	21	3.2	72.4	33.74	19.82
Texture (No. 200)	%	21	2.4	8.9	5.48	1.74

Table B-8. Minimum, maximum, mean, and standard deviation for each parameter analyzed in hammock soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	20	ND	ND	ND	ND
4,4'-DDE	µg/kg	20	ND	ND	ND	ND
4,4'-DDT	µg/kg	20	ND	ND	ND	ND
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	µg/kg	20	ND	ND	ND	ND
Aldrin	µg/kg	20	ND	ND	ND	ND
Alpha – BHC	µg/kg	20	ND	ND	ND	ND
Beta – BHC	µg/kg	20	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	20	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	20	ND	ND	ND	ND
Chlordane (total)	µg/kg	20	ND	ND	ND	ND
Delta – BHC	µg/kg	20	ND	ND	ND	ND
Dieldrin	µg/kg	20	ND	ND	ND	ND
Endosulfan I	µg/kg	20	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	20	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	20	ND	ND	ND	ND
Endrin	µg/kg	20	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	20	ND	ND	ND	ND
Endrin Ketone	µg/kg	20	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	20	ND	ND	ND	ND
Heptachlor	µg/kg	20	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	20	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	20	ND	ND	ND	ND
Isodrin	µg/kg	20	ND	ND	ND	ND
Methoxychlor	µg/kg	20	ND	ND	ND	ND
Mirex	µg/kg	20	ND	ND	ND	ND
Toxaphene	µg/kg	20	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	20	ND	ND	ND	ND
PCB - 1221	µg/kg	20	ND	ND	ND	ND
PCB - 1232	µg/kg	20	ND	ND	ND	ND
PCB – 1248	µg/kg	20	ND	ND	ND	ND
PCB – 1254	µg/kg	20	ND	ND	ND	ND
PCB – 1260	µg/kg	20	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5–Trichlorophenoxy)propionic acid (2,4,5 – TP) Silvex	µg/kg	20	5	23	8.2	5.2
2,4,5-Trichlorophenoxy acetic acid (2,4,5–T)	µg/kg	20	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 - D)	µg/kg	20	ND	ND	ND	ND
3,5 DCBA	µg/kg	20	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4-DB)	µg/kg	20	ND	ND	ND	ND
4 – Nitrophenol	µg/kg	20	ND	ND	ND	ND
Acifluorfen	µg/kg	20	ND	ND	ND	ND
Bentazon	µg/kg	20	ND	ND	ND	ND
Chloramben	µg/kg	20	ND	ND	ND	ND
Dacthal	µg/kg	20	ND	ND	ND	ND
Dalapon	µg/kg	20	ND	ND	ND	ND

Table B-8. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dicamba	µg/kg	20	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	20	ND	ND	ND	ND
Dinoseb	µg/kg	20	ND	ND	ND	ND
MCPA	µg/kg	20	ND	ND	ND	ND
MCPP	µg/kg	20	ND	ND	ND	ND
Pentachlorophenol	µg/kg	20	ND	ND	ND	ND
Picloram	µg/kg	20	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	20	15	67.5	22.90	11.83
PAHs (8310)						
1-Methylnaphthalene	µg/kg	20	8.5	38	13.60	7.77
2-Methylnaphthalene	µg/kg	20	ND	ND	ND	ND
Acenaphthene	µg/kg	20	ND	ND	ND	ND
Acenaphthylene	µg/kg	20	ND	ND	ND	ND
Anthracene	µg/kg	20	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	20	0.9	12	1.92	2.50
Benzo(a)pyrene	µg/kg	20	1	8	1.8	1.7
Benzo(b)fluoranthene	µg/kg	20	1.5	10	3.07	2.39
Benzo(g,h,i)perylene	µg/kg	20	1.8	26	4.80	7.03
Benzo(k)fluoranthene	µg/kg	20	1	11	2.7	3.0
Chrysene	µg/kg	20	0.9	8.1	1.88	1.95
Dibenzo(a,h)anthracene	µg/kg	20	ND	ND	ND	ND
Fluoranthene	µg/kg	20	1.8	180	13.23	39.56
Fluorene	µg/kg	20	1.8	170	10.91	37.47
Indeno(1,2,3-cd)pyrene	µg/kg	20	0.9	9	1.88	2.03
Naphthalene	µg/kg	20	8.5	38	13.20	6.94
Phenanthrene	µg/kg	20	0.9	88	5.58	19.41
Pyrene	µg/kg	20	0.9	320	21.67	71.40
Sum of PAHs	µg/kg	20	51.4	457	126.36	112.71
Metals						
Aluminum	mg/kg	20	220	9900	2395.0	2382.4
Antimony	mg/kg	20	ND	ND	ND	ND
Arsenic	mg/kg	20	0.2	1.6	0.44	0.37
Barium	mg/kg	20	ND	ND	ND	ND
Beryllium	mg/kg	20	ND	ND	ND	ND
Cadmium	mg/kg	20	ND	ND	ND	ND
Calcium	mg/kg	20	320	88000	11278.0	20934.6
Chromium	mg/kg	20	0.5	13	3.47	3.22
Cobalt	mg/kg	20	ND	ND	ND	ND
Copper	mg/kg	20	2.5	18	4.33	3.77
Iron	mg/kg	20	200	6400	1717.5	1716.3
Lead	mg/kg	20	2.5	17	6.24	4.52
Magnesium	mg/kg	20	69	3800	534.1	836.0
Manganese	mg/kg	20	1	79	14.7	17.5
Mercury	mg/kg	20	0.005	0.19	0.0396	0.0523
Nickel	mg/kg	20	ND	ND	ND	ND
Potassium	mg/kg	20	15	530	114.6	113.8

Table B-8. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Selenium	mg/kg	20	1	4.5	1.53	0.98
Silver	mg/kg	20	ND	ND	ND	ND
Sodium	mg/kg	20	15	880	168.5	227.8
Thallium	mg/kg	20	ND	ND	ND	ND
Vanadium	mg/kg	20	0.5	24	5.16	5.49
Zinc	mg/kg	20	2.5	110	12.77	23.67
Other Parameters						
Bulk density	g/cm^3	20	0.3	1.1	0.74	0.24
Cation exchange capacity (as Na)	meq/ 100g	20	4	71	23.5	18.6
Hydrogen ion		20	2.51189E-08	2.51189E-04	1.31E-05	5.60E-05
Percent solids	%	20	22	96	75.3	18.8
Resistivity	ohm-cm	20	4600	3100000	440645.0	866899.7
Texture (No. 4)	%	20	98.5	100	99.83	0.40
Texture (no. 10)	%	20	97.7	99.9	99.45	0.64
Texture (No. 40)	%	20	85.2	98.8	93.92	4.49
Texture (no. 60)	%	20	63.3	95.7	84.95	10.36
Texture (No. 100)	%	20	21	65.3	45.79	12.68
Texture (No. 200)	%	20	6.6	28.8	12.45	7.07

Table B-9. Minimum, maximum, mean, and standard deviation for each parameter analyzed in freshwater wetland soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	22	ND	ND	ND	ND
4,4'-DDE	µg/kg	22	ND	ND	ND	ND
4,4'-DDT	µg/kg	22	ND	ND	ND	ND
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	µg/kg	22	ND	ND	ND	ND
Aldrin	µg/kg	22	ND	ND	ND	ND
Alpha - BHC	µg/kg	22	ND	ND	ND	ND
Beta - BHC	µg/kg	22	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	22	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	22	ND	ND	ND	ND
Chlordane (total)	µg/kg	22	ND	ND	ND	ND
Delta – BHC	µg/kg	22	ND	ND	ND	ND
Dieldrin	µg/kg	22	ND	ND	ND	ND
Endosulfan I	µg/kg	22	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	22	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	22	ND	ND	ND	ND
Endrin	µg/kg	22	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	22	ND	ND	ND	ND
Endrin Ketone	µg/kg	22	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	22	ND	ND	ND	ND
Heptachlor	µg/kg	22	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	22	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	22	ND	ND	ND	ND
Isodrin	µg/kg	22	ND	ND	ND	ND
Methoxychlor	µg/kg	22	ND	ND	ND	ND
Mirex	µg/kg	22	ND	ND	ND	ND
Toxaphene	µg/kg	22	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	22	ND	ND	ND	ND
PCB - 1221	µg/kg	22	ND	ND	ND	ND
PCB - 1232	µg/kg	22	ND	ND	ND	ND
PCB – 1248	µg/kg	22	ND	ND	ND	ND
PCB – 1254	µg/kg	22	ND	ND	ND	ND
PCB – 1260	µg/kg	22	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5 – Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	µg/kg	22	ND	ND	ND	ND
2,4,5-Trichlorophenoxy acetic acid (2,4,5–T)	µg/kg	22	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 – D)	µg/kg	22	ND	ND	ND	ND
3,5 DCBA	µg/kg	22	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4–DB)	µg/kg	22	ND	ND	ND	ND
4 – Nitrophenol	µg/kg	22	ND	ND	ND	ND
Acifluorfen	µg/kg	22	ND	ND	ND	ND
Bentazon	µg/kg	22	ND	ND	ND	ND
Chloramben	µg/kg	22	ND	ND	ND	ND
Dacthal	µg/kg	22	ND	ND	ND	ND
Dalapon	µg/kg	22	ND	ND	ND	ND

Table B-9. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dicamba	µg/kg	22	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	22	ND	ND	ND	ND
Dinoseb	µg/kg	22	ND	ND	ND	ND
MCPA	µg/kg	22	ND	ND	ND	ND
MCPP	µg/kg	22	ND	ND	ND	ND
Pentachlorophenol	µg/kg	22	ND	ND	ND	ND
Picloram	µg/kg	22	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	22	ND	ND	ND	ND
PAHs (8310)						
1-Methylnaphthalene	µg/kg	22	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	22	ND	ND	ND	ND
Acenaphthene	µg/kg	22	ND	ND	ND	ND
Acenaphthylene	µg/kg	22	ND	ND	ND	ND
Anthracene	µg/kg	22	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	22	ND	ND	ND	ND
Benzo(a)pyrene	µg/kg	22	1	22	2.4	4.4
Benzo(b)fluoranthene	µg/kg	22	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/kg	22	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	22	ND	ND	ND	ND
Chrysene	µg/kg	22	ND	ND	ND	ND
Dibenzo(a,h)anthracene	µg/kg	22	ND	ND	ND	ND
Fluoranthene	µg/kg	22	ND	ND	ND	ND
Fluorene	µg/kg	22	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	22	ND	ND	ND	ND
Naphthalene	µg/kg	22	ND	ND	ND	ND
Phenanthrene	µg/kg	22	ND	ND	ND	ND
Pyrene	µg/kg	22	ND	ND	ND	ND
Sum of PAHs	µg/kg	22	50.5	172	78.93	32.00
Metals						
Aluminum	mg/kg	22	110	12000	2315.9	3148.0
Antimony	mg/kg	22	ND	ND	ND	ND
Arsenic	mg/kg	22	0.2	3	0.55	0.62
Barium	mg/kg	22	ND	ND	ND	ND
Beryllium	mg/kg	22	ND	ND	ND	ND
Cadmium	mg/kg	22	ND	ND	ND	ND
Calcium	mg/kg	22	150	140000	9609.5	29489.2
Chromium	mg/kg	22	0.5	18	3.07	4.34
Cobalt	mg/kg	22	ND	ND	ND	ND
Copper	mg/kg	22	0.5	25	4.70	4.84
Iron	mg/kg	22	70	8700	1326.1	2361.4
Lead	mg/kg	22	0.5	23	5.06	4.91
Magnesium	mg/kg	22	52	2100	316.0	468.5
Manganese	mg/kg	22	0.5	94	9.61	20.41
Mercury	mg/kg	22	0.005	0.16	0.0375	0.0471
Nickel	mg/kg	22	ND	ND	ND	ND
Potassium	mg/kg	22	14	250	95.2	65.6

Table B-9. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Selenium	mg/kg	22	1	6	1.7	1.1
Silver	mg/kg	22	ND	ND	ND	ND
Sodium	mg/kg	22	21	1400	169.4	311.2
Thallium	mg/kg	22	ND	ND	ND	ND
Vanadium	mg/kg	22	0.5	26	3.65	5.64
Zinc	mg/kg	22	3	48	13.6	11.1
Other Parameters						
Bulk density	g/cm^3	22	0.2	1.1	0.72	0.26
Cation exchange capacity	meq/100g	22	0.7	85	28.7	19.7
Hydrogen ion		22	1.99526E-08	6.30957E-05	1.47E-05	2.16E-05
Percent solids	%	22	31	98	69.9	19.5
Resistivity	ohm-cm	22	2000	870000	151027.3	265840.7
Texture (No. 4)	%	22	98.7	100	99.86	0.33
Texture (no. 10)	%	22	87.8	100	98.43	2.74
Texture (No. 40)	%	22	63.3	99.1	87.31	11.85
Texture (no. 60)	%	22	19.6	97.1	74.12	23.72
Texture (No. 100)	%	22	7.2	74	42.91	21.72
Texture (No. 200)	%	22	1.2	37.6	11.70	9.52

Table B-10. Minimum, maximum, mean, and standard deviation for each parameter analyzed in saltwater wetland soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	21	1.9	96	7.89	20.31
4,4'-DDE	µg/kg	21	1.9	30	5.30	6.91
4,4'-DDT	µg/kg	21	1.9	96	7.89	20.31
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	µg/kg	21	5.7	222	21.08	46.72
Aldrin	µg/kg	21	ND	ND	ND	ND
Alpha - BHC	µg/kg	21	ND	ND	ND	ND
Beta - BHC	µg/kg	21	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	21	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	21	ND	ND	ND	ND
Chlordane (total)	µg/kg	21	ND	ND	ND	ND
Delta – BHC	µg/kg	21	ND	ND	ND	ND
Dieldrin	µg/kg	21	1.9	10.5	3.94	2.53
Endosulfan I	µg/kg	21	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	21	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	21	ND	ND	ND	ND
Endrin	µg/kg	21	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	21	ND	ND	ND	ND
Endrin Ketone	µg/kg	21	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	21	1.9	14	3.99	3.17
Heptachlor	µg/kg	21	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	21	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	21	ND	ND	ND	ND
Isodrin	µg/kg	21	ND	ND	ND	ND
Methoxychlor	µg/kg	21	ND	ND	ND	ND
Mirex	µg/kg	21	ND	ND	ND	ND
Toxaphene	µg/kg	21	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	21	ND	ND	ND	ND
PCB - 1221	µg/kg	21	ND	ND	ND	ND
PCB - 1232	µg/kg	21	ND	ND	ND	ND
PCB – 1248	µg/kg	21	ND	ND	ND	ND
PCB – 1254	µg/kg	21	ND	ND	ND	ND
PCB – 1260	µg/kg	21	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5 – Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	µg/kg	21	ND	ND	ND	ND
2,4,5–Trichlorophenoxy acetic acid (2,4,5-T)	µg/kg	21	ND	ND	ND	ND
2,4 – Dichlorophenoxy acetic acid (2,4 - D)	µg/kg	21	6	62	17.6	15.3
3,5 DCBA	µg/kg	21	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4–DB)	µg/kg	21	ND	ND	ND	ND
4 – Nitrophenol	µg/kg	21	ND	ND	ND	ND
Acifluorfen	µg/kg	21	ND	ND	ND	ND
Bentazon	µg/kg	21	ND	ND	ND	ND
Chloramben	µg/kg	21	ND	ND	ND	ND
Dacthal	µg/kg	21	ND	ND	ND	ND
Dalapon	µg/kg	21	ND	ND	ND	ND

Table B-10. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dicamba	µg/kg	21	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	21	ND	ND	ND	ND
Dinoseb	µg/kg	21	ND	ND	ND	ND
MCPA	µg/kg	21	ND	ND	ND	ND
MCPP	µg/kg	21	ND	ND	ND	ND
Pentachlorophenol	µg/kg	21	ND	ND	ND	ND
Picloram	µg/kg	21	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	21	18	155	46.3	35.1
PAHs (8310)						
1-Methylnaphthalene	µg/kg	21	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	21	ND	ND	ND	ND
Acenaphthene	µg/kg	21	ND	ND	ND	ND
Acenaphthylene	µg/kg	21	ND	ND	ND	ND
Anthracene	µg/kg	21	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	21	ND	ND	ND	ND
Benzo(a)pyrene	µg/kg	21	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/kg	21	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/kg	21	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	21	ND	ND	ND	ND
Chrysene	µg/kg	21	ND	ND	ND	ND
Dibenzo(a,h)anthracene	µg/kg	21	ND	ND	ND	ND
Fluoranthene	µg/kg	21	ND	ND	ND	ND
Fluorene	µg/kg	21	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	21	ND	ND	ND	ND
Naphthalene	µg/kg	21	ND	ND	ND	ND
Phenanthrene	µg/kg	21	ND	ND	ND	ND
Pyrene	µg/kg	21	ND	ND	ND	ND
Sum of PAHs	µg/kg	21	ND	ND	ND	ND
Metals						
Aluminum	mg/kg	21	660	9100	2683.8	1997.6
Antimony	mg/kg	21	ND	ND	ND	ND
Arsenic	mg/kg	21	0.3	4.1	1.32	1.08
Barium	mg/kg	21	ND	ND	ND	ND
Beryllium	mg/kg	21	ND	ND	ND	ND
Cadmium	mg/kg	21	ND	ND	ND	ND
Calcium	mg/kg	21	380	67000	11627.1	18373.1
Chromium	mg/kg	21	0.5	15	4.51	3.28
Cobalt	mg/kg	21	ND	ND	ND	ND
Copper	mg/kg	21	ND	ND	ND	ND
Iron	mg/kg	21	250	3800	1504.8	1091.3
Lead	mg/kg	21	1	150	16.6	33.8
Magnesium	mg/kg	21	490	11000	3291.0	3151.2
Manganese	mg/kg	21	2	42	10.1	10.5
Mercury	mg/kg	21	0.005	0.068	0.0179	0.0162
Nickel	mg/kg	21	ND	ND	ND	ND
Potassium	mg/kg	21	110	6200	1631.0	1620.5

Table B-10. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Selenium	mg/kg	21	ND	ND	ND	ND
Silver	mg/kg	21	ND	ND	ND	ND
Sodium	mg/kg	21	1400	67000	13771.4	18366.1
Thallium	mg/kg	21	ND	ND	ND	ND
Vanadium	mg/kg	21	1.6	28	7.35	6.30
Zinc	mg/kg	21	3	19	7.7	4.8
Other Parameters						
Bulk density	g/cm^3	21	0.2	1.3	0.71	0.33
Cation exchange capacity	meq/ 100g	21	6	35	18.3	9.0
Hydrogen ion		20	1.58489E-09	2.51189E-06	4.65E-07	7.60E-07
Percent solids	%	21	16	86	56.9	20.7
Resistivity	ohm-cm	21	26	790	172.7	183.6
Texture (No. 4)	%	21	93.1	100	99.45	1.50
Texture (no. 10)	%	21	71.9	100	96.55	6.25
Texture (No. 40)	%	21	53.9	98.7	88.08	11.53
Texture (no. 60)	%	21	50.2	95.1	81.22	12.26
Texture (No. 100)	%	21	35.1	80.2	51.94	12.65
Texture (No. 200)	%	21	5.8	77	22.72	19.16

Table B-11. Minimum, maximum, mean, and standard deviation for each parameter analyzed in citrus scrub soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	23	ND	ND	ND	ND
4,4'-DDE	µg/kg	23	1.7	87	14.10	22.86
4,4'-DDT	µg/kg	23	1.7	86	11.96	22.47
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	µg/kg	23	5.1	174.7	27.82	45.08
Aldrin	µg/kg	23	ND	ND	ND	ND
Alpha - BHC	µg/kg	23	ND	ND	ND	ND
Beta - BHC	µg/kg	23	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	23	1.7	7.4	2.0	1.2
Chlordane (gamma)	µg/kg	23	1.7	5.0	1.9	0.7
Chlordane (total)	µg/kg	23	1.7	62	4.37	12.56
Delta – BHC	µg/kg	23	ND	ND	ND	ND
Dieldrin	µg/kg	23	1.7	160	13.90	36.10
Endosulfan I	µg/kg	23	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	23	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	23	ND	ND	ND	ND
Endrin	µg/kg	23	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	23	ND	ND	ND	ND
Endrin Ketone	µg/kg	23	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	23	ND	ND	ND	ND
Heptachlor	µg/kg	23	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	23	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	23	ND	ND	ND	ND
Isodrin	µg/kg	23	ND	ND	ND	ND
Methoxychlor	µg/kg	23	ND	ND	ND	ND
Mirex	µg/kg	23	ND	ND	ND	ND
Toxaphene	µg/kg	23	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	23	ND	ND	ND	ND
PCB - 1221	µg/kg	23	ND	ND	ND	ND
PCB - 1232	µg/kg	23	ND	ND	ND	ND
PCB – 1248	µg/kg	23	ND	ND	ND	ND
PCB – 1254	µg/kg	23	ND	ND	ND	ND
PCB – 1260	µg/kg	23	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5 – Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	µg/kg	23	ND	ND	ND	ND
2,4,5–Trichlorophenoxy acetic acid (2,4,5–T)	µg/kg	23	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 – D)	µg/kg	23	ND	ND	ND	ND
3,5 DCBA	µg/kg	23	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4-DB)	µg/kg	23	5	50	9.4	10.9
4 – Nitrophenol	µg/kg	23	ND	ND	ND	ND
Acifluorfen	µg/kg	23	ND	ND	ND	ND
Bentazon	µg/kg	23	ND	ND	ND	ND
Chloramben	µg/kg	23	ND	ND	ND	ND
Dacthal	µg/kg	23	ND	ND	ND	ND
Dalapon	µg/kg	23	ND	ND	ND	ND

Table B-11. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dicamba	µg/kg	23	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	23	ND	ND	ND	ND
Dinoseb	µg/kg	23	ND	ND	ND	ND
MCPA	µg/kg	23	ND	ND	ND	ND
MCPP	µg/kg	23	ND	ND	ND	ND
Pentachlorophenol	µg/kg	23	ND	ND	ND	ND
Picloram	µg/kg	23	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	23	15	150	23.8	28.3
PAHs (8310)						
1-Methylnaphthalene	µg/kg	23	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	23	8.5	170	20.61	36.74
Acenaphthene	µg/kg	23	ND	ND	ND	ND
Acenaphthylene	µg/kg	23	1.7	22	3.58	5.21
Anthracene	µg/kg	23	8.5	85	14.24	17.05
Benzo(a)anthracene	µg/kg	23	0.9	9.3	1.93	2.36
Benzo(a)pyrene	µg/kg	23	1	9	2.5	2.6
Benzo(b)fluoranthene	µg/kg	23	1.5	16.5	2.94	3.45
Benzo(g,h,i)perylene	µg/kg	23	1.7	18	3.45	4.65
Benzo(k)fluoranthene	µg/kg	23	1	14	2.80	3.59
Chrysene	µg/kg	23	0.9	14	2.85	3.23
Dibenzo(a,h)anthracene	µg/kg	23	ND	ND	ND	ND
Fluoranthene	µg/kg	23	1.7	18	3.45	4.65
Fluorene	µg/kg	23	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	23	0.9	17	2.10	3.66
Naphthalene	µg/kg	23	8.5	830	107.89	209.08
Phenanthrene	µg/kg	23	0.9	230	11.03	47.74
Pyrene	µg/kg	23	0.9	8.5	1.50	1.73
Sum of PAHs	µg/kg	23	50.5	1467	199.90	310.91
Metals						
Aluminum	mg/kg	23	200	4200	1172.2	919.4
Antimony	mg/kg	23	ND	ND	ND	ND
Arsenic	mg/kg	23	0.2	1	0.36	0.27
Barium	mg/kg	23	ND	ND	ND	ND
Beryllium	mg/kg	23	ND	ND	ND	ND
Cadmium	mg/kg	23	0.5	2.2	0.64	0.41
Calcium	mg/kg	23	170	15000	2100.9	3060.3
Chromium	mg/kg	23	3.7	34	12.18	7.81
Cobalt	mg/kg	23	ND	ND	ND	ND
Copper	mg/kg	23	7	130	53.5	36.4
Iron	mg/kg	23	270	3500	1502.2	900.4
Lead	mg/kg	23	2.4	19	9.70	4.82
Magnesium	mg/kg	23	68	760	232.6	189.3
Manganese	mg/kg	23	10	200	82.0	52.1
Mercury	mg/kg	23	0.005	0.046	0.0120	0.0116
Nickel	mg/kg	23	ND	ND	ND	ND
Potassium	mg/kg	23	12.5	560	94.57	110.71

Table B-11. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Selenium	mg/kg	23	ND	ND	ND	ND
Silver	mg/kg	23	ND	ND	ND	ND
Sodium	mg/kg	23	3.8	110	17.01	21.62
Thallium	mg/kg	23	0.5	2.6	0.59	0.44
Vanadium	mg/kg	23	0.5	4.8	2.02	1.10
Zinc	mg/kg	23	7.2	140	49.23	36.29
Other Parameters						
Bulk density	g/cm^3	23	0.8	1.4	1.13	0.15
Cation exchange capacity	meq/ 100g	17	4.0	55.0	19.4	17.2
Hydrogen ion		23	5.01187E-08	1.58489E-06	3.42E-07	3.93E-07
Percent solids	%	23	78	99	95.4	6.9
Resistivity	ohm-cm	23	10000	2500000	870130.4	855419.3
Texture (No. 4)	%	23	99.4	100	99.96	0.13
Texture (no. 10)	%	23	97.8	100	99.78	0.49
Texture (No. 40)	%	23	52.8	99.3	83.14	16.24
Texture (no. 60)	%	23	43.1	97.8	73.95	20.44
Texture (No. 100)	%	23	14.8	46.9	29.13	11.50
Texture (No. 200)	%	23	2	8.4	3.70	1.60

Table B-12. Minimum, maximum, mean, and standard deviation for each parameter analyzed in citrus hammock soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	23	ND	ND	ND	ND
4,4'-DDE	µg/kg	23	1.7	67	5.39	13.63
4,4'-DDT	µg/kg	23	1.7	5.4	1.94	0.77
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	µg/kg	23	5.1	70.4	9.12	13.64
Aldrin	µg/kg	23	ND	ND	ND	ND
Alpha - BHC	µg/kg	23	ND	ND	ND	ND
Beta - BHC	µg/kg	23	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	23	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	23	ND	ND	ND	ND
Chlordane (total)	µg/kg	23	ND	ND	ND	ND
Delta - BHC	µg/kg	23	ND	ND	ND	ND
Dieldrin	µg/kg	23	1.7	190	9.97	39.25
Endosulfan I	µg/kg	23	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	23	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	23	ND	ND	ND	ND
Endrin	µg/kg	23	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	23	ND	ND	ND	ND
Endrin Ketone	µg/kg	23	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	23	ND	ND	ND	ND
Heptachlor	µg/kg	23	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	23	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	23	ND	ND	ND	ND
Isodrin	µg/kg	23	ND	ND	ND	ND
Methoxychlor	µg/kg	23	ND	ND	ND	ND
Mirex	µg/kg	23	ND	ND	ND	ND
Toxaphene	µg/kg	23	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	23	ND	ND	ND	ND
PCB - 1221	µg/kg	23	ND	ND	ND	ND
PCB - 1232	µg/kg	23	ND	ND	ND	ND
PCB - 1248	µg/kg	23	ND	ND	ND	ND
PCB - 1254	µg/kg	23	ND	ND	ND	ND
PCB - 1260						
Chlorinated Herbicides (8151)						
2-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5 – TP) (Silvex)	µg/kg	23	5	50	9.6	12.3
2,4,5-Trichlorophenoxy acetic acid (2,4,5–T)	µg/kg	23	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 – D)	µg/kg	23	5	50	9.1	11.1
3,5 DCBA	µg/kg	23	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4-DB)	µg/kg	23	ND	ND	ND	ND
4 - Nitrophenol	µg/kg	23	ND	ND	ND	ND
Acifluorfen	µg/kg	23	ND	ND	ND	ND
Bentazon	µg/kg	23	ND	ND	ND	ND
Chloramben	µg/kg	23	ND	ND	ND	ND
Dacthal	µg/kg	23	ND	ND	ND	ND
Dalapon	µg/kg	23	ND	ND	ND	ND

Table B-12. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dicamba	µg/kg	23	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	23	ND	ND	ND	ND
Dinoseb	µg/kg	23	ND	ND	ND	ND
MCPA	µg/kg	23	ND	ND	ND	ND
MCPP	µg/kg	23	ND	ND	ND	ND
Pentachlorophenol	µg/kg	23	ND	ND	ND	ND
Picloram	µg/kg	23	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	23	15	150	26.0	31.0
PAHs (8310)						
1-Methylnaphthalene	µg/kg	23	8.5	20	9.39	2.44
2-Methylnaphthalene	µg/kg	23	8.5	42	10.35	6.94
Acenaphthene	µg/kg	23	ND	ND	ND	ND
Acenaphthylene	µg/kg	23	ND	ND	ND	ND
Anthracene	µg/kg	23	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	23	0.9	2.8	1.08	0.49
Benzo(a)pyrene	µg/kg	23	1	5	1.4	1.1
Benzo(b)fluoranthene	µg/kg	23	1.5	7	2.00	1.31
Benzo(g,h,i)perylene	µg/kg	23	1.7	13	3.05	3.42
Benzo(k)fluoranthene	µg/kg	23	1	3	1.1	0.4
Chrysene	µg/kg	23	0.9	3.7	1.06	0.58
Dibenzo(a,h)anthracene	µg/kg	23	ND	ND	ND	ND
Fluoranthene	µg/kg	23	ND	ND	ND	ND
Fluorene	µg/kg	23	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	23	0.9	15	2.14	3.45
Naphthalene	µg/kg	23	8.5	100	18.61	25.90
Phenanthrene	µg/kg	23	ND	ND	ND	ND
Pyrene	µg/kg	23	ND	ND	ND	ND
Sum of PAHs	µg/kg	23	50.5	164	68.33	32.10
Metals						
Aluminum	mg/kg	23	130	7200	1821.3	1768.2
Antimony	mg/kg	23	ND	ND	ND	ND
Arsenic	mg/kg	23	0.2	2.7	0.53	0.74
Barium	mg/kg	23	ND	ND	ND	ND
Beryllium	mg/kg	23	ND	ND	ND	ND
Cadmium	mg/kg	23	ND	ND	ND	ND
Calcium	mg/kg	23	210	99000	11099.1	24043.0
Chromium	mg/kg	23	0.5	30	11.79	9.50
Cobalt	mg/kg	23	ND	ND	ND	ND
Copper	mg/kg	23	2.5	130	54.04	40.63
Iron	mg/kg	23	100	8000	1984.8	2368.4
Lead	mg/kg	23	0.5	17	5.84	3.83
Magnesium	mg/kg	23	52	1200	377.4	328.3
Manganese	mg/kg	23	2.6	160	58.74	51.13
Mercury	mg/kg	23	0.005	0.06	0.0161	0.0158
Nickel	mg/kg	23	ND	ND	ND	ND
Potassium	mg/kg	23	12.5	490	121.70	120.98

Table B-12. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Selenium	mg/kg	23	ND	ND	ND	ND
Silver	mg/kg	23	ND	ND	ND	ND
Sodium	mg/kg	23	10	330	38.3	67.2
Thallium	mg/kg	23	0.5	3.5	0.92	0.96
Vanadium	mg/kg	23	0.5	19	4.46	5.09
Zinc	mg/kg	23	2.5	76	29.20	23.14
Other Parameters						
Bulk density	g/cm^3	23	1	1.3	1.18	0.09
Cation exchange capacity	meq/ 100g	23	4	31	11.3	8.1
Hydrogen ion		23	1.99526E-08	6.30957E-06	7.83E-07	1.77E-06
Percent solids	%	23	74	99	93.9	7.1
Resistivity	ohm-cm	16	29000	2900000	749750.0	910290.8
Texture (No. 4)	%	23	98.2	100	99.76	0.51
Texture (no. 10)	%	23	93.8	100	99.41	1.39
Texture (No. 40)	%	23	83.5	99.7	94.63	5.60
Texture (no. 60)	%	23	51.4	98.1	83.57	14.50
Texture (No. 100)	%	23	15.3	60.6	44.61	14.91
Texture (No. 200)	%	23	3.8	20.7	9.79	4.93

Table B-13. Minimum, maximum, mean, and standard deviation for each parameter analyzed in disturbed soils.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	23	1.7	10	2.21	1.71
4,4'-DDE	µg/kg	23	1.7	110	7.27	22.57
4,4'-DDT	µg/kg	23	1.7	67	6.00	14.71
Sum 4,4' DDD + 4,4' DDE + 4'4 DDT	µg/kg	23	5.1	187	15.48	38.46
Aldrin	µg/kg	23	ND	ND	ND	ND
Alpha - BHC	µg/kg	23	ND	ND	ND	ND
Beta - BHC	µg/kg	23	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	23	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	23	1.7	5.8	2.0	0.8
Chlordane (total)	µg/kg	23	ND	ND	ND	ND
Delta - BHC	µg/kg	23	ND	ND	ND	ND
Dieldrin	µg/kg	23	1.7	5	1.99	0.68
Endosulfan I	µg/kg	23	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	23	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	23	ND	ND	ND	ND
Endrin	µg/kg	23	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	23	ND	ND	ND	ND
Endrin Ketone	µg/kg	23	ND	ND	ND	ND
Gamma-BHC (Lindane)	µg/kg	23	1.7	5.4	2.00	0.76
Heptachlor	µg/kg	23	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	23	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	23	ND	ND	ND	ND
Isodrin	µg/kg	23	ND	ND	ND	ND
Methoxychlor	µg/kg	23	ND	ND	ND	ND
Mirex	µg/kg	23	ND	ND	ND	ND
Toxaphene	µg/kg	23	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	23	ND	ND	ND	ND
PCB - 1221	µg/kg	23	ND	ND	ND	ND
PCB - 1232	µg/kg	23	ND	ND	ND	ND
PCB - 1248	µg/kg	23	ND	ND	ND	ND
PCB - 1254	µg/kg	23	ND	ND	ND	ND
PCB - 1260	µg/kg	23	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
2-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5 - TP) (Silvex)	µg/kg	23	5	320	22.6	66.0
2,4,5-Trichlorophenoxy acetic acid (2,4,5–T)	µg/kg	23	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 - D)	µg/kg	23	ND	ND	ND	ND
3,5 DCBA	µg/kg	23	ND	ND	ND	ND
4-(2,4-Dichlorophenoxy) butyric acid (2,4-DB)	µg/kg	23	5	60	9.0	12.5
4 - Nitrophenol	µg/kg	23	ND	ND	ND	ND
Acifluorfen	µg/kg	23	ND	ND	ND	ND
Bentazon	µg/kg	23	ND	ND	ND	ND
Chloramben	µg/kg	23	ND	ND	ND	ND
Dacthal	µg/kg	23	ND	ND	ND	ND
Dalapon	µg/kg	23	ND	ND	ND	ND

Table B-13. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Dicamba	µg/kg	23	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	23	ND	ND	ND	ND
Dinoseb	µg/kg	23	ND	ND	ND	ND
MCPA	µg/kg	23	ND	ND	ND	ND
MCPP	µg/kg	23	ND	ND	ND	ND
Pentachlorophenol	µg/kg	23	ND	ND	ND	ND
Picloram	µg/kg	23	ND	ND	ND	ND
Sum Chlorinated Herbicides	µg/kg	23	15	440	39.4	88.8
PAHs (8310)						
1-Methylnaphthalene	µg/kg	23	8.5	46	12.37	10.19
2-Methylnaphthalene	µg/kg	23	8.5	68	13.33	13.86
Acenaphthene	µg/kg	23	ND	ND	ND	ND
Acenaphthylene	µg/kg	23	ND	ND	ND	ND
Anthracene	µg/kg	23	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	23	0.9	130	9.74	26.86
Benzo(a)pyrene	µg/kg	23	1	250	16.3	51.9
Benzo(b)fluoranthene	µg/kg	23	1.5	220	13.87	45.44
Benzo(g,h,i)perylene	µg/kg	23	1.7	190	18.99	40.15
Benzo(k)fluoranthene	µg/kg	23	1	120	12.2	30.7
Chrysene	µg/kg	23	0.9	200	15.02	41.42
Dibenzo(a,h)anthracene	µg/kg	23	1.7	59	6.22	12.46
Fluoranthene	µg/kg	23	1.7	540	35.11	113.35
Fluorene	µg/kg	23	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	23	0.9	210	13.22	43.32
Naphthalene	µg/kg	23	ND	ND	ND	ND
Phenanthrene	µg/kg	23	0.9	120	12.19	31.16
Pyrene	µg/kg	23	0.9	240	18.80	56.21
Sum of PAHs	µg/kg	23	50.5	2397.5	223.17	495.95
Metals						
Aluminum	mg/kg	23	54	22000	2491.3	5863.6
Antimony	mg/kg	23	ND	ND	ND	ND
Arsenic	mg/kg	23	0.2	2.4	0.70	0.70
Barium	mg/kg	23	10	36	13.0	6.8
Beryllium	mg/kg	23	ND	ND	ND	ND
Cadmium	mg/kg	23	ND	ND	ND	ND
Calcium	mg/kg	23	130	200000	43053.5	60942.3
Chromium	mg/kg	23	0.5	24	3.85	6.08
Cobalt	mg/kg	23	ND	ND	ND	ND
Copper	mg/kg	23	0.5	4.9	2.55	0.75
Iron	mg/kg	23	37	16000	1783.4	4059.3
Lead	mg/kg	23	0.5	18	5.06	4.61
Magnesium	mg/kg	23	12.5	1300	288.85	343.32
Manganese	mg/kg	23	1.2	20	7.90	6.43
Mercury	mg/kg	23	0.005	0.07	0.0108	0.0166
Nickel	mg/kg	23	ND	ND	ND	ND
Potassium	mg/kg	23	12.5	180	72.72	54.62

Table B-13. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Selenium	mg/kg	23	1	3	1.2	0.6
Silver	mg/kg	23	1	2.4	1.14	0.40
Sodium	mg/kg	23	10	1400	336.3	444.0
Thallium	mg/kg	23	ND	ND	ND	ND
Vanadium	mg/kg	23	0.5	25	3.44	6.26
Zinc	mg/kg	23	2.5	50	11.79	11.41
Other Parameters						
Bulk density	g/cm^3	22	0.6	1.4	1.11	0.21
Cation exchange capacity	meq/ 100g	18	1.0	39.0	10.6	9.6
Hydrogen ion		23	5.01187E-09	1.25893E-05	1.50E-06	3.34E-06
Percent solids	%	23	73	100	91.4	8.2
Resistivity	ohm-cm	22	3800	2900000	722345.5	891527.5
Texture (No. 4)	%	23	73.9	100	98.11	5.46
Texture (no. 10)	%	23	69.8	99.9	95.12	7.68
Texture (No. 40)	%	23	46.7	99.3	84.39	17.27
Texture (no. 60)	%	23	28	98.3	76.17	21.94
Texture (No. 100)	%	23	10.7	71.5	46.24	19.23
Texture (No. 200)	%	23	1.9	37.8	7.98	9.40

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC001 06/12/98	SSC002 06/12/98	SSC003 06/12/98	SSC004 06/18/98	SSC005 06/18/98	SSC006 06/12/98	SSC007 06/12/98	SSC008 06/18/98	SSC009 06/18/98	SSC010 8/28/98		SSC011 6/12/98		SSC012 06/12/98	SSC013 06/18/98	SSC014 06/18/98
												duplicate		duplicate			
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
4,4' - DDE	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
4,4' - DDT	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Aldrin	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Alpha - BHC	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Beta - BHC	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Chlordane (alpha)	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Chlordane (gamma)	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Chlordane (total)	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Delta - BHC	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Dieldrin	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Endosulfan I	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Endosulfan II (beta)	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Endosulfan Sulfate	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Endrin	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Endrin Aldehyde	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Endrin Ketone	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Gamma - BHC (Lindane)	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Heptachlor	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Heptachlor Epoxide (a)	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
heptachlor Epoxide (b)	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Isodrin	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Methoxychlor	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Mirex	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Toxaphene	µg/Kg	<4.4	<3.3	<3.3	<3.4	<3.3	<3.3	<3.3	<3.4	<3.4	<67	<67	<3.3	<3.7	<3.7	<3.7	<3.3
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<44	<33	<33	<34	<33	<33	<33	<34	<34	<33	<33	<33	<37	<37	<37	<33
PCB-1221	µg/Kg	<44	<33	<33	<34	<33	<33	<33	<34	<34	<33	<33	<33	<37	<37	<37	<33
PCB-1232	µg/Kg	<44	<33	<33	<34	<33	<33	<33	<34	<34	<33	<33	<33	<37	<37	<37	<33
PCB-1248	µg/Kg	<44	<33	<33	<34	<33	<33	<33	<34	<34	<33	<33	<33	<37	<37	<37	<33
PCB-1254	µg/Kg	<44	<33	<33	<34	<33	<33	<33	<34	<34	<33	<33	<33	<37	<37	<37	<33
PCB-1260	µg/Kg	<44	<33	<33	<34	<33	<33	<33	<34	<34	<33	<33	<33	<37	<37	<37	<33
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
3,5-DCBA	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<13	<10	19	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
4 - Nitrophenol	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Acifluorfen	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Bentazon	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Chloramben	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Dacthal	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Dalapon	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Dicamba	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Dinoseb	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
MCPA	µg/Kg	<130	<100	<100	<100	<100	<100	<100	<100	<100	<200	<200	<100	<110	<110	<110	<100
MCPP	µg/Kg	<130	<100	<100	<100	<100	<100	<100	<100	<100	<200	<200	<100	<110	<110	<110	<100
Pentachlorophenol	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10
Picloram	µg/Kg	<13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<11	<11	<11	<10

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC001 06/12/98	SSC002 06/12/98	SSC003 06/12/98	SSC004 06/18/98	SSC005 06/18/98	SSC006 06/12/98	SSC007 06/12/98	SSC008 06/18/98	SSC009 06/18/98	SSC010 8/28/98		SSC011 6/12/98		SSC012 06/12/98	SSC013 06/18/98	SSC014 06/18/98
												duplicate		duplicate			
PAH (8310)																	
1 - Methylnaphthalene	μg/Kg	<22	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<19	<19	<19	<17
2 - Methylnaphthalene	μg/Kg	<22	<17	<17	290	<17	<17	<17	<17	<17	<17	<17	<17	<19	<19	<19	<17
Acenaphthene	μg/Kg	<22	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<19	<19	<19	<17
Acenaphthylene	μg/Kg	<4.4	<3.3	<3.3	<3.4	49	<3.3	<3.3	<3.4	<3.4	<3.3	<3.3	<3.3	<3.7	<3.7	<3.7	<3.3
Anthracene	μg/Kg	<23	<17	<17	<17	<17	<17	<17	<17	<18	<17	<17	<17	<19	<19	<19	<17
Benzo(a)anthracene	μg/Kg	<2.2	<1.7	<1.7	3.2	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.9	<1.9	<1.9	<1.7
Benzo(a)pyrene	μg/Kg	<3	<2	<2	2 I	21	<2	<2	<2	<2	3 I	2 I	<2	<2	<2	3 I	3 I
Benzo(b)fluoranthene	μg/Kg	<4	<3	<3	<3	<3	<3	<3	<3	<3	7 I	4 I	<3	<3	<3	<3	<3
Benzo(g,h,i)perylene	μg/Kg	<4.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.7	<3.7	<3.7	<3.4
Benzo(k)fluoranthene	μg/Kg	<3	<2	<2	<2	<2	<2	<2	<2	<2	3 I	2 I	<2	<2	<2	6	<2
Chrysene	μg/Kg	<2.2	<1.7	<1.7	1.9 I	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.9	<1.9	3.1	2.1 I
Dibenzo(a,h)anthracene	μg/Kg	<4.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.7	<3.7	<3.7	<3.4
Fluoranthene	μg/Kg	<4.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.7	<3.7	<3.7	<3.4
Fluorene	μg/Kg	<4.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.7	<3.7	<3.7	<3.4
Indeno(1,2,3-cd)pyrene	μg/Kg	<2.2	<1.7	<1.7	<1.7	<1.7	5.4	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.9	<1.9	<1.9	<1.7
Naphthalene	μg/Kg	<22	<17	<17	20 I	<17	<17	<17	<17	<17	<17	<17	<17	<19	<19	<19	<17
Phenanthrene	μg/Kg	<2.2	<1.7	<1.7	<1.7	16	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.9	<1.9	<1.9	<1.7
Pyrene	μg/Kg	<2.2	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.9	<1.9	<1.9	<1.7
Surrogates																	
2,4-DCAA	%	124	108	84	92	100	112	132	80	82	132	80	136	88	108	72	82
2,4,5,6-TCMX	%	36	53	39	64	88	56	58	67	59	72	75	60	58	72	53	42
DBC	%	77	76	90	115	133	105	92	89	118	126	136	89	91	98	72	95
p-terphenyl	%	87	77	82	101	94	88	98	88	96	106	113	90	99	91	74	76
Metals																	
Aluminum	mg/Kg	320	260	170	240	240	240	280	210	1400	<1000	<1000	190	210	180	240	120
Antimony	mg/Kg	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	mg/Kg	2.5	2.5	2.2	1.2 I	1.5 I	2.8	2.4	2	<0.5	0.7 I	0.8 I	3.2	6.4	2.7	2.7	1.1 I
Barium	mg/Kg	<27	<20	<20	<20	<20	<20	<20	<20	<21	<20	<20	<20	<22	<22	<22	<20
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	51000	67000	48000	17000	42000	48000	41000	56000	27000	42000	48000	69000	79000	49000	60000	26000
Chromium (total)	mg/Kg	2.8	2.3	2	2.6	2.3	2.7	2.2	2.2	3.3	2.5	2.4	2.3	2.6	2	2.4	1.3
Cobalt	mg/Kg	<7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<6	<6	<6	<5
Copper	mg/Kg	<7	<5	<5	<1	<1	<5	<5	<1	<1	<5	<5	<5	<6	<6	<1	<1
Iron	mg/Kg	1200	1200	1000	860	1200	1100	1000	1200	1200	1300	1200	1300	1300	990	1500	650
Lead	mg/Kg	3.2	3	2.4	3	1.7	3.1	2.3	1.2	2.4	3.4	2.9	2.2	3.5	1.7	1.7	<1
Magnesium	mg/Kg	240	320	310	140	300	340	290	480	300	260	250	590	620	470	640	280
Manganese	mg/Kg	13	13	10	11	10	11	10	14	8.8	12	13	15	13	11	15	8
Mercury	mg/Kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/Kg	<7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<6	<6	<6	<5
Potassium	mg/Kg	59	56	49	33	46	65	58	40	84	25	<25	56	200	80	57	<25
Selenium	mg/Kg	<0.05	<1	<0.04	<2	<2	<0.04	<0.2	<2	<2	<2	<2	<1	<0.2	<0.2	<2	<2
Silver	mg/Kg	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sodium	mg/Kg	370	460	430	180	380	370	340	520	210	380	430	570	630	480	620	270
Thallium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3.6	<1	<1	<1
Vanadium	mg/Kg	2.4	2.7	2.2	1.9	2.5	2.4	2.3	2.6	3.2	2.6	2.9	2.9	3	2.1	3	1.4
Zinc	mg/Kg	15	14	12	5.7	<5	7.2	9	<5	<5	11	5.6	8.4	19	13	<6	<5

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. "*" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC001 06/12/98	SSC002 06/12/98	SSC003 06/12/98	SSC004 06/18/98	SSC005 06/18/98	SSC006 06/12/98	SSC007 06/12/98	SSC008 06/18/98	SSC009 06/18/98	SSC010 8/28/98		SSC011 6/12/98		SSC012 06/12/98	SSC013 06/18/98	SSC014 06/18/98
												duplicate		duplicate			
Other Parameters																	
Bulk Density	g/cm^3	1.2	1.1	1.2	1.1	1.2	1.2	1.3	1	1	1.2	1.3	1.2	1.1	0.88	1.3	1
CEC	meq/100g	3	2	2	1000	990	2	1	1000	1100	3	3	1	1	1	220	1100
Percent Solids	%	75	99	99	98	99	99	99	98	97	99	99	99	89	90	89	99
pH (lab)	S. U.	8.2	8	8.1	7.7	8.1	8.2	8.2	8.1	8.2	8	8.1	8.2	8.2	8.2	8	8.4
Resistivity	ohm-cm	53000	72000	48000	>590000	>1700000	39000	47000	1200000	1000000	1100000	2000000	13000	14000	18000	>1000000	15000
Texture (No. 4)	%	100	100	100	100	100	100	100	100	99	100	100	100	99.6	100	100	100
Texture (No. 10)	%	100	100	100	100	100	100	100	100	97.9	99.8	99.8	99.8	99.5	100	100	100
Texture (No. 40)	%	88.6	78.3	78.5	85.3	82	88.9	93.5	87.4	90.3	79.8	75.9	66	68	84.3	70	93.6
Texture (No. 60)	%	56.5	33.3	35.5	39.9	29.3	46.9	51.6	35.4	70.4	26.8	25.5	15.8	15.6	27.5	26.6	36.2
Texture (No. 100)	%	17.5	5.9	5.9	7.5	4.2	12.1	10.3	7.1	28.4	5.6	4.5	2.6	2	3.4	5	4.1
Texture (No. 200)	%	0.8	0.6	0.4	1	0.5	0.7	0.4	0.1	4	1.4	1.3	0.3	0.2	0.2	0.1	0.1
Total Organic Carbon	mg/Kg	12000	20000	13000	>26700	15000	5100	8200	2300	>26700	>26700	>26700	11000	17000	10000	>26700	7600

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Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC015 06/18/98	SSC016 06/09/98	SSC017 06/09/98	SSC018 6/22/98	SSC018 6/22/98 duplicate	SSC019 06/22/98	SSC020 06/22/98	SSC021 07/08/98	SSC022 06/16/98	SSC023 06/16/98	SSC024 06/26/98	SSC025 7/27/98	SSC025 7/27/98 duplicate	SSC026 8/20/98	SSC026 8/20/98 duplicate	SSC027 07/07/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
4,4' - DDE	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
4,4' - DDT	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Aldrin	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Alpha - BHC	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Beta - BHC	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Chlordane (alpha)	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Chlordane (gamma)	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Chlordane (total)	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Delta - BHC	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Dieldrin	µg/Kg	<3.3	<3.3	3.3 I	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Endosulfan I	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Endosulfan II (beta)	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Endosulfan Sulfate	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Endrin	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Endrin Aldehyde	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Endrin Ketone	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Gamma - BHC (Lindane)	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Heptachlor	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Heptachlor Epoxide (a)	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
heptachlor Epoxide (b)	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Isodrin	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Methoxychlor	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Mirex	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Toxaphene	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<72	<4.2	<3.3	<4.6	<67	<75	<92	<93	<73
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<33	<33	<33	<35	<34	<33	<33	<36	<42	<33	<46	<34	<38	<46	<46	<37
PCB-1221	µg/Kg	<33	<33	<33	<35	<34	<33	<33	<36	<42	<33	<46	<34	<38	<46	<46	<37
PCB-1232	µg/Kg	<33	<33	<33	<35	<34	<33	<33	<36	<42	<33	<46	<34	<38	<46	<46	<37
PCB-1248	µg/Kg	<33	<33	<33	<35	<34	<33	<33	<36	<42	<33	<46	<34	<38	<46	<46	<37
PCB-1254	µg/Kg	<33	<33	<33	<35	<34	<33	<33	<36	<42	<33	<46	<34	<38	<46	<46	<37
PCB-1260	µg/Kg	<33	<33	<33	<35	<34	<33	<33	<36	<42	<33	<46	<34	<38	<46	<46	<37
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
3,5-DCBA	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<4.6	<10	<11	<14	<14	<11
4 - Nitrophenol	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<4.6	<10	<11	<14	<14	<11
Acifluorfen	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
Bentazon	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
Chloramben	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
Dacthal	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
Dalapon	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
Dicamba	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
Dinoseb	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
MCPA	µg/Kg	<100	<100	<100	<110	<100	<100	<100	<220	<130	<100	<97	<200	<230	<280	<280	<110
MCPP	µg/Kg	<100	<100	<100	<110	<100	<100	<100	<220	<130	<100	<4.6	<200	<230	<280	<280	<110
Pentachlorophenol	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11
Picloram	µg/Kg	<10	<10	<10	<11	<10	<10	<10	<11	<13	<10	<10	<10	<11	<14	<14	<11

I = value is between the Method Detection Limit and the Practical Quanitation Level
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* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC015 06/18/98	SSC016 06/09/98	SSC017 06/09/98	SSC018 6/22/98		SSC019 06/22/98	SSC020 06/22/98	SSC021 07/08/98	SSC022 06/16/98	SSC023 06/16/98	SSC024 06/26/98	SSC025 7/27/98		SSC026 8/20/98		SSC027 07/07/98
						duplicate								duplicate		duplicate	
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<17	<17	<17	<18	<17	<17	<17	<18	<22	<17	94	<17	<19	<23	<24	<19
2 - Methylnaphthalene	µg/Kg	<17	<17	<17	<18	<17	<17	<17	<18	<21	<17	180	<17	<19	<23	<24	<19
Acenaphthene	µg/Kg	<17	<17	<17	<18	<17	<17	<17	<18	<21	<17	<23	<17	<19	<23	<24	<19
Acenaphthylene	µg/Kg	<3.3	<3.3	<3.3	<3.5	<3.4	<3.3	<3.3	<3.6	<4.2	<3.3	<4.6	<3.4	<3.8	<4.6	<4.6	<3.7
Anthracene	µg/Kg	<17	<17	<17	<18	<17	<17	<17	<19	<22	<17	<23	<17	<19	<24	<24	<19
Benzo(a)anthracene	µg/Kg	<1.7	<1.7	<1.7	<1.8	<1.7	<1.7	<1.7	<1.8	<2.1	<1.7	<23	<1.7	<1.9	<2.3	<2.4	<1.9
Benzo(a)pyrene	µg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<3	<2	<2	3 I	6	<2
Benzo(b)fluoranthene	µg/Kg	<3	<3	<3	<3	<3	<3	<3	<3	<4	<3	<4	<3	<3	<4	<4	<3
Benzo(g,h,i)perylene	µg/Kg	<3.4	<3.4	<3.4	<3.5	<3.4	<3.4	<3.4	<3.7	<4.3	<3.4	<4.6	<3.4	<3.8	<4.6	<4.7	<3.7
Benzo(k)fluoranthene	µg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<3	<2	<2	<3	<3	<2
Chrysene	µg/Kg	<1.7	<1.7	<1.7	<1.8	<1.7	<1.7	<1.7	<1.8	<2.1	<1.7	<23	<1.7	<1.9	4.7	7.6	<1.9
Dibenzo(a,h)anthracene	µg/Kg	<3.4	<3.4	<3.4	<3.5	<3.4	<3.4	<3.4	<3.7	<4.3	<3.4	<4.6	<3.4	<3.8	<4.6	<4.7	<3.7
Fluoranthene	µg/Kg	<3.4	<3.4	<3.4	<3.5	<3.4	<3.4	<3.4	<3.7	<4.3	<3.4	<4.6	<3.4	<3.8	<4.6	<4.7	<3.7
Fluorene	µg/Kg	<3.4	<3.4	<3.4	<3.5	<3.4	<3.4	<3.4	<3.7	<4.3	<3.4	<4.6	<3.4	<3.8	<4.6	<4.7	<3.7
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.7	<1.7	<1.7	<1.8	<1.7	<1.7	<1.7	<1.8	<2.1	<1.7	<2.3	<1.7	<1.9	<2.3	<2.4	<1.9
Naphthalene	µg/Kg	<17	<17	<17	<18	<17	<17	<17	<18	<21	32	<23	<17	<19	<23	<24	<19
Phenanthrene	µg/Kg	<1.7	<1.7	<1.7	<1.8	<1.7	<1.7	<1.7	<1.8	<2.1	<1.7	25	<1.7	<1.9	<2.3	<2.4	<1.9
Pyrene	µg/Kg	<1.7	<1.7	<1.7	<1.8	<1.7	<1.7	<1.7	<1.8	<2.1	<1.7	<2.3	<1.7	<1.9	<2.3	<2.4	<1.9
Surrogates																	
2,4-DCAA	%	76	132	102	100	104	124	80	66	64	92	44	116	120	132	132	70
2,4,5,6-TCMX	%	67	78	60	43	91	63	64	71	59	54	66	79	91	81	82	57
DBC	%	83	121	85	55	120	107	107	101	83	81	79	116	126	135	113	64
p-terphenyl	%	86	96	90	83	88	83	83	96	109	69	74	75	91	112	68	112
Metals																	
Aluminum	mg/Kg	180	160	260	150	140	140	170	69	490	1200	34	31	26	42	31	28
Antimony	mg/Kg	<2	<2	<2	<2	<2	<2	<0.04	<2	<2	<2	<3	<2	<2	<3	<3	<2
Arsenic	mg/Kg	<1.7	1.5 I	1.6 I	3.1	2.8	2.7	3.5	<0.5	8.5	0.6 I	<0.7	<0.5	<0.6	<0.7	<0.7	<0.6
Barium	mg/Kg	<20	<20	<20	<21	<20	<20	1.8	<22	<26	<20	<28	<20	<23	<28	<28	<22
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<0.05	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<1	0.08 I	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	24000	49000	43000	92000	61000	76000	36000	200	270	71	150	67	57	120	120	42
Chromium (total)	mg/Kg	2.1	1.5	2	1.2	1.2	1.2	1.4	<1	6	1.4	<1	<1	<1	<1	<1	<1
Cobalt	mg/Kg	<5	<5	<5	<5	<5	<5	<0.1	<5	<6	<5	<7	<5	<6	<7	<7	<6
Copper	mg/Kg	<1	<5	<5	2.3	1.7	1.6	1.3	<5	14	<5	<7	<5	<6	<7	<7	<6
Iron	mg/Kg	730	820	980	1000	950	960	810	63	630	1500	29	28	24	44	24	24
Lead	mg/Kg	<1.0	2.8	2.6	1.7	1.3	1.3	1.2	1.9	1.8	2.3	1.5	<1	<1	<1	<1	1.2
Magnesium	mg/Kg	330	370	270	520	440	440	310	<27	46	63	<34	<26	<28	<35	<35	<28
Manganese	mg/Kg	7.3	12	12	12	11	12	8.6	3	4.9	3	<1	<1	<1	2.4	2.1	<1
Mercury	mg/Kg	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/Kg	<5	<5	<5	<5	<5	<5	0.33 I	<5	<6	<5	<210	<5	<6	<7	<7	<6
Potassium	mg/Kg	100	58	56	58	42	45	31	<180	<32	34	<34	<26	<28	<35	<35	<28
Selenium	mg/Kg	<2	<2	<2	<2	<2	<2	<0.2	<2	<2	<2	<3	<2	<2	<3	<3	<2
Silver	mg/Kg	<2	<2	<2	<2	<2	<2	0.95	<4	<2	<2	<3	<2	<2	<3	<3	<2
Sodium	mg/Kg	360	610	420	920	580	720	360	13 I	11 I	14 I	22 I	<26	<28	<35	<35	13 I
Thallium	mg/Kg	2.1	<1	<1	<1	<1	<1	1.9	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	mg/Kg	2	1.8	2.2	2.2	2.1	2.1	1.7	<1	1.4	2	<1	<1	<1	<1	<1	<1
Zinc	mg/Kg	<5	5.2	<5	<5	<5	<5	1.2	<5	7.4	<5	<7	<5	<6	<22	<22	<6

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC015 06/18/98	SSC016 06/09/98	SSC017 06/09/98	SSC018 6/22/98		SSC019 06/22/98	SSC020 06/22/98	SSC021 07/08/98	SSC022 06/16/98	SSC023 06/16/98	SSC024 06/26/98	SSC025 7/27/98		SSC026 8/20/98		SSC027 07/07/98
						duplicate								duplicate		duplicate	
Other Parameters																	
Bulk Density	g/cm^3	1.2	1.3	1.3	1.4	1.3	1.3	1.3	1.1	1	0.93	1	1.1	1.1	0.92	0.91	1.1
CEC	meq/100g	1000	1	2	4	4	4	6	1	4.4	4.4	4	2	1	0.47	0.88	3
Percent Solids	%	99	99	99	94	98	99	99	91	78	99	72	98	88	72	71	90
pH (lab)	S. U.	8.2	8.13	8.2	8	8.2	8	8.1	5	5.8	5.7	5.1	5.1	5.2	5.9	5.9	4.7
Resistivity	ohm-cm	930000	19000	17000	790000	19000	1100000	1700000	320000	97000	140000	2400000	1500000	1600000	45000	290000	390000
Texture (No. 4)	%	100	100	100	100	100	100	100	100	99.9	100	100	100	100	100	100	100
Texture (No. 10)	%	100	100	99.6	99.8	99.8	100	100	99.9	99.8	99.9	99.8	99.9	99.9	99.8	99.8	99.8
Texture (No. 40)	%	97.9	60	57.8	50	58.7	78.4	84.2	99.4	96.2	99	72.9	97.9	90.3	96	96.1	99.1
Texture (No. 60)	%	57.2	11.8	14.6	7.4	10.2	21.4	28.9	97.1	89.6	96.8	17.3	68.2	68	55.3	55.4	98.2
Texture (No. 100)	%	10.6	1.6	2	0.9	1.3	2.2	3.5	46	31.1	43.3	4.5	14.2	14.2	8.5	8.6	63.8
Texture (No. 200)	%	0.1	0.5	0.4	0	0	0.1	0.2	3.2	3.1	3.5	1.9	1.3	1.5	1.5	1.6	1.7
Total Organic Carbon	mg/Kg	4700	>26700	26700	>26700	>26700	23300	17000	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700

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		SSC028 07/07/98	SSC029 07/07/98	SSC030 06/29/98	SSC031 06/29/98	SSC032 06/29/98	SSC033 06/29/98	SSC034 06/29/98	SSC035 06/29/98	SSC036 * 06/16/98	SSC037 06/16/98	SSC038 * 06/16/98	SSC039 06/16/98	SSC040 06/29/98	SSC041 06/30/98	SSC042 06/30/98	SSC043 06/30/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
4,4' - DDE	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
4,4' - DDT	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Aldrin	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Alpha - BHC	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Beta - BHC	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Chlordane (alpha)	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Chlordane (gamma)	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Chlordane (total)	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Delta - BHC	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Dieldrin	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Endosulfan I	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Endosulfan II (beta)	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Endosulfan Sulfate	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Endrin	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Endrin Aldehyde	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Endrin Ketone	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Gamma - BHC (Lindane)	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Heptachlor	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Heptachlor Epoxide (a)	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
heptachlor Epoxide (b)	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Isodrin	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Methoxychlor	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Mirex	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.3	<3.4
Toxaphene	µg/Kg	<68	<92	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<3.6	<3.4	<3.4	<3.3	<3.3	<67	<66	<67
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<34	<46	<34	<34	<33	<33	<33	<34	<36	<34	<34	<33	<33	<33	<33	<34
PCB-1221	µg/Kg	<34	<46	<34	<34	<33	<33	<33	<34	<36	<34	<34	<33	<33	<33	<33	<34
PCB-1232	µg/Kg	<34	<46	<34	<34	<33	<33	<33	<34	<36	<34	<34	<33	<33	<33	<33	<34
PCB-1248	µg/Kg	<34	<46	<34	<34	<33	<33	<33	<34	<36	<34	<34	<33	<33	<33	<33	<34
PCB-1254	µg/Kg	<34	<46	<34	<34	<33	<33	<33	<34	<36	<34	<34	<33	<33	<33	<33	<34
PCB-1260	µg/Kg	<34	<46	<34	<34	<33	<33	<33	<34	<36	<34	<34	<33	<33	<33	<33	<34
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<10	<14	<10	<10	<10	<10	40	<10	<11	<10	<10	<10	<10	<10	<10	<10
3,5-DCBA	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	33	<10	<10	<10	<10	<10	<10	<10
4 - Nitrophenol	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Acifluorfen	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Bentazon	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Chloramben	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Dacthal	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Dalapon	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Dicamba	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Dinoseb	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
MCPA	µg/Kg	<100	<140	<100	<100	<100	<100	<100	<100	<110	<100	<100	<100	<100	<100	<100	<100
MCPP	µg/Kg	<100	<140	<100	<100	<100	<100	<100	<100	<110	<100	<100	<100	<100	<100	<100	<100
Pentachlorophenol	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10
Picloram	µg/Kg	<10	<14	<10	<10	<10	<10	<10	<10	<11	<10	<10	<10	<10	<10	<10	<10

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC028 07/07/98	SSC029 07/07/98	SSC030 06/29/98	SSC031 06/29/98	SSC032 06/29/98	SSC033 06/29/98	SSC034 06/29/98	SSC035 06/29/98	SSC036 * 06/16/98	SSC037 06/16/98	SSC038 * 06/16/98	SSC039 06/16/98	SSC040 06/29/98	SSC041 06/30/98	SSC042 06/30/98	SSC043 06/30/98
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<17	<23	<18	<17	<17	<17	<17	<17	<92	<87	<85	<17	<17	<17	<17	<17
2 - Methylnaphthalene	µg/Kg	<17	<23	<18	<17	<17	<17	<17	<17	<92	<86	<85	<17	<17	<17	<17	<17
Acenaphthene	µg/Kg	<17	<23	<18	<17	<17	<17	<17	<17	<92	<86	<85	<17	<17	<17	<17	<17
Acenaphthylene	µg/Kg	<3.4	<4.6	<3.4	<3.4	<3.3	<3.3	<3.3	<3.4	<18	<17	<17	<3.3	<3.3	<3.3	<3.3	<3.4
Anthracene	µg/Kg	<18	<24	<18	<18	<17	<17	<17	<17	<91	<86	<85	<17	<17	<17	<17	<17
Benzo(a)anthracene	µg/Kg	<1.7	<2.3	<1.8	<1.7	<1.7	<1.7	<1.7	<1.7	<9.2	<8.6	<8.5	<1.7	<1.7	<1.7	<1.7	<1.7
Benzo(a)pyrene	µg/Kg	<2	<3	<2	<2	<2	<2	<2	<2	<9	<8	<8	<2	<2	<2	<2	<2
Benzo(b)fluoranthene	µg/Kg	<3	<4	<3	<3	<3	<3	<3	<3	<19	<18	<17	<3	<3	<3	<3	<3
Benzo(g,h,i)perylene	µg/Kg	<3.4	<4.6	<3.5	<3.4	<3.4	<3.3	<3.3	<3.4	<18	<17	<17	<3.4	<3.4	<3.4	<3.4	<3.4
Benzo(k)fluoranthene	µg/Kg	<2	<3	<2	<2	<2	<2	<2	<2	<9	<8	<8	<2	<2	<2	<2	<2
Chrysene	µg/Kg	<1.7	<2.3	<1.8	<1.7	<1.7	<1.7	<1.7	<1.7	<9.2	<8.6	<8.5	<1.7	<1.7	<1.7	<1.7	<1.7
Dibenzo(a,h)anthracene	µg/Kg	<3.4	<4.6	<3.5	<3.4	<3.4	<3.3	<3.3	<3.4	<18	<17	<17	<3.4	<3.4	<3.4	<3.4	<3.4
Fluoranthene	µg/Kg	<3.4	<4.6	<3.5	<3.4	<3.4	<3.3	<3.3	<3.4	<18	<17	<17	<3.4	<3.4	<3.4	<3.4	<3.4
Fluorene	µg/Kg	<3.4	<4.6	<3.5	<3.4	<3.4	<3.3	<3.3	<3.4	<18	<17	<17	<3.4	<3.4	<3.4	<3.4	<3.4
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.7	<2.3	<1.8	<1.7	<1.7	<1.7	<1.7	<1.7	<9.2	<8.6	<8.5	<1.7	<1.7	<1.7	<1.7	<1.7
Naphthalene	µg/Kg	<17	<23	<18	<17	<17	<17	<17	<17	<92	<86	<85	<17	<17	<17	<17	<17
Phenanthrene	µg/Kg	<1.7	<2.3	<1.8	<1.7	<1.7	<1.7	<1.7	<1.7	<9.2	<8.6	<8.5	<1.7	<1.7	<1.7	<1.7	<1.7
Pyrene	µg/Kg	<1.7	<2.3	<1.8	<1.7	<1.7	<1.7	<1.7	<1.7	<9.2	<8.6	<8.5	<1.7	<1.7	<1.7	<1.7	<1.7
Surrogates																	
2,4-DCAA	%	68	76	60	62	72	60	56	48	64	40	88	136	88	60	72	40
2,4,5,6-TCMX	%	79	91	57	74	70	63	59	57	54	54	53	67	55	62	64	58
DBC	%	72	79	70	89	86	83	73	69	78	97	105	99	75	66	72	65
p-terphenyl	%	103	96	95	113	78	90	85	109	97	85	95	88	99	114	103	103
Metals																	
Aluminum	mg/Kg	48	100	86	98	30	400	250	48	910	41	290	100	110	970	1900	930
Antimony	mg/Kg	<2	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	mg/Kg	<0.5	<0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium	mg/Kg	<21	<28	<21	<21	<20	<20	<20	<20	<22	<21	<20	<20	<20	<20	<20	<20
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	210	86	430	580	270	89	61	47	120	86	38	84	110	360	160	980
Chromium (total)	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	1.5	<1	<1	<1	<1	2.2	4.2	2
Cobalt	mg/Kg	<5	<7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Copper	mg/Kg	<5	<7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iron	mg/Kg	54	57	61	95	52	500	220	53	1400	38	210	63	120	1500	2800	1600
Lead	mg/Kg	1.4	<1	2.5	3.5	1.6	2.2	2	1.8	1.8	1.1	1.4	<1	2.7	8	4.4	3.6
Magnesium	mg/Kg	34	<35	48	65	42	28	<25	<26	65	<26	<26	<25	36	72	80	85
Manganese	mg/Kg	2.2	1.9	3.9	2.5	7.8	5.1	2.8	2	4	<1	1.1	1.2	3.2	76	27	66
Mercury	mg/Kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/Kg	<5	<7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Potassium	mg/Kg	<26	38	<170	<170	<170	<160	<160	<170	30	<26	<26	<25	<170	<170	<170	<170
Selenium	mg/Kg	<2	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Silver	mg/Kg	<2	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sodium	mg/Kg	14 I	19 I	15 I	11 I	9 I	12 I	9.5 I	10 I	<7.1	7.7 I	7.0 I	<6.6	22 I	22 I	17 I	16 I
Thallium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	mg/Kg	<1	<1	<1	<1	<1	1	1	<1	2	<1	<1	<1	<1	2.8	4.2	2.5
Zinc	mg/Kg	<5	<7	10	16	6.9	6.7	5	<5	<5	<5	<5	<5	5.7	10	6.3	5

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Other Parameters		SSC028 07/07/98	SSC029 07/07/98	SSC030 06/29/98	SSC031 06/29/98	SSC032 06/29/98	SSC033 06/29/98	SSC034 06/29/98	SSC035 06/29/98	SSC036 * 06/16/98	SSC037 06/16/98	SSC038 * 06/16/98	SSC039 06/16/98	SSC040 06/29/98	SSC041 06/30/98	SSC042 06/30/98	SSC043 06/30/98
Bulk Density	g/cm^3	1.1	1.2	0.93	0.75	0.86	1.1	1.1	1.1	1.1	0.67	0.99	0.73	0.95	0.94	1.2	0.91
CEC	meq/100g	4	1	2	5	3	2	2	2	5	5	6	4.4	3	3	2	5
Percent Solids	%	97	72	96	96	99	100	100	98	91	97	98	99	99	99	99	98
pH (lab)	S. U.	5.4	5.6	5.3	6.8	6.2	6	5	5.6	5.6	4.7	4.7	4.8	5	6.5	6.2	6.3
Resistivity	ohm-cm	2100000	800000	<12	<12	<12	<12	<12	<12	130000	130000	130000	150000	<12	<12	2500000	2200000
Texture (No. 4)	%	100	100	100	100	99.9	100	100	100	99.9	100	100	100	100	100	100	99.7
Texture (No. 10)	%	100	99.9	99.8	99.2	99.3	99.9	99.9	99.9	99.7	99.9	99.8	100	99.9	99.9	100	99.1
Texture (No. 40)	%	99.3	99.4	98.7	97.2	98.1	99.4	99.3	99.4	97.7	96.1	93.6	96.6	94.6	48.1	46	63.5
Texture (No. 60)	%	98.2	97.9	97.6	95.1	95.8	97.3	98.5	98.1	93.6	87.9	84.1	88.4	89.4	40.1	38.2	51.3
Texture (No. 100)	%	50.3	45.9	52.4	61.4	49.1	51	61.9	64.6	41.8	31.5	26.6	27.2	62.7	21	20.2	23.4
Texture (No. 200)	%	2.3	1.4	3.8	4.8	3.8	3	3	2.9	4	3.2	2.8	2	6.8	5.5	5.8	3.7
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	20000	>26700	13000	>26700	>26700	>26700	>26700

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Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC044 06/30/98	SSC045* 06/30/98	SSC046 06/30/98	SSC047 06/30/98	SSC048 6/30/98	SSC048 6/30/98 duplicate	SSC049 06/30/98	SSC050 06/30/98	SSC051 06/30/98	SSC052* 06/30/98	SSC053 07/06/98	SSC054 07/06/98	SSC055 07/06/98	SSC056 7/6/98	SSC056 7/6/98 duplicate	SSC057 07/06/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
4,4' - DDE	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
4,4' - DDT	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Aldrin	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Alpha - BHC	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Beta - BHC	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Chlordane (alpha)	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Chlordane (gamma)	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Chlordane (total)	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Delta - BHC	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Dieldrin	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Endosulfan I	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Endosulfan II (beta)	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Endosulfan Sulfate	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Endrin	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Endrin Aldehyde	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Endrin Ketone	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Gamma - BHC (Lindane)	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Heptachlor	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Heptachlor Epoxide (a)	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
heptachlor Epoxide (b)	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Isodrin	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Methoxychlor	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Mirex	µg/Kg	<3.3	<3.4	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<3.4	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Toxaphene	µg/Kg	<67	<67	<70	<68	<70	<67	<68	<68	<67	<67	<90	<67	<68	<67	<67	<67
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<33	<34	<35	<34	<35	<34	<34	<34	<34	<34	<45	<34	<34	<33	<34	<34
PCB-1221	µg/Kg	<33	<34	<35	<34	<35	<34	<34	<34	<34	<34	<45	<34	<34	<33	<34	<34
PCB-1232	µg/Kg	<33	<34	<35	<34	<35	<34	<34	<34	<34	<34	<45	<34	<34	<33	<34	<34
PCB-1248	µg/Kg	<33	<34	<35	<34	<35	<34	<34	<34	<34	<34	<45	<34	<34	<33	<34	<34
PCB-1254	µg/Kg	<33	<34	<35	<34	<35	<34	<34	<34	<34	<34	<45	<34	<34	<33	<34	<34
PCB-1260	µg/Kg	<33	<34	<35	<34	<35	<34	<34	<34	<34	<34	<45	<34	<34	<33	<34	<34
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
3,5-DCBA	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
4 - Nitrophenol	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Acifluorfen	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Bentazon	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Chloramben	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Dacthal	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Dalapon	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Dicamba	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Dinoseb	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
MCPA	µg/Kg	<100	<100	<110	<100	<110	<100	<100	<100	<100	<100	<140	<100	<100	<100	<100	<100
MCPP	µg/Kg	<100	<100	<110	<100	<110	<100	<100	<100	<100	<100	<140	<100	<100	<100	<100	<100
Pentachlorophenol	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10
Picloram	µg/Kg	<10	<10	<11	<10	<11	<10	<10	<10	<10	<10	<14	<10	<10	<10	<10	<10

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC044 06/30/98	SSC045* 06/30/98	SSC046 06/30/98	SSC047 06/30/98	SSC048 6/30/98		SSC049 06/30/98	SSC050 06/30/98	SSC051 06/30/98	SSC052* 06/30/98	SSC053 07/06/98	SSC054 07/06/98	SSC055 07/06/98	SSC056 7/6/98		SSC057 07/06/98
							duplicate									duplicate	
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<17	<85	75	<17	<18	<17	<17	<17	<17	<85	<23	<17	<17	<17	<17	<17
2 - Methylnaphthalene	µg/Kg	<17	<85	28 I	<17	<18	<17	<17	<17	<17	<85	<23	<17	<17	<17	<17	<17
Acenaphthene	µg/Kg	<17	<85	<18	<17	<18	<17	<17	<17	<17	<85	<23	<17	<17	<17	<17	<17
Acenaphthylene	µg/Kg	<3.3	<17	<3.5	<3.4	<3.5	<3.4	<3.4	<3.4	<3.4	<17	<4.5	<3.4	<3.4	<3.3	<3.4	<3.4
Anthracene	µg/Kg	<17	<84	<18	<18	<18	<17	<17	<17	<17	<84	<23	<17	<18	<17	<17	<17
Benzo(a)anthracene	µg/Kg	<1.7	<8.5	1 1	<1.7	<1.8	<1.7	<1.7	<1.7	<1.7	<8.5	<2.3	<1.7	<1.7	<1.7	<1.7	<1.7
Benzo(a)pyrene	µg/Kg	<2	<8	<2	<2	<2	<2	<2	<2	<2	<8	<3	<2	<2	<2	<2	<2
Benzo(b)fluoranthene	µg/Kg	<3	<17	<3	<3	<3	<3	<3	<3	<3	<17	<4	<3	<3	<3	<3	<3
Benzo(g,h,i)perylene	µg/Kg	<3.4	<17	<3.5	<3.4	<3.6	<3.4	<3.4	<3.4	<3.4	<17	<4.6	<3.4	<3.4	<3.4	<3.4	<3.4
Benzo(k)fluoranthene	µg/Kg	<2	<8	<2	<2	<2	<2	<2	<2	<2	<8	<3	<2	<2	<2	<2	<2
Chrysene	µg/Kg	<1.7	<8.5	4.4	<1.7	<1.8	<1.7	<1.7	<1.7	<1.7	<8.5	<2.3	<1.7	<1.7	<1.7	<1.7	<1.7
Dibenzo(a,h)anthracene	µg/Kg	<3.4	<17	<3.5	<3.4	<3.6	<3.4	<3.4	<3.4	<3.4	<17	<4.6	<3.4	<3.4	<3.4	<3.4	<3.4
Fluoranthene	µg/Kg	<3.4	<17	10	<3.4	<3.6	<3.4	<3.4	<3.4	<3.4	<17	<4.6	<3.4	<3.4	<3.4	<3.4	<3.4
Fluorene	µg/Kg	<3.4	<17	<3.5	<3.4	<3.6	<3.4	<3.4	<3.4	<3.4	<17	<4.6	<3.4	<3.4	<3.4	<3.4	<3.4
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.7	<8.5	<1.8	<1.7	<1.8	<1.7	<1.7	<1.7	<1.7	<8.5	<2.3	<1.7	<1.7	<1.7	<1.7	<1.7
Naphthalene	µg/Kg	<17	<85	<18	<17	<18	<17	<17	<17	<17	<85	<23	<17	<17	<17	<17	<17
Phenanthrene	µg/Kg	<1.7	<8.5	<1.8	<1.7	<1.8	<1.7	<1.7	<1.7	<1.7	<8.5	<2.3	<1.7	<1.7	<1.7	<1.7	<1.7
Pyrene	µg/Kg	<1.7	<8.5	4.8 I	<1.7	<1.8	<1.7	<1.7	<1.7	<1.7	<8.5	<2.3	<1.7	<1.7	<1.7	<1.7	<1.7
Surrogates																	
2,4-DCAA	%	56	60	40	72	120	50	76	60	64	64	68	76	96	84	90	80
2,4,5,6-TCMX	%	55	63	56	70	84	51	68	63	61	74	87	73	89	58	74	56
DBC	%	59	85	64	74	89	62	66	86	64	78	76	79	80	68	82	65
p-terphenyl	%	113	0	97	110	95	65	113	99	89	0	68	93	73	88	62	100
Metals																	
Aluminum	mg/Kg	1200	75	1000	880	530	610	260	1100	1600	80	2500	370	740	390	500	2000
Antimony	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<3	<2	<2	<2	<2	<2
Arsenic	mg/Kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.7	*140****	2.5	<0.5	<0.5	<0.5
Barium	mg/Kg	<20	<20	<21	<21	<21	<20	<20	<20	<20	<20	<27	<20	<21	<20	<20	<20
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	190	510	540	1200	660	790	600	690	14000	59	3600	260000	180000	150	7000	11000
Chromium (total)	mg/Kg	3.2	<1	2.3	1.6	1.3	1.5	<1	2.8	3.4	<1	3.2	1	1.8	1.1	1.2	4.5
Cobalt	mg/Kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<7	<5	<5	<5	<5	<5
Copper	mg/Kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<7	<5	<5	<5	<5	<5
Iron	mg/Kg	2100	130	1800	1000	960	1200	360	1800	2200	100	2000	740	970	780	920	3100
Lead	mg/Kg	2.9	2	4.9	7	3.4	4	3.9	5	5.5	1.5	3.4	3.6	4	2	2.2	4.6
Magnesium	mg/Kg	72	58	110	180	72	89	66	95	83	<25	120	120	100	35	52	120
Manganese	mg/Kg	46	8	150	70	39	45	68	87	81	3.4	4.4	5.3	13	3.6	8.4	140
Mercury	mg/Kg	<0.01	<0.01	0.013 I	0.019	0.012 I	0.015 I	0.012 I	0.015 I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/Kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<7	<5	<5	<5	<5	<5
Potassium	mg/Kg	<170	<170	<180	<170	<180	39	31	59	44	<25	49	140	200	56	47	76
Selenium	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<3	<2	<2	<2	<2	<2
Silver	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<3	3.2	<2	<2	<2	<2
Sodium	mg/Kg	18 I	11 I	15 I	25 I	19 I	16 I	14 I	20 I	140	14 I	60	1900	1300	15 I	43	100
Thallium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	mg/Kg	3	<1	2.6	1.8	1.3	1.5	1	3.5	3.4	<1	2.5	1	1.8	1.4	1.6	3.5
Zinc	mg/Kg	12	7.5	7.3	8.5	6.1	<5	<5	<5	<5	<5	<7	<5	<5	<5	<5	<5

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. "*" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Other Parameters		SSC044 06/30/98	SSC045* 06/30/98	SSC046 06/30/98	SSC047 06/30/98	SSC048 6/30/98		SSC049 06/30/98	SSC050 06/30/98	SSC051 06/30/98	SSC052* 06/30/98	SSC053 07/06/98	SSC054 07/06/98	SSC055 07/06/98	SSC056 7/6/98		SSC057 07/06/98
							duplicate									duplicate	
Bulk Density	g/cm³	0.99	1.1	0.99	1.1	0.96	0.92	0.93	1	0.97	0.93	0.91	1.4	1.2	0.95	1	1.2
CEC	meq/100g	3	6	3	8	4	5	2	8	3	1	3	2	3	1	1	8
Percent Solids	%	99	98	94	96	94	98	97	98	98	98	73	98	97	99	98	98
pH (lab)	S. U.	6.5	6	6.5	6.4	6.5	6.1	6.4	6.8	7.9	4.7	7.3	8.3	7.9	5	5.6	7
Resistivity	ohm-cm	2300000	0	2300000	<12	2200000	2300000	0	2300000	1300000	0	800000	1400000	730000	1300000	1400000	990000
Texture (No. 4)	%	99.9	100	100	100	99.8	100	99.8	99.9	99.1	100	100	92.4	94.4	100	100	99.8
Texture (No. 10)	%	99.8	99.6	100	99.8	99.7	99.9	99.7	99.7	96.3	99.8	99.9	68.3	76.7	99.9	100	97.2
Texture (No. 40)	%	62.8	70.5	65.4	64.4	74.6	74.4	78.9	66.9	46.7	95	57.9	36.4	43	75.3	74.8	52.8
Texture (No. 60)	%	47.5	51.8	45.5	54.4	62.5	62.6	65.5	55.3	38.2	83.8	43.8	28.9	35.4	56.4	55.8	40.9
Texture (No. 100)	%	17.1	16.6	14.6	21.4	24.6	21.4	16.5	21.5	17.4	29.8	16.5	14.7	18.1	22.7	19.1	16.7
Texture (No. 200)	%	4.1	2.7	3.3	4.8	3.6	3.6	3.9	4.8	4.5	2.2	3.8	1.3	2.7	2.8	2.5	5.7
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	16600	>26700	>26700	>26700	>26700	>26700

I = value is between the Method Detection Limit and the Practical Quanitation Level
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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC058 07/06/98	SSC059 07/06/98	SSC060 07/06/98	SSC061 06/26/98	SSC062 07/27/98	SSC063** 08/20/98	SSC064 7/7/98	SSC064 7/7/98 duplicate	SSC065 07/07/98	SSC66 06/22/98	SSC067 07/27/98	SSC068 07/27/98	SSC069 07/27/98	SSC070 08/20/98	SSC071** 08/20/98	SSC072 07/08/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	8.3
4,4' - DDE	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	5	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
4,4' - DDT	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Aldrin	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Alpha - BHC	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Beta - BHC	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Chlordane (alpha)	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Chlordane (gamma)	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Chlordane (total)	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Delta - BHC	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Dieldrin	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Endosulfan I	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Endosulfan II (beta)	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Endosulfan Sulfate	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Endrin	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Endrin Aldehyde	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Endrin Ketone	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Gamma - BHC (Lindane)	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Heptachlor	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Heptachlor Epoxide (a)	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
heptachlor Epoxide (b)	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Isodrin	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Methoxychlor	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Mirex	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<4.6	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<4.5	<4
Toxaphene	µg/Kg	<67	<67	<67	<4.4	<71	<92	<78	<72	<74	<3.5	<72	<67	<73	<78	<90	<80
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<33	<34	<33	<44	<36	<46	<39	<36	<37	<35	<36	<34	<37	<39	<45	<40
PCB-1221	µg/Kg	<33	<34	<33	<44	<36	<46	<39	<36	<37	<35	<36	<34	<37	<39	<45	<40
PCB-1232	µg/Kg	<33	<34	<33	<44	<36	<46	<39	<36	<37	<35	<36	<34	<37	<39	<45	<40
PCB-1248	µg/Kg	<33	<34	<33	<44	<36	<46	<39	<36	<37	<35	<36	<34	<37	<39	<45	<40
PCB-1254	µg/Kg	<33	<34	<33	<44	<36	<46	<39	<36	<37	<35	<36	<34	<37	<39	<45	<40
PCB-1260	µg/Kg	<33	<34	<33	<44	<36	<46	<39	<36	<37	<35	<36	<34	<37	<39	<45	<40
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
3,5-DCBA	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
4 - Nitrophenol	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Acifluorfen	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Bentazon	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Chloramben	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Dacthal	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Dalapon	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Dicamba	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Dinoseb	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
MCPA	µg/Kg	<100	<100	<100	<130	<220	<280	<120	<110	<220	<110	<220	<200	<220	<240	<270	<240
MCPP	µg/Kg	<100	<100	<100	<130	<220	<280	<120	<110	<220	<110	<220	<200	<220	<240	<270	<240
Pentachlorophenol	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12
Picloram	µg/Kg	<10	<10	<10	<13	<11	<14	<12	<11	<11	<11	<11	<10	<11	<12	<14	<12

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC058 07/06/98	SSC059 07/06/98	SSC060 07/06/98	SSC061 06/26/98	SSC062 07/27/98	SSC063** 08/20/98	SSC064 7/7/98	SSC064 7/7/98 duplicate	SSC065 07/07/98	SSC66 06/22/98	SSC067 07/27/98	SSC068 07/27/98	SSC069 07/27/98	SSC070 08/20/98	SSC071** 08/20/98	SSC072 07/08/98
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<17	<17	<17	<22	<18	<230	<20	<18	<19	<18	<18	<17	<19	<20	<230	<20
2 - Methylnaphthalene	µg/Kg	<17	<17	<17	<22	<18	<230	<20	<18	<19	<18	<18	<17	<19	<20	<230	<20
Acenaphthene	µg/Kg	<17	<17	<17	<22	<18	<230	<20	<18	<19	<18	<18	<17	<19	<20	<230	<20
Acenaphthylene	µg/Kg	<3.3	<3.4	<3.3	<4.4	<3.6	<46	<3.9	<3.6	<3.7	<3.5	<3.6	<3.4	<3.7	<3.9	<45	<4
Anthracene	µg/Kg	<17	<17	<17	<22	<18	<230	<20	<18	<19	<18	<18	<17	<19	<20	<230	<20
Benzo(a)anthracene	µg/Kg	<1.7	<1.7	<1.7	<2.2	<1.8	<23	<2	<1.8	<1.9	<1.8	<1.8	<1.7	<1.9	2.5 I	<23	<2
Benzo(a)pyrene	µg/Kg	<2	<2	<2	<3	<2	<24	<2	<2	<2	<2	<2	<2	<2	<2	<23	<2
Benzo(b)fluoranthene	µg/Kg	<3	<3	<3	<4	<3	<46	<4	<3	<3	<3	<3	<3	<3	<4	<45	<4
Benzo(g,h,i)perylene	µg/Kg	<3.4	<3.4	<3.4	<4.4	<3.6	<46	<4	<3.6	<3.7	<3.6	<3.6	<3.4	<3.7	<3.9	<46	<4
Benzo(k)fluoranthene	µg/Kg	<2	<2	<2	<3	<2	<24	<2	<2	<2	<2	<2	<2	<2	<2	<23	<2
Chrysene	µg/Kg	<1.7	<1.7	<1.7	<2.2	<1.8	<23	<2	<1.8	<1.9	<1.8	<1.8	<1.7	<1.9	5.6	<23	<2
Dibenzo(a,h)anthracene	µg/Kg	<3.4	<3.4	<3.4	<4.4	<3.6	<46	<4	<3.6	<3.7	<3.6	<3.6	<3.4	<3.7	<3.9	<46	<4
Fluoranthene	µg/Kg	<3.4	<3.4	<3.4	<4.4	<3.6	<46	<4	<3.6	<3.7	<3.6	<3.6	<3.4	<3.7	<3.9	<46	<4
Fluorene	µg/Kg	<3.4	<3.4	<3.4	<4.4	<3.6	<46	<4	<3.6	<3.7	<3.6	<3.6	<3.4	<3.7	<3.9	<46	<4
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.7	<1.7	<1.7	<2.2	<1.8	<23	<2	<1.8	<1.9	<1.8	<1.8	<1.7	<1.9	<2	<23	<2
Naphthalene	µg/Kg	<17	<17	<17	<22	<18	930	<20	<18	<19	<18	<18	<17	<19	<20	440	<20
Phenanthrene	µg/Kg	<1.7	<1.7	<1.7	<2.2	<1.8	<23	<2	<1.8	<1.9	<1.8	<1.8	<1.7	<1.9	<2	<23	<2
Pyrene	µg/Kg	<1.7	<1.7	<1.7	<2.2	<1.8	<23	<2	<1.8	<1.9	<1.8	<1.8	<1.7	<1.9	<2	<23	<2
Surrogates																	
2,4-DCAA	%	88	100	104	60	100	108	80	112	64	84	64	96	68	100	104	64
2,4,5,6-TCMX	%	69	89	73	68	73	64	78	60	60	54	79	68	108	52	51	85
DBC	%	76	106	68	68	104	118	79	82	54	81	129	89	120	74	85	128
p-terphenyl	%	78	84	74	70	62	0	102	61	115	77	62	80	64	70	0	82
Metals																	
Aluminum	mg/Kg	1100	2200	1100	87	58	<3	190	120	170	220	210	43	100	120	360	260
Antimony	mg/Kg	<2	<2	<2	<3	<2	<230	<2	<2	<2	<2	<2	<2	<2	<2	<3	<2
Arsenic	mg/Kg	<0.5	<0.5	<0.5	<0.7	<0.5	<0.7	<0.6	<0.5	<0.6	<0.5	<0.5	<0.5	<0.6	<0.6	0.8 I	<0.6
Barium	mg/Kg	<20	<20	<20	<26	<22	<28	<24	<22	<22	<43	<22	<20	<22	<24	<27	<24
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	320	2200	240	320	200	180	600	350	320	53	160	110	320	420	780	550
Chromium (total)	mg/Kg	2.9	5	2.9	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1
Cobalt	mg/Kg	<5	<5	<5	<7	<5	<7	<6	<5	<6	<11	<5	<5	<6	<6	<7	<6
Copper	mg/Kg	<5	<5	<5	<7	<5	<7	<6	<5	<6	1.3	<5	<5	<6	<6	<7	<6
Iron	mg/Kg	2000	3200	2000	61	40	68	140	230	180	260	200	36	66	98	320	220
Lead	mg/Kg	3	5	4.1	1.6	<1	1.5	3	1.5	2.1	<2	2.6	<1	1.3	3	12	5.2
Magnesium	mg/Kg	74	160	72	95	56	51	140	98	160	64	100	<25	87	85	200	110
Manganese	mg/Kg	73	120	58	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	1.4	2.9	<1
Mercury	mg/Kg	<0.01	0.015 I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01 I	<0.01	0.01 I	<0.01	<0.01	<0.01	0.01 I	<0.01
Nickel	mg/Kg	<5	<5	<5	<200	<5	<7	<6	<5	<6	<11	<5	<5	<6	<6	<7	<6
Potassium	mg/Kg	54	84	47	<33	28	<35	73	40	53	<54	<27	<25	<28	54	110	<200
Selenium	mg/Kg	<2	<2	<2	<3	<2	<3	<2	<2	<2	<4	<2	<2	<2	<2	<3	<2
Silver	mg/Kg	<2	<2	<2	<3	<2	<3	<2	<2	<2	<4	<2	<2	<2	<2	<3	<2
Sodium	mg/Kg	17 I	32	14 I	21 I	<27	<35	65	38	97	32	41	<25	67	41	130	43
Thallium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	mg/Kg	2.6	3.3	2.4	<1	<1	<1	1.3	<1	<1	<2	<1	<1	<1	<1	2.9	1.8
Zinc	mg/Kg	<5	9.8	6.4	<7	6.9	<22	<6	12	6.8	<11	<5	<5	<6	<19	<22	11

I = value is between the Method Detection Limit and the Practical Quanitation Level
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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. "*" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Other Parameters		SSC058 07/06/98	SSC059 07/06/98	SSC060 07/06/98	SSC061 06/26/98	SSC062 07/27/98	SSC063** 08/20/98	SSC064 7/7/98	SSC064 7/7/98 duplicate	SSC065 07/07/98	SSC66 06/22/98	SSC067 07/27/98	SSC068 07/27/98	SSC069 07/27/98	SSC070 08/20/98	SSC071** 08/20/98	SSC072 07/08/98
Bulk Density	g/cm³	0.9	1.2	1.4	0.72	0.79	0.72	0.65	0.68	0.6	0.93	0.53	1	0.88	0.75	0.66	0.62
CEC	meq/100g	2	7	4	16	9	24	23	13	16	19	22	4	12	11	28	28
Percent Solids	%	99	98	99	76	93	72	84	92	89	93	92	98	90	85	73	83
pH (lab)	S. U.	7.2	6.4	6.2	4.8	7.6	4.7	4.2	4.4	4.3	4.5	4.2	5.4	4.1	5.2	4.6	4.1
Resistivity	ohm-cm	2100000	1200000	1800000	<12	440000	95000	350000	640000	940000	300000	750000	1500000	420000	280000	190000	340000
Texture (No. 4)	%	99.6	100	100	100	100	100	100	99.9	100	100	100	100	100	100	100	99.8
Texture (No. 10)	%	99.4	99.9	99.6	99.9	99.7	99.3	99.2	99.2	99.4	99.8	99.6	99.8	99.7	99.5	99.8	99
Texture (No. 40)	%	43	48.4	97.3	70.5	98.2	97.2	95.4	97	96.1	97.3	96.8	98.7	98.4	67.2	82.8	84.5
Texture (No. 60)	%	32.6	37.6	91.6	12.2	96.3	94.4	93.2	94.7	93.5	91.7	83.6	86.3	97.1	16.5	25.3	49.5
Texture (No. 100)	%	13.9	17.1	49.7	3.2	50.4	53.9	53.6	59.2	61.2	33.8	32.3	31.5	72.4	6.1	7.2	10.6
Texture (No. 200)	%	3.9	5.2	3.1	2.4	8.2	5.4	7	5.5	8.9	7	7.9	3	6.4	3.9	5	3.8
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC073 07/08/98	SSC074 07/08/98	SSC075 07/08/98	SSC076 07/07/98	SSC077 07/07/98	SSC78 06/22/98	SSC079 07/08/98	SSC080 07/08/98	SSC081 07/14/98	SSC082 06/26/98	SSC083 06/29/98	SSC084 06/29/98	SSC085 08/12/98	SSC086 08/12/98	SSC087 08/12/98	SSC088 06/29/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
4,4' - DDE	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
4,4' - DDT	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Aldrin	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Alpha - BHC	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Beta - BHC	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Chlordane (alpha)	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Chlordane (gamma)	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Chlordane (total)	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Delta - BHC	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Dieldrin	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Endosulfan I	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Endosulfan II (beta)	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Endosulfan Sulfate	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Endrin	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Endrin Aldehyde	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Endrin Ketone	µg/Kg	<3.8	<4.7	6	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Gamma - BHC (Lindane)	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Heptachlor	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Heptachlor Epoxide (a)	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
heptachlor Epoxide (b)	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Isodrin	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Methoxychlor	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Mirex	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Toxaphene	µg/Kg	<76	<94	<78	<70	<72	<3.7	<110	<86	<100	<3.5	<3.4	<3.4	<78	<80	<81	<5.7
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<38	<47	<39	<35	<36	<37	<56	<43	<51	<35	<34	<34	<39	<40	<41	<57
PCB-1221	µg/Kg	<38	<47	<39	<35	<36	<37	<56	<43	<51	<35	<34	<34	<39	<40	<41	<57
PCB-1232	µg/Kg	<38	<47	<39	<35	<36	<37	<56	<43	<51	<35	<34	<34	<39	<40	<41	<57
PCB-1248	µg/Kg	<38	<47	<39	<35	<36	<37	<56	<43	<51	<35	<34	<34	<39	<40	<41	<57
PCB-1254	µg/Kg	<38	<47	<39	<35	<36	<37	<56	<43	<51	<35	<34	<34	<39	<40	<41	<57
PCB-1260	µg/Kg	<38	<47	<39	<35	<36	<37	<56	<43	<51	<35	<34	<34	<39	<40	<41	<57
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	23	<17
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
3,5-DCBA	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
4 - Nitrophenol	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Acifluorfen	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Bentazon	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Chloramben	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Dacthal	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Dalapon	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Dicamba	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Dinoseb	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
MCPA	µg/Kg	<230	<290	<240	<210	<220	<110	<340	<260	<310	<110	<100	<100	<240	<240	<250	<170
MCPP	µg/Kg	<230	<290	<240	<210	<220	<110	<340	<260	<310	<110	<100	<100	<240	<240	<250	<170
Pentachlorophenol	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17
Picloram	µg/Kg	<11	<14	<12	<11	<11	<11	<17	<13	<15	<11	<10	<10	<12	<12	<12	<17

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC073 07/08/98	SSC074 07/08/98	SSC075 07/08/98	SSC076 07/07/98	SSC077 07/07/98	SSC78 06/22/98	SSC079 07/08/98	SSC080 07/08/98	SSC081 07/14/98	SSC082 06/26/98	SSC083 06/29/98	SSC084 06/29/98	SSC085 08/12/98	SSC086 08/12/98	SSC087 08/12/98	SSC088 06/29/98
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<19	<24	<20	<18	<18	<19	<28	<22	<26	32	<17	<17	<20	<20	<21	<29
2 - Methylnaphthalene	µg/Kg	<19	<24	<20	<18	<18	<19	<28	<22	<26	<18	<17	<17	<20	<20	<21	<29
Acenaphthene	µg/Kg	<19	<24	<20	<18	<18	<19	<28	<22	<26	<18	<17	<17	<20	<20	<21	<29
Acenaphthylene	µg/Kg	<3.8	<4.7	<3.9	<3.5	<3.6	<3.7	<5.6	<4.3	<5.1	<3.5	<3.4	<3.4	<3.9	<4	<4.1	<5.7
Anthracene	µg/Kg	<20	<24	<20	<18	<19	<19	<29	<22	<26	<18	<18	<18	<20	<20	<21	<29
Benzo(a)anthracene	µg/Kg	<1.9	<2.4	<2	<1.8	<1.8	<1.9	<2.8	<2.2	<2.6	<1.8	<1.7	<1.7	3.3	<2	<2.1	<2.9
Benzo(a)pyrene	µg/Kg	<2	<3	<2	<2	<2	<2	<3	<2	<3	<2	<2	<2	8	<2	<2	<3
Benzo(b)fluoranthene	µg/Kg	<3	<4	<4	<3	<3	<3	<5	<4	<5	<3	<3	<3	10 I	<4	<4	<5
Benzo(g,h,i)perylene	µg/Kg	<3.8	<4.8	<3.9	<3.5	<3.7	<3.7	<5.6	<4.3	<5.1	<3.6	<3.5	<3.5	24	<4	<4.1	<5.7
Benzo(k)fluoranthene	µg/Kg	<2	<3	<2	<2	<2	<2	<3	<2	<3	<2	<2	<2	8	<2	<2	<3
Chrysene	µg/Kg	<1.9	<2.4	<2	<1.8	<1.8	<1.9	<2.8	<2.2	<2.6	<1.8	<1.7	<1.7	6.3	<2	<2.1	<2.9
Dibenzo(a,h)anthracene	µg/Kg	<3.8	<4.8	<3.9	<3.5	<3.7	<3.7	<5.6	<4.3	<5.1	<3.6	<3.5	<3.5	<4	<4	<4.1	<5.7
Fluoranthene	µg/Kg	<3.8	<4.8	<3.9	<3.5	<3.7	<3.7	<5.6	<4.3	<5.1	<3.6	<3.5	<3.5	13	180	21	<5.7
Fluorene	µg/Kg	<3.8	<4.8	<3.9	<3.5	<3.7	<3.7	<5.6	<4.3	<5.1	<3.6	<3.5	<3.5	<4	170	<4.1	<5.7
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.9	<2.4	<2	<1.8	<1.8	<1.9	<2.8	<2.2	<2.6	<1.8	<1.7	<1.7	9	<2	<2.1	<2.9
Naphthalene	µg/Kg	<19	<24	<20	<18	<18	<19	<28	<22	<26	24 I	<17	<17	<20	<20	<21	<29
Phenanthrene	µg/Kg	<1.9	<2.4	<2	<1.8	<1.8	<1.9	<2.8	<2.2	<2.6	<1.8	<1.7	<1.7	<2	<2	<2.1	<2.9
Pyrene	µg/Kg	<1.9	<2.4	<2	<1.8	<1.8	<1.9	<2.8	<2.2	<2.6	<1.8	<1.7	<1.7	30	53	<2.1	<2.9
Surrogates																	
2,4-DCAA	%	60	42	52	58	62	62	52	94	100	76	42	48	72	140	92	32
2,4,5,6-TCMX	%	84	85	68	63	65	65	75	76	62	76	58	58	80	81	66	61
DBC	%	134	216	129	56	72	114	128	117	103	79	56	56	115	119	100	80
p-terphenyl	%	61	71	118	92	90	64	111	118	92	108	80	91	67	78	71	75
Metals																	
Aluminum	mg/Kg	110	290	220	94	120	180	270	170	4000	410	940	280	1200	2200	2300	940
Antimony	mg/Kg	<2	<3	<2	<2	<2	<4	<3	<2	<3	<2	<2	<2	<2	<2	<2	<3
Arsenic	mg/Kg	<0.6	<0.7	<0.6	<0.5	<0.5	<1	<0.8	<0.6	<0.8	<0.5	<0.5	<0.5	1 I	<0.6	<0.6	<0.8
Barium	mg/Kg	<23	<28	<24	<21	<22	<44	<34	<26	<31	<21	<21	<21	<24	<24	<25	<34
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<2	<2	<1	<2	<1	<1	<1	<1	<1	<1	<2
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<2	<2	<1	<2	<1	<1	<1	<1	<1	<1	<2
Calcium	mg/Kg	670	570	92	280	620	370	440	640	11000	690	320	710	40000	1000	9400	88000
Chromium (total)	mg/Kg	<1	<1	<1	<1	<1	<2	<2	<1	5.8	<1	1	<1	2.8	7.5	4.2	<2
Cobalt	mg/Kg	<6	<7	<6	<5	<5	<11	<8	<6	<8	<5	<5	<5	<6	<6	<6	<8
Copper	mg/Kg	<6	<7	<6	<5	<5	1	<8	<6	<8	<5	<5	<5	<6	<6	<6	<8
Iron	mg/Kg	95	170	180	58	85	130	250	140	1500	360	650	230	930	2900	2000	890
Lead	mg/Kg	2.5	3	<1	2	2.6	<2	2.2	1.6	7.2	3.1	3	2.9	5.4	3.2	8.5	7
Magnesium	mg/Kg	100	140	120	42	88	130	270	210	820	98	85	69	290	140	210	3800
Manganese	mg/Kg	<1	2.3	<1	<1	3	<2	<2	<1	23	5.1	2.3	2.4	18	11	34	79
Mercury	mg/Kg	<0.01	0.017 I	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	0.071	<0.01	0.013 I	<0.01	0.02	<0.01	0.015 I	0.1
Nickel	mg/Kg	<6	<7	<6	<5	<5	<11	<8	<6	<8	<160	<5	<5	<6	<6	<6	<8
Potassium	mg/Kg	<190	<240	<190	<26	42	<56	<280	<210	130	80	<170	<170	64	<30	37	<280
Selenium	mg/Kg	<2	<3	<2	<2	<2	<4	<3	<2	<3	<2	<2	<2	<2	<2	<2	<3
Silver	mg/Kg	<2	<3	<2	<2	<2	<4	<3	<2	<3	<2	<2	<2	<2	<2	<2	<3
Sodium	mg/Kg	34	28 I	38	28	40	49	140	47	420	21 I	26 I	19 I	580	<30	32	880
Thallium	mg/Kg	<1	<1	<1	<1	<1	<2	<2	<1	<2	<1	<1	<1	<1	<1	<1	<2
Vanadium	mg/Kg	<1	<1	<1	<1	<1	<2	<2	<1	6.6	1.8	1.9	<1	4	8	3.2	2.9
Zinc	mg/Kg	11	11	<6	<5	<5	<11	10	28	12	<5	8.8	9	8.9	<6	9.1	15

I = value is between the Method Detection Limit and the Practical Quanitation Level
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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. "*" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC073 07/08/98	SSC074 07/08/98	SSC075 07/08/98	SSC076 07/07/98	SSC077 07/07/98	SSC78 06/22/98	SSC079 07/08/98	SSC080 07/08/98	SSC081 07/14/98	SSC082 06/26/98	SSC083 06/29/98	SSC084 06/29/98	SSC085 08/12/98	SSC086 08/12/98	SSC087 08/12/98	SSC088 06/29/98
Other Parameters																	
Bulk Density	g/cm^3	0.59	0.79	0.84	0.9	0.82	0.72	0.58	0.42	0.66	1.1	0.96	0.92	0.91	1.1	0.7	0.48
CEC	meq/100g	23	12	22	8	9	20	27	27	31	9	4	6	22	14	27	47
Percent Solids	%	87	70	85	94	91	90	59	77	65	94	96	96	84	83	81	58
pH (lab)	S. U.	4.5	4.9	4.4	4.7	4.8	4.6	4.2	4.2	7.6	5.8	5.9	6.2	6.6	6.7	6.7	7.4
Resistivity	ohm-cm	220000	320000	27000	1100000	730000	370000	200000	260000	130000	2300000	1700000	3100000	62000	63000	46000	4600
Texture (No. 4)	%	99.4	100	100	99.9	100	99.9	99.9	99.9	100	100	100	100	98.9	100	100	100
Texture (No. 10)	%	98.6	99.6	99.9	99.6	99.9	99.1	98.4	98.6	99.9	99.9	99.9	99.9	97.7	99.8	99.7	99.4
Texture (No. 40)	%	91.9	94.6	84	90.2	75.1	84.7	91.2	91.4	85.2	97.7	98.4	89.2	86.2	89.4	98.4	92.8
Texture (No. 60)	%	78.9	84.1	53.3	84.6	64.1	68.6	84.4	84.1	78.4	89.3	90.4	64.5	63.7	63.3	93.9	85.9
Texture (No. 100)	%	23.6	30.7	15.7	41	25.5	18.8	31.8	46.1	34.2	41.8	46.9	32	27.2	28.3	54.9	60.2
Texture (No. 200)	%	3.7	5.3	6	6.2	3.4	4.9	5.6	5.6	11.5	7.9	7.5	7.2	7.2	9.9	15.1	25.7
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	3000	>26700	>26700	>26700	>26700	>26700	>26700

I = value is between the Method Detection Limit and the Practical Quanitation Level
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* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC089 06/29/98	SSC090 06/29/98	SSC091 08/12/98	SSC092 08/12/98	SSC093 08/13/98	SSC94 07/14/98	SSC095 07/14/98	SSC096 07/14/98	SSC097 07/14/98	SSC098 08/21/98	SSC099 08/21/98	SSC100 08/21/98	SSC101 07/27/98	SSC102 07/27/98	SSC103 06/29/98	SSC104 06/29/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
4,4' - DDE	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
4,4' - DDT	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Aldrin	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Alpha - BHC	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Beta - BHC	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Chlordane (alpha)	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Chlordane (gamma)	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Chlordane (total)	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Delta - BHC	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Dieldrin	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<7.6	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Endosulfan I	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Endosulfan II (beta)	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Endosulfan Sulfate	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Endrin	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Endrin Aldehyde	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Endrin Ketone	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Gamma - BHC (Lindane)	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Heptachlor	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Heptachlor Epoxide (a)	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
heptachlor Epoxide (b)	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Isodrin	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Methoxychlor	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Mirex	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Toxaphene	µg/Kg	<3.6	<4.4	<82	<88	<140	<81	<78	<88	<72	<140	<300	<87	<75	<76	<6.8	<5.4
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<36	<44	<41	<44	<67	<41	<39	<44	<36	<67	<150	<43	<38	<38	<68	<54
PCB-1221	µg/Kg	<36	<44	<41	<44	<67	<41	<39	<44	<36	<67	<150	<43	<38	<38	<68	<54
PCB-1232	µg/Kg	<36	<44	<41	<44	<67	<41	<39	<44	<36	<67	<150	<43	<38	<38	<68	<54
PCB-1248	µg/Kg	<36	<44	<41	<44	<67	<41	<39	<44	<36	<67	<150	<43	<38	<38	<68	<54
PCB-1254	µg/Kg	<36	<44	<41	<44	<67	<41	<39	<44	<36	<67	<150	<43	<38	<38	<68	<54
PCB-1260	µg/Kg	<36	<44	<41	<44	<67	<41	<39	<44	<36	<67	<150	<43	<38	<38	<68	<54
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
3,5-DCBA	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
4 - Nitrophenol	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Acifluorfen	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Bentazon	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Chloramben	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Dacthal	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Dalapon	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Dicamba	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Dinoseb	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
MCPA	µg/Kg	<110	<130	<250	<270	<410	<250	<240	<270	<220	<410	<910	<260	<230	<230	<210	<160
MCPP	µg/Kg	<110	<130	<250	<270	<410	<250	<240	<270	<220	<410	<910	<260	<230	<230	<210	<160
Pentachlorophenol	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16
Picloram	µg/Kg	<11	<13	<12	<13	<20	<12	<12	<13	<11	<20	<45	<13	<11	<12	<21	<16

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC089 06/29/98	SSC090 06/29/98	SSC091 08/12/98	SSC092 08/12/98	SSC093 08/13/98	SSC94 07/14/98	SSC095 07/14/98	SSC096 07/14/98	SSC097 07/14/98	SSC098 08/21/98	SSC099 08/21/98	SSC100 08/21/98	SSC101 07/27/98	SSC102 07/27/98	SSC103 06/29/98	SSC104 06/29/98
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<18	<22	<21	<22	<34	<21	<20	<22	<18	<34	<76	<22	<19	<19	<34	<27
2 - Methylnaphthalene	µg/Kg	<18	<22	<21	<22	<34	<21	<20	<22	<18	<34	<76	<22	<19	<19	<34	<27
Acenaphthene	µg/Kg	<18	<22	<21	<22	<34	<21	<20	<22	<18	<34	<76	<22	<19	<19	<34	<27
Acenaphthylene	µg/Kg	<3.6	<4.4	<4.1	<4.4	<6.7	<4.1	<3.9	<4.4	<3.6	<6.7	<15	<4.3	<3.8	<3.8	<6.8	<5.4
Anthracene	µg/Kg	<18	<23	<21	<23	<35	<21	<20	<23	<19	<35	<77	<22	<19	<20	<35	<28
Benzo(a)anthracene	µg/Kg	<1.8	<2.2	<2.1	<2.2	<3.4	<2.1	<2	12	<1.8	<3.4	<7.6	<2.2	<1.9	<1.9	<3.4	<2.7
Benzo(a)pyrene	µg/Kg	<2	<3	<2	<3	<4	<2	<2	<3	<2	<4	<9	<3	<2	<2	<4	<3
Benzo(b)fluoranthene	µg/Kg	<3	<4	4 I	<4	<6	<4	<4	7.9	<3	<6	<14	<4	<3	<3	<6	<5
Benzo(g,h,i)perylene	µg/Kg	<3.6	<4.5	26	<4.4	<6.8	<4.1	<4	<4.4	<3.7	<6.8	<15	<4.4	<3.8	<3.8	<6.9	<5.4
Benzo(k)fluoranthene	µg/Kg	<2	<3	1 I	4 I	<4	<2	<2	8.3	<2	<4	<9	<3	<2	<2	<4	<3
Chrysene	µg/Kg	<1.8	<2.2	<2.1	<2.2	<3.4	<2.1	<2	8.1	<1.8	<3.4	<7.6	<2.2	<1.9	<1.9	<3.4	<2.7
Dibenzo(a,h)anthracene	µg/Kg	<3.6	<4.5	<4.2	<4.4	<6.8	<4.1	<4	<4.4	<3.7	<6.8	<15	<4.4	<3.8	<3.8	<6.9	<5.4
Fluoranthene	µg/Kg	<3.6	<4.5	<4.2	<4.4	10 I	<4.1	<4	<4.4	<3.7	<6.8	<15	<4.4	<3.8	<3.8	<6.9	<5.4
Fluorene	µg/Kg	<3.6	<4.5	<4.2	<4.4	<6.8	<4.1	<4	<4.4	<3.7	<6.8	<15	<4.4	<3.8	<3.8	<6.9	<5.4
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.8	<2.2	5.5	<2.2	<3.4	<2.1	<2	<2.2	<1.8	<3.4	<7.6	<2.2	<1.9	<1.9	<3.4	<2.7
Naphthalene	µg/Kg	<18	<22	<21	<22	<34	<21	<20	<22	<18	<34	<76	<22	<19	<19	<34	<27
Phenanthrene	µg/Kg	<1.8	<2.2	<2.1	<2.2	88	<2.1	<2	<2.2	<1.8	<3.4	<7.6	<2.2	<1.9	<1.9	<3.4	<2.7
Pyrene	µg/Kg	<1.8	<2.2	<2.1	320	10 I	<2.1	<2	<2.2	<1.8	<3.4	<7.6	<2.2	<1.9	<1.9	<3.4	<2.7
Surrogates																	
2,4-DCAA	%	44	60	108	156	144	88	54	104	46	84	136	86	56	68	52	56
2,4,5,6-TCMX	%	56	50	71	74	40	61	89	88	101	42	50	45	45	65	68	71
DBC	%	65	60	134	119	54	82	133	126	134	66	103	71	56	82	85	83
p-terphenyl	%	79	100	90	86	74	98	99	108	80	76	80	79	68	85	75	61
Metals																	
Aluminum	mg/Kg	2500	1600	790	930	220	1700	6300	9900	3600	4300	3200	590	430	320	8900	310
Antimony	mg/Kg	<2	<3	<2	<3	<4	<2	<2	<3	<2	<4	<9	<3	<2	<2	<4	<3
Arsenic	mg/Kg	<0.5	<0.7	<0.6	<0.7	<1	<0.6	<0.6	<0.7	<0.5	1.6 I	<2.3	<0.6	<0.6	<0.6	<1	<0.8
Barium	mg/Kg	<22	<27	<25	<27	<41	<25	<24	<27	<22	<41	<91	<26	<23	<23	<41	<32
Beryllium	mg/Kg	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<4	<1	<1	<1	<2	<2
Cadmium	mg/Kg	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<4	<1	<1	<1	<2	<2
Calcium	mg/Kg	1100	1300	2400	830	1500	1500	1800	16000	2100	26000	19000	910	360	150	11000	680
Chromium (total)	mg/Kg	3	2	<1	1.6	<2	2	6.4	13	5.7	6.3	4	<1	<1	<1	11	<2
Cobalt	mg/Kg	<5	<7	<6	<7	<10	<6	<6	<7	<5	<10	<23	<6	<6	<6	<10	<8
Copper	mg/Kg	<5	<7	<6	<7	<10	<6	<6	<7	<5	18	<23	<6	<6	<6	<10	<8
Iron	mg/Kg	1000	1300	720	840	200	1700	2500	6100	1900	1700	6400	530	180	94	8700	160
Lead	mg/Kg	3.4	4	4.5	4	3.5	15	4.5	6.3	3.8	17	16	2.5	2	<1	8	5.5
Magnesium	mg/Kg	230	170	320	150	200	200	390	690	230	1200	1100	290	110	88	580	230
Manganese	mg/Kg	9.1	12	10	1.9	<2	12	20	8.4	10	9.8	24	1.6	<1	<1	18	4.4
Mercury	mg/Kg	0.012 I	<0.01	0.026	0.02 I	<0.02	0.028	0.02	0.05	0.016 I	0.16	0.19	0.021	0.01 I	<0.01	0.12	<0.02
Nickel	mg/Kg	<5	<7	<6	<7	<10	<6	<6	<7	<5	<10	<23	<6	<6	<6	<10	<8
Potassium	mg/Kg	<180	<220	75	45	82	86	100	130	53	530	300	55	32	<29	<340	<270
Selenium	mg/Kg	<2	<3	<2	<3	<4	<2	<2	<3	<2	4	<9	<3	<2	<2	<4	<3
Silver	mg/Kg	<2	<3	<2	<3	<4	<2	<2	<3	<2	<4	<9	<3	<2	<2	<4	<3
Sodium	mg/Kg	52	38	35	<33	<51	210	130	320	50	240	130	130	40	51	190	82
Thallium	mg/Kg	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<4	<1	<1	<1	<2	<2
Vanadium	mg/Kg	3.6	3.4	2.1	3	<2	4.3	4.4	9	4.9	24	14	<1	1	<1	9.1	<2
Zinc	mg/Kg	6.7	12	<6	<7	<10	6.8	<6	<7	<5	28	110	<6	<6	<6	25	15

I = value is between the Method Detection Limit and the Practical Quanitation Level
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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Other Parameters		SSC089 06/29/98	SSC090 06/29/98	SSC091 08/12/98	SSC092 08/12/98	SSC093 08/13/98	SSC94 07/14/98	SSC095 07/14/98	SSC096 07/14/98
Bulk Density	g/cm³	0.76	1.1	0.73	0.52	0.74	0.6	0.8	0.5
CEC	meq/100g	10	7	21	21	26	17	22	59
Percent Solids	%	93	74	80	75	49	81	84	75
pH (lab)	S. U.	5.8	5.5	7.4	6.9	3.6	6.1	7.4	7.4
Resistivity	ohm-cm	160000	14000	34000	140000	350000	25000	170000	130000
Texture (No. 4)	%	100	99.8	99.9	100	100	99.9	99.9	98.5
Texture (No. 10)	%	99.9	99.6	99.7	99.5	99.8	99.4	99.4	97.8
Texture (No. 40)	%	98.8	98.7	96.9	96.3	93.6	97.4	94.7	90.1
Texture (No. 60)	%	93.3	95	88.9	87.6	83.2	94.8	88.7	83.7
Texture (No. 100)	%	49.6	51.1	61	55	21	53.4	45	45.2
Texture (No. 200)	%	10.6	8.6	10.5	11.8	6.6	9	7.3	23
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700

Other Parameters		SSC097 07/14/98	SSC098 08/21/98	SSC099 08/21/98	SSC100 08/21/98	SSC101 07/27/98	SSC102 07/27/98	SSC103 06/29/98	SSC104 06/29/98
Bulk Density	g/cm³	0.88	0.25	0.57	0.43	0.7	1.1	0.35	0.79
CEC	meq/100g	5	71	42	8	22	19	63	19
Percent Solids	%	91	49	22	76	88	87	48	62
pH (lab)	S. U.	7.2	6.5	6.2	6.5	4.4	4.2	6.4	7.1
Resistivity	ohm-cm	360000	5300	7000	12000	93000	16000	6900	18000
Texture (No. 4)	%	100	100	100	99.7	100	100	100	100
Texture (No. 10)	%	99.8	99	99.7	99.1	99.8	99.8	95.9	100
Texture (No. 40)	%	88.6	91.1	97.9	96.9	74.7	72.6	63.3	98.5
Texture (No. 60)	%	80.9	83.7	95.7	94.1	20.6	19.6	52.4	97.1
Texture (No. 100)	%	32.8	54.2	65.3	56.6	7.2	8.4	40.2	60.5
Texture (No. 200)	%	6.7	28.8	24.5	9.6	4.6	6.4	22	3.6
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC105 6/29/98	SSC105 6/29/98 duplicate	SSC106 07/27/98	SSC107 07/27/98	SSC108 06/29/98	SSC109 07/08/98	SSC110 7/8/98	SSC110 7/8/98 duplicate	SSC111 06/22/98	SSC112 06/22/98	SSC113 08/13/98	SSC114 07/14/98	SSC115 08/20/98	SSC116 08/20/98	SSC117 08/21/98	SSC118 08/28/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
4,4' - DDE	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
4,4' - DDT	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Aldrin	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Alpha - BHC	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Beta - BHC	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Chlordane (alpha)	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Chlordane (gamma)	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Chlordane (total)	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Delta - BHC	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Dieldrin	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Endosulfan I	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Endosulfan II (beta)	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Endosulfan Sulfate	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Endrin	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Endrin Aldehyde	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Endrin Ketone	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Gamma - BHC (Lindane)	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Heptachlor	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Heptachlor Epoxide (a)	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
heptachlor Epoxide (b)	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Isodrin	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Methoxychlor	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Mirex	μg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Toxaphene	μg/Kg	<5.6	<5.3	<73	<74	<3.4	<70	<78	<72	<4.9	<4.8	<210	<80	<110	<120	<130	<100
Aroclors (8082)																	
PCB-1016/1242	μg/Kg	<56	<53	<36	<37	<34	<35	<39	<36	<49	<48	<100	<40	<56	<60	<63	<52
PCB-1221	μg/Kg	<56	<53	<36	<37	<34	<35	<39	<36	<49	<48	<100	<40	<56	<60	<63	<52
PCB-1232	μg/Kg	<56	<53	<36	<37	<34	<35	<39	<36	<49	<48	<100	<40	<56	<60	<63	<52
PCB-1248	μg/Kg	<56	<53	<36	<37	<34	<35	<39	<36	<49	<48	<100	<40	<56	<60	<63	<52
PCB-1254	μg/Kg	<56	<53	<36	<37	<34	<35	<39	<36	<49	<48	<100	<40	<56	<60	<63	<52
PCB-1260	μg/Kg	<56	<53	<36	<37	<34	<35	<39	<36	<49	<48	<100	<40	<56	<60	<63	<52
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
2,4-Dichlorophenoxy acetic acid (2,4 - D)	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
3,5-DCBA	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
4 - Nitrophenol	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Acifluorfen	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Bentazon	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Chloramben	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Dacthal	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Dalapon	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Dicamba	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Dinoseb	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
MCPA	μg/Kg	<170	<160	<220	<230	<100	<210	<240	<220	<150	<150	<620	<240	<340	<360	<380	<310
MCPP	μg/Kg	<170	<160	<220	<230	<100	<210	<240	<220	<150	<150	<620	<240	<340	<360	<380	<310
Pentachlorophenol	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16
Picloram	μg/Kg	<17	<16	<11	<11	<10	<11	<12	<11	<15	<15	<31	<12	<17	<18	<19	<16

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC105 6/29/98		SSC106 07/27/98	SSC107 07/27/98	SSC108 06/29/98	SSC109 07/08/98	SSC110 7/8/98		SSC111 06/22/98	SSC112 06/22/98	SSC113 08/13/98	SSC114 07/14/98	SSC115 08/20/98	SSC116 08/20/98	SSC117 08/21/98	SSC118 08/28/98
			duplicate						duplicate								
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<28	<27	<18	<19	<17	<18	<20	<18	<25	<25	<52	<20	<28	<30	<32	<26
2 - Methylnaphthalene	µg/Kg	<28	<27	<18	<19	<17	<18	<20	<18	<25	<25	<52	<20	<28	<30	<32	<26
Acenaphthene	µg/Kg	<28	<27	<18	<19	<17	<18	<20	<18	<25	<25	<52	<20	<28	<30	<32	<26
Acenaphthylene	µg/Kg	<5.6	<5.3	<3.6	<3.7	<3.4	<3.5	<3.9	<3.6	<4.9	<4.8	<10	<4	<5.6	<6	<6.3	<5.2
Anthracene	µg/Kg	<29	<27	<19	<19	<17	<18	<20	<18	<25	<25	<53	<21	<29	<31	<33	<26
Benzo(a)anthracene	µg/Kg	<2.8	<2.7	<1.8	<1.9	<1.7	<1.8	<2	<1.8	<2.5	<2.5	<5.2	<2	<2.8	<3	<3.2	<2.6
Benzo(a)pyrene	µg/Kg	<3	<3	<2	<2	<2	<2	<2	<2	<3	<3	22	<2	<3	<4	<4	<3
Benzo(b)fluoranthene	µg/Kg	<5	<5	<3	<3	<3	<3	<4	<3	<4	<4	<9	<4	<5	<5	<6	<5
Benzo(g,h,i)perylene	µg/Kg	<5.6	<5.4	<3.7	<3.8	<3.4	<3.5	<4	<3.6	<5	<4.9	<10	<4.1	<5.6	<6	<6.4	<5.2
Benzo(k)fluoranthene	µg/Kg	<3	<3	<2	<2	<2	<2	<2	<2	<3	<3	<6	<2	<3	<4	<4	<3
Chrysene	µg/Kg	<2.8	<2.7	<1.8	<1.9	<1.7	<1.8	<2	<1.8	<2.5	<2.5	<5.2	<2	<2.8	<3	<3.2	<2.6
Dibenzo(a,h)anthracene	µg/Kg	<5.6	<5.4	<3.7	<3.8	<3.4	<3.5	<4	<3.6	<5	<4.9	<10	<4.1	<5.6	<6	<6.4	<5.2
Fluoranthene	µg/Kg	<5.6	<5.4	<3.7	<3.8	<3.4	<3.5	<4	<3.6	<5	<4.9	<10	<4.1	<5.6	<6	<6.4	<5.2
Fluorene	µg/Kg	<5.6	<5.4	<3.7	<3.8	<3.4	<3.5	<4	<3.6	<5	<4.9	<10	<4.1	<5.6	<6	<6.4	<5.2
Indeno(1,2,3-cd)pyrene	µg/Kg	<2.8	<2.7	<1.8	<1.9	<1.7	<1.8	<2	<1.8	<2.5	<2.5	<5.2	<2	<2.8	<3	<3.2	<2.6
Naphthalene	µg/Kg	<28	<27	<18	<19	<17	<18	<20	<18	<25	<25	<52	<20	<28	<30	<32	<26
Phenanthrene	µg/Kg	<2.8	<2.7	<1.8	<1.9	<1.7	<1.8	<2	<1.8	<2.5	<2.5	<5.2	<2	<2.8	<3	<3.2	<2.6
Pyrene	µg/Kg	<2.8	<2.7	<1.8	<1.9	<1.7	<1.8	<2	<1.8	<2.5	<2.5	<5.2	<2	<2.8	<3	<3.2	<2.6
Surrogates																	
2,4-DCAA	%	52	84	84	48	56	48	46	60	92	72	104	70	88	128	52	80
2,4,5,6-TCMX	%	73	78	89	61	61	70	70	59	47 J	61	61	42	51	39	33	58
DBC	%	99	103	148	55	79	100	131	92	108	116	54	50	75	54	51	116
p-terphenyl	%	73	78	84	74	73	100	114	100	76	80	66	97	69	81	63	101
Metals																	
Aluminum	mg/Kg	1600	1900	110	180	1900	400	330	220	330	6200	12000	600	120	2400	5000	3000
Antimony	mg/Kg	<3	<3	<2	<2	<2	<2	<2	<2	<6	<3	<6	<2	<3	<4	<4	<3
Arsenic	mg/Kg	<0.8	<0.8	<0.6	<0.6	<0.5	<0.5	<0.6	<0.5	<1	<0.7	3 I	<0.6	<0.8	0.9 I	1.5 I	<0.8
Barium	mg/Kg	<34	<32	<22	<22	<20	<21	<24	<22	<60	<29	<62	<24	<34	<36	<38	<31
Beryllium	mg/Kg	<2	<2	<1	<1	<1	<1	<1	<1	<3	<1	<3	<1	<2	<2	<2	<2
Cadmium	mg/Kg	<2	<2	<1	<1	<1	<1	<1	<1	<3	<1	<3	<1	<2	<2	<2	<2
Calcium	mg/Kg	170	150	259	380	4700	340	1300	800	350	4700	140000	1300	680	2000	13000	14000
Chromium (total)	mg/Kg	<2	1.8	<1	<1	1	<1	<1	<1	<3	7	18	<1	<2	2.9	6.3	6.1
Cobalt	mg/Kg	<8	<8	<6	<6	<5	<5	<6	<5	<15	<7	<16	<6	<8	<9	<10	<8
Copper	mg/Kg	<8	<8	<6	<6	<5	<5	<6	<5	<1	2.4	<16	<6	<8	<9	<10	25
Iron	mg/Kg	95	89	70	110	1000	180	240	160	160	1900	7800	600	86	1200	2500	2200
Lead	mg/Kg	4.1	4	1.5	1.6	3.4	3	2.7	1.4	<3	6.3	11	5	<2	5	6.5	23
Magnesium	mg/Kg	71	65	72	110	84	65	120	75	100	250	1100	160	52	250	2100	530
Manganese	mg/Kg	2	2	<1	<1	3	<1	<1	<1	<3	6.6	31	7.8	<2	4.4	94	20
Mercury	mg/Kg	<0.02	<0.02	<0.01	<0.01	0.038	<0.01	0.01 I	<0.01	<0.01	0.04	0.09	0.021	<0.02	0.02 I	0.11	0.11
Nickel	mg/Kg	<8	<8	<6	<6	<5	<5	<6	<5	<15	<7	<16	<6	<8	<9	<10	<8
Potassium	mg/Kg	<280	<270	28	32	<170	<180	<200	<180	<75	85	160	57	<42	47	210	250
Selenium	mg/Kg	<3	<3	<2	<2	<2	<2	<2	<2	<6	<3	6	<2	<3	<4	<4	<3
Silver	mg/Kg	<3	<3	<2	<2	<2	<2	<2	<2	<6	<3	<6	<2	<3	<4	<4	<3
Sodium	mg/Kg	51	60	32	45	44	26 I	44	28	39	76	1400	210	<42	58	690	160
Thallium	mg/Kg	<2	<2	<1	<1	<1	<1	<1	<1	<3	<1	<3	<1	<2	<2	<2	<2
Vanadium	mg/Kg	<2	<2	<1	<1	1.8	<1	1	<1	<3	6	26	1.7	<2	3.3	6.3	7.6
Zinc	mg/Kg	25	32	<6	<6	10	14	8	6.4	<15	<7	18	6.8	<27	<29	19	48

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Table B-15. KSC Background raw data for soil locations. "*" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC105 6/29/98		SSC106 07/27/98	SSC107 07/27/98	SSC108 06/29/98	SSC109 07/08/98	SSC110 7/8/98		SSC111 06/22/98	SSC112 06/22/98	SSC113 08/13/98	SSC114 07/14/98	SSC115 08/20/98	SSC116 08/20/98	SSC117 08/21/98	SSC118 08/28/98
			duplicate						duplicate								
Other Parameters																	
Bulk Density	g/cm^3	0.88	0.85	0.96	0.71	0.38	0.86	0.8	0.74	0.96	0.69	0.41	0.83	1	0.91	0.18	0.46
CEC	meq/100g	13	21	17	20	45	13	33	27	18	29	85	20	0.65	21	31	61
Percent Solids	%	59	62	90	89	98	94	84	92	67	68	32	82	59	55	52	64
pH (lab)	S. U.	4.9	5.8	4.6	4.6	6.5	4.2	4.3	4.5	5.1	6.4	6.6	6.6	6.5	6	7.7	7.6
Resistivity	ohm-cm	10000	12000	260000	34000	5900	620000	830000	870000	170000	180000	3600	120000	36000	13000	2000	2800
Texture (No. 4)	%	100	100	100	100	100	99.7	99.8	99.4	100	100	99.3	100	100	100	98.7	100
Texture (No. 10)	%	99.5	99.4	99.8	99.7	94.9	99.5	99.3	99.4	99.9	99.7	97.9	99.5	99.9	99.6	87.8	98.3
Texture (No. 40)	%	96.1	96.7	97	97.7	67.5	85.8	82.9	77.6	88.2	96.4	85	96.6	99.1	98.1	67.1	91.3
Texture (No. 60)	%	93.1	94	78.8	96	56.5	59.8	57.7	53.7	73.3	91.3	77.3	93.3	96.7	95.5	60.3	83.8
Texture (No. 100)	%	65.9	66.7	26.2	74	43.4	13.2	12.8	15.1	21.3	46.7	50.9	57.6	44.7	56.4	44.1	60.2
Texture (No. 200)	%	11.4	12.2	3.8	10.2	10.6	3.9	4.5	4.8	4.4	9.7	37.6	8.6	1.2	10.9	20.4	31.3
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. "*" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC119 08/21/98	SSC120 08/21/98	SSC121 06/09/98	SSC122 06/09/98	SSC123 06/09/98	SSC124 06/08/98	SSC125 06/08/98	SSC126 06/08/98	SSC127 06/08/98	SSC128 06/08/98	SSC129 06/08/98	SSC130 06/08/98	SSC131 06/08/98	SSC132 08/13/98	SSC133 06/09/98	SSC134 06/09/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	96	<15
4,4' - DDE	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	30	19
4,4' - DDT	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	96	<15
Aldrin	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Alpha - BHC	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Beta - BHC	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Chlordane (alpha)	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Chlordane (gamma)	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Chlordane (total)	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Delta - BHC	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Dieldrin	µg/Kg	<4.4	<11	8.6	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Endosulfan I	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Endosulfan II (beta)	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Endosulfan Sulfate	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Endrin	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Endrin Aldehyde	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Endrin Ketone	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Gamma - BHC (Lindane)	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	14 I	<15
Heptachlor	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Heptachlor Epoxide (a)	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
heptachlor Epoxide (b)	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Isodrin	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Methoxychlor	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Mirex	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Toxaphene	µg/Kg	<89	<210	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<97	<14	<15
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<44	<110	<50	<53	<42	<56	<56	<46	<46	<38	<210	<140	<78	<48	<140	<150
PCB-1221	µg/Kg	<44	<110	<50	<53	<42	<56	<56	<46	<46	<38	<210	<140	<78	<48	<140	<150
PCB-1232	µg/Kg	<44	<110	<50	<53	<42	<56	<56	<46	<46	<38	<210	<140	<78	<48	<140	<150
PCB-1248	µg/Kg	<44	<110	<50	<53	<42	<56	<56	<46	<46	<38	<210	<140	<78	<48	<140	<150
PCB-1254	µg/Kg	<44	<110	<50	<53	<42	<56	<56	<46	<46	<38	<210	<140	<78	<48	<140	<150
PCB-1260	µg/Kg	<44	<110	<50	<53	<42	<56	<56	<46	<46	<38	<210	<140	<78	<48	<140	<150
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<14	<32	<15	<16	<13	<28	<28	<23	<23	<19	<100	<69	<40	<15	<42	<45
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<14	<32	<15	<16	<13	<29	<29	<24	<24	<20	<110	<71	<40	<15	<42	<45
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<14	<32	<15	<16	13	<29	<29	<24	<24	<20	<110	<71	<40	<15	62	<45
3,5-DCBA	µg/Kg	<14	<32	<15	<16	<13	<29	<29	<24	<24	<20	<110	<71	<40	<15	<42	<45
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<14	<32	<15	<16	<13	<28	<28	<23	<23	<19	<100	<69	<40	<15	<42	<45
4 - Nitrophenol	µg/Kg	<14	<32	<15	<16	<13	<29	<29	<24	<24	<20	<110	<71	<40	<15	<42	<45
Acifluorfen	µg/Kg	<14	<32	<15	<16	<13	<28	<28	<23	<23	<19	<100	<69	<40	<15	<42	<45
Bentazon	µg/Kg	<14	<32	<15	<16	<13	<28	<28	<23	<23	<19	<100	<69	<40	<15	<42	<45
Chloramben	µg/Kg	<14	<32	<15	<16	<13	<28	<28	<23	<23	<19	<100	<69	<40	<15	<42	<45
Dacthal	µg/Kg	<14	<32	<15	<16	<13	<28	<28	<23	<23	<19	<100	<69	<40	<15	<42	<45
Dalapon	µg/Kg	<14	<32	<15	<16	<13	<29	<29	<24	<24	<20	<110	<71	<40	<15	<42	<45
Dicamba	µg/Kg	<14	<32	<15	<16	<13	<29	<29	<24	<24	<20	<110	<71	<40	<15	<42	<45
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<14	<32	<15	<16	<13	<29	<29	<24	<24	<20	<110	<71	<40	<15	<42	<45
Dinoseb	µg/Kg	<14	<32	<15	<16	<13	<28	<28	<23	<23	<19	<100	<69	<40	<15	<42	<45
MCPA	µg/Kg	<270	<640	<150	<160	<130	<280	<280	<240	<230	<190	<1000	<700	<400	<290	<420	<450
MCPP	µg/Kg	<270	<640	<150	<160	<130	<280	<280	<240	<230	<190	<1000	<700	<400	<290	<420	<450
Pentachlorophenol	µg/Kg	<14	<32	<15	<16	<13	<29	<29	<2.4	<24	<20	<110	<71	<40	<15	<42	<45
Picloram	µg/Kg	<14	<32	<15	<16	<13	<29	<29	<24	<24	<20	<110	<71	<40	<15	<42	<45

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC119 08/21/98	SSC120 08/21/98	SSC121 06/09/98	SSC122 06/09/98	SSC123 06/09/98	SSC124 06/08/98	SSC125 06/08/98	SSC126 06/08/98	SSC127 06/08/98	SSC128 06/08/98	SSC129 06/08/98	SSC130 06/08/98	SSC131 06/08/98	SSC132 08/13/98	SSC133 06/09/98	SSC134 06/09/98
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<23	<54	<25	<27	<21	<28	<28	<24	<23	<19	<100	<70	<40	<25	<70	<76
2 - Methylnaphthalene	µg/Kg	<23	<54	<25	<27	<21	<28	<28	<24	<23	<19	<100	<70	<40	<25	<70	<76
Acenaphthene	µg/Kg	<23	<54	<25	<27	<21	<28	<28	<24	<23	<19	<100	<70	<40	<25	<70	<76
Acenaphthylene	µg/Kg	<4.4	<11	<5	<5.3	<4.2	<5.6	<5.6	<4.6	<4.6	<3.8	<21	<14	<7.8	<4.8	<14	<15
Anthracene	µg/Kg	<23	<55	<26	<27	<22	<29	<29	<24	<24	<20	<110	<71	<40	<25	<71	<77
Benzo(a)anthracene	µg/Kg	<2.3	<5.4	<2.5	<2.7	<2.1	<2.8	<2.8	<2.4	<2.3	<1.9	<10	<7	<4	<2.5	<7	<7.6
Benzo(a)pyrene	µg/Kg	<3	<6	<3	<3	<2	<3	<3	<3	<3	<2	<12	<8	<5	<3	<8	<9
Benzo(b)fluoranthene	µg/Kg	<4	<10	<4	<5	<4	<5	<5	<4	<4	<3	<19	<12	<7	<4	<12	<14
Benzo(g,h,i)perylene	µg/Kg	<4.5	<11	<5	<5.4	<4.2	<5.6	<5.6	<4.7	<4.6	<3.9	<21	<14	<7.9	<4.9	<14	<15
Benzo(k)fluoranthene	µg/Kg	<3	<6	<3	<3	<2	<3	<3	<3	<3	<2	<12	<8	<5	<3	<8	<9
Chrysene	µg/Kg	<2.3	<5.4	<2.5	<2.7	<2.1	<2.8	<2.8	<2.4	<2.3	<1.9	<10	<7	<4	<2.5	<7	<7.6
Dibenzo(a,h)anthracene	µg/Kg	<4.5	<11	<5	<5.4	<4.2	<5.6	<5.6	<4.7	<4.6	<3.9	<21	<14	<7.9	<4.9	<14	<15
Fluoranthene	µg/Kg	<4.5	<11	<5	<5.4	<4.2	<5.6	<5.6	<4.7	<4.6	<3.9	<21	<14	<7.9	<4.9	<14	<15
Fluorene	µg/Kg	<4.5	<11	<5	<5.4	<4.2	<5.6	<5.6	<4.7	<4.6	<3.9	<21	<14	<7.9	<4.9	<14	<15
Indeno(1,2,3-cd)pyrene	µg/Kg	<2.3	<5.4	<2.5	<2.7	<2.1	<2.8	<2.8	<2.4	<2.3	<1.9	<10	<7	<4	<2.5	<7	<7.6
Naphthalene	µg/Kg	<23	<54	<25	<27	<21	<28	<28	<24	<23	<19	<100	<70	<40	<25	<70	<76
Phenanthrene	µg/Kg	<2.3	<5.4	<2.5	<2.7	<2.1	<2.8	<2.8	<24	<2.3	<1.9	<10	<7	<4	<2.5	<7	<7.6
Pyrene	µg/Kg	<2.3	<5.4	<2.5	<2.7	<2.1	<2.8	<2.8	<2.4	<2.3	<1.9	<10	<7	<4	<2.5	<7	<7.6
Surrogates																	
2,4-DCAA	%	128	148	136	92	120	56	96	64	64	124	60	136	80	92	88	120
2,4,5,6-TCMX	%	57	51	66	68	61	122	106	93	110	128	114	83	74	43	68	78
DBC	%	71	109	90	112	97	145	122	97	115	204	111	116	91	57	99	92
p-terphenyl	%	84	117	93	94	95	109	93	117	107	87	114	81	76	69	94	100
Metals																	
Aluminum	mg/Kg	1200	3500	1300	1500	2300	1200	1900	1200	1300	810	2800	3600	2400	690	3700	9100
Antimony	mg/Kg	<3	<6	<3	<3	<2	<3	<3	<3	<3	<2	<12	<8	<5	<3	<8	<9
Arsenic	mg/Kg	<0.7	<1.6	1.1 I	0.8 I	1 I	<0.8	0.8 I	<0.7	<0.7	<0.6	3.8 I	2.1 I	<1.2	<0.7	2.5 I	4.1 I
Barium	mg/Kg	<27	<64	<30	<32	<25	<34	<34	<28	<28	<23	<120	<83	<48	<29	<83	<91
Beryllium	mg/Kg	<1	<3	<2	<2	<1	<2	<2	<1	<1	<1	<6	<4	<2	<1	<4	<4
Cadmium	mg/Kg	<1	<3	<2	<2	<1	<2	<2	<1	<1	<1	<6	<4	<2	<1	<4	<4
Calcium	mg/Kg	3100	12000	1100	35000	380	800	1500	460	640	650	7500	12000	3300	910	5400	6400
Chromium (total)	mg/Kg	1.9	3	5	5	4.9	<2	2.5	2.2	2.1	<1	<6	6.7	3.6	<1	6.2	15
Cobalt	mg/Kg	<7	<16	<8	<8	<6	<8	<8	<7	<7	<6	<31	<21	<12	<7	<21	<23
Copper	mg/Kg	<7	<16	<8	<8	<6	<8	<8	<7	<7	<6	<31	<21	<12	<7	<21	<23
Iron	mg/Kg	550	1100	1700	1400	1800	320	510	450	350	500	690	1400	430	250	1000	3300
Lead	mg/Kg	4.3	10	150	3.1	7.8	3.9	5.4	2.2	2.4	1	62	35	3.8	1.9	8.8	24
Magnesium	mg/Kg	380	360	2100	2400	1100	1200	1600	680	620	490	11000	7900	2400	520	9600	7300
Manganese	mg/Kg	9.3	3	6.4	7.9	5.6	2	5.8	2.2	2.2	2.6	<6	26	10	2.2	<4	9.5
Mercury	mg/Kg	0.026	0.16	<0.02	<0.02	<0.01	<0.02	0.024 I	<0.01	<0.01	<0.01	<0.06	<0.04	<0.02	<0.01	<0.04	0.068 I
Nickel	mg/Kg	<7	<16	<8	<8	<6	<8	<8	<7	<7	<6	<31	<21	<12	<7	<21	<23
Potassium	mg/Kg	49	140	1200	1600	850	610	930	370	250	170	4100	2600	760	110	6200	4300
Selenium	mg/Kg	<3	<6	<3	<3	<2	<3	<3	<3	<3	<2	<12	<8	<5	<3	<8	<9
Silver	mg/Kg	<3	<6	<3	<3	<2	<3	<3	<3	<3	<2	<12	<8	<5	<3	<8	<9
Sodium	mg/Kg	270	130	7300	12000	3000	6400	9300	3800	2400	2600	56000	35000	9300	1800	67000	32000
Thallium	mg/Kg	<1	<3	<2	<2	<1	<2	<2	<1	<1	<1	<6	<4	<2	<1	<4	<4
Vanadium	mg/Kg	2.4	6.1	7	4.4	4.3	2.9	3.6	2.5	2.2	1.6	18	12	6.9	2.4	13	28
Zinc	mg/Kg	13	<16	11	13	<6	<8	<8	<7	<7	<6	<31	<21	<12	12	<21	<23

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. "**" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Other Parameters		SSC119 08/21/98	SSC120 08/21/98	SSC121 06/09/98	SSC122 06/09/98	SSC123 06/09/98	SSC124 06/08/98	SSC125 06/08/98	SSC126 06/08/98	SSC127 06/08/98	SSC128 06/08/98	SSC129 06/08/98	SSC130 06/08/98	SSC131 06/08/98	SSC132 08/13/98	SSC133 06/09/98	SSC134 06/09/98
Bulk Density	g/cm^3	0.86	0.18	0.6	0.57	1.3	0.8	0.67	1.1	0.61	1.1	0.15	0.21	0.66	0.94	0.84	0.24
CEC	meq/100g	12	42	13	17	8	9	19	6	8	6	21	31	24	12	30	29
Percent Solids	%	74	31	66	62	79	59	59	71	72	86	16	24	42	68	24	22
pH (lab)	S. U.	7.1	6.3	7.43	8.1	6.8	6.3	6.2	7	6.5	6.8	5.7	7.6	6.8	NA	5.6	6.9
Resistivity	ohm-cm	12000	7400	100	91	130	89	88	150	200	220	34	46	74	200	26	54
Texture (No. 4)	%	100	100	100	98.9	100	99.8	99.9	100	100	100	93.1	100	100	100	99.7	100
Texture (No. 10)	%	99.9	97.9	99.2	97.8	100	98.9	99	99.8	99.2	99.9	71.9	92.4	98	99.9	92	94.3
Texture (No. 40)	%	99	89.7	94.7	89	98.7	91.9	92.9	93.5	93	96	53.9	65.8	84.7	97	85.8	87.4
Texture (No. 60)	%	97	82.8	83.8	68.7	95.1	85.3	86.5	85.3	85.4	89.2	50.2	57.9	77.7	94.2	83.7	85.3
Texture (No. 100)	%	69.9	58.6	62	44.7	52.6	41.2	43.6	37.6	38.1	40.8	46.7	48.2	52.6	72.9	75.2	80.2
Texture (No. 200)	%	12.8	22.5	20.3	17.4	9.5	9.9	12.8	7.7	7.9	6.2	40	26.8	16.7	5.8	68.2	77
Total Organic Carbon	mg/Kg	>26700	>26700	22300	>26700	11900	>26700	>26700	25000	26000	15000	>26700	>26700	>26700	>26700	>26700	>26700

I = value is between the Method Detection Limit and the Practical Quanitation Level

J = value is below the established limit for accuracy

* = 8310s were diluted (1:5)

** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC135 06/09/98	SSC136 08/21/98	SSC136 08/21/98 duplicate	SSC137 06/09/98	SSC138 06/09/98	SSC139 06/09/98	SSC140 06/08/98	SSC141 06/16/98	SSC142 06/16/98	SSC143 06/16/98	SSC144 6/17/98	SSC144 6/17/98 duplicate	SSC145 06/17/98	SSC146** 06/17/98	SSC147 06/17/98	SSC148 06/17/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
4,4' - DDE	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	**5.4**	**7.3**	**28**	**7.8**	**7.1**	<3.3	**10**	<4	<3.8
4,4' - DDT	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	**32**	<3.8	<4	<3.3	<3.3	<4	<3.8
Aldrin	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Alpha - BHC	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Beta - BHC	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Chlordane (alpha)	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	**7.4**	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Chlordane (gamma)	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	**5**	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Chlordane (total)	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	**62**	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Delta - BHC	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Dieldrin	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	**7**	<3.8	<4	<3.3	<3.3	<4	<3.8
Endosulfan I	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Endosulfan II (beta)	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Endosulfan Sulfate	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Endrin	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Endrin Aldehyde	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Endrin Ketone	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Gamma - BHC (Lindane)	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Heptachlor	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Heptachlor Epoxide (a)	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
heptachlor Epoxide (b)	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Isodrin	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Methoxychlor	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Mirex	µg/Kg	<4.7	<7.8	<5	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Toxaphene	µg/Kg	<4.7	<160	<100	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	<3.3	<3.3	<4	<3.8
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<47	<78	<50	<41	<50	<49	<62	<42	<33	<33	<38	<40	<33	<33	<40	<38
PCB-1221	µg/Kg	<47	<78	<50	<41	<50	<49	<62	<42	<33	<33	<38	<40	<33	<33	<40	<38
PCB-1232	µg/Kg	<47	<78	<50	<41	<50	<49	<62	<42	<33	<33	<38	<40	<33	<33	<40	<38
PCB-1248	µg/Kg	<47	<78	<50	<41	<50	<49	<62	<42	<33	<33	<38	<40	<33	<33	<40	<38
PCB-1254	µg/Kg	<47	<78	<50	<41	<50	<49	<62	<42	<33	<33	<38	<40	<33	<33	<40	<38
PCB-1260	µg/Kg	<47	<78	<50	<41	<50	<49	<62	<42	<33	<33	<38	<40	<33	<33	<40	<38
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<14	<24	<15	<12	<15	<15	<31	<13	<10	<10	<12	<12	<10	<10	<12	<12
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<14	<24	<15	<12	<15	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<14	<24	<15	<12	20	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12
3,5-DCBA	µg/Kg	<14	<24	<15	<12	<15	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<14	<24	<15	<12	<15	<15	<31	**26**	<10	<10	<12	<12	<10	<10	<12	<12
4 - Nitrophenol	µg/Kg	<14	<24	<15	<12	<15	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12
Acifluorfen	µg/Kg	<14	<24	<15	<12	<15	<15	<31	<13	<10	<10	<12	<12	<10	<10	<12	<12
Bentazon	µg/Kg	<14	<24	<15	<12	<15	<15	<31	<13	<10	<10	<12	<12	<10	<10	<12	<12
Chloramben	µg/Kg	<14	<24	<15	<12	<15	<15	<31	<13	<10	<10	<12	<12	<10	<10	<12	<12
Dacthal	µg/Kg	<14	<24	<15	<12	<15	<15	<31	<13	<10	<10	<12	<12	<10	<10	<12	<12
Dalapon	µg/Kg	<14	<24	<15	<12	<15	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12
Dicamba	µg/Kg	<14	<24	<15	<12	<15	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<14	<24	<15	<12	<15	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12
Dinoseb	µg/Kg	<14	<24	<15	<12	<15	<15	<31	<13	<10	<10	<12	<12	<10	<10	<12	<12
MCPA	µg/Kg	<140	<480	<300	<120	<150	<150	<320	<130	<100	<100	<120	<120	<100	<100	<120	<120
MCPP	µg/Kg	<140	<480	<300	<120	<150	<150	<320	<130	<100	<100	<120	<120	<100	<100	<120	<120
Pentachlorophenol	µg/Kg	<14	<24	<15	<12	<15	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12
Picloram	µg/Kg	<14	<24	<15	<12	<15	<15	<32	<13	<10	<10	<12	<12	<10	<10	<12	<12

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC135 06/09/98	SSC136 08/21/98	SSC136 08/21/98 duplicate	SSC137 06/09/98	SSC138 06/09/98	SSC139 06/09/98	SSC140 06/08/98	SSC141 06/16/98	SSC142 06/16/98	SSC143 06/16/98	SSC144 6/17/98	SSC144 6/17/98 duplicate	SSC145 06/17/98	SSC146** 06/17/98	SSC147 06/17/98	SSC148 06/17/98
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<24	<40	<25	<21	<25	<25	<32	<21	<17	<17	<19	<20	<17	<170	<20	<19
2 - Methylnaphthalene	µg/Kg	<24	<40	<25	<21	<25	<25	<32	<21	<17	<17	<19	<20	<17	<170	<20	<19
Acenaphthene	µg/Kg	<24	<40	<25	<21	<25	<25	<32	<21	<17	<17	<19	<20	<17	<170	<20	<19
Acenaphthylene	µg/Kg	<4.7	<7.8	<5.0	<4.1	<5	<4.9	<6.2	<4.2	<3.3	<3.3	<3.8	<4	22	<33	<4	<3.8
Anthracene	µg/Kg	<24	<40	<26	<21	<26	<25	<32	<22	<17	<17	<20	<21	<17	<170	<21	<20
Benzo(a)anthracene	µg/Kg	<2.4	<4	<2.5	<2.1	<2.5	<2.5	<3.2	<2.1	<1.7	<1.7	<1.9	<2	<1.7	<17	2.6 I	<1.9
Benzo(a)pyrene	µg/Kg	<3	<5	<3	<2	<3	<3	<4	<2	<2	<2	<2	<2	<2	<17	<2	9
Benzo(b)fluoranthene	µg/Kg	<4	<7	<4	<4	<4	<4	<6	<4	<3	<3	<3	<4	<3	<33	<4	<3
Benzo(g,h,i)perylene	µg/Kg	<4.8	<7.9	<5	<4.1	<5	<5	<6.3	<4.3	<3.4	<3.4	<3.9	<4.1	<3.4	<34	<4.1	<3.9
Benzo(k)fluoranthene	µg/Kg	<3	<5	<3	<2	<3	<3	<4	<2	<2	<2	<2	<2	<2	<17	<2	<2
Chrysene	µg/Kg	<2.4	<4	<2.5	<2.1	<2.5	<2.5	<3.2	<2.1	<1.7	<1.7	<1.9	<2	<1.7	<17	<2	6.2
Dibenzo(a,h)anthracene	µg/Kg	<4.8	<7.9	<5	<4.1	<5	<5	<6.3	<4.3	<3.4	<3.4	<3.9	<4.1	<3.4	<34	<4.1	<3.9
Fluoranthene	µg/Kg	<4.8	<7.9	<5	<4.1	<5	<5	<6.3	<4.3	<3.4	<3.4	<3.9	<4.1	<3.4	<34	<4.1	<3.9
Fluorene	µg/Kg	<4.8	<7.9	<5	<4.1	<5	<5	<6.3	<4.3	<3.4	<3.4	<3.9	<4.1	<3.4	<34	<4.1	<3.9
Indeno(1,2,3-cd)pyrene	µg/Kg	<2.4	<4	<2.5	<2.1	<5	<2.5	<3.2	<2.1	<1.7	<1.7	<1.9	<2	<1.7	<17	<2	<1.9
Naphthalene	µg/Kg	<24	<40	<25	<21	<25	<25	<32	<21	<17	120	<19	<20	65	830	<20	<19
Phenanthrene	µg/Kg	<2.4	<4	<2.5	<2.1	<2.5	<2.5	<3.2	<2.1	<1.7	<1.7	<1.9	<2	<1.7	230	<2	<1.9
Pyrene	µg/Kg	<2.4	<4	<2.5	<2.1	<2.5	<2.5	<3.2	<2.1	<1.7	<1.7	<1.9	<2	<1.7	<17	<2	<1.9
Surrogates																	
2,4-DCAA	%	88	144	132	84	132	74	72	56	76	108	120	92	72	106	114	90
2,4,5,6-TCMX	%	71	35	59	71	68	61	70	53	59	56	69	70	67	58	70	58
DBC	%	88	52	71	86	91	104	92	84	113	85	107	115	90	114	117	102
p-terphenyl	%	96	63	63	97	96	89	98	84	77	94	86	88	61	0	76	82
Metals																	
Aluminum	mg/Kg	4100	5000	5200	2000	2300	3300	660	1500	520	970	200	210	820	230	990	4200
Antimony	mg/Kg	<3	<5	<3	<2	<3	<3	<4	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	mg/Kg	1.6 I	1.7 I	1.4 I	0.7 I	2 I	1 I	0.9 I	<0.6	<0.5	1 I	<0.6	<0.6	<0.5	<0.5	<0.6	<0.6
Barium	mg/Kg	<28	<48	<30	<25	<30	<30	<38	<26	<20	<20	<23	<24	<20	<20	<24	<23
Beryllium	mg/Kg	<1	<2	<2	<1	<2	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<2	<2	<1	<2	<1	<2	<1	<1	1.1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	67000	14000	44000	860	38000	870	3400	170	560	4100	590	980	320	630	2300	5300
Chromium (total)	mg/Kg	4.7	6.4	5.6	4.8	5.3	8.6	<2	4	9	20	5.6	5	6.9	4.8	11	19
Cobalt	mg/Kg	<7	<12	<8	<6	<8	<7	<9	<6	<5	<5	<6	<6	<5	<5	<6	<6
Copper	mg/Kg	<7	<12	<8	<6	<8	<7	<9	24	17	72	19	20	7.6	21	65	65
Iron	mg/Kg	2800	3800	3300	1700	2100	2100	1700	1500	450	1400	270	280	1500	360	1500	3500
Lead	mg/Kg	5.4	13	3.8	3.2	4.2	3.9	3.4	3.5	4.7	12	4.3	4.4	7.2	5	8.4	13
Magnesium	mg/Kg	4800	3100	2100	1100	5400	1400	2300	79	85	200	110	84	68	83	610	520
Manganese	mg/Kg	23	26	42	6	12	9.4	6.2	19	28	87	28	27	60	40	120	200
Mercury	mg/Kg	0.023 I	0.052	0.023	0.015 I	<0.02	<0.01	0.02 I	<0.01	<0.01	0.029	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
Nickel	mg/Kg	<7	<12	<8	<6	<8	<7	<9	<6	<5	<5	<6	<6	<5	<5	<6	<6
Potassium	mg/Kg	3400	1200	940	780	2300	980	600	45	99	54	<29	<30	61	<25	82	560
Selenium	mg/Kg	<3	<5	<3	<2	<3	<3	<4	<2	<2	<2	<2	<2	<2	<2	<2	<2
Silver	mg/Kg	<3	<5	<3	<2	<3	<3	<4	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sodium	mg/Kg	11000	1700	1400	3400	14000	1500	8300	8.3 I	7 I	18 I	<7.6	<7.9	6.6 I	7 I	10 I	37
Thallium	mg/Kg	<1	<2	<2	<1	<2	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	mg/Kg	5.1	8.3	5.2	6	8.2	10	2.8	2.3	<1	2	<1	<1	1.8	<1	2.3	4.8
Zinc	mg/Kg	<7	19	<8	<6	8.8	8.6	<9	14	26	75	12	11	12	21	32	90

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC135 06/09/98	SSC136 08/21/98		SSC137 06/09/98	SSC138 06/09/98	SSC139 06/09/98	SSC140 06/08/98	SSC141 06/16/98	SSC142 06/16/98	SSC143 06/16/98	SSC144 6/17/98		SSC145 06/17/98	SSC146** 06/17/98	SSC147 06/17/98	SSC148 06/17/98
				duplicate									duplicate				
Other Parameters																	
Bulk Density	g/cm³	0.31	0.93	0.91	0.84	1.2	0.81	0.26	0.86	1.1	1	1.1	1.1	1.1	1.1	1.4	1.1
CEC	meq/100g	24	28	20	13	12	20	35	4	4.2	6	5	5	31	38	37	55
Percent Solids	%	70	42	66	81	66	67	53	78	99	99	86	82	99	99	82	86
pH (lab)	S. U.	8.5	8.8	8.6	6.8	7.9	6.4	5.7	5.8	6.4	6.6	6.3	6.1	6.3	5.9	7	7.3
Resistivity	ohm-cm	44	790	530	170	50	300	240	93000	170000	270000	>880000	>880000	>270000	>120000	>10000	2500000
Texture (No. 4)	%	96.7	99.8	99.8	100	99.5	100	99.2	100	100	100	100	100	100	100	99.8	99.4
Texture (No. 10)	%	96.9	99.5	99.2	99.9	97.5	99.8	92.4	100	99.9	99.9	100	99.8	100	100	99.7	98.9
Texture (No. 40)	%	87	94.6	95	92.4	90.4	97.4	68.5	97.9	98.9	99.2	92.9	93.2	87.5	89.6	75.3	62
Texture (No. 60)	%	81.2	88.7	89.7	82.9	80.9	94.7	59.2	94	96.4	97.3	82.6	82.2	72	75.7	54.8	52.8
Texture (No. 100)	%	56.7	50.8	53.5	42.4	53.1	62.7	35.1	33.8	45.8	46.9	29.2	26.2	21.9	22.8	19.4	24.6
Texture (No. 200)	%	38.4	24.3	24.6	14.3	16.1	21.8	11.4	2.4	2.1	2.2	3	3	3.2	3.4	4.1	8.4
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	23700	>26700	>26700	>25000	>25000	>26700	>26700	>26700	>26700	>26700	>26700

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC149 06/17/98	SSC150 06/17/98	SSC151 06/17/98	SSC152 6/16/98	SSC152 6/16/98 duplicate	SSC153 06/16/98	SSC154*** 06/16/98	SSC155* 06/17/98	SSC156 06/17/98	SSC157 06/17/98	SSC158**** 06/17/98	SSC159 6/17/98	SSC159 6/17/98 duplicate	SSC160 06/17/98	SSC161 06/26/98	SSC162 06/26/98
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
4,4' - DDE	µg/Kg	<3.3	<3.4	<3.3	14	7.4	74	36	19	3.9	<3.4	87	<3.3	<3.4	<3.3	67	5.8
4,4' - DDT	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	63	35	27	<3.3	<3.4	86	<3.3	<3.4	<3.3	<3.4	<3.3
Aldrin	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Alpha - BHC	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Beta - BHC	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Chlordane (alpha)	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Chlordane (gamma)	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Chlordane (total)	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Delta - BHC	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Dieldrin	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Endosulfan I	µg/Kg	<3.3	<3.4	<3.3	5.6	<3.3	38	160	77	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	190	<3.3
Endosulfan II (beta)	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Endosulfan Sulfate	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Endrin	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Endrin Aldehyde	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Endrin Ketone	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Gamma - BHC (Lindane)	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Heptachlor	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Heptachlor Epoxide (a)	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
heptachlor Epoxide (b)	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Isodrin	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Methoxychlor	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Mirex	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Toxaphene	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<33	<34	<33	<33	<33	<33	<33	<33	<33	<34	<33	<33	<34	<33	<34	<33
PCB-1221	µg/Kg	<33	<34	<33	<33	<33	<33	<33	<33	<33	<34	<33	<33	<34	<33	<34	<33
PCB-1232	µg/Kg	<33	<34	<33	<33	<33	<33	<33	<33	<33	<34	<33	<33	<34	<33	<34	<33
PCB-1248	µg/Kg	<33	<34	<33	<33	<33	<33	<33	<33	<33	<34	<33	<33	<34	<33	<34	<33
PCB-1254	µg/Kg	<33	<34	<33	<33	<33	<33	<33	<33	<33	<34	<33	<33	<34	<33	<34	<33
PCB-1260	µg/Kg	<33	<34	<33	<33	<33	<33	<33	<33	<33	<34	<33	<33	<34	<33	<34	<33
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
3,5-DCBA	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<10	<10	<10	15	27	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
4 - Nitrophenol	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acifluorfen	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bentazon	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloramben	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dacthal	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dalapon	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dicamba	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dinoseb	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
MCPA	µg/Kg	<100	<100	<100	<100	<100	<100	<1000	<100	<100	<100	<100	<100	<100	<100	<100	<100
MCPP	µg/Kg	<100	<100	<100	<100	<100	<100	<1000	<100	<100	<100	<100	<100	<100	<100	<100	<100
Pentachlorophenol	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10
Picloram	µg/Kg	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC149 06/17/98	SSC150 06/17/98	SSC151 06/17/98	SSC152 6/16/98		SSC153 06/16/98	SSC154*** 06/16/98	SSC155* 06/17/98	SSC156 06/17/98	SSC157 06/17/98	SSC158**** 06/17/98	SSC159 6/17/98		SSC160 06/17/98	SSC161 06/26/98	SSC162 06/26/98
						duplicate								duplicate			
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<17	<17	<17	<17	<17	<17	<17	<84	<17	<17	<17	<17	<17	<17	<17	<17
2 - Methylnaphthalene	µg/Kg	<17	<17	<17	<17	<17	<17	<17	<84	170	<17	<17	<17	<17	<17	<17	<17
Acenaphthene	µg/Kg	<17	<17	<17	<17	<17	<17	<17	<84	<17	<17	<17	<17	<17	<17	<17	<17
Acenaphthylene	µg/Kg	<3.3	<3.4	<3.3	<3.3	<3.3	<3.3	<3.3	<17	<3.3	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.3
Anthracene	µg/Kg	<17	<17	<17	<17	<17	<17	<17	<84	<17	<17	<17	<17	<17	21	<17	<17
Benzo(a)anthracene	µg/Kg	<1.7	3	<1.7	<1.7	<1.7	<1.7	<1.7	<8.4	<1.7	<1.7	9.3	<1.7	<1.7	<1.7	<1.7	<1.7
Benzo(a)pyrene	µg/Kg	<2	2 I	<2	7	2 I	<2	<2	<8	4	5	<2	<2	<2	<2	<2	<2
Benzo(b)fluoranthene	µg/Kg	<3	<3	3 I	<3	<3	<3	<3	<17	<3	5 I	6 I	<3	<3	<3	<3	<3
Benzo(g,h,i)perylene	µg/Kg	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<17	<3.4	<3.4	18	<3.4	<3.4	<3.4	<3.4	<3.4
Benzo(k)fluoranthene	µg/Kg	<2	<2	14	<2	<2	<2	<2	<8	<2	5	11	3 I	3 I	<2	<2	<2
Chrysene	µg/Kg	2.4 I	2.6 I	4.7	<1.7	<1.7	<1.7	<1.7	<8.4	2.1 I	6	14	<1.7	1.9 I	1.7 I	<1.7	<1.7
Dibenzo(a,h)anthracene	µg/Kg	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<17	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
Fluoranthene	µg/Kg	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<17	<3.4	18	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
Fluorene	µg/Kg	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<17	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<8.4	<1.7	<1.7	17	<1.7	<1.7	<1.7	<1.7	<1.7
Naphthalene	µg/Kg	<17	<17	<17	540	400	230	<17	<84	120	<17	<17	<17	<17	<17	76	100
Phenanthrene	µg/Kg	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<8.4	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
Pyrene	µg/Kg	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<8.4	<1.7	<1.7	3.2 I	<1.7	<1.7	<1.7	<1.7	<1.7
Surrogates																	
2,4-DCAA	%	82	60	96	120	136	78	96	70	88	80	116	70	88	66	96	96
2,4,5,6-TCMX	%	49	47	70	48	38	76	64	61	66	44	92	58	74	65	98	63
DBC	%	86	85	102	78	69	131	103	114	109	74	150	80	109	104	137	90
p-terphenyl	%	85	85	85	87	101	87	61	82	93	104	102	75	87	93	106	92
Metals																	
Aluminum	mg/Kg	500	3100	310	1300	1300	930	830	980	1200	1800	1100	1600	1500	870	890	450
Antimony	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	mg/Kg	<0.5	<0.5	<0.5	0.09 I	1 I	0.6 I	0.7 I	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.6
Barium	mg/Kg	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	2.2	1.4	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	1300	15000	1600	990	780	2200	2000	1400	950	1800	790	2500	1500	560	1100	210
Chromium (total)	mg/Kg	10	15	7	4.3	3.9	34	24	14	18	20	17	12	12	3.7	11	3.5
Cobalt	mg/Kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Copper	mg/Kg	37	53	110	48	46	120	91	94	34	130	20	73	58	7	54	22
Iron	mg/Kg	670	3500	820	1700	1800	1100	1000	1500	1600	2800	1600	2200	2200	1300	930	320
Lead	mg/Kg	6.9	7.3	7.6	16	16	18	19	12	7.5	11	12	14	11	2.4	5.7	4
Magnesium	mg/Kg	190	760	360	160	150	210	230	460	110	350	150	140	120	120	130	62
Manganese	mg/Kg	54	98	78	42	37	150	98	73	110	160	87	160	120	10	21	2.6
Mercury	mg/Kg	<0.01	<0.01	<0.01	0.012 I	0.015 I	0.046	0.023	<0.01	<0.01	0.037	0.013 I	0.012 I	<0.01	<0.01	<0.01	<0.01
Nickel	mg/Kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<160	<150
Potassium	mg/Kg	78	220	42	61	52	74	69	94	79	140	77	110	91	45	32	240
Selenium	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Silver	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sodium	mg/Kg	12 I	110	11 I	9.6 I	8 I	22 I	16 I	9 I	12 I	23 I	11 I	21 I	15 I	10 I	10 I	10 I
Thallium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	2.6	<1	<1	<1	<1	<1	<1	<1	2.9
Vanadium	mg/Kg	1.2	3.9	1.3	2	2.2	1.8	1.4	2.2	2.3	3.8	1.6	2.5	2.3	2.8	1.5	1
Zinc	mg/Kg	35	43	31	74	70	140	120	39	37	100	44	54	45	7.2	15	6.9

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Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC149 06/17/98	SSC150 06/17/98	SSC151 06/17/98	SSC152 6/16/98		SSC153 06/16/98	SSC154*** 06/16/98	SSC155* 06/17/98	SSC156 06/17/98	SSC157 06/17/98	SSC158**** 06/17/98	SSC159 6/17/98		SSC160 06/17/98	SSC161 06/26/98	SSC162 06/26/98
						duplicate								duplicate			
Other Parameters																	
Bulk Density	g/cm^3	0.82	1.3	1.3	1.2	1.1	1.2	1.1	1.1	1.2	1.4	1	1.2	1.3	0.94	1.1	1.2
CEC	meq/100g	33	10	1000	3.9	5.7	8.6	6.9	38	37	1000	1000	1100	1100	1000	5	4
Percent Solids	%	99	98	99	99	99	99	99	99	99	98	99	99	98	99	98	99
pH (lab)	S. U.	6.9	7.2	7.1	6.6	6.8	6.7	6.8	7.1	6.5	6.9	6.3	7.2	7.2	6.6	6	6.3
Resistivity	ohm-cm	>30000	>180000	>2000	110000	120000	440000	460000	>2000000	>990000	>1700000	>2200000	>2000000	>2100000	>850000	2900000	1800000
Texture (No. 4)	%	100	100	99.9	100	100	100	100	100	100	100	100	100	100	100	100	100
Texture (No. 10)	%	99.9	97.8	99.9	99.9	99.9	100	99.8	99.8	100	100	99.9	100	99.9	99.9	100	100
Texture (No. 40)	%	74.2	59.3	70.5	98.3	98.3	98.9	99	97.9	59.1	52.8	99.3	68.6	69.3	70.2	89.1	97.9
Texture (No. 60)	%	59.6	55.7	47.5	94	94	96.4	97.3	93.9	47.3	43.1	97.8	57.3	58	51.1	68.4	90.2
Texture (No. 100)	%	14.8	24.3	17.1	37.9	37.8	45.2	46.3	39	19.3	17.9	46.3	17.7	17.2	18.5	22.9	44
Texture (No. 200)	%	2.8	7	4	2.6	2.3	2.9	3.7	3.2	4.6	6.2	2	4.3	4.1	3.5	3.8	7
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>25800	26000	>26700	>26700	>26700	>26700	9000

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC163 06/29/98	SSC164 06/29/98	SSC165 08/12/98		SSC166 06/30/98	SSC167 06/30/98	SSC168 06/30/98	SSC169 6/30/98		SSC170 06/30/98	SSC171 06/30/98	SSC172 06/30/98	SSC173 06/30/98	SSC174 06/30/98	SSC175 06/29/98	SSC176 06/26/98
					duplicate					duplicate							
Organochlorine Pesticides (8081)																	
4,4' - DDD	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
4,4' - DDE	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	5.4	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	12	<4.2	<3.4
4,4' - DDT	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	5.4	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Aldrin	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Alpha - BHC	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Beta - BHC	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Chlordane (alpha)	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Chlordane (gamma)	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Chlordane (total)	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Delta - BHC	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Dieldrin	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Endosulfan I	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Endosulfan II (beta)	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Endosulfan Sulfate	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Endrin	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Endrin Aldehyde	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Endrin Ketone	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Gamma - BHC (Lindane)	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Heptachlor	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Heptachlor Epoxide (a)	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
heptachlor Epoxide (b)	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Isodrin	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Methoxychlor	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Mirex	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Toxaphene	µg/Kg	<3.7	<3.5	<74	<89	<68	<73	<68	<67	<67	<67	<66	<67	<67	<80	<4.2	<3.4
Aroclors (8082)																	
PCB-1016/1242	µg/Kg	<37	<35	<37	<44	<34	<37	<34	<33	<33	<34	<33	<34	<34	<40	<42	<34
PCB-1221	µg/Kg	<37	<35	<37	<44	<34	<37	<34	<33	<33	<34	<33	<34	<34	<40	<42	<34
PCB-1232	µg/Kg	<37	<35	<37	<44	<34	<37	<34	<33	<33	<34	<33	<34	<34	<40	<42	<34
PCB-1248	µg/Kg	<37	<35	<37	<44	<34	<37	<34	<33	<33	<34	<33	<34	<34	<40	<42	<34
PCB-1254	µg/Kg	<37	<35	<37	<44	<34	<37	<34	<33	<33	<34	<3 3	<34	<34	<40	<42	<34
PCB-1260	µg/Kg	<37	<35	<37	<44	<34	<37	<34	<33	<33	<34	<33	<34	<34	<40	<42	<34
Chlorinated Herbicides (8151)																	
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
3,5-DCBA	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
4 - Nitrophenol	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Acifluorfen	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Bentazon	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Chloramben	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Dacthal	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Dalapon	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Dicamba	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Dinoseb	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
MCPA	µg/Kg	<110	<100	<220	<270	<100	<110	<100	<100	<100	<100	<100	<100	<100	<120	<130	<1000
MCPP	µg/Kg	<110	<100	<220	<270	<100	<110	<100	<100	<100	<100	<100	<100	<100	<120	<130	<1000
Pentachlorophenol	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100
Picloram	µg/Kg	<11	<10	<11	<14	<10	<11	<10	<10	<10	<10	<10	<10	<10	<12	<13	<100

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. "*" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC163 06/29/98	SSC164 06/29/98	SSC165 08/12/98	SSC165 08/12/98 duplicate	SSC166 06/30/98	SSC167 06/30/98	SSC168 06/30/98	SSC169 6/30/98	SSC169 6/30/98 duplicate	SSC170 06/30/98	SSC171 06/30/98	SSC172 06/30/98	SSC173 06/30/98	SSC174 06/30/98	SSC175 06/29/98	SSC176 06/26/98
PAH (8310)																	
1 - Methylnaphthalene	µg/Kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	<17	20	<21	<17
2 - Methylnaphthalene	µg/Kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	<17	42	<21	<17
Acenaphthene	µg/Kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	<17	<20	<21	<17
Acenaphthylene	µg/Kg	<3.7	<3.5	<3.7	<4.4	<3.4	<3.7	<3.4	<3.3	<3.3	<3.4	<3.3	<3.4	<3.4	<4	<4.2	<3.4
Anthracene	µg/Kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	<17	<20	<22	<17
Benzo(a)anthracene	µg/Kg	<1.9	2.8	2.4 I	<2.3	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1	<1.7
Benzo(a)pyrene	µg/Kg	<2	5	2 I	3 I	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	4
Benzo(b)fluoranthene	µg/Kg	<3	7 I	4 I	4 I	<3	<3	<3	<3	<3	<3	<3	<3	<3	<4	<4	<3
Benzo(g,h,i)perylene	µg/Kg	<3.7	9.8 I	13	12 I	<3.4	<3.7	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<4	<4.3	<3.4
Benzo(k)fluoranthene	µg/Kg	<2	3 I	<2	<3.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chrysene	µg/Kg	<1.9	3.7	<1.9	<2.3	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1	<1.7
Dibenzo(a,h)anthracene	µg/Kg	<3.7	<3.5	<3.7	<4.5	<3.4	<3.7	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<4	<4.3	<3.4
Fluoranthene	µg/Kg	<3.7	<3.5	<3.7	<4.5	<3.4	<3.7	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<4	<4.3	<3.4
Fluorene	µg/Kg	<3.7	<3.5	<3.7	<4.5	<3.4	<3.7	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<4	<4.3	<3.4
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.9	6.7	8.9	15	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1	<1.7
Naphthalene	µg/Kg	<19	<18	<19	<23	<17	<19	<17	<17	<17	<17	<17	<17	<17	73	<21	<17
Phenanthrene	µg/Kg	<1.9	<1.8	<1.9	<2.3	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1	<1.7
Pyrene	µg/Kg	<1.9	<1.8	<1.9	<2.3	<1.7	<1.9	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<2	<2.1	<1.7
Surrogates																	
2,4-DCAA	%	56	44	112	132	68	52	88	40	72	48	76	64	84	70	48	36
2,4,5,6-TCMX	%	57	75	71	70	65	66	54	55	59	69	67	59	69	59	57	68
DBC	%	60	124	147	118	75	85	69	58	77	92	105	68	67	81	60	88
p-terphenyl	%	105	75	83	83	81	86	73	91	94	90	63	104	103	63	87	117
Metals																	
Aluminum	mg/Kg	7200	2400	2900	3600	490	4600	1200	240	140	1400	210	1200	3700	440	3800	1300
Antimony	mg/Kg	<2	<2	<2	<3.0	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	mg/Kg	<0.6	<0.5	<0.6	.70 I	<0.5	<0.6	<0.5	<0.5	<0.5	0.5 I	<0.5	<0.5	2.6	2.7	<0.6	<0.5
Barium	mg/Kg	<22	<21	<22	<27	<20	<22	<20	<20	<20	<20	<20	<20	<20	<24	<26	<20
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	3800	1900	16000	24000	1700	2200	410	920	500	5900	760	1800	99000	2500	22000	510
Chromium (total)	mg/Kg	20	17	12	15	3.7	30	10	<1	<1	7.2	4.3	24	12	29	13	15
Cobalt	mg/Kg	<6	<5	<6	<7.0	<5	<6	<5	<5	<5	<5	<5	<5	<5	<6	<6	<5
Copper	mg/Kg	100	100	110	110	24	130	51	14	11	64	5.3	70	32	120	33	36
Iron	mg/Kg	8000	2200	1800	2000	570	3600	1100	160	100	940	110	1300	7200	440	3500	1700
Lead	mg/Kg	8.2	8.9	8.8	10	1.9	17	5	1.3	<1	10	1.5	5.8	5.3	6.3	4.2	8.8
Magnesium	mg/Kg	560	180	510	660	120	440	120	120	88	1000	150	180	840	440	780	170
Manganese	mg/Kg	99	130	160	150	29	100	17	12	7.5	48	5	65	110	110	53	5.9
Mercury	mg/Kg	0.026	0.019	0.02	0.03	<0.01	0.06	<0.01	<0.01	<0.01	0.05	<0.01	0.014 I	0.013 I	0.013 I	0.01 I	0.042
Nickel	mg/Kg	<6	<5	<6	<7	<5	<6	<5	<5	<5	<5	<5	<5	<5	<6	<6	<150
Potassium	mg/Kg	490	<170	260	310	28	170	70	36	<25	92	<25	62	300	64	<210	120
Selenium	mg/Kg	<2	<2	<2	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Silver	mg/Kg	<2	<2	<2	<3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sodium	mg/Kg	31	17 I	31	36	20 I	24 I	15 I	13 I	16 I	29	14 I	20 I	330	29 I	58	10 I
Thallium	mg/Kg	<1	<1	<6	<7	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.3	<1	<1
Vanadium	mg/Kg	18	6.2	4	4.6	1.3	9	2.5	<1	<1	1.9	<1	2.4	19	1.9	9.8	4
Zinc	mg/Kg	58	25	71	76	14	56	7.8	7	<5	36	<5	32	32	66	31	12

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC163 06/29/98	SSC164 06/29/98	SSC165 08/12/98		SSC166 06/30/98	SSC167 06/30/98	SSC168 06/30/98	SSC169 6/30/98		SSC170 06/30/98	SSC171 06/30/98	SSC172 06/30/98	SSC173 06/30/98	SSC174 06/30/98	SSC175 06/29/98	SSC176 06/26/98
					duplicate					duplicate							
Other Parameters																	
Bulk Density	g/cm^3	1.2	1.1	1	1	1.3	1.1	1.2	1.2	1.3	1.2	1.3	1.1	1.2	1.1	1.2	1.1
CEC	meq/100g	23	10	31	29	6	20	7	4	9	8	6	9	17	19	13	8
Percent Solids	%	89	95	89	74	98	90	97	99	99	98	99	98	98	83	78	98
pH (lab)	S. U.	6.3	6	7.4	7.6	7.2	6.9	6.8	7.2	6.8	7.7	7.2	7.4	7.6	6.8	7.6	6.1
Resistivity	ohm-cm	48000	110000	32000	29000	<12	1400000	<12	<12	<12	1600000	<12	<12	350000	64000	450000	<12
Texture (No. 4)	%	100	100	99.9	100	99.7	100	98.6	100	100	99	100	100	98.2	100	100	100
Texture (No. 10)	%	99.8	100	99.78	99.9	99.6	99.7	98.3	100	99.9	98.5	100	100	93.8	99.9	99.9	100
Texture (No. 40)	%	94.4	98	96.8	97	85.4	85.3	96.9	98.4	98.7	97.5	87.4	83.5	84.7	98.6	98	98.3
Texture (No. 60)	%	83	91.4	89.7	89.9	51.4	57.3	92.3	91.6	92.1	94.7	58.1	56.7	78.3	84.1	91	89.6
Texture (No. 100)	%	50.2	57.8	52.8	57.2	15.3	28	57.8	51.9	52	58	17.6	21.9	51.4	22.7	59.6	48.2
Texture (No. 200)	%	18.1	12.3	20.7	19	4.2	10.5	8.4	9.9	9.6	8.6	4.7	5	14.2	11.4	11.7	9.2
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	9800

I = value is between the Method Detection Limit and the Practical Quanitation Level
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* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. "*" = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC177 06/29/98	SSC177 duplicate	SSC178 07/14/98	SSC179 08/13/98	SSC180 08/13/98	SSC181 8/13/98	SSC181 duplicate	SSC182 06/22/98	SSC183 7/14/98	SSC183 duplicate	SSC184 07/28/98	SSC185 07/28/98	SSC186 06/18/98	SSC187 06/18/98	SSC188 06/18/98
Organochlorine Pesticides (8081)																
4,4' - DDD	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
4,4' - DDE	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
4,4' - DDT	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Aldrin	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Alpha - BHC	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Beta - BHC	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Chlordane (alpha)	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Chlordane (gamma)	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Chlordane (total)	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Delta - BHC	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Dieldrin	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Endosulfan I	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Endosulfan II (beta)	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Endosulfan Sulfate	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Endrin	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Endrin Aldehyde	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Endrin Ketone	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Gamma - BHC (Lindane)	µg/Kg	<3.3	<3.4	<3.7	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Heptachlor	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Heptachlor Epoxide (a)	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
heptachlor Epoxide (b)	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Isodrin	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Methoxychlor	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Mirex	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Toxaphene	µg/Kg	<3.3	<3.4	<72	<68	<67	<80	<86	<3.4	<74	<78	<66	<66	<3.3	<3.4	<4.5
Aroclors (8082)																
PCB-1016/1242	µg/Kg	<33	<34	<36	<34	<34	<40	<43	<34	<37	<39	<33	<33	<33	<34	<45
PCB-1221	µg/Kg	<33	<34	<36	<34	<34	<40	<43	<34	<37	<39	<33	<33	<33	<34	<45
PCB-1232	µg/Kg	<33	<34	<36	<34	<34	<40	<43	<34	<37	<39	<33	<33	<33	<34	<45
PCB-1248	µg/Kg	<33	<34	<36	<34	<34	<40	<43	<34	<37	<39	<33	<33	<33	<34	<45
PCB-1254	µg/Kg	<33	<34	<36	<34	<34	<40	<43	<34	<37	<39	<33	<33	<33	<34	<45
PCB-1260	µg/Kg	<33	<34	<36	<34	<34	<40	<43	<34	<37	<39	<33	<33	<33	<34	<45
Chlorinated Herbicides (8151)																
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<10	<10	<11	21	44	320	58	<10	<11	<12	<10	<10	<10	<10	<14
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<10	<10	<11	18	35	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
3,5-DCBA	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
4 - Nitrophenol	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Acifluorfen	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Bentazon	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Chloramben	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Dacthal	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Dalapon	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Dicamba	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Dinoseb	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
MCPA	µg/Kg	<100	<100	<220	<210	<200	<2400	<260	<100	<220	<240	<200	<200	<100	<100	<140
MCPP	µg/Kg	<100	<100	<220	<210	<200	<2400	<260	<100	<220	<240	<200	<200	<100	<100	<140
Pentachlorophenol	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14
Picloram	µg/Kg	<10	<10	<11	<10	<10	<120	<13	<10	<11	<12	<10	<10	<10	<10	<14

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC177 06/29/98	SSC177 06/29/98 duplicate	SSC178 07/14/98	SSC179 08/13/98	SSC180 08/13/98	SSC181 8/13/98	SSC181 8/13/98 duplicate	SSC182 06/22/98	SSC183 7/14/98	SSC183 7/14/98 duplicate	SSC184 07/28/98	SSC185 07/28/98	SSC186 06/18/98	SSC187 06/18/98	SSC188 06/18/98
PAH (8310)																
1 - Methylnaphthalene	µg/Kg	<17	<17	<18	<17	<17	<20	<22	<17	<19	<20	<17	<17	<17	46	<23
2 - Methylnaphthalene	µg/Kg	<17	<17	<18	<17	<17	<20	<22	<17	<19	<20	<17	<17	<17	68	<23
Acenaphthene	µg/Kg	<17	<17	<18	<17	<17	<20	<22	<17	<19	<20	<17	<17	<17	<17	<23
Acenaphthylene	µg/Kg	<3.3	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.3	<3.3	<3.4	<4.5
Anthracene	µg/Kg	<17	<18	<19	<18	<17	<20	<22	<18	<19	<20	<17	<17	<17	<17	<23
Benzo(a)anthracene	µg/Kg	<1.7	<1.7	<1.8	<1.7	<1.7	2.2 I	<2.2	<1.7	<1.9	<2	<1.7	3.8	4.8	21	<2.3
Benzo(a)pyrene	µg/Kg	<2	<2	<2	<2	<2	2 I	2 I	<2	<2	<2	<2	9	6	22	<3
Benzo(b)fluoranthene	µg/Kg	<3	<3	<3	<3	<3	4 I	5 I	<3	<3	<4	<3	7 I	<3	15	<4
Benzo(g,h,i)perylene	µg/Kg	<3.4	<3.4	<3.7	<3.4	<3.4	5 I	7.9 I	<3.4	<3.7	<3.9	<3.3	36	18	28	<4.6
Benzo(k)fluoranthene	µg/Kg	<2	<2	<2	<2	<2	2 I	2 I	<2	<2	<2	<2	6	<2	17	<3
Chrysene	µg/Kg	<1.7	<1.7	<1.8	<1.7	<1.7	4.6	<2.2	<1.7	<1.9	<2	<1.7	6.6	6.7	26	<2.3
Dibenzo(a,h)anthracene	µg/Kg	<3.4	<3.4	<3.7	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.4	<3.4	59	<4.6
Fluoranthene	µg/Kg	<3.4	<3.4	<3.6	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	17	20	<3.4	<4.6
Fluorene	µg/Kg	<3.4	<3.4	<3.7	<3.4	<3.4	<4	<4.3	<3.4	<3.7	<3.9	<3.3	<3.4	<3.4	<3.4	<4.6
Indeno(1,2,3-cd)pyrene	µg/Kg	<1.7	<1.7	<1.8	<1.7	<1.7	3 I	7.4	<1.7	<1.9	<2	<1.7	5.2	4.8	14	<2.3
Naphthalene	µg/Kg	<17	<17	<18	<17	<17	<20	<22	<17	<19	<20	<17	<17	<17	<17	<23
Phenanthrene	µg/Kg	<1.7	<1.7	<1.8	<1.7	<1.7	7.8	11	<1.7	<1.9	<2	<1.7	5.4	4.9 I	<1.7	<2.3
Pyrene	µg/Kg	<1.7	<1.7	<1.8	<1.7	<1.7	<2	<2.2	<1.7	<1.9	<2	<1.7	15	5.8	<1.7	<2.3
Surrogates																
2,4-DCAA	%	64	60	64	80	156	100	148	76	34	86	88	104	82	84	80
2,4,5,6-TCMX	%	53	71	108	69	74	98	100	126	125	118	106	138	112	103	85
DBC	%	78	73	143	108	119	65	67	56	97	101	77	96	54	59	43
p-terphenyl	%	82	79	90	73	61	67	77	89	96	104	90	84	88	90	88
Metals																
Aluminum	mg/Kg	1000	1200	2200	1200	130	420	390	1500	22000	20000	200	560	920	180	880
Antimony	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2.2	<2	<2	<2	<2	<2	<3
Arsenic	mg/Kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6	<0.6	1.4 I	<0.6	<0.6	<0.5	0.6 I	1.7	1.2 I	1.2 I
Barium	mg/Kg	<20	<21	<22	<21	<20	<24	<26	<21	36	32	<20	<20	<20	<20	<27
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	1300	670	66000	1200	900	1600	1800	130000	7600	10000	470	11000	90000	28000	49000
Chromium (total)	mg/Kg	5	3.6	30	3.4	1.4	<1	<1	3	24	21	<1	1.4	3.4	<1	1.6
Cobalt	mg/Kg	<5	<5	<5	<5	<5	<6	<6	<5	<6	<6	<5	<5	<5	<5	<7
Copper	mg/Kg	34	23	82	<5	15	<6	<6	2.5	<6	<6	<5	<5	4.9	<1	1.5
Iron	mg/Kg	920	1100	7100	440	120	120	320	1100	16000	13000	55	490	1500	330	620
Lead	mg/Kg	4.8	3.6	8.4	2.2	2.1	4.2	3.8	2	5.7	4.8	1.4	2.4	18	1.3	2.6
Magnesium	mg/Kg	490	180	1200	120	150	88	110	130	1300	690	38	90	480	140	190
Manganese	mg/Kg	42	49	110	5	20	2	2.5	7	20	20	2	4.7	15	3.9	7.1
Mercury	mg/Kg	<0.01	<0.01	0.019	<0.01	<0.01	<0.01	<0.01	<0.01	0.07	0.054	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/Kg	<5	<5	<5	<5	<5	<6	<6	<5	<6	<6	<5	<5	<5	<5	<7
Potassium	mg/Kg	<170	<170	97	30	<26	36	42	100	150	140	<25	28	180	<170	86
Selenium	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	3	3	<2	<2	<2	<2	<3
Silver	mg/Kg	<2	<2	<2	<2	<2	<2	<2	2.4	<2	<2	<2	<2	<2	<2	<3
Sodium	mg/Kg	17 I	14 I	110	<26	<26	<30	<32	1100	110	140	<25	100	800	300	470
Thallium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	mg/Kg	3	3.7	4.7	2	<1	<1	<1	2.2	25	21	<1	1.2	2.8	<1	1
Zinc	mg/Kg	20	24	52	6.9	18	10	12	<5	9.8	9	6.5	8.9	50	<5	<7

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC177 06/29/98	SSC177 06/29/98	SSC178 07/14/98	SSC179 08/13/98	SSC180 08/13/98	SSC181 8/13/98	SSC181 8/13/98	SSC182 06/22/98	SSC183 7/14/98	SSC183 7/14/98	SSC184 07/28/98	SSC185 07/28/98	SSC186 06/18/98	SSC187 06/18/98	SSC188 06/18/98
			duplicate					duplicate			duplicate					
Other Parameters																
Bulk Density	g/cm^3	1.2	1.2	1.3	1.2	1.3	1.1	1.1	1.2	1.1	NA	1.1	1.3	1.2	0.82	1.2
CEC	meq/100g	6	4	13	4	4	10	12	9	24	39	2	5	540	630	880
Percent Solids	%	99	96	91	97	98	83	77	97	89	85	100	99	99	98	73
pH (lab)	S. U.	6.7	6.4	7.4	5.2	5.2	5.5	5.3	8.3	7.3	7.3	4.9	6	8.2	8	7.7
Resistivity	ohm-cm	510000	64000	59000	480000	2100000	1100000	910000	130000	9800	3800	60000	2900000	>1900000	1400000	2800000
Texture (No. 4)	%	100	100	99.1	100	100	100	100	99.4	100	100	100	98.7	97.1	98.9	100
Texture (No. 10)	%	99.9	100	97.5	99.9	100	99.9	99.9	90.9	99.7	99.6	99.8	97.1	84.9	97.2	98.2
Texture (No. 40)	%	98.9	99.4	93	99.6	99.7	89.7	89.8	60.5	96.8	96.5	99	92.4	59.2	91.7	94.3
Texture (No. 60)	%	93.4	94.3	88.6	98	98.1	63.7	63.3	56.8	93	92.4	98.3	89.5	54.1	89.5	93.3
Texture (No. 100)	%	45.7	48.1	60.6	47.7	54.7	15.2	10.7	33.2	69.5	70.8	60.9	58.9	40.9	81.1	63.9
Texture (No. 200)	%	5.8	5.6	14.9	5.7	4.8	4.5	3.8	3.8	37.8	34.8	3	2.8	6.2	3.2	3.2
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	>26700	26000	>26700	23000

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC189 6/18/98	duplicate	SSC-190 06/29/98	SSC191 07/28/98	SSC192 07/28/98	SSC193 08/12/98	SSC194 07/28/98	SSC195 07/15/98	SSC196 07/15/98	SSC197 07/28/98	SSC198 08/13/98	SSC199 07/28/98	SSC200 08/12/98
Organochlorine Pesticides (8081)														
4,4' - DDD	µg/Kg	<4.1	<4.2	10	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
4,4' - DDE	µg/Kg	<4.1	<4.2	110	5	<3.4	15	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
4,4' - DDT	µg/Kg	<4.1	<4.2	67	<3.3	<3.4	32	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Aldrin	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Alpha - BHC	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Beta - BHC	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Chlordane (alpha)	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Chlordane (gamma)	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	5.8	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Chlordane (total)	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Delta - BHC	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Dieldrin	µg/Kg	<4.1	<4.2	5	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Endosulfan I	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Endosulfan II (beta)	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Endosulfan Sulfate	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	3.8	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Endrin	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Endrin Aldehyde	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Endrin Ketone	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Gamma - BHC (Lindane)	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	5.4
Heptachlor	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Heptachlor Epoxide (a)	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
heptachlor Epoxide (b)	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Isodrin	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Methoxychlor	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Mirex	µg/Kg	<4.1	<4.2	<3.4	<3.3	<3.4	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Toxaphene	µg/Kg	<4.1	<4.2	<3.4	<67	<68	<70	<68	<69	<71	<71	<75	<66	<72
Aroclors (8082)														
PCB-1016/1242	µg/Kg	<41	<42	<34	<33	<34	<35	<34	<35	<35	<36	<38	<33	<36
PCB-1221	µg/Kg	<41	<42	<34	<33	<34	<35	<34	<35	<35	<36	<38	<33	<36
PCB-1232	µg/Kg	<41	<42	<34	<33	<34	<35	<34	<35	<35	<36	<38	<33	<36
PCB-1248	µg/Kg	<41	<42	<34	<33	<34	<35	<34	<35	<35	<36	<38	<33	<36
PCB-1254	µg/Kg	<41	<42	<34	<33	<34	<35	<34	<35	<35	<36	<38	<33	<36
PCB-1260	µg/Kg	<41	<42	<34	<33	<34	<35	<34	<35	<35	<36	<38	<33	<36
Chlorinated Herbicides (8151)														
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	33
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
3,5-DCBA	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	33
4 - Nitrophenol	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Acifluorfen	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Bentazon	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Chloramben	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Dacthal	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Dalapon	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Dicamba	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Dinoseb	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
MCPA	µg/Kg	<120	<130	<100	<200	<210	<210	<210	<100	<110	<220	<230	<200	<220
MCPP	µg/Kg	<120	<130	<100	<200	<210	<210	<210	<100	<110	<220	<230	<200	<220
Pentachlorophenol	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11
Picloram	µg/Kg	<12	<13	<10	<10	<10	<11	<10	<10	<11	<11	<11	<10	<11

I = value is between the Method Detection Limit and the Practical Quanitation Level
J = value is below the established limit for accuracy
* = 8310s were diluted (1:5)
** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC189 6/18/98	SSC189 6/18/98 duplicate	SSC-190 06/29/98	SSC191 07/28/98	SSC192 07/28/98	SSC193 08/12/98	SSC194 07/28/98	SSC195 07/15/98	SSC196 07/15/98	SSC197 07/28/98	SSC198 08/13/98	SSC199 07/28/98	SSC200 08/12/98
PAH (8310)														
1 - Methylnaphthalene	μg/Kg	<21	<21	<17	<17	<86	<18	<17	<18	<18	<18	<19	<17	<18
2 - Methylnaphthalene	μg/Kg	<21	<21	<17	<17	<86	<18	<17	<18	<18	<18	<19	<17	<18
Acenaphthene	μg/Kg	<21	<21	<17	<17	<86	<18	<17	<18	<18	<18	<19	<17	<18
Acenaphthylene	μg/Kg	<4.1	<4.2	<3.4	<3.3	<17	<3.5	<3.4	<3.5	<3.5	<3.6	<3.8	<3.3	<3.6
Anthracene	μg/Kg	<21	<22	<17	<17	<86	<18	<17	<18	<18	<18	<19	<17	<19
Benzo(a)anthracene	μg/Kg	8	6	20	<1.7	130	2.8 I	<1.7	<1.8	<1.8	<1.8	1.9 I	<1.7	12
Benzo(a)pyrene	μg/Kg	11	5 I	7	<2	250	5	<2	<2	<2	<2	<2	<2	44
Benzo(b)fluoranthene	μg/Kg	6 I	<4	<3	<3	220	6 I	<3	<3	<3	<3	<3	<3	32
Benzo(g,h,i)perylene	μg/Kg	26	<4.3	54	<3.4	190	9.7 I	<3.4	<3.5	<3.6	<3.6	<3.8	<3.4	38
Benzo(k)fluoranthene	μg/Kg	12	<2	7	<2	120	3 I	<2	<2	<2	<2	<2	<2	96
Chrysene	μg/Kg	15	7.8	21	<1.7	200	6.3	<1.7	<1.8	<1.8	<1.8	3	<1.7	37
Dibenzo(a,h)anthracene	μg/Kg	21	14	7.2 I	<3.4	<17	<3.5	<3.4	<3.5	<3.6	<3.6	<3.8	<3.4	<3.7
Fluoranthene	μg/Kg	32	18	<3.4	<3.4	540	21	<3.4	<3.5	<3.6	<3.6	<3.8	<3.4	130
Fluorene	μg/Kg	<4.2	<4.3	<3.4	<3.4	<17	<3.5	<3.4	<3.5	<3.6	<3.6	<3.8	<3.4	<3.7
Indeno(1,2,3-cd)pyrene	μg/Kg	9.2	<2.1	5.3	<1.7	210	5.6	<1.7	<1.8	<1.8	<1.8	<1.9	<1.7	27
Naphthalene	μg/Kg	<21	<21	<17	<17	<86	<18	<17	<18	<18	<18	<19	<17	<18
Phenanthrene	μg/Kg	9.5	4.6 I	<1.7	<1.7	100	<1.8	<1.7	<1.8	<1.8	<1.8	4 I	<1.7	120
Pyrene	μg/Kg	2.2 I	<2.1	<1.7	<1.7	240	13	<1.7	<1.8	<1.8	<1.8	<1.9	<1.7	140
Surrogates														
2,4-DCAA	%	94	94	40	60	108	156	52	74	62	128	100	88	110
2,4,5,6-TCMX	%	132	121	70	132	165	155	130	114	130	182	94	129	87
DBC	%	70	65	66	109	104	90	99	79	97	120	60	94	93
p-terphenyl	%	92	89	115	71	98	61	79	80	87	86	81	89	115
Metals														
Aluminum	mg/Kg	800	960	65	270	1200	1300	1000	570	860	570	1400	1200	54
Antimony	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	mg/Kg	1.4 I	0.8 I	<0.5	<0.5	<0.5	<0.5	<0.5	2.2	2.4	<0.5	<0.6	<0.5	<0.5
Barium	mg/Kg	<25	<26	<20	<20	<21	<21	<20	<21	<22	<22	<23	<20	<22
Beryllium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	92000	97000	280	130	5900	7200	9600	200000	190000	39000	7300	12000	350
Chromium (total)	mg/Kg	2.9	3.2	<1	<1	6.3	3.1	2	2.6	4.1	2.8	2	1.7	<1
Cobalt	mg/Kg	<6	<6	<5	<5	<5	<5	<5	<5	<5	<5	<6	<5	<5
Copper	mg/Kg	2.2	2	<5	<5	<5	<5	<5	<5	<5	<5	<6	<5	<5
Iron	mg/Kg	1200	1300	53	37	510	380	780	630	1000	550	580	400	63
Lead	mg/Kg	8.4	7.3	4	3	18	7.9	<1	3.9	6	1.4	2.5	2.4	4.9
Magnesium	mg/Kg	500	580	<25	31	140	130	72	330	1100	150	140	140	62
Manganese	mg/Kg	16	18	2.6	1.2	7.4	8	1.4	9.2	17	6.3	5.4	3.6	1.3
Mercury	mg/Kg	<0.01	<0.01	<0.01	<0.01	0.016 I	0.014 I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	mg/Kg	<6	<6	<5	<5	<5	<5	<5	<5	<5	<5	<6	<5	<5
Potassium	mg/Kg	160	180	<170	<25	70	40	<26	50	66	39	41	43	<27
Selenium	mg/Kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Silver	mg/Kg	<2	<2	<2	<2	<2	<2	<2	2.3	<2	<2	<2	<2	<2
Sodium	mg/Kg	700	690	10 I	<25	<26	26	110	1400	1300	320	38	39	<27
Thallium	mg/Kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	mg/Kg	2.9	3.2	<1	<1	2	1.4	1.5	1.8	2.5	1.6	2.5	1.9	1.5
Zinc	mg/Kg	12	12	15	7	36	16	<5	<5	5.6	7.1	26	7.4	7.4

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** =8310s were diluted (1:10)

Table B-15. KSC Background raw data for soil locations. *** = value is an outlier and not used in the analysis to develop the KSC Background screening values.

		SSC189 6/18/98		SSC-190 06/29/98	SSC191 07/28/98	SSC192 07/28/98	SSC193 08/12/98	SSC194 07/28/98	SSC195 07/15/98	SSC196 07/15/98	SSC197 07/28/98	SSC198 08/13/98	SSC199 07/28/98	SSC200 08/12/98
			duplicate											
Other Parameters														
Bulk Density	g/cm^3	0.65	0.61	1.2	0.91	1.1	1.2	1.3	1.4	1.4	1.2	1.2	1.2	1
CEC	meq/100g	1000	840	1	7	14	14	3	3	2	6	11	7	22
Percent Solids	%	80	78	98	99	97	94	97	95	93	92	88	99	91
pH (lab)	S. U.	8.1	8.3	6	7.1	7.9	7.7	7.8	7.8	7.4	5	5.9	7.2	7
Resistivity	ohm-cm	11000	11000	<12	1400000	1000000	410000	230000	130000	44000	72000	280000	1000000	90000
Texture (No. 4)	%	73.9	99.4	100	100	99.7	99.9	100	97.4	94	99.7	100	98.6	99.8
Texture (No. 10)	%	69.8	94	99.8	99.9	99.5	99.5	99.6	85.3	82.1	96.2	99.8	96.2	98.9
Texture (No. 40)	%	56.8	76.4	98.4	99.3	97.4	96.4	98.4	46.7	49.9	88	77.8	90.7	94.9
Texture (No. 60)	%	52.7	71.3	95.2	95.8	92.1	88.1	96.4	37.5	28	85.6	39.1	84.2	91.9
Texture (No. 100)	%	42.9	58.3	46.1	52.6	52.6	45.7	56.3	21.8	14.3	71.5	14.5	53.6	48.3
Texture (No. 200)	%	10.9	14.8	1.9	7.7	7.7	6.4	3.7	2.6	4.6	4.6	5	5.7	4.9
Total Organic Carbon	mg/Kg	>26700	>26700	>26700	26700	>26700	>26700	19000	>26700	>26700	>26700	>26700	>26700	>26700

I = value is between the Method Detection Limit and the Practical Quanitation Level
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** =8310s were diluted (1:10)

APPENDIX C

Groundwater Data for Kennedy Space Center

Table C-1. Descriptions of groundwater well sampling locations for the KSC Background Study.

Well id	Well depths	Description of location
Dune Subsystem		
Dune 1	Shallow Intermediate Deep	North end of Canaveral National Seashore Parking Area 4-5
Dune 2	Shallow Intermediate Deep	North of KSC Security Zone/Playalinda Beach: all three - in disturbed area near Parking Lot 2 behind bathroom at south end of lot.
Dune 3	Shallow	North of KSC Security Zone/Playalinda Beach: shallow - in disturbed area near Parking Lot 5 behind bathroom on north end of lot.
Dune 4	Shallow	Dunes East of LC41: shallow – 1st Southeast of LC41 entrance
Dune 5	Shallow Intermediate	North of Corrosion Test (Solar Panel) site East of Road along dune ridge
Dune 6	Shallow Intermediate Deep	North of Pump Station 7 Road west of Cape Road
Dune-Swale Subsystem		
DS 1	Shallow Intermediate Deep	North of Haulover/Shiloh Shiloh Scrub Restoration Site
DS 2	Shallow Intermediate Deep	Happy Creek: north of Camera Pad: all three near old Clark study well
DS 3	Shallow	Happy Creek: south of Camera Pad
DS 4	Shallow Intermediate Deep	Southern Ridge Jerome Road- E of SR3 Apiary Site #67
DS 5	Shallow Intermediate	Ransom Road: E of SR3 Apiary Site #10
DS 6	Shallow	Schwartz Road north along firebreak

Table C-1. (cont.).

Well id	Well depths	Description of location
Western Plain Subsystem		
West 1	Shallow Intermediate Deep	West of SR3 road to PAPI Lights Apiary Site #47
West 2	Shallow	Schwartz Road West of SR3 South side road along ditch
West 3	Shallow Intermediate Deep	Roberts Road West of SR3 South side
West 4	Shallow Intermediate Deep	Jerome Road West of SR3 South side
West 5	Shallow Intermediate	West side of SLF near tower
West 6	Shallow	West of SR3 North of SR406 near Dummit tower
Marsh Subsystem		
Marsh 1	Shallow Intermediate Deep	Shiloh Turnbull Creek Drainage Road West of SR3
Marsh 2	Shallow	Shiloh 1 Impoundment
Marsh 3	Shallow Intermediate	T-10K area near tower
Marsh 4	Shallow Intermediate	Playalinda - Mosquito Lagoon by 1st Camera Pad
Marsh 5	Shallow Intermediate Deep	Banana Creek West of SR3
Marsh 6	Shallow	T-16 dike road

Table C-2. List of X and Y coordinates for groundwater well locations. Coordinates were collected with a Global Positioning System (GPS) in Florida State Plane NAD27. Wells are labeled according to the sub-aquifer they fall into, i.e. DS means that it was within the dune-swale sub-aquifer system. Well depth is represented by the final letter in the well id (D = deep, I = intermediate, S = shallow).

Well-id	X	Y
DS-1D	565163.592	1618299.238
DS-1I	565161.961	1618306.34
DS-1S	565161.395	1618314.069
DS-2D	610770.013	1560857.645
DS-2I	610776.552	1560850.899
DS-2S	610784.743	1560845.373
DS-3S	610483.337	1560561.588
DS-4D	606674.751	1511926.727
DS-4I	606681.555	1511928.325
DS-4S	606689.565	1511927.143
DS-5I	607478.034	1517300.319
DS-5S	607472.622	1517301.149
DS-6S	618187.188	1538267.209
DUNE-1S	565597.22	1654529.305
DUNE-1I	565600.288	1654524.604
DUNE-1D	565603.645	1654518.148
DUNE-2D	617651.842	1571357.347
DUNE-2I	617647.958	1571362.708
DUNE-2S	617644.022	1571367.488
DUNE-3S	615039.142	1575440.361
DUNE-4S	635674.225	1545203.455
DUNE-5S	633642.311	1549318.58
DUNE-5I	633646.749	1549311.608
DUNE-6S	635731.302	1541647.686
DUNE-6I	635730.751	1541642.813
DUNE-6D	635729.264	1541634.675
MARSH-1D	548909.542	1632066.595
MARSH-1I	548915.961	1632071.242
MARSH-1S	548919.566	1632073.57
MARSH-2S	567796.577	1609694.81
MARSH-3I	573244.011	1578966.49
MARSH-3S	573239.764	1578963.367
MARSH-4I	615540.472	1574061.608
MARSH-4S	615544.648	1574058.185

Table C-2. (cont.).

Well-id	X	Y
MARSH-5D	609001.289	1546419.353
MARSH-5I	608997.001	1546412.271
MARSH-5S	608991.484	1546405.833
MARSH-6S	587027.914	1559758.35
WEST-1S	591237.926	1571748.326
WEST-1I	591237.757	1571756.899
WEST-1D	591237.878	1571767.006
WEST-2S	596021.685	1537228.254
WEST-3D	604369.208	1529239.382
WEST-3I	604362.077	1529240.914
WEST-3S	604355.962	1529242.8
WEST-4D	598699.436	1509308.247
WEST-4I	598701.648	1509316.207
WEST-4S	598708.437	1509320.18
WEST-5I	594113.653	1559022.89
WEST-5S	594106.243	1559021.928
WEST-6S	588926.112	1585998.041

Table C-3. Minimum, maximum, mean, and standard deviation for each parameter analyzed for groundwater samples designated as Class G-II. Class G-II groundwater classification is defined as groundwater with total dissolved solids <10,000 mg/L. ND = non-detect.

		Class G-II N=41			
Parameter	Units	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)					
4,4' –DDD	µg/L	ND	ND	ND	ND
4,4' –DDE	µg/L	ND	ND	ND	ND
4,4' –DDT	µg/L	ND	ND	ND	ND
Aldrin	µg/L	ND	ND	ND	ND
Alpha – BHC	µg/L	ND	ND	ND	ND
Beta – BHC	µg/L	ND	ND	ND	ND
Chlordane (alpha)	µg/L	ND	ND	ND	ND
Chlordane (gamma)	µg/L	ND	ND	ND	ND
Chlordane (total)	µg/L	ND	ND	ND	ND
Delta – BHC	µg/L	ND	ND	ND	ND
Dieldrin	µg/L	ND	ND	ND	ND
Endosulfan I	µg/L	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	ND	ND	ND	ND
Endrin	µg/L	ND	ND	ND	ND
Endrin Aldehyde	µg/L	ND	ND	ND	ND
Endrin Ketone	µg/L	ND	ND	ND	ND
Gamma - BHC (Lindane)	µg/L	ND	ND	ND	ND
Heptachlor	µg/L	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	ND	ND	ND	ND
Isodrin	µg/L	ND	ND	ND	ND

Table C-3. (cont.).

Parameter	Units	Class G-II N=41 Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081) (cont.)					
Methoxychlor	µg/L	ND	ND	ND	ND
Mirex	µg/L	ND	ND	ND	ND
Toxaphene	µg/L	ND	ND	ND	ND
Aroclors (8082)					
PCB - 1016/1242	µg/L	ND	ND	ND	ND
PCB – 1221	µg/L	ND	ND	ND	ND
PCB – 1232	µg/L	ND	ND	ND	ND
PCB – 1248	µg/L	ND	ND	ND	ND
PCB – 1254	µg/L	ND	ND	ND	ND
PCB – 1260	µg/L	ND	ND	ND	ND
Chlorinated Herbicides (8151)					
2-(2,4,5 – Trichlorophenoxy) propionic acid (2,4,5 - TP) Silvex	µg/L	ND	ND	ND	ND
2,4,5 - Triclorophenoxy acetic acid (2,4,5 – T)	µg/L	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 – D)	µg/L	ND	ND	ND	ND
3,5 – DCBA	µg/L	ND	ND	ND	ND
4 - (2,4 - Dichlorophenoxy) butyric acid (2,4 – DB)	µg/L	ND	ND	ND	ND
4 – Nitrophenol	µg/L	ND	ND	ND	ND
Acifluorfen	µg/L	ND	ND	ND	ND
Bentazon	µg/L	ND	ND	ND	ND
Chloramben	µg/L	ND	ND	ND	ND
Dacthal	µg/L	ND	ND	ND	ND
Dalapon	µg/L	ND	ND	ND	ND
Dicambia	µg/L	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	ND	ND	ND	ND
Dinoseb	µg/L	ND	ND	ND	ND
MCPA	µg/L	ND	ND	ND	ND

Table C-3. (cont.).

Parameter	Units	Class G-II N=41 Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)					
MCPP	μg/L	ND	ND	ND	ND
Pentachlorophenol	μg/L	ND	ND	ND	ND
Picloram	μg/L	ND	ND	ND	ND
PAHs (8310)					
1 – Methylnapthalene	μg/L	ND	ND	ND	ND
2 – Methylnapthalene	μg/L	ND	ND	ND	ND
Acenaphthene	μg/L	ND	ND	ND	ND
Acenapththylene	μg/L	ND	ND	ND	ND
Anthracene	μg/L	ND	ND	ND	ND
Benzo(a)anthracene	μg/L	0.03	0.16	0.035	0.021
Benzo(a)pyrene	μg/L	0.025	0.14	0.0301	0.0197
Benzo(b)fluoranthene	μg/L	0.05	0.17	0.054	0.019
Benzo(g,h,i)perylene	μg/L	ND	ND	ND	ND
Benzo(k)fluoranthene	μg/L	0.025	0.1	0.0272	0.0117
Chrysene	μg/L	0.025	0.17	0.0298	0.0231
Dibenz(a,h)anthracene	μg/L	ND	ND	ND	ND
Fluoranthene	μg/L	0.05	0.66	0.067	0.096
Fluorene	μg/L	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	μg/L	0.025	0.09	0.0270	0.0102
Napthalene	μg/L	ND	ND	ND	ND
Phenanthrene	μg/L	ND	ND	ND	ND
Pyrene	μg/L	ND	ND	ND	ND
Metals					
Aluminum	mg/L	0.025	1.3	0.1841	0.3172
Antimony	mg/L	0.0025	0.005	0.00256	0.00039
Arsenic	mg/L	0.005	0.096	0.0125	0.0205

Table C-3. (cont.).

Parameter	Units	Class G-II N=41 Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)					
Barium	mg/L	0.05	0.05	0.05	0
Beryllium	mg/L	0.0005	0.003	0.00056	0.00039
Cadmium	mg/L	0.0005	0.009	0.00077	0.00134
Calcium	mg/L	0.3	670	168.77	164.43
Chromium	mg/L	0.005	0.019	0.0058	0.0030
Chloride	mg/L	5	4700	911.1	1330.7
Cobalt	mg/L	ND	ND	ND	ND
Copper	mg/L	0.025	0.28	0.0312	0.0398
Iron	mg/L	0.025	2.7	0.8418	0.8376
Lead	mg/L	0.0025	0.028	0.00372	0.00545
Magnesium	mg/L	0.25	210	47.647	53.811
Manganese	mg/L	0.005	0.26	0.0454	0.0620
Mercury	mg/L	ND	ND	ND	ND
Nickel	mg/L	0.005	0.031	0.0059	0.0042
Potassium	mg/L	0.25	120	12.467	20.865
Selenium	mg/L	0.005	0.027	0.0058	0.0036
Silver	mg/L	0.005	0.005	0.005	0
Sodium	mg/L	4.1	3400	508.95	713.19
Thallium	mg/L	0.001	0.003	0.0012	0.0006
Vanadium	mg/L	0.005	0.013	0.0056	0.0020
Zinc	mg/L	0.05	0.23	0.054	0.028

Table C-3. (cont.).

Parameter	Units	Class G-II N=41 Minimum	Maximum	Mean	Std. Deviation
Other Parameters					
Dissolved oxygen (N=36)	mg/L	0.04	4.33	1.65	1.20
Hydrogen ion (N=36)		8.91251E-09	3.89045E-4	1.24032E-05	6.49072E-05
Specific conductivity (N=36)	umhos/cm	71	10010	2866.3	2934.7
Temperature (N=36)	Celcius	22.9	27.9	25.5	1.4
Total dissolved solids	mg/L	10	8400	2019.1	2201.8
Total organic carbon	mg/L	0.5	95	19.45	25.98

Table C-4. Minimum, maximum, mean, and standard deviations for each parameter analyzed for groundwater samples designated as Class G-III. Class G-III groundwater classification is defined as groundwater with total dissolved solids >10,000. ND = non-detect

Parameter	Units	Class G-III N=16			
		Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)					
4,4' -DDD	μg/L	ND	ND	ND	ND
4,4' -DDE	μg/L	ND	ND	ND	ND
4,4' -DDT	μg/L	ND	ND	ND	ND
Aldrin	μg/L	ND	ND	ND	ND
Alpha - BHC	μg/L	ND	ND	ND	ND
Beta - BHC	μg/L	ND	ND	ND	ND
Chlordane (alpha)	μg/L	ND	ND	ND	ND
Chlordane (gamma)	μg/L	ND	ND	ND	ND
Chlordane (total)	μg/L	ND	ND	ND	ND
Delta - BHC	μg/L	ND	ND	ND	ND
Dieldrin	μg/L	ND	ND	ND	ND
Endosulfan I	μg/L	ND	ND	ND	ND
Endosulfan II (beta)	μg/L	ND	ND	ND	ND
Endosulfan Sulfate	μg/L	ND	ND	ND	ND
Endrin	μg/L	ND	ND	ND	ND
Endrin Aldehyde	μg/L	ND	ND	ND	ND
Endrin Ketone	μg/L	ND	ND	ND	ND
Gamma - BHC (Lindane)	μg/L	ND	ND	ND	ND
Heptachlor	μg/L	ND	ND	ND	ND
Heptachlor Epoxide (a)	μg/L	ND	ND	ND	ND
Heptachlor Epoxide (b)	μg/L	ND	ND	ND	ND
Isodrin	μg/L	ND	ND	ND	ND
Methoxychlor	μg/L	ND	ND	ND	ND
Mirex	μg/L	ND	ND	ND	ND
Toxaphene	μg/L	ND	ND	ND	ND

Table C-4. (cont.).

Parameter	Units	Class G-III N=16 Minimum	Maximum	Mean	Std. Deviation
Aroclors (8082)					
PCB - 1016/1242	μg/L	ND	ND	ND	ND
PCB - 1221	μg/L	ND	ND	ND	ND
PCB - 1232	μg/L	ND	ND	ND	ND
PCB - 1248	μg/L	ND	ND	ND	ND
PCB - 1254	μg/L	ND	ND	ND	ND
PCB - 1260	μg/L	ND	ND	ND	ND
Chlorinated Herbicides (8151)					
2-(2,4,5 - Trichlorophenoxy) propionic acid (2,4,5 - TP) Silvex	μg/L	ND	ND	ND	ND
2,4,5 - Triclorophenoxy acetic acid (2,4,5 - T)	μg/L	ND	ND	ND	ND
2,4 - Dichlorophenoxy acetic acid (2,4 – D)	μg/L	ND	ND	ND	ND
3,5 - DCBA	μg/L	ND	ND	ND	ND
4 - (2,4 - Dichlorophenoxy) butyric acid (2,4 – DB)	μg/L	ND	ND	ND	ND
4 - Nitrophenol	μg/L	ND	ND	ND	ND
Acifluorfen	μg/L	ND	ND	ND	ND
Bentazon	μg/L	ND	ND	ND	ND
Chloramben	μg/L	ND	ND	ND	ND
Dacthal	μg/L	ND	ND	ND	ND
Dalapon	μg/L	ND	ND	ND	ND
Dicambia	μg/L	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	μg/L	ND	ND	ND	ND
Dinoseb	μg/L	ND	ND	ND	ND
MCPA	μg/L	ND	ND	ND	ND
MCPP	μg/L	ND	ND	ND	ND
Pentachlorophenol	μg/L	ND	ND	ND	ND
Picloram	μg/L	ND	ND	ND	ND

Table C-4. (cont.).

Parameter	Units	Class G-III N=16			
		Minimum	Maximum	Mean	Std. Deviation
PAHs (8310)					
1 – Methylnapthalene	µg/L	ND	ND	ND	ND
2 – Methylnapthalene	µg/L	ND	ND	ND	ND
Acenaphthene	µg/L	ND	ND	ND	ND
Acenapththylene	µg/L	ND	ND	ND	ND
Anthracene	µg/L	ND	ND	ND	ND
Benzo(a)anthracene	µg/L	0.03	0.13	0.036	0.025
Benzo(a)pyrene	µg/L	0.025	0.06	0.0272	0.0088
Benzo(b)fluoranthene	µg/L	0.05	0.05	0.05	0
Benzo(g,h,i)perylene	µg/L	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/L	0.025	0.07	0.0294	0.0125
Chrysene	µg/L	0.025	0.18	0.0347	0.0388
Dibenz(a,h)anthracene	µg/L	ND	ND	ND	ND
Fluoranthene	µg/L	0.05	0.05	0.05	0
Fluorene	µg/L	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/L	0.025	0.1	0.0297	0.0188
Napthalene	µg/L	ND	ND	ND	ND
Phenanthrene	µg/L	ND	ND	ND	ND
Pyrene	µg/L	ND	ND	ND	ND
Metals					
Aluminum	mg/L	0.025	0.28	0.1053	0.0686
Antimony	mg/L	0.0025	0.012	0.00566	0.00364
Arsenic	mg/L	0.005	0.028	0.0097	0.0076
Barium	mg/L	0.05	0.41	0.082	0.091
Beryllium	mg/L	0.0005	0.0005	0.0005	0
Cadmium	mg/L	0.0005	0.0005	0.0005	0
Calcium	mg/L	170	760	431.3	161.9

Table C-4. (cont.).

Parameter	Units	Class G-III N=16 Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)					
Chromium	mg/L	0.005	0.005	0.005	0
Chloride	mg/L	3300	31000	13856.3	8010.9
Cobalt	mg/L	ND	ND	ND	ND
Copper	mg/L	0.009	0.1	0.0295	0.0195
Iron	mg/L	0.025	10	1.9978	2.9587
Lead	mg/L	0.0025	0.013	0.00456	0.00320
Magnesium	mg/L	390	1900	973.1	495.5
Manganese	mg/L	0.005	0.46	0.1299	0.1422
Mercury	mg/L	ND	ND	ND	ND
Nickel	mg/L	0.005	0.01	0.0056	0.0017
Potassium	mg/L	90	540	285.9	161.6
Selenium	mg/L	0.005	0.05	0.0081	0.0112
Silver	mg/L	0.005	0.01	0.0053	0.0013
Sodium	mg/L	3300	15000	8206.3	3638.4
Thallium	mg/L	0.001	0.002	0.0011	0.0003
Vanadium	mg/L	0.005	0.005	0.005	0
Zinc	mg/L	0.05	0.05	0.05	0
Other Parameters					
Dissolved oxygen (N=15)	mg/L	0.09	6.08	2.22	1.88
Hydrogen ion (N=15)		1.47911E-08	7.24436E-07	1.41E-07	1.76E-07
Specific conductivity (N=15)	umhos/cm	12260	44700	27162	12253
Temperature (N=15)	Celcius	24.8	27.5	26.3	1.0
Total dissolved solids	mg/L	11000	44000	23562.5	10276.0
Total organic carbon	mg/L	0.5	55	17.47	15.64

Appendix C-5. KSC Background raw data for groundwater well locations.

	Units	DS-1S	DS-1I	DS-1D	DS-2S	DS-2I	DS-2D	DS-3S		DS-4S	DS-4I
		09/27/98	09/27/98	09/27/98	10/11/98	10/11/98	10/11/98	10/11/98		10/10/98	10/10/98
									duplicate		
Organochlorine Pesticides (8081)											
4,4' - DDD	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (total)	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	µg/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Endrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(a)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(b)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Isodrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)											
PCB-1016/1242	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-DCBA	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4 - Nitrophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bentazon	µg/L	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloramben	µg/L	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dacthal	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dalapon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MCPP	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Picloram	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations

	Units	DS-1S	DS-1I	DS-1D	DS-2S	DS-2I	DS-2D	DS-3S		DS-4S	DS-4I
		09/27/98	09/27/98	09/27/98	10/11/98	10/11/98	10/11/98	10/11/98		10/10/98	10/10/98
									duplicate		
PAH (8310)											
1 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6	<0.6
2 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6	<0.6
Acenaphthene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6	<0.6
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.56	<0.6
Benzo(a)anthracene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.07 I**	<0.06	<0.06
Benzo(a)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.08 I**	<0.06	<0.06
Benzo(b)fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11	<0.12
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11	<0.12
Benzo(k)fluoranthene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.06	<0.06
Chrysene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.06 I**	<0.06	<0.06
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11	<0.12
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.12 I**	<0.11	<0.12
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.13 I**	<0.11	<0.12
Indeno(1,2,3-cd)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.06	<0.06
Naphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6	<0.6
Phenanthrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.13 I**	<0.06	<0.06
Pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.13 I**	<0.06	<0.06
Surrogates											
2,4-DCAA	%	82	80	126	80	72	110	92	60	70	72
2,4,5,6-TCMX	%	94	75	80	120	76	104	72	72	88	73
DBC	%	88	82	83	95	66	98	86	105	101	73
p-terphenyl	%	107	75	67	103	82	87	82	66	74	78
Metals											
Aluminum	mg/L	<0.05	**0.058**	<0.05	**0.099**	<0.05	**0.096**	**0.061**	<0.05	<0.05	**0.32**
Antimony	mg/L	<0.005	<0.005	**0.011**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	**72**	**89**	**560**	**96**	**120**	**82**	**48**	**48**	**120**	**1.4**
Chromium (total)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	mg/L	**0.18**	**1.9**	**2.9**	**0.092**	**0.7**	<0.05	**0.12**	**0.11**	**1.7**	**1**
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	**3.1**	**2.7**	**730**	**2.5**	**6.2**	**2.1**	<0.5	<0.5	**7.7**	**0.99**
Manganese	mg/L	<0.01	<0.01	**0.15**	<0.01	**0.034**	<0.01	<0.01	<0.01	**0.073**	<0.01
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	**1.8**	<0.5	**94**	<0.5	**0.7**	<0.5	**1.3**	**1.3**	**1.4**	<0.5
Selenium	mg/L	**0.01 I**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/L	**12**	**22**	**5600**	**8.2**	**44**	**10**	**4.1**	**4.1**	**37**	**8.2**
Thallium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	**0.002 I**	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations

	Units	DS-4D 10/10/98	DS-5S 10/17/98	DS-5I 10/17/98	DS-6S 10/11/98	DUNE-1S 09/18/98	DUNE-1I 09/18/98	DUNE-1D 09/15/98	DUNE-2S 09/21/98	DUNE-2I 09/21/98	DUNE-2D 11/27/98
Organochlorine Pesticides (8081)											
4,4' - DDD	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (total)	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	µg/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Endrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(a)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(b)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Isodrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	µg/L	<0.05	<0.95	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)											
PCB-1016/1242	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
3,5-DCBA	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
4 - Nitrophenol	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Acifluorfen	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Bentazon	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Chloramben	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Dacthal	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Dalapon	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Dicamba	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Dinoseb	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
MCPA	µg/L	<10	<10	<50	<10	<10	<10	<10	<10	<10	<50
MCPP	µg/L	<10	<10	<50	<10	<10	<10	<10	<10	<10	<50
Pentachlorophenol	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Picloram	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5 KSC Background raw data for groundwater well locations

	Units	DS-4D 10/10/98	DS-5S 10/17/98	DS-5I 10/17/98	DS-6S 10/11/98	DUNE-1S 09/18/98	DUNE-1I 09/18/98	DUNE-1D 09/15/98	DUNE-2S 09/21/98	DUNE-2I 09/21/98	DUNE-2D 11/27/98
PAH (8310)											
1 - Methylnaphthalene	µg/L	<0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2 - Methylnaphthalene	µg/L	<0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	µg/L	<0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1
Anthracene	µg/L	<0.58	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Benzo(a)anthracene	µg/L	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/L	<0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05 I	<0.05	<0.05
Chrysene	µg/L	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	µg/L	<0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	µg/L	<0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	µg/L	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogates											
2,4-DCAA	%	92	96	82	94	82	100	40	108	100	48
2,4,5,6-TCMX	%	78	67	80	79	78	61	58	95	66	93
DBC	%	83	42	68	107	86	69	72	100	73	112
p-terphenyl	%	76	69	85	75	70	68	61	85	92	113
Metals											
Aluminum	mg/L	<0.05	0.55	0.065	1.3	0.052	0.072	0.1	0.28	0.11	<0.05
Antimony	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.01	<0.005
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01 I	0.024 I	0.028 I
Barium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	<0.001	<0.001	<0.001	0.001 I	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	120	8.6	180	<0.5	170	280	350	170	530	530
Chromium (total)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05
Iron	mg/L	0.71	0.12	1.5	0.2	<0.05	<0.05	0.089	0.22	<0.05	5.8
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007 I	0.008 I
Magnesium	mg/L	2.7	0.94	30	1	120	660	1000	420	1600	1900
Manganese	mg/L	0.015	<0.01	0.045	<0.01	<0.01	<0.01	<0.01	<0.01	0.058	0.3
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02
Potassium	mg/L	<0.5	<0.5	3.7	1.1	34	200	290	150	500	540
Selenium	mg/L	<0.01	<0.01	<0.01	0.011 I	<0.01	<0.01	<0.01	<0.01	0.01 I	<0.1
Silver	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Sodium	mg/L	14	6.2	140	20	960	5400	7500	3300	12000	15000
Thallium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations.

	Units	DUNE-3S	DUNE-4S	DUNE-5S	DUNE-5I	DUNE-5I	DUNE-6S	DUNE-6I	DUNE-6D	MARSH-1S
		09/21/98	10/09/98	10/09/98	10/09/98	10/09/98	10/08/98	10/08/98	10/08/98	09/19/98
	Units					dulpicate				
Organochlorine Pesticides (8081)										
4,4' - DDD	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (total)	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	µg/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Endrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(a)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(b)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Isodrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)										
PCB-1016/1242	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)										
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-DCBA	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4 - Nitrophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bentazon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloramben	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dacthal	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dalapon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10
MCPP	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Picloram	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations.

	Units	DUNE-3S	DUNE-4S	DUNE-5S	DUNE-5I	DUNE-5I	DUNE-6S	DUNE-6I	DUNE-6D	MARSH-1S
		09/21/98	10/09/98	10/09/98	10/09/98	10/09/98	10/08/98	10/08/98	10/08/98	09/19/98
						dulpicate				
PAH (8310)										
1 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)anthracene	µg/L	**0.13**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	**0.08 I**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	**0.07 I**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	**0.18**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	**0.1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogates										
2,4-DCAA	%	68	76	90	130	118	80	146	102	64
2,4,5,6-TCMX	%	80	106	83	92	99	55	56	63	102
DBC	%	85	104	82	98	112	98	84	76	128
p-terphenyl	%	93	98	99	70	92	91	94	90	71
Metals										
Aluminum	mg/L	**0.055**	<0.05	<0.05	**0.14**	**0.11**	**0.061**	**0.092**	<0.05	**0.063**
Antimony	mg/L	<0.01	<0.005	<0.005	**0.012**	<0.01	<0.005	<0.005	<0.005	<0.005
Arsenic	mg/L	**0.011 I**	<0.01	<0.01	**0.012 I**	<0.01	**0.055**	**0.096**	**0.029 I**	<0.01
Barium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.003 I**	<0.001	<0.001
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002 I**	**0.009**	**0.001 I**	<0.001
Calcium	mg/L	**280**	**98**	**100**	**440**	**330**	**75**	**32**	**130**	**610**
Chromium (total)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.01 I**	<0.01	<0.01
Cobalt	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	mg/L	<0.05	<0.05	<0.05	**1.9**	**1.8**	<0.05	**0.11**	**0.3**	**0.84**
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	**0.005 I**	<0.005	**0.027**	<0.005	<0.005
Magnesium	mg/L	**640**	**9.6**	**11**	**1100**	**830**	**6.2**	**48**	**210**	**160**
Manganese	mg/L	<0.01	**0.055**	<0.01	**0.15**	**0.15**	**0.042**	**0.011**	**0.037**	**0.13**
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.012**	<0.01	<0.01
Potassium	mg/L	**210**	**0.5**	**1**	**340**	**310**	<0.5	**21**	**120**	**9.5**
Selenium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.027**	<0.01	<0.01
Silver	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/L	**4700**	**23**	**65**	**8000**	**8000**	**12**	**200**	**2000**	**1700**
Thallium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**0.003**
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.013**	<0.01	<0.01
Zinc	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

I = value is between the *Method Detection Limit and the Practical Quantitation Level* * = diluted sample, - = not analyzed

Appendix C-5 KSC Background raw data for groundwater well locations.

		MARSH-1I		MARSH-1D	MARSH-2S	MARSH-3S	MARSH-3I	MARSH-4S		MARSH-4I	MARSH-5S
		09/13/98		09/19/98	09/27/98	09/24/98	09/24/98	09/22/98		09/22/98	10/06/98
	Units		duplicate						duplicate		
Organochlorine Pesticides (8081)											
4,4' - DDD	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (total)	µg/L	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1
Delta - BHC	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	µg/L	<0.09	<0.09	<0.09	<0.11	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Endrin	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(a)	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(b)	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Isodrin	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	µg/L	<0.05	<0.05	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	µg/L	<2	<2	<2	<2.5	<2	<2	<2	<2	<2	<2
Aroclors (8082)											
PCB-1016/1242	µg/L	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1
PCB-1221	µg/L	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1
PCB-1232	µg/L	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1
PCB-1248	µg/L	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1
PCB-1254	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	µg/L	<1	<1	<1	<1.2	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/L	<0.5	<0.5	<0.5	12	10	<0.5	<0.5	<0.5	<0.5	<0.56
3,5-DCBA	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
4 - Nitrophenol	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
Acifluorfen	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
Bentazon	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
Chloramben	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
Dacthal	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
Dalapon	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
Dicamba	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.60
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
Dinoseb	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
MCPA	µg/L	<10	<10	<10	<100	<100	<10	<10	<10	<10	<11
MCPP	µg/L	<10	<10	<10	<100	<100	<10	<10	<10	<10	<11
Pentachlorophenol	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56
Picloram	µg/L	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.56

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations.

	Units	MARSH-1I 09/13/98		MARSH-1D 09/19/98	MARSH-2S 09/27/98	MARSH-3S 09/24/98	MARSH-3I 09/24/98	MARSH-4S 09/22/98		MARSH-4I 09/22/98	MARSH-5S 10/06/98
			duplicate						duplicate		
PAH (8310)											
1 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)anthracene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogates											
2,4-DCAA	%	76	112	106	0	*	104	84	140	56	130
2,4,5,6-TCMX	%	75	66	84	109	66	96	86	86	78	91
DBC	%	93	81	90	90	89	99	87	77	88	76
p-terphenyl	%	117	62	61	75	73	92	86	62	88	115
Metals											
Aluminum	mg/L	**0.25**	**0.12**	**0.052**	<0.05	**0.13**	**0.091**	**1.2**	**1.1**	**0.20**	**0.42**
Antimony	mg/L	<0.005	<0.005	<0.005	**0.009**	<0.005	<0.01	<0.005	<0.005	<0.020	**0.005**
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.069**	**0.063**	<0.01	<0.01
Barium	mg/L	<0.1	<0.1	<0.1	<0.1	**0.41**	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	**580**	**580**	**670**	**260**	**240**	**760**	**9.5**	**9.6**	**550**	**160**
Chromium (total)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.019**	**0.018**	<0.01	<0.01
Cobalt	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.05	<0.05	<0.05	<0.05	**0.009 I**	**0.038**	<0.05	<0.05	<0.05	<0.05
Iron	mg/L	**1.4**	**1**	**2.4**	<0.05	<0.05	**6.1**	**0.098**	**0.073**	**3.0**	**0.16**
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	**0.008 I**	**0.009 I**	<0.005	<0.005	**0.013**	<0.005
Magnesium	mg/L	**90**	**84**	**65**	**540**	**450**	**710**	**15**	**15**	**1600**	**170**
Manganese	mg/L	**0.24**	**0.26**	**0.22**	**0.015**	**0.044**	**0.46**	<0.01	<0.01	**0.38**	**0.023**
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	**9.2**	**8.8**	**8.7**	**170**	**150**	**120**	**28**	**27**	**540**	**49**
Selenium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.01
Silver	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/L	**1300**	**3400**	**1300**	**8800**	**3800**	**7100**	**540**	**510**	**14000**	**1400**
Thallium	mg/L	**0.0021 I**	**0.003**	**0.003**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.012**	**0.011**	<0.01	<0.01
Zinc	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations

	Units	MARSH-5I 10/06/98	MARSH-5D 10/06/98	MARSH-6S 09/20/98	WEST-1S 10/07/98	WEST-1I 10/07/98	WEST-1D 01/12/98	WEST-2S 10/21/98		WEST-3S 10/16/98	WEST-3I 10/16/98
									duplicate		
Organochlorine Pesticides (8081)											
4,4' - DDD	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (total)	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	µg/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Endrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(a)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(b)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Isodrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)											
PCB-1016/1242	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
3,5-DCBA	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
4 - Nitrophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Acifluorfen	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Bentazon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Chloramben	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Dacthal	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Dalapon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Dicamba	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Dinoseb	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
MCPA	µg/L	<10	<10	<10	<10	<10	<50	<12	<12	<10	<10
MCPP	µg/L	<10	<10	<10	<10	<10	<50	<12	<12	<10	<10
Pentachlorophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5
Picloram	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.62	<0.62	<0.5	<0.5

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations.

	Units	MARSH-5I	MARSH-5D	MARSH-6S	WEST-1S	WEST-1I	WEST-1D	WEST-2S		WEST-3S	WEST-3I
		10/06/1998	10/06/1998	09/20/1998	10/07/1998	10/07/1998	01/12/1999	10/21/98		10/16/1998	10/16/1998
									duplicate		
PAH (8310)											
1 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<1.0	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5
Benzo(a)anthracene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.05 I**	**0.16**	<0.05
Benzo(a)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.07 I**	**0.14**	<0.05
Benzo(b)fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.17 I**	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.1 I**	<0.05
Chrysene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.17**	<0.05
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.66**	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.09**	<0.05
Naphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogates											
2,4-DCAA	%	92	108	60	128	100	78	122	60	114	60
2,4,5,6-TCMX	%	114	87	70	92	110	109	136	122	120	111
DBC	%	136	90	84	79	112	108	66	69	100	100
p-terphenyl	%	110	71	91	107	118	104	91	72	85	82
Metals											
Aluminum	mg/L	**0.072**	**0.08**	**0.17**	**0.25**	**0.061**	<0.05	**0.065**	**0.065**	<0.05	**0.15**
Antimony	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic	mg/L	<0.01	<0.01	**0.02 I**	<0.01	<0.01	<0.01	<0.01	<0.01	**0.01 I**	**0.021 I**
Barium	mg/L	**0.12**	<0.1	**0.13**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	**500**	**570**	**550**	**100**	**140**	<.50	**130**	**130**	**140**	**270**
Chromium (total)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	mg/L	<0.05	<0.05	**10**	**1.4**	**1.4**	<0.05	**0.062**	**0.057**	<0.05	**1.4**
Lead	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	**1500**	**1500**	**390**	**24**	**44**	<0.50	**35**	**35**	**16**	**88**
Manganese	mg/L	**0.079**	**0.062**	**0.21**	**0.017**	**0.023**	<0.010	**0.021**	**0.021**	**0.01**	**0.041**
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	**400**	**470**	**90**	**0.9**	**6.8**	<0.50	**12**	**12**	**1.3**	**40**
Selenium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/L	**11000**	**12000**	**5100**	**110**	**160**	<.50	**230**	**220**	**52**	**1200**
Thallium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.01**	<0.01
Zinc	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations.

		WEST-3D	WEST-4S	WEST-4I	WEST-4D	WEST-5S	WEST-5I		WEST-6S
		10/16/1998	10/14/1998	10/14/1998	10/14/1998	09/29/1998	09/29/98		09/27/1998
	Units							duplicate	
Organochlorine Pesticides (8081)									
4,4' - DDD	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (total)	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	µg/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Endrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(a)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide(b)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Isodrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)									
PCB-1016/1242	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	µg/L	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)									
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-DCBA	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4 - Nitrophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bentazon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloramben	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dacthal	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dalapon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	µg/L	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	<0.5
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	µg/L	<10	<10	<10	<10	<10	<10	<10	<10
MCPP	µg/L	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Picloram	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

Appendix C-5. KSC Background raw data for groundwater well locations

	Units	WEST-3D	WEST-4S	WEST-4I	WEST-4D	WEST-5S	WEST-5I		WEST-6S
		10/16/1998	10/14/1998	10/14/1998	10/14/1998	09/29/1998	09/29/98	duplicate	09/27/1998
PAH (8310)									
1 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)anthracene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogates									
2,4-DCAA	%	126	112	110	74	62	94	98	80
2,4,5,6-TCMX	%	98	115	106	94	68	131	62	80
DBC	%	81	119	96	87	79	155	60	72
o-terphenyl	%	80	98	97	102	71	110	82	70
Metals									
Aluminum	mg/L	<0.05	**0.074**	<0.05	<0.05	<0.05	<0.05	<0.05	**0.5**
Antimony	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	**330**	**100**	**190**	**190**	**160**	**180**	**180**	**250**
Chromium (total)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	**0.28**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	mg/L	**2.4**	**0.24**	**1.6**	**0.89**	**1.6**	**1.8**	**1.8**	**2.3**
Lead	mg/L	**0.028**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	**110**	**13**	**62**	**66**	**5.3**	**87**	**84**	**100**
Manganese	mg/L	**0.063**	**0.035**	**0.076**	**0.071**	**0.03**	**0.046**	**0.044**	**0.035**
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel*	mg/L	**0.031**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	**13**	**5.7**	**11**	**13**	**1.7**	**14**	**13**	**23**
Selenium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sodium	mg/L	**1100**	**100**	**660**	**720**	**25**	**400**	**380**	**940**
Thallium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	**0.002 I**	**0.002 I**	<0.002
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

I = value is between the Method Detection Limit and the Practical Quantitation Level * = diluted sample, - = not analyzed

APPENDIX D

Universal Engineering Sciences Report
for Kennedy Space Center
Background Groundwater Well Installation
(Does not include IDW tracking logs from
the report Universal submitted to NASA)

UNIVERSAL
ENGINEERING SCIENCES
Consultants in: Geotechnical Engineering • Threshold Inspection
Environmental Sciences • Construction Materials Testing

November 11, 1998

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National Aeronautics and Space Administration
NASA Mail Code JJ-D
John F. Kennedy Space Center
Kennedy Space Center, Florida 32899

Attention: Ms. Rosaly Santos-Ebaugh, Remediation Project Manager

Reference: Summary of Field Work Activities
Basic Ordering Agreement NAS10-12206(B)/DO-5
Installation of 52 Permanent Monitoring Wells
Kennedy Space Center, Florida
Report No.: 98-1124 (35789)

Dear Ms. Santos-Ebaugh:

Universal Engineering Sciences, Inc. (UES) has completed the installation of monitor wells and lithological auger borings in accordance with BOA NAS10-12206(B)/DO-5. The following data is a report of UES's field work activities as completed during August and September 1998.

PROJECT OVERVIEW

The scope of work required the installation of 51 permanent investigation monitor wells and 24 standard penetration test (SPT) borings at 24 individual sites. Based upon NASA requirements for each individual site, UES installed and developed shallow, intermediate, and/or deep monitor wells for supplementary groundwater sampling by NASA and associated agencies. Please recall that the deep well at the T-10K site was canceled, thus a total of 51 wells as opposed to the initial plan of 52 wells. During the development tasks, UES obtained turbidity data from discrete groundwater samples collected from each well at variable time intervals. UES completed the standard penetration test borings to provide a lithological profile of the subsurface conditions at each project site. Table 1 presents a summary of each project site in terms of well depths, boring depths, and final well completion.

SUMMARY DOCUMENT CONTENTS

For each individual site, UES has prepared the following representative documents:

1) A Boring Log depicting the subsurface lithology at each site.
2) A Well Completion Log depicting the construction details of each monitor well.
3) A Standard Well Development Form which outlines well development data such as turbidity, groundwater appearance, and estimated gallons removed for each monitor well.
4) A Drum Inventory Log which documents information regarding the number, type, contents, and storage location of drums containing IDW derived at each project location.

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The aforementioned documents have been separated by site location and arranged as an Exhibit for preferential access. The Exhibit contents are as follows:

EXHIBIT	GRID	STUDY LOCATION
Exhibit I:	A-1	North of Canaveral National Seashore, Parking Area 4-5
Exhibit II:	A-2	Playalinda Beach: Parking Lots 1,2,5
Exhibit III:	A-3	Playalinda Beach: Parking Lots 1,2,5
Exhibit IV:	A-4	Dunes East of LC-41
Exhibit V:	A-5	North of Corrosion Test Site (Solar Panel)
Exhibit VI:	A-6	North of Pump Station 7 Road, west of Cape Road
Exhibit VII:	B-1	North of Haulover/Shiloh, Shiloh Scrub Restoration Site
Exhibit VIII:	B-2	Happy Creek: north or south of Camera Pad
Exhibit IX:	B-3	Happy Creek: north or south of Camera Pad
Exhibit X:	B-4	Jerome Road - East of SR3, Apiary Site #67
Exhibit XI:	B-5	Ranson Road, Apiary Site #10
Exhibit XII:	B-6	Schwartz Road north along firebreak
Exhibit XIII:	C-1	PAPI Lights, Apiary Site #47
Exhibit XIV:	C-2	Schwartz Road, West of SR3
Exhibit XV:	C-3	Roberts Road, West of SR3
Exhibit XVI:	C-4	Jerome Road, West of SR3
Exhibit XVII:	C-5	Shuttle Landing Facility
Exhibit XVIII:	C-6	Dummit tower
Exhibit XIX:	D-1	Shiloh Turnbull Creek Drainage
Exhibit XX:	D-2	Shiloh 1 Impoundment
Exhibit XXI:	D-3	T-10K area near tower
Exhibit XXII:	D-4	Playalinda - Mosquito Lagoon by 1st Camera Pad
Exhibit XXIII:	D-5	Banana Creek West of SR3
Exhibit XXIV:	D-6	T-24/T-16 dike road

PERMANENT INVESTIGATION MONITOR WELLS

MONITOR WELL INSTALLATION

UES installed the monitor wells using truck-mounted drill rigs and hollow-stem auger (6.25-inch I.D.) assemblies. UES steam-cleaned and decontaminated the individual auger assemblies and associated tools prior to their use at each monitor well location. UES completed the cleaning and decontamination tasks in accordance with NASA's Program Wide Sampling and Analysis Plan (PWSAP) and UES's Florida Department of Environmental Protection (FDEP) approved Comprehensive Quality Assurance Plan (CQAP) No. 860101G. Investigation Derived Wastes (IDW) generated during UES's fieldwork were collected in steel drums: fluids generated during the decontamination and/or development process were stored in closed-head 55-gallon drums; and, soils generated during drilling were stored in open-head 55-gallon drums. The drums used for this project were selected to be in compliance with Performance Oriented Packaging Standards (POP) and 49 CFR 173.24a, 178.504, 178.509, and 178.522 regulations. Upon completion of work at each project site, all drums were appropriately labeled, positioned on spill pallets, covered, and strapped for security. As a final step, UES labeled each spill pallet.

MONITOR WELL SPECIFICATIONS AND CONSTRUCTION

The intent of the monitor well installation tasks and construction specifications was to provide low turbidity well water for sampling organic compounds and inorganic metals. To address this requirement, UES constructed the monitor wells implementing 30/65 fine sand as a filter pack medium and utilized No. 6 (0.006-inch) slotted well screen to accommodate the 30/65 fine sand. Each monitor well is constructed with standard two-inch diameter Triloc PVC casing, screen, and well points. The well screen is 10 feet in length for water table investigation wells (shallow monitor wells) and intermediate monitor wells, and the well screen is five feet in length for the deep monitor wells. The final monitor well depths for the shallow monitor wells were based on observed water table depths at the time of well installation. An approximate two-feet section of slotted screen remains above the groundwater table (where feasible) to allow for seasonal fluctuations in the water table.

UES installed a 30/65 grade silica sand filter pack in the annular space between the well screen and the borehole walls, and extended the filter pack to height approximately two feet above the top of the well screen. An additional one-half to one foot of bentonite was added to serve as an effective seal above the well screen where applicable. The remaining annular space was grouted with neat Portland Cement. Each well was protected with a flush-mounted liquid-tight protective manhole cover or a steel above grade protective sleeve.

STANDARD PENETRATION TEST BORING INSTALLATION

To assess the subsurface lithology at each project location, UES installed one standard penetration test boring (SPT) utilizing a split spoon sampler to the depth of the deepest well slated for that corresponding site; therefore, one SPT boring is representative of all wells installed at a given site. The SPT boring designation directly corresponds to an individual project site.

WELL DEVELOPMENT AND TURBIDITY ASSESSMENT

WELL DEVELOPMENT

UES's primary objective when developing a monitor well is to provide groundwater which is suitable for sample collection and laboratory analysis. Well development creates a stable, effective filter zone in the annular space of the well boring, removes particulate matter from the filter media, increases the hydraulic conductivity of the aquifer surrounding the well filter pack, and reduces the turbidity of groundwater infiltrating the well screen.

UES developed each monitor well installed for DO-5 using a hydraulic powered rotary pump and 1.25-inch tremie pipe equipped with a foot valve. The monitor wells were developed prior to final completion of the upper well sections (cement grout, concrete pad, protective measures).

TURBIDITY ASSESSMENT

To assess the turbidity of the groundwater being removed from each monitor well, UES utilized a HF Scientific, Incorporated, DRT-15CE Turbidimeter. The DRT-15CE operates through three sensitivity ranges: 0 - 10 nephelometric turbidity units (NTUs), 0 - 100 NTUs, and 0 - 1,000 NTUs. The referenced turbidimeter functions via the Nephelometric method where the intensity of light scattered by the groundwater sample is compared to the intensity of light scattered by a calibrated reference sample. UES utilized a 0.02 NTU reference sample to calibrate the DRT-15CE device at each monitor well location.

UES developed each monitor well until a DRT-15CE response of approximately 20 NTUs or less was achieved. When groundwater samples are to be analyzed for chlorinated solvent compounds and inorganic metals, the FDEP Waste Cleanup Section suggests that groundwater wells be developed until a turbidity level of 20 NTUs or less is obtained.

TURBIDITY ASSESSMENT - COMMENTARY

Six monitor wells, DuneSwale-IW-4S (B-4), DuneSwale-IW-5S (B-5), DuneSwale-IW-6S (B-6), Western-IW-1S and 1I (C-1), and Western-IW-6S (C-6), presented development complications based on the lithological formations present in the screened interval (see Boring Logs). The fine sand and silty conditions surrounding the well screens resulted in turbid effluent groundwater during the initial development period.

CONCLUSIONS

UES recommends that all investigation monitor wells associated with this report be purged prior to sampling with a peristaltic pump; this technique will limit the disturbance within the well screen and may assist in limiting turbidity conditions sometimes initiated by purging. Groundwater samples slated to be analyzed for inorganic metals should be collected using a peristaltic pump, as well.

UES appreciates this opportunity to offer environmental consulting services to the National Aeronautics and Space Administration, and we are looking forward to our continued association. Please contact either of the undersigned should you have questions.

Respectfully submitted,
Universal Engineering Sciences, Inc.

Melissa A. Albright

Melissa A. Albright
Project Geologist

Ronald V Sanzi

Ronald V. Sanzi
NASA Contract Manager

MAA/RVS:tlk
Attachments: Exhibit I through Exhibit XXIV

TABLE 1
Summary of Site Work and Estimated Units
NASA DO-5

NO.	SUBSYSTEM & SITE NAME	MAP GRID	RIG / BUG TRK TRAK BCAR	WELL FOOTAGE SHAL	WELL FOOTAGE INT	WELL FOOTAGE DEEP	TOTAL FOOT.	SPT FOOTAGE	WELL PROTECTION MAN	WELL PROTECTION AGP	BOLLARDS	IDW DRUMS LIQUIDS	IDW DRUMS SOLID	SPILL PALLETS & STRAPS SP	SPILL PALLETS & STRAPS STR
	A. Dune Subsystem														
1	North end of Canaveral National Seashore, Parking Area 4-5.			15	35	50	100	50	3	0	9	7	10	5	5
2	North of KSC Security Zone/Playalinda Beach: all three - several choices in disturbed areas near Parking Lots 1,2,5.			15	35	50	100	50	3	0	9	7	10	5	5
3	North of KSC Security Zone/Playalinda Beach: shallow - several choices in disturbed areas near Parking Lots 1,2,5.			15	0	0	15	15	1	0	3	2	2	1	1
4	Dunes East of LC41.			15	0	0	15	15	1	0	3	2	2	1	1
5	North of Corrosion Test (Solar Panel) site East of Road along dune ridge.			15	35	0	50	35	2	0	6	4	5	2	2
6	North of Pump Station 7 Road, west of Cape Road.			15	35	50	100	50	3	0	9	7	10	5	5
	B. Dune-Swale Subsystem														
1	North of Haulover/Shiloh, Shiloh Scrub Restoration Site.			15	35	50	100	50	3	0	9	7	10	5	5
2	Happy Creek: north or south of Camera Pad.			15	35	50	100	50	3	0	9	7	10	5	5
3	Happy Creek: north or south of Camera Pad.			15	0	0	15	15	1	0	3	2	2	1	1
4	Southern Ridge Jerome Road - E of SR3, Apiary Site #67.			15	35	50	100	50	0	3	9	7	10	5	5
5	Ranson Road: E of SR3, Apiary Site #10.			15	35	0	50	35	2	0	9	4	5	2	2
6	Schwartz Road north along firebreak.			15	0	0	15	15	1	0	3	2	2	1	1
	C. Western Plain Subsystem														
1	West of SR3, road to PAPI Lights, Apiary Site #47.			15	35	50	100	50	0	3	9	7	10	5	5

TABLE 1
Summary of Site Work and Estimated Units
NASA DO-5

NO.	SUBSYSTEM & SITE NAME	MAP GRID	RIG / BUG TRK TRAK BCAR	WELL FOOTAGE			TOTAL FOOT.	SPT FOOTAGE	WELL PROTECTION		BOLLARDS	IDW DRUMS		SPILL PALLETS & STRAPS	
				SHAL	INT	DEEP			MAN	AGP		LIQUIDS	SOLID	SP	STR
2	Schwartz Road, West of SR3, South side, road along ditch, some cutting required.			15	0	0	15	15	0	1	3	2	2	1	1
3	Roberts Road, West of SR3, South side.			15	35	50	100	50	0	3	9	7	10	5	5
4	Jerome Road, West of SR3, South side.			15	35	50	100	50	0	3	9	7	10	5	5
5	West side of SLF near tower.			15	35	0	50	35	2	0	6	4	5	2	2
6	West of SR3, North of SR406, near Dummit tower.			15	0	0	15	15	1	0	3	2	2	1	1
	D. Marsh Subsystem														
1	Shiloh Turnbull Creek Drainage, Road West of SR3, South of US1.			15	35	50	100	50	0	3	9	7	10	5	5
2	Shiloh 1 Impoundment.			15	0	0	15	15	0	1	3	2	2	1	1
3	T-10K area near tower: all three			15	35	~~50~~	100	50	0	3	9	7	10	5	5
4	Playalinda - Mosquito Lagoon by 1st Camera Pad.			15	35	0	50	35	0	2	6	4	5	5	5
5	Banana Creek West of SR3.			15	35	50	100	50	3	0	9	7	10	5	5
6	T-24/T-16 dike road.			15	0	0	15	15	0	1	3	2	2	1	1
	Tabulation Of Units														
	DRILLING UNIT REQUIREMENTS			360	560	550	1,470	810	29	23	159	118	156	79	79

EXHIBIT I

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

REPORT NO.
PAGE B-2

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: A-1 SHEET: 1 of 1
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 0.0
DATE OF READING: 08/21/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/21/98
DATE FINISHED: 8/21/98
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0				▼		Tan SAND; with shell [SP]						
						Loose, SHELL; with trace of fine sand						
5	X	2-3-4	7									
	X	4-4-4	8									
	X	4-4-6	10									
10	X	4-5-7	12			— medium dense						
15	X	8-11-13	24									
20	X	8-8-12	20									
25	X	7-11-17	28									
30	X	25-28-33	61			Dense, tan fine SAND; with shell [SP]						
35	X	14-21-18	39									
40	X	16-16-22	38									
45	X	20-25-27	52									
50	X	5-4-7	11			Loose, tan SHELL; with sand						
						BORING TERMINATED AT 50 FEET						
55												

UNIVERSAL ENGINEERING SCIENCES **WELL COMPLETION LOG**	PROJECT NO.: 15467-005-01 REPORT NO.: PAGE:

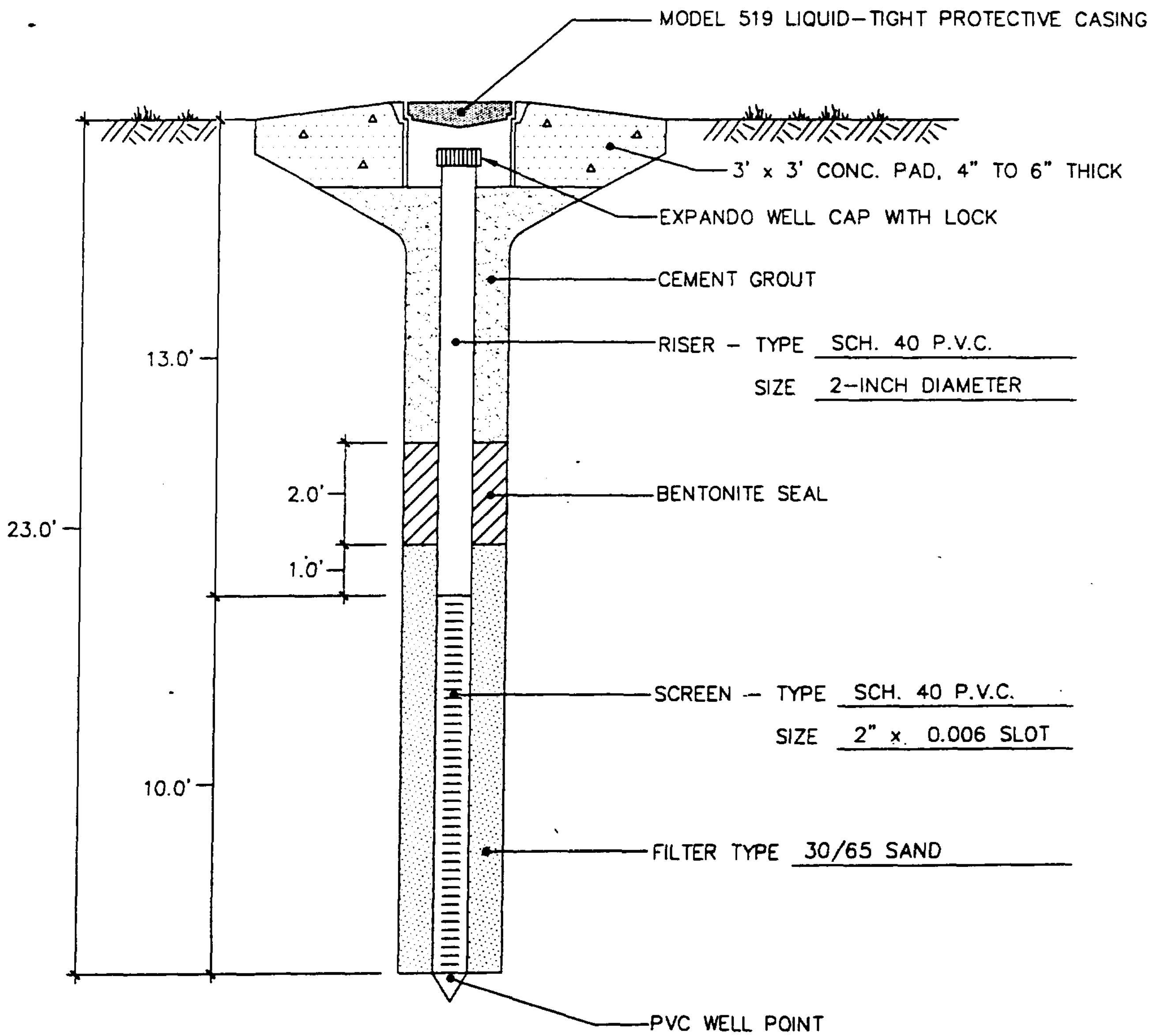
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/26/98

WELL NUMBER: DUNE-IW-1S LOCATION: A-1

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

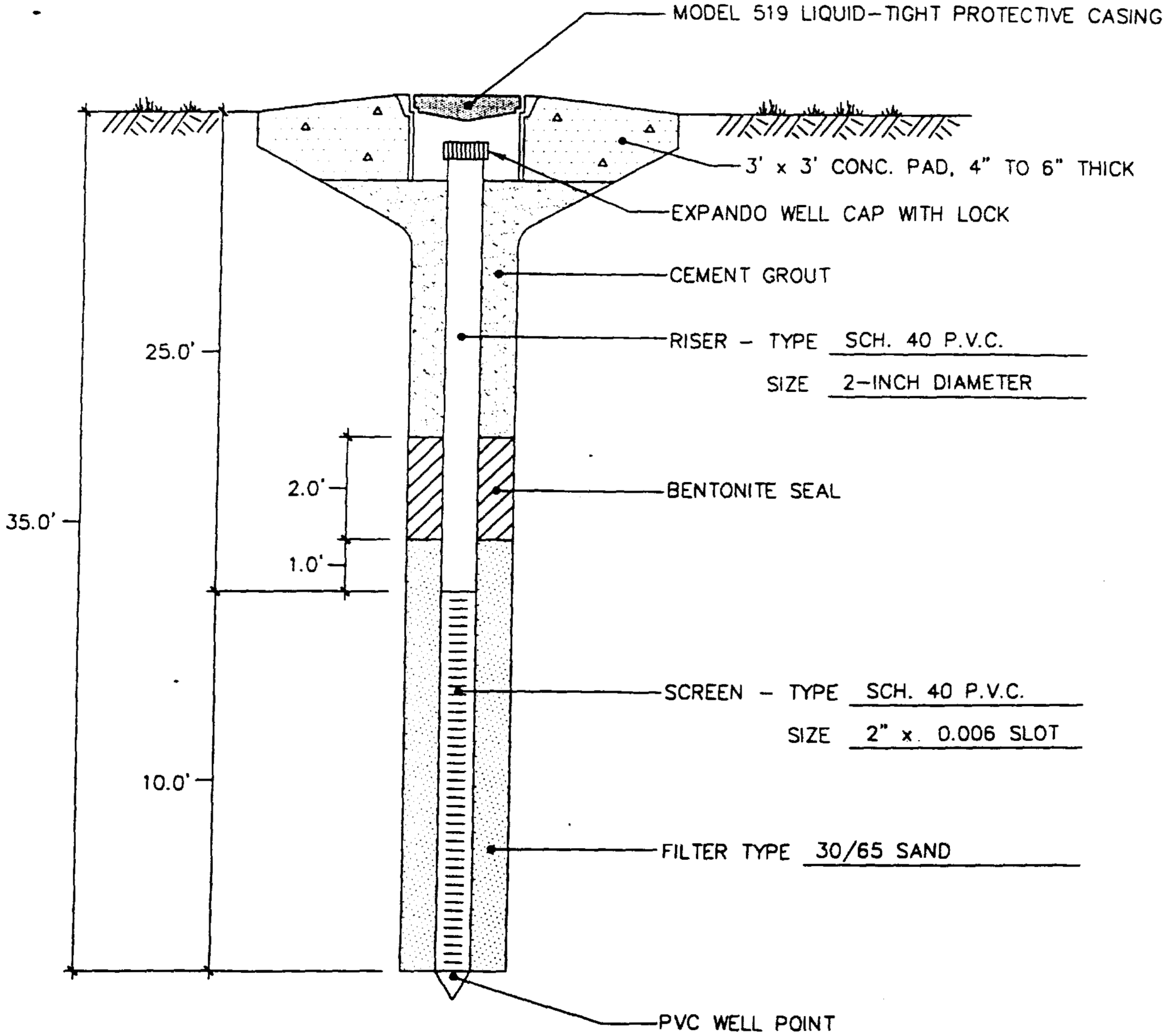
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D
DATE: 08/26/98

WELL NUMBER: DUNE-IW-11
LOCATION: A-1

INSTALLED BY: UES – DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES **WELL COMPLETION LOG**	PROJECT NO.: 18467-005-01 REPORT NO.: PAGE:

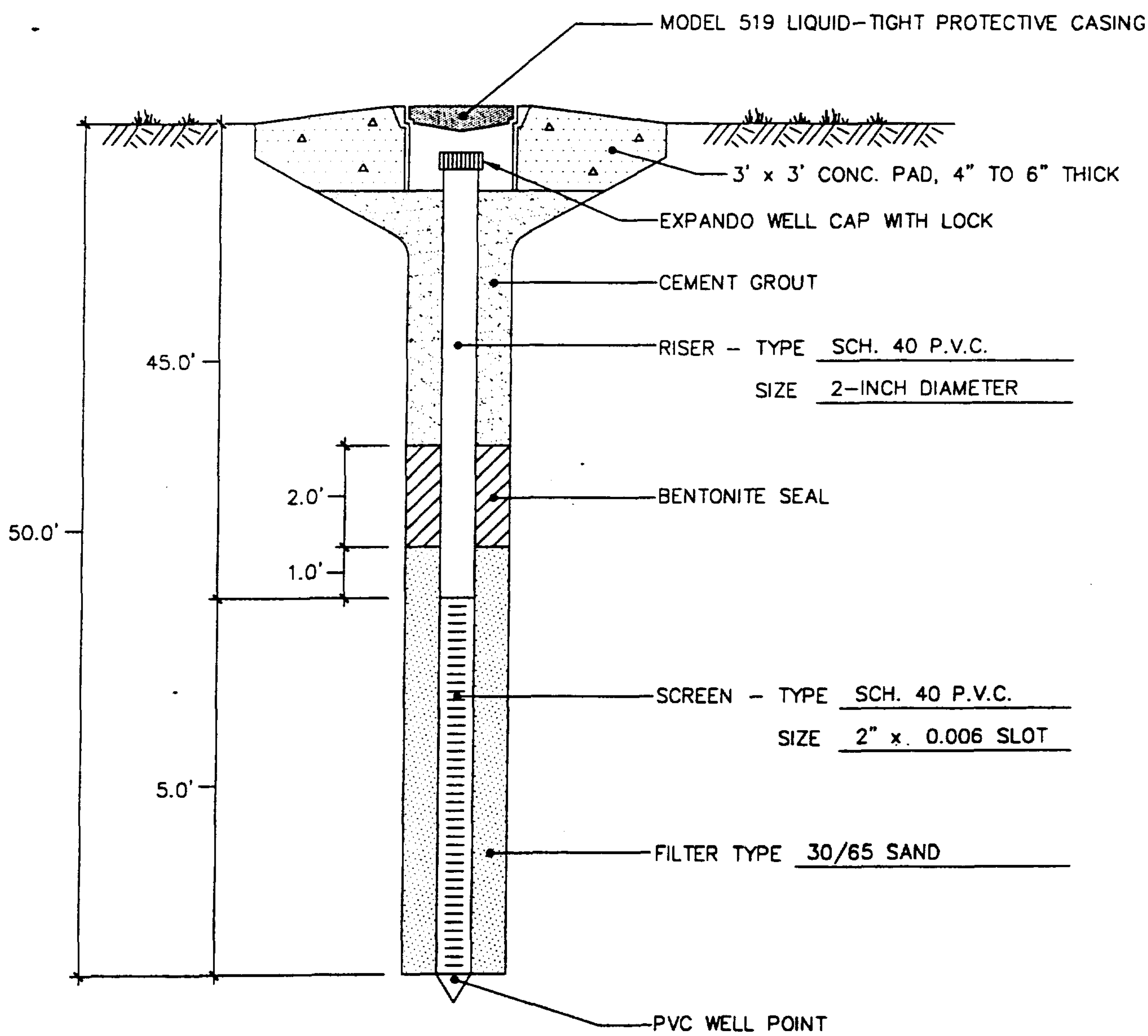
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D   DATE: 08/27/98

WELL NUMBER: DUNE-IW-1D   LOCATION: A-1

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-1	**Client Phone:**	(407) 867-4121
Date:	8-26-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-1S	**Total Depth:**	23.0'
Screen Interval:	13.0 to 23.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
1:40 p.m.	200+	Murky
	87.3	Murky
	51.2	Cloudy
	37.5	Clearer
	15.53	Clear
1:55 p.m.	11.15	Clear

Total Development Time:	15 minutes
Final Turbidity Reading:	11.15 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-1	**Client Phone:**	(407) 867-4121
Date:	8-26-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-1I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
2:45 p.m.	200+	Murky
	185.3	Murky
	76.9	Cloudy
	37.2	Cloudy
	29.9	Clearer
	21.3	Clear
3:10 p.m.	8.9	Clear

Total Development Time:	25 minutes
Final Turbidity Reading:	8.9 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: **Reference:**	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	**Client Name:** **Department:**	NASA JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-1	**Client Phone:**	(407) 867-4121
Date:	8-27-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-1D	**Total Depth:**	50.0' bls
Screen Interval:	45.0 to 50.0'	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
1:20 p.m.	200+	
	137.3	
	82.4	
	54.6	
1:35 p.m.	14.23	

Total Development Time:	15 minutes
Final Turbidity Reading:	14.23 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	**SOIL SCREENING RESULTS (OVA-PID):**

EXHIBIT II

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.	[illegible]
REPORT NO.	
PAGE	B-2.2

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

CLIENT: NASA JJ-D

LOCATION: AS SPECIFIED BY CLIENT

REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

BORING DESIGNATION: **A-2** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):
WATER TABLE (ft): 5.6
DATE OF READING: 08/07/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/7/98
DATE FINISHED: 8/7/98
DRILLED BY: UES - D.B.
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./ DAY)	ORG. CONT. (%)
0						Gray-brown fine SAND [SP]						
5	X	4-5-7	12	▼		--- gray dark gray						
	X	5-6-6	12			--- gray						
	X	4-8-9	17			Medium dense, light brown fine SAND; with shell [SP]						
						--- loose						
10	X	3-4-3	7			Dark gray fine SAND; with shell [SP-SM]						
15	X	2-3-4	7			--- dark gray sand; with silt						
						Medium dense, gray SHELL; and sand trace silt						
20	X	9-10-15	25									
25	X	12-21-23	44									
						Dense, dark gray fine SAND; shell; trace silt [SP]						
30	X	14-17-17	34									
						--- dark gray sand; trace shell						
35	X	11-14-15	29			~~--- medium dense, with trace of shell and silt~~						
						Medium dense, dark gray fine SAND; with silt [SP-SM]						
40	X	7-8-8	16									
						Loose, dark gray SHELL; with some sand and silt						
45	X	3-4-4	8									
						Dense, dark gray fine SAND; trace silt and shell fragments [SP]						
50	X	12-15-17	32									
						BORING TERMINATED AT 50 FEET						
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

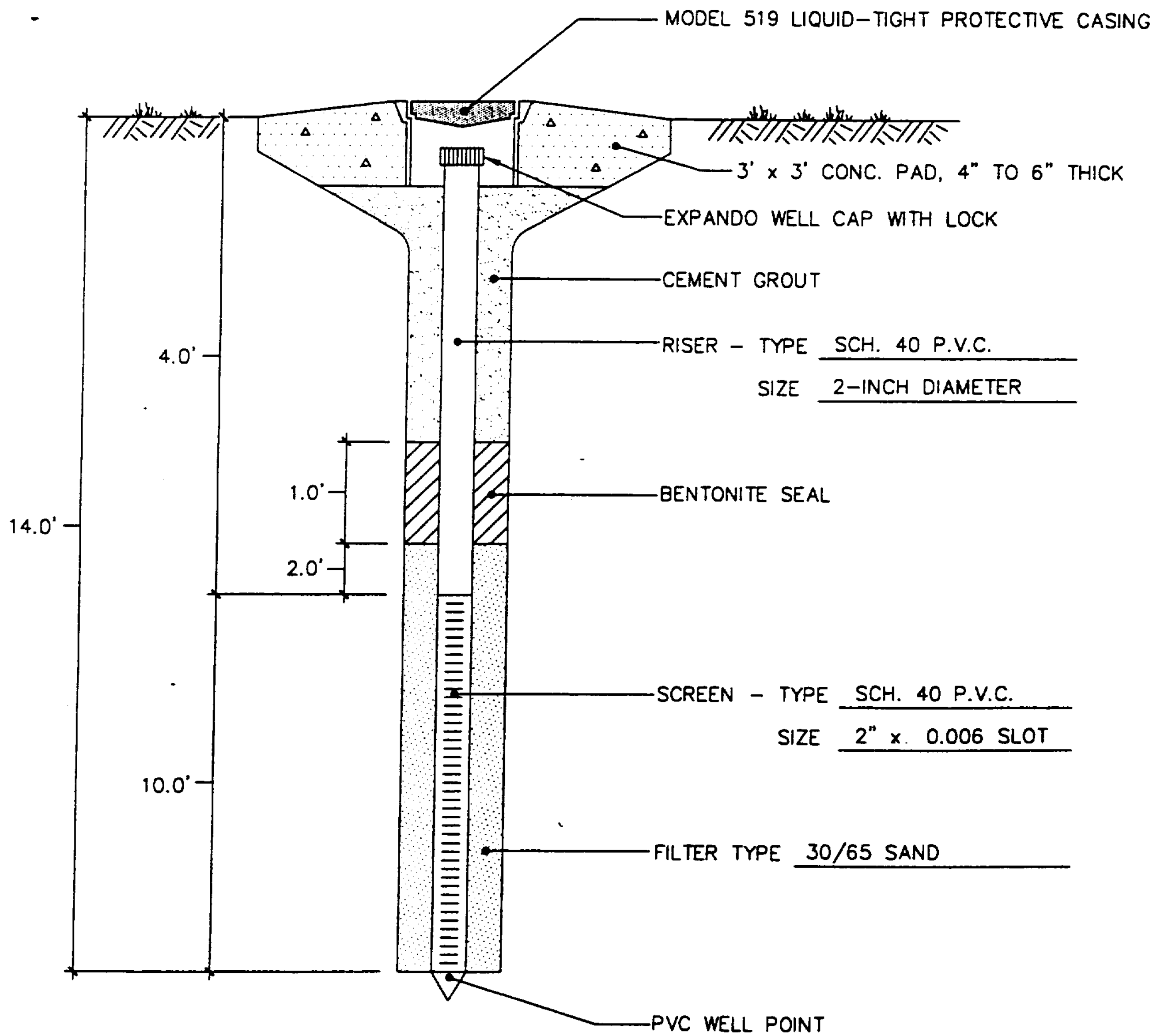
DATE: 08/13/98

WELL NUMBER: DUNE-IW-2S

LOCATION: A-2

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

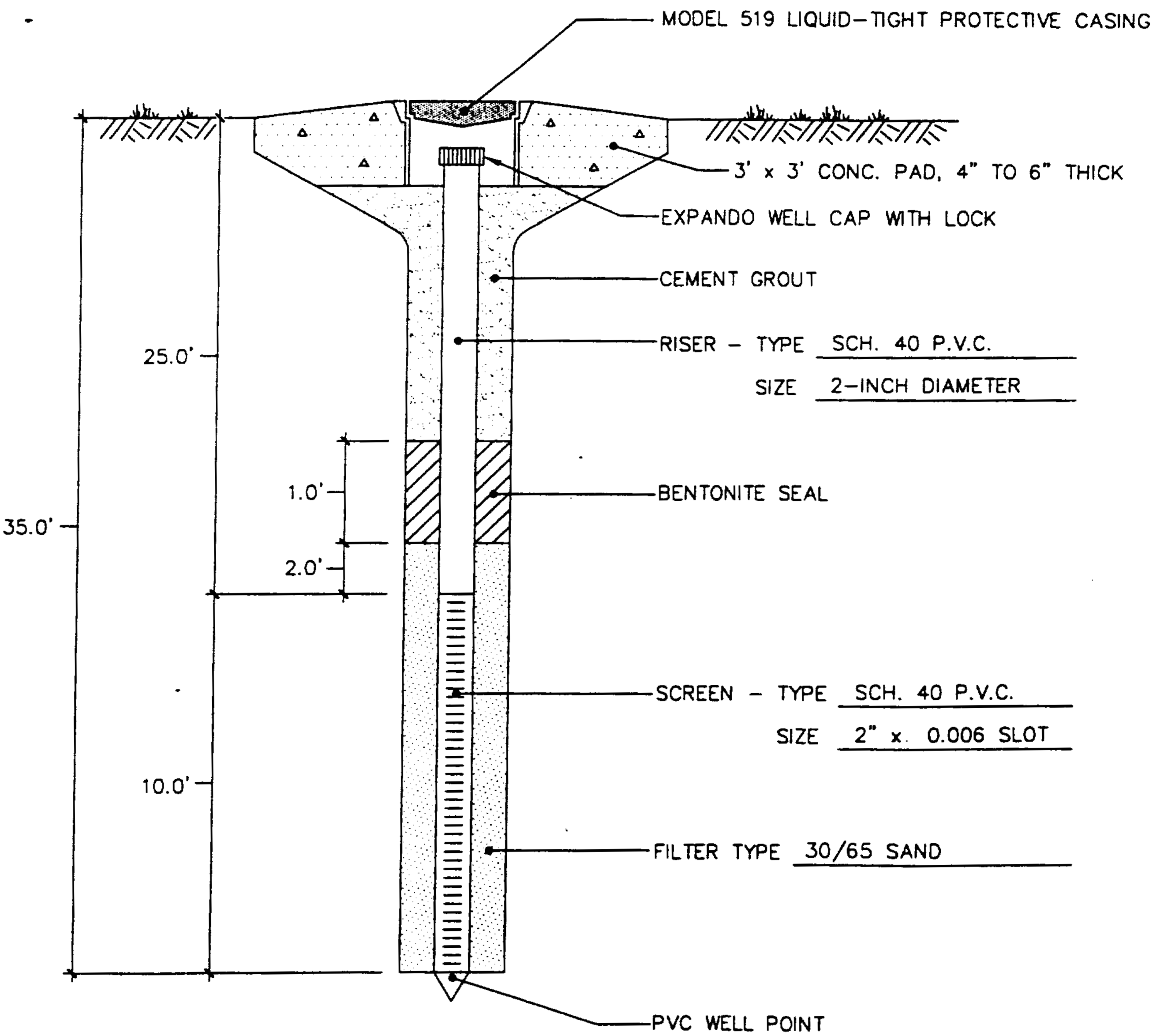
DATE: 08/13/98

WELL NUMBER: DUNE-IW-21

LOCATION: A-2

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

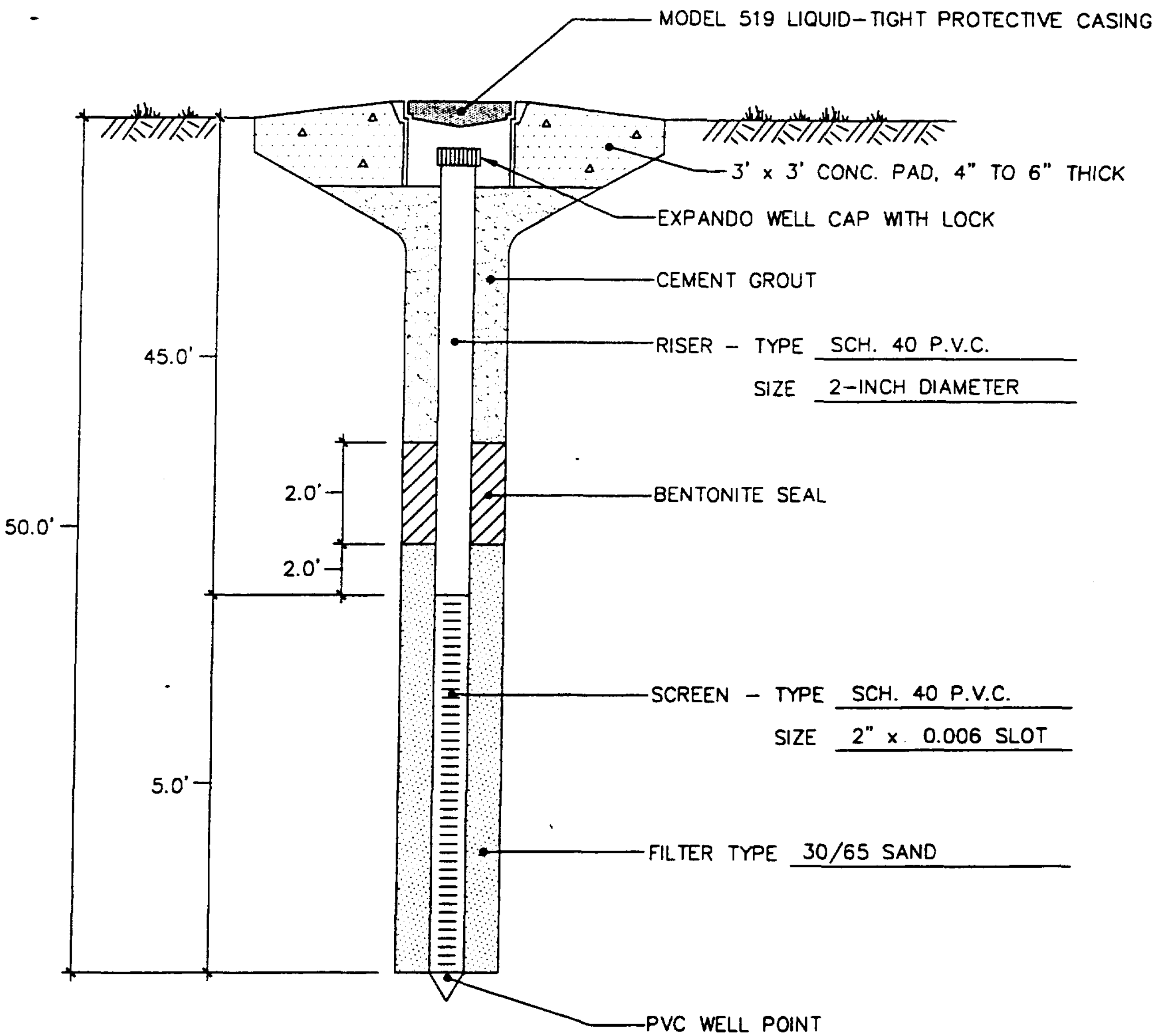
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/10/98

WELL NUMBER: DUNE-IW-2D LOCATION: A-2

INSTALLED BY: UES - ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-2	**Client Phone:**	(407) 867-4121
Date:	8-14-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-2S	**Total Depth:**	14.0' bls
Screen Interval:	4.0 to 14.0'	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
7:35 a.m.	200+	Murky/Cloudy
	137.6	Cloudy
	83.4	Clearer
	39.7	Clear
7:55 a.m.	10.1	Very clear

Total Development Time:	20 minutes
Final Turbidity Reading:	10.1 NTUs
Estimated Volume Removed:	50 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-2	**Client Phone:**	(407) 867-4121
Date:	8-13-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-2I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:**	Permanent
		Construction:	2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
2:20 p.m.	200+	Murky/Cloudy
	135.7	
	85.6	
	42.3	Clearer
2:35 p.m.	18.0	Clear

Total Development Time:	15 minutes
Final Turbidity Reading:	18.0 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-2	**Client Phone:**	(407) 867-4121
Date:	8-10-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-2D	**Total Depth:**	50.0'
Screen Interval:	45.0 to 50.0' bls	**Well Type:**	Permanent
		Construction:	2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
11:59 a.m.	1,000+	
12:04 p.m.	418	
12:10 p.m.	61	
12:18 p.m.	10.6	

Total Development Time:	19 minutes
Final Turbidity Reading:	10.6 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT III

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO	13467-005-01
REPORT NO	
PAGE	B-2.3

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **A-3**   SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 5.8
DATE OF READING: 08/07/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/7/98
DATE FINISHED: 8/7/98
DRILLED BY: UES - D.B.
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT./ DAY)	ORG. CONT. (%)
									LL	PI		
0						Light brown fine SAND [SP]						
						--- brown						
5	X	4-5-7	12			Medium dense, light brown-brown fine SAND; trace shell						
	X	4-4-6	10	▼		Loose, brown fine SAND; with shell [SP]						
	X	3-4-2	6									
	X	2-2-5	7			--- tan						
10						Medium dense, dark gray fine SAND; with silt [SP-SM]						
15	X	3-5-8	13			--- no silt						
						BORING TERMINATED AT 15 FEET						
20												
25												
30												
35												
40												
45												
50												
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

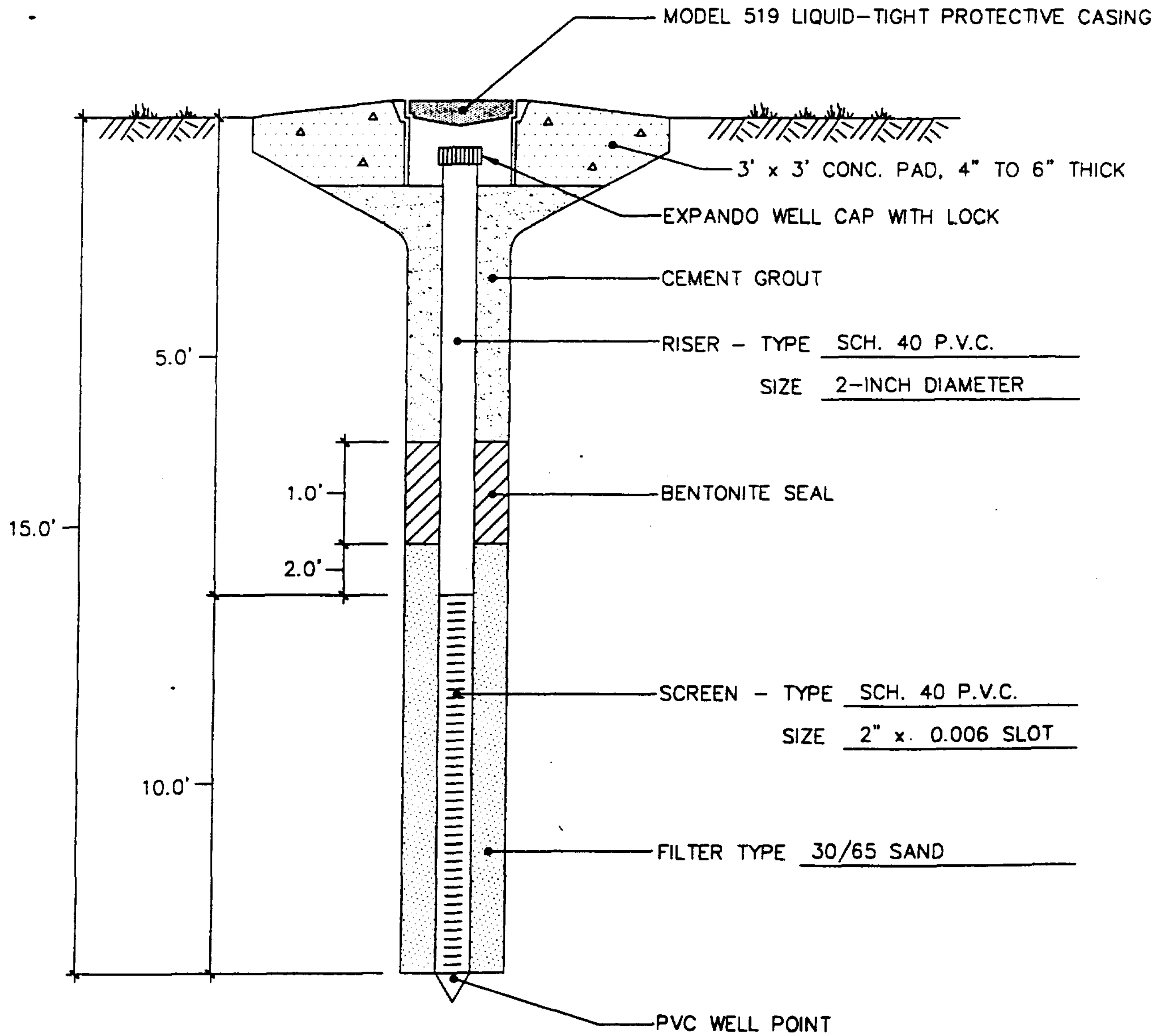
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/10/98

WELL NUMBER: DUNE-IW-3S LOCATION: A-3

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-3	**Client Phone:**	(407) 867-4121
Date:	8-10-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-3S	**Total Depth:**	15.0'
Screen Interval:	5.0 to 15.0' bls	**Well Type:**	Permanent
		Construction:	2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:00 a.m.	200+	Murky/Cloudy
9:04 a.m.	86.5	Cloudy
9:09 a.m.	43.1	Cloudy/Milky
9:12 a.m.	28.7	Clearer
9:15 a.m.	11.3	Clear

Total Development Time:	15 minutes
Final Turbidity Reading:	11.3 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT IV

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.	18467-005-01
REPORT NO.	
PAGE	B-2.4

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **A-4** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 9.0
DATE OF READING: 08/24/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/24/98
DATE FINISHED: 8/24/98
DRILLED BY: UES - ROCKLEDGE
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Light brown fine SAND; with shell [SP]						
5	X	2-2-2	4			— very loose						
	X	4-6-7	13			— medium dense						
	X	7-7-7	14	▼								
	X	6-7-10	17									
10						Dense, light brown fine SAND [SP]						
15	X	12-18-21	39									
						BORING TERMINATED AT 15 FEET						
20												
25												
30												
35												
40												
45												
50												
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

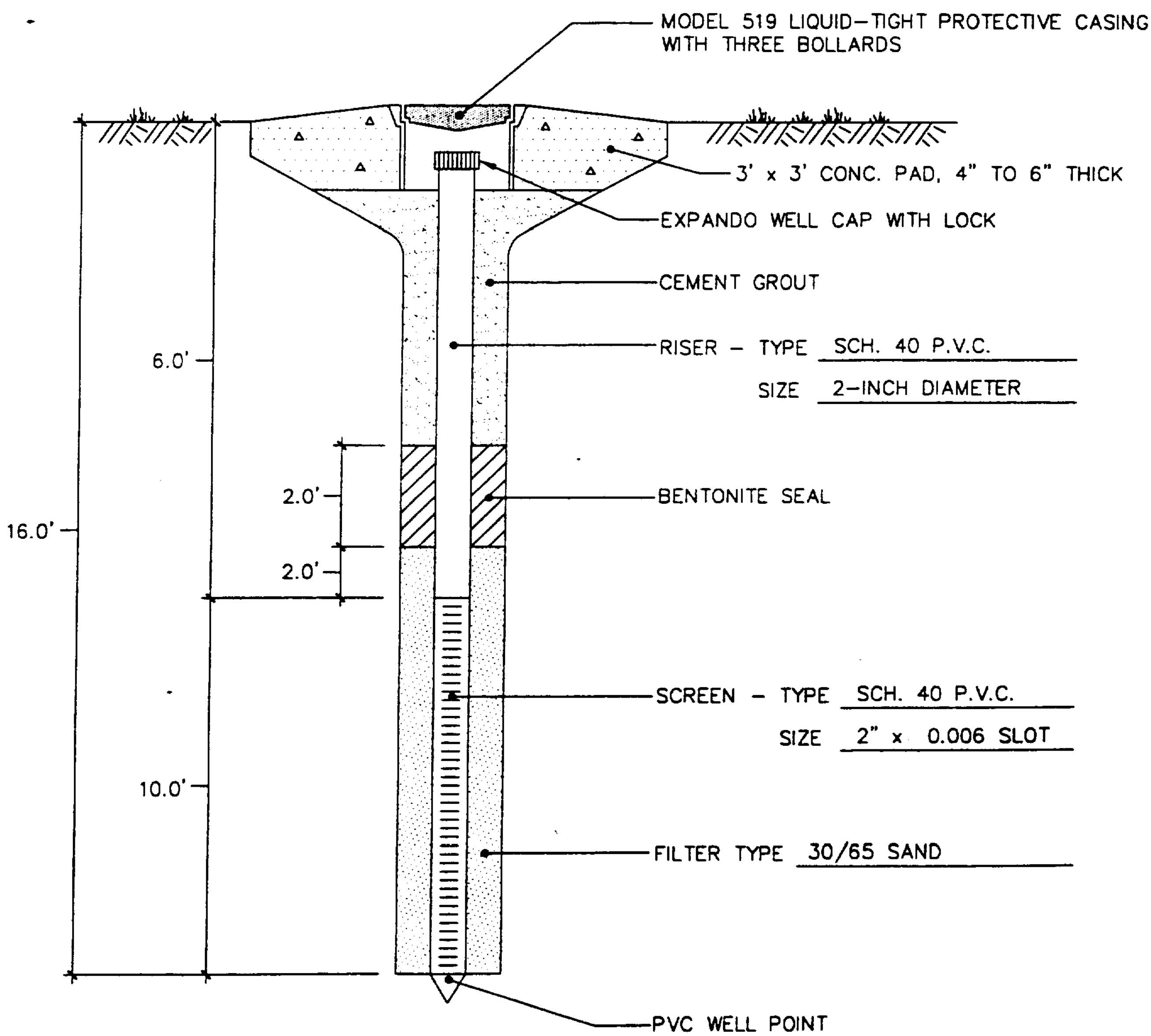
DATE: 09/01/98

WELL NUMBER: DUNE-IW-4S

LOCATION: A-4

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-4	**Client Phone:**	(407) 867-4121
Date:	9-1-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-4S	**Total Depth:**	16.0'
Screen Interval:	6.0 to 16.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
12:40 p.m.	2.3	Clear
1:10 p.m.	2.4	

Total Development Time:	30 minutes
Final Turbidity Reading:	2.4 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT V

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO 18467-005-01
REPORT NO
PAGE B-2.5

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **A-5** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 8.0
DATE OF READING: 08/24/98
EST. W.S.W.T. (ft):
DATE STARTED: 8/24/98
DATE FINISHED: 8/24/98
DRILLED BY: UES - ROCKLEDGE
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Light brown fine SAND; with shell [SP]						
5	X	2-4-5	9			--- loose						
	X	4-5-5	10									
	X	5-6-7	13	▼		--- medium dense						
10	X	6-10-11	21									
15	X	16-20-34	54			--- very dense						
20	X	14-29-36	65									
25	X	15-19-27	46			--- dense						
						Dense, gray fine SAND [SP]						
30	X	8-15-20	35									
35	X					BORING TERMINATED AT 35 FEET						
40												
45												
50												
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 15467-005-01	
REPORT NO.:	
PAGE:	

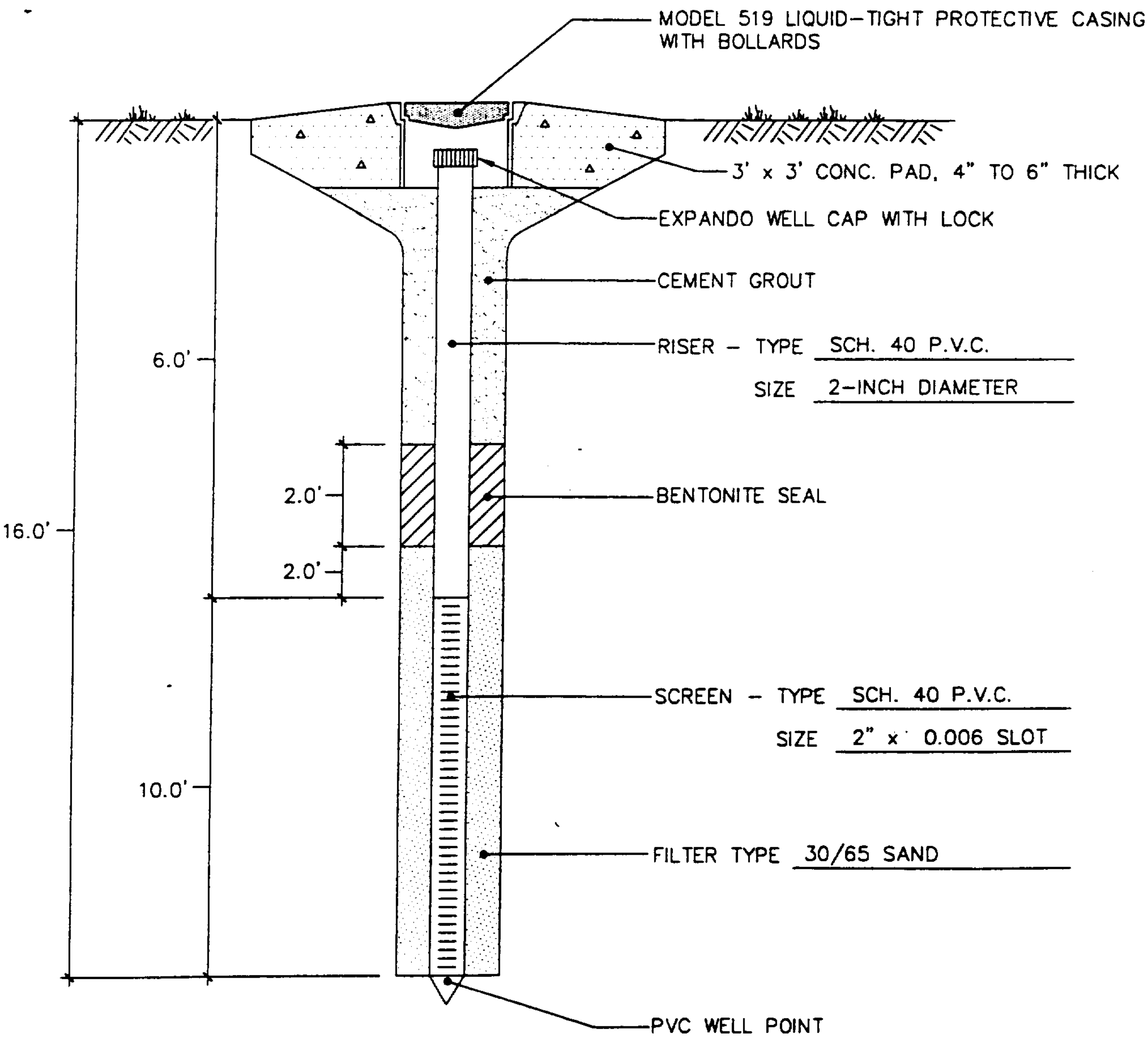
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 09/02/98

WELL NUMBER: DUNE-IW-5S LOCATION: A-5

INSTALLED BY: UES – ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

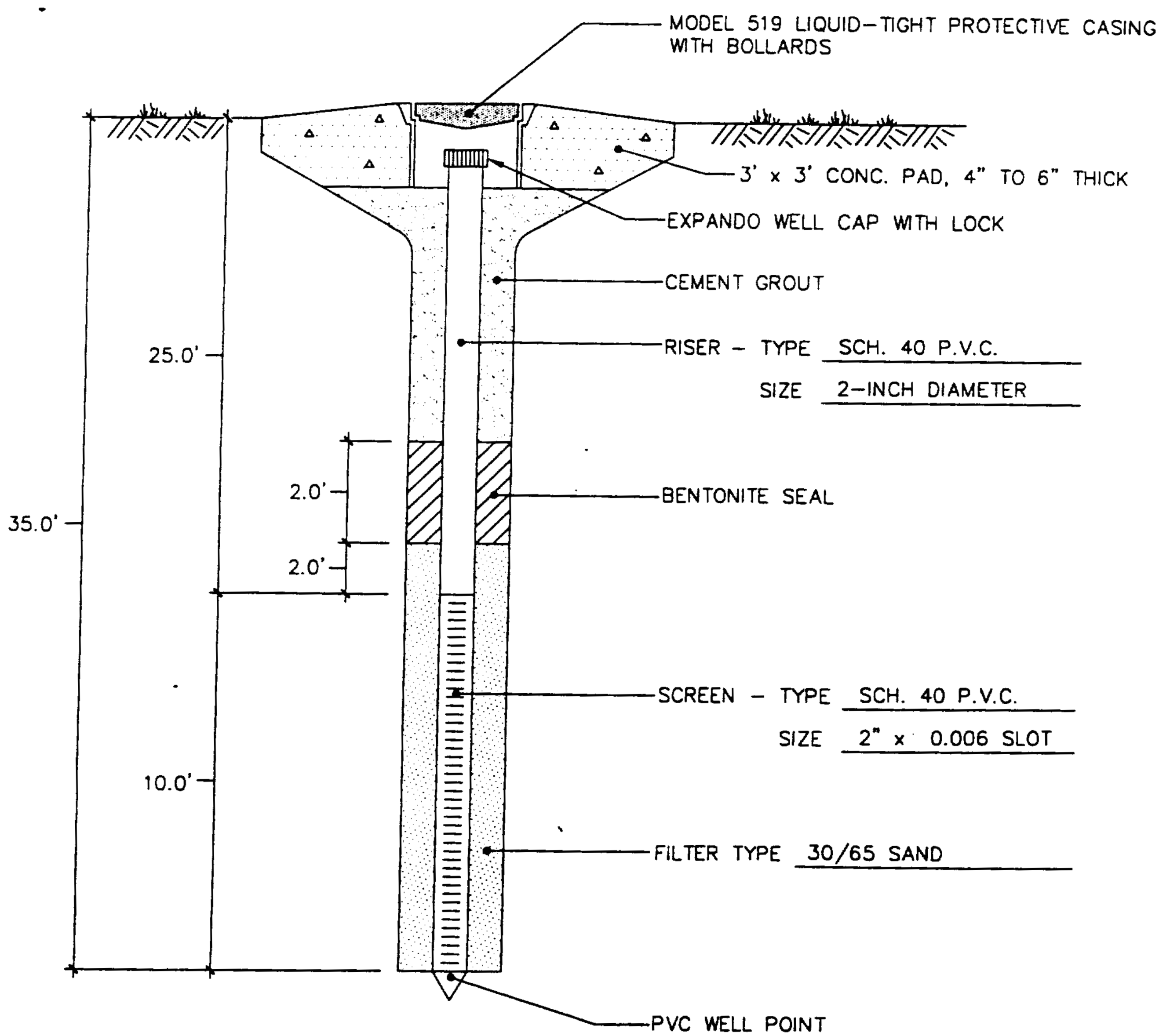
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D   DATE: 09/02/98

WELL NUMBER: DUNE-IW-51   LOCATION: A-5

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: **Reference:**	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	**Client Name:** **Department:**	NASA JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-5	**Client Phone:**	(407) 867-4121
Date:	9-2-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-5S	**Total Depth:**	16.0'
Screen Interval:	6.0 to 16.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
8:50 a.m.	60	
9:20 a.m.	22	

Total Development Time:	30 minutes
Final Turbidity Reading:	22 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-5	**Client Phone:**	(407) 867-4121
Date:	9-2-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-5I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
12:15 p.m.	128	
12:25 p.m.	110	
12:30 p.m.	83	
12:40 p.m.	48	
12:45 p.m.	18	

Total Development Time:	30 minutes
Final Turbidity Reading:	18 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT VI

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.	13457-005-01
REPORT NO.	
PAGE	B-2.6

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: A-6 SHEET: 1 of 1
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 8.0
DATE OF READING: 08/24/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/24/98
DATE FINISHED: 8/24/98
DRILLED BY: UES - ROCKLEDGE
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Light brown fine SAND; with shell [SP]						
5	X	7-8-11	19			— medium dense						
	X	14-15-12	27			Medium dense, dark brown fine SAND; with silt [SP-SM]						
	X	8-11-13	24	▼		Medium dense, light brown fine SAND [SP]						
	X	9-12-15	27									
10						— with shell						
15	X	10-13-37	50									
						Dense, gray fine SAND [SP]						
20	X	15-22-33	55			— very dense						
25	X	15-17-23	40			— dense						
						Dense, gray fine SAND [SP]						
30	X	18-24-25	49									
35	X	11-9-11	20			— medium dense						
						Very loose, gray silt fine SAND; with clay and trace of shell [SM-SC]						
40	X	1-1-1	2									
						Loose, gray silt fine SAND; with shell [SM]						
45	X	2-3-4	7									
						Medium dense, gray fine SAND; with shell [SP]						
50	X	6-6-5	11			BORING TERMINATED AT 50 FEET						
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO. 18467-005-01
REPORT NO.:
PAGE:

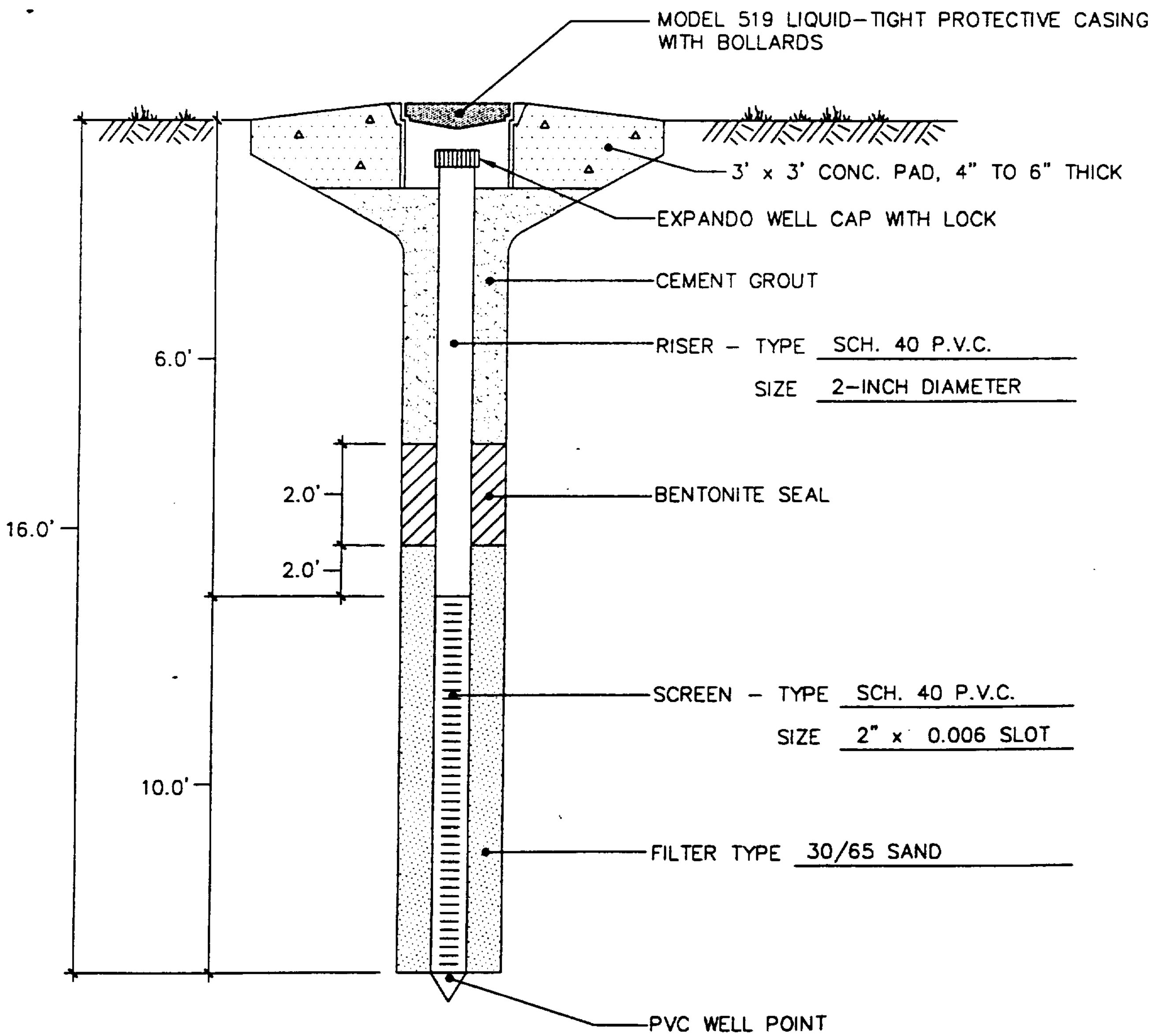
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/28/98

WELL NUMBER: DUNE-IW-6S LOCATION: A-6

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

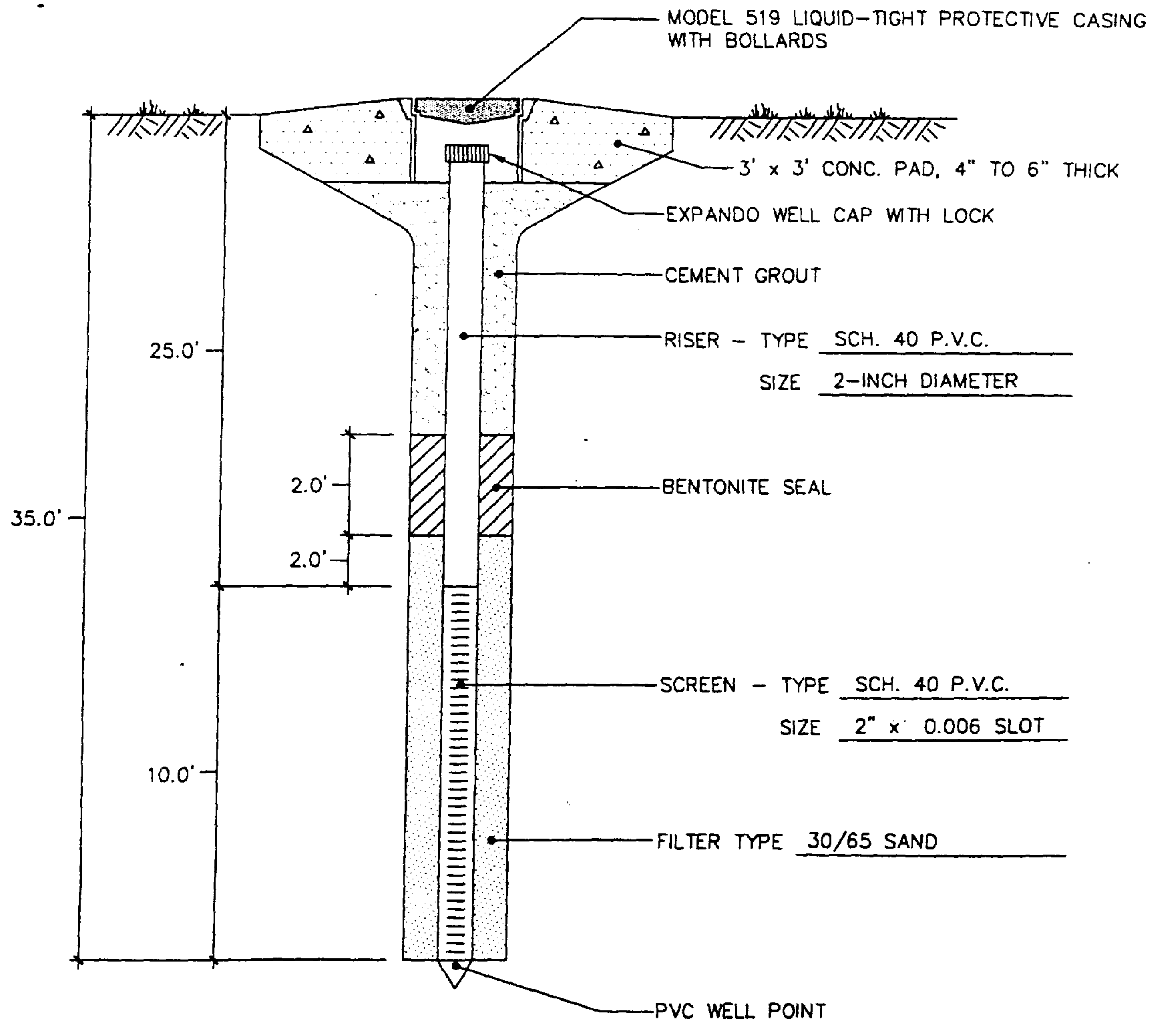
DATE: 08/28/98

WELL NUMBER: DUNE-IW-61

LOCATION: A-6

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

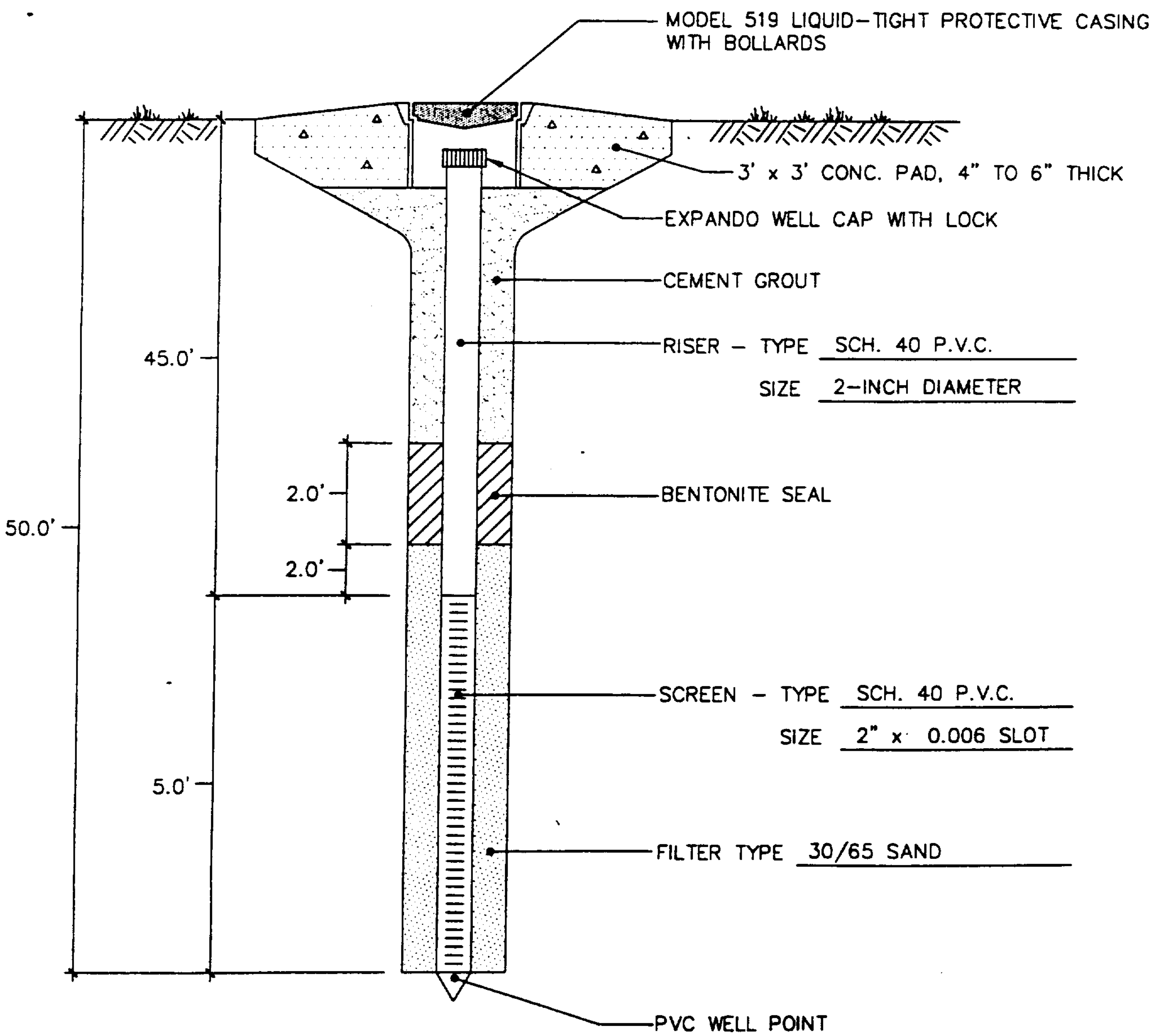
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D   DATE: 08/28/98

WELL NUMBER: DUNE-IW-6D   LOCATION: A-6

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-6	**Client Phone:**	(407) 867-4121
Date:	9-1-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-6S	**Total Depth:**	16.0'
Screen Interval:	6.0 to 16.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
8:45 a.m.	42.7	Clear
9:15 a.m.	2.7	

Total Development Time:	30 minutes
Final Turbidity Reading:	2.7 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-6	**Client Phone:**	(407) 867-4121
Date:	9-1-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-6I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** / **Construction:**	Permanent / 2" PVC Riser / 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
8:30 a.m.	380	Clear
8:50 a.m.	75	
9:15 a.m.	19	

Total Development Time:	45 minutes
Final Turbidity Reading:	19 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	A-6	**Client Phone:**	(407) 867-4121
Date:	8-31-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Dune-IW-6D	**Total Depth:**	50.0'
Screen Interval:	45.0 to 50.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:00 a.m.	180	
9:05 a.m.	60	
9:30 a.m.	11	

Total Development Time:	30 minutes
Final Turbidity Reading:	11 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT VII

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO. 18467-005-01
REPORT NO.
PAGE: B-2.7

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **B-1** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 7.3
DATE OF READING: 08/03/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/3/98
DATE FINISHED: 8/3/98
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./ DAY)	ORG. CONT. (%)
0						Very loose, orange fine SAND [SP]						
	X	2-2-2	4									
	X	3-2-3	5			--- loose						
5	X	5-2-3	5									
	X	5-4-4	8	▼								
	X	4-4-4	8			Loose, light gray brown fine SAND [SP]						
10	X	4-2-10	12									
15	X	9-11-11	22			Medium dense, light gray green silty shelly fine SAND [SM]						
20	X	9-9-9	18									
25	X	18-24-16	40			Dense, light gray to white silty cemented SAND; with shell [SM]						
30	X	7-8-7	15			Medium dense, light gray green silty shelly fine SAND [SM]						
35	X	14-24-16	40			Dense, light gray fine SAND; with shell [SP]						
40	X	0-1-1	2			Very loose, green silty fine SAND [SM]						
45	X	1-2-1	3			Soft, dark green gray CLAY [CH]						
50	X	3-3-3	6			Loose, gray fine SAND; with shells and dark gray silt [SP]						
						BORING TERMINATED AT 50 FEET						
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.:	18467-005-01
REPORT NO.:	
PAGE:	

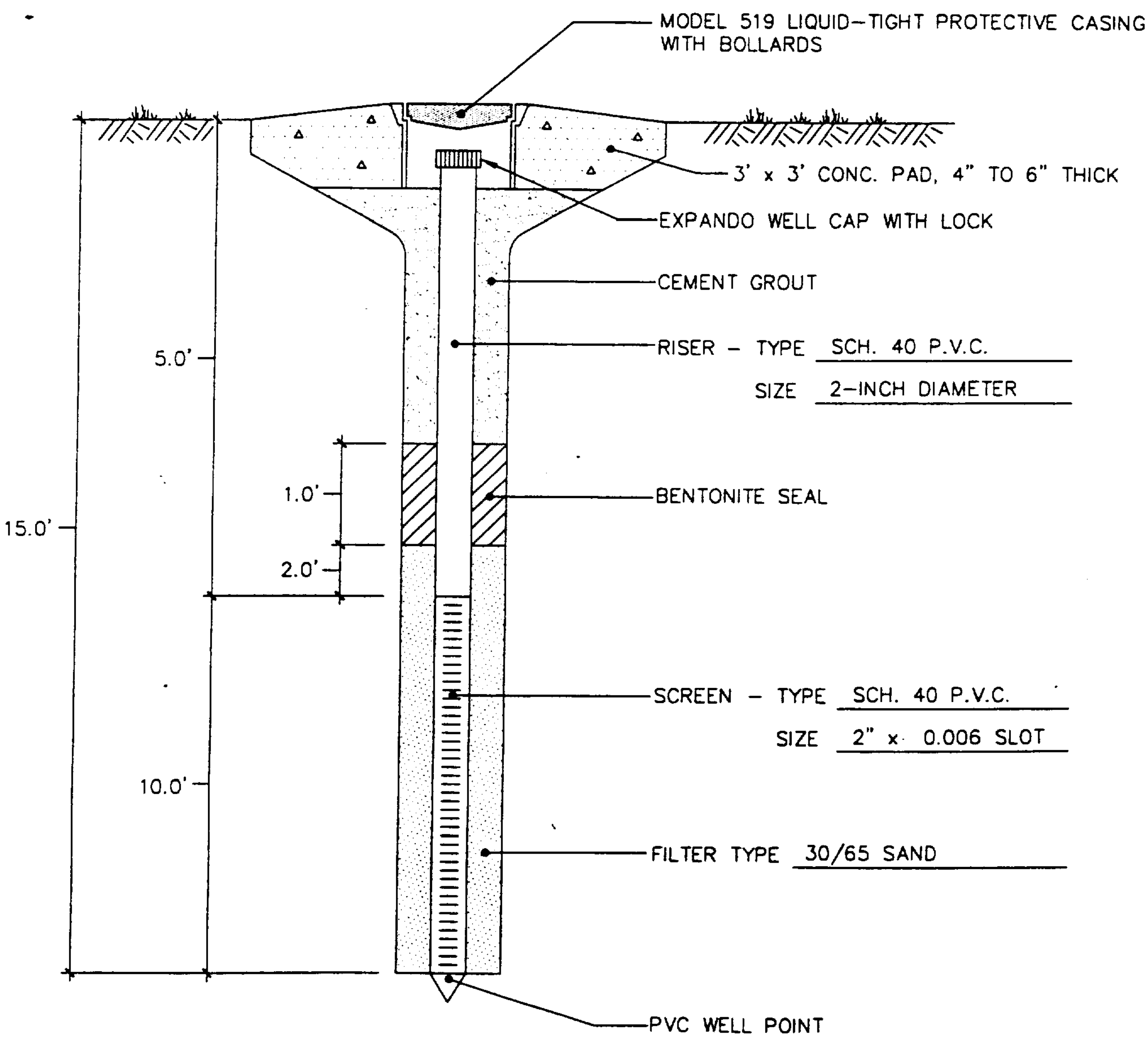
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/05/98

WELL NUMBER: DUNESWALE-IW-1S LOCATION: B-1

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

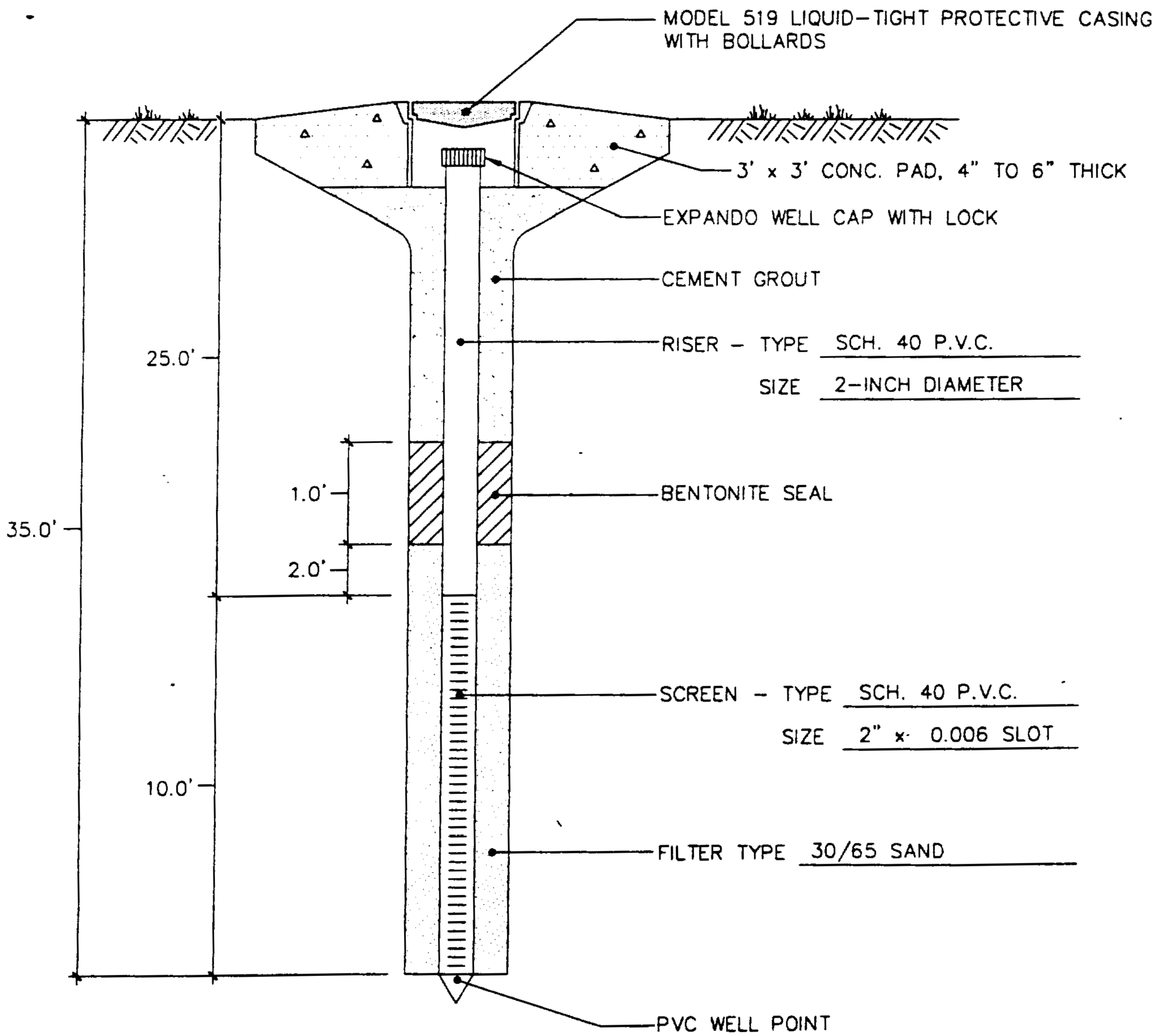
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/05/98

WELL NUMBER: DUNESWALE-IW-11 LOCATION: B-1

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

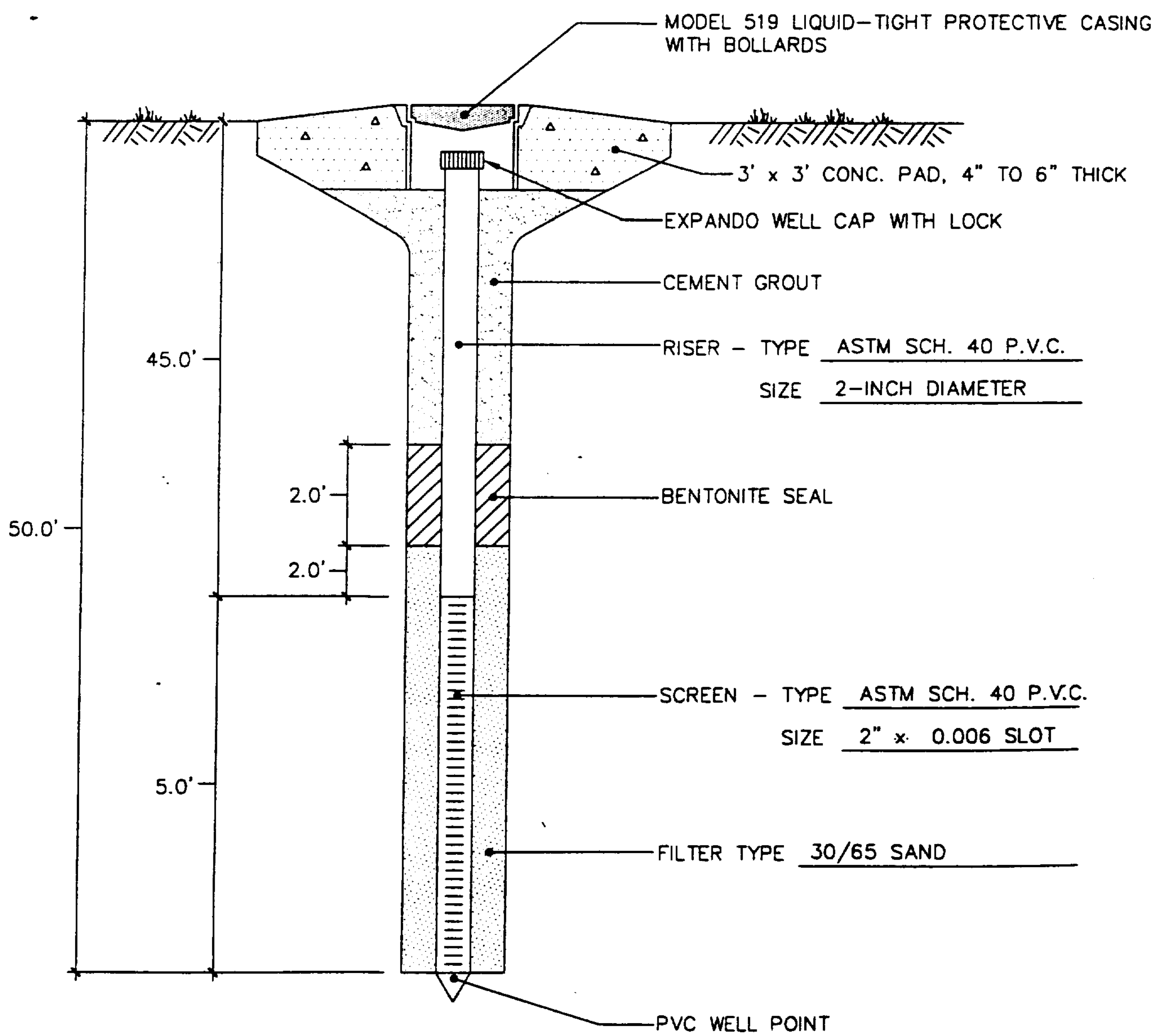
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/03/98

WELL NUMBER: DUNESWALE-IW-1D LOCATION: B-1

INSTALLED BY: UES - ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-1	**Client Phone:**	(407) 867-4121
Date:	8-5-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-1S	**Total Depth:**	15.0'
Screen Interval:	5.0 to 15.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
1:15 p.m.	200+	Cloudy/murky
1:18 p.m.	163.4	
1:21 p.m.	80.7	
1:23 p.m.	40.3	Clearer
1:25 p.m.	18.54	Clear

Total Development Time:	10 minutes
Final Turbidity Reading:	18.54 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-1	**Client Phone:**	(407) 867-4121
Date:	8-5-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-1I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:**	Permanent
		Construction:	2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
11:40 a.m.	200+	Cloudy/Murky
11:43 a.m.	200+	
11:47 a.m.	200+	
11:50 a.m.	100.3	
11:53 a.m.	49.4	Clearer
11:57 a.m.	24.3	Clear
12:00 p.m.	18.1	Clear

Total Development Time:	20 minutes
Final Turbidity Reading:	18.1 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

	UNIVERSAL ENGINEERING SCIENCES
	STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-1	**Client Phone:**	(407) 867-4121
Date:	8-3-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-1D	**Total Depth:**	50.0'
Screen Interval:	45.0 to 50.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
3:05 p.m.	1,000+	
3:30 p.m.	101	Murky
3:45 p.m.	107	Cloudy
4:00 p.m.	56	Cloudy
4:05 p.m.	31.7	Clear
4:12 p.m.	27.4	Clear
4:18 p.m.	17.7	Clear

Total Development Time:	73 minutes
Final Turbidity Reading:	17.7 NTUs
Estimated Volume Removed:	100 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT VIII

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO	18467-005-01
REPORT NO	
PAGE:	B-2.8

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **B-2** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.3
DATE OF READING: 08/03/98
EST. W.S.W.T. (ft):
DATE STARTED: 8/7/98
DATE FINISHED: 8/7/98
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Light gray fine SAND [SP]						
5	X	2-3-4	7	▼		Very light gray to white fine SAND [SP]						
	X	5-4-4	8									
	X	3-3-3	6			Loose, very dark red brown fine SAND; with silt [SP-SM]						
10	X	4-5-9	14			— medium dense						
						Loose, very light gray brown fine SAND [SP]						
15	X	1-3-2	5									
20	X	2-7-12	19			Medium dense, dark green silty fine SAND; with shells [SM]						
25	X	6-6-5	11			Medium dense, light green fine SAND; with shells [SP]						
30	X	8-12-14	26			--- dense						
						Soft, green CLAY; with shells [CH]						
35	X	3-1-2	3									
40	X	0-0-0	WOR			--- dark green						
45	X	0-1-2	3									
50	X	1-0-1	1			BORING TERMINATED AT 50 FEET						
55												

UNIVERSAL ENGINEERING SCIENCES WELL COMPLETION LOG	PROJECT NO.: 15467-005-01
	REPORT NO.:
	PAGE:

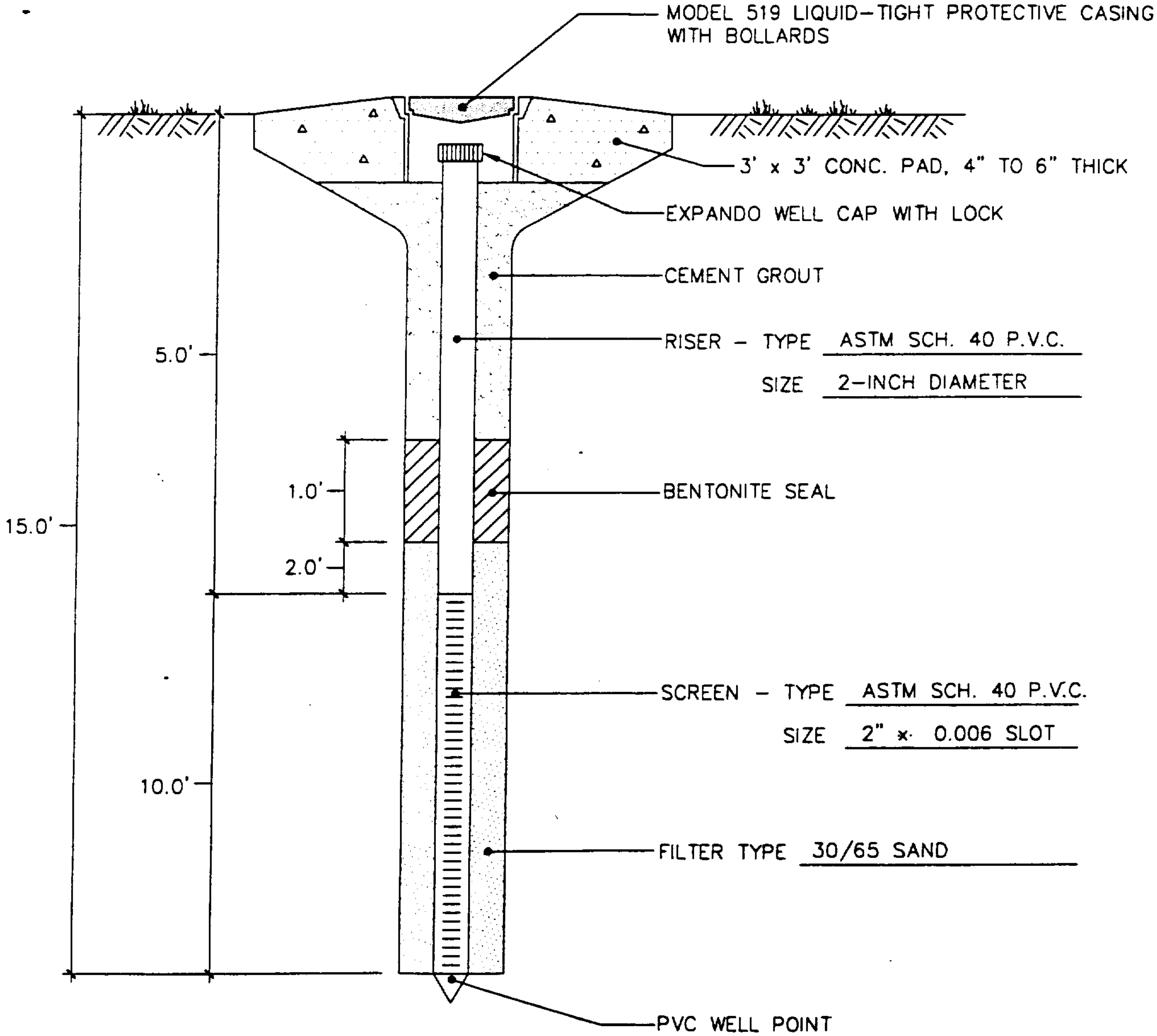
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/10/98

WELL NUMBER: DUNESWALE-IW-2S LOCATION: B-2

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 15467-005-01
REPORT NO.:
PAGE:

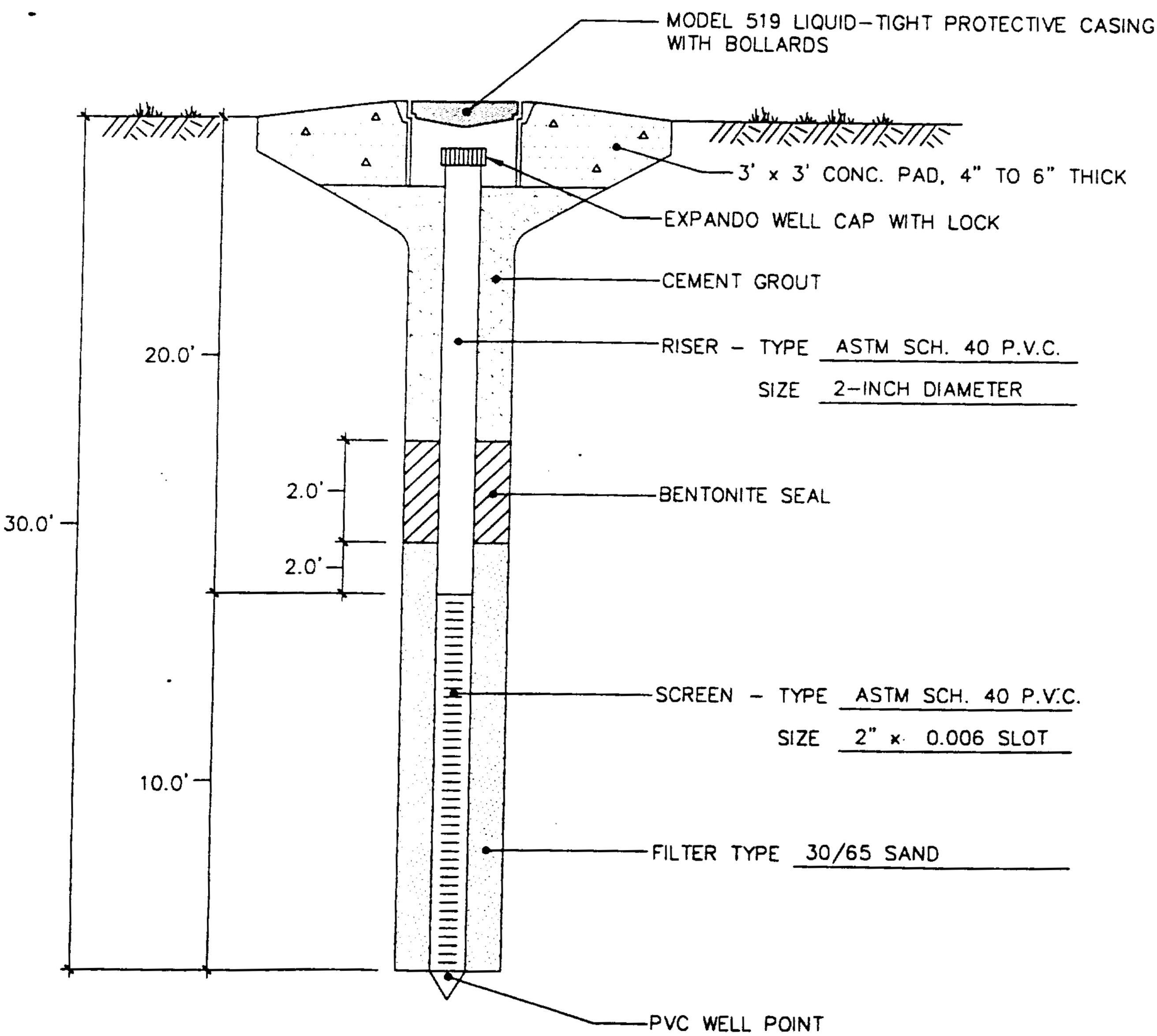
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D
DATE: 08/11/98

WELL NUMBER: DUNESWALE-IW-21
LOCATION: B-2

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 15487-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

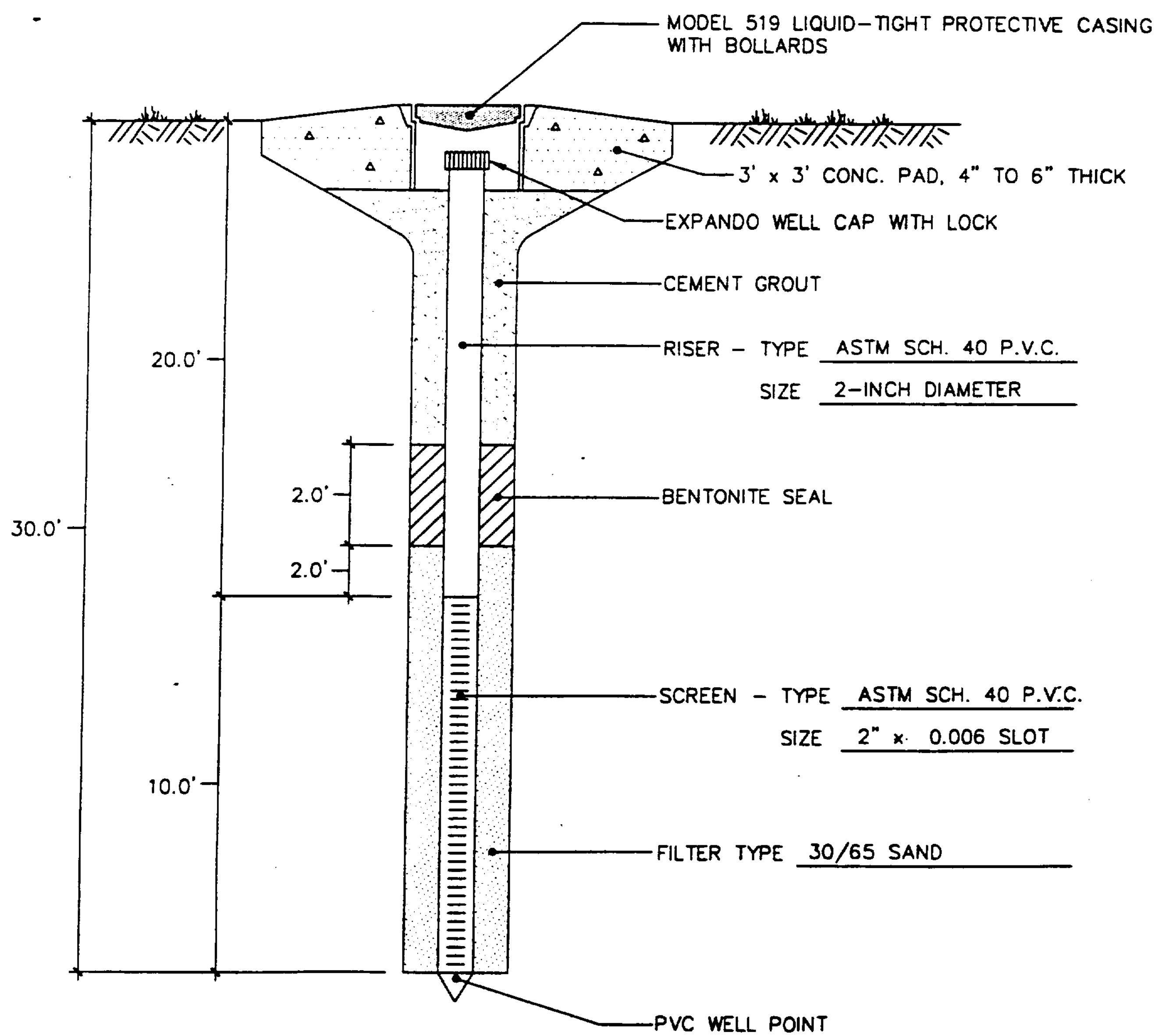
DATE: 08/11/98

WELL NUMBER: DUNESWALE-IW-21

LOCATION: B-2

INSTALLED BY: UES – ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES WELL COMPLETION LOG	PROJECT NO.: 18467-005-01
	REPORT NO.:
	PAGE:

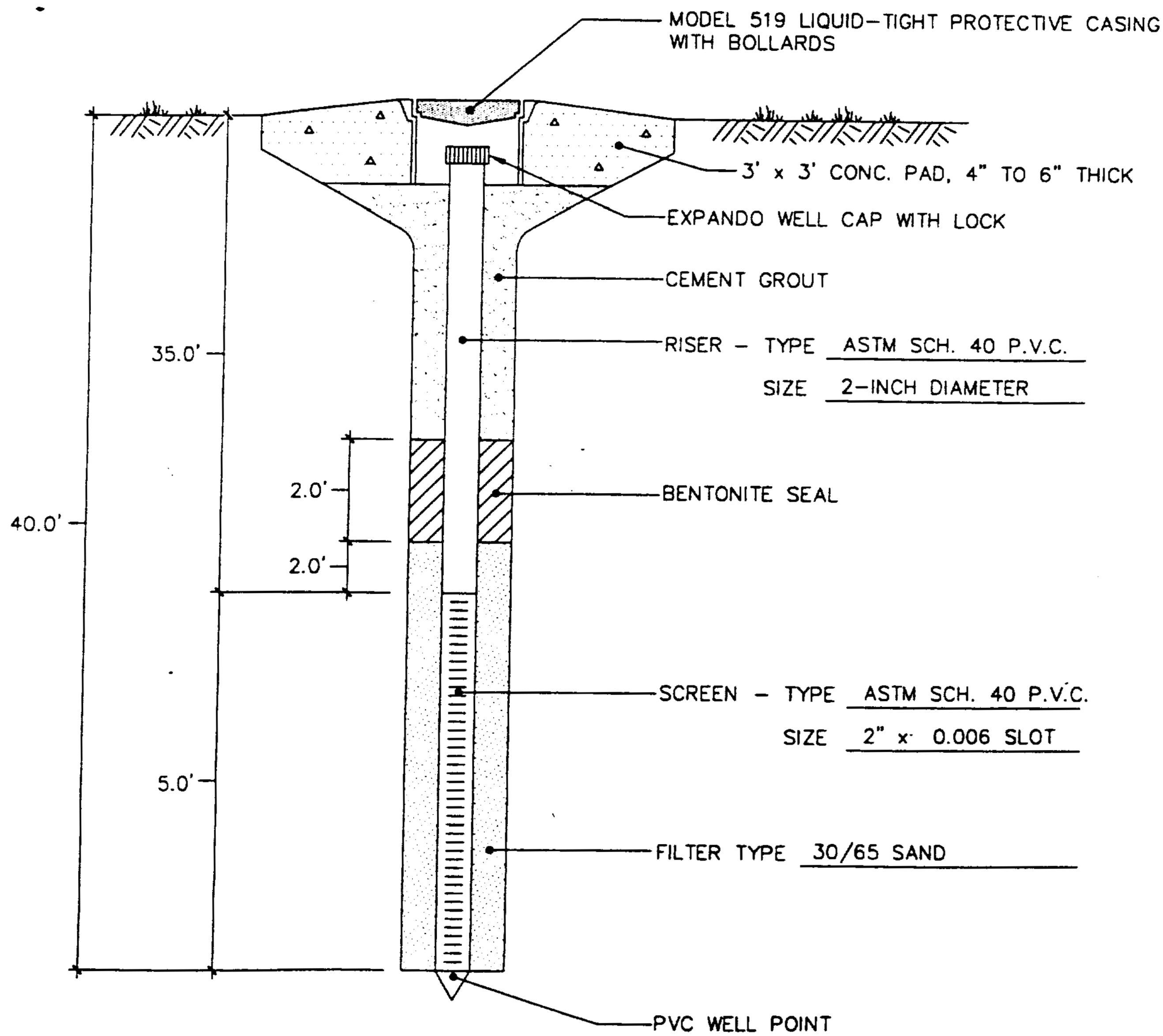
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D   DATE: 08/07/98

WELL NUMBER: DUNE-SWALE-1W-2D   LOCATION: B-2

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-2	**Client Phone:**	(407) 867-4121
Date:	8-10-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-2S	**Total Depth:**	15.0'
Screen Interval:	5.0 to 15.0' bls	**Well Type:**	Permanent
		Construction:	2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
1:55 p.m.	1,000+	Brown
2:00 p.m.	140	Light brown
2:02 p.m.	12.7	Clear

Total Development Time:	7 minutes
Final Turbidity Reading:	12.7 NTUs
Estimated Volume Removed:	gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-2	**Client Phone:**	(407) 867-4121
Date:	8-11-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-2I	**Total Depth:**	30.0'
Screen Interval:	20.0 to 30.0' bls	**Well Type:** / **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad with bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:58 a.m.	1,000+	Grey
10:00 a.m.	447	Light grey
10:02 a.m.	217	Grey
10:04 a.m.	95.9	Grey
10:09 a.m.	73.4	Grey
10:12 a.m.	45.0	Grey
10:14 a.m.	40.4	Grey
10:16 a.m.	31.3	Grey
10:18 a.m.	21.1	Grey

Total Development Time:	20 minutes
Final Turbidity Reading:	21.1 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: **Reference:**	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	**Client Name:** **Department:**	NASA JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-2	**Client Phone:**	(407) 867-4121
Date:	8-7-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-2D	**Total Depth:**	40.0'
Screen Interval:	35.0 to 40.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
3:48 p.m.	1,000+	Cloudy
3:52 p.m.	No reading	
Stop		
4:09 p.m.	166.4	Cloudy
4:13 p.m.	77.2	
4:15 p.m.	55.7	
4:17 p.m.	48.5	
4:19 p.m.	35.9	
4:20 p.m.	34.9	
4:22 p.m.	19	

Total Development Time:	17 minutes
Final Turbidity Reading:	19 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT VIV

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO	18467-005-01
REPORT NO.:	
PAGE:	B-2.9

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **B-3** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 5.0
DATE OF READING: 08/10/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/10/98
DATE FINISHED: 8/10/98
DRILLED BY: UES - ROCKLEDGE
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Brown fine SAND; with roots [SP] — gray sand						
						Loose, brown fine SAND; with silt [SP-SM] — light brown						
5	X	3-4-4	8	▼								
	X	6-5-5	10			Loose, light gray brown fine SAND [SP]						
	X	3-4-4	8									
10	X	5-6-6	12									
15						Light brown fine SAND [SP]						
						BORING TERMINATED AT 15 FEET						
20												
25												
30												
35												
40												
45												
50												
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

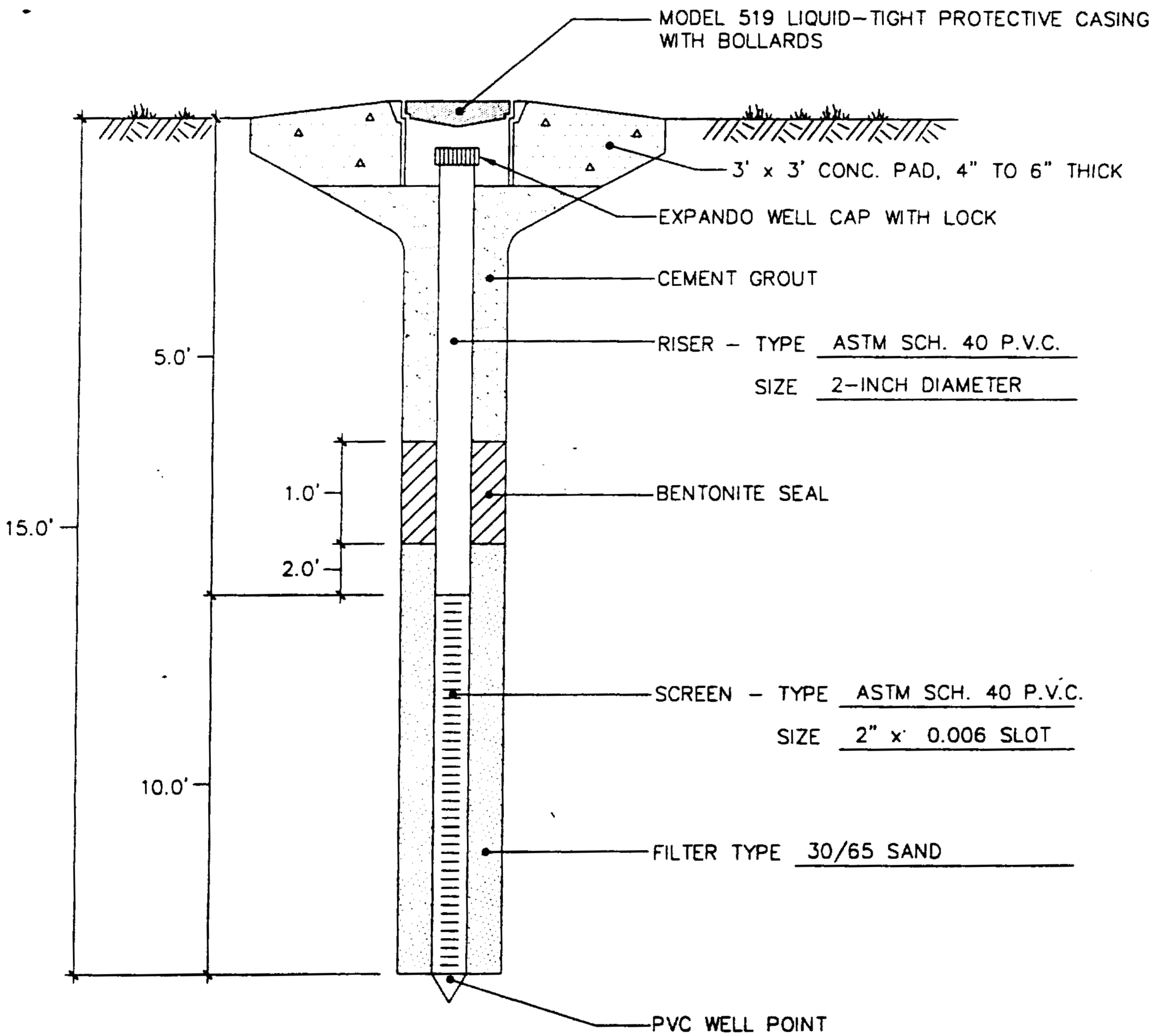
DATE: 08/10/98

WELL NUMBER: DUNESWALE-IW-3S

LOCATION: B-3

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-3	**Client Phone:**	(407) 867-4121
Date:	8-10-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-3S	**Total Depth:**	15.0'
Screen Interval:	5.0 to 15.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad with bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:09 a.m.	1,000+	
9:13 a.m.	22.5	
9:14 a.m.	10.9	

Total Development Time:	5 minutes
Final Turbidity Reading:	10.9 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT X

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	18467-005-01
REPORT NO.:	
PAGE:	B-2.10

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **B-4** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D

LOCATION: AS SPECIFIED BY CLIENT

REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 6.11
DATE OF READING: 08/10/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/11/98
DATE FINISHED: 8/11/98
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./ DAY)	ORG. CONT. (%)
0						Mixed gray brown fine SAND [SP]						
						Light gray fine SAND [SP]						
5	X	3-3-4	7			— loose, with roots						
	X	5-5-5	10	▼		Loose, very light brown fine SAND [SP]						
	X	7-8-9	17			Medium dense, dark brown fine SAND; with silt [SP-SM]						
10	X	9-10-15	25			Medium dense, dark gray brown fine SAND [SP]						
15	X	3-3-4	7			Loose, dark reddish brown fine SAND [SP]						
20	X	2-2-2	4			Very loose, gray fine SAND [SP]						
25	X	10-13-23	36									
						— dense, with shells						
30	X	7-9-17	26									
						— medium dense, with fine sand						
35	X	9-10-9	19									
						— not as much shell						
40	X	2-3-5	8			Loose, greenish gray SILT; with few shells [ML]						
45	X	6-8-4	12			Medium dense, very light gray fine SAND; with few shells [SP]						
50	X	15-21-24	45			BORING TERMINATED AT 50 FEET						
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

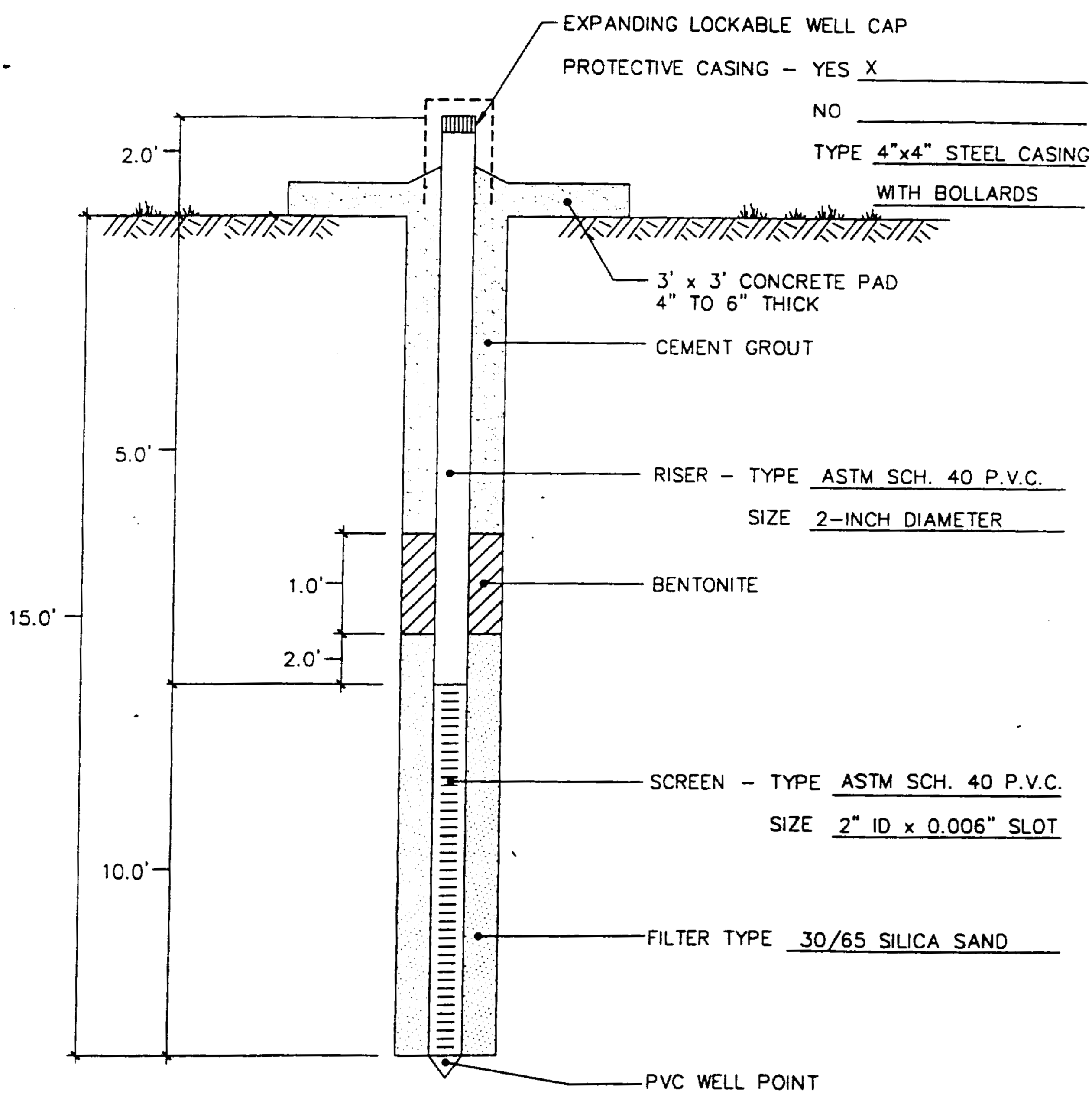
DATE: 08/14/98

WELL NUMBER: DUNESWALE-IW-4S

LOCATION: B-4

INSTALLED BY: UES – ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES **WELL COMPLETION LOG**	PROJECT NO.: 18467-005-01 REPORT NO.: PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS

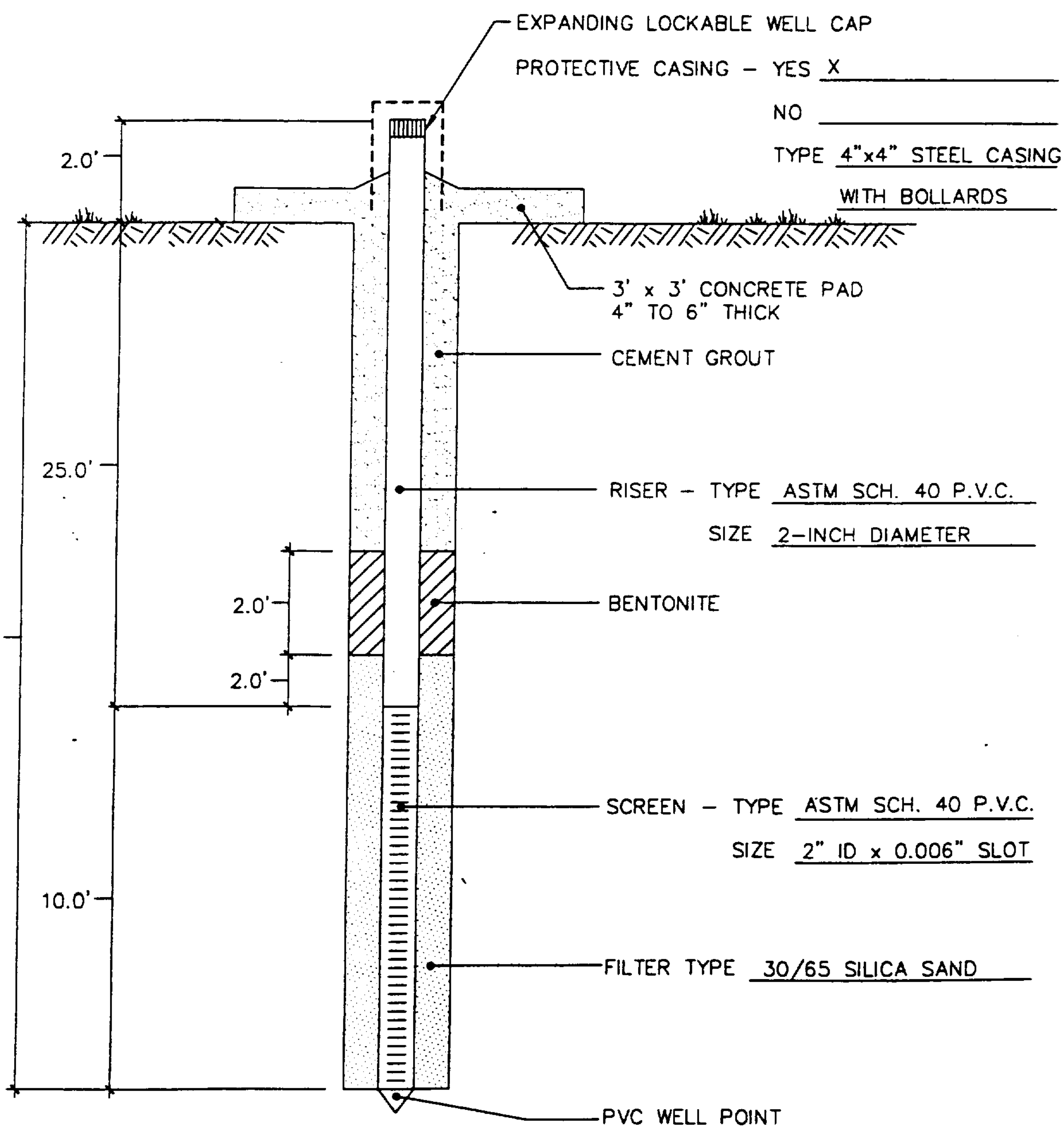
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/14/98

WELL NUMBER: DUNESWALE-IW-41 LOCATION: B-4

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS

KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

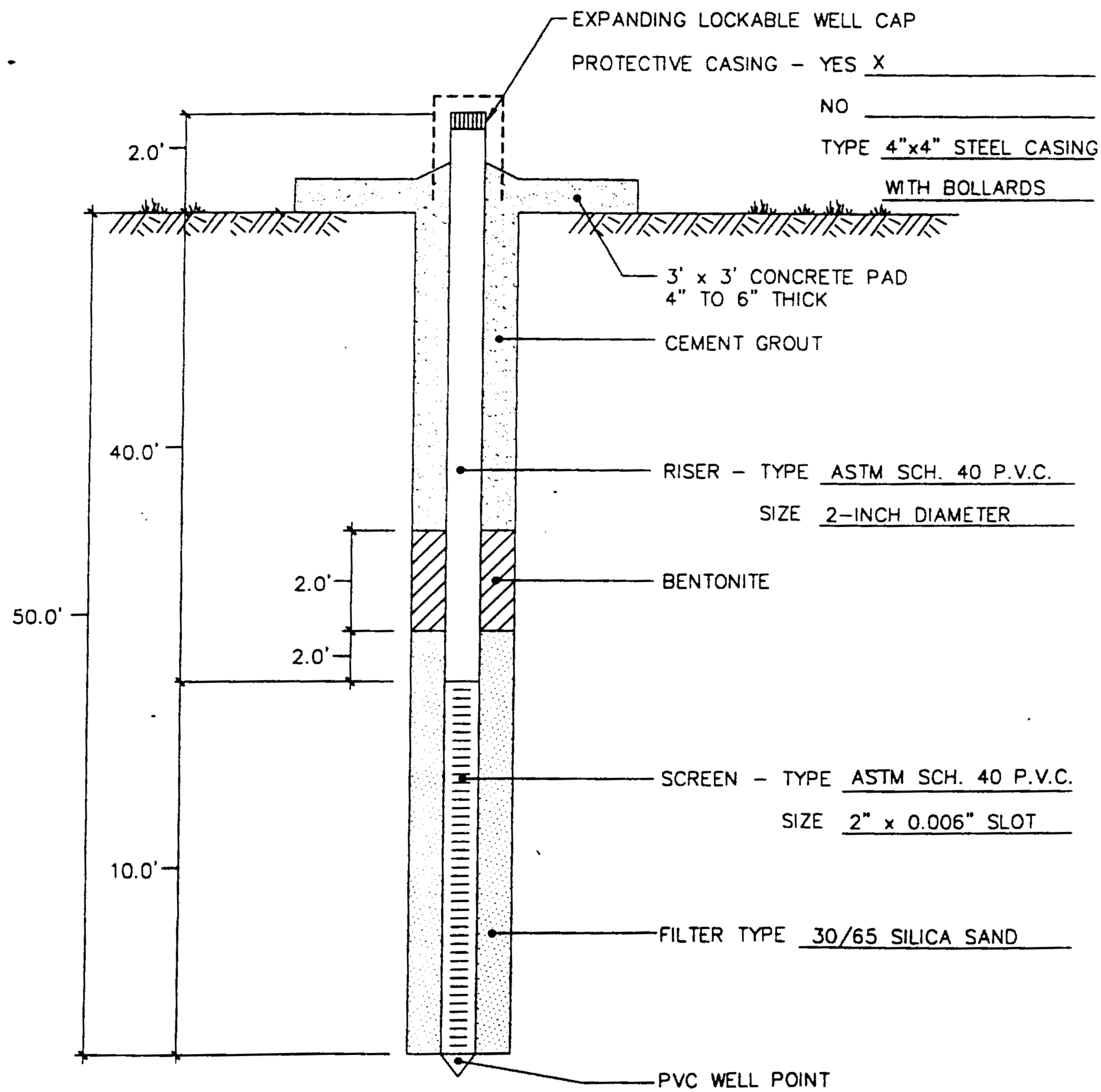
DATE: 08/11/98

WELL NUMBER: DUNE SWALE-1W-4D

LOCATION: B-4

INSTALLED BY: UES - ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: **Reference:**	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	**Client Name:** **Department:**	NASA JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-4	**Client Phone:**	(407) 867-4121
Date:	8-14-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-4S	**Total Depth:**	15.0'
Screen Interval:	5.0 to 15.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4"x4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
10:20 a.m.	1,000+	Dark brown
10:30 a.m.	1,000+	
10:45 a.m.	550	Brown
10:55 a.m.	300	Light brown
11:00 a.m.	220	
11:05 a.m.	190	
11:10 a.m.	190	

Total Development Time:	50 minutes
Final Turbidity Reading:	190 NTUs
Estimated Volume Removed:	165 gallons

COMMENTS: Well screen installed in silty sand and	**SOIL SCREENING RESULTS (OVA-PID):**
fine sand	

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: **Reference:**	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	**Client Name:** **Department:**	NASA JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-4	**Client Phone:**	(407) 867-4121
Date:	8-14-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-4I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
12:55 p.m.	1,000+	Dark grey
1:02 p.m.	60	Clear
1:25 p.m.	33	Clear

Total Development Time:	30 minutes
Final Turbidity Reading:	33 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-4	**Client Phone:**	(407) 867-4121
Date:	8-11-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-4D	**Total Depth:**	50.0'
Screen Interval:	45.0 to 50.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
1:02 p.m.	No reading	
1:04 p.m.	310	Cloudy grey
1:08 p.m.	59.6	
1:10 p.m.	72.1	
1:12 p.m.	26.8	
1:14 p.m.	15.6	

Total Development Time:	12 minutes
Final Turbidity Reading:	15.6 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT XI

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO	18467-005-01
REPORT NO	
PAGE:	B-2.11

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **B-5** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft):
DATE OF READING: 08/ /98
EST. W.S.W.T. (ft):

DATE STARTED: 8/13/98
DATE FINISHED: 8/13/98
DRILLED BY: UES - ROCKLEDGE
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Brown fine SAND; with roots [SP]						
						— light gray						
5	X	2-2-4	6			Loose, light brown fine SAND; with roots [SP]						
	X	4-4-6	10			Loose, gray brown fine SAND; with silt [SP-SM]						
	X	6-6-10	16			Medium dense, dark brown silty fine SAND; with roots [SM]						
10	X	6-7-8	15									
15	X	2-7-14	21			Medium dense, gray fine SAND; with shells [SP]						
20	X	10-18-15	33			— dense						
25	X	14-10-14	24			Medium dense, gray fine SAND; with shells [SP]						
30	X	10-11-10	21			— gray						
35	X	3-1-2	3			Very loose, gray silty fine SAND [SM]						
						BORING TERMINATED AT 35 FEET						
40												
45												
50												
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 15467-005-01
REPORT NO.:
PAGE:

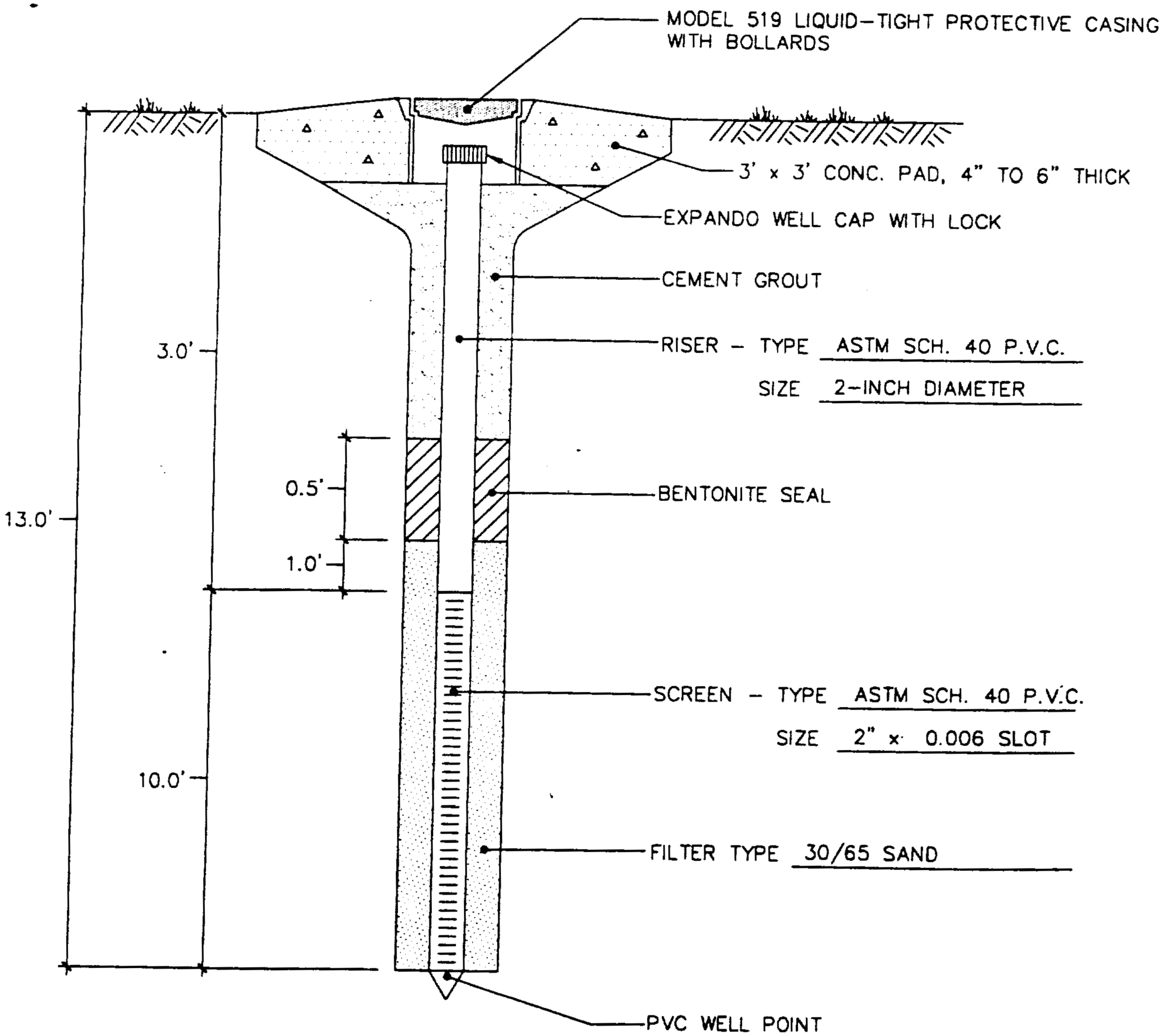
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D
DATE: 08/13/98

WELL NUMBER: DUNESWALE-IW-5S
LOCATION: B-5

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

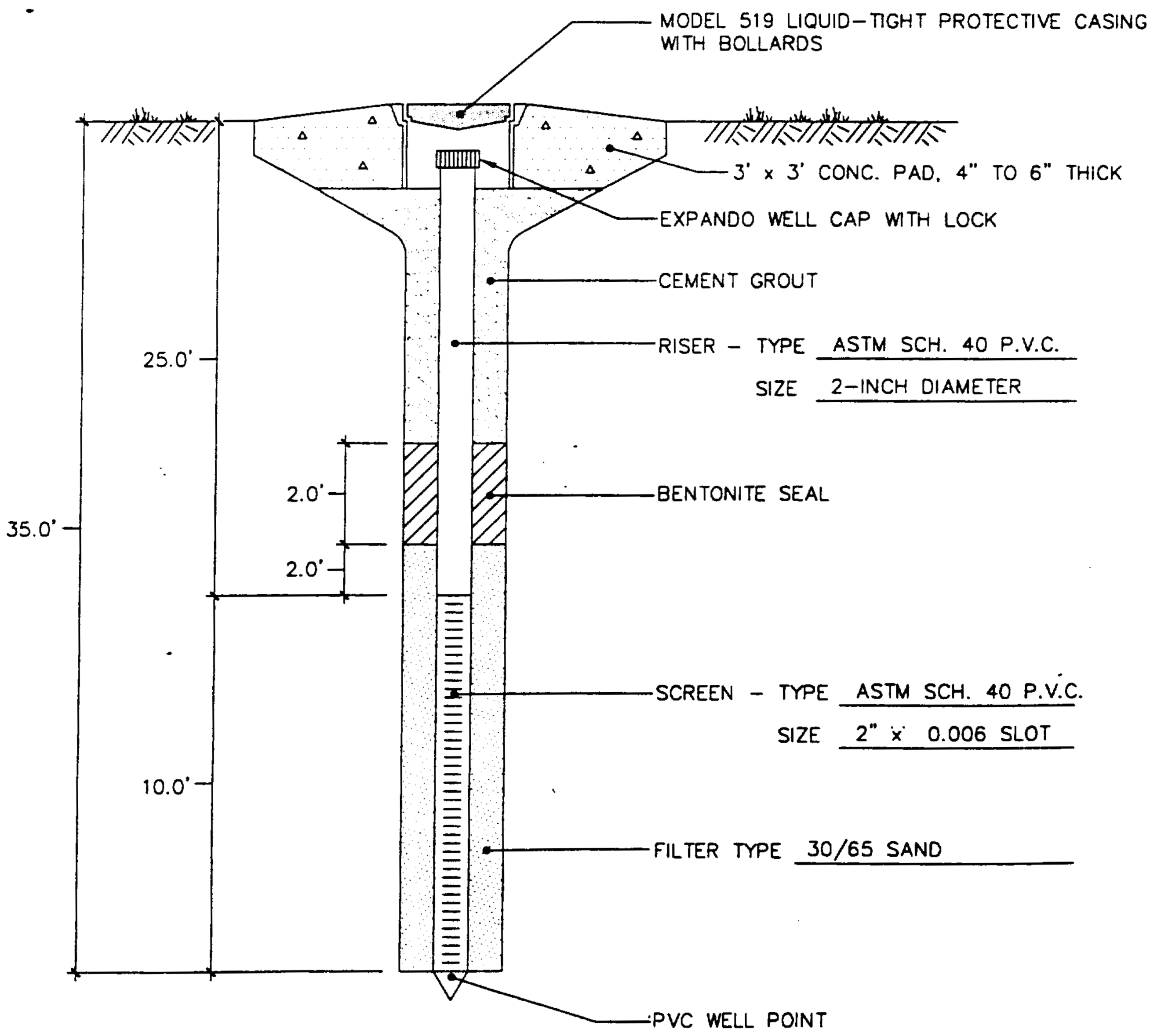
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D　　DATE: 08/13/98

WELL NUMBER: DUNESWALE-IW-51　　LOCATION: B-5

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-5	**Client Phone:**	(407) 867-4121
Date:	8-13-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-5S	**Total Depth:**	13.0'
Screen Interval:	3.0 to 13.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
6:34 p.m.	1,100	Brown
7:03 p.m.	800	Brown
7:15 p.m.	330	Brown
7:30 p.m.	150	
7:37 p.m.	180	Well surge
8:00 p.m.	75	

Total Development Time:	86 minutes
Final Turbidity Reading:	75 NTUs
Estimated Volume Removed:	165 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):
Well screen installed in silty sand.	

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	B-5	**Client Phone:**	(407) 867-4121
Date:	8-13-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-5I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
3:00 p.m.	1,000+	Grey silty
3:17 p.m.	450	Light grey
3:20 p.m.	65	
4:02 p.m.	17	

Total Development Time:	62 minutes
Final Turbidity Reading:	17 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT XII

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO: 18467-005-01
REPORT NO:
PAGE: B-2.12

PROJECT: INSTALLATION OF 52 MONITOR WELLS, KENNEDY SPACE CENTER, BREVARD, FLORIDA

BORING DESIGNATION: **B-6** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.5
DATE OF READING: 08/12/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/12/98
DATE FINISHED: 8/12/98
DRILLED BY: UES - ORLANDO
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./DAY)	ORG. CONT. (%)
0						Light gray fine SAND; with roots [SP]						
						— brown						
4.5				▼								
5	X	8-16-20	36			— dark brown						
	X	26-28-29	57			— dense						
	X	10-11-29	40			Very dense, dark gray fine SAND; with silt [SP-SM]						
10	X	26-28-32	60			— very dense						
15	X	10-12-12	24			— medium dense						
						BORING TERMINATED AT 15 FEET						

UNIVERSAL ENGINEERING SCIENCES **WELL COMPLETION LOG**	PROJECT NO.: 18467-005-01 REPORT NO.: PAGE:

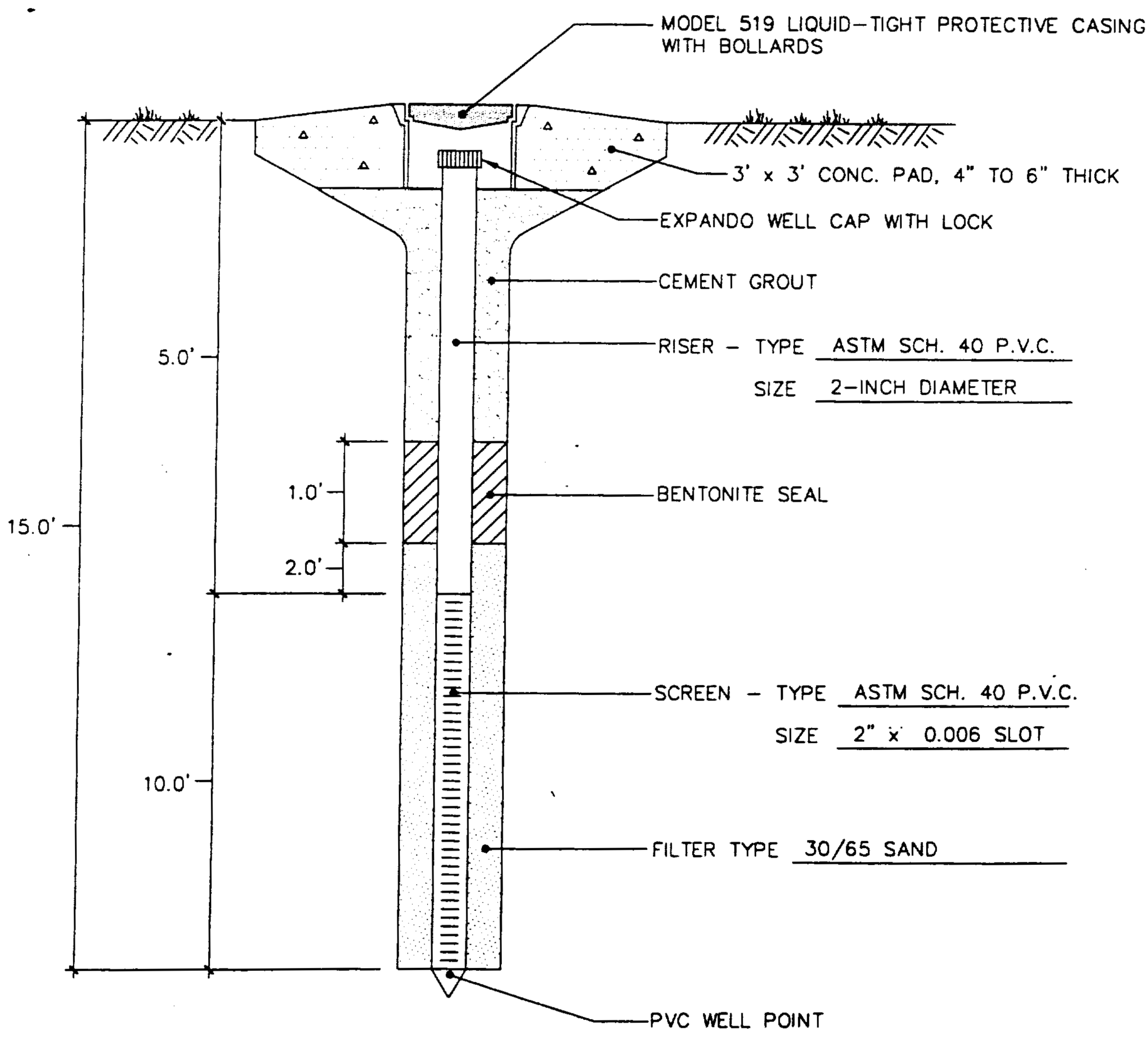
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/12/98

WELL NUMBER: DUNESWALE-IW-6S LOCATION: B-6

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



	UNIVERSAL ENGINEERING SCIENCES
	STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: Reference:	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	Client Name: Department:	NASA JJ-D
Project No.:	18467-005-01	Client Contact:	Rosaly Santos-Ebaugh, RPM
Well Location:	B-6	Client Phone:	(407) 867-4121
Date:	8-12-98	Client Fax:	(407) 867-8040

MONITOR WELL DATA

Well ID:	DuneSwale-IW-6S	Total Depth:	15.0'
Screen Interval:	5.0 to 15.0' bls	Well Type: Construction:	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad with bollards	Development Method:	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
11:55 a.m.	1,000+	
12:00 p.m.	1,000+	
12:06 p.m.	650	
12:09 p.m.	380	
12:15 p.m.	290	
12:20 p.m.	240	
1:25 p.m.	300	
1:30 p.m.	110	
1:39 p.m.	55	

Total Development Time:	104 minutes
Final Turbidity Reading:	55 NTUs
Estimated Volume Removed:	165 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT XIII

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.: 18457-005-01
REPORT NO.:
PAGE: B-2.13

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **C-1** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 5.3
DATE OF READING: 08/12/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/12/98
DATE FINISHED: 8/12/98
DRILLED BY: UES - D.B.
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./DAY)	ORG. CONT. (%)
0				Loose, gray fine SAND; trace roots [SP]						
	2-3-3	6		Medium dense, dark brown fine SAND [SP]; hardpan						
	3-4-7	11								
5	3-3-4	7	▼	Loose, dark brown fine SAND; trace silt [SP]						
	4-5-3	8								
	3-2-2	4		-- dark brown						
10	2-1-2	3		-- very loose, brown						
				Medium dense, light gray cemented SHELL; with sand						
15	11-6-7	13								
				Medium dense, gray cemented SHELL; with sand						
20	9-10-12	22								
25	11-12-15	27								
				Medium dense, gray fine SAND; with shell [SP]						
30	8-11-12	23								
				Medium dense, blueish dark gray fine SAND; with shell [SP]						
35	10-8-9	17								
				Medium dense, blueish dark gray fine SAND; shell, and trace silt [SP]						
40	7-8-8	16								
				Medium dense, gray fine SAND; trace shell, clay						
45	6-5-5	10								
				Loose, blue gray CLAY; some shell [CH]						
50	4-4-5	9								
				BORING TERMINATED 50 FEET						
55										

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UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

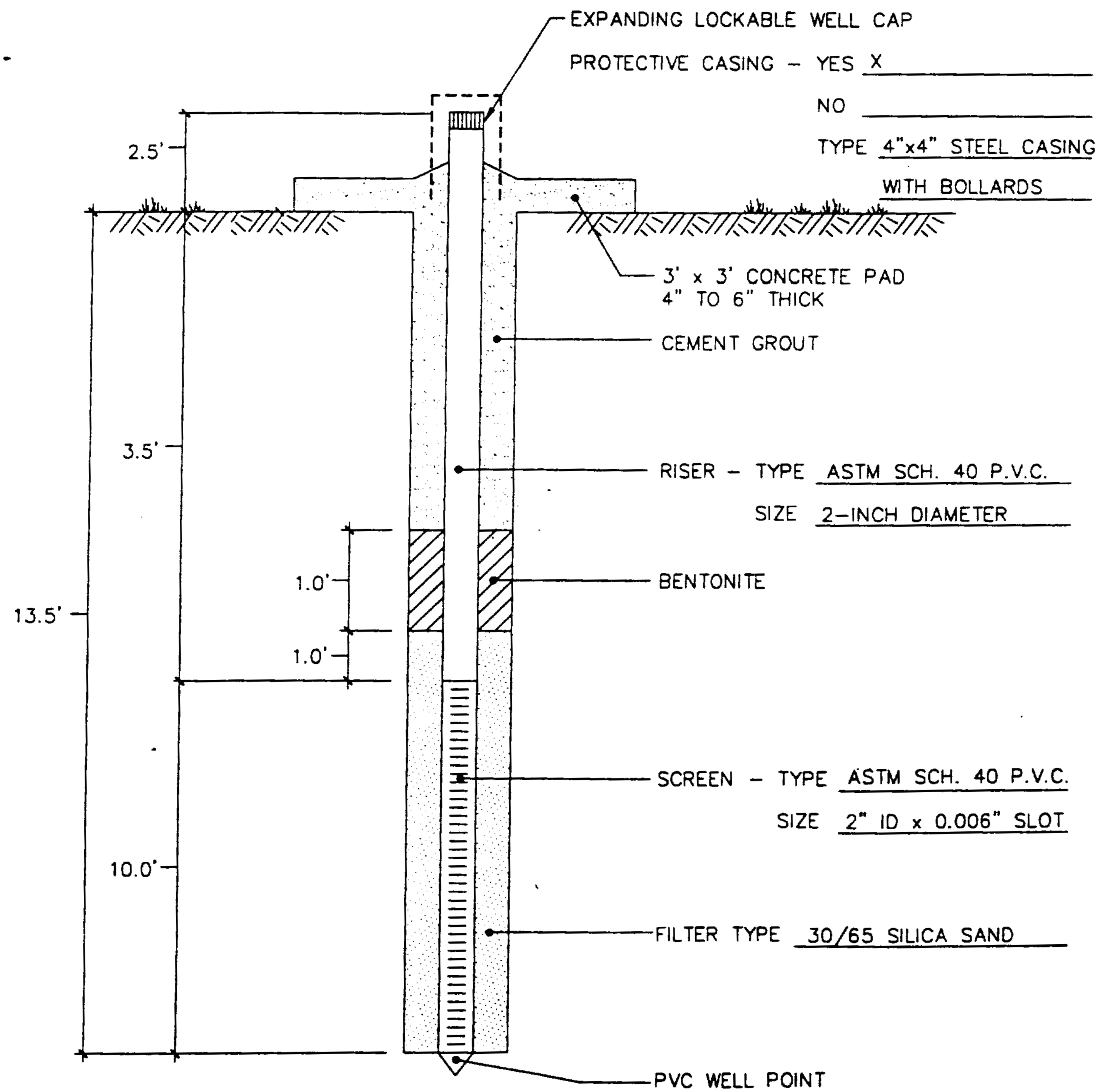
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/13/98

WELL NUMBER: WESTERN-IW-1S LOCATION: C-1

INSTALLED BY: UES – DAYTONA BEACH

WELL DIAGRAM – NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

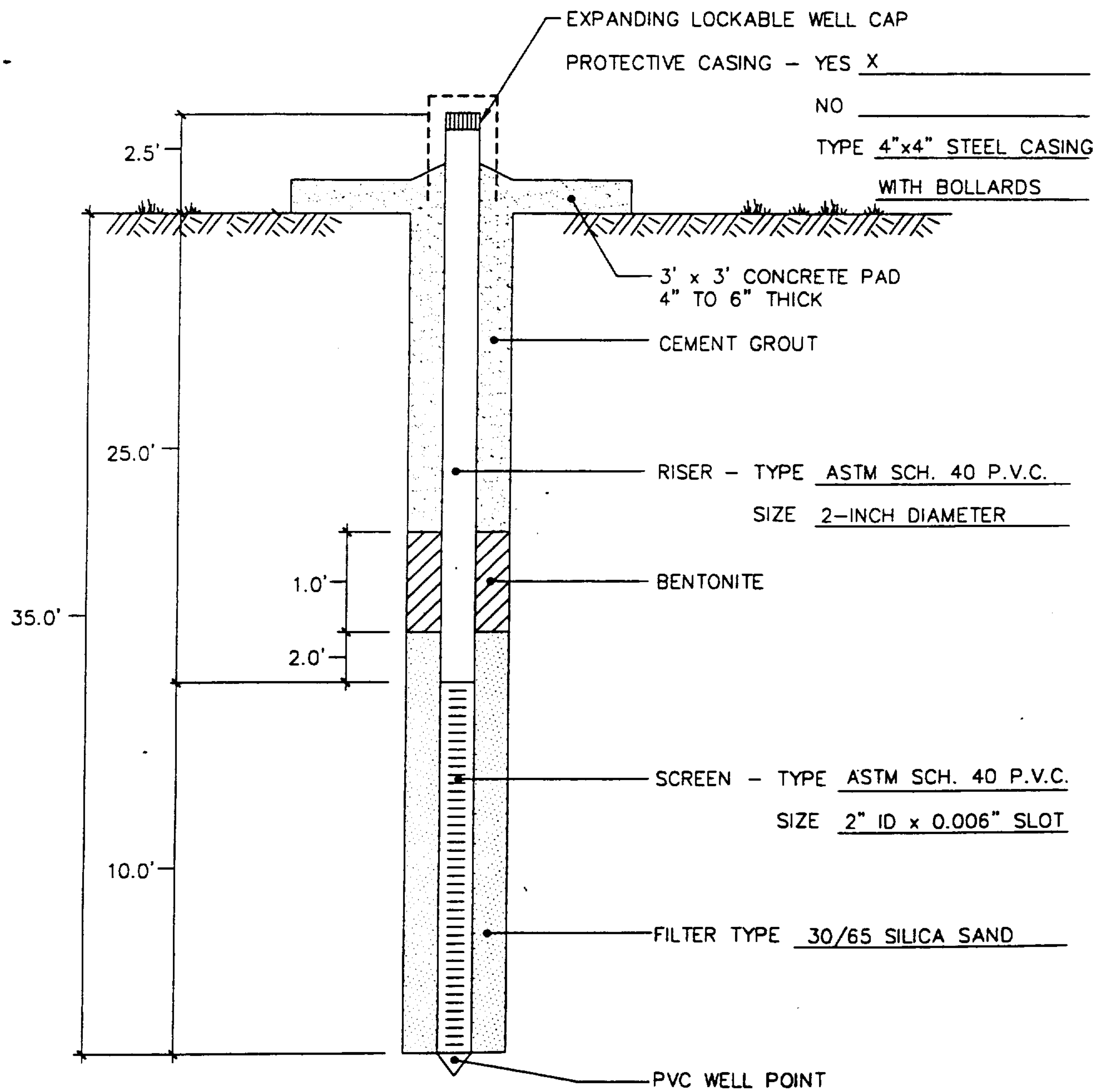
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D   DATE: 08/12/98

WELL NUMBER: WESTERN-IW-11   LOCATION: C-1

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

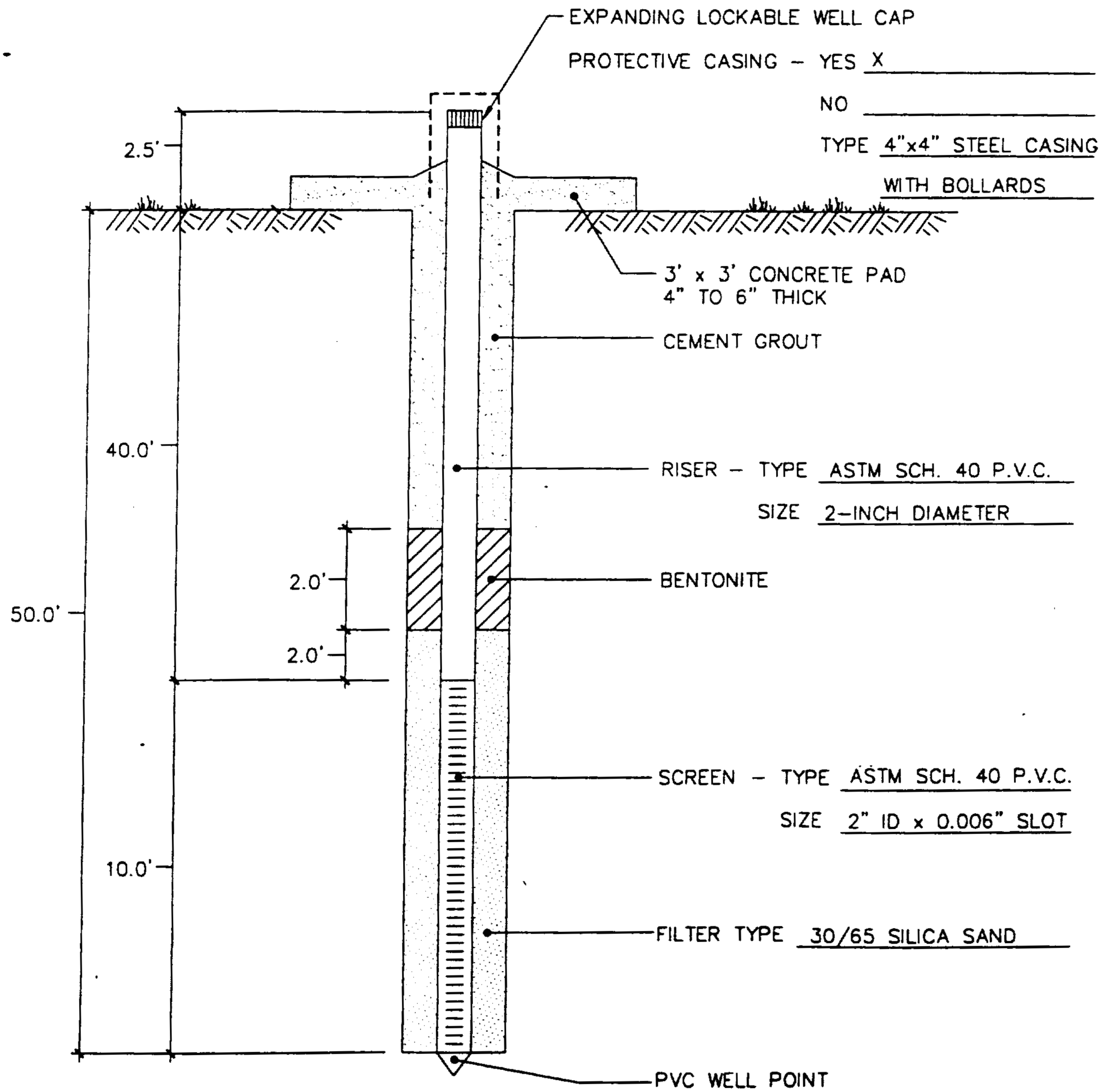
DATE: 08/19/98

WELL NUMBER: WESTERN-IW-1D

LOCATION: C-1

INSTALLED BY: UES – ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: **Reference:**	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	**Client Name:** **Department:**	NASA JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-1	**Client Phone:**	(407) 867-4121
Date:	8-13-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-1S	**Total Depth:**	15.0'
Screen Interval:	3.5 to 13.5' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
8:50 a.m.	200+	Murky/Cloudy
	200+	
	158.9	
	100.5	Cloudy
	83.6	
9:50 a.m.	58.9	

Total Development Time:	60 minutes
Final Turbidity Reading:	58.9 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	**SOIL SCREENING RESULTS (OVA-PID):**
Well screen installed in sand, silty sand, and sand	
with shell.	

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-1	**Client Phone:**	(407) 867-4121
Date:	8-12-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-11	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
4:00 p.m.	200+	Murky/Cloudy
	200+	
	200+	
	200+	
	200+	
	200+	
4:30 p.m.	200+	Murky/Cloudy

Total Development Time:	30 minutes
Final Turbidity Reading:	200+ NTUs
Estimated Volume Removed:	165 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):
Well screen installed in sand with shell.	

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: **Reference:**	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	**Client Name:** **Department:**	NASA JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-1	**Client Phone:**	(407) 867-4121
Date:	8-19-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-1D	**Total Depth:**	50.0'
Screen Interval:	45.0 to 50.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
1:17 p.m.	No reading	Milky grey - opaque
1:20 p.m.	473	Cloudy grey
1:28 p.m.	106	
1:38 p.m.	25.6	

Total Development Time:	21 minutes
Final Turbidity Reading:	25.6 NTUs
Estimated Volume Removed:	50 gallons

COMMENTS:	**SOIL SCREENING RESULTS (OVA-PID):**

EXHIBIT XIV

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

REPORT NO.:
PAGE: B-2.14

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: C-2 SHEET: 1 of 1
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D

LOCATION: AS SPECIFIED BY CLIENT

REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
DATE STARTED: 8/5/98
WATER TABLE (ft): 0.0
DATE FINISHED: 8/5/98
DATE OF READING: 08/05/98
DRILLED BY: UES - ROCKLEDGE
EST. W.S.W.T. (ft):
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./DAY)	ORG. CONT. (%)
0				▼		Gray fine SAND; with roots [SP]						
						Dark gray brown silty fine SAND [SM]						
						— dark brown						
5	X	3-4-5	9			— gray						
	X	4-4-4	8			Loose, light gray fine SAND; with silt [SP-SM]						
	X	4-4-5	9			Loose, gray brown fine SAND; with shell and silt [SP]						
10	X	4-5-4	9									
15	X	7-10-12	22			— gray fine sand tight sands						
						BORING TERMINATED AT 15 FEET						
20												
25												
30												
35												
40												
45												
50												
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO: 15467-005-01
REPORT NO:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

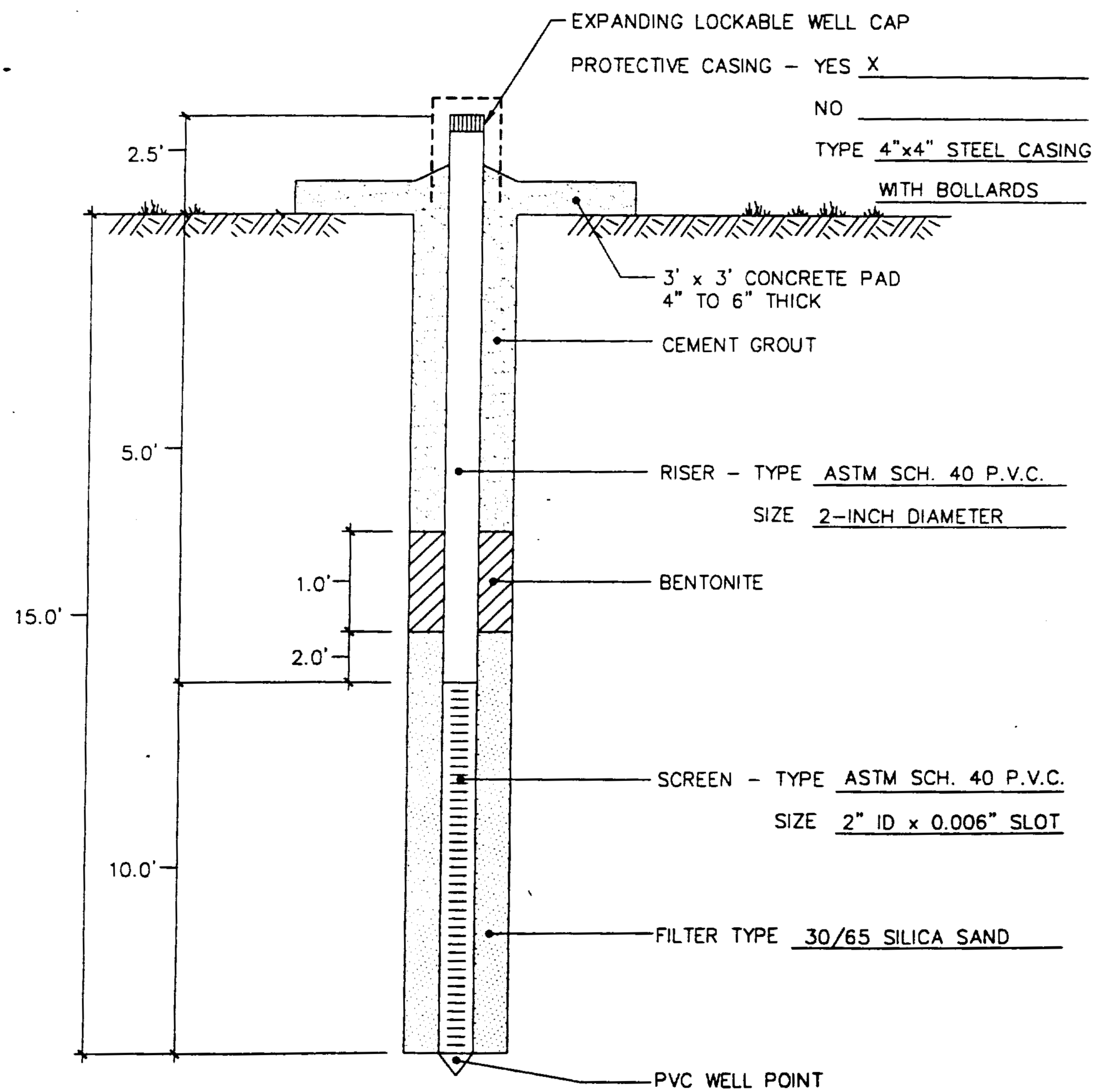
DATE: 08/05/98

WELL NUMBER: WESTERN-IW-2S

LOCATION: C-2

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: Reference:	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	Client Name: Department:	NASA JJ-D
Project No.:	18467-005-01	Client Contact:	Rosaly Santos-Ebaugh, RPM
Well Location:	C-2	Client Phone:	(407) 867-4121
Date:	8-5-98	Client Fax:	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-2S	Total Depth:	15.0'
Screen Interval:	5.0 to 15.0' bls	Well Type: Construction:	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	Development Method:	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
8:35 a.m.	1,000+	Dark grey
8:41 a.m.	137	Cloudy
8:47 a.m.	62.6	Cloudy
8:50 a.m.	15.8	Clear

Total Development Time:	15 minutes
Final Turbidity Reading:	15.8 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT XV

UNIVERSAL ENGINEERING SCIENCES

BORING LOG

REPORT NO.:
PAGE: B-2.15

PROJECT:	INSTALLATION OF 52 MONITOR WELLS KENNEDY SPACE CENTER BREVARD, FLORIDA
CLIENT:	NASA JJ-D
LOCATION:	AS SPECIFIED BY CLIENT
REMARKS:	HAND AUGER FROM 0 FEET TO 4 FEET

BORING DESIGNATION: C-3 SHEET: 1 of 1
SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):		DATE STARTED:	8/12/98
WATER TABLE (ft):	5.5	DATE FINISHED:	8/12/98
DATE OF READING:	08/12/98	DRILLED BY:	UES - ROCKLEDGE
EST. W.S.W.T. (ft):		TYPE OF SAMPLING:	ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./DAY)	ORG. CONT. (%)
0						Gray fine SAND; with roots [SP]						
						Gray brown clayey fine SAND [SC]						
						Light brown cemented fine SAND [SP]						
5	X	6-6-11	17	▼		Medium dense, light brown fine SAND; with gravel [SP]						
	X	10-12-15	27			— light gray brown						
	X	9-10-13	26			— light gray						
10	X	7-8-10	18			— trace shell						
15	X	5-5-5	10			Loose, gray fine SAND; with silt [SP-SM]						
20	X	3-4-8	12			Medium dense, gray fine SAND; with gravel [SP]						
25	X	13-20-20	40			Dense, light gray fine SAND [SP]						
30	X	13-30-24	54			Very dense, gray fine SAND; with shell [SP]						
35	X	7-6-5	11			Medium dense, grayish fine SAND; with shell [SP]						
40	X	3-3-3	6			Loose, gray silty fine SAND; with shell [SM]						
45	X	7-6-4	10			Loose, gray silty fine SAND; with shell [SM]						
50	X	5-4-3	7			BORING TERMINATED AT 50 FEET						
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-065-01

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

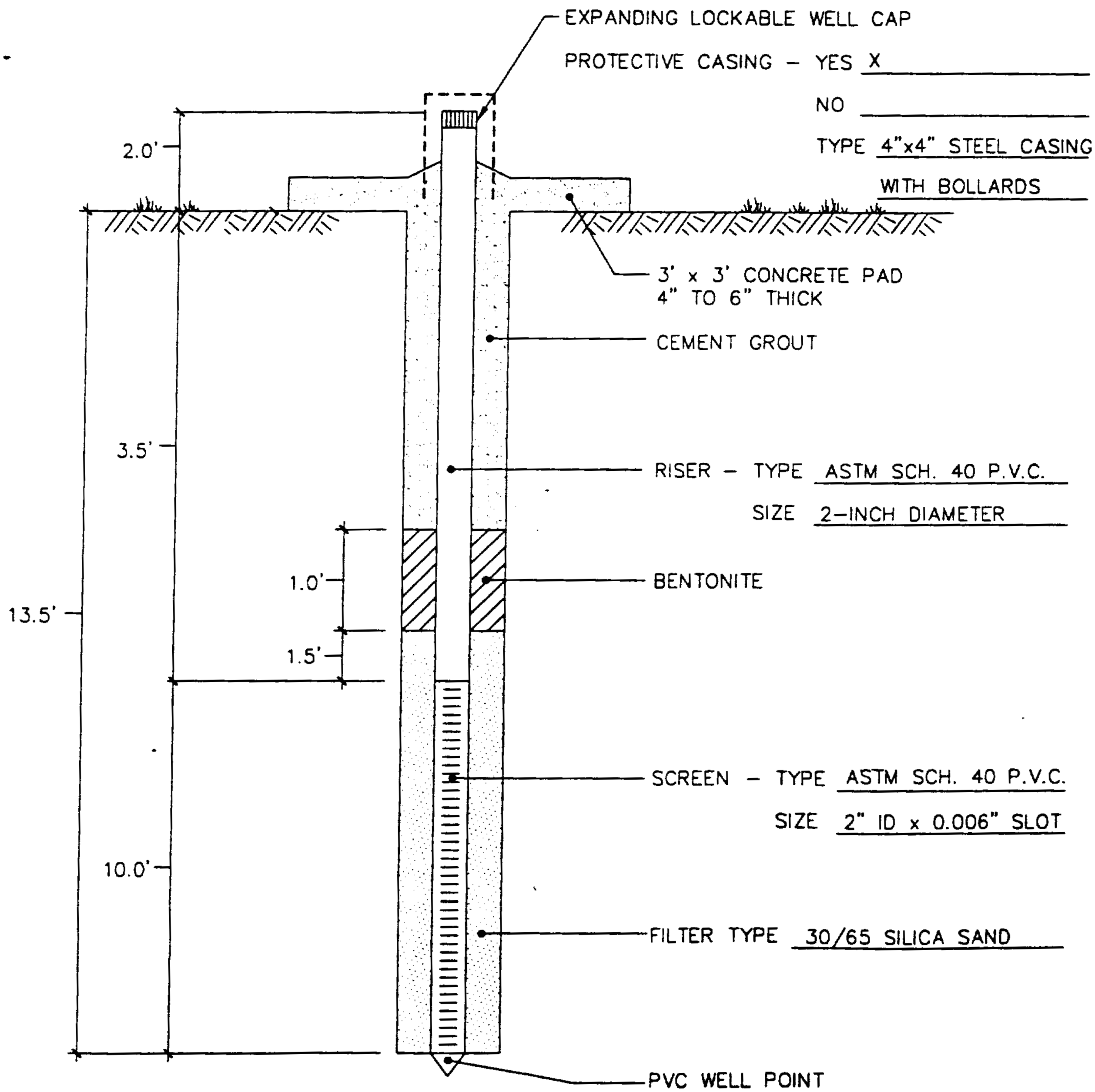
DATE: 08/19/98

WELL NUMBER: WESTERN-IW-3S

LOCATION: C-3

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

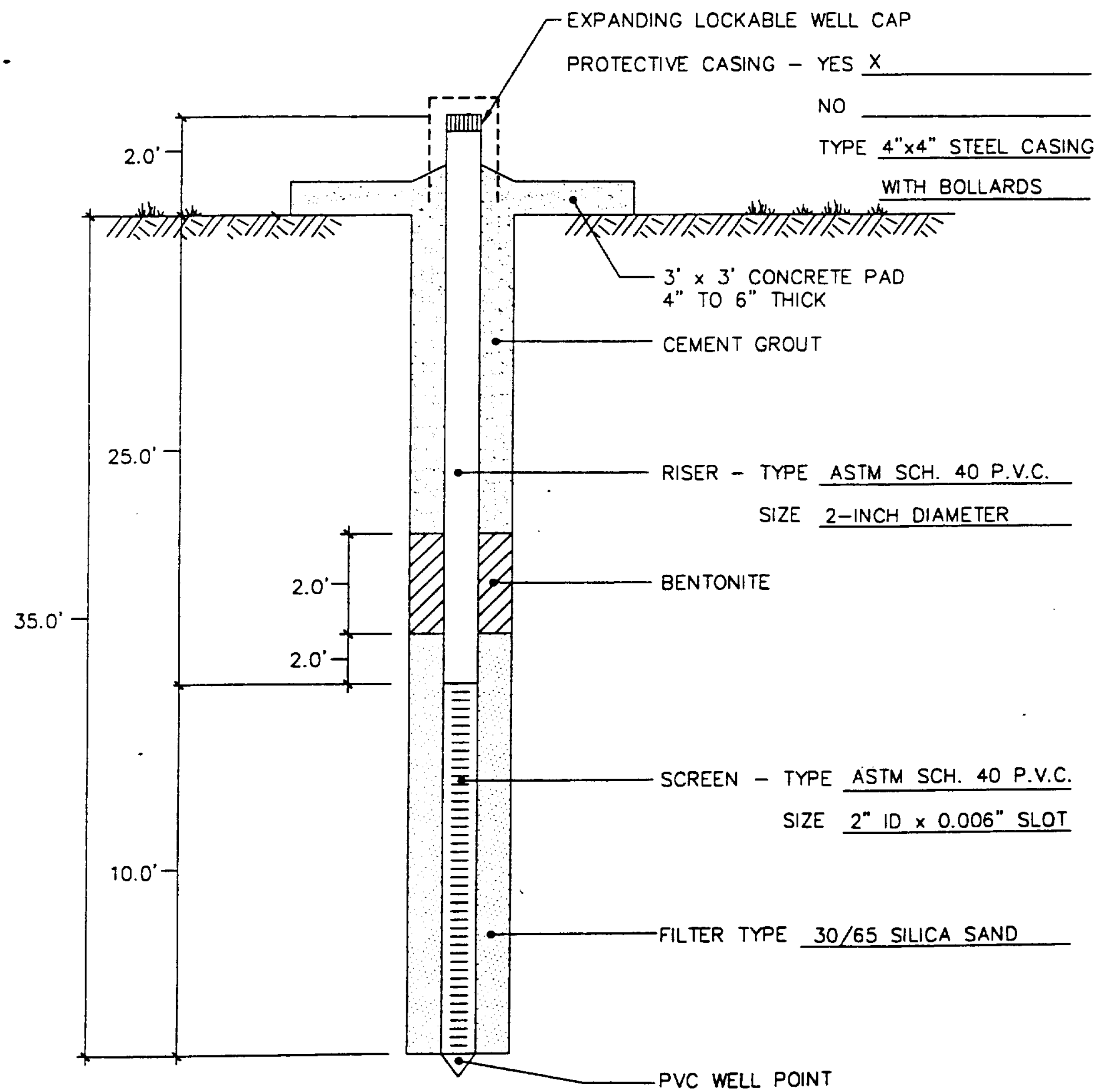
DATE: 08/19/98

WELL NUMBER: WESTERN-IW-31

LOCATION: C-3

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES **WELL COMPLETION LOG**	PROJECT NO.: 18467-005-01 REPORT NO.: PAGE:

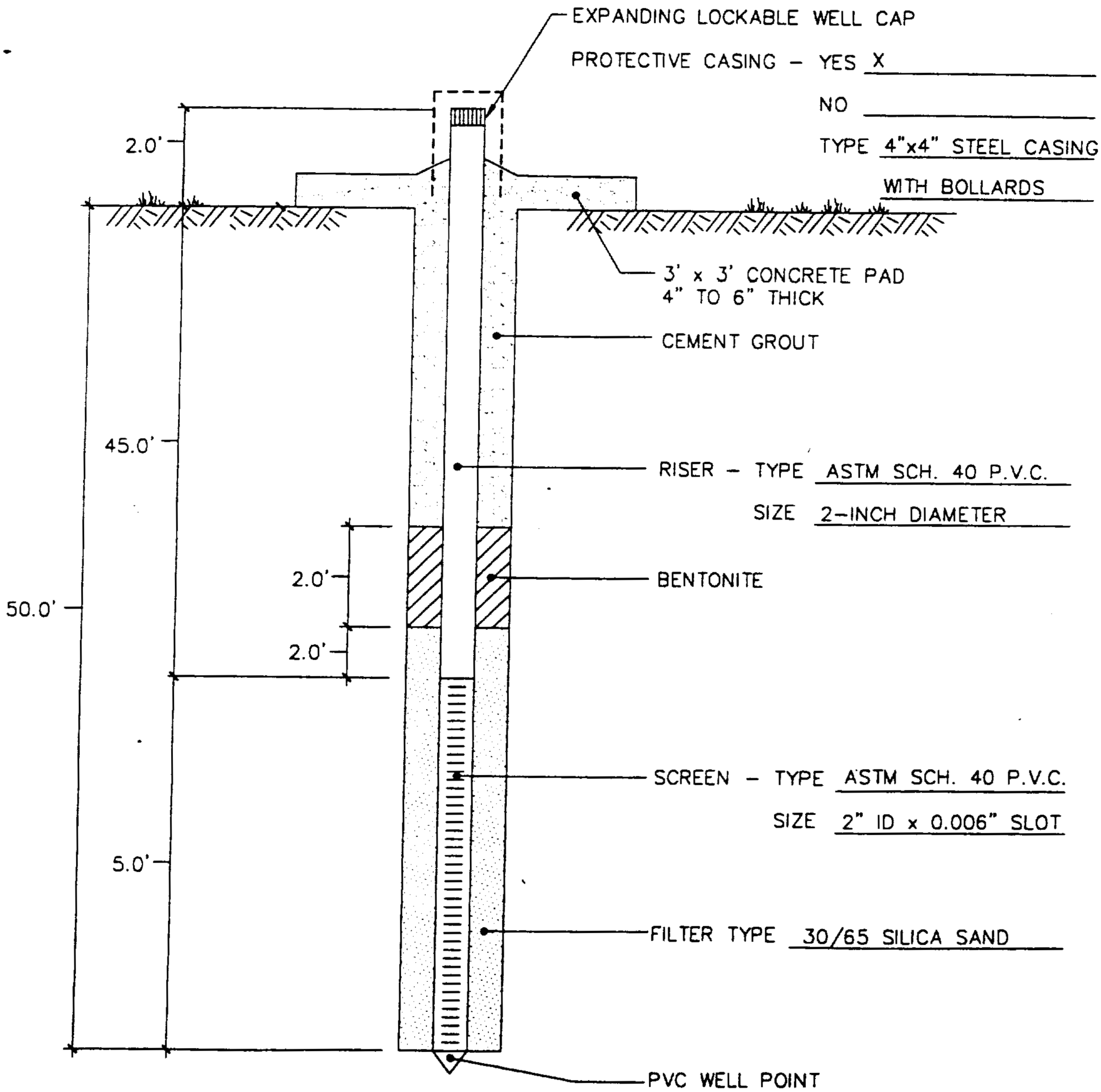
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/14/98

WELL NUMBER: WESTERN-IW-3D LOCATION: C-3

INSTALLED BY: UES - ORLANDO

WELL DIAGRAM - NOT TO SCALE



	UNIVERSAL ENGINEERING SCIENCES
	STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	Client Name:	NASA
Reference:	Monitor Well Installation	Department:	JJ-D
Project No.:	18467-005-01	Client Contact:	Rosaly Santos-Ebaugh, RPM
Well Location:	C-3	Client Phone:	(407) 867-4121
Date:	8-19-98	Client Fax:	(407) 867-8040

MONITOR WELL DATA

Well ID:	Westem-IW-3S	Total Depth:	13.5'
Screen Interval:	3.5 to 13.5' bls	Well Type: Construction:	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	Development Method:	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:20 a.m.	638	
9:25 a.m.	312	
9:33 a.m.	114	
9:35 a.m.	83	
9:40 a.m.	44	
9:45 a.m.	18	

Total Development Time:	25 minutes
Final Turbidity Reading:	19 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT XVI

UNIVERSAL ENGINEERING SCIENCES

BORING LOG

REPORT NO:

PAGE: B-2.16

PROJECT	INSTALLATION OF 52 MONITOR WELLS KENNEDY SPACE CENTER BREVARD, FLORIDA	BORING DESIGNATION: C-4	SHEET: 1 of 1
		SECTION: TOWNSHIP:	RANGE:
CLIENT:	NASA JJ-D	G.S. ELEVATION (ft):	DATE STARTED: 8/12/98
LOCATION:	AS SPECIFIED BY CLIENT	WATER TABLE (ft): 4.6	DATE FINISHED: 8/12/98
REMARKS:	HAND AUGER FROM 0 FEET TO 4 FEET	DATE OF READING: 08/12/98	DRILLED BY: UES - ORLANDO
		EST. W.S.W.T. (ft):	TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./ DAY)	ORG. CONT. (%)
0						Medium dense, light gray to white cemented SILT [ML]						
	X	5-6-6	12									
	X	5-6-5	11			— with limestone						
5	X	7-5-7	12	▼		Medium dense, light yellow silty fine SAND [SM]						
	X	3-4-3	7			Loose, light green gray silty fine SAND; with broken shell [SM]						
	X	1-1-4	5									
10	X	2-1-1	2			Very loose, gray fine SAND; with silt [SP-SM]						
15	X	2-3-3	6			Loose, gray fine SAND; with shells [SP]						
20	X	12-13-15	28			— medium dense						
						Medium dense, SHELLS; with fine sand						
25	X	6-6-8	14									
						Very loose, green fine SAND; with shells						
30	X	2-2-2	4									
35	X	5-7-7	14			Medium dense, gray green silty fine SAND; with shell [SM]						
40	X	4-3-3	6			— loose, with seams of clay						
45	X	2-3-5	8									
50	X	6-4-6	10			BORING TERMINATED AT 50 FEET						
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

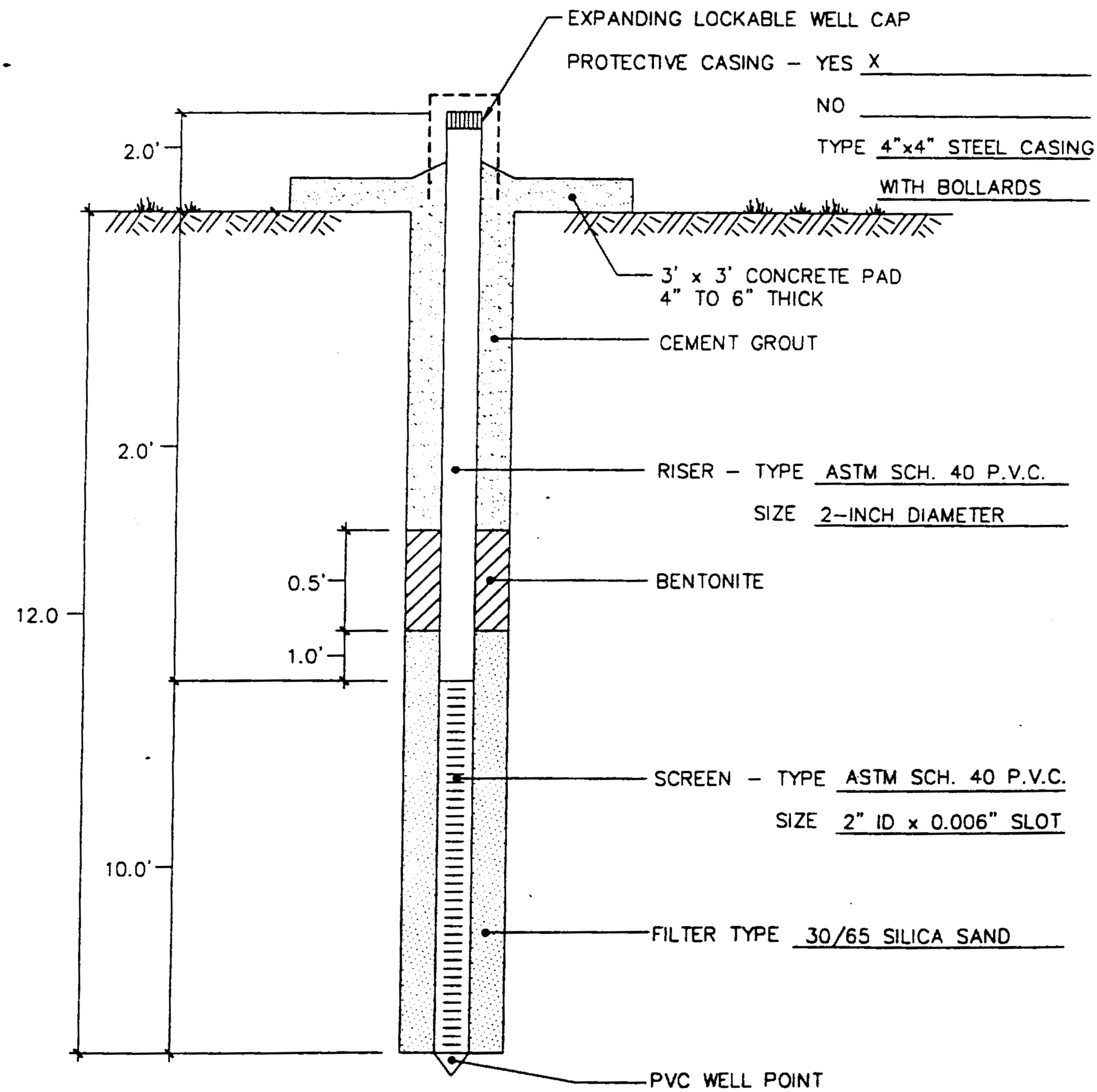
DATE: 08/19/98

WELL NUMBER: WESTERN-IW-4S

LOCATION: C-4

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

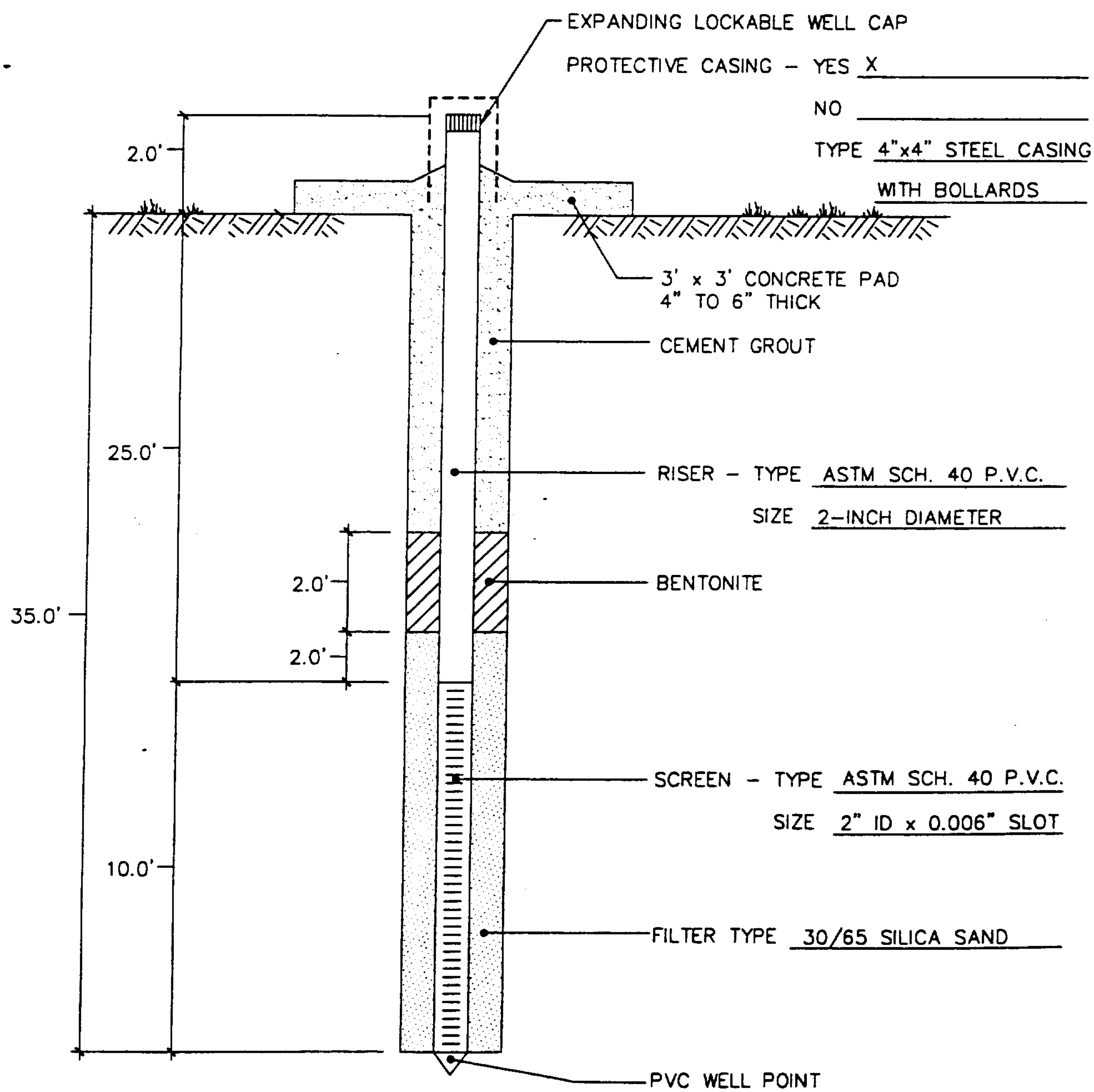
DATE: 08/19/98

WELL NUMBER: WESTERN-IW-41

LOCATION: C-4

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

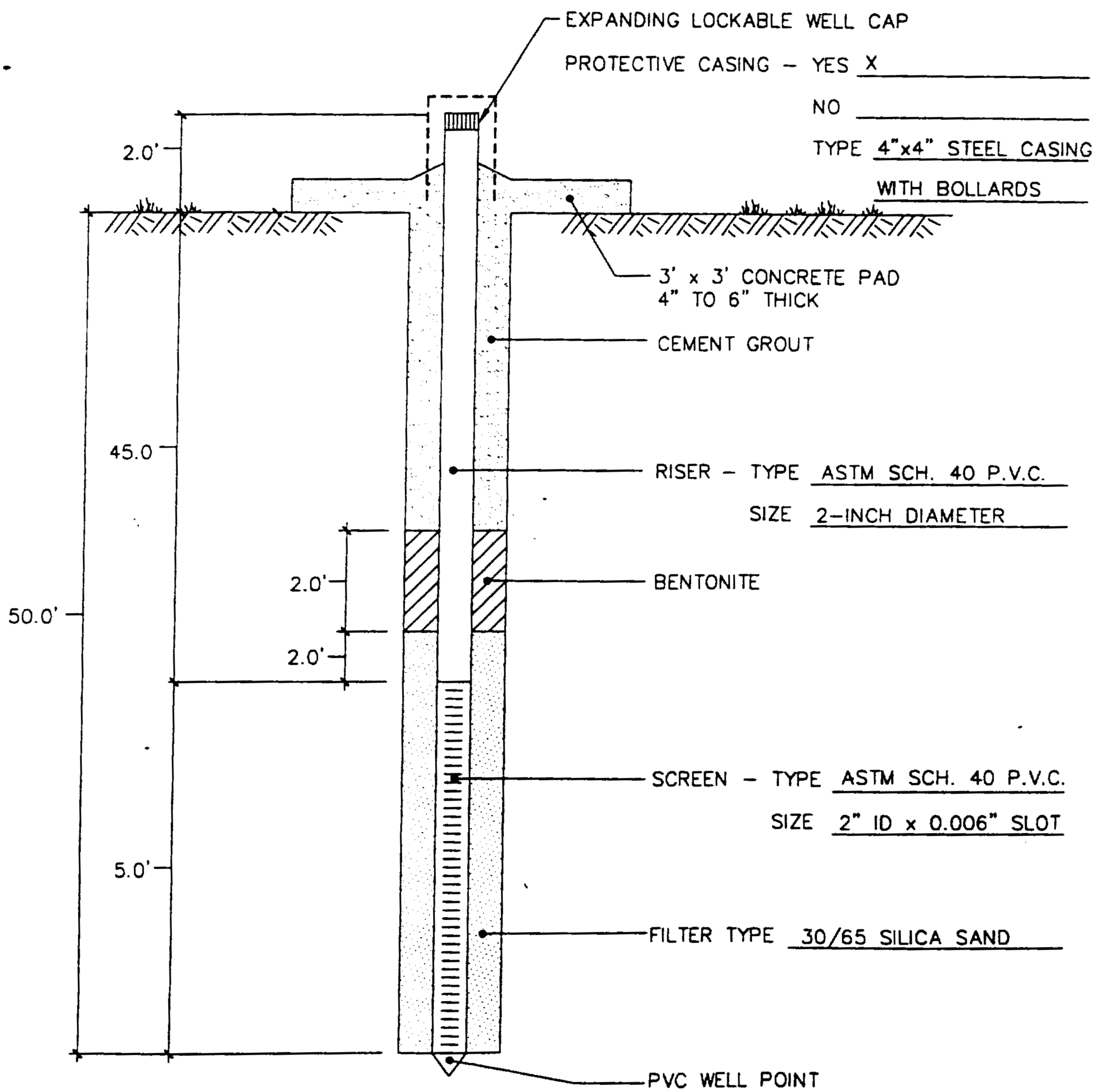
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D   DATE: 08/13/98

WELL NUMBER: WESTERN-IW-4D   LOCATION: C-4

INSTALLED BY: UES – ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-4	**Client Phone:**	(407) 867-4121
Date:	8-19-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-4S	**Total Depth:**	12.0'
Screen Interval:	2.0 to 12.0' bls	**Well Type:** / **Construction:**	Permanent / 2" PVC Riser / 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
8:15 a.m	1,000+	Grey, cloudy
8:19 a.m.	110	
8:30 a.m.	120	
8:35 a.m.	45	
8:45 a.m.	12	

Total Development Time:	30 minutes
Final Turbidity Reading:	12 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-4	**Client Phone:**	(407) 867-4121
Date:	8-19-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Westem-IW-4I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
10:50 a.m.	1,000+	Grey
10:55 a.m.	140	
11:05 a.m.	55	
11:15 a.m.	19	Clear

Total Development Time:	25 minutes
Final Turbidity Reading:	19 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-4	**Client Phone:**	(407) 867-4121
Date:	8-13-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-4D	**Total Depth:**	50.0'
Screen Interval:	45.0 to 50.0' bls	**Well Type:**	Permanent
		Construction:	2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:00 a.m.	783	Cloudy, grey
9:10 a.m.	312	
9:20 a.m.	148	
9:25 a.m.	132	
9:35 a.m.	87	Murky
9:41 a.m.	63	Clear
9:45 a.m.	20.7	Clear

Total Development Time:	45 minutes
Final Turbidity Reading:	20.7 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT XVII

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO. 15467-005-01
REPORT NO.:
PAGE:

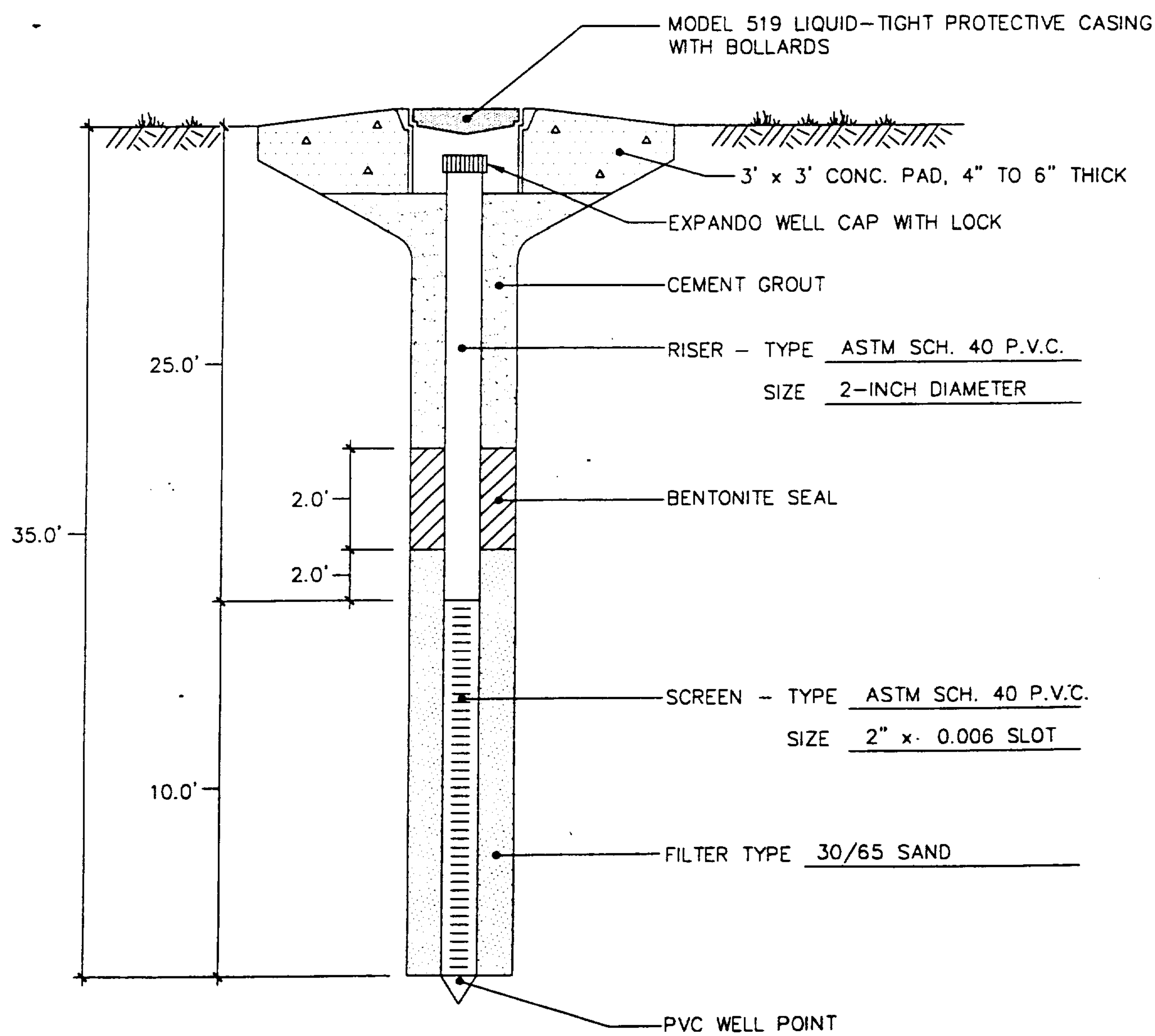
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/03/98

WELL NUMBER: MARSH-IW-51 LOCATION: D-5

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

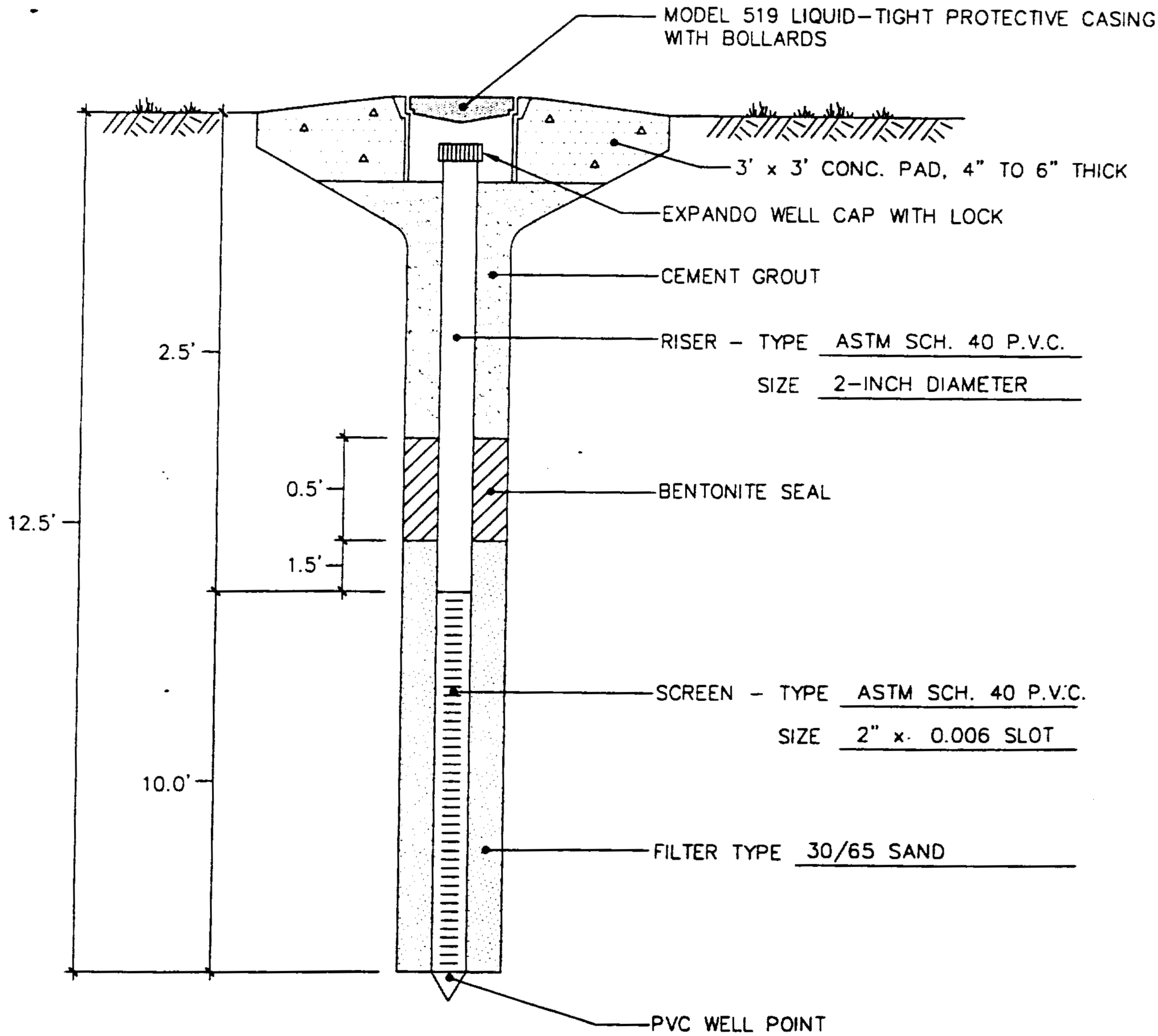
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/03/98

WELL NUMBER: MARSH-IW-5S LOCATION: D-5

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE: B-2.22

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **D-5** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 4.5
DATE OF READING: 08/03/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/3/98
DATE FINISHED: 8/3/98
DRILLED BY: UES - ROCKLEDGE
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Grass and brown SAND						
						Light gray fine SAND [SP]						
				▼		Very loose, dark brown silty fine SAND; with roots [SM]						
5	X	2-1-2	3									
	X	3-3-4	7			Loose, gray brown fine SAND; with silt and roots [SP-SM]						
	X	3-3-3	6			--- gray brown						
10	X	4-5-6	11			Medium dense, light gray fine SAND [SP]						
15	X	8-4-5	9			Loose, gray fine SAND; and shell [SP]						
20	X	5-2-5	7			Loose, gray SHELL; with sand						
25	X	10-12-13	25			Medium dense, gray fine SAND; and shells [SP]						
30	X	15-14-23	37									
35	X	7-10-17	27									
40	X	11-10-12	22			Medium dense, gray fine SAND [SP]						
45	X	5-6-5	11			Medium dense, gray fine SAND; with silt [SP-SM]						
50	X	5-5-5	10			Loose, gray fine SAND; with shells [SP]						
						BORING TERMINATED AT 50 FEET						
55												

EXHIBIT XXIII

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-4	**Client Phone:**	(407) 867-4121
Date:	8-17-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-4I	**Total Depth:**	33.0'
Screen Interval:	23.0 to 33.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
12:05 p.m.	No reading	
12:08 p.m.	39.6	
12:10 p.m.	52.1	
12:20 p.m.	253	
12:24 p.m.	67.3	
12:30 p.m.	37.5	
12:35 p.m.	32	
12:40 p.m.	23.2	

Total Development Time:	35 minutes
Final Turbidity Reading:	23.2 NTUs
Estimated Volume Removed:	40 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-4	**Client Phone:**	(407) 867-4121
Date:	8-17-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-4S	**Total Depth:**	12.5'
Screen Interval:	2.5 to 12.5' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
7:30 a.m.	No reading	
7:42 a.m.	72.9	
8:04 a.m.	194	
8:09 a.m.	142	
Stopped - rain		
11:10 a.m.	No reading	
11:18 a.m.	123	
11:31 a.m.	83.8	
11:45 a.m.	49.3	
12:05 p.m.	22.3	

Total Development Time:	94 minutes
Final Turbidity Reading:	22.3 NTUs
Estimated Volume Removed:	70 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-0[illegible]

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

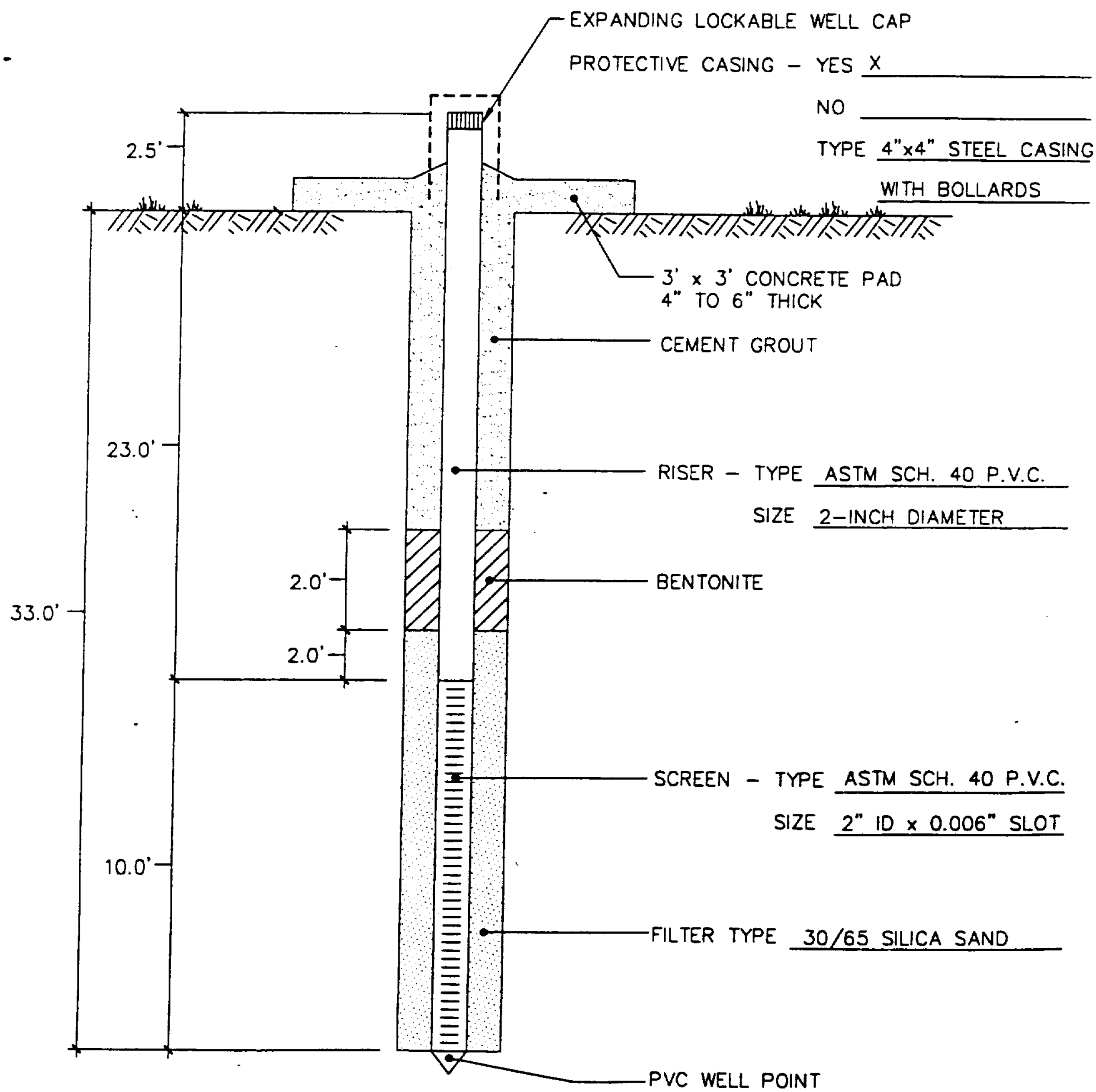
DATE: 08/17/98

WELL NUMBER: MARSH-IW-41

LOCATION: D-4

INSTALLED BY: UES - ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

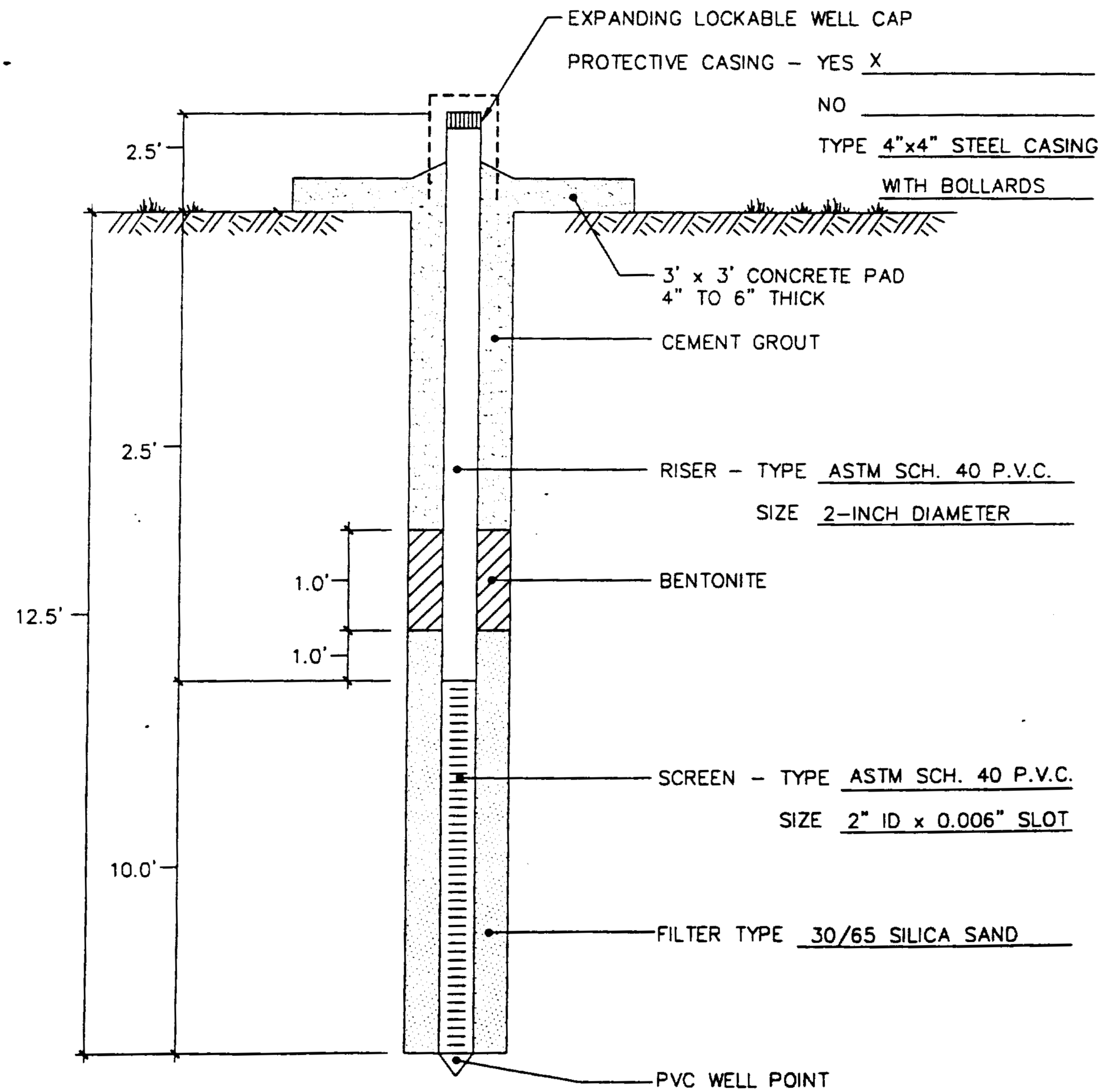
DATE: 08/17/98

WELL NUMBER: MARSH-IW-4S

LOCATION: D-4

INSTALLED BY: UES - ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
BORING LOG

REPORT NO.:
PAGE: B-2.22

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: D-4 SHEET: 1 of 1
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET. MARSH

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.0
DATE OF READING: 08/17/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/17/98
DATE FINISHED: 8/17/98
DRILLED BY: UES - D.B.
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Greenish gray fine SAND [SP]						
3				▼								
5	X	1-1-2	3			--- with shells						
	X	2-2-2	4									
	X	3-5-5	10									
	X	3-1-1	2			--- loose						
10						--- very loose						
	X	4-4-4	8									
15						--- loose, brown						
	X	5-6-6	12									
20						--- medium dense, little lighter						
	X	10-21-22	43									
25						--- dense, greenish gray with shells						
	X	8-19-21	40									
30						--- more shells						
	X	10-15-12	27									
35						--- not as many shells						
						BORING TERMINATED AT 35 FEET						
40												
45												
50												
55												

EXHIBIT XXII

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-3	**Client Phone:**	(407) 867-4121
Date:	8-11-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-3I	**Total Depth:**	34.0'
Screen Interval:	24.0 to 34.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:05 a.m.	200+	
	85.7	
	62.4	
	32.6	
9:20 a.m.	14.5	

Total Development Time:	15 minutes
Final Turbidity Reading:	14.5 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	**SOIL SCREENING RESULTS (OVA-PID):**

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-3	**Client Phone:**	(407) 867-4121
Date:	8-10-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-3S	**Total Depth:**	12.5'
Screen Interval:	2.5 to 12.5' bls	**Well Type:** / **Construction:**	Permanent / 2" PVC Riser / 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
11:10 a.m.	200+	
	135.7	
	73.4	
	34.6	
11:25 a.m.	15.3	

Total Development Time:	15 minutes
Final Turbidity Reading:	15.34 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 15487-006-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

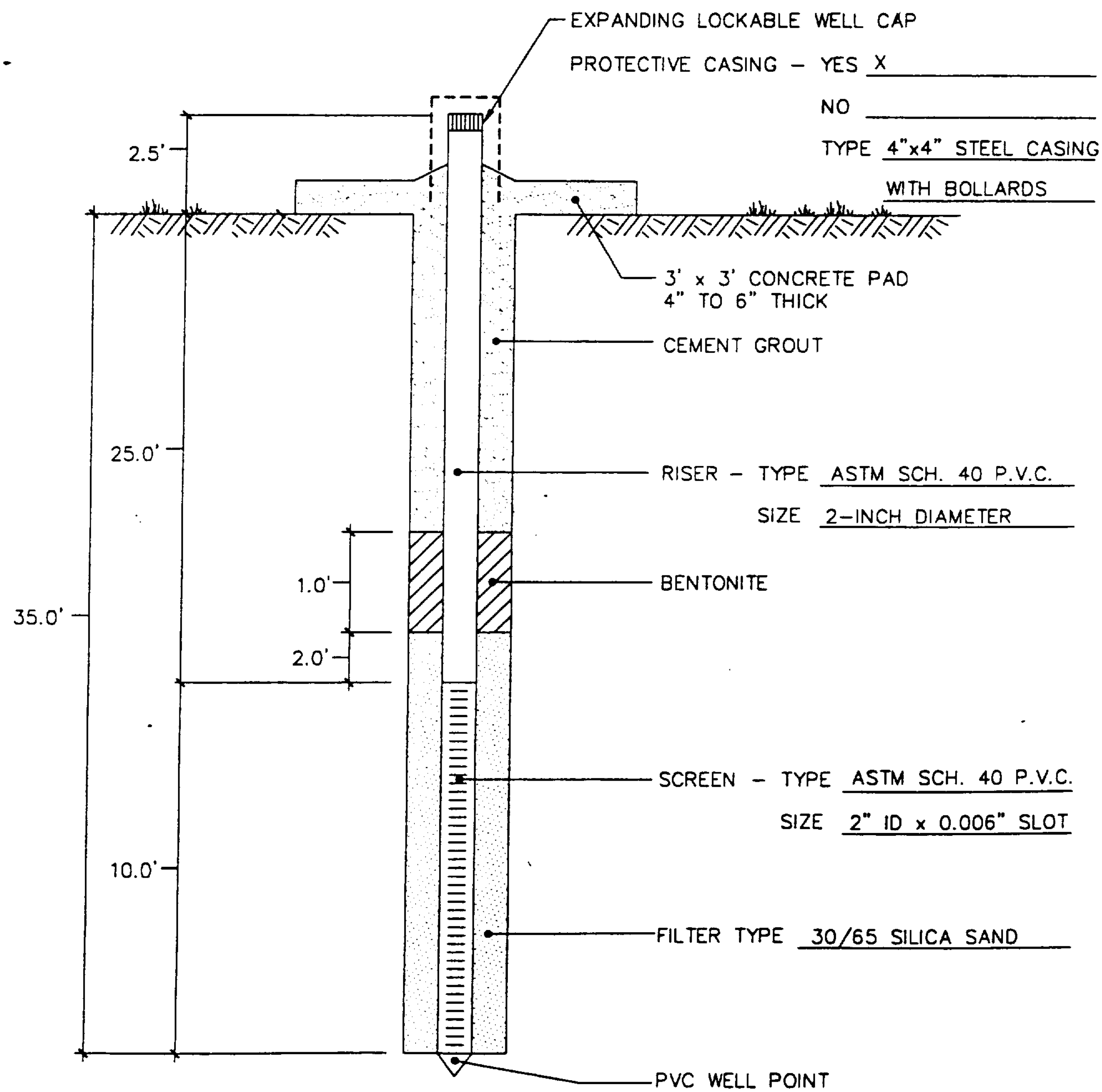
DATE: 08/11/98

WELL NUMBER: MARSH-IW-31

LOCATION: D-3

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 15467-005-01

REPORT NO.:

PAGE:

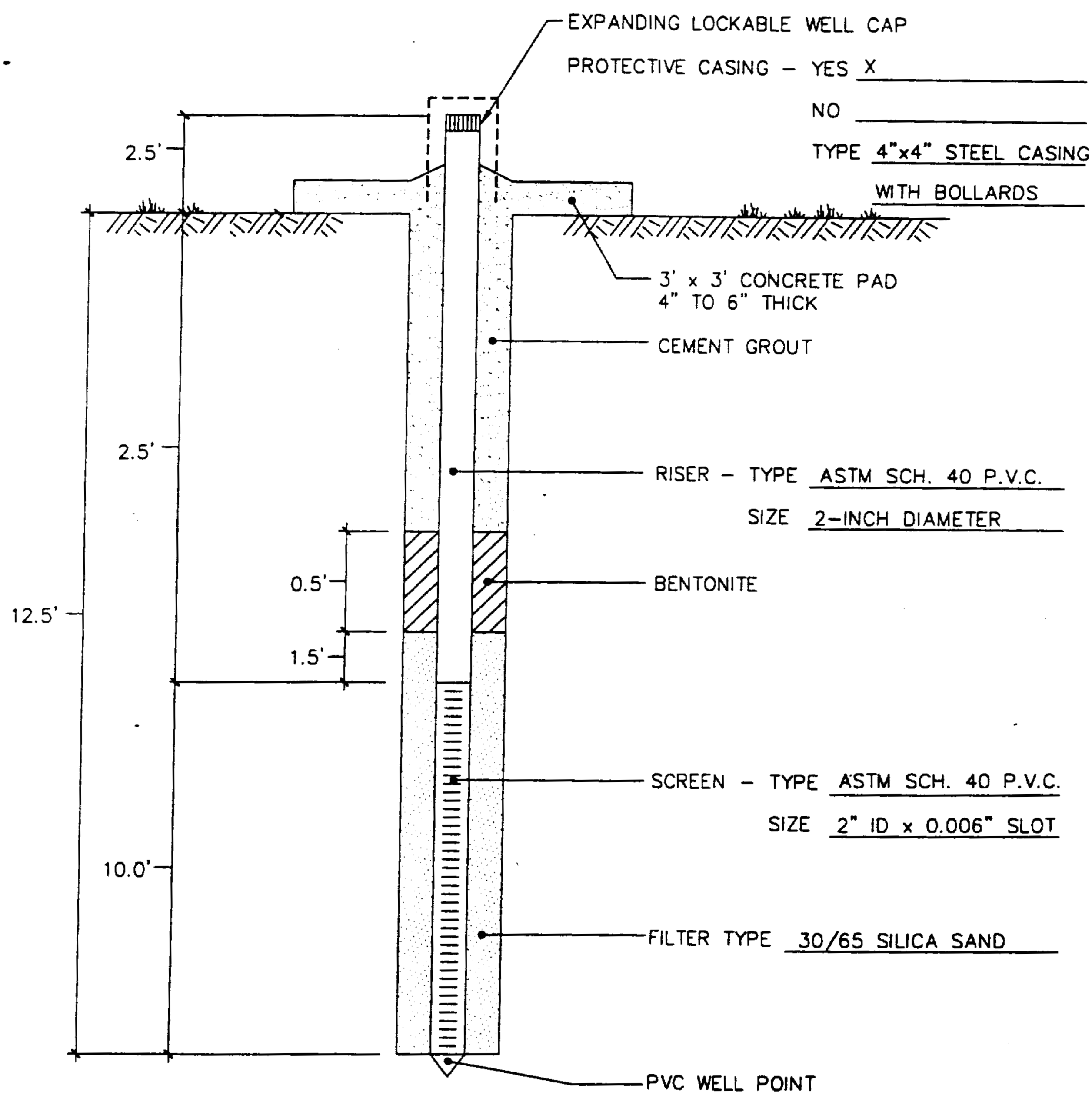
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D DATE: 08/10/98

WELL NUMBER: MARSH-IW-3S LOCATION: D-3

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.: 13437-005-01
REPORT NO.:
PAGE: B-2.21

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **D-3**
SHEET: **1 of 1**
SECTION:
TOWNSHIP:
RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.4
DATE OF READING: 08/10/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/10/98
DATE FINISHED: 8/10/98
DRILLED BY: UES - D.B.
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Loose, gray and light gray fine SAND; with clay [SP-SC]						
	X	4-5-3	8	▼								
	X	2-1-4	5			Loose, dark brown muck trace fine SAND; and organics [SP]						
5	X	3-2-3	5			Loose, gray-brown fine SAND; with roots [SP]						
	X	3-4-4	8									
	X	3-4-5	9			Loose, gray-brown fine SAND; trace silt						
	X	3-2-3	5			Loose, gray fine SAND; trace silt [SP-SM]						
10						Very loose, dark gray fine SAND; trace silt [SP-SM]						
	X	2-1-2	3									
15						Medium dense, dark gray fine SAND; with shell [SP]						
	X	7-7-8	15									
20						Very soft, dark gray CLAY; with shell						
	X	1-0-1	1									
25						Very soft, dark gray CLAY; trace shell [CL]						
	X	0-1-1	2									
30						Firm, dark gray CLAY; with sand and shell [CH]						
	X	3-2-4	6									
35												
	X	2-1-2	3									
40						— soft						
	X	3-4-2	6									
45						— firm						
	X	2-2-2									4	
50						— soft BORING TERMINATED AT 50 FEET						
55												

EXHIBIT XXI

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-2	**Client Phone:**	(407) 867-4121
Date:	8-6-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-2S	**Total Depth:**	12.5'
Screen Interval:	2.5 to 12.5' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
10:57 a.m.	200+	Silty/Cloudy
11:06 a.m.	200+	
11:15 a.m.	200+	
11:20 a.m.	136.7	Murky
11:38 a.m.	65.4	Clearer/Cloudy
11:47 a.m.	33.8	
11:55 a.m.	21.9	Clear
12:00 p.m.	17.9	

Total Development Time:	63 minutes
Final Turbidity Reading:	17.9 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.:	15467-005-01
REPORT NO.:	
PAGE:	

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

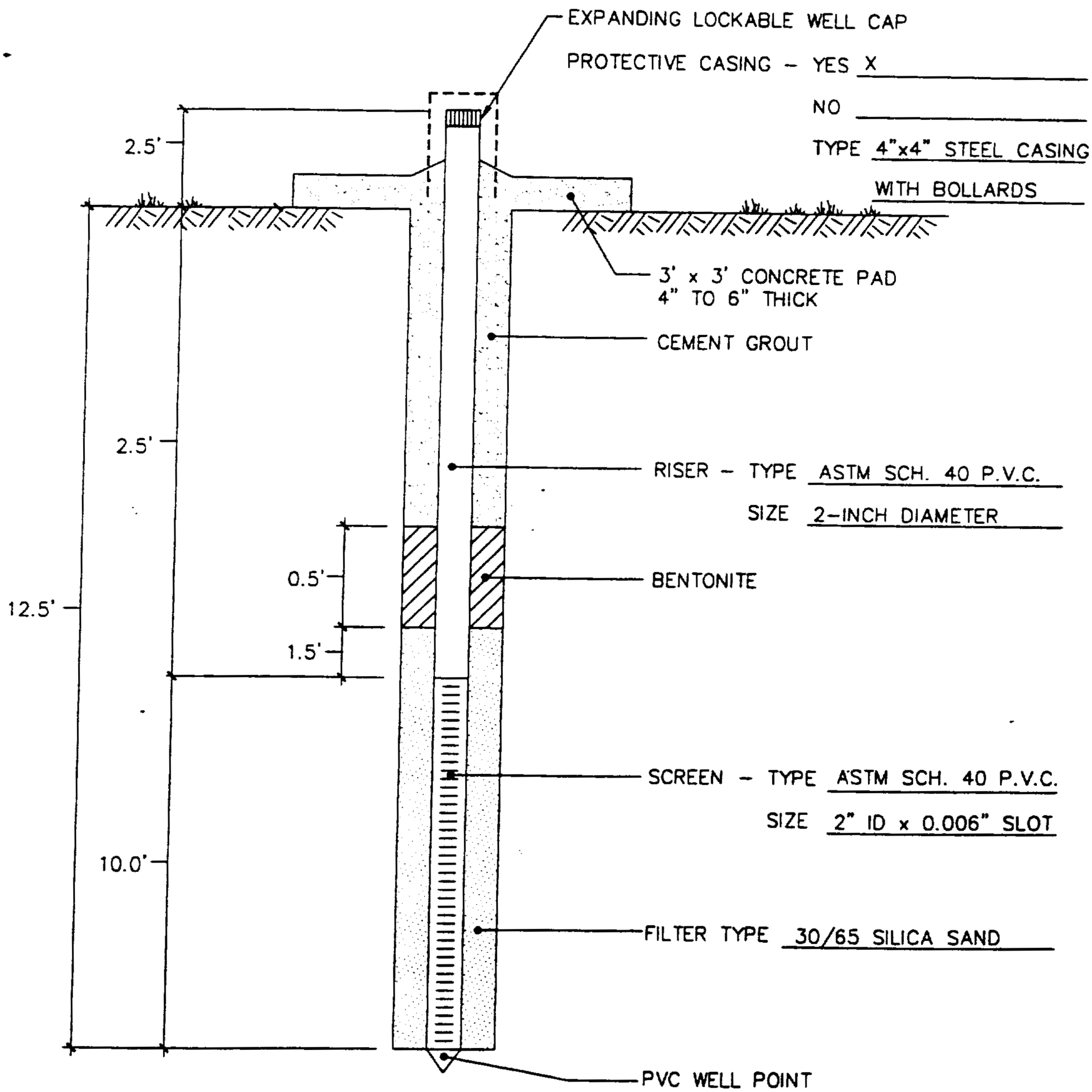
DATE: 08/06/98

WELL NUMBER: MARSH-IW-2S

LOCATION: D-2

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO	18467-005-0
REPORT NO	
PAGE	B-2.20

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: D-2 SHEET: 1 of 1
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 0.0
DATE OF READING: 08/06/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/6/98
DATE FINISHED: 8/6/98
DRILLED BY: UES - D.B.
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0				▼								
		2-3-4	7			Loose, gray-light gray fine SAND; some shell [SP]						
		3-3-5	8			Firm, dark gray CLAY [CH]						
5		1-1-2	3			Very loose, dark gray SILT; trace sand [ML]						
		1-1-1	2			— dark brown-dark gray						
		1-1-1	2			— dark gray, trace shell						
10		1-1-2	3			Very loose, dark gray fine SAND; with silt [SP-SM]						
						Medium dense, light gray SHELL; trace sand						
15		5-8-11	19									
						BORING TERMINATED AT 15 FEET						
20												
25												
30												
35												
40												
45												
50												
55												

EXHIBIT XX

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

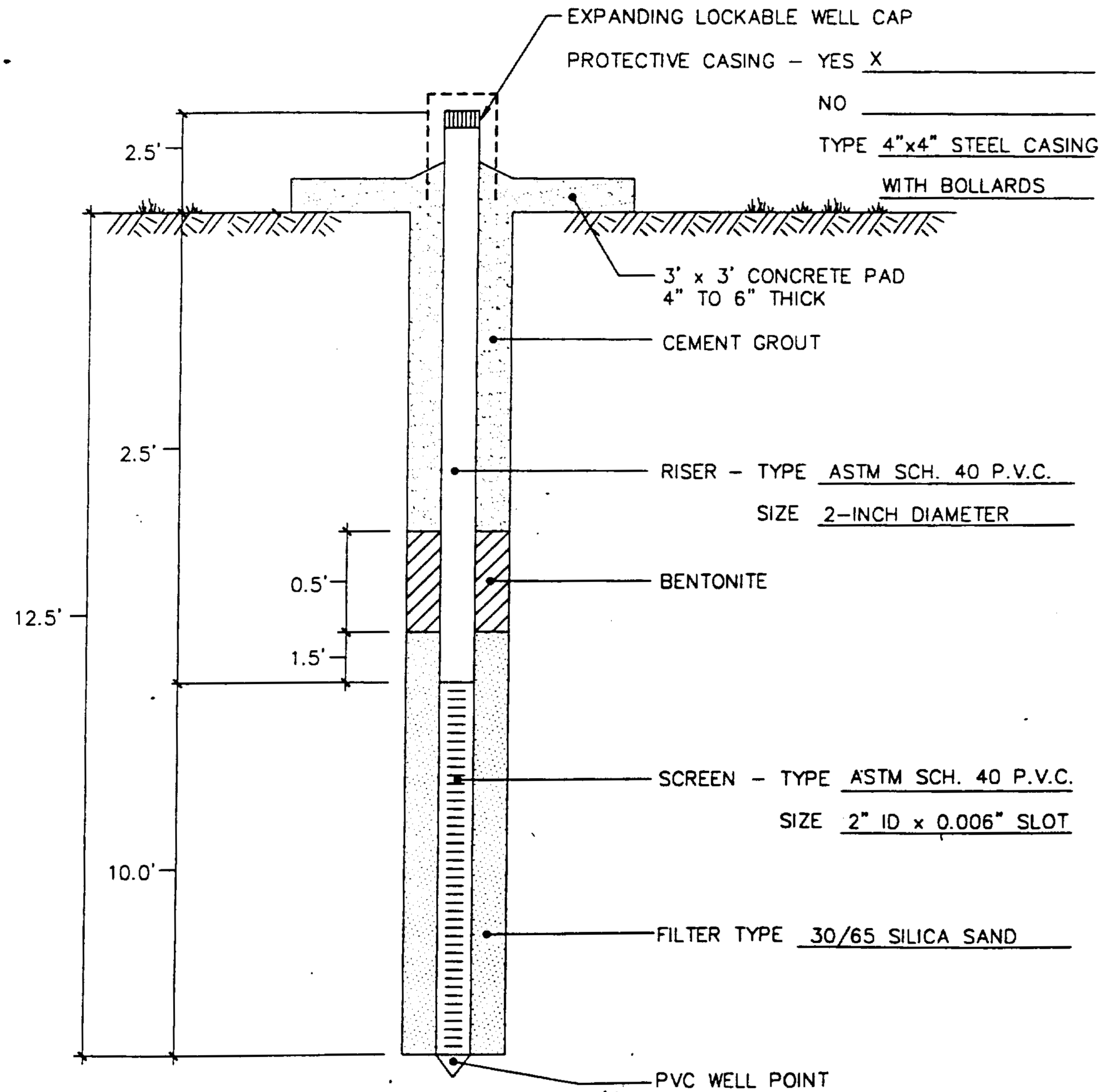
DATE: 08/06/98

WELL NUMBER: MARSH-IW-2S

LOCATION: D-2

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-1	**Client Phone:**	(407) 867-4121
Date:	8-4-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-1D	**Total Depth:**	50.0'
Screen Interval:	45.0 to 50.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
3:00 p.m.	234	Milky grey
3:15 p.m.	198	Milky grey
Stopped		Pumped well dry
3:40 p.m.	No reading	
3:45 p.m.	41	
Stopped		Pumped well dry
4:02 p.m.	No reading	
4:10 p.m.	47	Murky grey
4:25 p.m.	52	
4:36 p.m.	56	

Total Development Time:	54 minutes
Final Turbidity Reading:	56 NTUs
Estimated Volume Removed:	35 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-1	**Client Phone:**	(407) 867-4121
Date:	8-4-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-1I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
10:45 a.m.	200+	
10:50 a.m.	200+	
10:54 a.m.	132.5	
10:58 a.m.	67.5	
11:02 a.m.	27.3	
11:05 a.m.	14.7	

Total Development Time:	20 minutes
Final Turbidity Reading:	14.7 NTUs
Estimated Volume Removed:	80 gallons

COMMENTS:	**SOIL SCREENING RESULTS (OVA-PID):**

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-1	**Client Phone:**	(407) 867-4121
Date:	8-3-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-1S	**Total Depth:**	13.5'
Screen Interval:	3.5 to 13.5' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
4:45 p.m.	200+	
4:48 p.m.	57.2	
4:52 p.m.	31.9	
5:00 p.m.	15.2	

Total Development Time:	15 minutes
Final Turbidity Reading:	15.2 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 15467-005-01

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

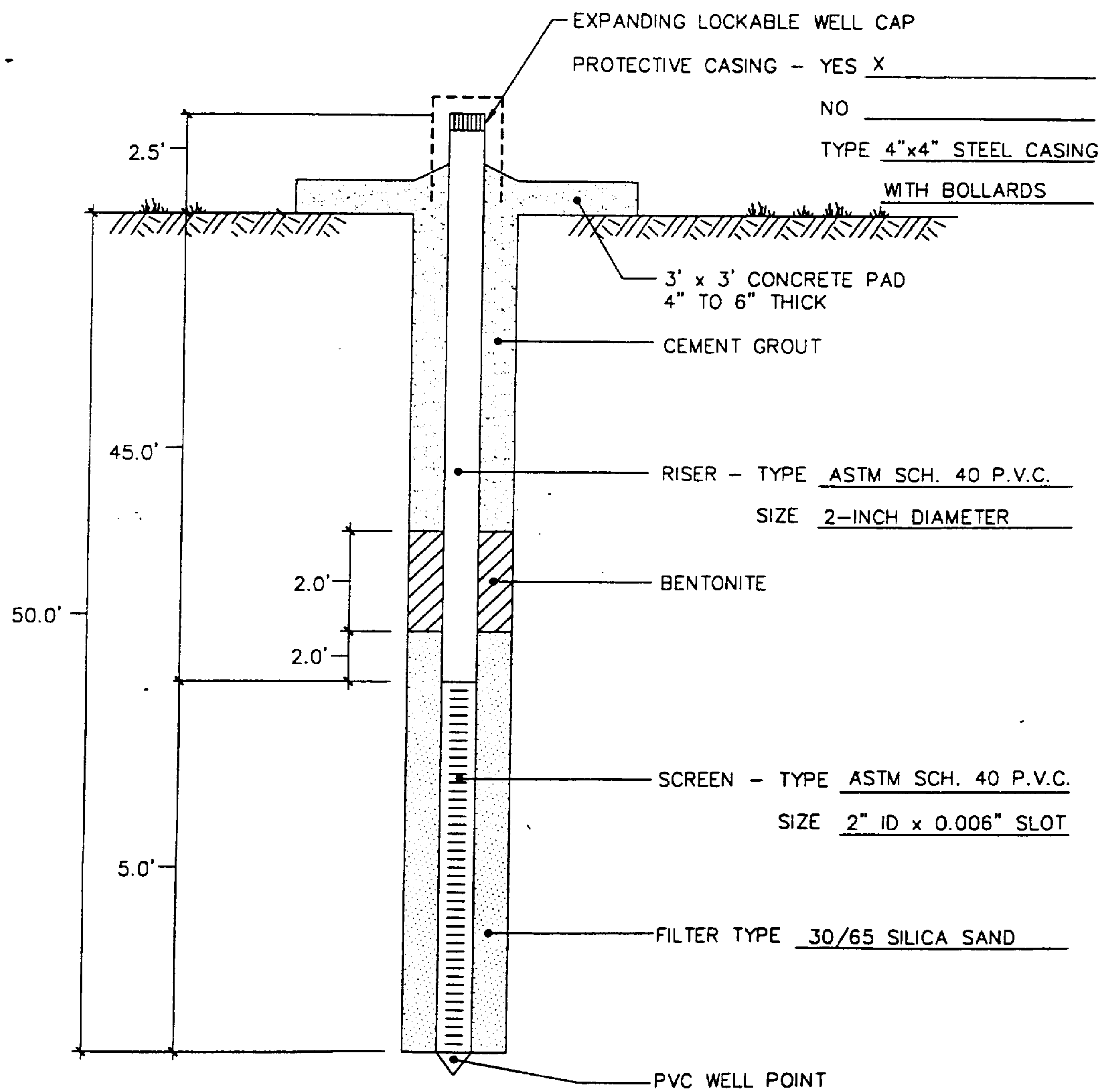
DATE: 08/07/98

WELL NUMBER: MARSH-IW-1D

LOCATION: D-1

INSTALLED BY: UES - ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

WELL COMPLETION LOG

PROJECT NO.: 18467-005-01

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

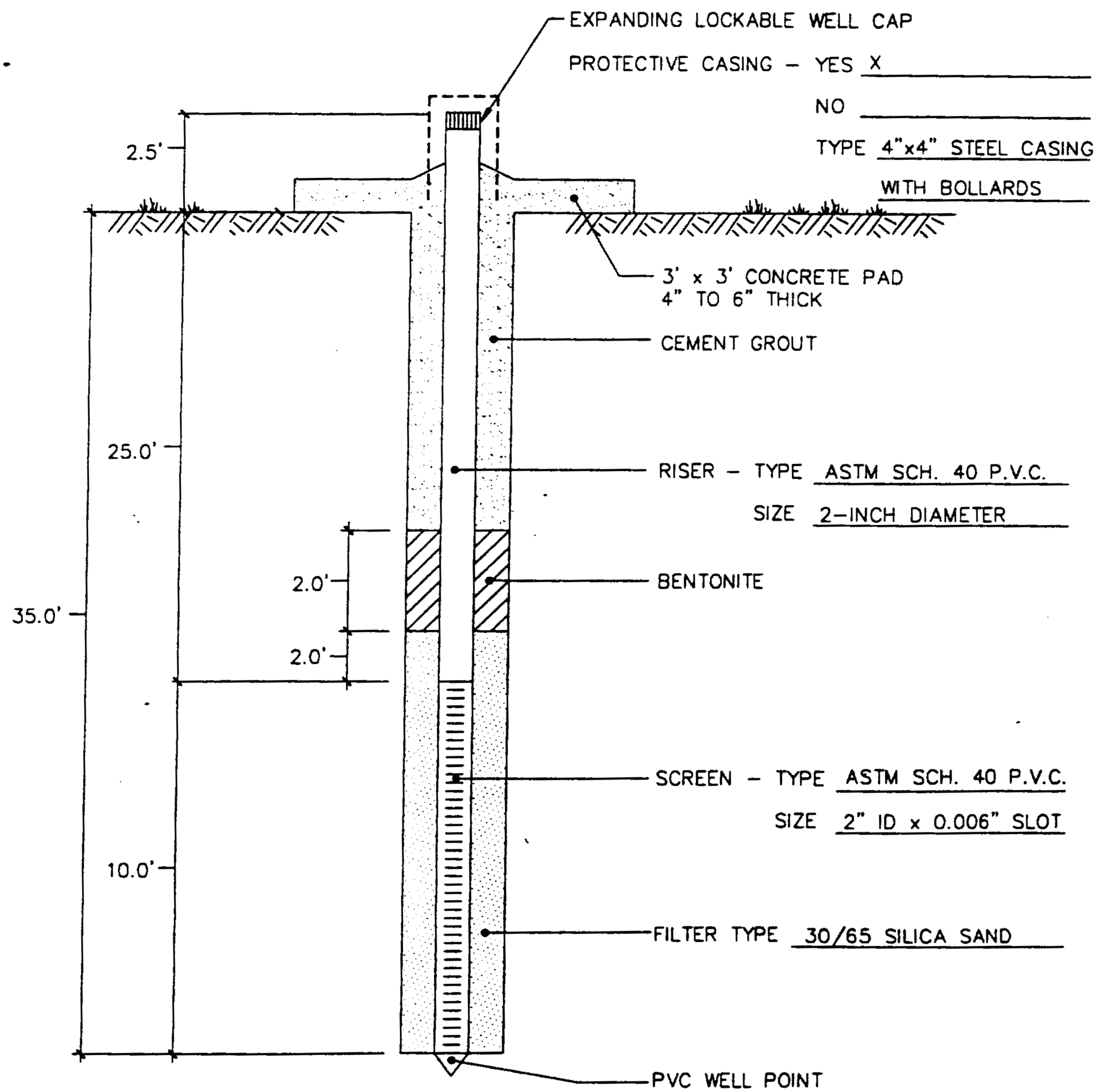
DATE: 08/04/98

WELL NUMBER: MARSH-IW-1I

LOCATION: D-1

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

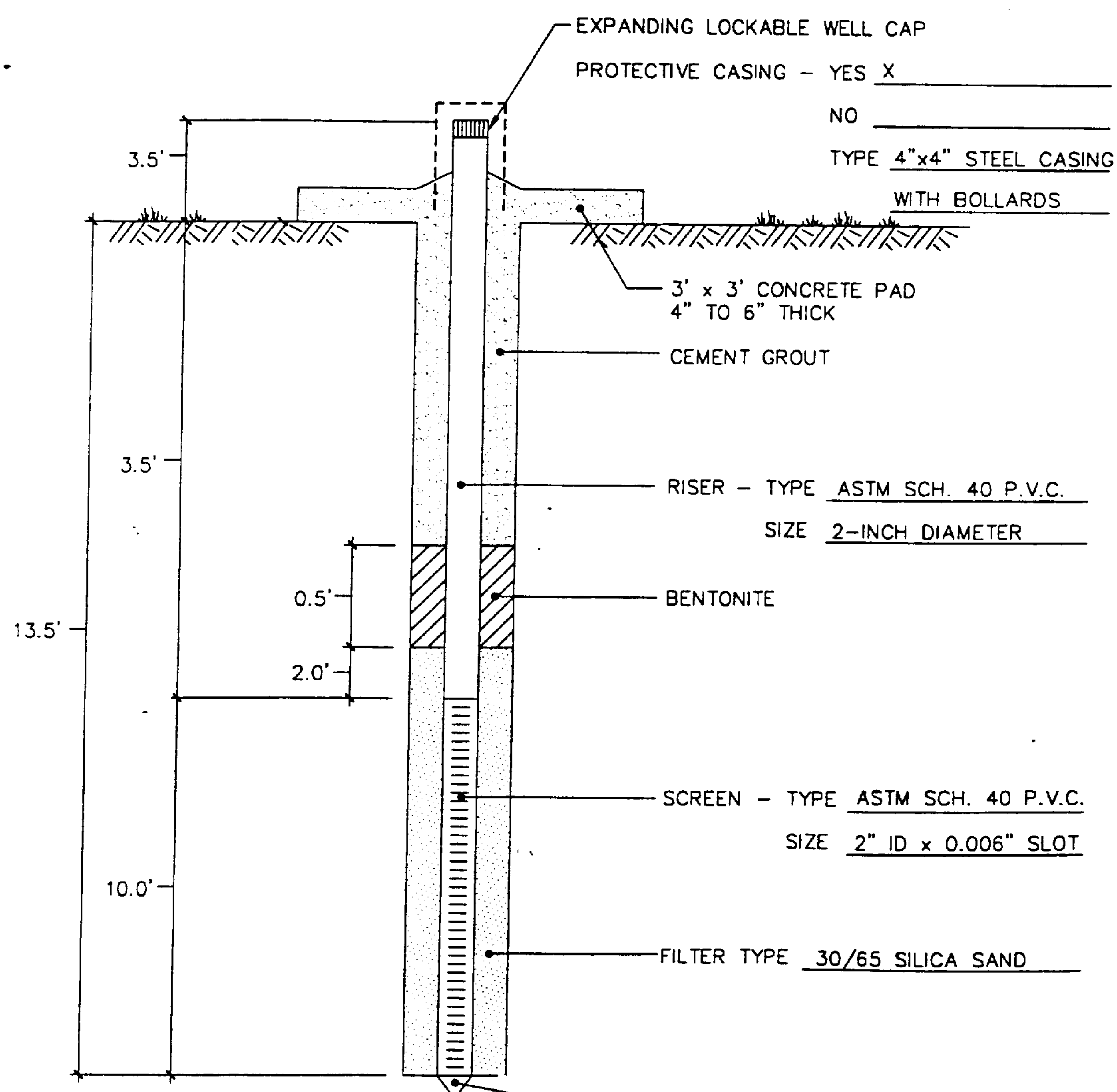
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D
DATE: 08/03/98

WELL NUMBER: MARSH-IW-1S
LOCATION: D-1

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO	1S467-005-01
REPORT NO	
PAGE	B-2.19

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **D-1** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS:

G.S. ELEVATION (ft):
WATER TABLE (ft): 5.3
DATE OF READING: 08/03/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/3/98
DATE FINISHED: 8/3/98
DRILLED BY: UES - D.B
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0												
	X	2-3-2	5			Loose, dark gray fine SAND; with silt [SP-SM]						
	X	2-3-3	6			— light gray						
5	X	3-3-4	7	▼		— blue gray						
	X	2-2-3	5			— dark gray with some silt						
	X	2-1-3	4			Very loose, dark gray fine SAND; with silt						
10	X	3-4-5	9			Loose, dark gray fine SAND; with silt trace shell [SP-SM]						
						Loose, gray SHELL						
						Very loose, blue dark gray CLAY; with shell [CH]						
15	X	2-1-1									2	
						Loose, dark gray fine SAND; trace silt and shell [SP-SM]						
20	X	2-2-5									7	
						Loose, dark gray fine SAND; some shell [SP]						
25	X	9-11-15									26	
						Medium dense, dark gray fine SAND; some silt [SP]						
30	X	11-9-15									24	
						Very loose, dark gray fine SAND; with silt trace shell [SP-SM]						
35	X	2-2-1									3	
						Soft, dark gray CLAY; with shell [CH]						
40	X	2-2-2									4	
45	X	1-2-2									4	
50	X	2-2-3									5	
						BORING TERMINATED AT 50 FEET						
55												

EXHIBIT XVIV

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract: **Reference:**	NAS10-12206(B)/DO-5/TD-002 Monitor Well Installation	**Client Name:** **Department:**	NASA JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-6	**Client Phone:**	(407) 867-4121
Date:	8-3-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-6S	**Total Depth:**	12.5'
Screen Interval:	2.5 to 12.5' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
11:55 a.m.	200+	Milky
12:05 p.m.	200+	Milky/Cloudy
12:12 p.m.	170.5	Cloudy
12:20 p.m.	200+	Milky
12:25 p.m.	101.3	Murky/Clear
12:28 p.m.	79.2	Murky/Clear

Total Development Time:	33 minutes
Final Turbidity Reading:	79.2 NTUs
Estimated Volume Removed:	165 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):
Well screen installed in sand with shell.	

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO. 18487-005-01

REPORT NO.:

PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS

KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

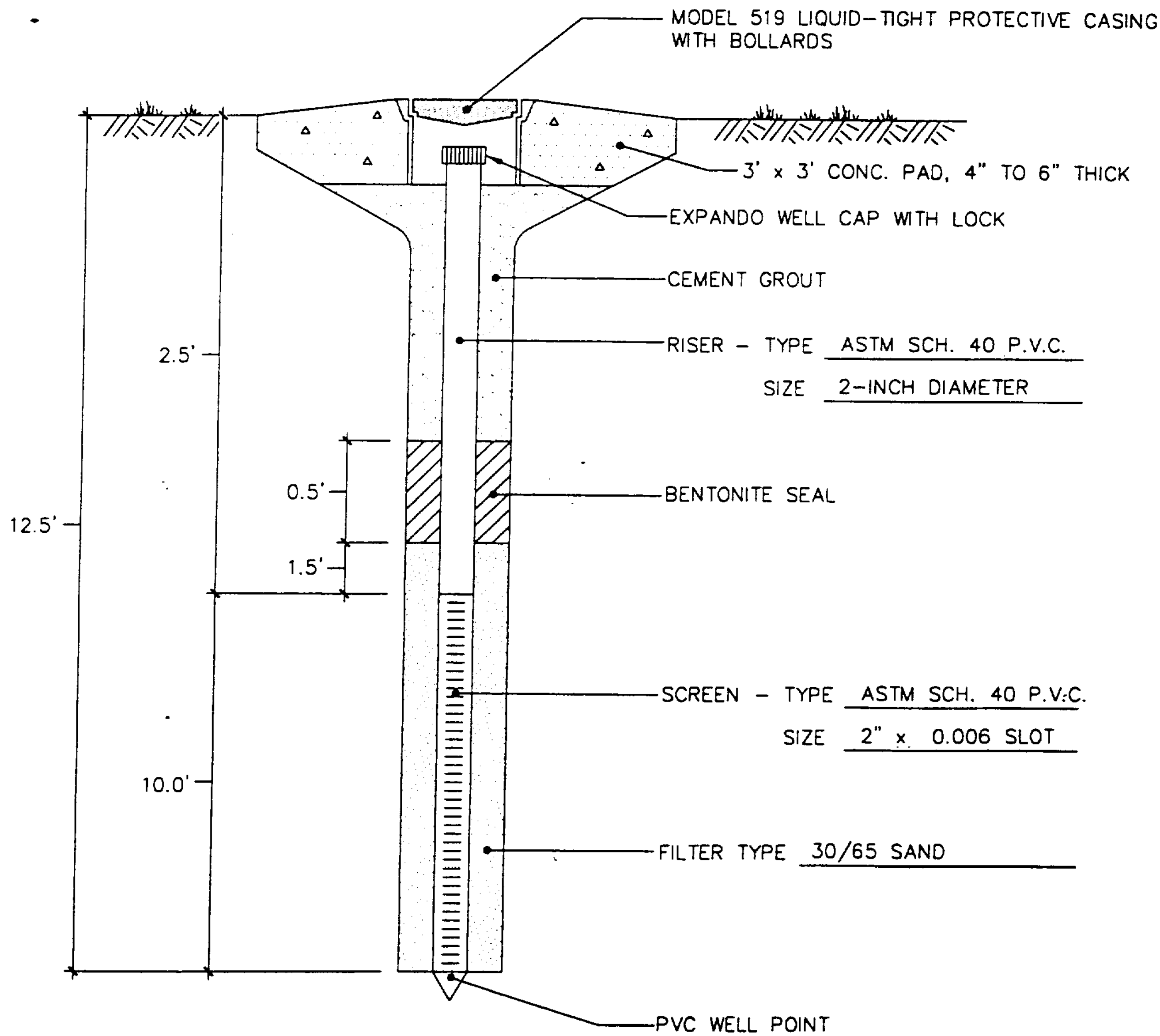
DATE: 08/03/98

WELL NUMBER: WESTERN-IW-6S

LOCATION: C-6

INSTALLED BY: UES - DAYTONA BEACH

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

BORING LOG

REPORT NO.:
PAGE: B-2.19

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: C-6
SHEET: 1 of 1
SECTION:
TOWNSHIP:
RANGE:

CLIENT: NASA JJ-D
LOCATION: AS SPECIFIED BY CLIENT
REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 3.8
DATE OF READING: 08/03/98
EST. W.S.W.T. (ft):

DATE STARTED: 8/3/98
DATE FINISHED: 8/3/98
DRILLED BY: UES - D.B.
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./DAY)	ORG. CONT. (%)
0						Dark gray fine SAND [SP]						
						— gray						
				▼		— dark brown						
						brown						
5	X	4-4-8	12			— gray-brown						
	X	7-9-11	20			Medium dense, gray SHELL; with sand						
	X	10-12-12	24			Medium dense, gray fine SAND; with shell [SP]						
10	X	13-11-14	25			Loose, light gray fine SAND; with shell [SP]						
15	X	2-2-3	5			BORING TERMINATED AT 15 FEET						
20												
25												
30												
35												
40												
45												
50												
55												

EXHIBIT XVIII

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-5	**Client Phone:**	(407) 867-4121
Date:	8-6-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-5I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:51 a.m.	1,000+	Milky
9:56 a.m.	728	Cloudy
10:01 a.m.	368	Cloudy
10:06 a.m.	142	Clear
10:12 a.m.	83.1	Clear
10:18 a.m.	48.5	Clear
10:20 a.m.	30.1	Clear
10:30 a.m.	20.1	Clear

Total Development Time:	39 minutes
Final Turbidity Reading:	20.1 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	**SOIL SCREENING RESULTS (OVA-PID):**

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	C-5	**Client Phone:**	(407) 867-4121
Date:	8-6-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Western-IW-5S	**Total Depth:**	13.5'
Screen Interval:	3.5 to 13.5' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
1:53 p.m.	1,060	Cloudy
1:57 p.m.	40.6	
1:59 p.m.	18.7	

Total Development Time:	6 minutes
Final Turbidity Reading:	18.7 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO:	15467-005-01
REPORT NO:	
PAGE:	

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

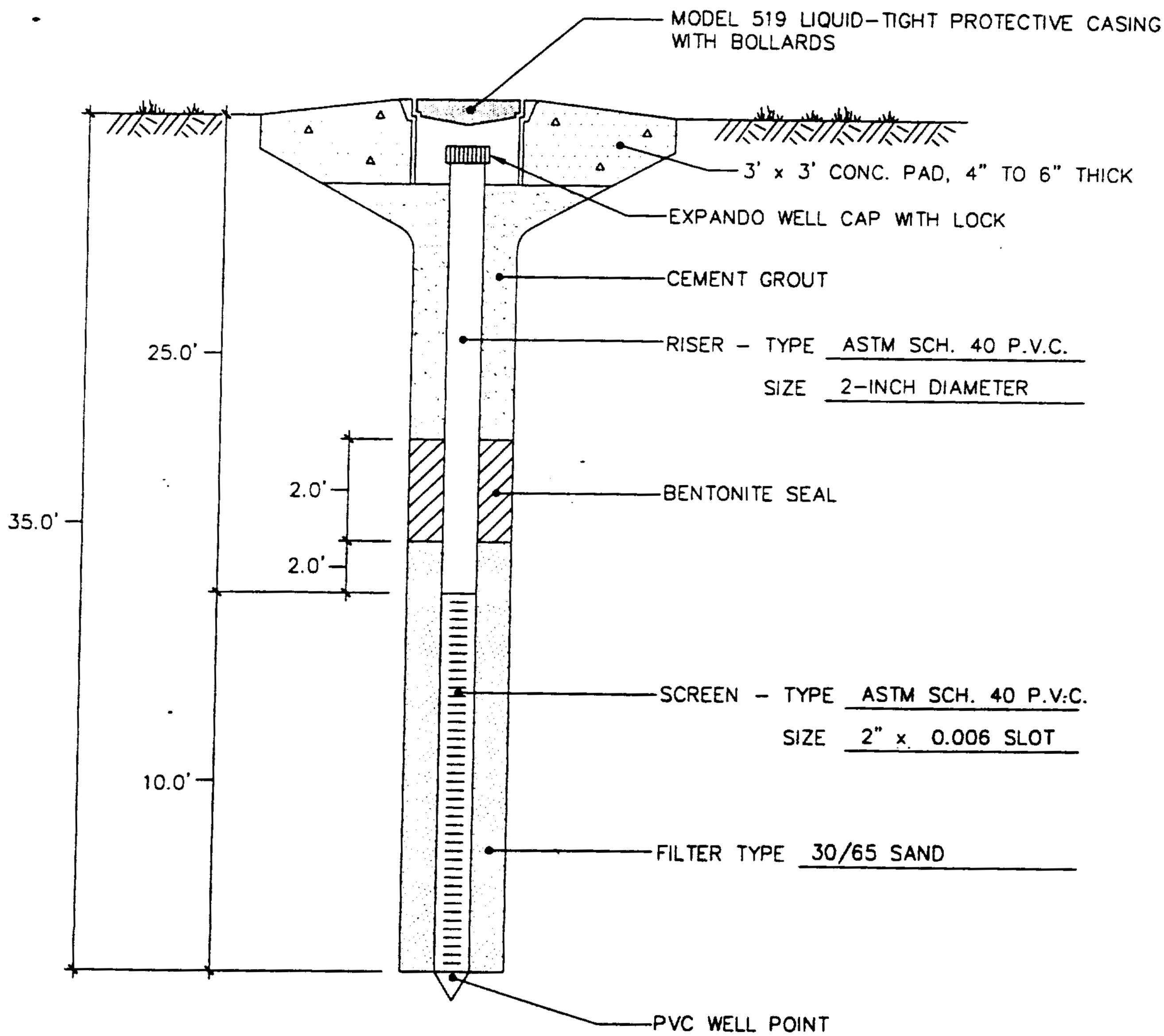
DATE: 08/06/98

WELL NUMBER: WESTERN-IW-51

LOCATION: C-5

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

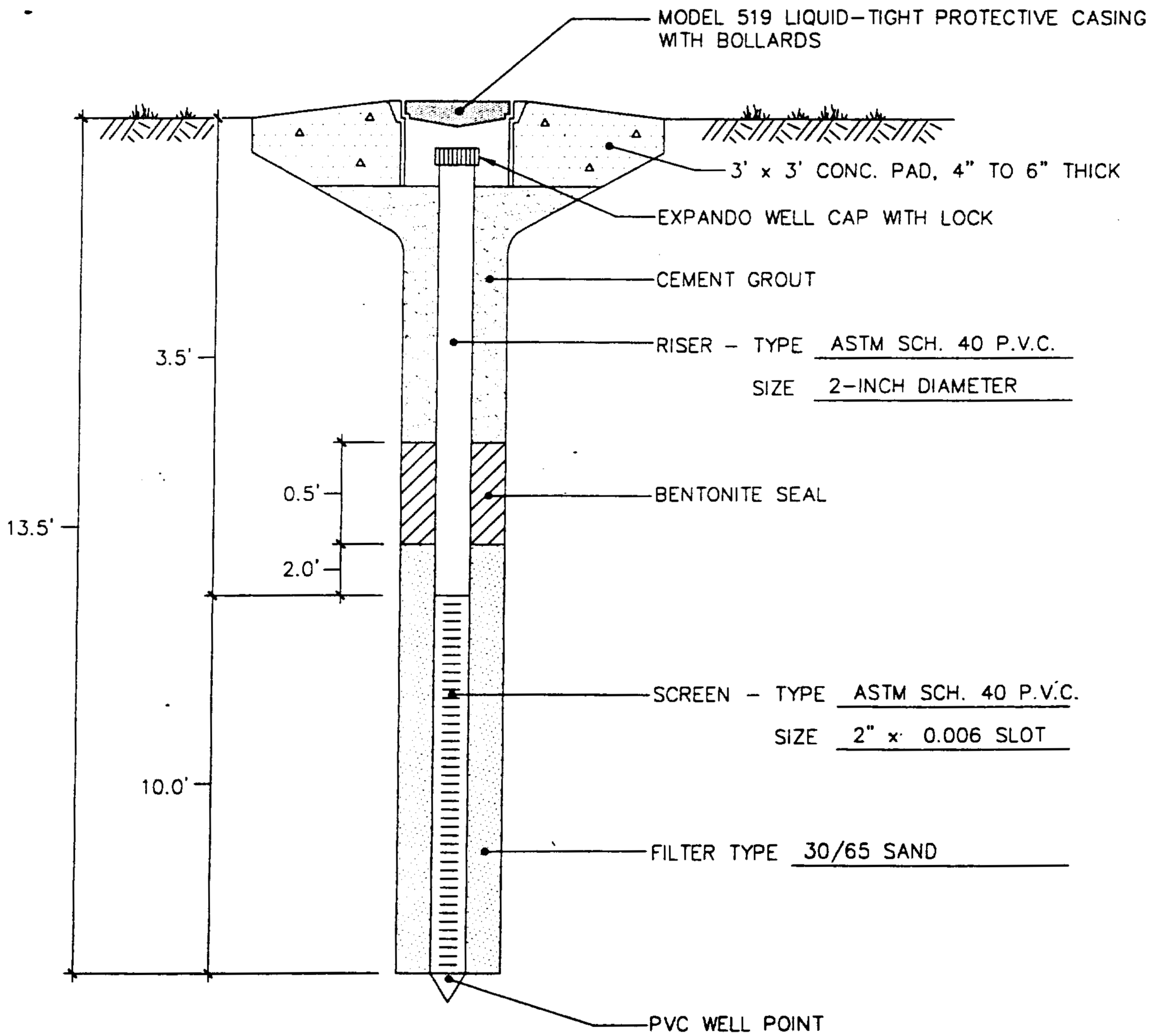
PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D   DATE: 08/06/98

WELL NUMBER: WESTERN-IW-5S   LOCATION: C-5

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



BORING LOG

REPORT NO.

PAGE: B-2.17

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

CLIENT: NASA JJ-D

LOCATION: AS SPECIFIED BY CLIENT

REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

BORING DESIGNATION: C-5 SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

G.S. ELEVATION (ft):

WATER TABLE (ft): 5.5

DATE OF READING: 08/05/98

EST. W.S.W.T. (ft):

DATE STARTED: 8/5/98

DATE FINISHED: 8/5/98

DRILLED BY: UES - ROCKLEDGE

TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						Gray fine SAND; with roots [SP]						
						Light brown fine SAND; with roots [SP]						
						Brown clayey fine SAND; with roots [SC]						
5	X	4-5-10	15	▼		Medium dense, brown fine SAND; with shell [SP]						
	X	10-12-15	27									
	X	7-8-9	17			Medium dense, gray fine SAND; with shell [SP]						
10	X	10-14-12	26			Medium dense, gray brown fine SAND; with shells [SP]						
15	X	7-10-13	23									
20	X	18-21-34	55			--- very dense						
25	X	14-19-23	42			--- dense						
30	X	5-10-13	23			--- medium dense						
35	X	7-9-12	21			Dense, gray fine SAND; with silt [SP-SM]						
						BORING TERMINATED AT 35 FEET						
40												
45												
50												
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

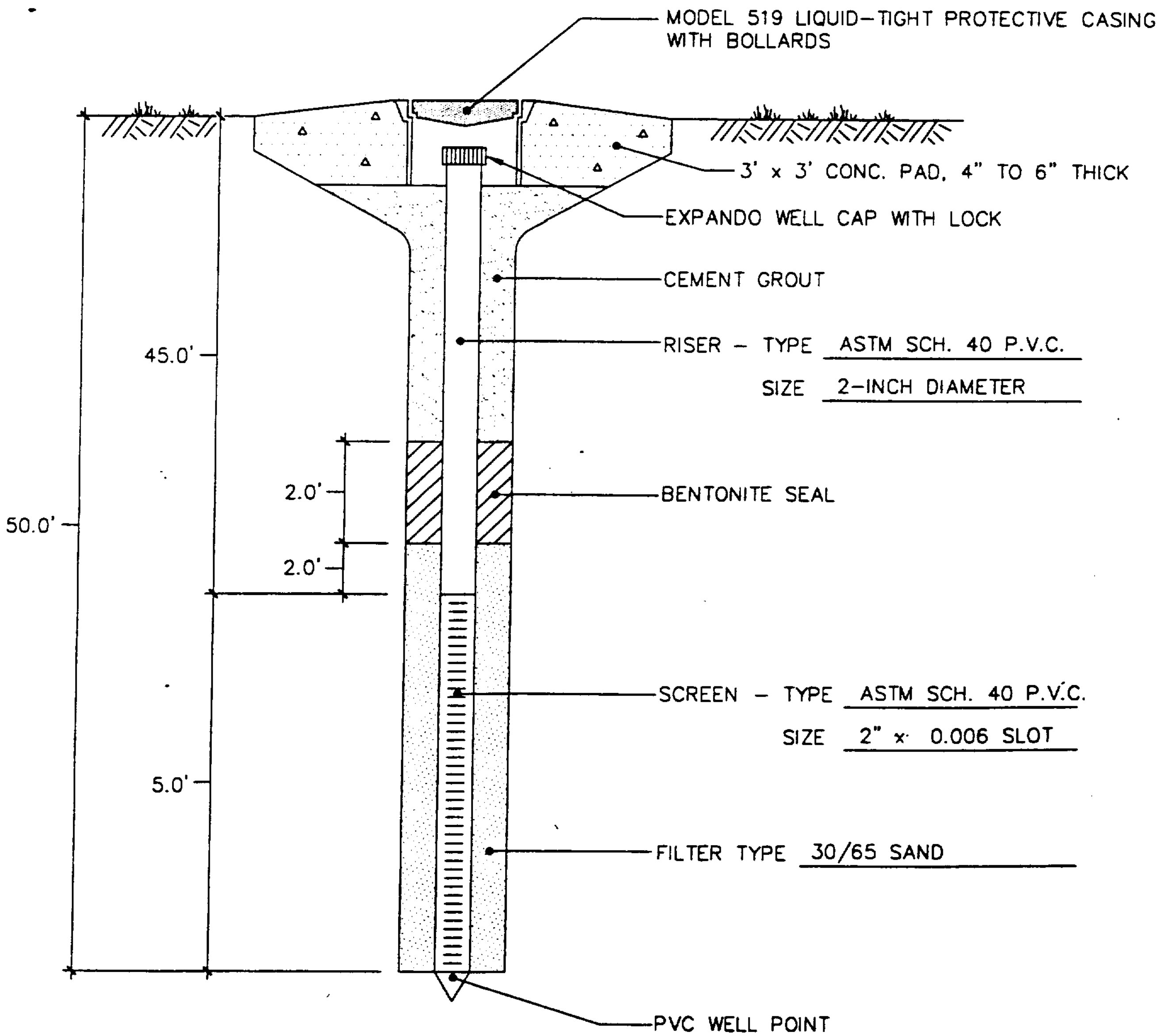
DATE: 08/06/98

WELL NUMBER: MARSH-IW-5D

LOCATION: D-5

INSTALLED BY: UES - ORLANDO

WELL DIAGRAM - NOT TO SCALE



UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-5	**Client Phone:**	(407) 867-4121
Date:	8-3-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-5S	**Total Depth:**	12.5'
Screen Interval:	2.5 to 12.5' bls	**Well Type:** / **Construction:**	Permanent / 2" PVC Riser / 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
2:15 p.m.	1,000+	Dark grey
2:20 p.m.	409	Grey
2:27 p.m.	130	Light grey
2:32 p.m.	87.3	Light grey
2:42 p.m.	59.3	Light grey
2:47 p.m.	41.9	Clear
2:51 p.m.	31.7	Clear

Total Development Time:	36 minutes
Final Turbidity Reading:	31.7 NTUs
Estimated Volume Removed:	110 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

UNIVERSAL ENGINEERING SCIENCES

STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-5	**Client Phone:**	(407) 867-4121
Date:	8-4-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-5I	**Total Depth:**	35.0'
Screen Interval:	25.0 to 35.0' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:50 a.m.	1,000+	Dark grey
9:59 a.m.	490	Light brown
10:09 a.m.	12.9	Clear

Total Development Time:	19 minutes
Final Turbidity Reading:	12.9 NTUs
Estimated Volume Removed:	165 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

	UNIVERSAL ENGINEERING SCIENCES
	STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	Client Name:	NASA
Reference:	Monitor Well Installation	Department:	JJ-D
Project No.:	18467-005-01	Client Contact:	Rosaly Santos-Ebaugh, RPM
Well Location:	D-5	Client Phone:	(407) 867-4121
Date:	8-6-98	Client Fax:	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-5D	Total Depth:	50.0'
Screen Interval:	45.0 to 50.0' bls	Well Type: Construction:	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	Flush mount with concrete pad and bollards	Development Method:	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:15 a.m.	No reading	
9:20 a.m.	67.5	Clear
9:25 a.m.	11.7	

Total Development Time:	10 minutes
Final Turbidity Reading:	11.7 NTUs
Estimated Volume Removed:	55 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

EXHIBIT XXIV

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

REPORT NO.

PAGE B-2.22

PROJECT: INSTALLATION OF 52 MONITOR WELLS
KENNEDY SPACE CENTER
BREVARD, FLORIDA

BORING DESIGNATION: **D-6** SHEET: **1 of 1**
SECTION: TOWNSHIP: RANGE:

CLIENT: NASA JJ-D

LOCATION: AS SPECIFIED BY CLIENT

REMARKS: HAND AUGER FROM 0 FEET TO 4 FEET

G.S. ELEVATION (ft):
WATER TABLE (ft): 2.8
DATE OF READING: 09/02/98
EST. W.S.W.T. (ft):

DATE STARTED: 9/2/98
DATE FINISHED: 9/2/98
DRILLED BY: UES - ROCKLEDGE
TYPE OF SAMPLING: ASTM D-1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	PI	K (FT./ DAY)	ORG. CONT. (%)
0						Dark gray fine SAND [SP]						
				▼		Dark gray fine SAND; with roots (muck)						
5	X	1-1-1	2			— very loose						
	X	0-0-0	0			Gray clayey fine SAND; with trace sand						
	X	1-3-8	11			— medium dense, shell						
10	X	7-7-6	13									
15	X	6-7-7	14			BORING TERMINATED AT 15 FEET						
20												
25												
30												
35												
40												
45												
50												
55												

UNIVERSAL ENGINEERING SCIENCES
WELL COMPLETION LOG

PROJECT NO.: 18467-005-01
REPORT NO.:
PAGE:

PROJECT: INSTALLATION 52 MONITOR WELLS
KENNEDY SPACE CENTER, FLORIDA

CLIENT: NASA JJ-D

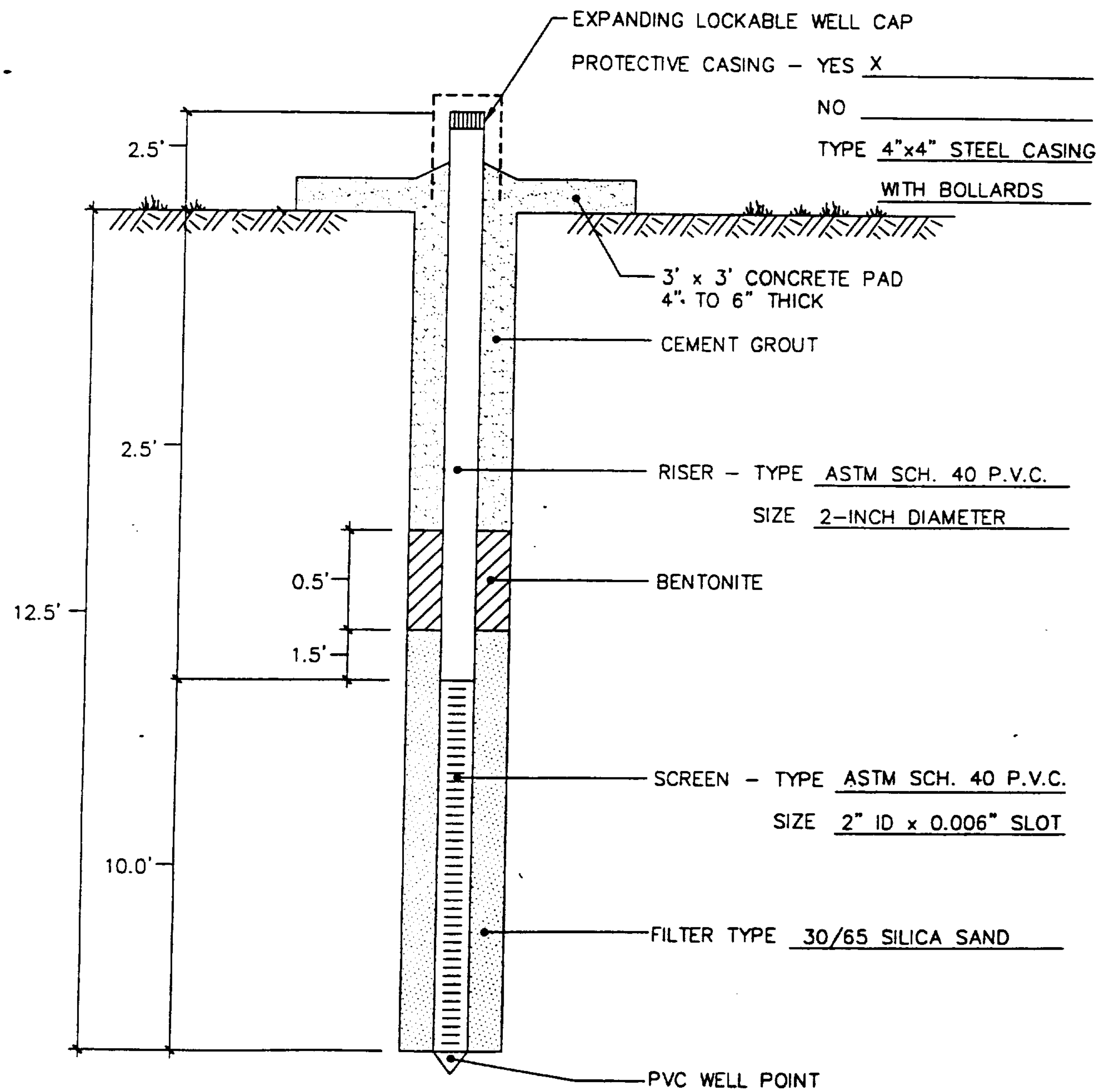
DATE: 09/02/98

WELL NUMBER: MARSH-IW-6S

LOCATION: D-6

INSTALLED BY: UES - ROCKLEDGE

WELL DIAGRAM - NOT TO SCALE



	UNIVERSAL ENGINEERING SCIENCES
	STANDARD WELL DEVELOPMENT LOG

PROJECT INFORMATION

Contract:	NAS10-12206(B)/DO-5/TD-002	**Client Name:**	NASA
Reference:	Monitor Well Installation	**Department:**	JJ-D
Project No.:	18467-005-01	**Client Contact:**	Rosaly Santos-Ebaugh, RPM
Well Location:	D-6	**Client Phone:**	(407) 867-4121
Date:	9-2-98	**Client Fax:**	(407) 867-8040

MONITOR WELL DATA

Well ID:	Marsh-IW-6S	**Total Depth:**	12.5'
Screen Interval:	2.5' to 12.5' bls	**Well Type:** **Construction:**	Permanent 2" PVC Riser 2" PVC Screen
Above Grade Protection:	4" x 4" Steel riser with concrete pad and bollards	**Development Method:**	Rotary Pump, Tremie Pipe

WELL DEVELOPMENT DATA

TIME	TURBIDITY (NTU)	GROUNDWATER APPEARANCE
9:00 a.m.	1,000+	Milky
9:15 a.m.	250	Cloudy
9:40 a.m.	90	Milky, Purged well dry
10:10 a.m.	12	

Total Development Time:	60 minutes
Final Turbidity Reading:	12 NTUs
Estimated Volume Removed:	40 gallons

COMMENTS:	SOIL SCREENING RESULTS (OVA-PID):

APPENDIX E

Surface Water Data for Kennedy Space Center

Table E-1. List of sample site descriptions for KSC Background Study surface water sampling locations.

Sampling Station	Classification	Description of site
AVE001	Ditch	End of Avenue E (or Radio Tower Road)
BCE004	Banana Creek	East Banana Creek
BCE012	Banana Creek	East side of Route 3 culvert
BCW014	Banana Creek	West of Route 3 culvert
BCW15	Banana Creek/Moore Creek	North end where Moore Creek enters Banana Creek.
BDP001	Black Point Dr.	Just before viewing site #3 near cedar tree
BPD002	Black Point Dr.	Before viewing tower near culvert
BRC09	Banana River	Pepper Flats channel seagrass transect
BRN18	Banana River	KSC Long Term Water station
BRN020	Banana River	SE corner of the manantee enclosures
BRS017	Banana River	Banana River East of radio tower
BRS019	Banana River	Banana River south of Hangar AF islands
HPC001	Happy Creek	Boat ramp on side road
IRL001	Indian River Lagoon	Indian River Lagoon
IRL002	Indian River Lagoon	Indian River Lagoon
IRL003	Indian River Lagoon	Indian River Lagoon south of Haulover near SE corner
IRL004	Indian River Lagoon	North side of Indian River by Titusville
IRL005	Indian River Lagoon	South side of Indian River by bridge
JER001	Ditch	Jerome Road
KPI001	Borrow Pit	Kars Park II
MAX01	Max Hoeck Back Creek	KSC Long Term Water station
MLN001	Mosquito Lagoon	60 degrees east of channel marker 21
MLN002	Mosquito Lagoon	South side of channel marker 34
MLS03	Mosquito Lagoon	KSC Long Term Water station
MOC021	Moore Creek	Moore Creek in C15-E
NSC001	Ditch	North side of NASA causeway
OCA010	Borrow Pit	Avenue 10 south of O&C building
PEF20	Banana River	Guard guard boat dock
PEF024	Banana River	Pepper Flats, south of PEF10 seagrass transect
REF001	Impoundment	Inside the refuge by Indian River
ROB001	Ditch	Robert's Road
SJBO2	Banana River	St. John's Water Management District station
SJML02	Mosquito Lagoon	St. John's Water Management District station
SLF001	Ditch	South side of the tow road before SLF
SR3-D1	Ditch	Ditch on the side road by the Lightning lab
SR3-D2	Ditch	Ditch on the SE corner of the SR 3 security station
SRE001	Ditch	Corner of Schwartz Road east and Static Test Road
SRW001	Ditch	Schwartz Road west of Route 3 about 1 mile E of the left curve
SRW002	Borrow Pit	Borrow Pit area towards Robert's Road
TEL004	Ditch	East side of road near cattle farm area

Table E-2. List of latitude, longitude, and Florida State Plane NAD27 coordinates (X and Y) for surface water sampling locations. Coordinates were collected with a Global Positioning System (GPS).

STATION	Latitude	Longitude	X Coordinate	Y Coordinate
AVE001	80.69322849	28.52090342	598514.128	1522152.539
BCE004	80.64351194	28.60581045	614387.966	1553067.047
BCE012	80.65900196	28.5989994	609424.635	1550576.197
BCW014	80.66519987	28.58589169	607449.071	1545804.885
BCW15	80.70782029	28.58526396	593771.175	1545540.843
BDP001	80.76606	28.65621191	575029.403	1571295.007
BPD002	80.77242619	28.67575843	572974.088	1578397.828
BRC09	80.60487976	28.57026397	626826.801	1540181.955
BRN18	80.60961147	28.52954257	625356.205	1525371.543
BRN020	80.59903326	28.50545843	628782.222	1516626.302
BRS017	80.64335991	28.46280848	614591.345	1501074.951
BRS019	80.60319886	28.4716421	627484.919	1504327.068
HPC001	80.65780787	28.61459092	609791.604	1556246.064
IRL001	80.83889609	28.75297154	551621.808	1606436.57
IRL002	80.79451931	28.75797648	565838.152	1608278.182
IRL003	80.74988309	28.71763042	580170.897	1593636.268
IRL004	80.78751796	28.62900032	568164.959	1561388.551
IRL005	80.7873466	28.62737116	568220.988	1560796.318
JER001	80.67294948	28.49271873	605054.318	1511922.49
KPI001	80.66836547	28.52125525	606498.129	1522301.693
MAX01	80.64482416	28.65136981	613917.706	1569630.363
MLN001	80.78613466	28.8272189	568479.428	1633458.667
MLN002	80.77062248	28.77136094	573485.593	1613158.581
MLS03	80.67589247	28.6873698	603917.396	1582691.051
MOC021	80.71047434	28.56152436	592940.249	1536907.581
NSC001	80.70887827	28.52626672	593483.727	1524089.979
OCA010	80.64316548	28.50784925	614605.174	1517450.808
PEF20	80.62070578	28.59374787	621719.838	1548703.816
PEF024	80.60367124	28.59328304	627187.023	1548552.521
REF001	80.77177926	28.63270232	573211.434	1562743.826
ROB001	80.6902763	28.54077212	599443.522	1529378.755
SJB02	80.63383414	28.43975227	617677.594	1492701.541
SJML02	80.71741362	28.7317818	590566.304	1598804.759
SLF001	80.66544776	28.59314977	607362.141	1548443.55
SR3-D1	80.72085799	28.70525556	589484.989	1589157.602
SR3-D2	80.74468642	28.72509064	581830.801	1596352.224
SRE001	80.61020229	28.56248671	625127.547	1537348.704
SRW001	80.69254774	28.56282572	598693.66	1537395.063
SRW002	80.66817001	28.55321287	606528.749	1533920.916
TEL004	80.67544479	28.47626649	604268.937	1505938.711

Table E-3. Parameters that were determined by the NASA/KSC Remediation Program team to be treated as below detection limits (non-detect) for all surface water locations based on low frequency of detection.

PAHs (8310)
Fluorene
Napthalene
Metals
Copper

Table E-4. Minimum, maximum, mean, and standard deviation of all surface water sampling stations with salinity 0-5 ppt. Certain values have combined means based on frequency of detection which was *<6, and **<12.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Dev.
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/L	13	ND	ND	ND	ND
4,4'-DDE	µg/L	13	ND	ND	ND	ND
4,4'-DDT	µg/L	13	ND	ND	ND	ND
Aldrin	µg/L	13	ND	ND	ND	ND
Alpha - BHC	µg/L	13	ND	ND	ND	ND
Beta - BHC	µg/L	13	ND	ND	ND	ND
Chlordane (alpha)	µg/L	13	ND	ND	ND	ND
Chlordane (gamma)	µg/L	13	ND	ND	ND	ND
Chlordane (total)	µg/L	13	ND	ND	ND	ND
Delta - BHC	µg/L	13	ND	ND	ND	ND
Dieldrin	µg/L	13	ND	ND	ND	ND
Endosulfan I	µg/L	13	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	13	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	13	ND	ND	ND	ND
Endrin	µg/L	13	ND	ND	ND	ND
Endrin Aldehyde	µg/L	13	ND	ND	ND	ND
Endrin Ketone	µg/L	13	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/L	13	ND	ND	ND	ND
Heptachlor	µg/L	13	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	13	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	13	ND	ND	ND	ND
Isodrin	µg/L	13	ND	ND	ND	ND
Methoxychlor	µg/L	13	ND	ND	ND	ND
Mirex	µg/L	13	ND	ND	ND	ND
Toxaphene	µg/L	13	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/L	13	ND	ND	ND	ND
PCB - 1221	µg/L	13	ND	ND	ND	ND
PCB - 1232	µg/L	13	ND	ND	ND	ND
PCB - 1248	µg/L	13	ND	ND	ND	ND
PCB - 1254	µg/L	13	ND	ND	ND	ND
PCB - 1260	µg/L	13	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	µg/L	13	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/L	13	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/L	13	ND	ND	ND	ND
3,5 - DCBA	µg/L	13	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/L	13	ND	ND	ND	ND
MCPP	µg/L	13	ND	ND	ND	ND

Table E-4. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Dev.
Chlorinated Herbicides (8151) (cont.)						
4 - Nitrophenol	μg/L	13	ND	ND	ND	ND
Acifluorfen	μg/L	13	ND	ND	ND	ND
Bentazon	μg/L	13	ND	ND	ND	ND
Chloramben	μg/L	13	ND	ND	ND	ND
Dacthal	μg/L	13	ND	ND	ND	ND
Dalapon	μg/L	13	ND	ND	ND	ND
Dicambia	μg/L	13	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	μg/L	13	ND	ND	ND	ND
Dinoseb	μg/L	13	ND	ND	ND	ND
MCPA	μg/L	13	ND	ND	ND	ND
Pentachlorophenol	μg/L	13	ND	ND	ND	ND
Picloram	μg/L	13	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	μg/L	13	ND	ND	ND	ND
2-Methylnaphthalene	μg/L	13	ND	ND	ND	ND
Acenaphthylene	μg/L	13	ND	ND	ND	ND
Anthracene	μg/L	13	ND	ND	ND	ND
Benzo(a)anthracene	μg/L	13	ND	ND	ND	ND
Benzo(a)pyrene	μg/L	13	ND	ND	ND	ND
Benzo(b)fluoranthene	μg/L	13	ND	ND	ND	ND
Benzo(g,h,i)perylene	μg/L	13	ND	ND	ND	ND
Benzo(k)fluoranthene	μg/L	13	ND	ND	ND	ND
Chrysene	μg/L	13	ND	ND	ND	ND
Dibenzo(a,h)anthracene	μg/L	13	ND	ND	ND	ND
Fluoranthene	μg/L	13	ND	ND	ND	ND
Fluorene	μg/L	13	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	μg/L	13	ND	ND	ND	ND
Naphthalene	μg/L	13	ND	ND	ND	ND
Phenanthrene	μg/L	13	ND	ND	ND	ND
Pyrene	μg/L	13	ND	ND	ND	ND
Metals						
Aluminum	mg/L	13	0.025	1.4	0.42	0.51
Antimony *	mg/L	13	0.003	0.026	0.008	0.008
Arsenic	mg/L	13	ND	ND	ND	ND
Barium	mg/L	13	ND	ND	ND	ND
Beryllium	mg/L	13	ND	ND	ND	ND
Cadmium	mg/L	13	ND	ND	ND	ND
Calcium	mg/L	13	22	340	98	85
Chloride	mg/L	13	20	14000	1527	3789
Chromium	mg/L	13	ND	ND	ND	ND
Cobalt	mg/L	13	ND	ND	ND	ND
Copper	mg/L	13	ND	ND	ND	ND
Iron	mg/L	13	0.05	2.3	0.49	0.61

Table E-4. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Dev.
Metals (cont.)						
Lead *	mg/L	13	0.003	0.013	0.004	0.003
Magnesium	mg/L	13	2.3	1400	139	380
Manganese **	mg/L	13	0.005	0.27	0.04	0.07
Mercury	mg/L	13	ND	ND	ND	ND
Nickel	mg/L	13	ND	ND	ND	ND
Potassium	mg/L	13	2.3	290	33	78
Selenium	mg/L	13	ND	ND	ND	ND
Silver	mg/L	13	ND	ND	ND	ND
Sodium	mg/L	13	9.8	7700	895	2064
Thallium	mg/L	13	ND	ND	ND	ND
Vanadium	mg/L	13	ND	ND	ND	ND
Zinc	mg/L	13	ND	ND	ND	ND

Table E-5. Minimum, maximum, mean, and standard deviation of all surface water sampling stations with salinity ≥ 6 ppt. Certain values have combined means based on frequency of detection which was *<16, **<10, and ***<5.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Dev.
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/L	33	ND	ND	ND	ND
4,4'-DDE	µg/L	33	ND	ND	ND	ND
4,4'-DDT	µg/L	33	ND	ND	ND	ND
Aldrin	µg/L	33	ND	ND	ND	ND
Alpha - BHC	µg/L	33	ND	ND	ND	ND
Beta - BHC	µg/L	33	ND	ND	ND	ND
Chlordane (alpha)	µg/L	33	ND	ND	ND	ND
Chlordane (gamma)	µg/L	33	ND	ND	ND	ND
Chlordane (total)	µg/L	33	ND	ND	ND	ND
Delta - BHC	µg/L	33	ND	ND	ND	ND
Dieldrin ***	µg/L	33	0.025	0.39	0.037	0.064
Endosulfan I	µg/L	33	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	33	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	33	ND	ND	ND	ND
Endrin	µg/L	33	ND	ND	ND	ND
Endrin Aldehyde	µg/L	33	ND	ND	ND	ND
Endrin Ketone	µg/L	33	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/L	33	ND	ND	ND	ND
Heptachlor	µg/L	33	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	33	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	33	ND	ND	ND	ND
Isodrin	µg/L	33	ND	ND	ND	ND
Methoxychlor	µg/L	33	ND	ND	ND	ND
Mirex	µg/L	33	ND	ND	ND	ND
Toxaphene	µg/L	33	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/L	33	ND	ND	ND	ND
PCB - 1221	µg/L	33	ND	ND	ND	ND
PCB - 1232	µg/L	33	ND	ND	ND	ND
PCB - 1248	µg/L	33	ND	ND	ND	ND
PCB - 1254	µg/L	33	ND	ND	ND	ND
PCB - 1260	µg/L	33	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	µg/L	33	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/L	33	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/L	33	ND	ND	ND	ND
3,5 - DCBA	µg/L	33	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/L	33	ND	ND	ND	ND
MCPP	µg/L	33	ND	ND	ND	ND

Table E-5. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Dev.
Chlorinated Herbicides (8151) (cont.)						
4 - Nitrophenol	µg/L	33	ND	ND	ND	ND
Acifluorfen	µg/L	33	ND	ND	ND	ND
Bentazon	µg/L	33	ND	ND	ND	ND
Chloramben	µg/L	33	ND	ND	ND	ND
Dacthal	µg/L	33	ND	ND	ND	ND
Dalapon	µg/L	33	ND	ND	ND	ND
Dicambia	µg/L	33	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	33	ND	ND	ND	ND
Dinoseb	µg/L	33	ND	ND	ND	ND
MCPA	µg/L	33	ND	ND	ND	ND
Pentachlorophenol	µg/L	33	ND	ND	ND	ND
Picloram	µg/L	33	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/L	33	ND	ND	ND	ND
2-Methylnaphthalene	µg/L	33	ND	ND	ND	ND
Acenaphthylene	µg/L	33	ND	ND	ND	ND
Anthracene	µg/L	33	ND	ND	ND	ND
Benzo(a)anthracene ***	µg/L	33	0.025	0.13	0.05	0.02
Benzo(a)pyrene ***	µg/L	33	0.025	0.22	0.06	0.04
Benzo(b)fluoranthene	µg/L	33	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/L	33	ND	ND	ND	ND
Benzo(k)fluoranthene ***	µg/L	33	0.025	0.21	0.05	0.03
Chrysene ***	µg/L	33	0.025	0.21	0.05	0.03
Dibenzo(a,h)anthracene	µg/L	33	ND	ND	ND	ND
Fluoranthene	µg/L	33	ND	ND	ND	ND
Fluorene	µg/L	33	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene ***	µg/L	33	0.025	0.13	0.05	0.02
Naphthalene	µg/L	33	ND	ND	ND	ND
Phenanthrene	µg/L	33	ND	ND	ND	ND
Pyrene	µg/L	33	ND	ND	ND	ND
Metals						
Aluminum	mg/L	33	0.025	1.9	0.448	0.503
Antimony *	mg/L	33	0.002	0.033	0.012	0.009
Arsenic **	mg/L	33	0.005	0.023	0.007	0.006
Barium	mg/L	33	ND	ND	ND	ND
Beryllium **	mg/L	33	0.0005	0.002	0.0005	0.0004
Cadmium	mg/L	33	ND	ND	ND	ND
Calcium	mg/L	33	140	550	304	89
Chloride	mg/L	33	2500	25000	12097	4803
Chromium	mg/L	33	ND	ND	ND	ND
Cobalt	mg/L	33	ND	ND	ND	ND
Copper	mg/L	33	ND	ND	ND	ND
Iron	mg/L	33	0.025	1.25	0.26	0.35

Table E-5. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Dev.
Metals (cont.)						
Lead *	mg/L	33	0.003	0.014	0.003	0.002
Magnesium	mg/L	33	0.005	0.065	0.035	0.014
Manganese ***	mg/L	33	0.005	0.065	0.012	0.014
Mercury	mg/L	33	ND	ND	ND	ND
Nickel	mg/L	33	ND	ND	ND	ND
Potassium	mg/L	33	55	600	311	142
Selenium ***	mg/L	33	0.005	0.025	0.017	0.006
Silver ***	mg/L	33	0.0002	0.005	0.001	0.0009
Sodium	mg/L	33	1700	12000	7006	2576
Thallium ***	mg/L	33	0.001	0.005	0.002	0.0009
Vanadium	mg/L	33	ND	ND	ND	ND
Zinc	mg/L	33	ND	ND	ND	ND

Table E-6. Minimum, maximum, mean, and standard deviation of each parameter analyzed in surface water samples classified as Banana Creek.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/L	7	ND	ND	ND	ND
4,4'-DDE	µg/L	7	ND	ND	ND	ND
4,4'-DDT	µg/L	7	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/L	7	ND	ND	ND	ND
Aldrin	µg/L	7	ND	ND	ND	ND
Alpha – BHC	µg/L	7	ND	ND	ND	ND
Beta – BHC	µg/L	7	ND	ND	ND	ND
Chlordane (alpha)	µg/L	7	ND	ND	ND	ND
Chlordane (gamma)	µg/L	7	ND	ND	ND	ND
Chlordane (total)	µg/L	7	ND	ND	ND	ND
Delta – BHC	µg/L	7	ND	ND	ND	ND
Dieldrin	µg/L	7	ND	ND	ND	ND
Endosulfan I	µg/L	7	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	7	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	7	ND	ND	ND	ND
Endrin	µg/L	7	ND	ND	ND	ND
Endrin Aldehyde	µg/L	7	ND	ND	ND	ND
Endrin Ketone	µg/L	7	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/L	7	ND	ND	ND	ND
Heptachlor	µg/L	7	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	7	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	7	ND	ND	ND	ND
Isodrin	µg/L	7	ND	ND	ND	ND
Methoxychlor	µg/L	7	ND	ND	ND	ND
Mirex	µg/L	7	ND	ND	ND	ND
Toxaphene	µg/L	7	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/L	7	ND	ND	ND	ND
PCB - 1221	µg/L	7	ND	ND	ND	ND
PCB - 1232	µg/L	7	ND	ND	ND	ND
PCB - 1248	µg/L	7	ND	ND	ND	ND
PCB - 1254	µg/L	7	ND	ND	ND	ND
PCB - 1260	µg/L	7	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	µg/L	7	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/L	7	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/L	7	ND	ND	ND	ND
3,5 - DCBA	µg/L	7	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/L	7	ND	ND	ND	ND

Table E-6. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
4 - Nitrophenol	μg/L	7	ND	ND	ND	ND
Acifluorfen	μg/L	7	ND	ND	ND	ND
Bentazon	μg/L	7	ND	ND	ND	ND
Chloramben	μg/L	7	ND	ND	ND	ND
Dacthal	μg/L	7	ND	ND	ND	ND
Dalapon	μg/L	7	ND	ND	ND	ND
Dicambia	μg/L	7	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	μg/L	7	ND	ND	ND	ND
Dinoseb	μg/L	7	ND	ND	ND	ND
MCPA	μg/L	7	ND	ND	ND	ND
MCPP	μg/L	7	ND	ND	ND	ND
Pentachlorophenol	μg/L	7	ND	ND	ND	ND
Picloram	μg/L	7	ND	ND	ND	ND
Sum of Chlorinated Herbicides	μg/L	7	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	μg/L	7	ND	ND	ND	ND
2-Methylnaphthalene	μg/L	7	ND	ND	ND	ND
Acenaphthylene	μg/L	7	ND	ND	ND	ND
Anthracene	μg/L	7	ND	ND	ND	ND
Benzo(a)anthracene	μg/L	7	ND	ND	ND	ND
Benzo(a)pyrene	μg/L	7	ND	ND	ND	ND
Benzo(b)fluoranthene	μg/L	7	ND	ND	ND	ND
Benzo(g,h,i)perylene	μg/L	7	ND	ND	ND	ND
Benzo(k)fluoranthene	μg/L	7	ND	ND	ND	ND
Chrysene	μg/L	7	ND	ND	ND	ND
Dibenzo(a,h)anthracene	μg/L	7	ND	ND	ND	ND
Fluoranthene	μg/L	7	ND	ND	ND	ND
Fluorene	μg/L	7	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	μg/L	7	ND	ND	ND	ND
Naphthalene	μg/L	7	ND	ND	ND	ND
Phenanthrene	μg/L	7	ND	ND	ND	ND
Pyrene	μg/L	7	ND	ND	ND	ND
Sum of Polyaromatic Hydrocarbons	μg/L	7	ND	ND	ND	ND
Metals						
Aluminum	mg/L	7	0.24	1.9	1.1	0.61
Antimony	mg/L	7	0.003	0.015	0.006	0.004
Arsenic	mg/L	7	0.005	0.016	0.008	0.004
Barium	mg/L	7	ND	ND	ND	ND
Beryllium	mg/L	7	ND	ND	ND	ND
Cadmium	mg/L	7	ND	ND	ND	ND
Calcium	mg/L	7	220	380	311.43	76.69
Chloride	mg/L	7	8000	18000	12414.29	4046.57
Chromium	mg/L	7	ND	ND	ND	ND

Table E-6. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Cobalt	mg/L	7	ND	ND	ND	ND
Copper	mg/L	7	ND	ND	ND	ND
Iron	mg/L	7	0.07	1.2	0.64	0.42
Lead	mg/L	7	ND	ND	ND	ND
Magnesium	mg/L	7	580	1100	857.14	244.45
Manganese	mg/L	7	0.005	0.042	0.013	0.013
Mercury	mg/L	7	ND	ND	ND	ND
Nickel	mg/L	7	ND	ND	ND	ND
Potassium	mg/L	7	150	340	258.57	92.45
Selenium	mg/L	7	ND	ND	ND	ND
Silver	mg/L	7	ND	ND	ND	ND
Sodium	mg/L	7	4400	8900	6714.29	2110.63
Thallium	mg/L	7	ND	ND	ND	ND
Vanadium	mg/L	7	ND	ND	ND	ND
Zinc	mg/L	7	ND	ND	ND	ND
Other Parameters						
Dissolved Oxygen	mg/L	7	3.72	10.25	6.88	2.70
Total Dissolved Solids	mg/L	7	14000	28000	21000	6531.97
Total Organic Carbon	mg/L	7	22	48	33.57	10.56

Table E-7. Minimum, maximum, mean, and standard deviation of each parameter analyzed in surface water samples classified as Banana River.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/L	8	ND	ND	ND	ND
4,4'-DDE	µg/L	8	ND	ND	ND	ND
4,4'-DDT	µg/L	8	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/L	8	ND	ND	ND	ND
Aldrin	µg/L	8	ND	ND	ND	ND
Alpha - BHC	µg/L	8	ND	ND	ND	ND
Beta - BHC	µg/L	8	ND	ND	ND	ND
Chlordane (alpha)	µg/L	8	ND	ND	ND	ND
Chlordane (gamma)	µg/L	8	ND	ND	ND	ND
Chlordane (total)	µg/L	8	ND	ND	ND	ND
Delta - BHC	µg/L	8	ND	ND	ND	ND
Dieldrin	µg/L	8	ND	ND	ND	ND
Endosulfan I	µg/L	8	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	8	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	8	ND	ND	ND	ND
Endrin	µg/L	8	ND	ND	ND	ND
Endrin Aldehyde	µg/L	8	ND	ND	ND	ND
Endrin Ketone	µg/L	8	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/L	8	ND	ND	ND	ND
Heptachlor	µg/L	8	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	8	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	8	ND	ND	ND	ND
Isodrin	µg/L	8	ND	ND	ND	ND
Methoxychlor	µg/L	8	ND	ND	ND	ND
Mirex	µg/L	8	ND	ND	ND	ND
Toxaphene	µg/L	8	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/L	8	ND	ND	ND	ND
PCB - 1221	µg/L	8	ND	ND	ND	ND
PCB - 1232	µg/L	8	ND	ND	ND	ND
PCB - 1248	µg/L	8	ND	ND	ND	ND
PCB - 1254	µg/L	8	ND	ND	ND	ND
PCB - 1260	µg/L	8	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	µg/L	8	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/L	8	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/L	8	ND	ND	ND	ND
3,5 - DCBA	µg/L	8	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/L	8	ND	ND	ND	ND

Table E-7. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
4 - Nitrophenol	µg/L	8	ND	ND	ND	ND
Acifluorfen	µg/L	8	ND	ND	ND	ND
Bentazon	µg/L	8	ND	ND	ND	ND
Chloramben	µg/L	8	ND	ND	ND	ND
Dacthal	µg/L	8	ND	ND	ND	ND
Dalapon	µg/L	8	ND	ND	ND	ND
Dicambia	µg/L	8	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	8	ND	ND	ND	ND
Dinoseb	µg/L	8	ND	ND	ND	ND
MCPA	µg/L	8	ND	ND	ND	ND
MCPP	µg/L	8	ND	ND	ND	ND
Pentachlorophenol	µg/L	8	ND	ND	ND	ND
Picloram	µg/L	8	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/L	8	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/L	8	ND	ND	ND	ND
2-Methylnaphthalene	µg/L	8	ND	ND	ND	ND
Acenaphthylene	µg/L	8	ND	ND	ND	ND
Anthracene	µg/L	8	ND	ND	ND	ND
Benzo(a)anthracene	µg/L	8	ND	ND	ND	ND
Benzo(a)pyrene	µg/L	8	0.05	0.18	0.07	0.05
Benzo(b)fluoranthene	µg/L	8	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/L	8	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/L	8	0.05	0.21	0.07	0.06
Chrysene	µg/L	8	ND	ND	ND	ND
Dibenzo(a,h)anthracene	µg/L	8	ND	ND	ND	ND
Fluoranthene	µg/L	8	ND	ND	ND	ND
Fluorene	µg/L	8	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/L	8	ND	ND	ND	ND
Naphthalene	µg/L	8	ND	ND	ND	ND
Phenanthrene	µg/L	8	ND	ND	ND	ND
Pyrene	µg/L	8	ND	ND	ND	ND
Sum of Polyaromatic Hydrocarbons	µg/L	8	ND	ND	ND	ND
Metals						
Aluminum	mg/L	8	0.025	0.72	0.207	0.255
Antimony	mg/L	8	0.003	0.021	0.008	0.007
Arsenic	mg/L	8	0.005	0.023	0.015	0.007
Barium	mg/L	8	ND	ND	ND	ND
Beryllium	mg/L	8	0.001	0.002	0.001	0.001
Cadmium	mg/L	8	ND	ND	ND	ND
Calcium	mg/L	8	200	250	226.25	15.98
Chloride	mg/L	8	6200	11000	8212.5	1956.26
Chromium	mg/L	8	ND	ND	ND	ND

Table E-7. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Cobalt	mg/L	8	ND	ND	ND	ND
Copper	mg/L	8	ND	ND	ND	ND
Iron	mg/L	8	0.025	0.41	0.12	0.14
Lead	mg/L	8	0.003	0.008	0.004	0.002
Magnesium	mg/L	8	520	650	606.25	46.58
Manganese	mg/L	8	0.005	0.042	ND	0.013
Mercury	mg/L	8	ND	ND	ND	ND
Nickel	mg/L	8	ND	ND	ND	ND
Potassium	mg/L	8	170	320	238.75	50.55
Selenium	mg/L	8	ND	ND	ND	ND
Silver	mg/L	8	ND	ND	ND	ND
Sodium	mg/L	8	4300	5400	4925	452.77
Thallium	mg/L	8	ND	ND	ND	ND
Vanadium	mg/L	8	ND	ND	ND	ND
Zinc	mg/L	8	ND	ND	ND	ND
Other Parameters						
Dissolved Oxygen	mg/L	8	5.7	8.74	7.25	1.06
Total Dissolved Solids	mg/L	8	14000	18000	16125	1552.65
Total Organic Carbon	mg/L	8	15	24	18.5	3.12

Table E-8. Minimum, maximum, mean, and standard deviation of each parameter analyzed in ditches with salinity values of 0-5 ppt. for surface water sampling locations.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/L	7	ND	ND	ND	ND
4,4'-DDE	µg/L	7	ND	ND	ND	ND
4,4'-DDT	µg/L	7	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/L	7	ND	ND	ND	ND
Aldrin	µg/L	7	ND	ND	ND	ND
Alpha - BHC	µg/L	7	ND	ND	ND	ND
Beta - BHC	µg/L	7	ND	ND	ND	ND
Chlordane (alpha)	µg/L	7	ND	ND	ND	ND
Chlordane (gamma)	µg/L	7	ND	ND	ND	ND
Chlordane (total)	µg/L	7	ND	ND	ND	ND
Delta - BHC	µg/L	7	ND	ND	ND	ND
Dieldrin	µg/L	7	ND	ND	ND	ND
Endosulfan I	µg/L	7	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	7	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	7	ND	ND	ND	ND
Endrin	µg/L	7	ND	ND	ND	ND
Endrin Aldehyde	µg/L	7	ND	ND	ND	ND
Endrin Ketone	µg/L	7	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/L	7	ND	ND	ND	ND
Heptachlor	µg/L	7	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	7	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	7	ND	ND	ND	ND
Isodrin	µg/L	7	ND	ND	ND	ND
Methoxychlor	µg/L	7	ND	ND	ND	ND
Mirex	µg/L	7	ND	ND	ND	ND
Toxaphene	µg/L	7	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/L	7	ND	ND	ND	ND
PCB - 1221	µg/L	7	ND	ND	ND	ND
PCB - 1232	µg/L	7	ND	ND	ND	ND
PCB - 1248	µg/L	7	ND	ND	ND	ND
PCB - 1254	µg/L	7	ND	ND	ND	ND
PCB - 1260	µg/L	7	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	µg/L	7	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/L	7	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/L	7	ND	ND	ND	ND
3,5 - DCBA	µg/L	7	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/L	7	ND	ND	ND	ND

Table E-8. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
4 - Nitrophenol	µg/L	7	ND	ND	ND	ND
Acifluorfen	µg/L	7	ND	ND	ND	ND
Bentazon	µg/L	7	ND	ND	ND	ND
Chloramben	µg/L	7	ND	ND	ND	ND
Dacthal	µg/L	7	ND	ND	ND	ND
Dalapon	µg/L	7	ND	ND	ND	ND
Dicambia	µg/L	7	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	7	ND	ND	ND	ND
Dinoseb	µg/L	7	ND	ND	ND	ND
MCPA	µg/L	7	ND	ND	ND	ND
MCPP	µg/L	7	ND	ND	ND	ND
Pentachlorophenol	µg/L	7	ND	ND	ND	ND
Picloram	µg/L	7	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/L	7	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/L	7	ND	ND	ND	ND
2-Methylnaphthalene	µg/L	7	ND	ND	ND	ND
Acenaphthylene	µg/L	7	ND	ND	ND	ND
Anthracene	µg/L	7	ND	ND	ND	ND
Benzo(a)anthracene	µg/L	7	ND	ND	ND	ND
Benzo(a)pyrene	µg/L	7	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/L	7	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/L	7	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/L	7	ND	ND	ND	ND
Chrysene	µg/L	7	ND	ND	ND	ND
Dibenzo(a,h)anthracene	µg/L	7	ND	ND	ND	ND
Fluoranthene	µg/L	7	ND	ND	ND	ND
Fluorene	µg/L	7	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/L	7	ND	ND	ND	ND
Naphthalene	µg/L	7	ND	ND	ND	ND
Phenanthrene	µg/L	7	ND	ND	ND	ND
Pyrene	µg/L	7	ND	ND	ND	ND
Sum of Polyaromatic Hydrocarbons	µg/L	7	ND	ND	ND	ND
Metals						
Aluminum	mg/L	7	0.03	1.4	0.42	0.51
Antimony	mg/L	7	0.003	0.026	0.008	0.009
Arsenic	mg/L	7	ND	ND	ND	ND
Barium	mg/L	7	ND	ND	ND	ND
Beryllium	mg/L	7	ND	ND	ND	ND
Cadmium	mg/L	7	ND	ND	ND	ND
Calcium	mg/L	7	22	340	98.38	85.19
Chloride	mg/L	7	20	14000	1527.15	3789.13
Chromium	mg/L	7	ND	ND	ND	ND

Table E-8. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Cobalt	mg/L	7	ND	ND	ND	ND
Copper	mg/L	7	ND	ND	ND	ND
Iron	mg/L	7	0.05	2.3	0.49	0.61
Lead	mg/L	7	0.003	0.013	0.004	0.003
Magnesium	mg/L	7	2.3	1400	139.2	380.3
Manganese	mg/L	7	0.005	0.270	0.039	0.077
Mercury	mg/L	7	ND	ND	ND	ND
Nickel	mg/L	7	ND	ND	ND	ND
Potassium	mg/L	7	2.3	290	32.6	77.8
Selenium	mg/L	7	ND	ND	ND	ND
Silver	mg/L	7	ND	ND	ND	ND
Sodium	mg/L	7	9.8	7700	894.7	2064.1
Thallium	mg/L	7	ND	ND	ND	ND
Vanadium	mg/L	7	ND	ND	ND	ND
Zinc	mg/L	7	ND	ND	ND	ND
Other Parameters						
Dissolved Oxygen	mg/L	13	3.4	106.9	22.3	36.6
Total Dissolved Solids	mg/L	13	155	27000	3138.9	7253.45
Total Organic Carbon	mg/L	13	9	68	32.7	16.7

Table E-9. Minimum, maximum, mean, and standard deviation of each parameter analyzed in surface water samples classified as ditches with salinity values $\geq$ 6 ppt.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/L	5	ND	ND	ND	ND
4,4'-DDE	µg/L	5	ND	ND	ND	ND
4,4'-DDT	µg/L	5	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/L	5	ND	ND	ND	ND
Aldrin	µg/L	5	ND	ND	ND	ND
Alpha - BHC	µg/L	5	ND	ND	ND	ND
Beta - BHC	µg/L	5	ND	ND	ND	ND
Chlordane (alpha)	µg/L	5	ND	ND	ND	ND
Chlordane (gamma)	µg/L	5	ND	ND	ND	ND
Chlordane (total)	µg/L	5	ND	ND	ND	ND
Delta - BHC	µg/L	5	ND	ND	ND	ND
Dieldrin	µg/L	5	0.025	0.07	0.034	0.02
Endosulfan I	µg/L	5	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	5	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	5	ND	ND	ND	ND
Endrin	µg/L	5	ND	ND	ND	ND
Endrin Aldehyde	µg/L	5	ND	ND	ND	ND
Endrin Ketone	µg/L	5	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/L	5	ND	ND	ND	ND
Heptachlor	µg/L	5	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	5	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	5	ND	ND	ND	ND
Isodrin	µg/L	5	ND	ND	ND	ND
Methoxychlor	µg/L	5	ND	ND	ND	ND
Mirex	µg/L	5	ND	ND	ND	ND
Toxaphene	µg/L	5	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/L	5	ND	ND	ND	ND
PCB - 1221	µg/L	5	ND	ND	ND	ND
PCB - 1232	µg/L	5	ND	ND	ND	ND
PCB - 1248	µg/L	5	ND	ND	ND	ND
PCB - 1254	µg/L	5	ND	ND	ND	ND
PCB - 1260	µg/L	5	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	µg/L	5	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/L	5	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/L	5	ND	ND	ND	ND
3,5 - DCBA	µg/L	5	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/L	5	ND	ND	ND	ND

Table E-9. (cont.)

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
4 - Nitrophenol	µg/L	5	ND	ND	ND	ND
Acifluorfen	µg/L	5	ND	ND	ND	ND
Bentazon	µg/L	5	ND	ND	ND	ND
Chloramben	µg/L	5	ND	ND	ND	ND
Dacthal	µg/L	5	ND	ND	ND	ND
Dalapon	µg/L	5	ND	ND	ND	ND
Dicambia	µg/L	5	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	5	ND	ND	ND	ND
Dinoseb	µg/L	5	ND	ND	ND	ND
MCPA	µg/L	5	ND	ND	ND	ND
MCPP	µg/L	5	ND	ND	ND	ND
Pentachlorophenol	µg/L	5	ND	ND	ND	ND
Picloram	µg/L	5	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/L	5	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/L	5	ND	ND	ND	ND
2-Methylnaphthalene	µg/L	5	ND	ND	ND	ND
Acenaphthylene	µg/L	5	ND	ND	ND	ND
Anthracene	µg/L	5	ND	ND	ND	ND
Benzo(a)anthracene	µg/L	5	ND	ND	ND	ND
Benzo(a)pyrene	µg/L	5	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/L	5	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/L	5	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/L	5	ND	ND	ND	ND
Chrysene	µg/L	5	ND	ND	ND	ND
Dibenzo(a,h)anthracene	µg/L	5	ND	ND	ND	ND
Fluoranthene	µg/L	5	ND	ND	ND	ND
Fluorene	µg/L	5	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/L	5	ND	ND	ND	ND
Naphthalene	µg/L	5	ND	ND	ND	ND
Phenanthrene	µg/L	5	ND	ND	ND	ND
Pyrene	µg/L	5	ND	ND	ND	ND
Sum of Polyaromatic Hydrocarbons	µg/L	5	ND	ND	ND	ND
Metals						
Aluminum	mg/L	5	0.03	1.25	0.43	0.48
Antimony	mg/L	5	0.003	0.033	0.017	0.012
Arsenic	mg/L	5	0.005	0.017	0.007	0.005
Barium	mg/L	5	ND	ND	ND	ND
Beryllium	mg/L	5	ND	ND	ND	ND
Cadmium	mg/L	5	ND	ND	ND	ND
Calcium	mg/L	5	140	400	266	120.7
Chloride	mg/L	5	2500	17000	9520	6961.1
Chromium	mg/L	5	ND	ND	ND	ND

Table E-9. (cont.)

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Cobalt	mg/L	5	ND	ND	ND	ND
Copper	mg/L	5	ND	ND	ND	ND
Iron	mg/L	5	0.06	1.25	0.32	0.52
Lead	mg/L	5	ND	ND	ND	ND
Magnesium	mg/L	5	200	5200	1628	2050.8
Manganese	mg/L	5	ND	ND	ND	ND
Mercury	mg/L	5	ND	ND	ND	ND
Nickel	mg/L	5	ND	ND	ND	ND
Potassium	mg/L	5	55	560	257.2	217.1
Selenium	mg/L	5	ND	ND	ND	ND
Silver	mg/L	5	ND	ND	ND	ND
Sodium	mg/L	5	1700	9800	5480	3945.5
Thallium	mg/L	5	ND	ND	ND	ND
Vanadium	mg/L	5	ND	ND	ND	ND
Zinc	mg/L	5	ND	ND	ND	ND
Other Parameters						
Dissolved Oxygen	mg/L	5	4.09	69.4	22.4	31.5
Total Dissolved Solids	mg/L	5	2750	33000	17390	14081.39
Total Organic Carbon	mg/L	5	11	33	23.8	8.0

Table E-10. Minimum, maximum, mean, and standard deviation of each parameter analyzed in surface water samples classified as Indian River Lagoon.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/L	7	ND	ND	ND	ND
4,4'-DDE	µg/L	7	ND	ND	ND	ND
4,4'-DDT	µg/L	7	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/L	7	ND	ND	ND	ND
Aldrin	µg/L	7	ND	ND	ND	ND
Alpha - BHC	µg/L	7	ND	ND	ND	ND
Beta - BHC	µg/L	7	ND	ND	ND	ND
Chlordane (alpha)	µg/L	7	ND	ND	ND	ND
Chlordane (gamma)	µg/L	7	ND	ND	ND	ND
Chlordane (total)	µg/L	7	ND	ND	ND	ND
Delta - BHC	µg/L	7	ND	ND	ND	ND
Dieldrin	µg/L	7	0.025	0.39	0.08	0.14
Endosulfan I	µg/L	7	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	7	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	7	ND	ND	ND	ND
Endrin	µg/L	7	ND	ND	ND	ND
Endrin Aldehyde	µg/L	7	ND	ND	ND	ND
Endrin Ketone	µg/L	7	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/L	7	ND	ND	ND	ND
Heptachlor	µg/L	7	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	7	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	7	ND	ND	ND	ND
Isodrin	µg/L	7	ND	ND	ND	ND
Methoxychlor	µg/L	7	ND	ND	ND	ND
Mirex	µg/L	7	ND	ND	ND	ND
Toxaphene	µg/L	7	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/L	7	ND	ND	ND	ND
PCB - 1221	µg/L	7	ND	ND	ND	ND
PCB - 1232	µg/L	7	ND	ND	ND	ND
PCB - 1248	µg/L	7	ND	ND	ND	ND
PCB - 1254	µg/L	7	ND	ND	ND	ND
PCB - 1260	µg/L	7	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	µg/L	7	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/L	7	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/L	7	ND	ND	ND	ND
3,5 - DCBA	µg/L	7	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/L	7	ND	ND	ND	ND
4 - Nitrophenol	µg/L	7	ND	ND	ND	ND

Table E-10. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Acifluorfen	µg/L	7	ND	ND	ND	ND
Bentazon	µg/L	7	ND	ND	ND	ND
Chloramben	µg/L	7	ND	ND	ND	ND
Dacthal	µg/L	7	ND	ND	ND	ND
Dalapon	µg/L	7	ND	ND	ND	ND
Dicambia	µg/L	7	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	7	ND	ND	ND	ND
Dinoseb	µg/L	7	ND	ND	ND	ND
MCPA	µg/L	7	ND	ND	ND	ND
MCPP	µg/L	7	ND	ND	ND	ND
Pentachlorophenol	µg/L	7	ND	ND	ND	ND
Picloram	µg/L	7	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/L	7	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/L	7	ND	ND	ND	ND
2-Methylnaphthalene	µg/L	7	ND	ND	ND	ND
Acenaphthylene	µg/L	7	ND	ND	ND	ND
Anthracene	µg/L	7	ND	ND	ND	ND
Benzo(a)anthracene	µg/L	7	ND	ND	ND	ND
Benzo(a)pyrene	µg/L	7	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/L	7	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/L	7	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/L	7	ND	ND	ND	ND
Chrysene	µg/L	7	ND	ND	ND	ND
Dibenzo(a,h)anthracene	µg/L	7	ND	ND	ND	ND
Fluoranthene	µg/L	7	ND	ND	ND	ND
Fluorene	µg/L	7	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/L	7	ND	ND	ND	ND
Naphthalene	µg/L	7	ND	ND	ND	ND
Phenanthrene	µg/L	7	ND	ND	ND	ND
Pyrene	µg/L	7	ND	ND	ND	ND
Sum of Polyaromatic Hydrocarbons	µg/L	7	ND	ND	ND	ND
Metals						
Aluminum	mg/L	7	0.03	0.74	0.21	0.25
Antimony	mg/L	7	0.003	0.028	0.012	0.011
Arsenic	mg/L	7	0.005	0.016	0.007	0.004
Barium	mg/L	7	ND	ND	ND	ND
Beryllium	mg/L	7	ND	ND	ND	ND
Cadmium	mg/L	7	ND	ND	ND	ND
Calcium	mg/L	7	280	420	341	49
Chloride	mg/L	7	13000	17000	14857	1464
Chromium	mg/L	7	ND	ND	ND	ND
Cobalt	mg/L	7	ND	ND	ND	ND

Table E-10. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Copper	mg/L	7	ND	ND	ND	ND
Iron	mg/L	7	0.03	0.42	0.11	0.15
Lead	mg/L	7	ND	ND	ND	ND
Magnesium	mg/L	7	800	1300	990	172
Manganese	mg/L	7	0.005	0.065	0.024	0.022
Mercury	mg/L	7	ND	ND	ND	ND
Nickel	mg/L	7	ND	ND	ND	ND
Potassium	mg/L	7	230	390	303	58
Selenium	mg/L	7	0.005	0.024	0.013	0.007
Silver	mg/L	7	0.000	0.002	0.001	0.001
Sodium	mg/L	7	7100	9300	8300	879
Thallium	mg/L	7	0.001	0.003	0.002	0.001
Vanadium	mg/L	7	ND	ND	ND	ND
Zinc	mg/L	7	ND	ND	ND	ND
Other Parameters						
Dissolved Oxygen	mg/L	7	5.29	12.28	8.18	2.18
Total Dissolved Solids	mg/L	7	20000	30000	25285.7	3860.7
Total Organic Carbon	mg/L	7	11	31	21.6	6.2

Table E-11. Minimum, maximum, mean, and standard deviation of each parameter analyzed in surface water samples classified as Mosquito Lagoon.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/L	6	ND	ND	ND	ND
4,4'-DDE	µg/L	6	ND	ND	ND	ND
4,4'-DDT	µg/L	6	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/L	6	ND	ND	ND	ND
Aldrin	µg/L	6	ND	ND	ND	ND
Alpha - BHC	µg/L	6	ND	ND	ND	ND
Beta - BHC	µg/L	6	ND	ND	ND	ND
Chlordane (alpha)	µg/L	6	ND	ND	ND	ND
Chlordane (gamma)	µg/L	6	ND	ND	ND	ND
Chlordane (total)	µg/L	6	ND	ND	ND	ND
Delta - BHC	µg/L	6	ND	ND	ND	ND
Dieldrin	µg/L	6	ND	ND	ND	ND
Endosulfan I	µg/L	6	ND	ND	ND	ND
Endosulfan II (beta)	µg/L	6	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	6	ND	ND	ND	ND
Endrin	µg/L	6	ND	ND	ND	ND
Endrin Aldehyde	µg/L	6	ND	ND	ND	ND
Endrin Ketone	µg/L	6	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/L	6	ND	ND	ND	ND
Heptachlor	µg/L	6	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/L	6	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/L	6	ND	ND	ND	ND
Isodrin	µg/L	6	ND	ND	ND	ND
Methoxychlor	µg/L	6	ND	ND	ND	ND
Mirex	µg/L	6	ND	ND	ND	ND
Toxaphene	µg/L	6	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/L	6	ND	ND	ND	ND
PCB - 1221	µg/L	6	ND	ND	ND	ND
PCB - 1232	µg/L	6	ND	ND	ND	ND
PCB - 1248	µg/L	6	ND	ND	ND	ND
PCB - 1254	µg/L	6	ND	ND	ND	ND
PCB - 1260	µg/L	6	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy)) propionic acid	µg/L	6	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/L	6	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/L	6	ND	ND	ND	ND
3,5 - DCBA	µg/L	6	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/L	6	ND	ND	ND	ND
4 - Nitrophenol	µg/L	6	ND	ND	ND	ND

Table E-11. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Acifluorfen	µg/L	6	ND	ND	ND	ND
Bentazon	µg/L	6	ND	ND	ND	ND
Chloramben	µg/L	6	ND	ND	ND	ND
Dacthal	µg/L	6	ND	ND	ND	ND
Dalapon	µg/L	6	ND	ND	ND	ND
Dicambia	µg/L	6	ND	ND	ND	ND
Dichloroprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/L	6	ND	ND	ND	ND
Dinoseb	µg/L	6	ND	ND	ND	ND
MCPA	µg/L	6	ND	ND	ND	ND
MCPP	µg/L	6	ND	ND	ND	ND
Pentachlorophenol	µg/L	6	ND	ND	ND	ND
Picloram	µg/L	6	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/L	6	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/L	6	ND	ND	ND	ND
2-Methylnaphthalene	µg/L	6	ND	ND	ND	ND
Acenaphthylene	µg/L	6	ND	ND	ND	ND
Anthracene	µg/L	6	ND	ND	ND	ND
Benzo(a)anthracene	µg/L	6	0.025	0.13	0.07	0.04
Benzo(a)pyrene	µg/L	6	0.025	0.22	0.09	0.07
Benzo(b)fluoranthene	µg/L	6	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/L	6	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/L	6	0.05	0.13	0.06	0.03
Chrysene	µg/L	6	0.05	0.21	0.08	0.06
Dibenzo(a,h)anthracene	µg/L	6	ND	ND	ND	ND
Fluoranthene	µg/L	6	ND	ND	ND	ND
Fluorene	µg/L	6	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/L	6	0.025	0.13	0.07	0.04
Naphthalene	µg/L	6	ND	ND	ND	ND
Phenanthrene	µg/L	6	ND	ND	ND	ND
Pyrene	µg/L	6	ND	ND	ND	ND
Sum of Polyaromatic Hydrocarbons	µg/L	6	ND	ND	ND	ND
Metals						
Aluminum	mg/L	6	0.18	0.6	0.31	0.15
Antimony	mg/L	6	0.003	0.030	0.008	0.011
Arsenic	mg/L	6	ND	ND	ND	ND
Barium	mg/L	6	ND	ND	ND	ND
Beryllium	mg/L	6	ND	ND	ND	ND
Cadmium	mg/L	6	ND	ND	ND	ND
Calcium	mg/L	6	340	550	388	81
Chloride	mg/L	6	12000	25000	15833	4792
Chromium	mg/L	6	ND	ND	ND	ND
Cobalt	mg/L	6	ND	ND	ND	ND

Table E-11. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Copper	mg/L	6	ND	ND	ND	ND
Iron	mg/L	6	0.06	0.3	0.14	0.09
Lead	mg/L	6	0.005	0.014	0.008	0.003
Magnesium	mg/L	6	1000	2300	1267	513
Manganese	mg/L	6	ND	ND	ND	ND
Mercury	mg/L	6	ND	ND	ND	ND
Nickel	mg/L	6	ND	ND	ND	ND
Potassium	mg/L	6	450	600	523	57
Selenium	mg/L	6	ND	ND	ND	ND
Silver	mg/L	6	ND	ND	ND	ND
Sodium	mg/L	6	8700	12000	9883	1347
Thallium	mg/L	6	0.001	0.002	0.001	0.001
Vanadium	mg/L	6	ND	ND	ND	ND
Zinc	mg/L	6	ND	ND	ND	ND
Other Parameters						
Dissolved Oxygen	mg/L	6	5.6	10.9	7.2	2.1
Total Dissolved Solids	mg/L	6	27000	47000	33667	7581
Total Organic Carbon	mg/L	6				

Table E-10. KSC Background raw data for surface water locations.

		AVE001 07/22/1998	BPD001 07/17/1998	BPD002 07/17/1998	JER001 07/22/1998	MAX01 07/17/1998	ROB001 7/22/98		IRL004 09/03/1998	IRL005 09/03/1998	OCA010 09/03/98	
								dulpicate				duplicate
Organochlorine pesticides (8081)												
4,4' - DDD	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	µg/L	<0.05	<0.05	<0.05	<0.0 5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (Total)	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	µg/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Endrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide (a)	µg/L	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050
Heptachlor Epoxide (b)	µg/L	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<.050
Isodrin	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)												
PCB-1016/1242	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)												
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

I= value is between the Method Detection Limit and the Practical Quanitation Limit.

* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

		AVE001 07/22/1998	BPD001 07/17/1998	BPD002 07/17/1998	JER001 07/22/1998	MAX01 07/17/1998	ROB001 7/22/98		IRL004 09/03/1998	IRL005 09/03/1998	OCA010 09/03/98	
								dulpicate				duplicate
Chlorinated Herbicides (8151) (cont.)												
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-DCBA	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4 - Nitrophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bentazon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloramben	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dacthal	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dalapon	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MCPP	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Picloram	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAHs (8310)												
1 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2 - Methylnaphthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)anthracene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	<0.05	<0.05	<0.05	<0.05	**0.13**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	<0.05	<0.05	<0.05	<0.05	**0.07 I**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	**0.23**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Napthalene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

		AVE001 07/22/1998	BPD001 07/17/1998	BPD002 07/17/1998	JER001 07/22/1998	MAX01 07/17/1998	ROB001 7/22/98		IRL004 09/03/1998	IRL005 09/03/1998	OCA010 09/03/98	
								dulpicate				duplicate
Metals												
Aluminum	mg/L	<0.05	<0.05	0.18	0.083	0.22	1.4	1.3	0.14	0.74	0.77	0.95
Antimony	mg/L	<0.006	0.008 I	0.016 I	<0.006	0.03	<0.006	<0.006	0.009 I	<0.006	<0.006	<0.006
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	mg/L	48	180	340	60	550	120	120	310	280	79	73
Chloride (total)	mg/L	76	2000	14000	42	25000	870	860	14000	14000	730	660
Chromium (total)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	0.007 I	<0.004	<0.008	<0.008	<0.008	<0.008
Iron	mg/L	0.084	0.24	<0.1	0.85	0.16	0.58	0.53	0.11	0.42	0.54	0.72
Lead	mg/L	0.005 I	0.005 I	0.013	0.007 I	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	8.4	110	1400	4	2300	53	54	900	830	66	67
Manganese	mg/L	0.049	0.019	0.016 I	0.02	<0.01	0.034	0.034	0.065	0.037	0.011	0.012
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	7.5	28 I	290	7.7	560	16	16	290	260	21	21
Selenium	mg/L	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.01	0.024	0.012 I	<0.01	<0.01
Silver	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0014	0.0011	<0.0005	<0.0005
Sodium	mg/L	63	900 I	7700 I	75	12000 I	460	490	8000	7100	560	550
Thallium	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.006	<0.006	<0.006	<0.006
Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Other Parameters												
Dissolved Oxygen	mg/L	7.68	11.05	8.59	4.25	5.6	6.78	NA	8.19	8.56	4.21	4.34
Total Dissolved Solids	mg/L	430	3800	27000	410	47000	2000	2000	22000	22000	1900	1900
Total Organic Carbon	mg/L	19	47	30	55	48	42	38	25	19	27	27

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

	REF001 09/03/1998	TEL004 09/03/1998	BRN020 06/01/1998	KPI001 06/05/1998	NSC001 06/05/1998	PEF20 06/01/1998	SLF001 06/05/1998	SRE001 06/01/1998	SRW001 06/01/1998	SRW002 06/01/1998	BRC09 6/10/98
Organochlorine pesticides (8081)											
4,4' - DDD	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (Total)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	<0.09	<0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.09	<0.09	<0.09	<0.05
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide (a)	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide (b)	<.050	<.050	<.050	<.050	<.050	<.050	<.050	<0.05	<0.05	<0.05	<0.05
Isodrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)											
PCB-1016/1242	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

	REF001 09/03/1998	TEL004 09/03/1998	BRN020 06/01/1998	KPI001 06/05/1998	NSC001 06/05/1998	PEF20 06/01/1998	SLF001 06/05/1998	SRE001 06/01/1998	SRW001 06/01/1998	SRW002 06/01/1998	BRC09 6/10/98
Chlorinated Herbicides (8151) (cont.)											
2,4-Dichlorophenoxy acetic acid (2,4 -D)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
3,5-DCBA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
4-(2,4-Dichlorophenoxy)butyric acid (2,4 -DB)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
4 - Nitrophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Acifluorfen	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Bentazon	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Chloramben	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Dacthal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Dalapon	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Dicamba	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Dinoseb	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
MCPA	<10	<10	<5	<5	<5	<5	<5	<50	<50	<50	<10
MCPP	<10	<10	<5	<5	<5	<5	<5	<50	<50	<50	<10
Pentachlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
Picloram	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1
PAHs (8310)											
1 - Methylnaphthalene	<0.5	<0.5	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<1
2 - Methylnaphthalene	<0.5	<0.5	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<1
Acenaphthene	<0.5	<0.5	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<1
Acenaphthylene	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<1	<0.2
Anthracene	<0.5	<0.5	<1	<1	<1	<1	<1	<0.05	<0.05	<0.05	<1
Benzo(a)anthracene	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.1
Benzo(a)pyrene	<0.05	<0.05	<0.1	<0.1	<0.1	**0.18**	<0.1	<0.05	<0.05	<0.05	<0.1
Benzo(b)fluoranthene	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(g,h,i)perylene	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(k)fluoranthene	<0.05	<0.05	<0.1	<0.1	<0.1	**0.21**	<0.1	<0.05	<0.05	<0.05	<0.1
Chrysene	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.1
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2
Fluoranthene	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2
Fluorene	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2
Indeno(1,2,3-cd)pyrene	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.1
Napthalene	<0.5	<0.5	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<1
Phenanthrene	<0.05	<0.05	<1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.1
Pyrene	<0.05	<0.05	<1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.1

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

	REF001 09/03/1998	TEL004 09/03/1998	BRN020 06/01/1998	KPI001 06/05/1998	NSC001 06/05/1998	PEF20 06/01/1998	SLF001 06/05/1998	SRE001 06/01/1998	SRW001 06/01/1998	SRW002 06/01/1998	BRC09 6/10/98
Metals											
Aluminum	**0.25**	**0.22**	**0.066**	**0.097**	**0.23**	**0.72**	**0.32**	<2.5	**0.057**	<0.05	**0.48**
Antimony	**0.01 I**	<0.006	**0.021**	**0.023**	**0.033**	**0.018**	**0.026**	<0.005	<0.005	<0.005	**0.006 I**
Arsenic	<0.01	<0.01	**0.01**	<0.01	<0.01	<0.01	<0.01	**0.017**	<0.01	<0.01	**0.022 I**
Barium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001 I**
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	**310**	**22**	**230**	**62**	**250**	**210**	**25**	**140**	**110**	**40**	**220**
Chloride (total)	**13000**	**20**	**6700**	<50	**6300**	**6200**	**150**	**2500**	**320**	**100**	**6700**
Chromium (total)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	<0.008	<0.008	<0.002	<0.004	<0.004	<0.002	<0.004	<0.05	<0.05	<0.05	<0.004
Iron	**0.15**	*2.3**	<0.05	**0.051**	**0.084**	**0.41**	**0.18**	<2.5	**0.14**	**0.13**	**0.23**
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.006**	<0.005	**0.005 I**
Magnesium	**800**	**2.3**	**620**	**6**	*5200**	**560**	**5.2**	**200**	**23**	**11**	**590**
Manganese	**0.034**	**0.27**	<0.01	<0.01	<0.01	<0.01	<0.01	**0.013**	**0.022**	**0.01**	<0.01
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	<0.01	<0.01	<0.055	<0.01	<0.01	<0.055	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	**260**	**4.2**	**180**	**2.7**	**190**	**170**	**2.6**	**55**	**4.7**	**2.3**	**240**
Selenium	**0.018**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.03
Silver	<0.0005	<0.0005	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.01	<0.01	<0.01	<0.0006
Sodium	**7200**	**9.8**	**4700**	**39**	**3400**	**4300**	**570**	**1700**	**160**	**54**	**4900 I**
Thallium	<0.006	<0.006	<0.004	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Other Parameters											
Dissolved Oxygen	5.29	3.4	98	93.6	69.4	89.4	106.9	11.23	6.66	10.1	8.74
Total Dissolved Solids	20000	220	16000	290	10000	14000	260	<5500	<880	<310	17000
Total Organic Carbon	24	68	18	16	26	22	26	*33*	21	9	18

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

	BRN18 6/10/98	BRS017 6/10/98	BRS019 6/10/98	IRL003 06/11/1998	MLN001 06/11/1998	MLN002 06/11/1998	MLS03 06/11/98		PEF024 6/10/98	SJB02 6/10/98	SJML02 06/11/1998	IRL001 06/17/1998
								duplicate				
Organochlorine pesticides (8081)												
4,4' - DDD	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (Total)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.39**
Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide (a)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide (b)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Isodrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)												
PCB-1016/1242	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)												
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5

I= value is between the Method Detection Limit and the Practical Quanitation Limit.

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Table E-10. KSC Background raw data for surface water locations.

	BRN18	BRS017	BRS019	IRL003	MLN001	MLN002	MLS03		PEF024	SJB02	SJML02	IRL001
	6/10/98	6/10/98	6/10/98	06/11/1998	06/11/1998	06/11/1998	06/11/98		6/10/98	6/10/98	06/11/1998	06/17/1998
								duplicate				
Chlorinated Herbicides (8151) (cont.)												
2,4-Dichlorophenoxy acetic acid (2,4 - D)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
3,5-DCBA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
4 - Nitrophenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Acifluorfen	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Bentazon	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Chloramben	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Dacthal	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Dalapon	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Dicamba	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Dinoseb	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
MCPA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<5
MCPP	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<5
Pentachlorophenol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Picloram	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
PAHs (8310)												
1 - Methylnaphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2 - Methylnaphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.12 I**	<0.1	<0.1	**0.13 I**	<0.1
Benzo(a)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.13 I**	<0.1	<0.1	**0.22**	<0.1
Benzo(b)fluoranthene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(g,h,i)perylene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.21**	<0.1
Dibenzo(a,h)anthracene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoranthene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluorene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.12 I**	<0.1	<0.1	**0.13 I**	<0.1
Napthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

	BRN18 6/10/98	BRS017 6/10/98	BRS019 6/10/98	IRL003 06/11/1998	MLN001 06/11/1998	MLN002 06/11/1998	MLS03 06/11/98		PEF024 6/10/98	SJB02 6/10/98	SJML02 06/11/1998	IRL001 06/17/1998
								duplicate				
Metals												
Aluminum	**0.095**	<0.05	**0.068**	<0.05	**0.6**	**0.26**	**0.25**	**0.32**	**0.18**	<0.05	**0.18**	**0.23**
Antimony	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	**0.007 I**	<0.006	**0.008 I**	<0.006	<0.006	**0.028**
Arsenic	**0.021 I**	**0.014 I**	**0.019 I**	**0.016 I**	<0.01	<0.01	<0.01	<0.01	<0.01	**0.023 I**	<0.01	<0.01
Barium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	**0.002 I**	<0.001	**0.002 I**	<0.001	<0.001	<0.001	<0.001	<0.001	**0.001 I**	**0.002 I**	<0.001	<0.001
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	**230**	**230**	**250**	**350**	**390**	**360**	**340**	**350**	**200**	**240**	**340**	**330**
Chloride (total)	**10000**	**8800**	**10000**	**14000**	**17000**	**14000**	**13000**	**14000**	**6300**	**11000**	**12000**	**16000**
Chromium (total)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Iron	<0.05	<0.05	<0.05	<0.05	**0.3**	**0.097**	**0.081**	**0.14**	**0.16**	<0.05	**0.059**	<0.05
Lead	<0.005	<0.005	**0.008 I**	<0.005	**0.006 I**	**0.007 I**	**0.006 I**	**0.007 I**	**0.006 I**	**0.005 I**	**0.005 I**	<0.006
Magnesium	**620**	**640**	**650**	**1000**	**1200**	**1100**	**1000**	**1000**	**520**	**650**	**1000**	**1000**
Manganese	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	**250**	**260**	**320**	<460	**600**	**550**	**470**	**450**	**210**	**280**	**510**	**340**
Selenium	<0.03	<0.02	<0.025	<0.03	<0.02	<0.03	<0.034	<0.02	<0.03	<0.03	<0.02	<0.01
Silver	<0.0006	<0.0006	<0.0006	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0006	<0.0006	<0.004	<0.004
Sodium	**5200 I**	**5400 I**	**5400 I**	**8800 I**	**11000 I**	**9800 I**	**8700 I**	**8900 I**	**4300 I**	**5200 I**	**8900 I**	**8700 I**
Thallium	<0.002	<0.002	<0.002	**0.002**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**0.002**	<0.002
Vanadium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Other Parameters												
Dissolved Oxygen	7.31	6.82	5.7	12.28	6.6	6.18	10.88	NA	8.05	6.88	6.7	7.44
Total Dissolved Solids	16000	18000	18000	27000	34000	29000	28000	37000	14000	16000	27000	28000
Total Organic Carbon	15	16	16	21	12	12	14	16	19	24	12	20

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

	IRL002	SR3-D1		SR3-D2	BCE012	BCE004	BCW15		BCW014	HPC001		MOC021
	06/17/1998	06/17/98		06/17/1998	06/24/1998	06/24/1998	6/25/98		06/25/1998	06/24/98		06/25/1998
			duplicate					duplicate			duplicate	
Organochlorine pesticides (8081)												
4,4' - DDD	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4' - DDT	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Alpha - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Beta - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (alpha)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (gamma)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane (Total)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Delta - BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.05	<0.05	<0.05	**0.07**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II (beta)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulfate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Gamma - BHC (Lindane)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide (a)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide (b)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Isodrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mirex	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclors (8082)												
PCB-1016/1242	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1221	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1232	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1248	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1254	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB-1260	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorinated Herbicides (8151)												
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

	IRL002	SR3-D1		SR3-D2	BCE012	BCE004	BCW15		BCW014	HPC001		MOC021
	06/17/1998	06/17/98		06/17/1998	06/24/1998	06/24/1998	6/25/98		06/25/1998	06/24/98		06/25/1998
			duplicate					duplicate			duplicate	
Chlorinated Herbicides (8151) (cont.)												
2,4-Dichlorophenoxy acetic acid (2,4 -D)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-DCBA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-(2,4-Dichlorophenoxy)butyric acid (2,4 -DB)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4 - Nitrophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bentazon	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloramben	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dacthal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dalapon	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MCPP	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Pentachlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Picloram	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAHs (8310)												
1 - Methylnaphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.1
2 - Methylnaphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.1
Acenaphthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.1
Acenaphthylene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.1
Benzo(a)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11
Benzo(a)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11
Benzo(b)fluoranthene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.21	<0.2	<0.2	<0.2	<0.2	<0.21	<0.22
Benzo(g,h,i)perylene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.21	<0.2	<0.2	<0.2	<0.2	<0.21	<0.22
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11
Chrysene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11
Dibenzo(a,h)anthracene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.21	<0.2	<0.2	<0.2	<0.2	<0.21	<0.22
Fluoranthene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.21	<0.2	<0.2	<0.2	<0.2	<0.21	<0.22
Fluorene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.21	<0.2	<0.2	<0.2	<0.2	<0.21	<0.22
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11
Napthalene	<1	<1	<1	1.6	<1	<1	<1	<1	<1	<1	<1	<1.1
Phenanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11
Pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.11

I= value is between the Method Detection Limit and the Practical Quanitation Limit.

* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

Table E-10. KSC Background raw data for surface water locations.

	IRL002	SR3-D1		SR3-D2	BCE012	BCE004	BCW15		BCW014	HPC001		MOC021
	06/17/1998	06/17/98		06/17/1998	06/24/1998	06/24/1998	6/25/98		06/25/1998	06/24/98		06/25/1998
			duplicate					duplicate			duplicate	
Metals												
Aluminum	<0.05	**0.32**	**0.3**	<0.05	**1.5**	**1.9**	**0.71**	**0.65**	**0.24**	**1**	**1.7**	<0.1
Antimony	**0.028**	**0.021 I**	**0.01 I**	**0.016 I**	<0.012	<0.012	<0.006	<0.012	<0.006	<0.006	**0.015 I**	<0.012
Arsenic	<0.01	<0.01	<0.01	<0.01	<0.01	**0.016 I**	<0.01	<0.01	<0.02	<0.01	<0.02	<0.016
Barium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	**420**	**400**	**380**	**160**	**370**	**240**	**380**	**360**	**380**	**230**	**220**	**390**
Chloride (total)	**16000**	**17000**	**17000**	**4800**	**14000**	**8800**	**15000**	**15000**	**18000**	**8100**	**8000**	**17000**
Chromium (total)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01
Cobalt	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<0.004	<0.004	<0.002
Iron	<0.05	**0.11**	**0.083**	**0.058**	**0.73**	**1.1**	**0.38**	**0.26**	**0.074**	**0.72**	**1.2**	<0.05
Lead	<0.006	<0.006	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	**1300**	**1200**	**1200**	**340**	**1000**	**630**	**1100**	**1000**	**1100**	**590**	**580**	**1100**
Manganese	<0.02	<0.02	<0.05	<0.01	<0.02	**0.042**	<0.02	<0.02	<0.02	<0.01	<0.01	<0.02
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	**390**	**400**	**560**	**81**	**330**	**170**	**340**	**330**	**330**	**160**	**150**	**350**
Selenium	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
Silver	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001
Sodium	**9300 I**	**9800 I**	**9700 I**	**2800 I**	**7600**	**4700**	**8900**	**8600**	**8400**	**4400**	**4400**	**9000**
Thallium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**0.005**	<0.002	<0.002	<0.002
Vanadium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1
Other Parameters												
Dissolved Oxygen	6.67	4.78	NA	4.09	6.41	8.96	3.72	NA	10.25	5.05	NA	8.86
Total Dissolved Solids	30000	32000	33000	9200	22000	15000	27000	28000	27000	14000	14000	28000
Total Organic Carbon	11	24	25	11	29	37	22	22	31	46	48	31

I= value is between the Method Detection Limit and the Practical Quanitation Limit.
* = value is an outlier and not used in the analysis to develop the KSC Background screening values.

APPENDIX F

Sediment Data for Kennedy Space Center

Table F-1. Minimum, maximum, mean, and standard deviation for each parameter analyzed in all sediment samples.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	46	ND	ND	ND	ND
4,4'-DDE	µg/kg	46	ND	ND	ND	ND
4,4'-DDT	µg/kg	46	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/kg	46	ND	ND	ND	ND
Aldrin	µg/kg	46	ND	ND	ND	ND
Alpha - BHC	µg/kg	46	ND	ND	ND	ND
Beta - BHC	µg/kg	46	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	46	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	46	ND	ND	ND	ND
Chlordane (total)	µg/kg	46	ND	ND	ND	ND
Delta - BHC	µg/kg	46	ND	ND	ND	ND
Dieldrin	µg/kg	46	ND	ND	ND	ND
Endosulfan I	µg/kg	46	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	46	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	46	ND	ND	ND	ND
Endrin	µg/kg	46	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	46	ND	ND	ND	ND
Endrin Ketone	µg/kg	46	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/kg	46	ND	ND	ND	ND
Heptachlor	µg/kg	46	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	46	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	46	ND	ND	ND	ND
Isodrin	µg/kg	46	ND	ND	ND	ND
Methoxychlor	µg/kg	46	ND	ND	ND	ND
Mirex	µg/kg	46	ND	ND	ND	ND
Toxaphene	µg/kg	46	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	46	ND	ND	ND	ND
PCB - 1221	µg/kg	46	ND	ND	ND	ND
PCB - 1232	µg/kg	46	ND	ND	ND	ND
PCB - 1248	µg/kg	46	ND	ND	ND	ND
PCB - 1254	µg/kg	46	ND	ND	ND	ND
PCB - 1260	µg/kg	46	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy) propionic acid)	µg/kg	46	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/kg	46	3	27	8.45	4.32
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/kg	46	3	27	8.38	3.91
3,5 - DCBA	µg/kg	46	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/kg	46	ND	ND	ND	ND
4 - Nitrophenol	µg/kg	46	ND	ND	ND	ND
Acifluorfen	µg/kg	46	ND	ND	ND	ND

Table F-1. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (cont.)						
Bentazon	µg/kg	46	ND	ND	ND	ND
Chloramben	µg/kg	46	ND	ND	ND	ND
Dacthal	µg/kg	46	ND	ND	ND	ND
Dalapon	µg/kg	46	ND	ND	ND	ND
Dicambia	µg/kg	46	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	46	ND	ND	ND	ND
Dinoseb	µg/kg	46	ND	ND	ND	ND
MCPA	µg/kg	46	ND	ND	ND	ND
MCPP	µg/kg	46	ND	ND	ND	ND
Pentachlorophenol	µg/kg	46	ND	ND	ND	ND
Picloram	µg/kg	46	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/kg	46	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/kg	46	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	46	ND	ND	ND	ND
Acenaphthene	µg/kg	46	ND	ND	ND	ND
Acenaphthylene	µg/kg	46	ND	ND	ND	ND
Anthracene	µg/kg	46	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	46	0.95	12	1.64	1.79
Benzo(a)pyrene	µg/kg	46	1	11	1.80	1.55
Benzo(b)fluoranthene	µg/kg	46	1.5	14	2.99	2.75
Benzo(g,h,i)perylene	µg/kg	46	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	46	1	10	1.86	1.70
Chrysene	µg/kg	46	0.95	42	2.71	6.26
Dibenzo(a,h)anthracene	µg/kg	46	ND	ND	ND	ND
Fluoranthene	µg/kg	46	1.95	67	4.14	9.55
Fluorene	µg/kg	46	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	46	ND	ND	ND	ND
Naphthalene	µg/kg	46	9.5	67	15.37	16.33
Phenanthrene	µg/kg	46	0.95	10	1.68	2.92
Pyrene	µg/kg	46	0.95	34	2.23	4.59
Metals						
Aluminum	mg/kg	46	210	2800	977	632
Antimony	mg/kg	46	ND	ND	ND	ND
Arsenic	mg/kg	46	0.3	3.3	0.82	0.71
Barium	mg/kg	46	ND	ND	ND	ND
Beryllium	mg/kg	46	ND	ND	ND	ND
Cadmium	mg/kg	46	ND	ND	ND	ND
Calcium	mg/kg	46	19	220000	52208	63423
Chromium	mg/kg	46	0.5	6.4	2.47	1.59
Cobalt	mg/kg	46	ND	ND	ND	ND
Copper	mg/kg	46	0.5	7	3.25	1.15
Iron	mg/kg	46	150	3200	967	756

Table F-1. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Lead	mg/kg	46	0.5	6	2.35	1.36
Magnesium	mg/kg	46	42	3800	974	882
Manganese	mg/kg	46	0.5	110	11.31	17.85
Mercury	mg/kg	46	0.005	0.019	0.008	0.004
Nickel	mg/kg	46	ND	ND	ND	ND
Potassium	mg/kg	46	16	1200	354	299
Selenium	mg/kg	46	ND	ND	ND	ND
Silver	mg/kg	46	1	3.4	1.61	0.57
Sodium	mg/kg	46	19	10000	2865	2149
Thallium	mg/kg	46	0.5	5.4	0.82	0.82
Vanadium	mg/kg	46	0.5	7.7	2.58	1.86
Zinc	mg/kg	46	3	27	7.26	6.12

Table F-2. Minimum, maximum, mean, and standard deviation for each parameter analyzed in Banana Creek sediment samples.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	8	ND	ND	ND	ND
4,4'-DDE	µg/kg	8	ND	ND	ND	ND
4,4'-DDT	µg/kg	8	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/kg	8	ND	ND	ND	ND
Aldrin	µg/kg	8	ND	ND	ND	ND
Alpha - BHC	µg/kg	8	ND	ND	ND	ND
Beta - BHC	µg/kg	8	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	8	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	8	ND	ND	ND	ND
Chlordane (total)	µg/kg	8	ND	ND	ND	ND
Delta - BHC	µg/kg	8	ND	ND	ND	ND
Dieldrin	µg/kg	8	ND	ND	ND	ND
Endosulfan I	µg/kg	8	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	8	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	8	ND	ND	ND	ND
Endrin	µg/kg	8	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	8	ND	ND	ND	ND
Endrin Ketone	µg/kg	8	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/kg	8	ND	ND	ND	ND
Heptachlor	µg/kg	8	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	8	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	8	ND	ND	ND	ND
Isodrin	µg/kg	8	ND	ND	ND	ND
Methoxychlor	µg/kg	8	ND	ND	ND	ND
Mirex	µg/kg	8	ND	ND	ND	ND
Toxaphene	µg/kg	8	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	8	ND	ND	ND	ND
PCB - 1221	µg/kg	8	ND	ND	ND	ND
PCB - 1232	µg/kg	8	ND	ND	ND	ND
PCB - 1248	µg/kg	8	ND	ND	ND	ND
PCB - 1254	µg/kg	8	ND	ND	ND	ND
PCB - 1260	µg/kg	8	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy) propionic acid)	µg/kg	8	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/kg	8	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/kg	8	ND	ND	ND	ND
3,5 - DCBA	µg/kg	8	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/kg	8	ND	ND	ND	ND
4 - Nitrophenol	µg/kg	8	ND	ND	ND	ND
Acifluorfen	µg/kg	8	ND	ND	ND	ND

Table F-2. (cont.)

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (cont.)						
Bentazon	µg/kg	8	ND	ND	ND	ND
Chloramben	µg/kg	8	ND	ND	ND	ND
Dacthal	µg/kg	8	ND	ND	ND	ND
Dalapon	µg/kg	8	ND	ND	ND	ND
Dicambia	µg/kg	8	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	8	ND	ND	ND	ND
Dinoseb	µg/kg	8	ND	ND	ND	ND
MCPA	µg/kg	8	ND	ND	ND	ND
MCPP	µg/kg	8	ND	ND	ND	ND
Pentachlorophenol	µg/kg	8	ND	ND	ND	ND
Picloram	µg/kg	8	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/kg	8	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/kg	8	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	8	ND	ND	ND	ND
Acenaphthene	µg/kg	8	ND	ND	ND	ND
Acenaphthylene	µg/kg	8	ND	ND	ND	ND
Anthracene	µg/kg	8	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	8	ND	ND	ND	ND
Benzo(a)pyrene	µg/kg	8	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/kg	8	0.002	0.004	0.002	0.001
Benzo(g,h,i)perylene	µg/kg	8	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	8	ND	ND	ND	ND
Chrysene	µg/kg	8	ND	ND	ND	ND
Dibenzo(a,h)anthracene	µg/kg	8	ND	ND	ND	ND
Fluoranthene	µg/kg	8	0.002	0.009	0.003	0.003
Fluorene	µg/kg	8	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	8	ND	ND	ND	ND
Naphthalene	µg/kg	8	ND	ND	ND	ND
Phenanthrene	µg/kg	8	ND	ND	ND	ND
Pyrene	µg/kg	8	ND	ND	ND	ND
Metals						
Aluminum	mg/kg	8	620	1900	1119	453
Antimony	mg/kg	8	ND	ND	ND	ND
Arsenic	mg/kg	8	0.35	2.3	1.36	0.87
Barium	mg/kg	8	ND	ND	ND	ND
Beryllium	mg/kg	8	ND	ND	ND	ND
Cadmium	mg/kg	8	ND	ND	ND	ND
Calcium	mg/kg	8	3700	160000	68100	69314
Chromium	mg/kg	8	1.7	4.4	2.56	0.94
Cobalt	mg/kg	8	ND	ND	ND	ND
Copper	mg/kg	8	0.5	3.4	1.85	1.16
Iron	mg/kg	8	440	1700	1021	447
Lead	mg/kg	8	0.5	3	2.05	1.01

Table F-2. (cont.)

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Magnesium	mg/kg	8	110	1900	969	566
Manganese	mg/kg	8	4.2	10	6.6	2.3
Mercury	mg/kg	8	ND	ND	ND	ND
Nickel	mg/kg	8	ND	ND	ND	ND
Potassium	mg/kg	8	100	680	471	183
Selenium	mg/kg	8	ND	ND	ND	ND
Silver	mg/kg	8	1	3	1.96	0.80
Sodium	mg/kg	8	130	3600	2791	1115
Thallium	mg/kg	8	0.5	1.8	0.8	0.5
Vanadium	mg/kg	8	1.8	4.1	2.6	0.9
Zinc	mg/kg	8	3	19	5.9	5.6

Table F-3. Minimum, maximum, mean, and standard deviation for each parameter analyzed in Banana River sediment samples.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	13	ND	ND	ND	ND
4,4'-DDE	µg/kg	13	ND	ND	ND	ND
4,4'-DDT	µg/kg	13	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/kg	13	ND	ND	ND	ND
Aldrin	µg/kg	13	ND	ND	ND	ND
Alpha - BHC	µg/kg	13	ND	ND	ND	ND
Beta - BHC	µg/kg	13	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	13	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	13	ND	ND	ND	ND
Chlordane (total)	µg/kg	13	ND	ND	ND	ND
Delta - BHC	µg/kg	13	ND	ND	ND	ND
Dieldrin	µg/kg	13	ND	ND	ND	ND
Endosulfan I	µg/kg	13	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	13	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	13	ND	ND	ND	ND
Endrin	µg/kg	13	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	13	ND	ND	ND	ND
Endrin Ketone	µg/kg	13	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/kg	13	ND	ND	ND	ND
Heptachlor	µg/kg	13	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	13	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	13	ND	ND	ND	ND
Isodrin	µg/kg	13	ND	ND	ND	ND
Methoxychlor	µg/kg	13	ND	ND	ND	ND
Mirex	µg/kg	13	ND	ND	ND	ND
Toxaphene	µg/kg	13	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	13	ND	ND	ND	ND
PCB - 1221	µg/kg	13	ND	ND	ND	ND
PCB - 1232	µg/kg	13	ND	ND	ND	ND
PCB - 1248	µg/kg	13	ND	ND	ND	ND
PCB - 1254	µg/kg	13	ND	ND	ND	ND
PCB - 1260	µg/kg	13	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy) propionic acid)	µg/kg	13	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/kg	13	0.005	0.027	0.010	0.006
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/kg	13	0.005	0.021	0.010	0.005
3,5 - DCBA	µg/kg	13	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/kg	13	ND	ND	ND	ND
4 - Nitrophenol	µg/kg	13	ND	ND	ND	ND
Acifluorfen	µg/kg	13	ND	ND	ND	ND

Table F-3. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (cont.)						
Bentazon	μg/kg	13	ND	ND	ND	ND
Chloramben	μg/kg	13	ND	ND	ND	ND
Dacthal	μg/kg	13	ND	ND	ND	ND
Dalapon	μg/kg	13	ND	ND	ND	ND
Dicambia	μg/kg	13	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	μg/kg	13	ND	ND	ND	ND
Dinoseb	μg/kg	13	ND	ND	ND	ND
MCPA	μg/kg	13	ND	ND	ND	ND
MCPP	μg/kg	13	ND	ND	ND	ND
Pentachlorophenol	μg/kg	13	ND	ND	ND	ND
Picloram	μg/kg	13	ND	ND	ND	ND
Sum of Chlorinated Herbicides	μg/kg	13	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	μg/kg	13	ND	ND	ND	ND
2-Methylnaphthalene	μg/kg	13	ND	ND	ND	ND
Acenaphthene	μg/kg	13	ND	ND	ND	ND
Acenaphthylene	μg/kg	13	ND	ND	ND	ND
Anthracene	μg/kg	13	ND	ND	ND	ND
Benzo(a)anthracene	μg/kg	13	0.001	0.006	0.002	0.002
Benzo(a)pyrene	μg/kg	13	0.001	0.003	0.002	0.001
Benzo(b)fluoranthene	μg/kg	13	0.002	0.014	0.003	0.003
Benzo(g,h,i)perylene	μg/kg	13	ND	ND	ND	ND
Benzo(k)fluoranthene	μg/kg	13	0.001	0.009	0.002	0.002
Chrysene	μg/kg	13	0.001	0.013	0.003	0.003
Dibenzo(a,h)anthracene	μg/kg	13	ND	ND	ND	ND
Fluoranthene	μg/kg	13	0.002	0.067	0.007	0.018
Fluorene	μg/kg	13	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	μg/kg	13	ND	ND	ND	ND
Naphthalene	μg/kg	13	ND	ND	ND	ND
Phenanthrene	μg/kg	13	0.001	0.007	0.002	0.002
Pyrene	μg/kg	13	0.001	0.034	0.004	0.009
Metals						
Aluminum	mg/kg	13	210	2200	915	580
Antimony	mg/kg	13	ND	ND	ND	ND
Arsenic	mg/kg	13	0.35	2	0.86	0.49
Barium	mg/kg	13	ND	ND	ND	ND
Beryllium	mg/kg	13	ND	ND	ND	ND
Cadmium	mg/kg	13	ND	ND	ND	ND
Calcium	mg/kg	13	820	220000	50540	60407
Chromium	mg/kg	13	1.8	5.2	2.9	1.0
Cobalt	mg/kg	13	ND	ND	ND	ND
Copper	mg/kg	13	ND	ND	ND	ND
Iron	mg/kg	13	150	3200	1166	930

Table F-3. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Lead	mg/kg	13	2	6	3.4	1.4
Magnesium	mg/kg	13	42	2100	892	633
Manganese	mg/kg	13	1	27	10.6	8.2
Mercury	mg/kg	13	0.005	0.01	0.007	0.003
Nickel	mg/kg	13	ND	ND	ND	ND
Potassium	mg/kg	13	19	790	286	241
Selenium	mg/kg	13	ND	ND	ND	ND
Silver	mg/kg	13	1	2.4	1.5	0.4
Sodium	mg/kg	13	19	4800	1940	1498
Thallium	mg/kg	13	0.5	5.4	0.99	1.34
Vanadium	mg/kg	13	0.5	7.7	3.0	2.1
Zinc	mg/kg	13	3	27	10.8	6.2

Table F-4. *Minimum, maximum, mean, and standard deviation for each parameter analyzed in Indian River sediment samples.*

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	µg/kg	16	ND	ND	ND	ND
4,4'-DDE	µg/kg	16	ND	ND	ND	ND
4,4'-DDT	µg/kg	16	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	µg/kg	16	ND	ND	ND	ND
Aldrin	µg/kg	16	ND	ND	ND	ND
Alpha - BHC	µg/kg	16	ND	ND	ND	ND
Beta - BHC	µg/kg	16	ND	ND	ND	ND
Chlordane (alpha)	µg/kg	16	ND	ND	ND	ND
Chlordane (gamma)	µg/kg	16	ND	ND	ND	ND
Chlordane (total)	µg/kg	16	ND	ND	ND	ND
Delta - BHC	µg/kg	16	ND	ND	ND	ND
Dieldrin	µg/kg	16	ND	ND	ND	ND
Endosulfan I	µg/kg	16	ND	ND	ND	ND
Endosulfan II (beta)	µg/kg	16	ND	ND	ND	ND
Endosulfan Sulfate	µg/kg	16	ND	ND	ND	ND
Endrin	µg/kg	16	ND	ND	ND	ND
Endrin Aldehyde	µg/kg	16	ND	ND	ND	ND
Endrin Ketone	µg/kg	16	ND	ND	ND	ND
Gamma -BHC (Lindane)	µg/kg	16	ND	ND	ND	ND
Heptachlor	µg/kg	16	ND	ND	ND	ND
Heptachlor Epoxide (a)	µg/kg	16	ND	ND	ND	ND
Heptachlor Epoxide (b)	µg/kg	16	ND	ND	ND	ND
Isodrin	µg/kg	16	ND	ND	ND	ND
Methoxychlor	µg/kg	16	ND	ND	ND	ND
Mirex	µg/kg	16	ND	ND	ND	ND
Toxaphene	µg/kg	16	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	µg/kg	16	ND	ND	ND	ND
PCB - 1221	µg/kg	16	ND	ND	ND	ND
PCB - 1232	µg/kg	16	ND	ND	ND	ND
PCB - 1248	µg/kg	16	ND	ND	ND	ND
PCB - 1254	µg/kg	16	ND	ND	ND	ND
PCB - 1260	µg/kg	16	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy) propionic acid)	µg/kg	16	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	µg/kg	16	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	µg/kg	16	ND	ND	ND	ND
3,5 - DCBA	µg/kg	16	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	µg/kg	16	ND	ND	ND	ND
4 - Nitrophenol	µg/kg	16	ND	ND	ND	ND
Acifluorfen	µg/kg	16	ND	ND	ND	ND

Table F-4. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (8151) (cont.)						
Bentazon	µg/kg	16	ND	ND	ND	ND
Chloramben	µg/kg	16	ND	ND	ND	ND
Dacthal	µg/kg	16	ND	ND	ND	ND
Dalapon	µg/kg	16	ND	ND	ND	ND
Dicambia	µg/kg	16	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	16	ND	ND	ND	ND
Dinoseb	µg/kg	16	ND	ND	ND	ND
MCPA	µg/kg	16	ND	ND	ND	ND
MCPP	µg/kg	16	ND	ND	ND	ND
Pentachlorophenol	µg/kg	16	ND	ND	ND	ND
Picloram	µg/kg	16	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/kg	16	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/kg	16	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	16	ND	ND	ND	ND
Acenaphthene	µg/kg	16	ND	ND	ND	ND
Acenaphthylene	µg/kg	16	ND	ND	ND	ND
Anthracene	µg/kg	16	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	16	0.001	0.012	0.002	0.003
Benzo(a)pyrene	µg/kg	16	0.001	0.011	0.002	0.003
Benzo(b)fluoranthene	µg/kg	16	0.002	0.013	0.003	0.004
Benzo(g,h,i)perylene	µg/kg	16	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	16	0.001	0.01	0.002	0.002
Chrysene	µg/kg	16	0.001	0.042	0.004	0.010
Dibenzo(a,h)anthracene	µg/kg	16	ND	ND	ND	ND
Fluoranthene	µg/kg	16	0.002	0.005	0.003	0.001
Fluorene	µg/kg	16	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	16	ND	ND	ND	ND
Naphthalene	µg/kg	16	0.011	0.067	0.016	0.014
Phenanthrene	µg/kg	16	ND	ND	ND	ND
Pyrene	µg/kg	16	ND	ND	ND	ND
Metals						
Aluminum	mg/kg	16	230	2800	837	739
Antimony	mg/kg	16	ND	ND	ND	ND
Arsenic	mg/kg	16	0.3	3.3	0.7	0.8
Barium	mg/kg	16	ND	ND	ND	ND
Beryllium	mg/kg	16	ND	ND	ND	ND
Cadmium	mg/kg	16	ND	ND	ND	ND
Calcium	mg/kg	16	450	220000	50145	68188
Chromium	mg/kg	16	0.5	6.4	1.7	1.7
Cobalt	mg/kg	16	ND	ND	ND	ND
Copper	mg/kg	16	0.5	7	3.4	1.3

Table F-4. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Iron	mg/kg	16	150	1700	555	431
Lead	mg/kg	16	0.5	4.7	2.2	1.3
Magnesium	mg/kg	16	63	1800	562	498
Manganese	mg/kg	16	0.5	110	10.9	26.6
Mercury	mg/kg	16	0.005	0.017	0.008	0.005
Nickel	mg/kg	16	ND	ND	ND	ND
Potassium	mg/kg	16	16	820	211	212
Selenium	mg/kg	16	ND	ND	ND	ND
Silver	mg/kg	16	ND	ND	ND	ND
Sodium	mg/kg	16	26	6700	2424	2048
Thallium	mg/kg	16	0.5	2.9	0.7	0.6
Vanadium	mg/kg	16	0.5	5.5	1.8	1.7
Zinc	mg/kg	16	3	25	6.4	6.8

Table F-5. Minimum, maximum, mean, and standard deviation for each parameter analyzed in Mosquito Lagoon sediment samples.

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Organochlorine Pesticides (8081)						
4,4'-DDD	μg/kg	9	ND	ND	ND	ND
4,4'-DDE	μg/kg	9	ND	ND	ND	ND
4,4'-DDT	μg/kg	9	ND	ND	ND	ND
Sum 4,4'-DDD + 4,4'-DDE + 4,4'-DDT	μg/kg	9	ND	ND	ND	ND
Aldrin	μg/kg	9	ND	ND	ND	ND
Alpha - BHC	μg/kg	9	ND	ND	ND	ND
Beta - BHC	μg/kg	9	ND	ND	ND	ND
Chlordane (alpha)	μg/kg	9	ND	ND	ND	ND
Chlordane (gamma)	μg/kg	9	ND	ND	ND	ND
Chlordane (total)	μg/kg	9	ND	ND	ND	ND
Delta - BHC	μg/kg	9	ND	ND	ND	ND
Dieldrin	μg/kg	9	ND	ND	ND	ND
Endosulfan I	μg/kg	9	ND	ND	ND	ND
Endosulfan II (beta)	μg/kg	9	ND	ND	ND	ND
Endosulfan Sulfate	μg/kg	9	ND	ND	ND	ND
Endrin	μg/kg	9	ND	ND	ND	ND
Endrin Aldehyde	μg/kg	9	ND	ND	ND	ND
Endrin Ketone	μg/kg	9	ND	ND	ND	ND
Gamma -BHC (Lindane)	μg/kg	9	ND	ND	ND	ND
Heptachlor	μg/kg	9	ND	ND	ND	ND
Heptachlor Epoxide (a)	μg/kg	9	ND	ND	ND	ND
Heptachlor Epoxide (b)	μg/kg	9	ND	ND	ND	ND
Isodrin	μg/kg	9	ND	ND	ND	ND
Methoxychlor	μg/kg	9	ND	ND	ND	ND
Mirex	μg/kg	9	ND	ND	ND	ND
Toxaphene	μg/kg	9	ND	ND	ND	ND
Aroclors (8082)						
PCB - 1016/1242	μg/kg	9	ND	ND	ND	ND
PCB - 1221	μg/kg	9	ND	ND	ND	ND
PCB - 1232	μg/kg	9	ND	ND	ND	ND
PCB - 1248	μg/kg	9	ND	ND	ND	ND
PCB - 1254	μg/kg	9	ND	ND	ND	ND
PCB - 1260	μg/kg	9	ND	ND	ND	ND
Chlorinated Herbicides (8151)						
Silvex (2,4,5 - TP) (2-(2,4,5 - Trichlorophenoxy) propionic acid)	μg/kg	9	ND	ND	ND	ND
2,4,5 - T (2,4,5 - Triclorophenoxy acetic acid)	μg/kg	9	ND	ND	ND	ND
2,4 - D (2,4 - Dichlorophenoxy acetic acid)	μg/kg	9	ND	ND	ND	ND
3,5 - DCBA	μg/kg	9	ND	ND	ND	ND
2,4 - DB (4 - (2,4 - Dichlorophenoxy) butyric acid)	μg/kg	9	ND	ND	ND	ND
4 - Nitrophenol	μg/kg	9	ND	ND	ND	ND
Acifluorfen	μg/kg	9	ND	ND	ND	ND

Table F-5. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Chlorinated Herbicides (cont.)						
Bentazon	µg/kg	9	ND	ND	ND	ND
Chloramben	µg/kg	9	ND	ND	ND	ND
Dacthal	µg/kg	9	ND	ND	ND	ND
Dalapon	µg/kg	9	ND	ND	ND	ND
Dicambia	µg/kg	9	ND	ND	ND	ND
Dichlorprop [2-(2,4-Dichlorophenoxy) proponic acid]	µg/kg	9	ND	ND	ND	ND
Dinoseb	µg/kg	9	ND	ND	ND	ND
MCPA	µg/kg	9	ND	ND	ND	ND
MCPP	µg/kg	9	ND	ND	ND	ND
Pentachlorophenol	µg/kg	9	ND	ND	ND	ND
Picloram	µg/kg	9	ND	ND	ND	ND
Sum of Chlorinated Herbicides	µg/kg	9	ND	ND	ND	ND
Polyaromatic Hydrocarbons (8310)						
1-Methylnaphthalene	µg/kg	9	ND	ND	ND	ND
2-Methylnaphthalene	µg/kg	9	ND	ND	ND	ND
Acenaphthene	µg/kg	9	ND	ND	ND	ND
Acenaphthylene	µg/kg	9	ND	ND	ND	ND
Anthracene	µg/kg	9	ND	ND	ND	ND
Benzo(a)anthracene	µg/kg	9	ND	ND	ND	ND
Benzo(a)pyrene	µg/kg	9	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/kg	9	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/kg	9	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/kg	9	ND	ND	ND	ND
Chrysene	µg/kg	9	ND	ND	ND	ND
Dibenzo(a,h)anthracene	µg/kg	9	ND	ND	ND	ND
Fluoranthene	µg/kg	9	ND	ND	ND	ND
Fluorene	µg/kg	9	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/kg	9	ND	ND	ND	ND
Naphthalene	µg/kg	9	0.012	0.054	0.023	0.016
Phenanthrene	µg/kg	9	0.001	0.01	0.002	0.003
Pyrene	µg/kg	9	0.001	0.015	0.003	0.005
Metals						
Aluminum	mg/kg	9	500	2300	1196	671
Antimony	mg/kg	9	ND	ND	ND	ND
Arsenic	mg/kg	9	0.35	0.9	0.54	0.25
Barium	mg/kg	9	ND	ND	ND	ND
Beryllium	mg/kg	9	ND	ND	ND	ND
Cadmium	mg/kg	9	ND	ND	ND	ND
Calcium	mg/kg	9	19	180000	44158	62393
Chromium	mg/kg	9	0.5	6	3.2	2.2
Cobalt	mg/kg	9	ND	ND	ND	ND
Copper	mg/kg	9	ND	ND	ND	ND

Table F-5. (cont.).

Parameter	Units	N	Minimum	Maximum	Mean	Std. Deviation
Metals (cont.)						
Iron	mg/kg	9	500	2800	1363	915
Lead	mg/kg	9	0.5	2.3	1.4	0.7
Magnesium	mg/kg	9	280	3800	1938	1376
Manganese	mg/kg	9	3	55	17	17
Mercury	mg/kg	9	0.005	0.019	0.009	0.005
Nickel	mg/kg	9	ND	ND	ND	ND
Potassium	mg/kg	9	140	1200	635	413
Selenium	mg/kg	9	ND	ND	ND	ND
Silver	mg/kg	9	1	3.4	1.7	0.7
Sodium	mg/kg	9	2200	10000	5325	2449
Thallium	mg/kg	9	ND	ND	ND	ND
Vanadium	mg/kg	9	0.5	6	3.2	2.2
Zinc	mg/kg	9	3	13	5	3.1

Table F-6. KSC Background raw data for sediment locations.

		AVE001	BPD001	BPD002	JER001	MAXO1	ROB001		IRL004	IRL005
		07/22/1998	07/17/1998	07/17/1998	07/22/1998	07/17/1998	07/22/98		09/03/1998	09/03/1998
								duplicate		
Organochlorine pesticides (8081)										
4,4' - DDD	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
4,4' - DDE	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
4,4' - DDT	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Aldrin	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Alpha - BHC	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Beta - BHC	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Chlordane, alpha	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Chlordane, gamma	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Chlordane (Total)	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Delta - BHC	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Dieldrin	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Endosulfan I	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Endosulfan II (beta)	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Endosulfan Sulfate	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Endrin	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Endrin Aldehyde	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Endrin Ketone	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Gamma - BHC (Lindane)	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Heptachlor	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Heptachlor Epoxide(a)	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Heptachlor Epoxide(b)	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Isodrin	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Methoxychlor	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Mirex	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Toxaphene	µg/kg	<130	<92	<86	<96	<98	<87	<86	<90	<86
Aroclors (8082)										
PCB-1016/1242	µg/kg	<65	<46	<43	<48	<49	<43	<43	<45	<43
PCB-1221	µg/kg	<65	<46	<43	<48	<49	<43	<43	<45	<43
PCB-1232	µg/kg	<65	<46	<43	<48	<49	<43	<43	<45	<43
PCB-1248	µg/kg	<65	<46	<43	<48	<49	<43	<43	<45	<43
PCB-1254	µg/kg	<65	<46	<43	<48	<49	<43	<43	<45	<43
PCB-1260	µg/kg	<65	<46	<43	<48	<49	<43	<43	<45	<43

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

		AVE001	BPD001	BPD002	JER001	MAXO1	ROB001		IRL004	IRL005
		07/22/1998	07/17/1998	07/17/1998	07/22/1998	07/17/1998	07/22/98		09/03/1998	09/03/1998
								duplicate		
Chlorinated Herbicides (8151)										
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
2,4-Dichlorophenoxy acetic acid (2,4 - D)	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
3,5-DCBA	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
4 - Nitrophenol	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Acifluorfen	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Bentazon	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Chloramben	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Dacthal	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Dalapon	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Dicamba	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Dinoseb	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
MCPA	µg/kg	<200	<140	<130	<140	<150	<130	<130	<270	<260
MCPP	µg/kg	<200	<140	<130	<140	<150	<130	<130	<270	<260
Pentachlorophenol	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Picloram	µg/kg	<10	<14	<13	<7	<15	<6	<6	<14	<13
Polyaromatic Hydrocarbons (8310)										
1 - Methylnaphthalene	µg/kg	<33	<23	<22	<24	<25	<22	<22	<23	<22
2 - Methylnaphthalene	µg/kg	<33	<23	<22	<24	<25	<22	<22	<23	<22
Acenaphthene	µg/kg	<33	<23	<22	<24	<25	<22	<22	<23	<22
Acenaphthylene	µg/kg	<6.5	<4.6	<4.3	<4.8	<4.9	<4.3	<4.3	<4.5	<4.3
Anthracene	µg/kg	<33	<24	<22	<25	<25	<22	<22	<23	<22
Benzo(a)anthracene	µg/kg	<3.3	<2.3	<2.2	<2.4	<2.5	<2.2	<2.2	12	<2.2
Benzo(a)pyrene	µg/kg	<4	<3	<2	<3	<3	<3	<2	11	5
Benzo(b)fluoranthene	µg/kg	<6	<4	<4	<4	<4	<4	<4	12	13

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

		AVE001	BPD001	BPD002	JER001	MAXO1	ROB001		IRL004	IRL005
		07/22/1998	07/17/1998	07/17/1998	07/22/1998	07/17/1998	07/22/98		09/03/1998	09/03/1998
								duplicate		
Polyaromatic Hydrocarbons (8310) (cont.)										
Benzo(g,h,i)perylene	µg/kg	<6.5	<4.6	<4.3	<4.8	<5	<4.4	<4.3	**11 I**	<4.3
Benzo(k)fluoranthene	µg/kg	<4	<3	<2	<3	<3	<3	<2	**10**	**2 I**
Chrysene	µg/kg	<3.3	<2.3	<2.2	<2.4	<2.5	<2.2	<2.2	**42**	**6.9**
Dibenzo(a,h)anthracene	µg/kg	<6.5	<4.6	<4.3	<4.8	<5	<4.4	<4.3	<4.6	<4.3
Fluoranthene	µg/kg	<6.5	<4.6	<4.3	<4.8	<5	<4.4	<4.3	<4.6	<4.3
Fluorene	µg/kg	<6.5	<4.6	<4.3	<4.8	<5	<4.4	<4.3	<4.6	<4.3
Indeno(1,2,3-cd)pyrene	µg/kg	<3.3	<2.3	<2.2	<2.4	<2.5	<2.2	<2.2	**9**	<2.2
Naphthalene	µg/kg	<33	<23	<22	<24	<25	<22	<22	<23	<22
Phenanthrene	µg/kg	<3.3	<2.3	<2.2	<2.4	<2.5	<2.2	<2.2	<2.3	<2.2
Pyrene	µg/kg	<3.3	<2.3	<2.2	<2.4	<2.5	<2.2	<2.2	<2.3	<2.2
Surrogates										
2,4,5,6-TCMX	%	114	62	85	98	66	123	126	81	65
DBC	%	128	78	102	99	79	125	139	100	103
2,4-DCAA	%	98	100	58	108	104	106	82	88	124
p-terphenyl	%	89	84	93	84	104	90	64	78	73
Metals										
Aluminum	mg/Kg	**1600**	**440**	**350**	**2000**	**610**	**660**	**740**	**260**	**230**
Antimony	mg/Kg	<4	<3	<2	<3	<3	<3	<2	<3	<2
Arsenic	mg/Kg	<1	<0.7	**0.9**	<0.7	<0.7	<0.6	<0.6	<0.7	<0.6
Barium	mg/Kg	<39	<28	<26	<29	<30	<26	<26	<27	<26
Beryllium	mg/Kg	<2	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	mg/Kg	<2	<1	<1	<1	<1	<1	<1	<1	<1
Calcium	mg/Kg	**35000**	**22000**	**14000**	**62000**	**7000**	**2100**	**1400**	**220000**	**120000**
Chromium	mg/Kg	**2.9**	<1	<1	**3.6**	<1	**1.4**	**1.6**	<1	<1
Cobalt	mg/Kg	<10	<7	<6	<7	<7	<6	<6	<7	<6
Copper	mg/Kg	<10	<7	<6	<7	<7	<6	<6	<7	***380****
Iron	mg/Kg	**1200**	**150**	**220**	**1700**	**520**	**340**	**400**	**250**	**260**
Lead	mg/Kg	**5.1**	**1.8**	**1.7**	**4.6**	**1**	**1.6**	**1.7**	**3.4**	**3.2**
Magnesium	mg/Kg	**510**	**620**	**430**	**380**	**960**	**110**	**130**	**550**	**440**
Manganese	mg/Kg	**27**	**2.4**	**2.1**	**14**	**7.6**	**1.7**	**2.1**	**4.9**	**5**
Mercury	mg/Kg	<0.02	**0.017**	**0.014**	<0.01	**0.019**	<0.01	<0.02	<0.01	<0.01

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

		AVE001	BPD001	BPD002	JER001	MAXO1	ROB001		IRL004	IRL005
		07/22/1998	07/17/1998	07/17/1998	07/22/1998	07/17/1998	07/22/98		09/03/1998	09/03/1998
								duplicate		
Metals (cont.)										
Nickel	mg/Kg	<10	<7	<6	<7	<7	<6	<6	<7	<6
Potassium	mg/Kg	**82**	**140**	**140**	**39**	**210**	<33	<32	**140**	**140**
Selenium	mg/Kg	<4	<3	<2	<3	<3	<3	<2	<3	<5
Silver	mg/Kg	<4	<3	<2	<3	<3	<3	<2	<3	<2
Sodium	mg/Kg	**350**	**3300**	**2800**	**98**	**7000**	**200**	**310**	**5200**	**3900**
Thallium	mg/Kg	<2	<1	<1	<1	<1	<1	<1	<1	<1
Vanadium	mg/Kg	**3.5**	<1	<1	**5.5**	**1**	<1	**1.4**	<1	<1
Zinc	mg/Kg	**13**	<7	**21**	**10**	<7	<6	<6	**25**	<6
Other Parameters										
Percent Solids	%	51	72	77	69	67	76	77	73	77
Total organic carbon	mg/Kg	>26700	23000	7400	22000	16600	2200	2400	9000	9500

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	OCA010 09/03/98		REF001 09/03/1998	TEL004 09/03/1998	BRN020 06/01/1998	KPI001 06/05/1998	NSC001 06/05/1998	PEF20 06/01/1998	SLF001 06/05/1998	SRE001 06/01/1998	SRW001 06/01/1998
		duplicate									
Organochlorine pesticides (8081)											
4,4' - DDD	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
4,4' - DDE	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
4,4' - DDT	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Aldrin	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Alpha - BHC	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Beta - BHC	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Chlordane, alpha	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Chlordane, gamma	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Chlordane (Total)	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Delta - BHC	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Dieldrin	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Endosulfan I	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Endosulfan II (beta)	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Endosulfan Sulfate	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Endrin	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Endrin Aldehyde	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Endrin Ketone	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Gamma - BHC (Lindane)	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Heptachlor	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Heptachlor Epoxide(a)	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Heptachlor Epoxide(b)	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Isodrin	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Methoxychlor	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Mirex	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Toxaphene	<89	<90	<96	<100	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Aroclors (8082)											
PCB-1016/1242	<44	<45	<48	<50	<38	<41	<41	<43	<43	<42	<44
PCB-1221	<44	<45	<48	<50	<38	<41	<41	<43	<43	<42	<44
PCB-1232	<44	<45	<48	<50	<38	<41	<41	<43	<43	<42	<44
PCB-1248	<44	<45	<48	<50	<38	<41	<41	<43	<43	<42	<44
PCB-1254	<44	<45	<48	<50	<38	<41	<41	<43	<43	<42	<44
PCB-1260	<44	<45	<48	<50	<38	<41	<41	<43	<43	<42	<44

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	OCA010 09/03/98		REF001 09/03/1998	TEL004 09/03/1998	BRN020 06/01/1998	KPI001 06/05/1998	NSC001 06/05/1998	PEF20 06/01/1998	SLF001 06/05/1998	SRE001 06/01/1998	SRW001 06/01/1998
		duplicate									
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	<14	<14	<14	<15	<19	<21	<21	<22	<22	<21	<22
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
2,4-Dichlorophenoxy acetic acid (2,4 - D)	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
3,5-DCBA	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	<14	<14	<14	<15	<19	<21	<21	<22	<22	<21	<22
4 - Nitrophenol	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
Acifluorfen	<14	<14	<14	<15	<19	<21	<21	<22	<22	<21	<22
Bentazon	<14	<14	<14	<15	<19	<21	<21	<22	<22	<21	<22
Chloramben	<14	<14	<14	<15	<19	<21	<21	<22	<22	<21	<22
Dacthal	<14	<14	<14	<15	<19	<21	<21	<22	<22	<21	<22
Dalapon	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
Dicamba	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
Dinoseb	<14	<14	<14	<15	<19	<21	<21	<22	<22	<21	<22
MCPA	<270	<270	<290	<300	<190	<210	<210	<220	<220	<210	<220
MCPP	<270	<270	<290	<300	<190	<210	<210	<220	<220	<210	<220
Pentachlorophenol	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
Picloram	<14	<14	<14	<15	<20	<21	<21	<22	<22	<22	<23
Polyaromatic Hydrocarbons (8310)											
1 - Methylnaphthalene	<23	<23	<24	<25	<19	<21	<21	<22	<22	<21	<22
2 - Methylnaphthalene	<23	<23	<24	<25	<19	<21	<21	<22	<22	<21	<22
Acenaphthene	<23	<23	<24	<25	<19	<21	<21	<22	<22	<21	<22
Acenaphthylene	<4.4	<4.5	<4.8	<5	<3.8	<4.1	<4.1	<4.3	<4.3	<4.2	<4.4
Anthracene	<23	<23	<25	<26	<20	<21	<21	<22	<22	<22	<23
Benzo(a)anthracene	<2.3	<2.3	<2.4	<2.5	<1.9	<2.1	<2.1	**4.7**	<2.2	**5.9**	<2.2
Benzo(a)pyrene	<3	<3	<3	<3	<2	<2	<2	<2	<2	<2	<3
Benzo(b)fluoranthene	<4	**4 I**	<4	<4	<3	<4	<4	<4	**4 I**	**14**	<4

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Table F-6. KSC Background raw data for sediment locations.

	OCA010 09/03/98		REF001	TEL004	BRN020	KPI001	NSC001	PEF20	SLF001	SRE001	SRW001
			09/03/1998	09/03/1998	06/01/1998	06/05/1998	06/05/1998	06/01/1998	06/05/1998	06/01/1998	06/01/1998
		duplicate									
Polyaromatic Hydrocarbons (8310) (cont.)											
Benzo(g,h,i)perylene	<4.5	<4.6	<4.8	<5	<3.9	<4.2	<4.2	<4.3	<4.3	<4.2	<4.4
Benzo(k)fluoranthene	<3	3 I	<3	<3	<2	<2	<2	<2	<2	9	<3
Chrysene	5.3	3.6	<2.4	<2.5	<1.9	<2.1	<2.1	4.3	<2.2	13	<2.2
Dibenzo(a,h)anthracene	<4.5	<4.6	<4.8	<5	<3.9	<4.2	<4.2	<4.3	<4.3	<4.2	<4.4
Fluoranthene	<4.5	<4.6	<4.8	<5	<3.9	<4.2	<4.2	<4.3	9.6	67	4.5 I
Fluorene	<4.5	<4.6	<4.8	<5	<3.9	<4.2	<4.2	<4.3	<4.3	<4.2	<4.4
Indeno(1,2,3-cd)pyrene	<2.3	<2.3	<2.4	<2.5	<1.9	<2.1	<2.1	<2.2	<2.2	<2.1	<2.2
Naphthalene	<23	<23	<24	<25	<19	<21	<21	<22	<22	<21	67
Phenanthrene	<2.3	<2.3	<2.4	<2.5	<1.9	<2.1	<2.1	<2.2	<2.2	7.5	<2.2
Pyrene	<2.3	<2.3	<2.4	<2.5	<1.9	<2.1	<2.1	<2.2	<2.2	34	<2.2
Surrogates											
2,4,5,6-TCMX	69	74	68	66	100	111	94	81	127	92	93
DBC	102	105	98	104	109	107	97	69	137	109	104
2,4-DCAA	124	132	108	128	68	80	120	114	136	84	96
p-terphenyl	89	95	85	84	87	80	85	100	90	95	113
Metals											
Aluminum	1400	2200	480	210	300	2800	690	440	620	650	590
Antimony	<3	<3	<3	<3	<2	<2	<2	<2	<2	<2	<3
Arsenic	<0.7	<0.7	<0.7	*5.4**	2	<0.6	2 I	0.9 I	1.4 I	1 I	<0.7
Barium	<27	<27	<29	<30	<23	<25	<25	<26	<26	<25	<27
Beryllium	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
Cadmium	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
Calcium	5300	5900	40000	820	220000	450	120000	26000	11000	44000	1300
Chromium	3.6	5.2	<1	3	2	6.4	2.2	1.8	1.8	1.8	1
Cobalt	<7	<7	<7	<8	<6	<6	<6	<6	<6	<6	<7
Copper	<7	<7	<7	*18**	<6	3	<6	<6	<6	<6	<7
Iron	3000	3200	550	150	540	960	920	490	440	760	410
Lead	3.2	2.9	2	5	2.9	2	3.1	2.1	<1	2	<1
Magnesium	300	260	520	42	1500	78	260	570	110	400	63
Manganese	1.8	1.8	2.8	<2	15	<1	7.1	4.7	4.2	7.2	1.6
Mercury	<0.01	0.010 I	<0.01	<0.02	<0.01	0.015 I	<0.01	<0.01	<0.01	<0.01	<0.01

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Table F-6. KSC Background raw data for sediment locations.

	OCA010 09/03/98		REF001	TEL004	BRN020	KPI001	NSC001	PEF20	SLF001	SRE001	SRW001
			09/03/1998	09/03/1998	06/01/1998	06/05/1998	06/05/1998	06/01/1998	06/05/1998	06/01/1998	06/01/1998
		duplicate									
Metals (cont.)											
Nickel	<34	<34	<14	<8	<6	<6	<6	<6	<6	<6	<7
Potassium	**40**	**52**	**170**	<38	**260**	**40**	**380**	**250**	**100**	**140**	<33
Selenium	<14	<14	<6	<3	<2	<2	<2	<2	<2	<2	<3
Silver	<3	<3	<3	<3	**2.4**	<2	<2	<2	<2	<2	<3
Sodium	**260**	**190**	**3800**	<38	**3000**	**261 I**	**2200**	**1600**	**130**	**1200**	**77**
Thallium	<1	<1	<1	***5.4****	<1	<1	***2.9****	<1	**1.8**	<1	<1
Vanadium	**7.7**	**7.1**	**1.9**	**2**	**1.3**	**5**	**2**	**1.4**	**1.8**	**2**	<1
Zinc	<7	**8**	<7	**27**	<6	<6	<6	**12**	<6	<6	<7
Other Parameters											
Percent Solids	74	73	69	66	86	80	80	77	77	79	75
Total organic carbon	>26700	>26700	1380	>26700	140	150	90	90	120	80	80

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	SRW002	BRC09	BRN18	BRS017	BRS019	IRL003	MLN001	MLN002	MLSO3		PEF024
	06/01/1998	06/10/1998	06/10/1998	06/10/1998	06/10/1998	06/11/1998	06/11/1998	06/11/1998	6/11/98		06/10/1998
										duplicate	
Organochlorine pesticides (8081)											
4,4' - DDD	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
4,4' - DDE	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
4,4' - DDT	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Aldrin	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Alpha - BHC	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Beta - BHC	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Chlordane, alpha	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Chlordane, gamma	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Chlordane (Total)	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Delta - BHC	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Dieldrin	<9.2	<5.2	<4.7	**7.9**	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Endosulfan I	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Endosulfan II (beta)	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Endosulfan Sulfate	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Endrin	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Endrin Aldehyde	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Endrin Ketone	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Gamma - BHC (Lindane)	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Heptachlor	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Heptachlor Epoxide(a)	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Heptachlor Epoxide(b)	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Isodrin	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Methoxychlor	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Mirex	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Toxaphene	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Aroclors (8082)											
PCB-1016/1242	<92	<52	<47	<46	<52	<44	<60	<46	<53	<50	<47
PCB-1221	<92	<52	<47	<46	<52	<44	<60	<46	<53	<50	<47
PCB-1232	<92	<52	<47	<46	<52	<44	<60	<46	<53	<50	<47
PCB-1248	<92	<52	<47	<46	<52	<44	<60	<46	<53	<50	<47
PCB-1254	<92	<52	<47	<46	<52	<44	<60	<46	<53	<50	<47
PCB-1260	<92	<52	<47	<46	<52	<44	<60	<46	<53	<50	<47

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	SRW002	BRC09	BRN18	BRS017	BRS019	IRL003	MLN001	MLN002	MLSO3		PEF024
	06/01/1998	06/10/1998	06/10/1998	06/10/1998	06/10/1998	06/11/1998	06/11/1998	06/11/1998	6/11/98		06/10/1998
										duplicate	
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	<46	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	<47	<16	<14	<14	17	<13	<18	<14	<16	<15	27
2,4-Dichlorophenoxy acetic acid (2,4 - D)	<47	<16	<14	<14	19	<13	<18	<14	<16	<15	21
3,5-DCBA	<47	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	<46	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
4 - Nitrophenol	<47	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Acifluorfen	<46	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Bentazon	<46	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Chloramben	<46	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Dacthal	<46	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Dalapon	<47	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Dicamba	<47	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	<47	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Dinoseb	<46	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
MCPA	<460	<160	<140	<140	<160	<130	<180	<140	<160	<150	<140
MCPP	<460	<160	<140	<140	<160	<130	<180	<140	<160	<150	<140
Pentachlorophenol	<47	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Picloram	<47	<16	<14	<14	<16	<13	<18	<14	<16	<15	<14
Polyaromatic Hydrocarbons (8310)											
1 - Methylnaphthalene	<46	<26	<24	<24	<26	<22	<30	<24	<27	<25	<24
2 - Methylnaphthalene	<46	<26	<24	<24	<26	<22	<30	<24	<27	<25	<24
Acenaphthene	<46	<26	<24	<24	<26	<22	<30	<24	<27	<25	<24
Acenaphthylene	<9.2	<5.2	<4.7	<4.6	<5.2	<4.4	<6	<4.6	<5.3	<5	<4.7
Anthracene	<47	<27	<24	<24	<27	<23	<31	<24	<27	<26	<24
Benzo(a)anthracene	<4.6	<2.6	<2.4	<2.4	<2.6	<2.2	<3	<2.4	<2.7	<2.5	<2.4
Benzo(a)pyrene	<6	<3	3 I	<3	<3	3 I	<4	<3	<3	<3	<3
Benzo(b)fluoranthene	<8	<5	<4	<4	<5	<4	<5	<4	<5	<4	<4

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	SRW002	BRC09	BRN18	BRS017	BRS019	IRL003	MLN001	MLN002	MLSO3		PEF024
	06/01/1998	06/10/1998	06/10/1998	06/10/1998	06/10/1998	06/11/1998	06/11/1998	06/11/1998	6/11/98		06/10/1998
										duplicate	
Polyaromatic Hydrocarbons (8310) (cont.)											
Benzo(g,h,i)perylene	<9.2	<5.3	<4.8	<4.7	<5.3	<4.4	<6	<4.7	<5.4	<5	<4.8
Benzo(k)fluoranthene	<6	<3	<3	<3	<3	<3	<4	<3	<3	<3	<3
Chrysene	<4.6	<2.6	<2.4	<2.4	<2.6	<2.2	<3	<2.4	<2.7	<2.5	<2.4
Dibenzo(a,h)anthracene	<9.2	<5.3	<4.8	<4.7	<5.3	<4.4	<6	<4.7	<5.4	<5	<4.8
Fluoranthene	<9.2	<5.3	<4.8	<4.7	<5.3	<4.4	<6	<4.7	<5.4	<5	<4.8
Fluorene	<9.2	<5.3	<4.8	<4.7	<5.3	<4.4	<6	<4.7	<5.4	<5	<4.8
Indeno(1,2,3-cd)pyrene	<4.6	<2.6	<2.4	<2.4	<2.6	<2.2	<3	<2.4	<2.7	<2.5	<2.4
Naphthalene	<46	<26	<24	<24	<26	<22	<30	<24	<27	<25	<24
Phenanthrene	<4.6	<2.6	**7.3 I**	<2.4	<2.6	<2.2	<3	<2.4	<2.7	<2.5	<2.4
Pyrene	<4.6	<2.6	<2.4	<2.4	<2.6	<2.2	<3	<2.4	<2.7	<2.5	<2.4
Surrogates											
2,4,5,6-TCMX	100	84	67	67	68	66	69	78	55	71	69
DBC	117	122	88	126	99	103	121	128	96	107	96
2,4-DCAA	90	118	40	96	136	40	82	72	118	98	96
p-terphenyl	95	83	82	78	82	82	87	80	85	88	91
Metals											
Aluminum	*5300**	**1000**	**830**	**560**	**1200**	**280**	**1600**	*4500**	**1400**	**1800**	**410**
Antimony	<6	<3	<3	<3	<3	<3	<4	<3	<3	<3	<3
Arsenic	**3.3 I**	**1.1 I**	**0.7 I**	**0.7 I**	**1.1 I**	<0.7	<0.9	<0.7	<0.8	**0.8 I**	<0.7
Barium	<56	<32	<28	<28	<32	<27	<36	<28	<32	<30	<28
Beryllium	<3	<2	<1	<1	<2	<1	<2	<1	<2	<2	<1
Cadmium	<3	<2	<1	<1	<2	<1	<2	<1	<2	<2	<1
Calcium	**160000**	**43000**	**12000**	**58000**	**100000**	**3100**	**6400**	**120000**	**21000**	**23000**	**11000**
Chromium	*13**	**3**	**3.4**	**1.8**	**3.8**	<1	**4.7**	*11**	**4.5**	**5.4**	**1.8**
Cobalt	<14	<8	<7	<7	<8	<7	<9	<7	<8	<8	<7
Copper	<14	<8	<7	<7	<8	<7	<9	<7	<8	<8	<7
Iron	*5600**	**1000**	**1100**	**630**	**1200**	**270**	**2000**	*5400**	**1800**	**2100**	**490**
Lead	**4.7**	**3.5**	**2**	**2.5**	**6**	<1	<2	**2.2**	<2	**1.8**	**2.1**
Magnesium	**1600**	**1600**	**1200**	**930**	**2100**	**690**	**3100**	**6500**	**2600**	**3200**	**690**
Manganese	**110**	**10**	**12**	**12**	**19**	**2.5**	**16**	**55**	**16**	**20**	**4.7**
Mercury	<0.03	<0.02	<0.01	<0.01	<0.02	<0.01	<0.02	<0.01	<0.02	<0.02	<0.01

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	SRW002	BRC09	BRN18	BRS017	BRS019	IRL003	MLN001	MLN002	MLSO3		PEF024
	06/01/1998	06/10/1998	06/10/1998	06/10/1998	06/10/1998	06/11/1998	06/11/1998	06/11/1998	6/11/98		06/10/1998
										duplicate	
Metals (cont.)											
Nickel	<14	<8	<7	<7	<8	<7	<9	<7	<8	<8	<7
Potassium	**360**	**570**	**310**	**370**	**790**	**270**	**1200**	***2100****	**770**	**910**	**240**
Selenium	<6	<3	<3	<3	<3	<3	<4	<3	<3	<3	<3
Silver	<6	<3	<3	<3	<3	<3	<4	<3	<3	<3	<3
Sodium	**470**	**3300**	**2300**	**2800**	**4800**	**3300**	***12000****	**10000**	**5300**	**5300**	**2000**
Thallium	<3	<2	<1	<1	<2	<1	<2	<1	<2	<2	<1
Vanadium	***11****	**2.8**	**2.6**	**1.7**	**3.5**	<1	**4.4**	***12****	**4.4**	**5.8**	<1
Zinc	<14	<25	<23	<22	<25	<7	<9	**13**	<8	<8	<23
Other Parameters											
Percent Solids	36	63	70	71	63	75	55	71	62	66	70
Total organic carbon	170	18000	5700	30000	34000	4000	14000	38000	9000	16000	6000

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	SJB02	SJML02	IRL001	IRL002	SR3-D1		SR3-D2	BCE012	BCE004	BCW15	
	06/10/1998	06/11/1998	06/17/1998	06/17/1998	06/17/98		06/17/1998	06/24/1998	06/24/1998	6/25/98	
						duplicate					duplicate
Organochlorine pesticides (8081)											
4,4' - DDD	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
4,4' - DDE	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
4,4' - DDT	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
Aldrin	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
Alpha - BHC	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
Beta - BHC	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
Chlordane, alpha	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
Chlordane, gamma	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
Chlordane (Total)	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
Delta - BHC	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Dieldrin	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Endosulfan I	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Endosulfan II (beta)	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Endosulfan Sulfate	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Endrin	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Endrin Aldehyde	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Endrin Ketone	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Gamma - BHC (Lindane)	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Heptachlor	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Heptachlor Epoxide(a)	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Heptachlor Epoxide(b)	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Isodrin	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Methoxychlor	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Mirex	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Toxaphene	<4.9	<5.1	<4.5	<5.5	<4.4	<4.1	<4.8	<4.8	<5.2	<4.3	<4.3
Aroclors (8082)											
PCB-1016/1242	<49	<51	<45	<55	<44	<41	<48	<48	<52	<43	<43
PCB-1221	<49	<51	<45	<55	<44	<41	<48	<48	<52	<43	<43
PCB-1232	<49	<51	<45	<55	<44	<41	<48	<48	<52	<43	<43
PCB-1248	<49	<51	<45	<55	<44	<41	<48	<48	<52	<43	<43
PCB-1254	<49	<51	<45	<55	<44	<44	<48	<48	<52	<43	<43
PCB-1260	<49	<51	<45	<55	<44	<41	<48	<48	<52	<43	<43

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Table F-6. KSC Background raw data for sediment locations.

	SJB02	SJML02	IRL001	IRL002	SR3-D1		SR3-D2	BCE012	BCE004	BCW15	
	06/10/1998	06/11/1998	06/17/1998	06/17/1998	06/17/98		06/17/1998	06/24/1998	06/24/1998	6/25/98	
						duplicate					duplicate
Chlorinated Herbicides (8151)											
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	<15	<15	<14	<17	<14	<12	<15	<15	<16	<13	<13
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	<15	<15	<14	<17	<14	<12	<15	<15	<16	<13	<13
2,4-Dichlorophenoxy acetic acid (2,4 - D)	<15	<15	<14	<17	<14	<14	<15	<15	<16	<13	<13
3,5-DCBA	<15	<15	<14	<17	<14	<14	<15	<15	<16	<13	<13
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	<15	<15	<14	<17	<14	<14	<15	<15	<16	<13	<13
4 - Nitrophenol	<15	<15	<14	<17	<14	<14	<15	<15	<16	<13	<13
Acifluorfen	<15	<15	<14	<17	<14	<14	<15	<15	<16	<13	<13
Bentazon	<15	<15	<14	<17	<14	<14	<15	<15	<16	<13	<13
Chloramben	<15	<15	<14	<17	<14	<14	<15	<15	<16	<13	<13
Dacthal	<15	<15	<14	<17	<14	<12	<15	<15	<16	<13	<13
Dalapon	<15	<15	<14	<17	<14	<12	<15	<15	<16	<13	<13
Dicamba	<15	<15	<14	<17	<14	<14	<15	<15	<16	<13	<13
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	<15	<15	<14	<17	<14	<12	<15	<15	<16	<13	<13
Dinoseb	<15	<15	<14	<17	<14	<12	<15	<15	<16	<13	<13
MCPA	<150	<150	<140	<170	<140	<120	<150	<150	<160	<130	<130
MCPP	<150	<150	<140	<170	<140	<140	<150	<150	<160	<130	<130
Pentachlorophenol	<15	<15	<14	<17	<14	<12	<15	<15	<16	<13	<13
Picloram	<15	<15	<14	<17	<14	<12	<15	<15	<16	<13	<13
Polyaromatic Hydrocarbons (8310)											
1 - Methylnaphthalene	<25	<26	<23	<28	<23	<21	<25	<25	<26	<22	<22
2 - Methylnaphthalene	<25	<26	<23	<28	<23	<21	140	<25	<26	<22	<22
Acenaphthene	<25	<26	<23	<28	<23	<23	<25	<25	<26	<22	<22
Acenaphthylene	<4.9	<5.1	<4.5	<5.5	<4.4	<4.4	<4.8	<4.8	<5.2	<4.3	<4.3
Anthracene	<25	<26	<23	<28	<23	<23	<25	<25	<27	<22	<22
Benzo(a)anthracene	<2.5	<2.6	<2.3	<2.8	<2.3	<2.3	<2.5	<2.5	<2.6	<2.2	<2.2
Benzo(a)pyrene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<2	<3
Benzo(b)fluoranthene	<4	<5	<4	<5	<4	<4	<4	<4	<5	<4	<4

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	SJB02	SJML02	IRL001	IRL002	SR3-D1		SR3-D2	BCE012	BCE004	BCW15	
	06/10/1998	06/11/1998	06/17/1998	06/17/1998	06/17/98		06/17/1998	06/24/1998	06/24/1998	6/25/98	
						duplicate					duplicate
Polyaromatic Hydrocarbons (8310) (cont.)											
Benzo(g,h,i)perylene	<5	<5.1	<4.6	<5.6	<4.5	<4.5	<4.9	<4.9	<5.3	<4.3	<4.3
Benzo(k)fluoranthene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<2	<3
Chrysene	<2.5	<2.6	<2.3	<2.8	<2.3	<2.3	<2.5	<2.5	<2.6	<2.2	<2.2
Dibenzo(a,h)anthracene	<5	<5.1	<4.6	<5.6	<4.5	<4.5	<4.9	<4.9	<5.3	<4.3	<4.3
Fluoranthene	<5	<5.1	<4.6	<5.6	<4.5	<4.2	<4.9	<4.9	<5.3	<4.3	<4.3
Fluorene	<5	<5.1	<4.6	<5.6	<4.5	<4.2	<4.9	<4.9	<5.3	<4.3	<4.3
Indeno(1,2,3-cd)pyrene	<2.5	<2.6	<2.3	<2.8	<2.3	<2.1	<2.5	<2.5	<2.6	<2.2	<2.2
Naphthalene	<25	<26	<23	<28	**54**	**24 I**	**47**	<25	<26	<22	<22
Phenanthrene	<2.5	**10**	<2.3	<2.8	<2.3	<2.1	<2.5	<2.5	<2.6	<2.2	<2.2
Pyrene	<2.5	**15**	<2.3	<2.8	<2.3	<2.1	<2.5	<2.5	<2.6	<2.2	<2.2
Surrogates											
2,4,5,6-TCMX	69	68	71	58	72	62	75	55	65	75	66
DBC	105	107	130	119	130	119	150	107	118	110	120
2,4-DCAA	112	96	72	88	80	80	80	120	96	40	104
p-terphenyl	82	83	89	89	95	85	86	72	101	82	76
Metals											
Aluminum	**1100**	**2300**	**1300**	**1400**	**640**	**720**	**500**	**1300**	**1900**	**750**	**700**
Antimony	<3	<3	<3	<3	<3	<3	<3	<3	<3	<2	<3
Arsenic	**1.3 I**	**0.9 I**	<0.7	<0.8	<0.7	<0.7	**0.9**	<0.7	<0.8	**2.3**	**1.8**
Barium	<30	<31	<27	<33	<27	<27	<29	<29	<32	<26	<26
Beryllium	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	<1
Cadmium	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	<1
Calcium	**96000**	<38	**970**	**32000**	**16000**	**24000**	**180000**	**3700**	**4100**	**140000**	**130000**
Chromium	**3.7**	**6**	**2.6**	**2.7**	**1.9**	**2**	<1	**3**	**4.4**	**1.8**	**1.7**
Cobalt	<7	<8	<7	<8	<7	<7	<7	<7	<8	<6	<6
Copper	<7	<8	<7	<8	<7	<7	<7	<1	<2	**1.8**	**1.6**
Iron	**1400**	**2800**	**480**	**1100**	**590**	**590**	**500**	**1200**	**1700**	**690**	**640**
Lead	**4.8**	**2.3**	<1	**1.8**	<1	<1	**1.9**	**2.4**	**1.9**	**2.7**	**2.5**
Magnesium	**1500**	**3800**	**810**	**1800**	**880**	**680**	**280**	**1400**	**1900**	**540**	**570**
Manganese	**21**	**32**	**5.1**	**8**	**3**	**3**	**3.5**	**7**	**10**	**4.9**	**4.6**
Mercury	<0.01	<0.02	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	SJB02	SJML02	IRL001	IRL002	SR3-D1		SR3-D2	BCE012	BCE004	BCW15	
	06/10/1998	06/11/1998	06/17/1998	06/17/1998	06/17/98		06/17/1998	06/24/1998	06/24/1998	6/25/98	
						duplicate					duplicate
Metals (cont.)											
Nickel	<7	<8	<7	<8	<7	<6	<7	<7	<8	<6	<6
Potassium	600	1100	450	820	400	350	140	500	570	440	460
Selenium	<3	<3	<3	<3	<3	<2	<3	<3	<3	<2	<3
Silver	<3	<3	<3	<3	<3	<2	3.4	<3	<3	2.7	3
Sodium	3400	5700	3300	6700	4300	2800	2200	3100	2700	3500	3600
Thallium	<1	<2	<1	<2	<1	<1	<1	<1	<2	<1	<1
Vanadium	3.3	6	3	3.5	1.9	1.9	<1	3.8	4.1	2.3	2.1
Zinc	<24	<8	<7	<8	<7	<6	<7	19	<8	<6	<6
Other Parameters											
Percent Solids	67	65	73	60	74	80	68	68	63	77	77
Total organic carbon	30000	18000	11000	22000	22000	>26700	26700	12400	21500	8510	>26700

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	BCW014	HPC001		MOC021
	06/25/1998	06/24/98		06/25/1998
			duplicate	
Organochlorine pesticides (8081)				
4,4' - DDD	<4.7	<5.1	<4.8	<4.7
4,4' - DDE	<4.7	<5.1	<4.8	<4.7
4,4' - DDT	<4.7	<5.1	<4.8	<4.7
Aldrin	<4.7	<5.1	<4.8	<4.7
Alpha - BHC	<4.7	<5.1	<4.8	<4.7
Beta - BHC	<4.7	<5.1	<4.8	<4.7
Chlordane, alpha	<4.7	<5.1	<4.8	<4.7
Chlordane, gamma	<4.7	<5.1	<4.8	<4.7
Chlordane (Total)	<4.7	<5.1	<4.8	<4.7
Delta - BHC	<4.7	<5.1	<4.8	<4.7
Dieldrin	<4.7	<5.1	<4.8	<4.7
Endosulfan I	<4.7	<5.1	<4.8	<4.7
Endosulfan II (beta)	<4.7	<5.1	<4.8	<4.7
Endosulfan Sulfate	<4.7	<5.1	<4.8	<4.7
Endrin	<4.7	<5.1	<4.8	<4.7
Endrin Aldehyde	<4.7	<5.1	<4.8	<4.7
Endrin Ketone	<4.7	<5.1	<4.8	<4.7
Gamma - BHC (Lindane)	<4.7	<5.1	<4.8	<4.7
Heptachlor	<4.7	<5.1	<4.8	<4.7
Heptachlor Epoxide(a)	<4.7	<5.1	<4.8	<4.7
Heptachlor Epoxide(b)	<4.7	<5.1	<4.8	<4.7
Isodrin	<4.7	<5.1	<4.8	<4.7
Methoxychlor	<4.7	<5.1	<4.8	<4.7
Mirex	<4.7	<5.1	<4.8	<4.7
Toxaphene	<4.7	<5.1	<4.8	<4.7
Aroclors (8082)				
PCB-1016/1242	<47	<51	<48	<47
PCB-1221	<47	<51	<48	<47
PCB-1232	<47	<51	<48	<47
PCB-1248	<47	<51	<48	<47
PCB-1254	<47	<51	<48	<47
PCB-1260	<47	<51	<48	<47

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	BCW014	HPC001		MOC021
	06/25/1998	06/24/98		06/25/1998
			duplicate	
Chlorinated Herbicides (8151)				
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	<14	<15	<14	<14
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	<14	<15	<14	<14
2,4-Dichlorophenoxy acetic acid (2,4 - D)	<14	<15	<14	<14
3,5-DCBA	<14	<15	<14	<14
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	<14	<15	<14	<14
4 - Nitrophenol	<14	<15	<14	<14
Acifluorfen	<14	<15	<14	<14
Bentazon	<14	<15	<14	<14
Chloramben	<14	<15	<14	<14
Dacthal	<14	<15	<14	<14
Dalapon	<14	<15	<14	<14
Dicamba	<14	<15	<14	<14
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	<14	<15	<14	<14
Dinoseb	<14	<15	<14	<14
MCPA	<140	<150	<140	<140
MCPP	<140	<150	<140	<140
Pentachlorophenol	<14	<15	<14	<14
Picloram	<14	<15	<14	<14
Polyaromatic Hydrocarbons (8310)				
1 - Methylnaphthalene	<24	<26	<24	<24
2 - Methylnaphthalene	<24	<26	<24	<24
Acenaphthene	<24	<26	<24	<24
Acenaphthylene	<4.7	<5.1	<4.8	<4.7
Anthracene	<24	<26	<25	<24
Benzo(a)anthracene	<2.4	<2.6	<2.4	<2.4
Benzo(a)pyrene	<3	<3	<3	<3
Benzo(b)fluoranthene	<4	<5	<4	<4

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	BCW014	HPC001		MOC021
	06/25/1998	06/24/98		06/25/1998
			duplicate	
Polyaromatic Hydrocarbons (8310) (cont.)				
Benzo(g,h,i)perylene	<4.8	<5.1	<4.8	<4.8
Benzo(k)fluoranthene	<3	<3	<3	<3
Chrysene	<2.4	<2.6	<2.4	<2.4
Dibenzo(a,h)anthracene	<4.8	<5.1	<4.8	<4.8
Fluoranthene	<4.8	<5.1	<4.8	<4.8
Fluorene	<4.8	<5.1	<4.8	<4.8
Indeno(1,2,3-cd)pyrene	<2.4	<2.6	<2.4	<2.4
Naphthalene	<24	<26	<24	<24
Phenanthrene	<2.4	<2.6	<2.4	<2.4
Pyrene	<2.4	<2.6	<2.4	<2.4
Surrogates				
2,4,5,6-TCMX	96	62	55	60
DBC	109	132	110	110
2,4-DCAA	80	72	92	72
p-terphenyl	67	82	89	79
Metals				
Aluminum	**880**	**1500**	**1300**	**340**
Antimony	<3	<3	<3	<3
Arsenic	<0.7	**2**	**2.3**	<0.7
Barium	<28	<31	<29	<28
Beryllium	<1	<2	<1	<1
Cadmium	<1	<2	<1	<1
Calcium	**4000**	**92000**	**160000**	**3000**
Chromium	**2**	**3.2**	**2.6**	<1
Cobalt	<7	<8	<7	<7
Copper	<1	**3.4**	**3**	<1
Iron	**800**	**1500**	**1200**	**310**
Lead	<1	**2.9**	**3**	**2.1**
Magnesium	**930**	**1300**	**1000**	**510**
Manganese	**4.8**	**9**	**8.1**	**4.7**
Mercury	<0.01	<0.02	<0.01	<0.01

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Table F-6. KSC Background raw data for sediment locations.

	BCW014	HPC001		MOC021
	06/25/1998	06/24/98		06/25/1998
			duplicate	
Metals (cont.)				
Nickel	<7	<8	<7	<7
Potassium	**370**	**680**	**650**	**230**
Selenium	<3	<3	<3	<3
Silver	<3	<3	**3**	<3
Sodium	**3100**	**2900**	**3300**	**3100**
Thallium	<1	<2	<1	<1
Vanadium	**1.8**	**2.8**	**2.3**	**1.6**
Zinc	<7	**8.3**	<7	<7
Other Parameters				
Percent Solids	70	65	69	70
Total organic carbon	11900	20000	>26700	>26700

I = value is between the Method Detection Limit and the Practical Quantitation Limit.
* = value is an outlier and not used in the analysis to deveop the KSC Background screening values.

Appendix G

John F. Kennedy Space Center
Baseline Chemical Characterization
Database Evaluation and Validation

Prepared by
Dynamac Corporation

Prepared for the
NASA KSC Remediation Program Office

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Abstract

This appendix provides a summary of the KSC Baseline Chemical Characterization Database. Emphasis is placed on sampling and analytical procedures, data collection efficiency, chain of custody record keeping, and overall data quality and validity. The project specific database includes 42073 data points out of an expected 42076. This represents a 99.99% data collection efficiency. All field methods utilized during sample collection followed procedures described in the contractor laboratory Florida DEP approved Quality Assurance Plan. In addition, groundwater sampling was conducted in compliance with NASA/KSC Sampling and Analysis Plan for RCRA Facility Investigations. All samples were analyzed utilizing appropriate EPA approved methods and all sample holding times were met. Chain of custody records were maintained throughout the project. Date entry errors were found on four Chain of Custody sheets, but no unusual data were reported for the sampling events in question. Signed laboratory reports were provided for each analytical event. Laboratory narratives were provided with laboratory reports. Results of equipment blank analyses indicate no significant procedural contamination of field samples. One equipment blank was reported to have organic contamination however all organic results for the field samples in question were reported as below detection. Results for method blank analyses indicated possible metal contamination in five sample runs. Low level sodium and calcium contamination did not meaningfully impact estimates of mean values. Aluminum contamination in the laboratory process may have produced a positive 4.25% bias in the mean concentration estimate for the coastal soil class.

All laboratory blanks for the EPA 8081, 8082, 8151, and 8310 organic analyses were reported as below detection indicating no laboratory process contamination of organic samples. Assessment of surrogate and spike recovery data show the Laboratory had good quality control. Metal analyses were high quality with few problems noted. Matrix interferences were an issue in several coastal soil samples, which are known to be high in sodium, magnesium, calcium, chloride, and aluminum. Organic analyses displayed a greater degree of variability than metals, as expected with the more complex procedures and methodologies. Organic analyses results are in general of good quality. Sample collection and processing induced errors have little influence on estimates of mean concentrations in the different media or the calculations of screening levels.

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1.0 Introduction

The Kennedy Space Center Environmental Program Office (EPO) conducted a Baseline Chemical Characterization to define background concentrations of selected chemicals in the environment at the space center. The objective of the project was to create a data set describing ambient concentrations of metals, pesticides, herbicides and polycyclic aromatic hydrocarbons (PAH) in soils, sediments, surface waters and ground waters. These chemical data can be used in the decision-making and project development process for remediation activities, contamination assessments, ecological risk determinations, ecological research, and other regulatory and NEPA activities. This document provides a review and assessment of field and laboratory data generation processes. The assessment evaluates the extent to which the data set satisfies the overall project objective of defining baseline conditions in the four media.

1.1 Data Quality Objectives

Definition of data quality objectives is recognized as the single most important aspect of any data collection activity (Keith, 1991). Without clear data quality objectives and good planning, data may be unusable no matter how good the field crews or laboratories perform. The goal of this project was to create a statistically valid data set, describing as realistically as possible within cost considerations, the baseline or ambient chemical concentrations of metals, pesticides, herbicides and PAH in soil, sediment, surface water and groundwater of KSC. Data quality objectives established prior to project initiation included:

- Environmental samples must be collected in locations free from past KSC operational activities in a fashion (stratified) that optimizes data utility and enhances knowledge about KSC conditions.
- Data must be collected that is statistically robust and scientifically meaningful so a valid estimate of the mean chemical concentration in background media can be developed.
- Field and laboratory procedures and processes must be conducted under a Florida approved Comprehensive Quality Assurance Program and documented according to approved and accredited methods.
- Chain of custody records must be maintained, field sampling equipment and sample containers must be free from contamination, equipment to perform analyses must be rigorously calibrated and readily available.
- Personnel must show competence to perform the tests,
- A computerized data management system must be in place to allow for the electronic transfer of data, eliminating potential data entry errors.

1.2 Laboratory Qualifications

The contractor laboratory selected to conduct field sampling and laboratory analyses for this project was Environmental Conservation Laboratories, Inc. (ENCO) of Orlando Florida. ENCO is a full service laboratory that operates under approved Florida Department of Environmental Protection Standard Operating Procedures for Laboratory Operations and Sample Collection Activities. Their Comprehensive QA Plan is # 960038. In addition to the Florida State certification, ENCO participates in the USEPA Water Pollution (WP) proficiency program twice a year and the American Association for Laboratory Accreditation for non-water matrices. A detailed description of the ENCO Quality Control and Quality Assurance procedures can be found in the Environmental Conservation Laboratories, Inc. Quality Assurance Program Plan (Inman, 1997 with annual updates).

2.0 Overall Measurement Systems

2.1 Field Sampling

2.1.1 Sample Site Selection

Sample site selection was defined based on statistical sampling theory that included a stratified design by media type (Cochran, 1953; Sokal and Rohlf,1969). Sampling was to provide data of sufficient quality and quantity to satisfy possible future statistical test requirements. Media (soil, groundwater, surface water, and sediments) were stratified according to unique features of each media type based on existing knowledge of the KSC area. All sample sites were located away from industrial activities with a minimal history of disturbance by man. The history of activity was determined by examining historical aerial photography (1943-1996) for KSC in combination with current land use maps and GIS layers. GIS data included information on soils, vegetation types, and groundwater systems. Once sample sites were selected and locations were identified in the field, coordinates were obtained using a Trimble Pathfinder Professional Global Positioning System using real-time differential–correction procedures (Trimble Navigation Limited,1994). This method has been shown to be accurate in the X,Y plane to less than one meter for the KSC area.

2.1.2 Sample Sizes

Determination of sample size in each strata was based on the law of diminishing returns and cost (Levin and Rubin, 1980). The best sample number is defined as the largest that can be achieved economically given that the precision of the estimate of the mean increases with sample size. In addition, the standard error of the mean decreases in proportion to the square root of the sample number. For example, an increase in sample size from 10 to 20 reduces the standard error (and the width of the confidence limits) by approximately one third (Levin and Ruben, 1980). To achieve another one third reduction in the width of the confidence limits would require a sample size of about 45, more than doubling the cost of laboratory analysis and significantly increasing field sampling requirements.

Based on existing knowledge, media types were stratified as follows, soils (10), surface water (2), sediment class (2) and groundwater (4). For soils, surface waters, and sediments, the sample size per strata was set at 20. This sample size provided statistically robust results and a quality estimate of mean values within cost limitations of the project. Because of cost associated with groundwater well installation, the sample number was limited to 10 per strata. For groundwater sampling, a vertical stratification was also requested and an additional 11 wells were installed to accommodate sampling from different depths. This produced 51 groundwater samples.

2.1.3 Sample Collection Efficiency

All field sampling activities followed protocols described in the ENCO Florida State approved Quality Assurance Plan. LSSC staff determined all sample site selections and accompanied ENCO staff during all sampling events for soils, surface waters, and sediments, verifying use of proper procedures. In addition, a meeting was held with a KSC Remediation Site contractor to ensure groundwater well sampling was conducted in the same fashion as ongoing and planned remediation sampling. These procedures are defined in the NASA/KSC Sampling and Analysis Plan for RCRA Facility Investigations at Kennedy Space Center, Florida and Cape Canaveral Air Station, Florida, Volume 4 (NASA, 1996)

Results of sampling activities are summarized in Tables F.1 and F.2, which describe expected and actual number of samples by parameter for each media type. Data collection success for this survey was very high, at greater than 99.99%. For soils, 200 samples and 20 duplicates were collected producing a total of 220 data points per parameter. One bulk density and one pH sample were lost during sample processing. This resulted in a total of 23098 measurements out of an expected 23100 (99.99%). A total of 40 sediment samples sites were sampled with the inclusion of 6 duplicates. All 4738 (100%) sediment parameters were collected. Surface water sampling was conducted at 40 stations. There were 6 duplicates and one equipment blank for a total of 47 possible samples. Dissolved oxygen, pH and specific conductivity were collected at the 40 surface water stations with no field duplication. Surface water sampling produced 4531 measurements. Groundwater sampling was conducted at 51 well locations. Field crews collected six duplicate samples and 24 equipment blanks for a total of 81 samples. The turbidity value for one well was not recorded, producing 7706 possible measurements out of an expected 7707 (99.99%). Overall sampling success was very high.

2.1.4 Equipment Blanks

During the sampling program 25 equipment blanks were processed to test the possibility of procedure induced contamination of samples. Results for all parameters observed above detection limits in equipment blanks are presented in Table F.3. For sample OR3879, several organic compounds were reported in concentrations above the detection limit in the equipment blank, however the same compounds were reported as below detection in the associated groundwater samples. Therefore, possible equipment contamination had no meaningful influence on the sample data.

Detectable values of chlorides were observed in equipment blanks for OR3706, OR3836, and OR4456. Equipment Blank values were below 95 mg/l. Sample results for these three stations ranged between 3300 and 7500 mg/l limiting possible contamination effects to less than 1.5%.

Three metals, copper, lead and zinc were reported as present in the equipment blank for sample OR3890. Reported sample results for these metals were all below detection. Based on the Equipment Blank analysis, significant sample contamination did not occur during field operations.

2.2 Laboratory Performance

2.2.1 Holding Times

Review of the database information on time elapsed between sample collection, processing, and analysis indicates that all samples were processed within required method specific holding times. There are no issues associated with laboratory sample processing rates for the Baseline Chemical Characterization survey.

2.2.2 Laboratory Blanks

Results of method blank analyses are presented in Table 4. Laboratory blank detects were observed in five sample runs for metals. No lab blank detections were reported for the EPA 8081, 8082, 8310 or 8151 organic analyses methods.

In soil sample report OR2540 sodium was detected at 28 mg/kg. Soil sample values for this report ranged between 9,300 and 56,000 mg/kg. The blank contamination level was below the level of significant digits recorded for the analysis and therefore had no meaningful impact on results. Similarly, calcium was observed in the soil sample lab blank for report OR2613 at 47 mg/kg.

Sample results ranged between 5100 and 6700 mg/kg and were not meaningfully influenced by the possible low level contamination.

In report OR2613 aluminum was report in the lab blank as 69 mg/kg while the three coastal soil samples from the report were between 180 and 320 mg/kg. This possible error in 3 of the 23 total samples used to calculate the mean (282.6 mg/kg) in the coastal soil class could produce a positive bias of up to 4.25 %. This possible positive bias in the mean value estimate is minor considering the large estimate of the standard deviation (262.7 mg/kg) for aluminum. Calcium was also reported present in the lab blank.

Cadmium was reported in the laboratory blank for surface water laboratory reports OR2525 and OR3023. Cadmium concentrations in associated field samples were reported as below detection. Similarly, lead and zinc were reported in the laboratory blank for surface water report OR4986. The field sample results data for these stations were reported as below detection.

2.2.3 Surrogate Recovery

Surrogate recovery results, summarized by lab number and method, are presented in Table F.4. For the 268 surrogate analysis, 19 or 7% were found to be out side expected control limits. Eight of the 67 runs of the EPA 8081 procedure for organochlorine pesticides were beyond control limits. One control limit violation was low and 7 were high suggesting a possible slight positive bias in the estimated mean values of organochlorine pesticides. The impact of this bias on statistical estimates of baseline values is minimal because nearly all parameters were reported as below detection in field samples.

Two surrogate control limit violations were observed in the 67 lab runs using the EPA 8082 method for aroclors. Both violations were below the lower control limit for the method suggesting actual values could potentially be slightly higher than reported values. Impacts of this possible bias on this group of parameters is not significant because all field samples were reported as below detection.

Nine of the surrogate control limits violations were associated with the 67 runs of the EPA 8151 analysis procedure for chlorinated herbicides. All nine of the out of limit recoveries were biased high suggesting estimated mean values for these parameters could be somewhat higher than true baseline concentrations. The importance of this to the Baseline Database is minimal since the majority of sample values for herbicides were reported as below detection.

There were no surrogate recovery control limit violations for the EPA 8310 method for polycyclic aromatic hydrocarbons.

2.2.4 Matrix Spikes (duplicate precision)

Matrix spike duplicate analysis results are presented in Table F.4. Fifty-five of the 268 (20.5%) analyses had one or more parameters reported above the control limit. In most cases, the reported sample result values for these analyses were below detection and the poor precision displayed by the laboratory in analyzing duplicate matrix spikes had no influence on database quality. For the EPA Method 8081, 4,4-DDT, Heptachlor, Lindane, and Aldrin analysis were noted on one or more occasions as being outside desired control limits. In each case the associated field sample results were reported as below detection.

All matrix spike duplicate analyses for the EPA Method 8082 were within the control limit, and there were no issues with precision for this procedure.

Matrix spike duplicate data for the EPA Method 8151 indicated poor precision for 2,4-D on soils laboratory report OR3429. Field sample results for all other parameters where precision was out of control limits were reported as below detection. There were no data quality impacts from poor laboratory precision on this EPA Method. Matrix spike duplicate data for EPA Method 8310 were outside control limits for Naphthalene in soils laboratory reports OR2665 and OR3082.

Interpretation of results for matrix spike duplicate analyses for metals procedures is confounded by the problem of matrix interferences with spike recoveries. The coastal environment of Florida with the associated high levels of sodium, chloride, magnesium. aluminum, and silica often result in uncontrolled interference with laboratory procedures. This problem introduces error in analyses and directly influences quantification of low concentration level recoveries. This in turn influences precision estimates. For this database, the poor matrix spike recoveries for sodium, calcium, magnesium and aluminum are considered inconsequential. Matrix spike RPD values beyond control limits for arsenic, barium, cadmium, chromium, iron, nickel and zinc are not significant because field sample values are reported as below detection on the laboratory reports.

2.2.5 Spike Recoveries

Spike recovery is one of the best indicators of laboratory procedure, equipment, and operator performance accuracy. Spike recovery analyses data are summarized in Figures F.1. through F.41. Figures are presented in alphabetical order. For this assessment, we considered spike recoveries to be acceptable if they were between 55 and 145% for organics and 65 and 135% for metals. If all recoveries fell within the range and the sampling distribution appeared normal (little skewness or kurtosis) the procedure was ranked as excellent. If a plot had less that 10% of values outside the control range and the sampling distribution appeared normal, it was ranked as good. A plot with between 10 and 20% of values outside the control range was ranked fair. A rank of poor was assigned to any plot that had more than 20% of results outside the control limits.

A summary of reported results is presented in Table F.5. Spike recovery for the surrogate 2,4-DCAA is presented in Figure F.2. Spike recovery was fair with 25 of 266 samples being below the 55% lower limit and five values being above the 145% upper limit. The sampling distribution appears slightly biased low by approximately 10%. These surrogate results are considered representative of the performance of sampling instruments and procedures for many organic analysis. Issues associated with the fair performance include matrix interferences and poor spike extraction due to tight bonding with materials in the sample. This may be especially problematic in soil and sediment spike recoveries where the introduced material is mixed with the complex soil matrix prior to extraction.

Metals spike recovery rates were generally very good with fifteen being ranked as excellent (Table F.5) In contrast, only two of the organic recoveries ranked excellent.

2.3 Reporting

2.3.1 Chain of Custody Records

Chain of custody record evaluation is presented in Table F.5. All records were maintained by ENCO staff during all phases of the baseline program. Examination of chain of custody data sheets revealed that signatures were present for sample bottle pick-up, sample check-in, and sample processing.

Four data sheets were found to have data entry errors. These included mistakes in the date fields (wrong month), for the date of sampling and in the sample bottle check out signature field. In the case of the date issue the field personnel wrote that samples were collected in the eighth month instead of the ninth month. All other dates on the sheet were correct.

Sample bottles and equipment were prepared and provided by the laboratory on an as needed basis. All sample bottle storage, when needed, was conducted at the Cape Dispensary building 49635, inside the security of CCAFS. These human errors in data entry were not associated with any unusual or inconsistent chemical data values.

2.3.2 Narratives

Laboratory narratives describing issues associated with sample collection and processing were provided to explain unusual results and procedures. The text provided was often brief, lacking detail necessary to assess data issues. This resulted in the need to make many calls to the laboratory for additional information and clarification.

2.3.3 Electronic Data Transfer

This area represents the single weakest aspect of the overall project. Data were provided by ENCO in electronic format as requested. However, loss of the LSSC Database Administrators early in the project prior to completion of database development and loading produced many delays. In addition, discrepancies were found between the electronic data and the several hardcopy laboratory reports. This required extensive database review, data re-entry and verification to correct all problems.

3.0 Summary

Overall this chemical characterization provides a statistically rigorous data set describing mean background chemical concentration values for metals, herbicides, pesticides, and PAH in soils, sediments, surface water, and groundwater of KSC. A large number of parameters were found to be below detection limits of the EPA required methods. The spatially stratified approach to sampling with moderate to large sample sizes (n= 10-20) allows for definition of expected ranges of parameters within strata and provides a data set that can be used to characterize concentration difference between strata and potential contamination sites. Estimates of mean values, minimum values, maximum values, and standard deviations are representative of baseline conditions for these parameters in background areas of KSC at the time of sampling. The lack of temporal sampling within a media type precludes definition of seasonal variability that may be associated with changing environmental conditions such as rainfall patterns, severe storm events, wildfires, biological activity, and temperature.

Field and laboratory performance on this project are considered good with the exception of the electronic data transfer procedure and onsite database development activities. Field and laboratory procedures introduced little error in the data as indicated by equipment and laboratory blanks and matrix spike recoveries. Chain-of-custody records were maintained with few human errors, Sample holding times were met and appropriate EPA methods were utilized in all analyses. Laboratory and field procedures followed Florida DEP and NASA approved procedures. Metals analysis were found to be of high quality with few exceptions. Organic analysis were more problematic due to procedural complexities; however, the majority of analyses were reported as below detection as would be expected in background areas of KSC and the Merritt Island

National Wildlife Refuge. One set of cation exchange capacity measurements for coastal soils were found to be an order of magnitude higher than previously measured values or values reported in the scientific literature for coastal soils. The laboratory was not able to identify a procedural cause for the error so data were excluded from analysis as not representative of background conditions.

4.0 References

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Levin, R. I. and D. S. Rubin, 1980, Applied Elementry Statistics. Prentice-Hall Inc. Englewood Cliffs, NJ. 578 pp.

Sokal, R.R., and F. J. Rohlf, 1969, Biometry. W. H. Freeman Co., San Francisco, CA., 776 pp.

Table G-1. Summary of surface water and groundwater parameter collection efficiency for the KSC Baseline Chemical Characterization. The expected numbers include duplicate samples where appropriate.

Parameter Name	Surface Water			Groundwater		
	Expected	Collected	Percent	Expected	Collected	Percent
1 - Methylnaphthalene	47	47	100.00	81	81	100.00
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	47	47	100.00	81	81	100.00
2 - Methylnaphthalene	47	47	100.00	81	81	100.00
2,4,5,6-TCMX	47	47	100.00	81	81	100.00
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	47	47	100.00	81	81	100.00
2,4-DCAA	47	47	100.00	81	81	100.00
2,4-Dichlorophenoxy acetic acid (2,4 - D)	47	47	100.00	81	81	100.00
3,5-DCBA	47	47	100.00	81	81	100.00
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	47	47	100.00	81	81	100.00
4-(2-Methyl-4-chlorophenoxy)butyric acid (MCPP)	47	47	100.00	81	81	100.00
4 - Nitrophenol	47	47	100.00	81	81	100.00
4,4' - DDD	47	47	100.00	81	81	100.00
4,4' - DDE	47	47	100.00	81	81	100.00
4,4' - DDT	47	47	100.00	81	81	100.00
Acenaphthene	47	47	100.00	81	81	100.00
Acenaphthylene	47	47	100.00	81	81	100.00
Acifluorfen	47	47	100.00	81	81	100.00
Aldrin	47	47	100.00	81	81	100.00
alpha - BHC	47	47	100.00	81	81	100.00
Aluminum	47	47	100.00	81	81	100.00
Anthracene	47	47	100.00	81	81	100.00
Antimony	47	47	100.00	81	81	100.00
Aroclor-1254 (noncarcinogenic)	47	47	100.00	81	81	100.00
Arsenic (as carcinogen)	47	47	100.00	81	81	100.00
Barium	47	47	100.00	81	81	100.00
Bentazon	47	47	100.00	81	81	100.00
Benzo(a)anthracene	47	47	100.00	81	81	100.00
Benzo(a)pyrene	47	47	100.00	81	81	100.00
Benzo(b)fluoranthene	47	47	100.00	81	81	100.00
Benzo(g,h,i)perylene	47	47	100.00	81	81	100.00
Benzo(k)fluoranthene	47	47	100.00	81	81	100.00
Beryllium	47	47	100.00	81	81	100.00
beta - BHC	47	47	100.00	81	81	100.00
Bulk Density	NA	NA	NA	NA	NA	NA
Cadmium	47	47	100.00	81	81	100.00
Calcium	47	47	100.00	81	81	100.00
CEC (as Na)	NA	NA	NA	NA	NA	NA
Chloramben	47	47	100.00	81	81	100.00
Chlordane (Total)	47	47	100.00	81	81	100.00
Chlordane, alpha or gamma	47	47	100.00	81	81	100.00
Chloride, Total	47	47	100.00	81	81	100.00
Chromium (total)	47	47	100.00	81	81	100.00
Chrysene	47	47	100.00	81	81	100.00
Cobalt	47	47	100.00	81	81	100.00

Table G-1. (cont.).

Parameter Name	Surface Water			Groundwater		
	Expected	Collected	Percent	Expected	Collected	Percent
Copper	47	47	100.00	81	81	100.00
Dacthal	47	47	100.00	81	81	100.00
Dalapon	47	47	100.00	81	81	100.00
DBC	47	7	100.00	81	81	100.00
delta - BHC	47	47	100.00	81	81	100.00
Dibenz(a,h)anthracene	47	47	100.00	81	81	100.00
Dicamba	47	47	100.00	81	81	100.00
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	47	47	100.00	81	81	100.00
Dieldrin	47	47	100.00	81	81	100.00
Dinoseb	47	47	100.00	81	81	100.00
Dissolved Oxygen	40	40	100.00	51	51	100.00
Endosulfan I	47	47	100.00	81	81	100.00
Endosulfan II (beta)	47	47	100.00	81	81	100.00
Endosulfan sulfate	47	47	100.00	81	81	100.00
Endrin	47	47	100.00	81	81	100.00
Endrin aldehyde	47	47	100.00	81	81	100.00
Endrin Ketone	47	47	100.00	81	81	100.00
Fluoranthene	47	47	100.00	81	81	100.00
Fluorene	47	47	100.00	81	81	100.00
gamma - BHC (Lindane)	47	47	100.00	81	81	100.00
Heptachlor	47	47	100.00	81	81	100.00
Heptachlor Epoxide(a)	47	47	100.00	81	81	100.00
Heptachlor Epoxide(b)	47	47	100.00	81	81	100.00
Indeno(1,2,3-cd)pyrene	47	47	100.00	81	81	100.00
Iron	47	47	100.00	81	81	100.00
Isodrin	47	47	100.00	81	81	100.00
Lead	47	47	100.00	81	81	100.00
Magnesium	47	47	100.00	81	81	100.00
Manganese	47	47	100.00	81	81	100.00
MCPA	47	47	100.00	81	81	100.00
Mercury (inorganic)	47	47	100.00	81	81	100.00
Methoxychlor	47	47	100.00	81	81	100.00
Mirex	47	47	100.00	81	81	100.00
Naphthalene	47	47	100.00	81	81	100.00
Nickel	47	47	100.00	81	81	100.00
p-terphenyl	47	47	100.00	81	81	100.00
PCB-1016/1242	47	47	100.00	81	81	100.00
PCB-1221	47	47	100.00	81	81	100.00
PCB-1232	47	47	100.00	81	81	100.00
PCB-1248	47	47	100.00	81	81	100.00
PCB-1260	47	47	100.00	81	81	100.00
Pentachlorophenol	47	47	100.00	81	81	100.00
Percent Solids	NA	NA	NA	NA	NA	NA
pH	40	40	100.00	51	51	100.00
Phenanthrene	47	47	100.00	81	81	100.00
Picloram	47	47	100.00	81	81	100.00
Potassium	47	47	100.00	81	81	100.00

Table G-1. (cont.).

Parameter Name	Surface Water			Groundwater		
	Expected	Collected	Percent	Expected	Collected	Percent
Pyrene	47	47	100.00	81	81	100.00
Resistivity	NA	NA	NA	NA	NA	NA
Selenium	47	47	100.00	81	81	100.00
Silver	47	47	100.00	81	81	100.00
Sodium	47	47	100.00	81	81	100.00
Spec Cond-Field	40	40	100.00	51	51	100.00
Temp-field	40	40	100.00	51	51	100.00
Texture (No.4)	NA	NA	NA	NA	NA	NA
Texture (No. 10)	NA	NA	NA	NA	NA	NA
Texture (No. 40)	NA	NA	NA	NA	NA	NA
Texture (No. 60)	NA	NA	NA	NA	NA	NA
Texture (No. 100)	NA	NA	NA	NA	NA	NA
Texture (No. 200)	NA	NA	NA	NA	NA	NA
Thallium	47	47	100.00	81	81	100.00
Total Dissolved Solids, Filterable residue	47	47	100.00	81	81	100.00
Total organic carbon	47	47	100.00	81	81	100.00
Toxaphene	47	47	100.00	81	81	100.00
Turbidity	47	47	100.00	51	50	98.04
Vanadium	47	47	100.00	81	81	100.00
Zinc	47	47	100.00	81	81	100.00
Total Number	4531	4531	100.00	7707	7706	99.99

NA = Not Analyzed

Table G-2. Summary of soil and sediment parameter collection efficiency for the KSC Baseline Chemical Characterization. The expected numbers include duplicate samples where appropriate.

Parameter Name	Soil			Sediment		
	Expected	Collected	Percent	Expected	Collected	Percent
1 - Methylnaphthalene	220	220	100.00	46	46	100.00
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 - TP) (Silvex)	220	220	100.00	46	46	100.00
2 - Methylnaphthalene	220	220	100.00	46	46	100.00
2,4,5,6-TCMX	220	220	100.00	46	46	100.00
2,4,5-Trichlorophenoxy acetic acid (2,4,5 - T)	220	220	100.00	46	46	100.00
2,4-DCAA	220	220	100.00	46	46	100.00
2,4-Dichlorophenoxy acetic acid (2,4 - D)	220	220	100.00	46	46	100.00
3,5-DCBA	220	220	100.00	46	46	100.00
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	220	220	100.00	46	46	100.00
4-(2-Methyl-4-chlorophenoxy)butyric acid (MCPP)	220	220	100.00	46	46	100.00
4 - Nitrophenol	220	220	100.00	46	46	100.00
4,4' - DDD	220	220	100.00	46	46	100.00
4,4' - DDE	220	220	100.00	46	46	100.00
4,4' - DDT	220	220	100.00	46	46	100.00
Acenaphthene	220	220	100.00	46	46	100.00
Acenaphthylene	220	220	100.00	46	46	100.00
Acifluorfen	220	220	100.00	46	46	100.00
Aldrin	220	220	100.00	46	46	100.00
alpha - BHC	220	220	100.00	46	46	100.00
Aluminum	220	220	100.00	46	46	100.00
Anthracene	220	220	100.00	46	46	100.00
Antimony	220	220	100.00	46	46	100.00
Aroclor-1254 (noncarcinogenic)	220	220	100.00	46	46	100.00
Arsenic (as carcinogen)	220	220	100.00	46	46	100.00
Barium	220	220	100.00	46	46	100.00
Bentazon	220	220	100.00	46	46	100.00
Benzo(a)anthracene	220	220	100.00	46	46	100.00
Benzo(a)pyrene	220	220	100.00	46	46	100.00
Benzo(b)fluoranthene	220	220	100.00	46	46	100.00
Benzo(g,h,i)perylene	220	220	100.00	46	46	100.00
Benzo(k)fluoranthene	220	220	100.00	46	46	100.00
Beryllium	220	220	100.00	46	46	100.00
beta - BHC	220	220	100.00	46	46	100.00
Bulk Density	220	219	99.55	NA	NA	NA
Cadmium	220	220	100.00	46	46	100.00
Calcium	220	220	100.00	46	46	100.00
CEC (as Na)	220	220	100.00	NA	NA	NA
Chloramben	220	220	100.00	46	46	100.00
Chlordane (Total)	220	220	100.00	46	46	100.00
Chlordane, alpha or gamma	220	220	100.00	46	46	100.00
Chloride, Total	NA	NA	NA	NA	NA	NA
Chromium (total)	220	220	100.00	46	46	100.00
Chrysene	220	220	100.00	46	46	100.00
Cobalt	220	220	100.00	46	46	100.00
Copper	220	220	100.00	46	46	100.00

Table G-2. (cont.).

Parameter Name	Soil			Sediment		
	Expected	Collected	Percent	Expected	Collected	Percent
Dacthal	220	220	100.00	46	46	100.00
Dalapon	220	220	100.00	46	46	100.00
DBC	220	220	100.00	46	46	100.00
delta - BHC	220	220	100.00	46	46	100.00
Dibenz(a,h)anthracene	220	220	100.00	46	46	100.00
Dicamba	220	220	100.00	46	46	100.00
Dichloroprop [2-(2,4-Dichlorophenoxy)proponic acid]	220	220	100.00	46	46	100.00
Dieldrin	220	220	100.00	46	46	100.00
Dinoseb	220	220	100.00	46	46	100.00
Dissolved Oxygen	NA	NA	NA	NA	NA	NA
Endosulfan I	220	220	100.00	46	46	100.00
Endosulfan II (beta)	220	220	100.00	46	46	100.00
Endosulfan sulfate	220	220	100.00	46	46	100.00
Endrin	220	220	100.00	46	46	100.00
Endrin aldehyde	220	220	100.00	46	46	100.00
Endrin Ketone	220	220	100.00	46	46	100.00
Fluoranthene	220	220	100.00	46	46	100.00
Fluorene	220	220	100.00	46	46	100.00
gamma - BHC (Lindane)	220	220	100.00	46	46	100.00
Heptachlor	220	220	100.00	46	46	100.00
Heptachlor Epoxide(a)	220	220	100.00	46	46	100.00
Heptachlor Epoxide(b)	220	220	100.00	46	46	100.00
Indeno(1,2,3-cd)pyrene	220	220	100.00	46	46	100.00
Iron	220	220	100.00	46	46	100.00
Isodrin	220	220	100.00	46	46	100.00
Lead	220	220	100.00	46	46	100.00
Magnesium	220	220	100.00	46	46	100.00
Manganese	220	220	100.00	46	46	100.00
MCPA	220	220	100.00	46	46	100.00
Mercury (inorganic)	220	220	100.00	46	46	100.00
Methoxychlor	220	220	100.00	46	46	100.00
Mirex	220	220	100.00	46	46	100.00
Naphthalene	220	220	100.00	46	46	100.00
Nickel	220	220	100.00	46	46	100.00
p-terphenyl	220	220	100.00	46	46	100.00
PCB-1016/1242	220	220	100.00	46	46	100.00
PCB-1221	220	220	100.00	46	46	100.00
PCB-1232	220	220	100.00	46	46	100.00
PCB-1248	220	220	100.00	46	46	100.00
PCB-1260	220	220	100.00	46	46	100.00
Pentachlorophenol	220	220	100.00	46	46	100.00
Percent Solids	220	220	100.00	46	46	100.00
pH	220	219	99.55	46	46	100.00
Phenanthrene	220	220	100.00	46	46	100.00
Picloram	220	220	100.00	46	46	100.00
Potassium	220	220	100.00	46	46	100.00
Pyrene	220	220	100.00	46	46	100.00

Table G-2. (cont.).

Parameter Name	Soil			Sediment		
	Expected	Collected	Percent	Expected	Collected	Percent
Resistivity	220	220	100.00	46	46	100.00
Selenium	220	220	100.00	46	46	100.00
Silver	220	220	100.00	46	46	100.00
Sodium	220	220	100.00	46	46	100.00
Spec Cond-Field	NA	NA	NA	NA	NA	NA
Temp-field	NA	NA	NA	NA	NA	NA
Texture (No.4)	220	220	100.00	46	46	100.00
Texture (No. 10)	220	220	100.00	46	46	100.00
Texture (No. 40)	220	220	100.00	46	46	100.00
Texture (No. 60)	220	220	100.00	46	46	100.00
Texture (No. 100)	220	220	100.00	46	46	100.00
Texture (No. 200)	220	220	100.00	46	46	100.00
Thallium	220	220	100.00	46	46	100.00
Total Dissolved Solids, Filterable residue	NA	NA	NA	NA	NA	NA
Total organic carbon	220	220	100.00	46	46	100.00
Toxaphene	220	220	100.00	46	46	100.00
Turbidity	NA	NA	NA	NA	NA	NA
Vanadium	220	220	100.00	46	46	100.00
Zinc	220	220	100.00	46	46	100.00
Total Number	23100	23098	99.99	4738	4738	100.00

NA = Not Analyzed

Table G-3. Results of equipment blank analysis. Values presented are for all parameters reported above detection limits. All other parameters analyses results reported as below detection.

Sample Number	Chemical Name	Concentration	Units
OR3706	Chloride, Total	4	mg/L
OR3836	Chloride, Total	92	mg/L
OR3836	Total Dissolved Solids, Filterable residue	40	mg/L
OR3879	Benzo(a)anthracene	0.09	ug/L
OR3879	Benzo(a)pyrene	0.14	ug/L
OR3879	Chrysene	0.16	ug/L
OR3879	Indeno(1,2,3-cd)pyrene	0.11	ug/L
OR3890	Copper	0.44	mg/L
OR3890	Lead	0.28	mg/L
OR3890	Zinc	1.9	mg/L
OR3955	Total organic carbon	8	mg/L
OR4456	Chloride, Total	6	mg/L

Table G-4. Summary of laboratory test data for blanks, surrogate recoveries, and relative percent differences of matrix spike duplicates.

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR2472	SW	8081	ND		
OR2472		8082	ND		
OR2472		8151	ND	HIGH	2,4-D, 2,4-DB RPD high. Sample values reported below detection.
OR2472		8310	ND		
OR2472		METALS	ND		Calcium, Magnesium, Potassium, Sodium with matrix interference. Copper and iron RPD high.
OR2473	SED	8081	ND		4,4-DDT RDP high. Sample reported below detection.
OR2473		8082	ND		
OR2473		8151	ND		2,4 D RDP high. Sample reported below detection.
OR2473		8310	ND		
OR2473		METALS	ND		
OR2524	SED	8081	ND	HIGH	4,4-DDT RDP high. Sample reported below detection.
OR2524		8082	ND		
OR2524		8151	ND		2,4-D RDP high. Sample reported below detection.
OR2524		8310	ND		
OR2524		METALS	ND		
OR2525	SW	8081	ND		
OR2525		8082	ND		
OR2525		8151	ND	HIGH	2,4-D, 2,4-DB RPD high. Samples reported below detection.
OR2525		8310	ND		Acenaphthene RPD high. Samples reported below detection.
OR2525		METALS	cadmium		
OR2540	SO	8081	ND	HIGH	
OR2540		8082	ND		
OR2540		8151	ND		2,4 D RPD High. Sample value reported below detection.
OR2540		8310	ND		
OR2540		METALS	sodium		
OR2559	SO	8081	ND		
OR2559		8082	ND		
OR2559		8151	ND	HIGH	Dicamba RPD high. Sample value reported below detection.
OR2559		8310	ND		

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR2559		METALS	ND		Aluminum, Iron, and Sodium matrix interference. Iron not detected in samples.
OR2575	SW	8081	ND		
OR2575		8082	ND		
OR2575		8151	ND	HIGH	2,4-D, and 2,4-DB RPD high. Samples reported below detection.
OR2575		8310	ND		
OR2575		METALS	ND		
OR2576	SED	8081	ND		Heptachlor RPD high. Samples reported below detection.
OR2576		8082	ND		
OR2576		8151	ND	HIGH	Dicamba RPD high. Samples reported below detection.
OR2576		8310	ND		Benzo(a)pyrene RPD high. Samples reported below detection.
OR2576		METALS	ND		
OR2592	SW	8081	ND		
OR2592		8082	ND		
OR2592		8151	ND		
OR2592		8310	ND		
OR2592		METALS	ND		
OR2593	SED	8081	ND		
OR2593		8082	ND		
OR2593		8151	ND		Dicamba RPD high. Samples reported below detection.
OR2593		8310	ND		Benzo(a)pyrene RPD high. Samples reported below detection.
OR2593		METALS	ND		
OR2613	SO	8081	ND		Heptachlor RPD high. Sample values reported below detection.
OR2613		8082	ND		
OR2613		8151	ND		
OR2613		8310	ND		Benzo(a)pyrene RPD high. Sample values reported below detection.
OR2613		METALS	aluminum, calcium		Magnesium RPD high. Matrix interference.
OR2633	SO	8081	ND		Heptachlor RPD high. Sample values reported below detection.
OR2633		8082	ND		
OR2633		8151	ND		
OR2633		8310	ND		

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR2633		METALS	ND		
OR2642	SW	8081	ND		
OR2642		8082	ND		
OR2642		8151	ND		
OR2642		8310	ND		
OR2642		METALS	ND		Calcium, Magnesium, Manganese, Potassium, and Sodium RPD high. Matrix interference.
OR2644	SED	8081	ND		
OR2644		8082	ND		
OR2644		8151	ND		
OR2644		8310	ND		
OR2644		METALS	ND		
OR2645	SO	8081	ND		
OR2645		8082	ND		
OR2645		8151	ND		Dalpon RPD high. Sample values reported below detection.
OR2645		8310	ND		
OR2645		METALS	ND		
OR2665	SO	8081	ND		
OR2665		8082	ND		
OR2665		8151	ND		Dalapon RPD high. Samples reported below detection.
OR2665		8310	ND		RPD high. Naphthalene poor precision, Acenaphthene sample values reported below detection.
OR2665		METALS	ND		Sodium, Aluminum, Calcium and Iron matrix interference. Iron not detected in sample.
OR2693	SO	8081	ND		
OR2693		8082	ND		
OR2693		8151	ND		Dalpon RPD high. Sample values reported below detection.
OR2693		8310	ND		Naphthalene, Acenaphthene RPD high. Sample values reported below detection.
OR2693		METALS	ND		
OR2725	SW	8081	ND		
OR2725		8082	ND		
OR2725		8151	ND		

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR2725		8310	ND		
OR2725		METALS	ND		Iron, Nickel RPD high. Samples reported below detection.
OR2726	SED	8081	ND		
OR2726		8082	ND		
OR2726		8151	ND		
OR2726		8310	ND		
OR2726		METALS	ND		
OR2742	SW	8081	ND		
OR2742		8082	ND		
OR2742		8151	ND		
OR2742		8310	ND		
OR2742		METALS	ND		Iron, Nickel RPD high. Samples reported below detection.
OR2743	SED	8081	ND		
OR2743		8082	ND		
OR2743		8151	ND		
OR2743		8310	ND		
OR2743		METALS	ND		
OR2763	SO	8081	ND		
OR2763		8082	ND		
OR2763		8151	ND		
OR2763		8310	ND		
OR2763		METALS	ND		Copper RPD high. Poor precision.
OR2779	SO	8081	ND		
OR2779		8082	ND		
OR2779		8151	ND		
OR2779		8310	ND		Benzo(a)pyrene RPD high.
OR2779		METALS	ND		Calcium RPD high. Poor precision.
OR2784	SO	8081	ND		
OR2784		8082	ND		
OR2784		8151	ND	HIGH	Dicamba RPD high. Sample values reported below detection.
OR2784		8310	ND		
OR2784		METALS	ND		Calcium RPD high. Poor precision.
OR2836	SO	8081	ND		
OR2836		8082	ND		
OR2836		8151	ND		Dicamba RPD high. Sample values reported below detection.
OR2836		8310	ND		

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR2836		METALS	ND		
OR2843	SO	8081	ND		
OR2843		8082	ND		
OR2843		8151	ND		Dicamba RPD high. Sample values reported below detection.
OR2843		8310	ND		
OR2843		METALS	ND		Calcium and Iron matrix interference.
OR2859	SO	8081	ND		
OR2859		8082	ND		
OR2859		8151	ND		
OR2859		8310	ND		
OR2859		METALS	ND		Calcium RPD high. Matrix interference.
OR2923	SO	8081	ND		
OR2923		8082	ND		
OR2923		8151	ND		
OR2923		8310	ND		
OR2923		METALS	ND		
OR2927	SO	8081	ND		
OR2927		8082	ND		
OR2927		8151	ND		
OR2927		8310	ND		
OR2927		METALS	ND		Calcium RPD high. Matrix interference.
OR2985	SW	8081	ND		
OR2985		8082	ND		
OR2985		8151	ND		
OR2985		8310	ND		
OR2985		METALS	ND		Arsenic, Barium, Cadmiun, Chromium, Nickel RPD high. Samples reported below detection.
OR2986	SED	8081	ND		
OR2986		8082	ND		
OR2986		8151	ND		
OR2986		8310	ND		
OR2986		METALS	ND		
OR3023	SW	8081	ND		
OR3023		8082	ND		
OR3023		8151	ND		
OR3023		8310	ND		
OR3023		METALS	cadmium		Potassium RPD high. Poor precision.
OR3024	SED	8081	ND	HIGH	

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR3024		8082	ND		
OR3024		8151	ND		
OR3024		8310	ND		
OR3024		METALS	ND		
OR3069	SO	8081	ND		
OR3069		8082	ND		
OR3069		8151	ND		2,4-D, Naphthalene, and Acenaphthene RPD high. Poor precision. Acenaphthene not detected in samples.
OR3069		8310	ND		
OR3069		METALS	ND		
OR3082	SO	8081	ND		
OR3082		8082	ND		
OR3082		8151	ND		2,4-D, Naphthalene, and Acenaphthene RPD high. Poor precision. Acenaphthene not detected in samples.
OR3082		8310	ND		ND
OR3082		METALS	ND		
OR3251	SO	8081	ND	HIGH	
OR3251		8082	ND		
OR3251		8151	ND	HIGH	
OR3251		8310	ND		
OR3251		METALS	ND		
OR3285	SO	8081	ND		
OR3285		8082	ND		
OR3285		8151	ND	HIGH	
OR3285		8310	ND		
OR3285		METALS	ND		
OR3362	SO	8081	ND		
OR3362		8082	ND		
OR3362		8151	ND		2,4-D RPD high. Sample value reported below detection.
OR3362		8310	ND		
OR3362		METALS	ND		
OR3363	SO	8081	ND		
OR3363		8082	ND		
OR3363		8151	ND		2,4-D RPD high. Sample values reported below detection.
OR3363		8310	ND		
OR3363		METALS	ND		
OR3429	SO	8081	ND		

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR3429		8082	ND		
OR3429		8151	ND		2,4-D RPD high. Poor precision.
OR3429		8310	ND		
OR3429		METALS	ND		Calcium RPD high. Matrix interference.
OR3491	SW	8081	ND		
OR3491		8082	ND		
OR3491		8151	ND		2,4,5-TP silvex RPD high. Sample values reported below detection.
OR3491		8310	ND		Naphthalene and Acenaphthene RPD high. Sample values reported below detection.
OR3491		METALS	ND		
OR3492	SED	8081	ND		
OR3492		8082	ND		
OR3492		8151	ND		
OR3492		8310	ND		
OR3492		METALS	ND		
OR3564	GW	8081	ND		
OR3564		8082	ND		
OR3564		8151	ND		2,4,5-TP silvex RPD high. Samples reported below detection.
OR3564		8310	ND		Naphthalene, Acaphthene RPD high. Samples reported below detection.
OR3564		METALS	ND		
OR3584	GW	8081	ND		
OR3584		8082	ND		
OR3584		8151	ND		2,4-DB RPD high. Samples reported below detection.
OR3584		8310	ND		
OR3584		METALS	ND		
OR3629	GW	8180	ND		
OR3629		8082	ND		
OR3629		8151	ND	HGH	2,4-DB RPD high. Samples reported below detection.
OR3629		8310	ND		
OR3629		METALS	ND		
OR3634	GW	8081	ND		
OR3634		8082	ND		
OR3634		8151	ND		
OR3634		8310	ND		
OR3634		METALS	ND		

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR3635	GW	8081	ND		
OR3635		8082	ND		
OR3635		8151	ND		
OR3635		8310	ND		
OR3635		METALS	ND		
OR3660	GW	8081	ND		
OR3660		8082	ND		
OR3660		8151	ND		
OR3660		8310	ND		
OR3660		METALS	ND		Sodium RPD high. Matrix interference.
OR3681		8081	ND	LOW	
OR3681		8082	ND	LOW	
OR3681		8151	ND		
OR3681		8310	ND		
OR3681		METALS	ND		
OR3706	GW	8081	ND	LOW	
OR3706		8082	ND	LOW	
OR3706		8151	ND		
OR3706		8310	ND		Naphthalene RPD high. Samples reported below detection.
OR3706		METALS	ND		
OR3717	GW	8081	ND		
OR3717		8082	ND		
OR3717		8151	ND		
OR3717		8310	ND		Naphthalene RPD high. Samples reported below detection.
OR3717		METALS	ND		
OR3718	GW	8081	ND		
OR3718		8082	ND		
OR3718		8151	ND		
OR3718		8310	ND		Naphthalene RPD high. Samples reported below detection.
OR3718		METALS	ND		
OR3737	GW	8081	ND		4,4-DDT, Gamma BHC Lindane RPD high. Samples reported below detection.
OR3737		8082	ND		
OR3737		8151	ND		
OR3737		8310	ND		Naphthalene RPD high. Samples reported below detection.
OR3737		METALS	ND		

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR3835	GW	8081	ND		4,4-DDT, Gamma BHC Lindane RPD high. Samples reported below detection.
OR3835		8082	ND		
OR3835		8151	ND		
OR3835		8310	ND		
OR3835		METALS	ND		
OR3836	GW	8081	ND		4,4-DDT, Gamma BHC Lindane RPD high. Samples reported below detection.
OR3836		8082	ND		
OR3836		8151	ND		
OR3836		8310	ND		
OR3836		METALS	ND		
OR3879	GW	8081	ND		Aldrin RPD high. Samples reported below detection.
OR3879		8082	ND		
OR3879		8151	ND		Dalapon, Dicamba, 2,4-D,2,4,5-TP silvex, 2,4-DB RPD high. Samples reported below detection.
OR3879		8310	ND		
OR3879		METALS	ND		
OR3883	GW	8081	ND		Aldrin RPD high. Samples reported below detection.
OR3883		8082	ND		
OR3883		8151	ND		
OR3883		8310	ND		
OR3883		METALS	ND		
OR3889	GW	8081	ND		
OR3889		8082	ND		
OR3889		8151	ND		All parameters RPD high. Samples reported below detection.
OR3889		8310	ND		Acenaphthene RPd high. Samples reported below detection.
OR3889		METALS	ND		
OR3890	GW	8081	ND		
OR3890		8082	ND		
OR3890		8151	ND		All parameters RPD high. Samples reported below detection.
OR3890		8310	ND		Acenaphthene RPD high. Samples reported below detection.
OR3890		METALS	ND		
OR3891	GW	8081	ND		
OR3891		8082	ND		

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR3891		8151	ND		Dalapon, Dicamba, 2,4-D, 2,4,5-TP silvex, 2,4-DB RPD high. Samples reported below detection.
OR3891		8310	ND		Acenaphthene RPD high. Samples reported below detection.
OR3891		METALS	ND		
OR3916	GW	8081	ND		
OR3916		8082	ND		
OR3916		8151	ND		All parameters RPD high. Samples reported below detection.
OR3916		8310	ND		
OR3916		METALS	ND		
OR3955	GW	8081	ND		
OR3955		8082	ND		
OR3955		8151	ND		Dieldrin RPD high. Samples reported below detection.
OR3955		8310	ND		
OR3955		METALS	ND		
OR3962	GW	8081	ND		
OR3962		8082	ND		
OR3962		8151	ND		Dalapon RPD high. Samples reported below detection.
OR3962		8310	ND		
OR3962		METALS	ND		Calcium RPD high. Samples reported below detection.
OR4013	GW	8081	ND	HIGH	
OR4013		8082	ND		
OR4013		8151	ND		
OR4013		8310	ND		
OR4013		METALS	ND		
OR4456	GW	8081	ND	HIGH	
OR4456		8082	ND		
OR4456		8151	ND		
OR4456		8310	ND		Naphthalene, Acenaphthene RPD high. Samples reported below detection.
OR4456		METALS	ND		
OR4986	SW	8081	ND		
OR4986		8082	ND		
OR4986		8151	ND		
OR4986		8310	ND		
OR4986		METALS	lead, zinc		Lead, Sodium, and Zinc RPD high. Sample value reported below detection.

Table G-4. (cont.).

Lab Report Number	Media	Analysis Method	Lab Blank Results	Surrogate Recovery	Matrix Spike Relative Percent Difference
OR5062	GW	8081	ND		
OR5062		8082	ND		
OR5062		8151	ND		
OR5062		8310	ND		
OR5062		METALS	ND		

Table G-5. Summary laboratory spike recovery data expressed as a percent. Recoveries ranked as Excellent = all values within control limits, Good > 90% within control limits, Fair > 80% within control limits and Poor < 80% within control limits.

Parameter	Comment
2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5 -TP) (Silvex)	Poor spike recovery. Six values below 55% and one value above 145%
2,4,5,6-TCMX	Fair spike recovery. Fifteen values below 55% and two values above 145%
2,4-Dichlorophenoxy acetic acid (2,4 - D)	Fair spike recover. Nine values below 55% and one value above 145%
2,4-DCAA	Fair spike recovery. Twenty five values below 55% and five values above 145%. Method biased low approximately 10%
4-(2,4-Dichlorophenoxy)butyric acid (2,4 - DB)	Poor spike recovery. Thirteen values below 55% and one above 145%
4,4' - DDT	Good spike recovery. One value above 145%
Acenaphthene	Good spike recover but method biased low approximately 25%
Aldrin	Excellent.
Aluminum	Poor spike recovery. Nine values above 135%. Matrix interferences cited.
Antimony	Good spike recovery but method biased high approximately 10%
Arsenic (as carcinogen)	Excellent
Barium	Excellent
Benzo(a)pyrene	Excellent spike recovery but method biased low approximately 10%
Benzo(g,h,i)perylene	Excellent spike recovery but method biased low approximately 10%
Beryllium	Excellent. Method biased high approximately 10%
Cadmium	Excellent
Calcium	Fair spike recovery. One value below 65% and five values above 135%. Matrix interferences cited.
Cobalt	Excellent
Copper	Excellent
Dalapon	Fair spike recovery. Five values below 55% and four values above 145%
DBC	Fair spike recovery. Two values below 55% and thirteen values above 145%
Dicamba	Fair spike recovery. Four values below 55% and three values above 145%
Endrin	Good spike recovery
gamma - BHC (Lindane)	Good spike recovery. One value above 145%
Heptachlor	Good spike recovery. Two values below 55%
Iron	Fair spike recovery. Four values below 65% and four values above 145%. Matrix interference cited.
Lead	Excellent
Magnesium	Good spike recovery. One value below 65% and one value above 150 %. Matrix interference cited.
Manganese	Good spike recovery. One value below 55%.

Table G-5. (cont.).

Parameter	Comment
Mercury (inorganic)	Excellent.
Naphthalene	Good spike recovery. Four values below 55%. Method biased low approximately 25%
Nickel	Excellent
p-terphenyl	Excellent
PCB-1221	Good spike recovery. One value below 55% and one value above 145%.
Potassium	Fair spike recovery. Eight values above 145%. Matrix interference cited.
Selenium	Excellent
Silver	Excellent
Sodium	Good spike recovery. One value below 65%
Thallium	Excellent
Total organic carbon	Excellent
Vanadium	Excellent
Zinc	Excellent

Table G-6. Summary of chain of custody records and sample holding time information.

Report Number	Date Sampled	Date Submitted	Date Reported	Holding Time	Signed	Chain of Custody Intact
OR2472	06/01/98	06/02/98	08/04/98	OK	YES	YES
OR2473	06/01/98	06/02/98	06/26/98	OK	YES	YES
OR2524	06/05/98	06/05/98	06/26/98	OK	YES	YES
OR2525	06/05/98	06/05/98	08/04/98	OK	YES	YES
OR2540	06/08/98	06/09/98	07/14/98	OK	YES	YES
OR2559	06/09/98	06/10/98	07/20/98	OK	YES	YES
OR2575	06/10/98	06/11/98	07/06/98	OK	YES	YES
OR2576	06/10/98	06/11/98	07/09/98	OK	YES	YES
OR2592	06/11/98	06/12/98	07/06/98	OK	YES	YES
OR2593	06/11/98	06/12/98	07/16/98	OK	YES	YES
OR2613	06/12/98	06/12/98	07/15/98	OK	YES	YES
OR2633	06/16/98	06/17/98	07/17/98	OK	YES	YES
OR2642	06/17/98	06/18/98	08/04/98	OK	YES	YES
OR2644	06/17/98	06/18/98	07/17/98	OK	YES	NO
OR2645	06/17/98	06/18/98	07/21/98	OK	YES	YES
OR2665	06/18/98	06/19/99	07/21/98	OK	YES	YES
OR2693	06/22/98	06/23/98	07/22/98	OK	YES	YES
OR2725	06/24/98	06/25/98	07/29/98	OK	YES	YES
OR2726	06/24/98	06/25/98	07/22/98	OK	YES	YES
OR2742	06/25/98	06/26/98	08/13/98	OK	YES	YES
OR2743	06/25/98	06/26/98	07/23/98	OK	YES	YES
OR2763	06/26/98	06/27/98	07/23/98	OK	YES	YES
OR2779	06/29/98	06/30/98	07/23/98	OK	YES	YES
OR2784	06/30/98	07/01/98	07/30/98	OK	YES	YES
OR2836	07/06/98	07/06/98	08/04/98	OK	YES	YES
OR2843	07/07/98	07/08/98	08/07/98	OK	YES	YES
OR2859	07/08/98	07/09/98	08/31/98	OK	YES	YES
OR2923	07/14/98	07/14/98	08/07/98	OK	YES	YES
OR2927	07/15/98	07/15/98	08/19/98	OK	YES	YES
OR2985	07/17/98	07/18/98	08/10/98	OK	YES	YES
OR2986	07/17/98	07/18/98	08/19/98	OK	YES	YES
OR3023	07/22/98	07/22/98	08/11/98	OK	YES	YES
OR3024	07/22/98	07/22/98	08/24/98	OK	YES	YES
OR3069	07/27/98	07/27/98	08/28/98	OK	YES	YES
OR3082	07/28/98	07/28/98	08/28/98	OK	YES	YES
OR3251	08/12/98	08/13/98	09/18/98	OK	YES	NO
OR3285	08/13/98	08/17/98	09/18/98	OK	YES	YES
OR3362	08/20/98	08/21/98	09/18/98	OK	YES	YES
OR3363	08/21/98	08/21/98	09/22/98	OK	YES	YES
OR3429	08/28/98	08/28/98	09/21/98	OK	YES	NO
OR3491	08/03/98	09/03/98	09/25/98	OK	YES	YES
OR3492	08/03/98	09/03/98	09/23/98	OK	YES	YES
OR3564	09/13/98	09/14/98	09/28/98	OK	YES	YES

Table G-6. (cont.).

Report Number	Date Sampled	Date Submitted	Date Reported	Holding Time	Signed	Chain of Custody Intact
OR3584	09/15/98	09/16/98	09/28/98	OK	YES	YES
OR3629	09/18/98	09/19/98	09/30/98	OK	YES	YES
OR3634	09/19/98	09/21/98	09/30/98	OK	YES	YES
OR3635	09/20/98	09/21/98	09/30/98	OK	YES	YES
OR3660	09/21/98	09/23/98	10/01/98	OK	YES	YES
OR3681	09/22/98	09/24/98	10/01/98	OK	YES	YES
OR3706	missing	09/25/98	10/08/98	OK	YES	NO
OR3717	09/27/98	09/29/98	10/09/98	OK	YES	YES
OR3718	09/27/98	09/29/98	10/14/98	OK	YES	YES
OR3737	09/29/98	09/29/98	10/21/98	OK	YES	YES
OR3835	10/07/98	10/08/98	10/23/98	OK	YES	YES
OR3836	10/06/98	10/08/98	10/23/98	OK	YES	YES
OR3879	10/09/98	10/10/98	10/27/98	OK	YES	YES
OR3883	10/08/98	10/09/98	10/22/98	OK	YES	YES
OR3889	10/11/98	10/12/98	11/02/98	OK	YES	YES
OR3890	10/10/98	10/12/98	11/05/98	OK	YES	YES
OR3891	10/11/98	10/12/98	11/03/98	OK	YES	YES
OR3916	10/14/98	10/15/98	11/09/98	OK	YES	YES
OR3955	10/16/98	10/17/98	11/03/98	OK	YES	YES
OR3962	10/17/98	10/19/98	10/30/98	OK	YES	YES
OR4013	10/21/98	10/22/98	11/13/98	OK	YES	YES
OR4456	11/27/98	11/28/98	12/18/98	OK	YES	YES
OR4986	01/06/99	01/07/99	01/22/99	OK	YES	YES
OR5062	01/12/99	01/13/99	01/29/99	OK	YES	YES

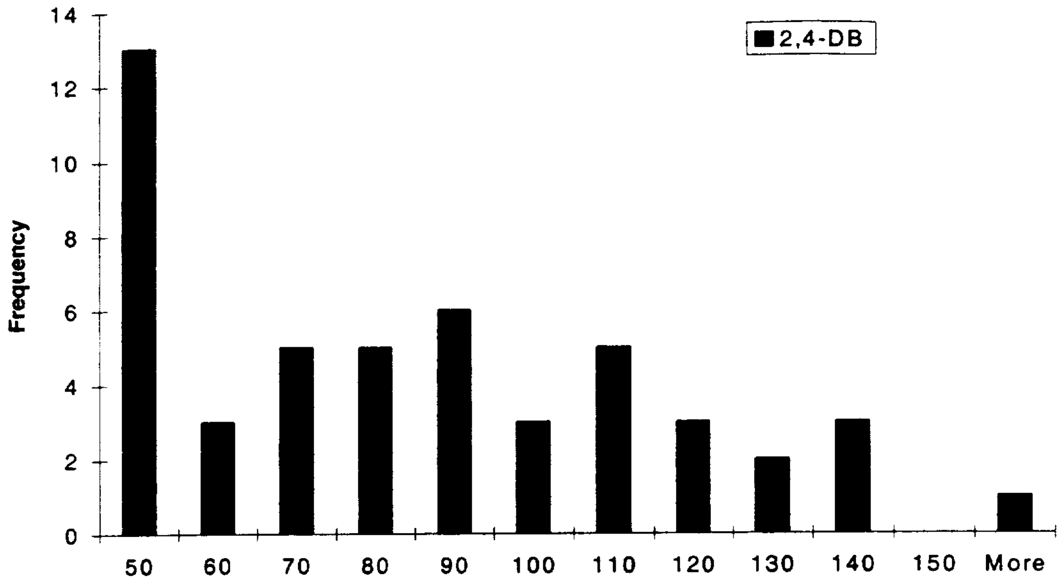

Figure G.1. Spike recovery frequency histogram for 2,4,-DB.

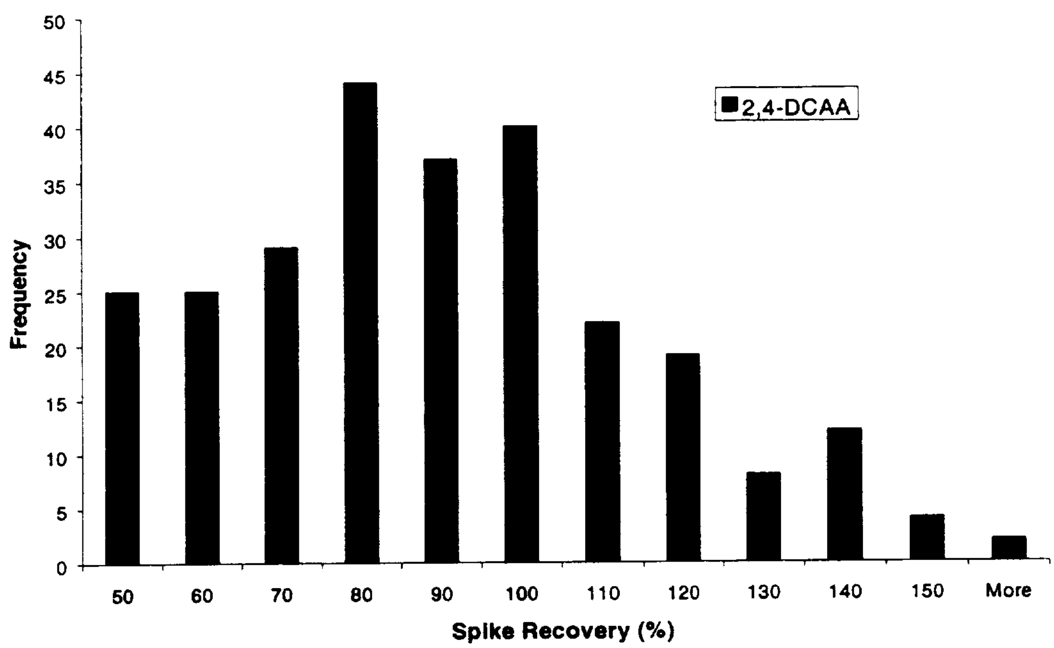

Figure G.2. Spike recovery frequency histogram for 2,4,-DCAA

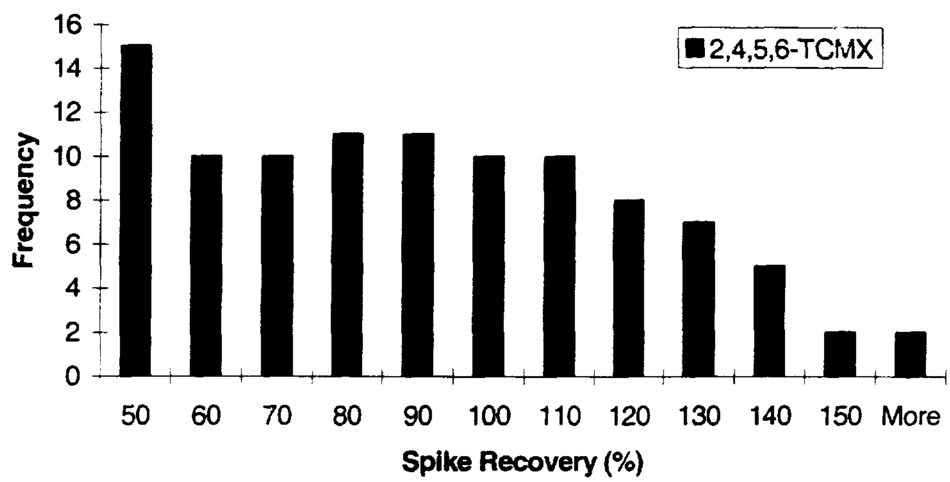

Figure G.3. Spike recovery frequency histogram for 2,4,5,6-TCMX..

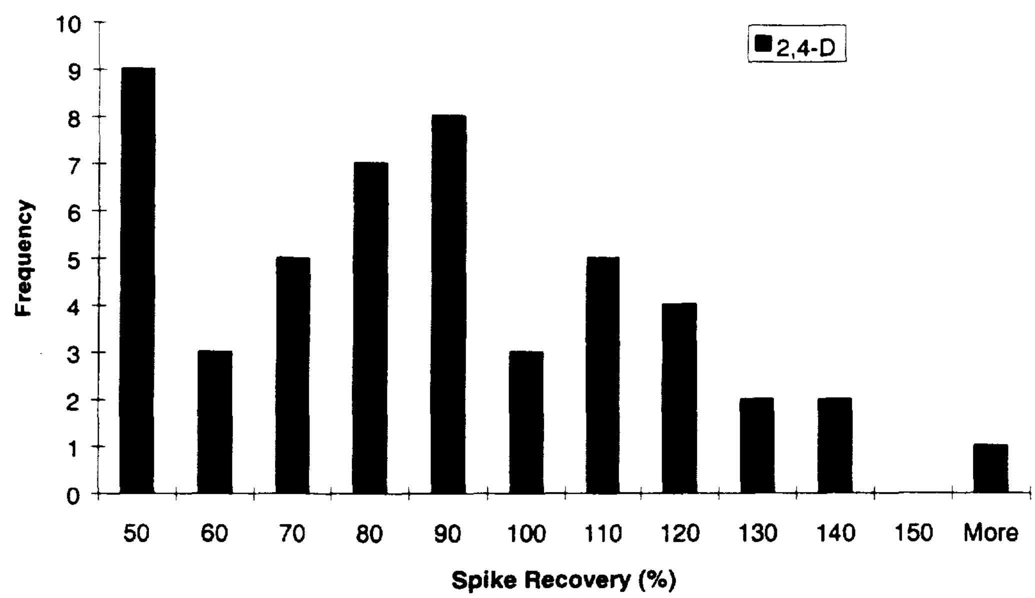

Figure G.4. Spike recovery frequency histogram for 2,4-D.

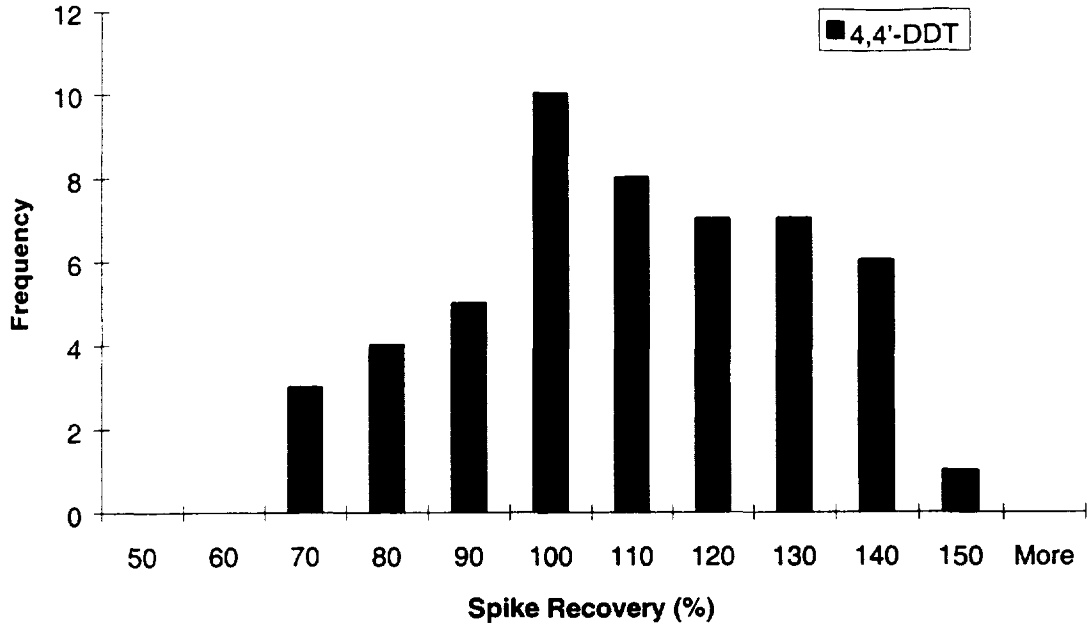

Figure G.5. Spike recovery frequency histogram for 4,4'-DDT.

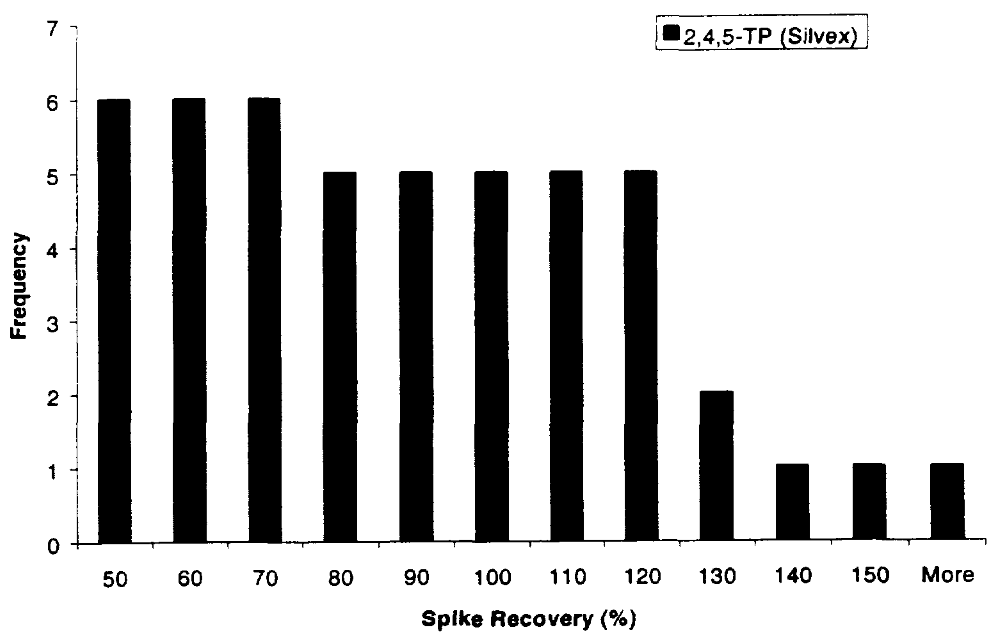

Figure G.6. Spike recovery frequency histogram for 2,4,5-TP (Silvex).

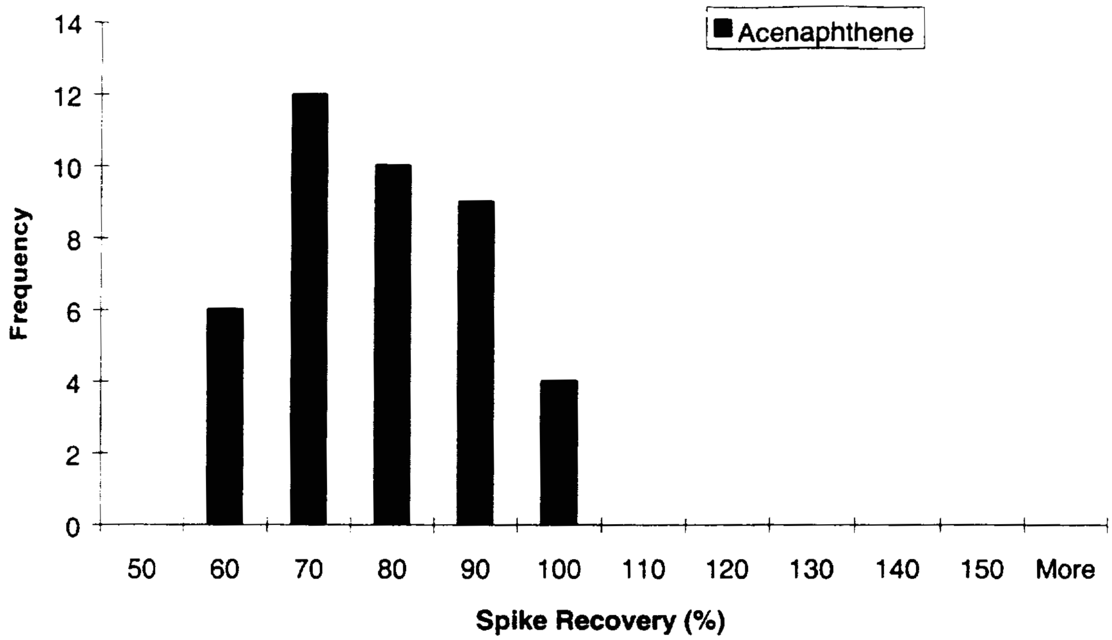

Figure G.7. Spike recovery frequency histogram for Acenaphthene.

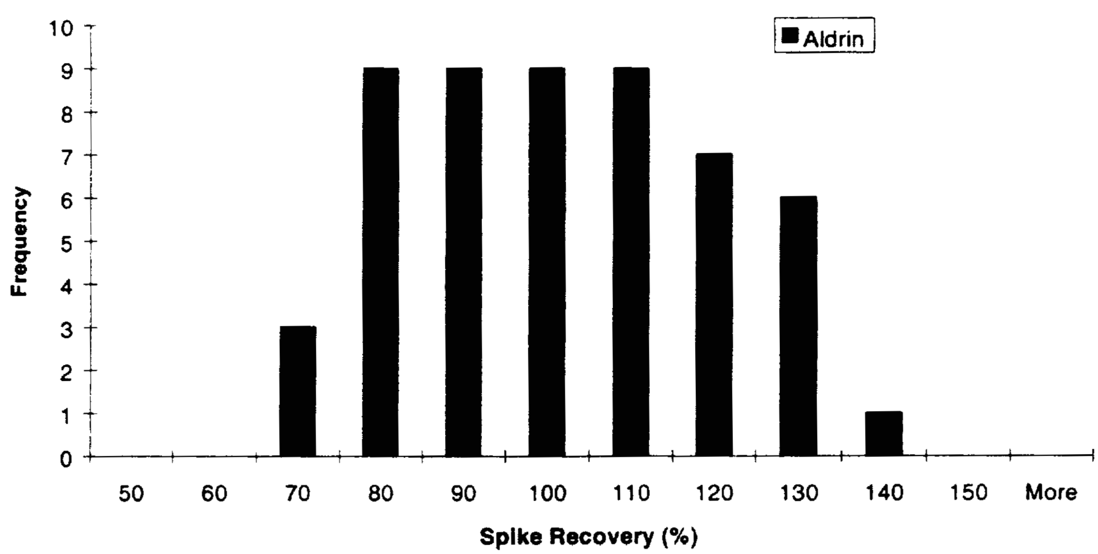

Figure G.8. Spike recovery frequency histogram for Aldrin.

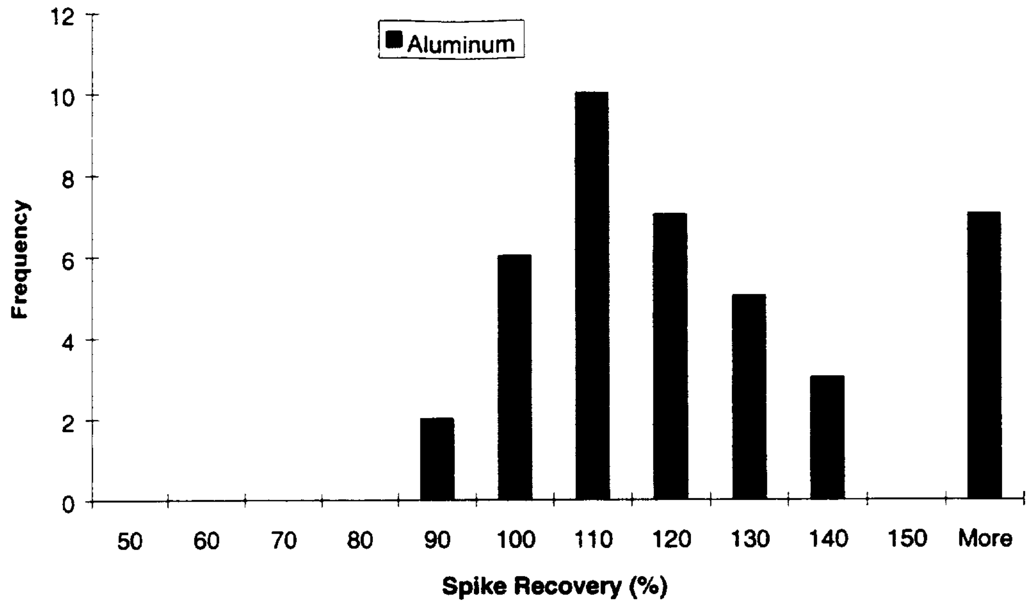

Figure G.9. Spike recovery frequency histogram for Aluminum.

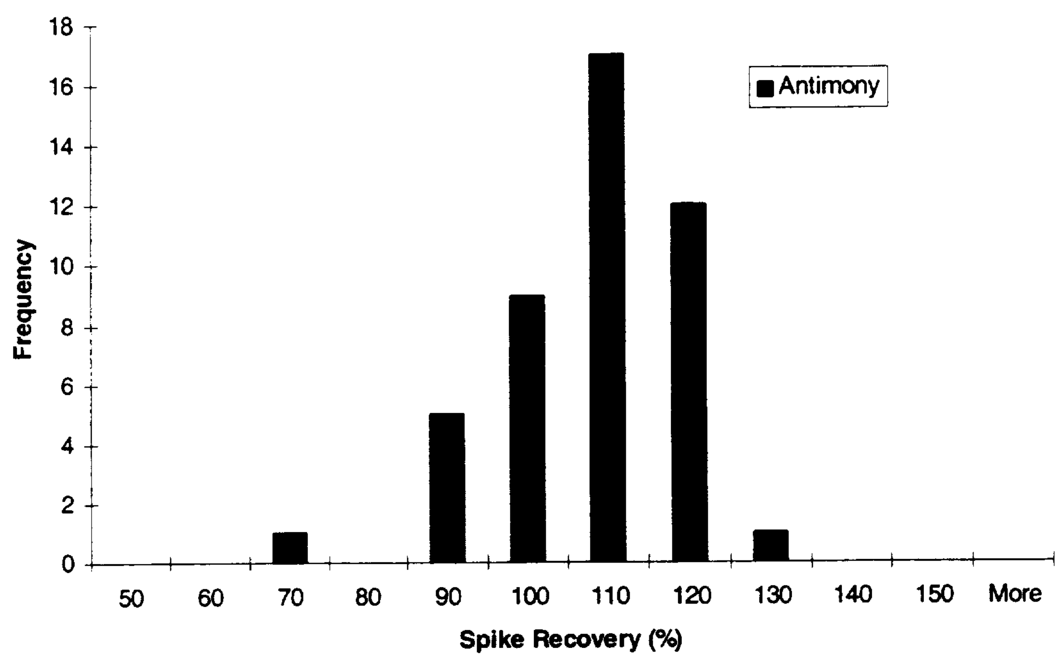

Figure G.10. Spike recovery frequency histogram for Antimony.

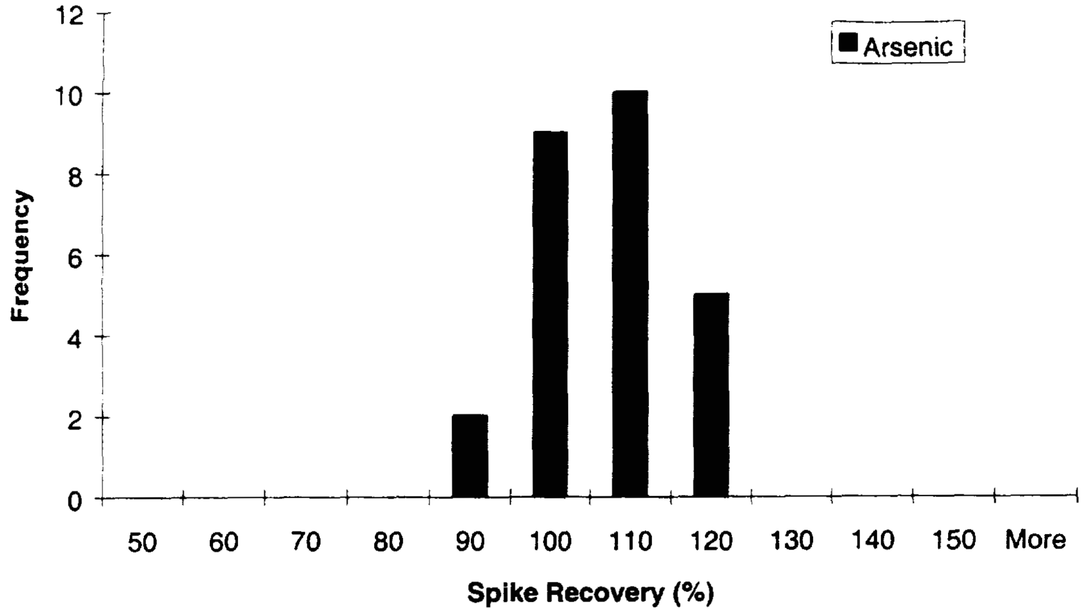

Figure G.11. Spike recovery frequency histogram for Arsenic.

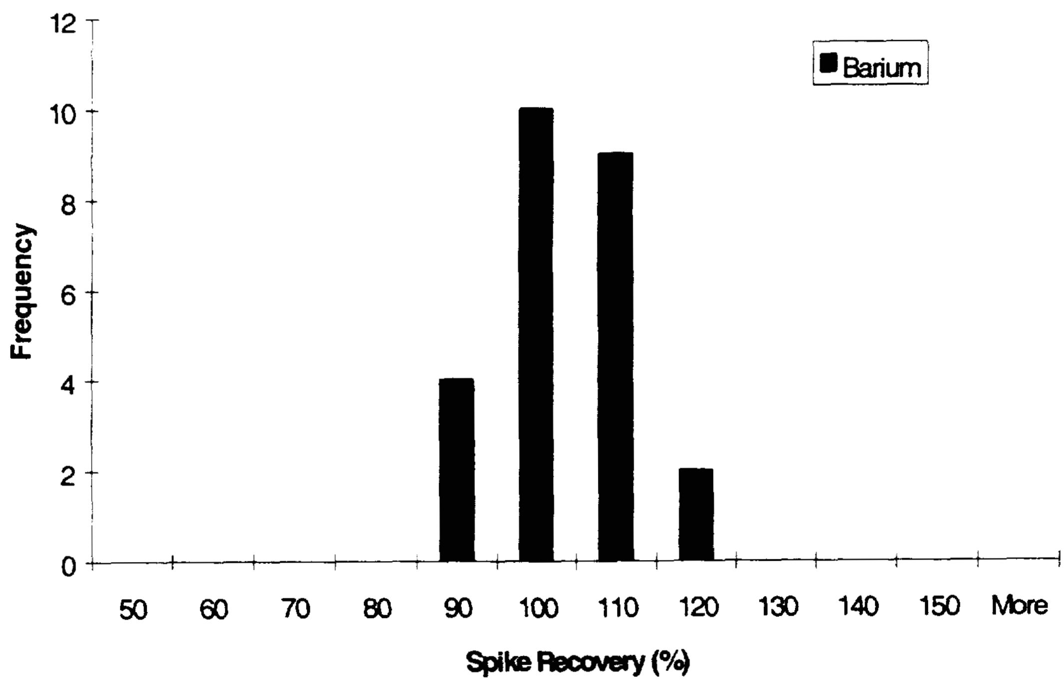

Figure G.12. Spike recovery frequency histogram for Barium.

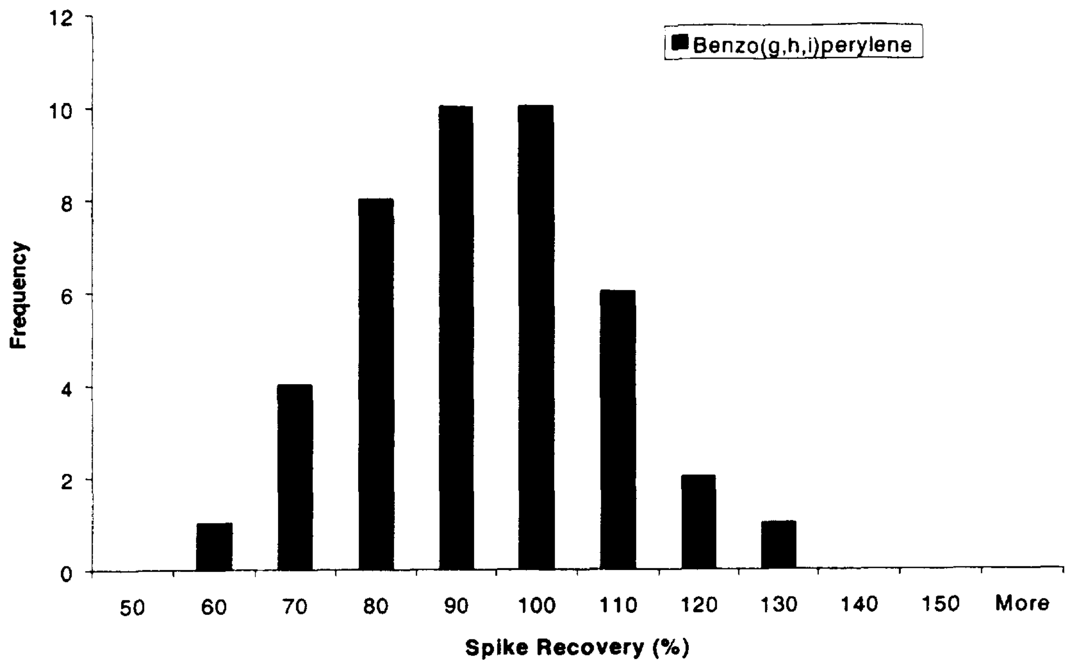

Figure G.13. Spike recovery frequency histogram for Benzo(g,h,i)perylene.

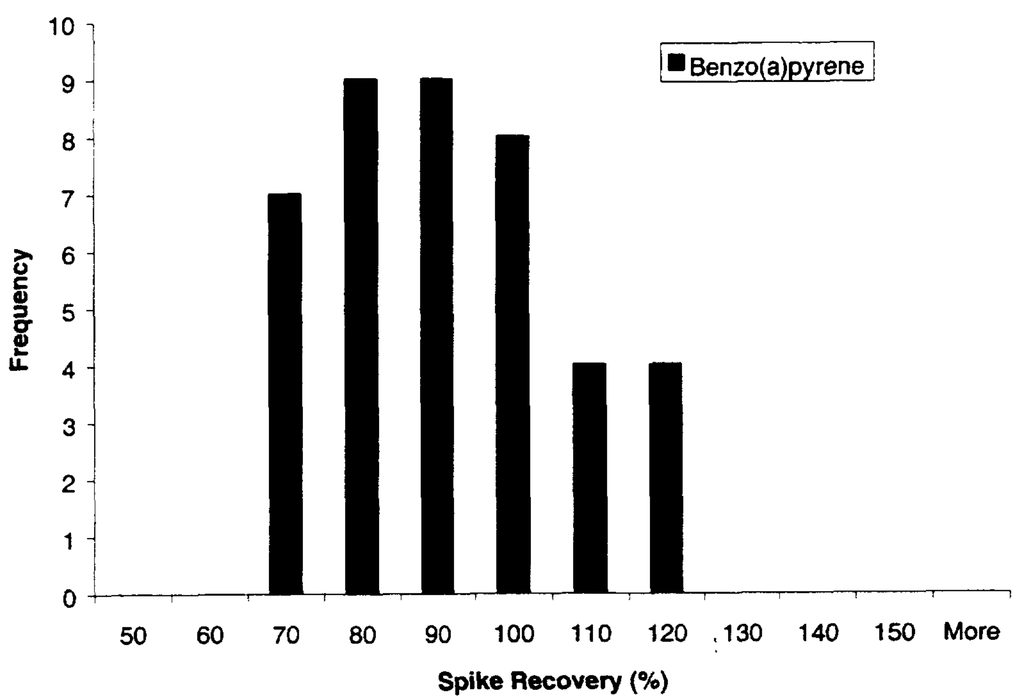

Figure G.14. Spike recovery frequency histogram for Benzo(a)pyrene.

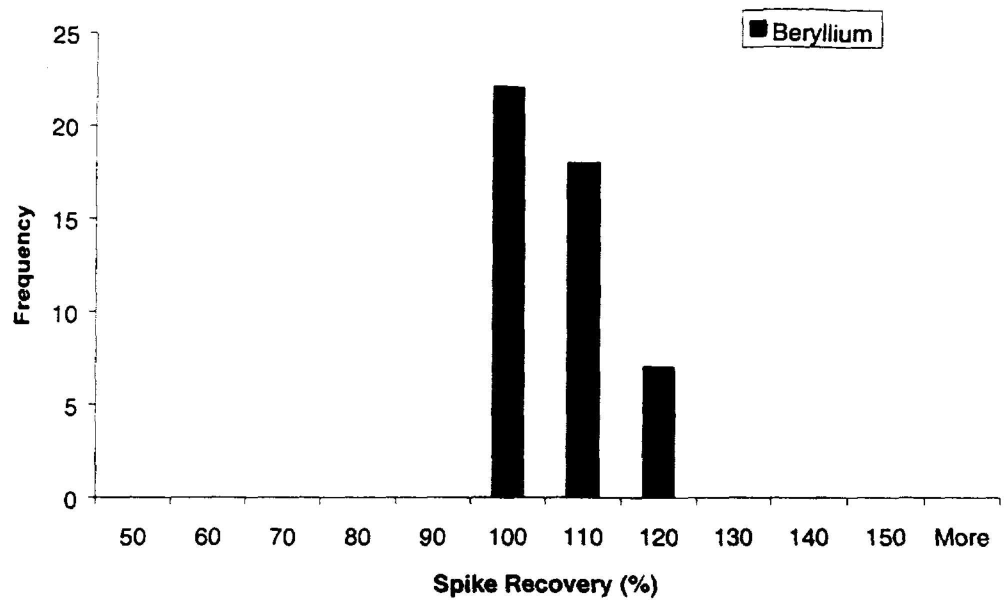

Figure G.15. Spike recovery frequency histogram for Berylium.

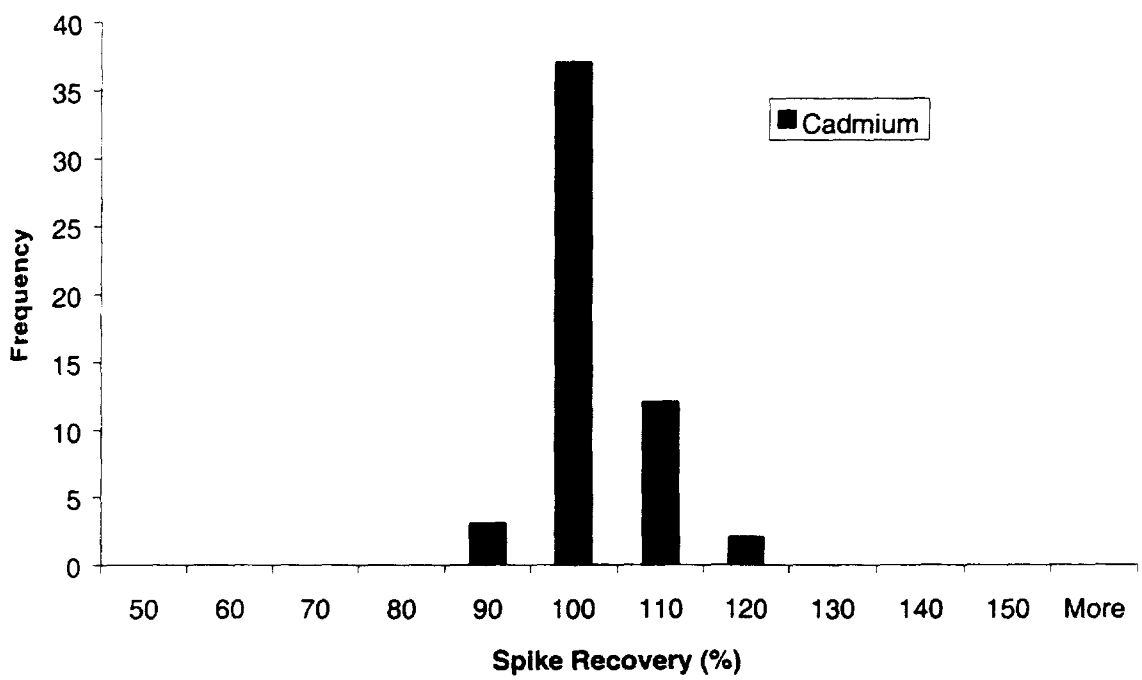

Figure G.16. Spike recovery frequency histogram for Cadmium.

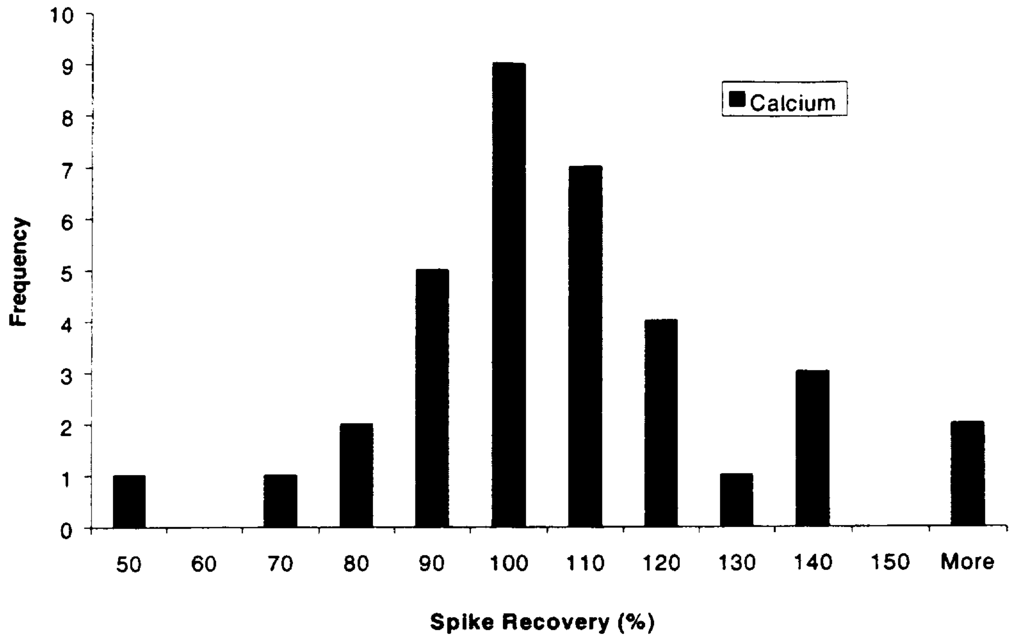

Figure G.17. Spike recovery frequency histogram for Calcium.

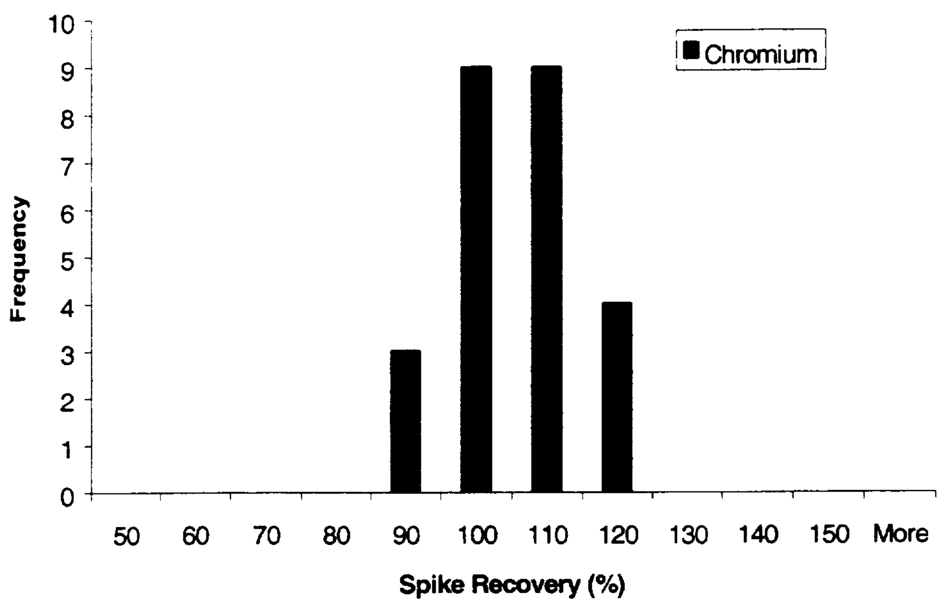

Figure G.18. Spike recovery frequency histogram for Chromium.

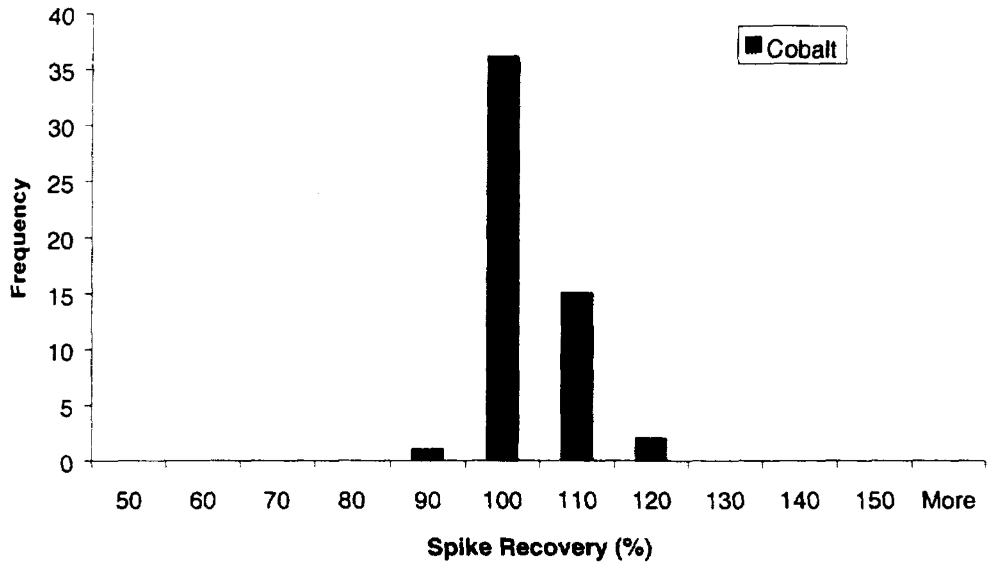

Figure G.19. Spike recovery frequency histogram for Cobalt.

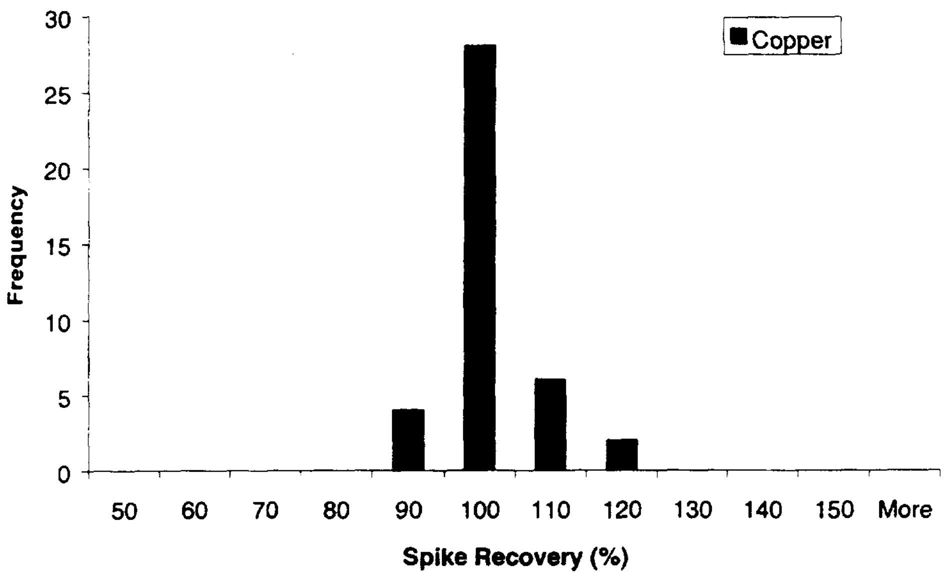

Figure G.20. Spike recovery frequency histogram for Copper.

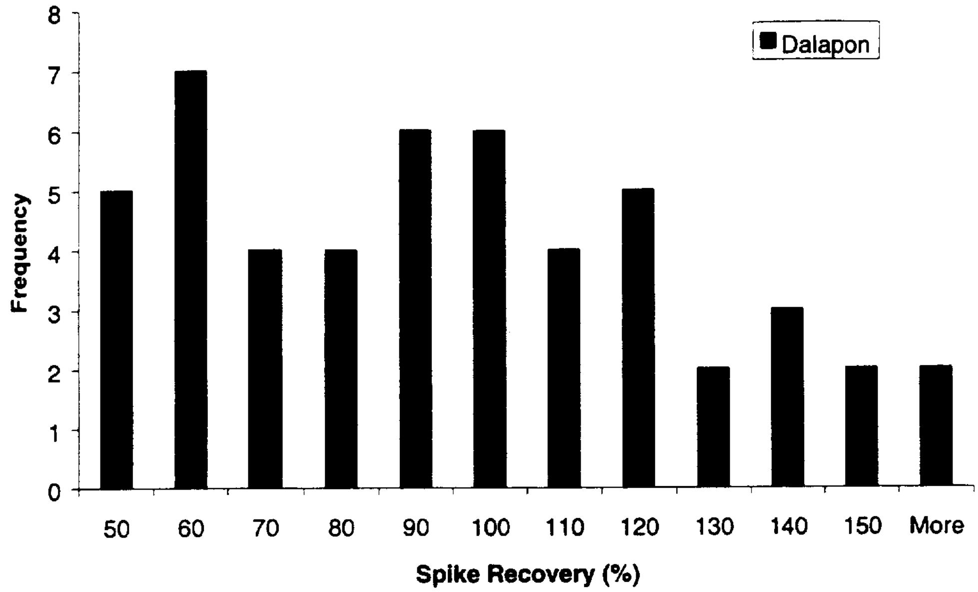

Figure G.21. Spike recovery frequency histogram for Dalapon.

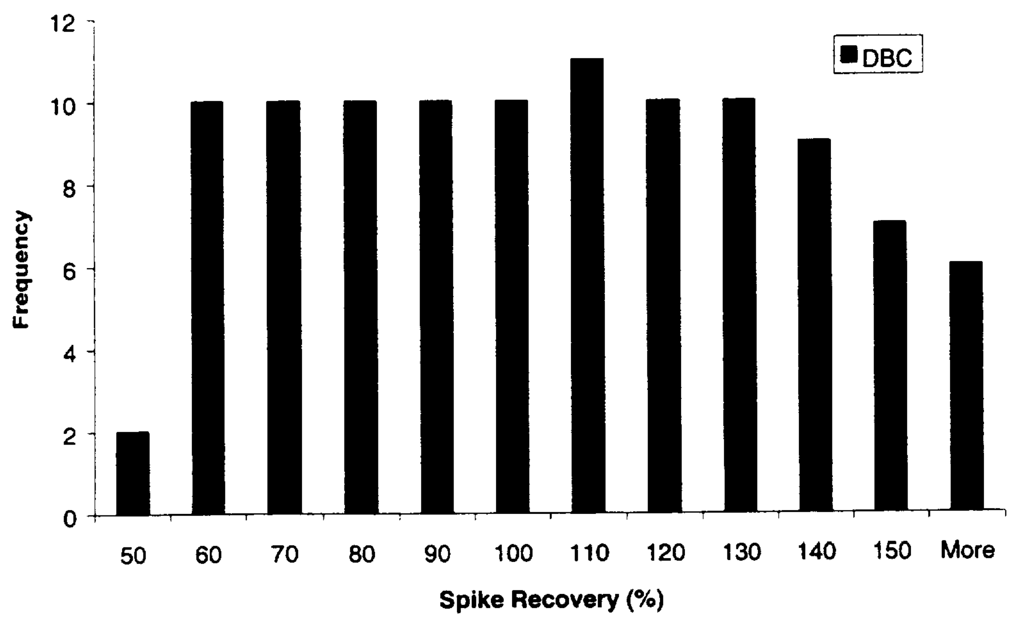

Figure G.22. Spike recovery frequency histogram for DBC.

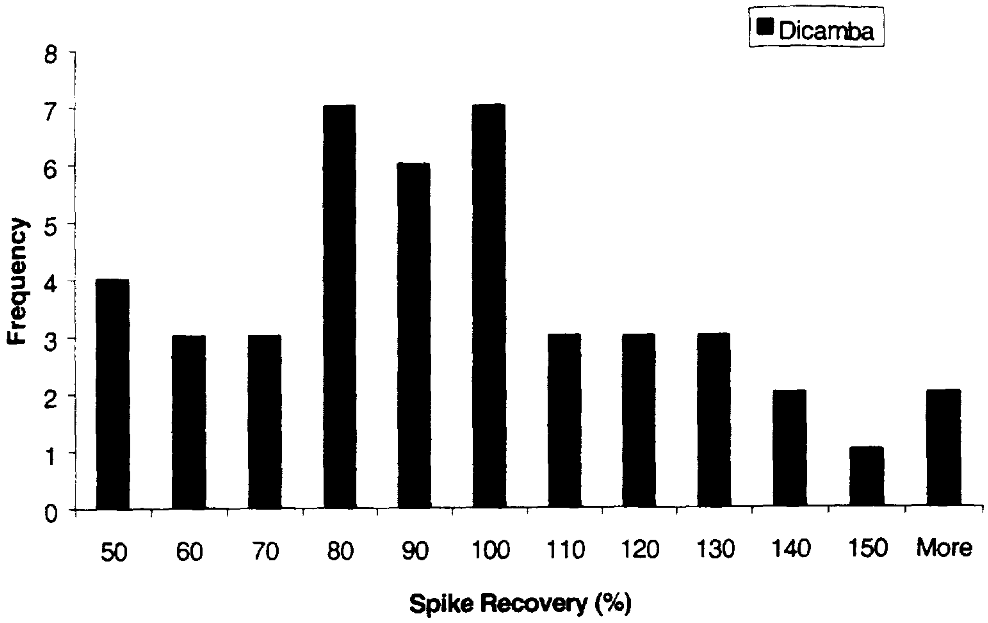

Figure G.23. Spike recovery frequency histogram for Dicamba.

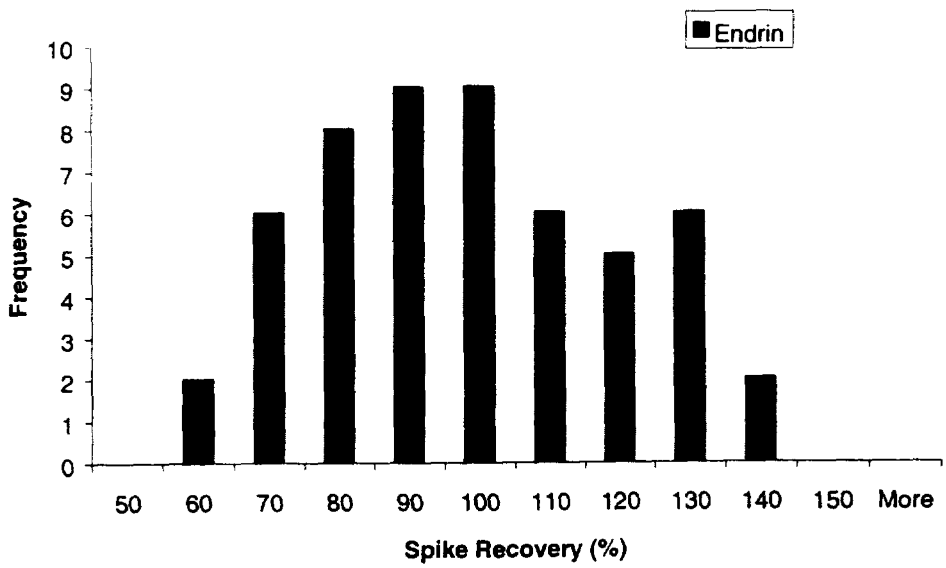

Figure G.24. Spike recovery frequency histogram for Endrin.

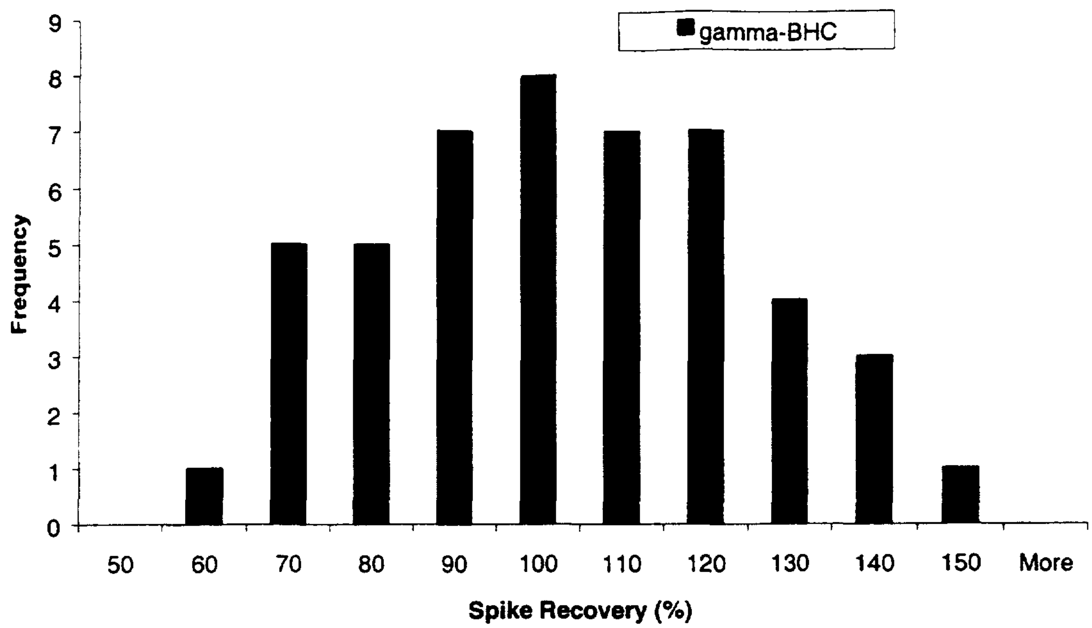

Figure G.25. Spike recovery frequency histogram for gamma-BHC.

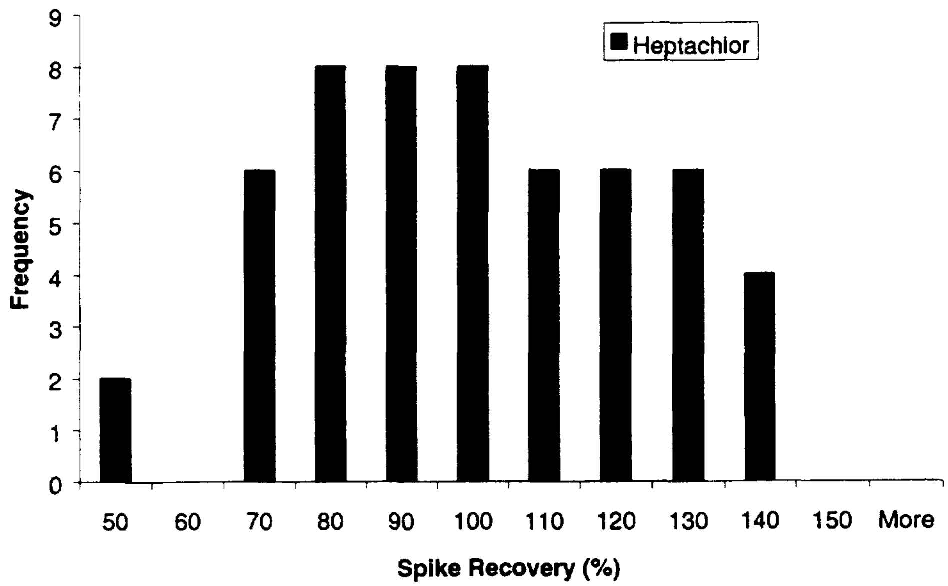

Figure G.26. Spike recovery frequency histogram for Heptachlor.

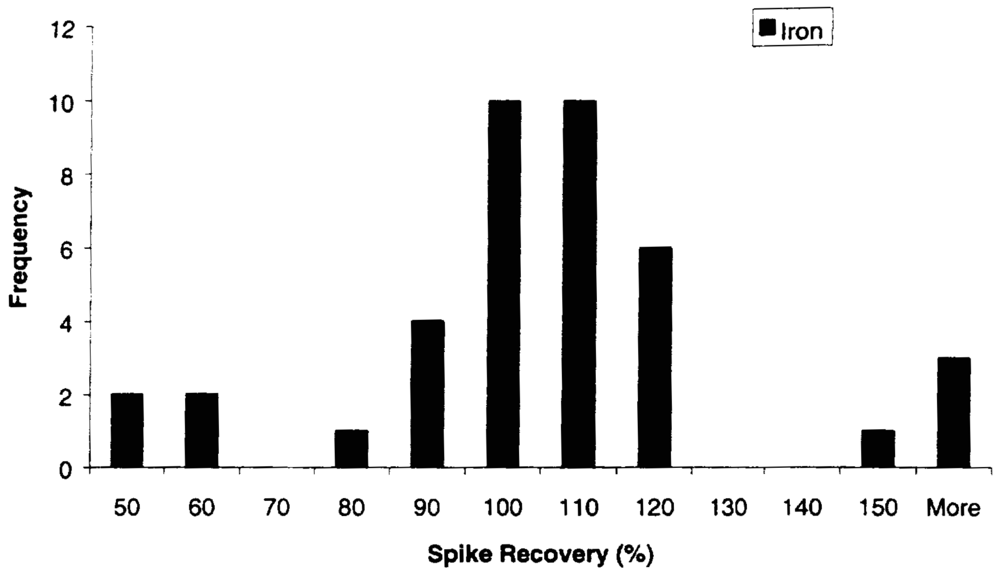

Figure G.27. Spike recovery frequency histogram for Iron.

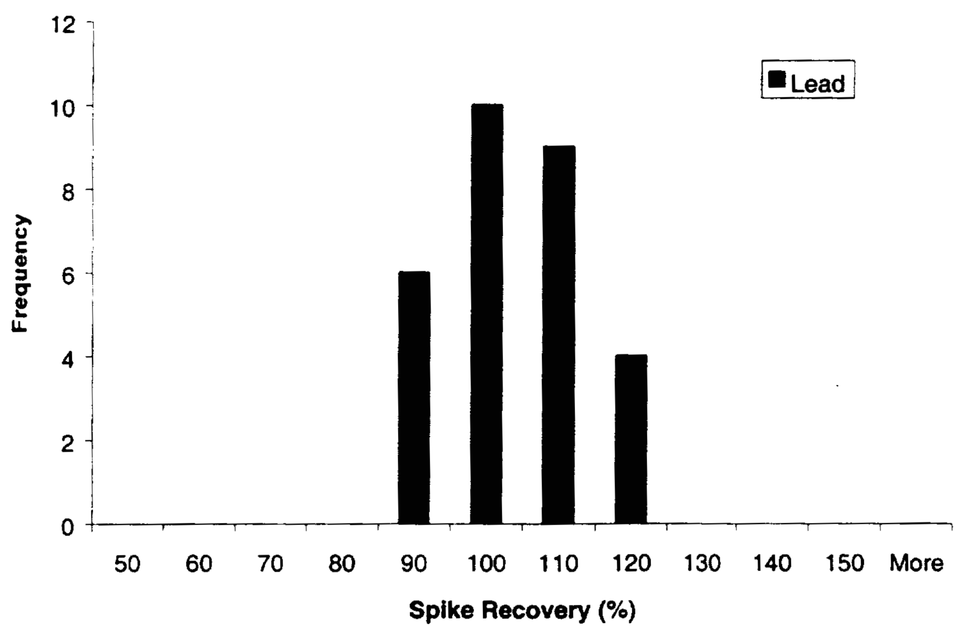

Figure G.28. Spike recovery frequency histogram for Lead.

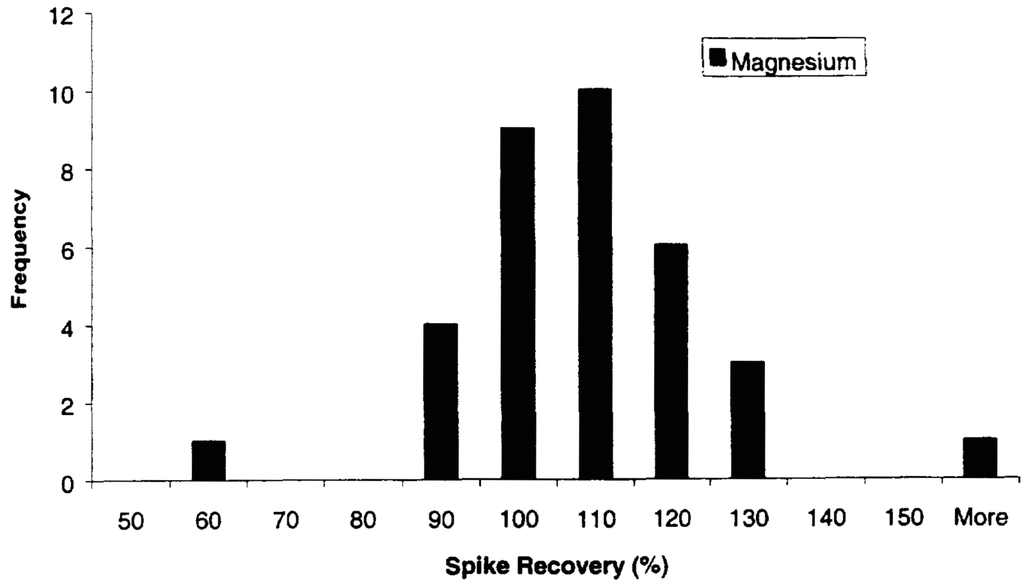

Figure G.29. Spike recovery frequency histogram for Magnesium.

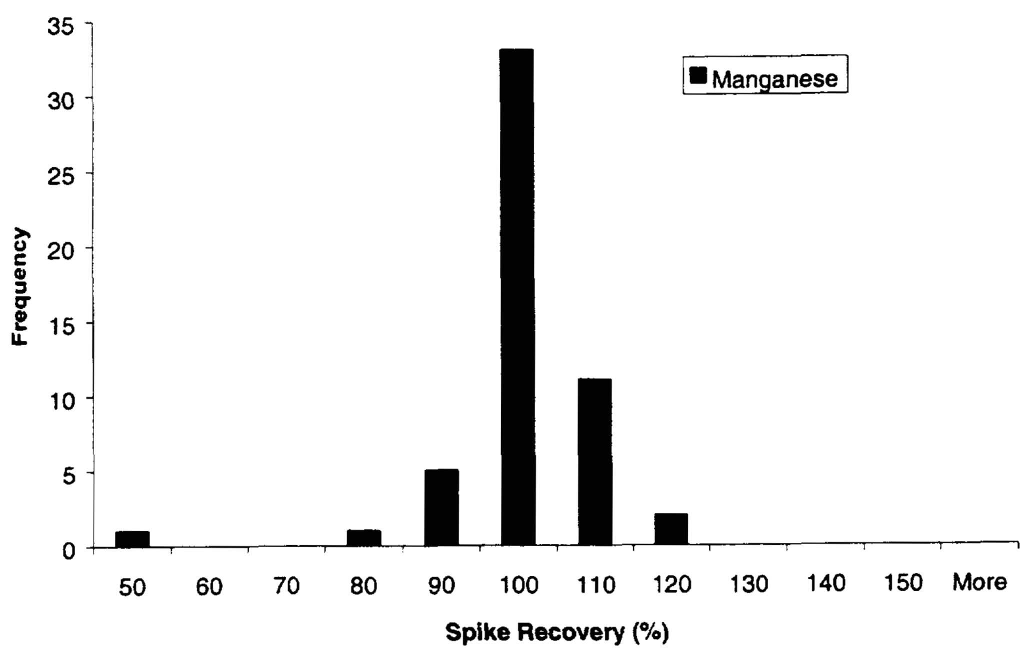

Figure G.30. Spike recovery frequency histogram for Manganese.

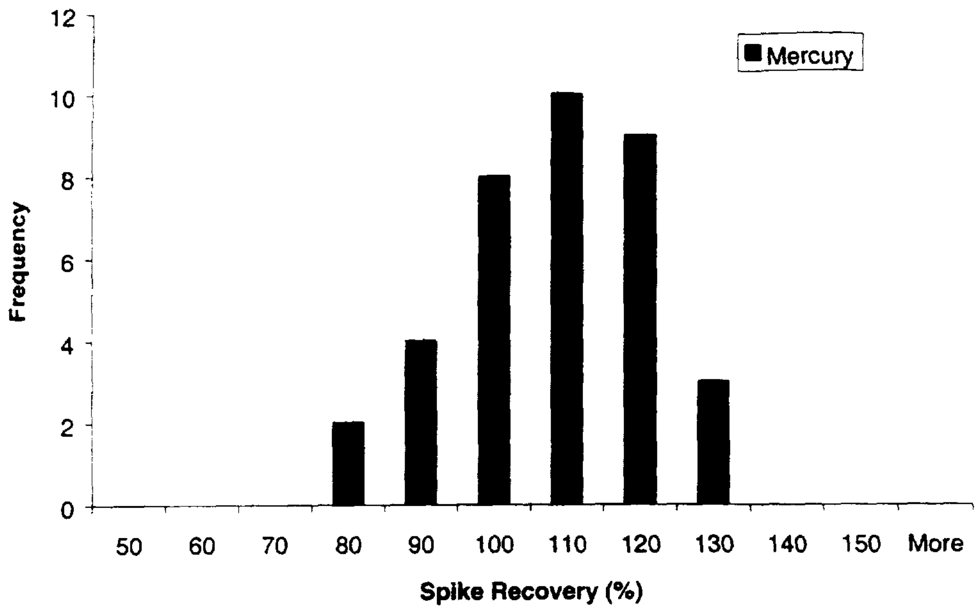

Figure G.31. Spike recovery frequency histogram for Mercury.

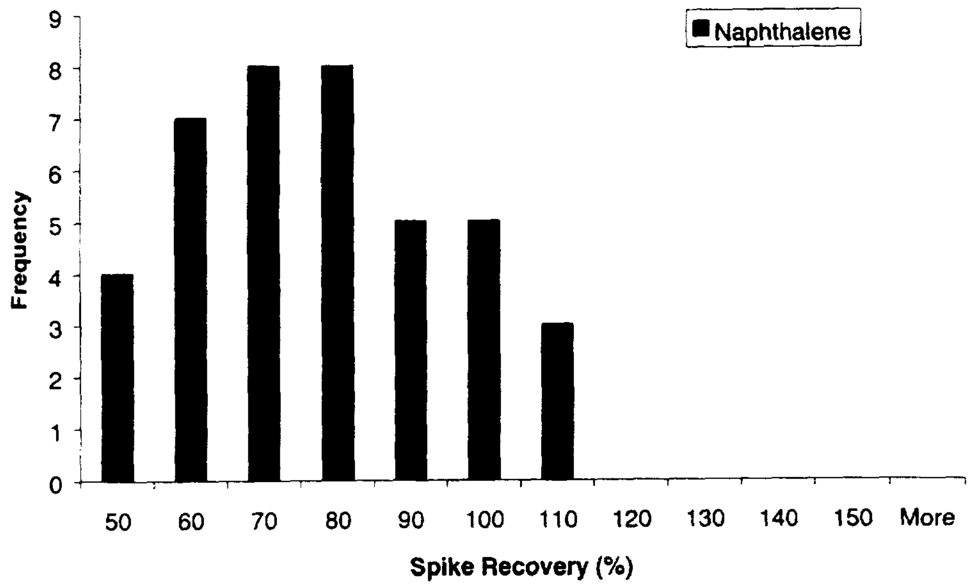

Figure G.32. Spike recovery frequency histogram for Napthalene.

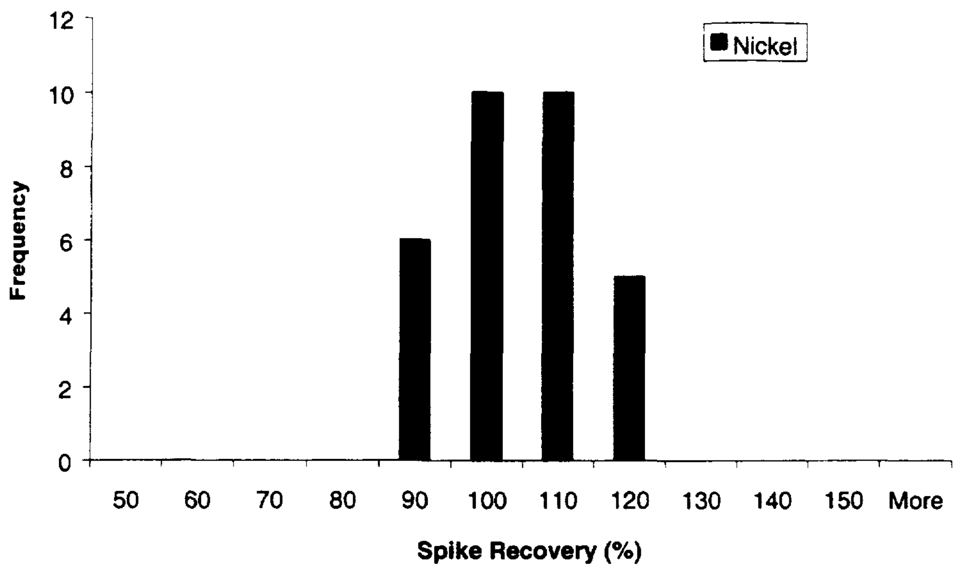

Figure G.33. Spike recovery frequency histogram for Nickel.

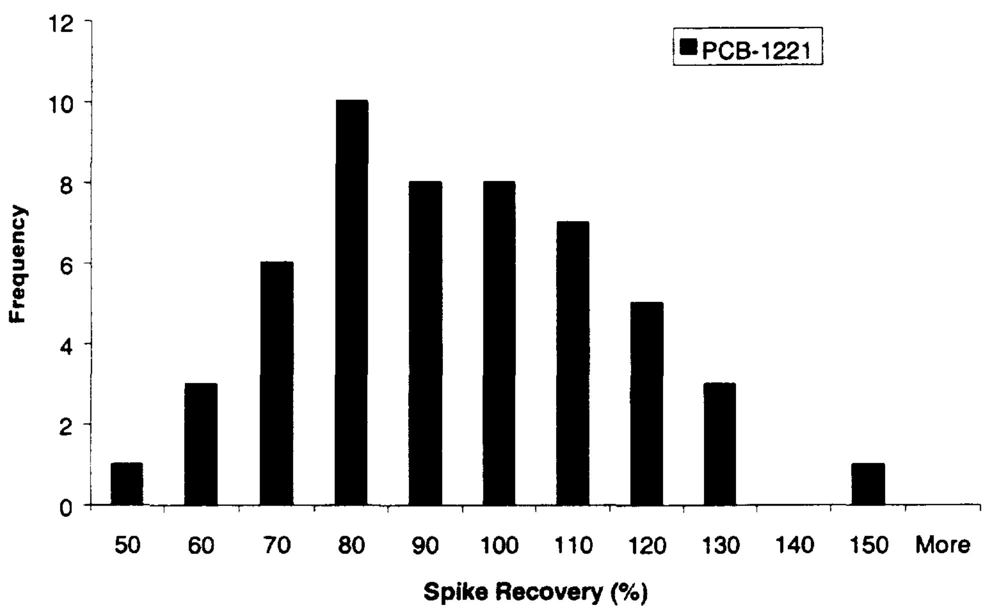

Figure G.34. Spike recovery frequency histogram for PCB-1221.

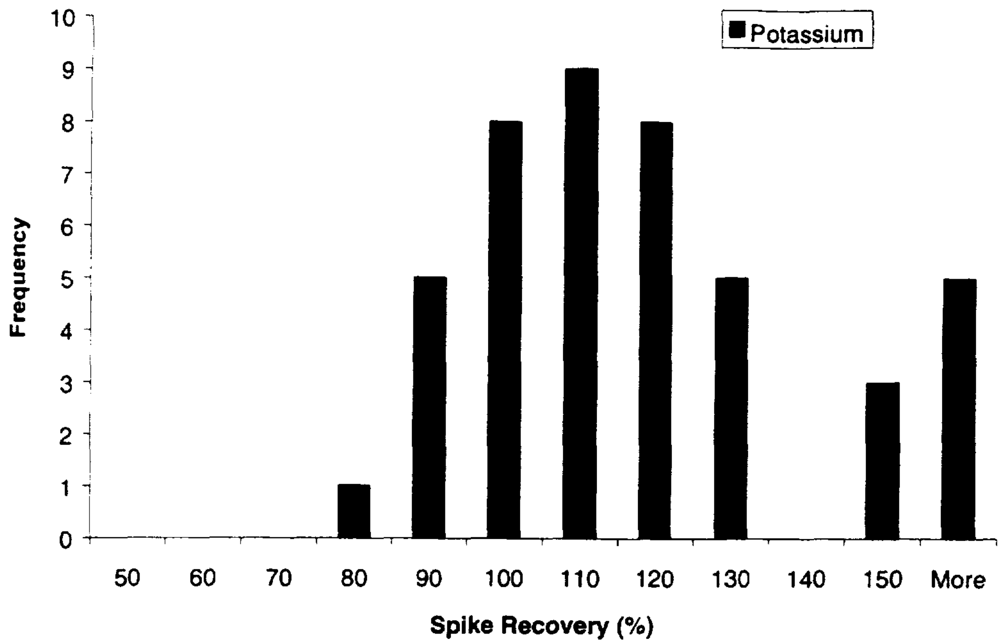

Figure G.35. Spike recovery frequency histogram for Potassium.

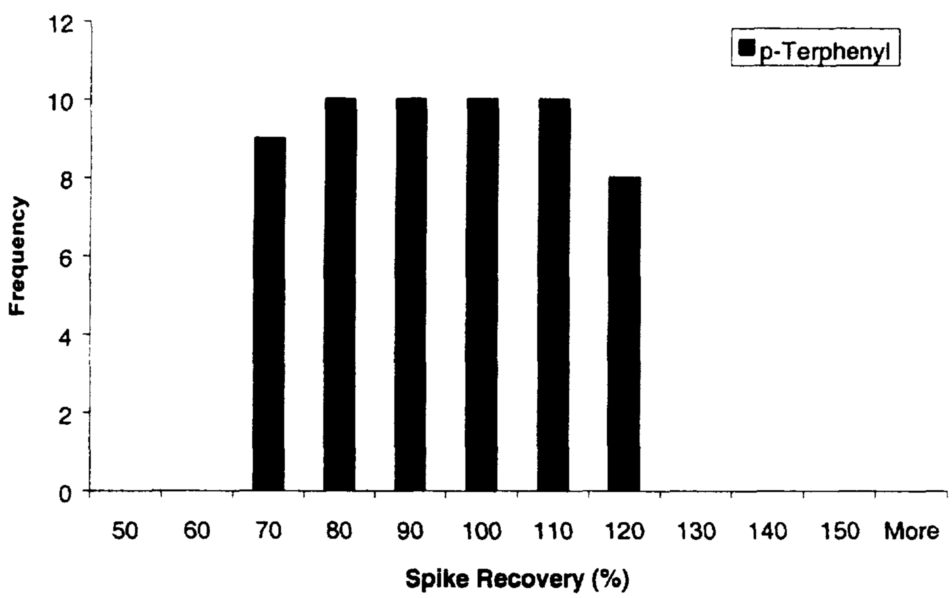

Figure G.36. Spike recovery frequency histogram for p-Terphenyl.

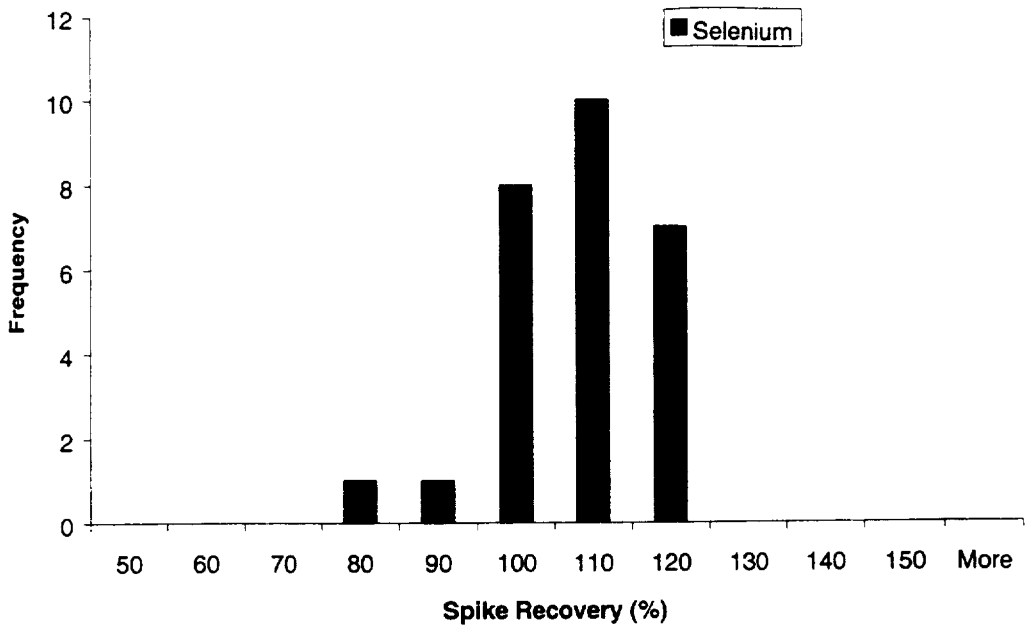

Figure G.37. Spike recovery frequency histogram for Selenium.

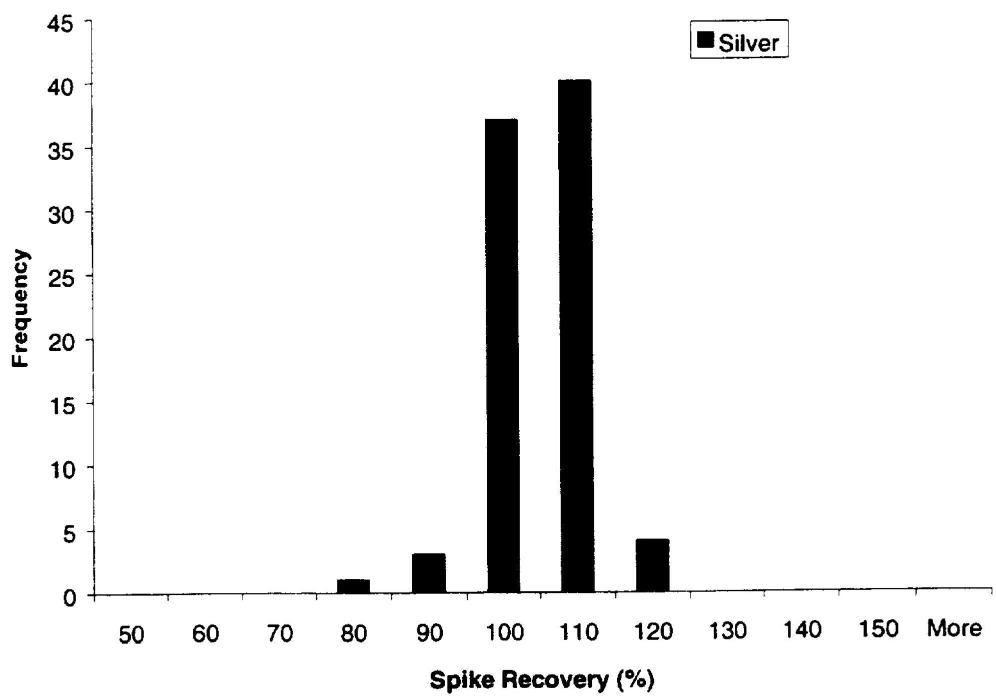

Figure G. 38. Spike recovery frequency histogram for Silver.

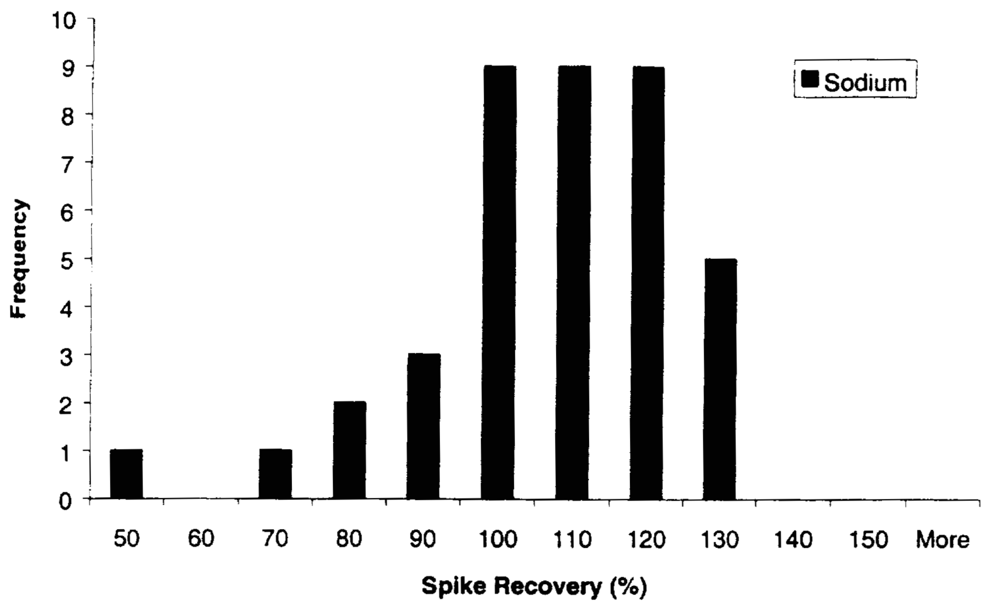

Figure G.39. Spike recovery frequency histogram for Sodium.

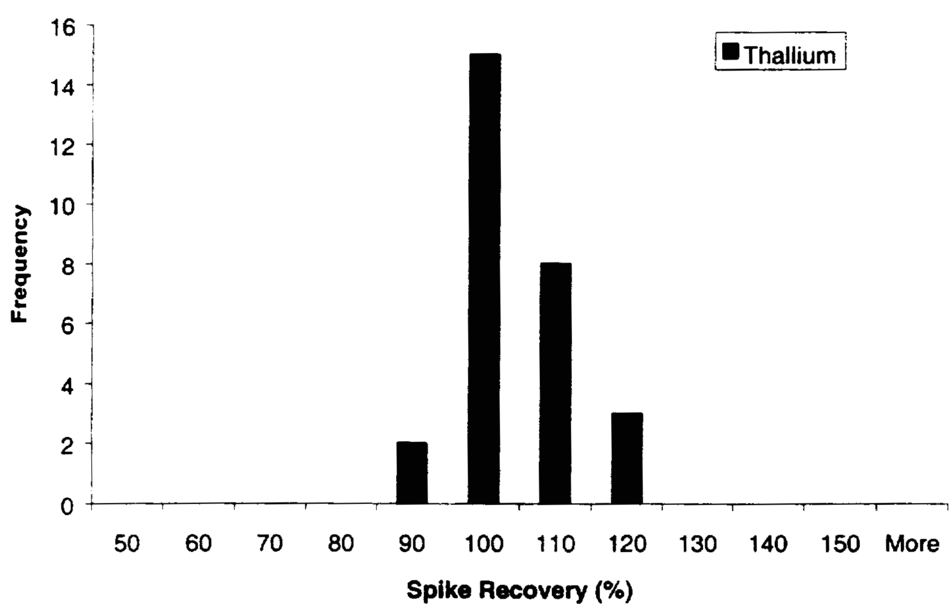

Figure G.40. Spike recovery frequency histogram for Thallium.

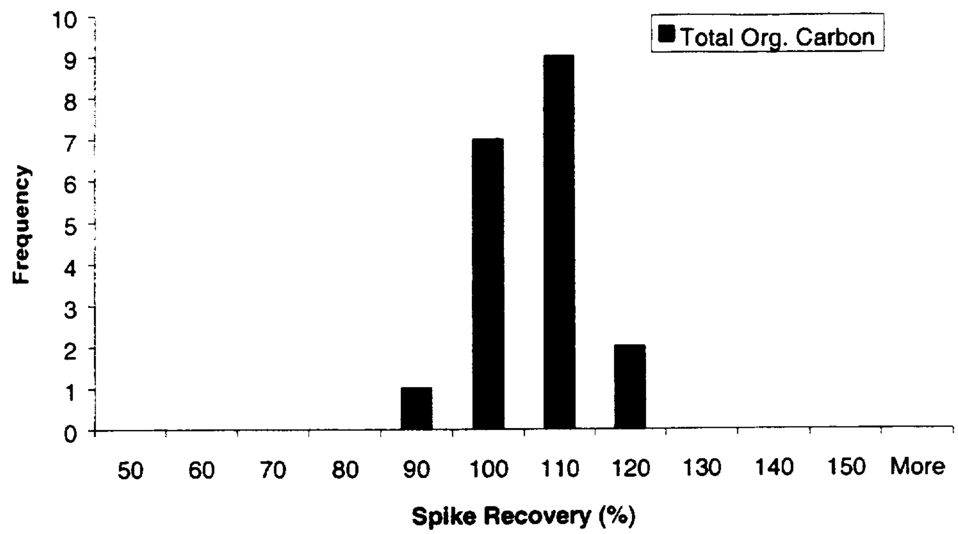

Figure G.41. Spike recovery frequency histogram for Total Organic Carbon.

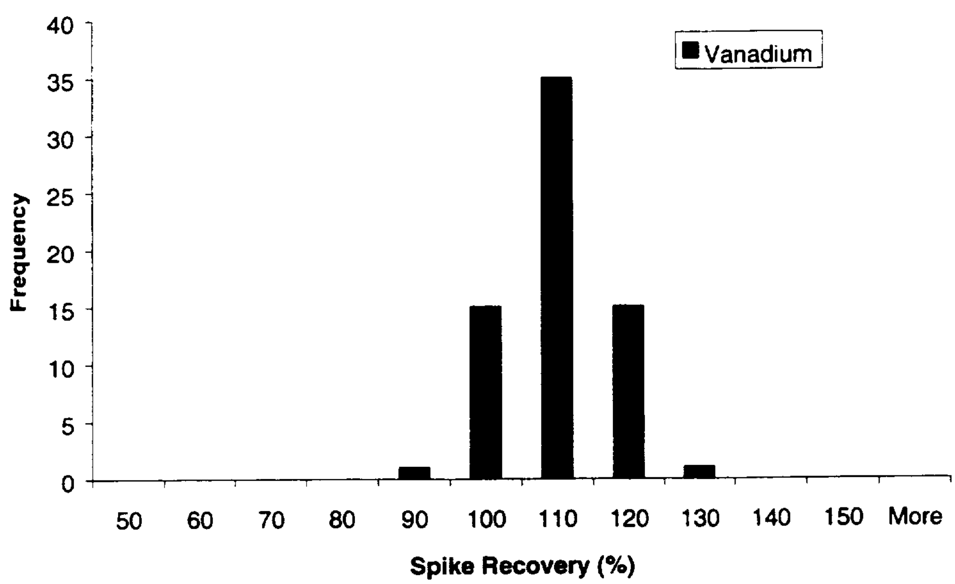

Figure G.42. Spike recovery frequency histogram for Vanadium.

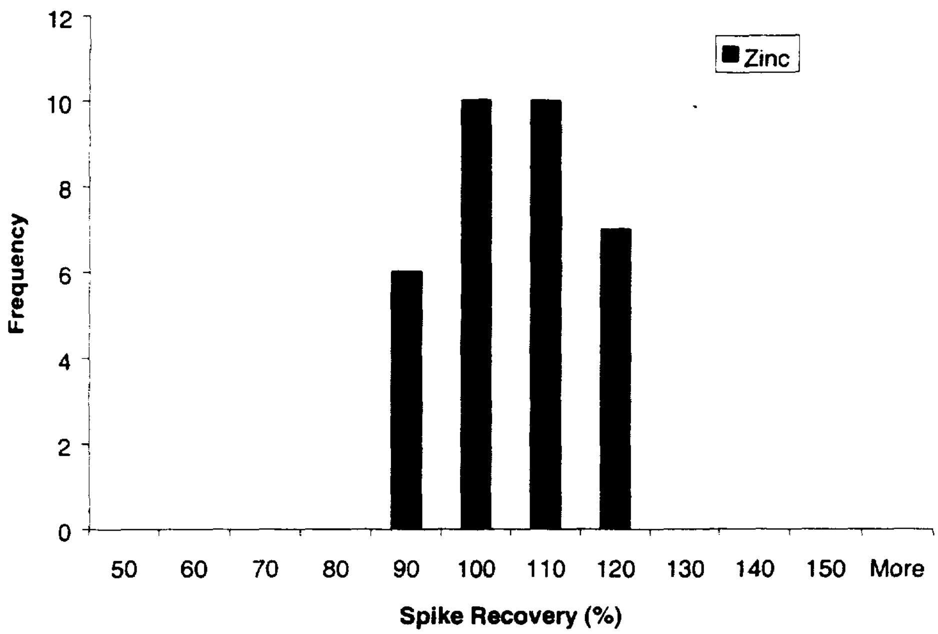

Figure G.43. Spike recovery frequency histogram for Zinc.

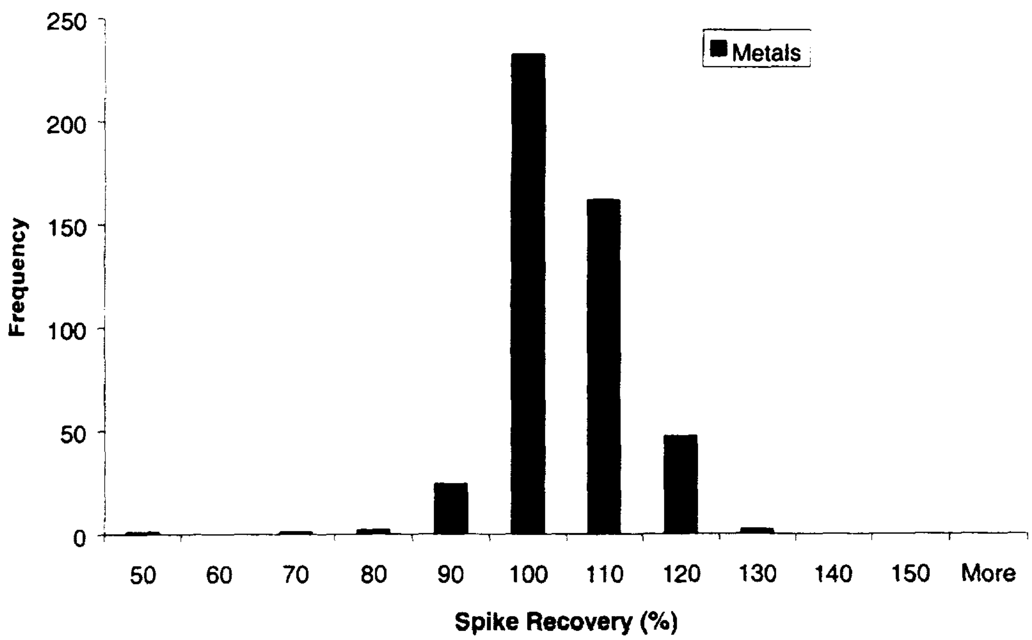

Figure G.44. Spike recovery frequency histogram for Metals.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
June 2000

3. REPORT TYPE AND DATES COVERED

4. TITLE AND SUBTITLE
Soil, Groundwater, Surface Water, and Sediments of Kennedy Space Center, Florida: Background Chemical and Physical Characteristics

5. FUNDING NUMBERS

6. AUTHOR(S)
Paul A. Schmalzer, Melissa A. Hensley, Mario Mota, Carlton R. Hall, and Colleen A. Dunlevy

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Dynamac Corporation
Mail Code DYN-2
Kennedy Space Center, Florida 32899

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
NASA
Mail Code JJ
Kennedy Space Center, Florida 32899

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
NASA/TM

11. SUPPLEMENTARY NOTES
Background, Chemical Characterization, Groundwater, Metals, Organics, Sediment, Soil, Surface Water

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*
This study documented background chemical composition of soils, groundwater, surface water, and sediments of Kennedy Space Center. Two hundred soil samples were collected, 20 each in 10 soil classes. Fifty-one groundwater wells were installed in 4 subaquifers of the Surficial Aquifer and sampled; there were 24 shallow, 16 intermediate, and 11 deep wells. Forty surface water and sediment samples were collected in major watershed basins. All samples were away from sites of known contamination. Samples were analyzed for organochlorine pesticides, aroclors, chlorinated herbicides, polycyclic aromatic hydrocarbons (PAH), total metals, and other parameters. All aroclors (6) were below detection in all media. Some organochlorine pesticides were detected at very low frequencies in soil, sediment, and surface water. Chlorinated herbicides were detected at very low frequencies in soil and sediments. PAH occurred in low frequencies in soil, shallow groundwater, surface water, and sediments. Concentrations of some metals differed among soil classes, with subaquifers and depths, and among watershed basins for surface water but not sediments. Most of the variation in metal concentrations was natural, but agriculture had increased Cr, Cu, Mn, and Zn.

14. SUBJECT TERMS

15. NUMBER OF PAGES
595

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	

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