SITE INVESTIGATION REPORT

OLD WASTEWATER TREATMENT PLANT

WALLOPS FLIGHT FACILITY, VIRGINIA

Prepared for

UNITED STATES ARMY CORPS OF ENGINEERS

Norfolk District

Prepared by

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List of Acronyms

ARAR	applicable or relevant and appropriate requirements
AWQC	ambient water quality criteria
bgs	below ground surface
BTAG	Biological Technical Assessment Group
CCC	criteria continuous concentration
CCME	Canadian Council of Ministers of the Environment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
chromium III	trivalent chromium
chromium VI	hexavalent chromium
CMC	criteria maximum concentration
CNAAS	Chincoteague Naval Auxiliary Air Station
COEC	contaminants of ecological concern
DDD	dichloro-diphenyl-dichloroethane
DDE	dichloro-diphenyl-dichloroethylene
DDT	dichloro-diphenyl-trichloroethane
DL	detection limit
DO	dissolved oxygen
DOD	U.S. Department of Defense
DPT	direct-push technology
DQI	data quality indicator
DQO	data quality objective
Eco-SSL	Ecological Soil Screening Level
EDQL	ecological data quality level
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ERL	Effects Range Low
ESL	ecological screening level
°F	degrees Fahrenheit
ft	feet
FUDS	Formerly Used Defense Site
gpd	gallons per day
HEAST	Health Effects Assessment Summary Tables
HQ	hazard quotient
I.D.	inner diameter
IDW	Investigation-derived wastes
kg	kilogram

List of Acronyms (Continued)

L	liter
LOAEL	lowest observed adverse effect level
LOEC	lowest observed effect concentration
MCL	Maximum Contaminant Level
MEK	methyl ethyl ketone
MET	minimal effects threshold
mg	milligram
MIBK	methyl isobutyl ketone
MSL	mean sea level
mV	millivolt
MW	monitor well
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no observed adverse effect level
NPDWR	National Primary Drinking Water Regulation
NSDWR	National Secondary Drinking Water Regulation
NTU	Nephelometric Turbidity Unit
NWI	National Wetland Inventory
ORP	oxidation-reduction potential
OVM	organic vapor meter
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	perchloroethylene (tetrachloroethene)
PEC	probable effects concentration
PRG	Preliminary Remediation Goal
PRP	potentially responsible party
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RAGS	Risk Assessment Guidance for Superfund
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
SD	sediment
SI	Site Investigation
SL	sludge
SLERA	screening level ecological risk assessment
SQAL	sediment quality advisory level

List of Acronyms (Continued)

SQG	sediment quality guidelines
SQL	sample quantitation limit
SS	surface soil
SSL	soil screening level
STL	Severn Trent Laboratories, Inc.
SVOC	semivolatile organic compound
SW	surface water
SWQS	Surface Water Quality Standard
TAL	Target Analyte List
TB	trip blank
TCDD	tetrachlorodibenzodioxin
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
TCRA	time-critical removal action
TEC	threshold effects concentration
THQ	target hazard quotient
TR	target risk
UCL	upper confidence limit
µg	microgram
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	unexploded ordinance
VAGWQS	Virginia Groundwater Quality Standard
VASWQS	Virginia Surface Water Quality Standard
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VOC	volatile organic compound
WESTON	Weston Solutions, Inc.
WFF	Wallops Flight Facility
WWTP	wastewater treatment plant

1.0 INTRODUCTION

Weston Solutions, Inc. (WESTON®) is submitting this Site Investigation (SI) Report to the U.S. Army Corps of Engineers (USACE) - Norfolk District for the site known as the Old Wastewater Treatment Plant (WWTP), located at the National Aeronautics and Space Administration (NASA) Wallops Flight Facility (WFF), Accomack County, Virginia. The SI Report was prepared under agreement with USACE - Norfolk District, under Contract No. W91236-05-D-0036, Task Order No. 0008 and in accordance with the approved Work Plan, submitted on 13 February 2007. The purpose of the SI Report is to summarize analytical data collected during SI activities and evaluate for potential contamination in groundwater, soil, sediment, and surface water, at the WWTP site.

The SI Report summarizes SI field activities completed between 19 and 23 February 2007. All field activities were conducted in general accordance with the U.S. Environmental Protection Agency (EPA) document, *Guidance for Conducting Site Inspections under CERCLA* (EPA, September 1992). The SI Report consists of the following eight major sections:

- Section 1.0, Introduction.
- Section 2.0, Site Description.
- Section 3.0, Summary of Field Activities, Investigation, & Results.
- Section 4.0, Human Health Screening Level Risk Assessment.
- Section 5.0, Ecological Screening.
- Section 6.0, Summary and Conclusions.
- Section 7.0, References

2.0 SITE DESCRIPTION

2.1 Wallops Flight Facility Location and Status

The NASA WFF is located in Accomack County, Virginia, and comprises three separate areas: Main Base, Wallops Island, and Wallops Mainland. The study area (Main Base) is situated on the Atlantic Coast of the Delmarva Peninsula, approximately 5 miles south of the Maryland/Virginia state boundary, and just to the west of Chincoteague Island. The Main Base is approximately 2,230 acres, and is bounded by Little Mosquito Creek to the north, Cedar Creek to the south, Simoneaston Bay to the east, and Wattsville Branch to the west. Wallops Island and Wallops Mainland are located approximately 7.5 miles southeast of the Main Base.

The Department of the Navy acquired the site in 1942 through condemnation in order to establish the Chincoteague Naval Auxiliary Air Station (CNAAS) as a training facility for World War II naval aviators. Prior to being developed for the CNAAS, this area principally consisted of farmland and marshes. Aerial photographs indicate that by 1943, various buildings and three runways were complete. Over the years, the mission of the facility changed numerous times. The three runways were modified and extended as needed with the changing mission. This resulted in the construction, expansion, and occasional abandonment of numerous associated structures and roadways. On 26 January 1946, the Naval Aviation Ordnance Test Station was established. In 1958 the National Aeronautics and Space Act established NASA. Although the Navy decided to shut down the CNAAS, the facility continued to operate until 1959, when it was officially closed. NASA took custody of the facility on 30 June 1959, along with the Wallops Mainland area. Finalization of the transfer from the Navy did not take place until 1 December 1961. From 1959 to 1974, the area consisting of the Main Base, Wallops Island, and Wallops Mainland was known as Wallops Station. During this time period, activities in the study area were conducted in support of the Civilian Space Program. In 1975 the facility name was changed to Wallops Flight Center. Activities were expanded to include studies of ocean processes. Noise reduction studies of aircraft on runways were conducted on the Main Base at the Wallops Research Airport. In July 1975, NASA excessed approximately 397 acres of land along the eastern extent of the Main

Base to the U.S. Fish and Wildlife Service (USFWS) to establish the Wallops Island National Wildlife Refuge (U.S. Department of the Interior, 1975). In October 1981, Wallops Flight Center was consolidated with the Goddard Space Flight Center in Maryland and the name was officially changed to WFF. Since then, WFF has become NASA's primary facility for suborbital programs (NASA, 1999). The anticipated future use for WFF is to remain an industrial launch facility/airport.

2.2 Old Wastewater Treatment Plant

The WWTP was constructed by the Navy in the early 1940s and is located northwest of the intersection of Runway 17-35 and the taxiway that parallels Runway 10-28. The WWTP is situated at the base of a moderate hill that consists of approximately 30 feet of topographic relief. A site location map is provided as Figure 2-1, and a site vicinity map illustrating topography and area features is provided as Figure 2-2.

The area surrounding the WWTP comprises approximately 0.8 acres, and includes mounded material identified in previous investigations as possible residual sludge piles located approximately 150 to 200 feet north of the WWTP structures. In addition, two sludge drying beds were thought to contain residual sludge materials associated with former WWTP activities. The site consists of and is surrounded by dense vegetative cover, including woodland underbrush and young trees. The WWTP is no longer active and the structures are currently partially degraded and overgrown with vegetation. NASA abandoned the facility upon obtaining custody of the land and has not used the WWTP for any purpose since the transfer of the facility ownership in 1959. A Principal Responsible Party (PRP) Analysis performed by NASA in 2001 concluded that the U.S. Department of Defense (DOD) and USACE should assume responsibility for the WWTP and the surrounding area under the Formerly Used Defense Site (FUDS) program.

The WWTP consists of three cinder-block structures and a trickling filter (removed in 2006). The cinder-block structures include a control/pump house, process tanks (clarifiers), and sludge drying beds. System operations are inferred from the layout of the system as historic

documentation of WWTP processes were not available. Influent to the WWTP likely flowed by gravity or pump stations to the headworks (control/pump house), where the flow was routed through a screening process before it entered the process tanks (clarifiers). Effluent from the clarifier was then pumped over the trickling filter, likely returning to the inlet side of the clarifier tanks. As a result, effluent from the trickling filter could be circulated continuously through the clarifier or a secondary clarifier to aid in the removal of the suspended solids. Once the effluent from the clarifier underwent significant treatment in the trickling filter process, the effluent was likely discharged and sludge from the clarifiers discarded to the sludge drying beds.

Topography of the site slopes generally to the northwest. Stormwater runoff from the site flows overland in a northwesterly direction and discharges into an intermittent stream. The stream conveys surface water in a northerly direction for approximately 0.4 miles before discharging into Little Mosquito Creek. Soil in the vicinity of the WWTP site has been classified as Molena loamy sand, with slope gradients ranging from 6 to 35%. The Molena series consists of very deep, somewhat excessively drained soils on stream terraces of the Piedmont and Upper Coastal Plain. This soil typically exhibits slow-to-medium runoff and rapid permeability (USDA, 1994).

Groundwater flow direction at the site had not been established based on data collected previously at the site, and shallow groundwater flow was expected to be north-northwest based on local topography and the locations of the intermittent stream and Little Mosquito Creek.

2.3 Previous Environmental Investigations

A 1988 NASA memo addressed to the Corps of Engineers indicated that a drainage swale located near the old WWTP plant was potentially used as an ordnance disposal site, though no evidence of ordnance was noted during an initial site survey. The WWTP site was identified for investigation in a 1990 Environmental Site Survey (ESS) Report completed by Ebasco, based on a lack of historical data and potential environmental significance. An unexploded ordnance (UXO) and magnetometer survey were conducted as part of a 1993 Site Inspection (Phase 1). Approximately 90 subsurface contacts were located at three areas: 1) 10 possible subsurface contacts at Area A, an area surrounding the WWTP structures; 2) 30 subsurface contacts at Area

B, the sludge disposal area; and 3) 50 subsurface contacts at Area C, the possible ordnance disposal area in a drainage swale – not included as part of this SI. Subsurface objects were not identified during the Phase I investigation, and all contacts were less than 2 feet in diameter. The Phase I Site Inspection made no further recommendation regarding Areas A and B, but recommended recording Area C as a possible ordnance disposal area, with additional investigation required prior to performing any intrusive work in the area. See Appendix A for further discussion and illustration of the referenced areas.

During Phase II of the 1993 Site Inspection, six soil gas samples were collected, and recommendations were made for subsequent collection of subsurface soil samples at three locations. One soil and one groundwater sample were collected by direct-push technology (DPT) in 1999. Aluminum, iron, and manganese exceeded the EPA maximum contaminant levels (MCLs) in the groundwater sample and a "Relative Risk Evaluation, performed using existing data, found the relative risk to be high". Data from the 1993 investigations are presented in Appendix A.

On 9 December 2005, USACE representatives conducted a reconnaissance visit for the current SI. During the visit, beads of elemental mercury were discovered several inches below the surface immediately adjacent to the pedestal of a rotary arm trickling filter. While inspecting the trickling filter, a clogged and uncapped pipe was noted in the location where the seal drain should have been. The drain pipe appeared to be clogged with a rusty sludge material. Just below the surface of the stone filter media, beads of elemental mercury were observed several inches from the pedestal. The detached locked drain valve was also found lying on the ground nearby.

The trickling filter, Serial No. 7828, was manufactured by Dorr Inc. during the early 1940s. According to a Dorr-Oliver representative, the filter seal contained 11.5 pounds of mercury. The area above and under the seal drain pipe was isolated with plastic to prevent further spillage of mercury and to prevent migration of released mercury further down into the filter. In May 2006, the trickling filter was demolished and removed from the site. Soil samples collected below the former trickling filter did not indicate impact from the mercury release. The results of this effort

are documented in the *Time Critical Removal Action (TCRA) After Action Report* (WESTON, August 2006).

2.3.1 WWTP Process

The WWTP consists of three cinder-block and concrete structures (control/pump house, process tanks [chlorine reaction tanks, primary and final settling tanks, and sludge digestion tank], and sludge drying beds). With the exception of the control/pump house, the system was controlled by gravity flow. Three electrical transformers were formerly located adjacent to the south side of the control/pump house. A trickling filter, a 24-foot diameter concrete basin 4 feet in depth, was removed in May 2006 as part of the TCRA. Figure 2-3 is a site layout map and Figure 2-4 is a diagram of the WWTP flow process. Influent to the WWTP flowed by gravity through a 10-inch diameter sewer line entering the site into the valve house and entered the Comminutor (grinding process) building, after which the flow was routed to the primary settling tank. As the primary settling tank filled, solids settled to the bottom and effluent from the primary process tank flowed by gravity from the top of the tank to the trickling filter. The trickling filter acted as an aerator and biofilter, spraying wastewater over rock, which then drained to a wet well in the control/pump house. A pump station in the control/pump house returned the wastewater to the primary and final settling tanks. As a result, wastewater from the trickling filter was re-circulated through the primary settling tank or final settling tank to aid in the removal of the suspended solids. Once the effluent from the process tanks had undergone significant treatment in the trickling filter process, the effluent was treated by chlorine reaction and discharged to an intermittent stream on the north-northeast side of the site. Sludge from the process tanks was sent to the digester from the lower portion of each process tank, before being placed in the sludge drying beds. As necessary, the sludge was removed from the drying beds, and was suspected to have been piled in the northern portion of the site. It is also noted that an overflow line was present at the control/pump house which may have been utilized on occasion, when the pumping system was not functional. The overflow pipe and its outfall were constructed of terracotta tile, based on site observations and consistent with the age of the WWTP. The overflow pipe's outfall could not be located during the TCRA. However, during the current SI the pipe was located

approximately 2 feet below grade and completely buried, and a sample was collected at the pipe's termination point (SS-8).

2.4 General Environmental Setting

The following subsections discuss general site conditions at WFF, including demography, land use, topography and drainage, climate, ecological setting, geology, soils, and hydrogeology.

2.4.1 Demography

WFF is located in a rural area where year-round population densities are relatively low for neighboring areas. Chincoteague Island, which lies approximately 5 miles from the Main Base area of the facility, is the largest, most densely populated area near WFF, and has a resident population of approximately 3,600 people. Area populations are seasonal and fluctuate. During the summer months, the population expands due to tourists visiting the nature reserves and beaches of Assateague Island. Daily populations can reach up to 15,000 in the summer months. During special events like the carnival and the pony roundup, sponsored by the Chincoteague Volunteer Fire Department each July, the daily summer population doubles. As a result, businesses in the Chincoteague area are generally targeted to the seasonal tourist industry, with the exception of fishing.

2.4.2 Land Use

The WFF Main Base contains offices, tracking facilities, a range control center, a rocket and fuel storage depot, shops, housing, and the airfield. The nearest off-site private home is located approximately 1,000 feet west of the Main Gate. Farms and residences are located north across Little Mosquito Creek. An Accomack County landfill (closed) is located to the south of State Route 798, approximately 1,000 feet west of the Main Gate. The nearest commercial business (a small store) is located southwest of the site, at the intersection of State Routes 175 and 679. Little Mosquito Creek forms the northern boundary and Simoneaston Bay, Little Simoneaston Creek, and Jenneys Gut form the eastern boundary of the Main Base.

The nearest town is the Town of Chincoteague, which lies approximately 4 miles east of Wallops Island. The Town of Chincoteague has approximately 3,600 permanent residents. During the summer months, the population increases up to 15,000 inhabitants. As stated above, businesses in the Chincoteague area are generally targeted to the seasonal tourist industry, with the exception of fishing.

2.4.3 Topography and Drainage

WFF is located in the Atlantic Coastal Plain Physiographic Province and is underlain by a thick sequence of approximately 7,000 feet of unconsolidated sediments that overlie crystalline bedrock. The sediments range in age from recent to Cretaceous and generally consist of alternating series of sands, silts, clays, and gravels.

The area is relatively flat with a reported highest point of elevation of about 40 feet above mean sea level (msl). The area is bordered to the east by extensive marshland and creeks that drain to the Chincoteague Bay and inlet. Little Mosquito Creek, which eventually also flows east into the inlet and to the Atlantic Ocean, borders WFF to the north and west. The runway complex covers a large portion of WFF and forms a flat plateau-like feature that covers the majority of the highest elevations at WFF. Drainage from and across WFF is through natural and man-made drainage structures. Drainage within the industrialized portions of WFF is controlled and diverted by stormwater collection and conveyance systems. In addition, portions of the base have been isolated from surface water drainage areas by the construction of berms and higher elevation structures.

The natural drainage patterns for the southwest, west and northern portions of WFF are towards Little Mosquito Creek and its tributaries. The eastern, southeastern and southern portions of WFF drain towards a series of marshlands, creeks and bays that lead to Chincoteague Bay and the Atlantic Ocean.

2.4.4 Climate

The climate at WFF is humid with hot summers, and without a distinct dry season. From October through March, the weather at the facility is dominated by continental air masses with relatively low moisture content. From April through September, the air is more maritime with high moisture content at low levels due to circulation of the Bermuda High cell that reaches its peak during late summer.

The average annual precipitation is 36.8 inches. The average mean temperature is 56 degrees Fahrenheit (ºF), with a mean maximum of 64ºF and mean minimum of 48ºF. The prevailing wind direction is southerly during the summer and northwesterly during the winter. The average wind speed is 10 knots.

The cloud cover varies from month to month, being at a minimum in August and at a maximum in January. From June through November, WFF and surrounding areas are subject to severe thunderstorms, high tides, heavy rains, and phenomena generally associated with the hurricane season. From December through March, the area is subject to cold fronts and occasional associated snow storms, and sleet.

2.4.5 Ecological Setting

The National Wetlands Inventory (NWI) map overlay for the Chincoteague, Virginia/Maryland U.S. Geological Survey (USGS) topographic quadrangle is based on photo-interpretation of high altitude, black and white, vertical aerial photography. The NWI map and the Accomack County Wetland Maps for the area of WFF indicate that both tidal and non-tidal wetlands occur at the site. The three predominant types of wetlands at WFF are marine, estuarine, and palustrine. The NWI map indicates many large areas of estuarine wetlands adjacent to the main base, with several smaller parcels of palustrine forested wetlands. On Wallops Island, most of the wetlands depicted by NWI are mapped as estuarine. Some of the threatened and endangered species that may utilize the site include: the bald eagle, peregrine falcon, gull-billed tern and upland sandpiper.

2.4.6 Geology

WFF is part of the Atlantic Coastal Plain Physiographic Province, a seaward sloping stratified body of sediments bounded on the west by the Fall Line and on the east by the Atlantic Ocean. The facility is underlain by approximately 7,000 feet of unconsolidated sediments dating back to the Cretaceous period. Below this group of sediments are igneous and metamorphic crystalline basement rocks.

The water-bearing formations within the WFF area consist of sedimentary units ranging in age from Cretaceous to Quaternary. The two uppermost stratigraphic units, the Yorktown Formation and the overlying Columbia Group, are the most important water supply formations for agricultural, domestic, public, and industrial uses in the area.

The Yorktown Formation is the uppermost unit in the Chesapeake Group. The formation consists of fine-to-coarse, greenish gray, glauconitic quartz sand, which is clayey, silty, and in part, shelly. The formation occurs at depths of 60 to 140 feet in Accomack County.

The Columbia Group sediments represent the Holocene and Pleistocene epochs. Lithologies of the Columbia Group consist of sand, sandy clay, and minor amounts of gravel deposited during the sea level fluctuations in the Pleistocene epoch.

2.4.7 Soils

Soils at WFF are Coastal Plain soils that are typically nearly level, very deep and well drained. Soils within the Main Base area are predominately Bojac fine sandy loam (USDA, 1994). In general, the upland, terrace and level portions of the Main Base are comprised of Bojac fine sandy loam. This soil type is reported to be a low organic content, acidic, well-drained soil with moderately rapid permeability. The more steeply sloped areas found around the perimeter of the Main Base and the slopes leading from the level areas to the marshlands are predominantly classified as Molena loamy sand. These soils have properties similar to the Bojac series but reportedly have a higher permeability, a higher percentage of coarser sands, and slightly more

acidic content. Other soil types that appear to be present include silty bands and mucky sandy loam (Chincoteague and Polawana series) which are present within the marshland areas around the extreme perimeter of the Main Base.

2.4.8 Hydrogeology and Water Use

2.4.8.1 Regional

The Virginia State Water Control Board identified four major aquifers on the eastern shore of Virginia: the Holocene-Pleistocene aquifer (Columbia Group) and the three separate units of Miocene aquifers including the lower part of the Yorktown-Eastover aquifer (the part in the Eastover Formation which corresponds in age to the late uppermost Miocene epoch), the St. Marys-Choptank aquifer (Choptank Formation), and the Chickohominy-Piney Point aquifer (Old Church Formation). The water table aquifer, known as the Columbia aquifer, is unconfined and typically overlain by wind-deposited beach sands, silts, and gravel. The aquifer occurs between depths of 5 and 60 feet below ground surface (ft bgs). The water table ranges from depths of 0 to 30 ft bgs.

The top of the shallowest confined Miocene aquifer is the Pliocene-aged portion of the Yorktown-Eastover aquifer in the Yorktown Formation. This zone continues down into upper Miocene-aged sediments of the Eastover Formations found at depths of approximately 100 feet below the ground surface. It is separated from the overlying Columbia aquifer by a 20- to 30-foot confining layer (aquitard) of clay and silt.

In general, the water table (Columbia) aquifer on the Delmarva Peninsula is recharged by surface waters or infiltration of precipitation. The confined aquifers are recharged by the same process. The annual average rainfall for WFF is 36.8 inches, with an estimated annual net precipitation of 14 inches. Aquifer tests conducted on shallow wells at the Main Base (Versar, 2001) indicated transmissivity values ranging from a low of 0.000919 feet squared per minute (ft^2/min) or 10 gallons per day per foot (gpd/ft) to a high of 0.16 ft^2/min or 1,764 gpd/ft for the unconfined aquifer. Aquifer tests estimated hydraulic conductivity values ranging from approximately 80 to

200 feet per day and specific yield and storativity values from 0.01 to 0.13. These values are typical of unconfined aquifers with mainly sand units, and demonstrate the ease of recharge from surface water and/or precipitation. The tests also indicated there was not significant vertical leakage through the aquitard below the unconfined aquifer. The confined aquifers are believed to be recharged laterally from areas with greater vertical leakages. Aquifer tests performed on the upper and middle Miocene aquifers estimated a transmissivity range of 8,500 to 14,500 gallons per day per foot (gpd/ft), a storativity of approximately 0.003, and a vertical leakage rate of 0.0352 feet per day for the upper aquifer. The middle Miocene aquifer indicated a transmissivity of 4,000 gpd/ft and a storativity range of 0.002 to 0.0002.

2.4.8.2 Local

On the Main Base, groundwater flow direction in the shallow Columbia aquifer is generally east and north toward nearby creeks and towards the marsh area that separates Chincoteague Island from the mainland. In the site area, surface contours suggest groundwater flow direction is toward the unnamed tributary to Little Mosquito Creek. Generally, groundwater flow direction is north-northeast towards Little Mosquito Creek. The Town of Chincoteague and WFF both have potable water supply wells screened in the upper and middle Miocene aquifer, at depths ranging from 100 to 260 ft bgs.

Based on groundwater investigations conducted to date at the Main Base, groundwater within the Columbia aquifer occurs under unconfined conditions between depths of about 5 feet to 60 ft bgs. Groundwater flow directions within the Columbia Group throughout the base are variable, but are consistent with the flow directions that are typical or expected for a water table or unconfined aquifer. That is, the topography of the water table is a generally subdued reflection of the surface topography. WFF is essentially a peninsula that is surrounded on three sides by surface water bodies that reside at an elevation of sea level and function as discharge points for groundwater, and groundwater generally flows from the base towards these surface water bodies.

Groundwater is the only source for drinking, agricultural, and process water within the WFF area. This is generally true for a large portion of the eastern shore of Virginia. Because of the

reliance on groundwater and the coastal proximity of the area, the Commonwealth of Virginia has declared the eastern shore of Virginia a Critical Groundwater Area. The withdrawal of groundwater from the area, including Accomack County, is controlled through the issuance of withdrawal permits under the Virginia Groundwater Management Act. The State Water Control Board, in consultation with local planning commissions and the Department of Health, administers the permitting program and allocates groundwater withdrawal volumes as part of the permitting process. Groundwater withdrawal permits are required for withdrawals that equal or exceed 10,000 gallons per day or 300,000 gallons per month. Withdrawals below the regulated amount, such as a typical single family home withdrawal, are not permitted.

WFF operates and maintains its own permitted water supply system that includes five wells (WW01-WW05) actively used to withdraw water from the Yorktown Formation. The closest of these wells to the WWTP site (WW-04) is approximately 0.5 miles to the south. The locations of the WFF Main Base potable supply wells are illustrated on Figure 2-2. In addition, the National Oceanic and Atmospheric Administration (NOAA) and the Town of Chincoteague operate water supply wells located on WFF property. NOAA operates a single well (NOAA 2) drilled into the Yorktown aquifer, located approximately 0.35 miles to the north of the WWTP site (see Figure 2-2). The Town of Chincoteague operates eight supply wells located along the eastern boundary of the WFF Main Base property. The closest well to the WWTP site is located approximately 0.75 miles to the west (see PWS well, Figure 2-2). Three of the Town of Chincoteague wells are shallow wells drilled into the Columbia aquifer. These three Town of Chincoteague Columbia aquifer wells are periodically sampled in accordance with monitoring program requirements. The remaining five Town of Chincoteague wells are deeper wells installed in the Yorktown aquifer. These five wells are sampled and monitored on a regular basis under the drinking water program.

2.4.8.3 Site-Specific

Groundwater flow direction at the WWTP site had not been established based on data collected previously at the site. No monitor wells were installed at the site prior to the current investigation, though shallow groundwater flow was expected to be north-northwest based on local topography and the locations of the intermittent stream and Little Mosquito Creek.

Following installation of seven groundwater monitor wells (MW-01 through MW-07), groundwater levels were measured on 23 February 2007 (see Table 2-1). The monitor well groundwater elevations and potentiometric surface map for the WWTP site are shown in Figure 2-5. The contours indicate flow in a northwesterly direction toward the intermittent stream from the former WWTP operations located on the western side of the WWTP site. West of the facility, groundwater flow direction is northeast and toward the intermittent stream. The hydraulic gradient is 0.0047 feet per foot (ft/ft) based on wells MW-06 and MW-07.

3.0 SUMMARY OF FIELD ACTIVITIES, INVESTIGATION & RESULTS

SI field activities included installation of monitor wells and sampling of groundwater, soil, sludge, sediment, surface water, and waste water. Sampling locations are shown in Figure 3-1. Field notes and site photographs are included in Appendix B.

3.1 Groundwater Investigation

The groundwater investigation included installation of seven monitor wells, and soil and groundwater sampling. The purpose of the groundwater investigation was to establish groundwater flow direction beneath the site, and to assess groundwater quality on and around the site.

3.1.1 Drilling and Monitor Well Installation

Seven shallow monitor wells (MW-01 through MW-07) were installed at the former WWTP site from 19 through 21 February 2007 (see Figure 3-1 for well locations). Well locations were selected to provide groundwater data from upgradient, downgradient, and on-site locations.

Wells were installed using 4.25-inch inner diameter (I.D.) hollow stem augers. Monitor wells were installed to depths between 12 and 26 ft bgs using 10 feet of 2-inch diameter 0.010-inch slotted polyvinyl chloride (PVC) screen and the appropriate amount of PVC riser pipe. Where possible, the bottom of the screen was placed approximately 7 feet into the saturation zone. Where this was not possible because the depth to water was less than 4 ft bgs, the screen was placed as high as possible without compromising the filter pack and bentonite seal placed above the filter pack. A filter pack was gravity fed from 6 inches below the bottom of the well screen to between 0.5 and 2 feet above the top of well screen. A 30% solids bentonite seal was then gravity fed or conveyed by tremie pipe to between 0.5 and 2 feet above the top of the filter pack. The remainder of the annular space to top of ground surface was filled with a cement/bentonite grout. Each well was completed with a lockable cap, and a 2.5 foot above ground monument set

within a 3-foot square and 6-inch deep concrete pad. The concrete pads were sloped to allow runoff. The pads extended 2 inches down into the borehole and were bonded to the grout. See Table 3-1 for well construction details. Well construction diagrams are included in Appendix C.

3.1.1.1 Monitor Well Development

The seven newly installed monitor wells were developed on 21 and 22 February 2007, no sooner than 24 hours from the time the grout seal was emplaced. Wells were developed using pumping techniques in accordance with the approved SI Work Plan. Equipment was decontaminated prior to use and between each well location. Purge data is included in Appendix B.

A submersible pump was used to surge and pump each of the newly installed wells. During development, purge rate, depth to water, and water parameters pH, temperature, conductivity, and turbidity were recorded. Well development continued until water purged from the well reached a turbidity measurements less than 10 nephelometric turbidity units (NTU) or less and water parameter measurements were stable over three successive measurements.

3.1.1.2 Investigative Derived Waste

Development, purge, and decontamination water was contained in ten 55-gallon drums and transported to the on-site staging area. A sample was collected from the contained waste water (development, purge and decontamination water) and submitted under chain-of-custody protocol to Severn Trent Laboratories (STL) in Savannah, Georgia for waste characterization (toxicity characteristic leaching procedure [TCLP]-volatile organic compounds [VOCs], -semivolatile organic compounds [SVOCs], -pesticides, -herbicides, -metals, corrosivity, reactivity, and flash point). Sample results are summarized in Table 3-2, and laboratory analytical reports are included in Appendix D. Barium was detected at an estimated concentration of 0.091 milligrams per liter (mg/L). No other constituents were detected in the investigative derived waste (IDW) water sample. Based on the analytical results, the wastewater was characterized as non-hazardous and transported for discharge to the WFF active WWTP by IMS Environmental on 19 April 2007.

Cuttings from monitor well installation were contained in nine 55-gallon drums. A soil sample was collected from the contained soils (soil cuttings), and submitted under chain-of-custody protocol to STL for waste characterization (TCLP-VOCs, - SVOCs, -pesticides, -herbicides, -metals, corrosivity, reactivity, and ignitability). Sample results are summarized in Table 3-2, and laboratory analytical reports are included in Appendix D. Barium was detected at 0.18 mg/L and chromium was detected at 0.012 mg/L, both estimated concentrations. No other constituents were detected in the IDW soil sample. Based on the analytical results, the soil cuttings were characterized as non-hazardous and transported for disposal to SoilEx in Chesapeake, Virginia on 19 April 2007. Documentation is included in Appendix E.

3.1.1.3 Monitor Well Elevation Survey

On 23 February 2007, Baldwin & Gregg, Ltd. (Virginia registered land surveyors) surveyed the locations of MW-01 through MW-07. Top of casings and ground surface elevations were surveyed relative to the National Geodetic Vertical Datum of 1929 (NGVD 29).

3.1.2 Groundwater Sampling

Groundwater samples were collected from the seven groundwater monitor wells installed at the site to assess groundwater quality.

3.1.2.1 Groundwater Sampling Methodology

Purging was conducted using low-stress (or low-flow) protocols whereby drawdown is minimized. Each well was purged and using the low-flow submersible bladder pump connected to Teflon®-lined tubing. Water level and field parameter measurements (pH, specific conductivity, temperature, dissolved oxygen (DO), and oxidation-reduction potential [ORP]) were recorded on field data sheets which are included in Appendix B. The pump-tubing assembly was slowly lowered to the approximate midpoint location of the well's screen. The well casing volume of each well was calculated using depth-to-water, well diameter, and the total depth of the well. At least one well volume was removed, and purging continued until stabilization was demonstrated through

obtaining three consecutive measurements of pH +/- 0.1 standard pH units, conductivity +/- 3% micromhos, turbidity +/- 10% NTUs (for turbidity values > 10 NTUs), DO +/- 0.3 mg/L, ORP +/- 10 millivolts (mV), and temperature +/- 10%. Purge water was contained in 55-gallon drums at the site pending proper disposal.

Laboratory samples for analysis of Target Compound List (TCL) VOCs, -SVOCs, -pesticides, -polychlorintated biphenyls (PCBs), Target Analyte List (TAL) metals, and cyanide were then collected in pre-labeled, pre-preserved sample bottles. Bottles were capped appropriately, placed in a resealable plastic bag, and stored in an ice-cooled container prior to shipment to STL

All non-dedicated downhole equipment was decontaminated after use in each well. Purge water was contained in 55-gallon drums and transported to the on-site staging area, pending receipt of analytical characterization and transport and discharge to the active WFF WWTP disposal as discussed in Section 3.1.1.1.

3.1.2.2 Field Quality Assurance/Quality Control Samples

One equipment rinsate blank (Rinsate 4), two duplicates, and two trip blanks (TB-4 and TB-5) were collected during the groundwater sampling event as quality assurance/quality control (QA/QC) measures. The rinsate blank, collected by pouring reagent water over the bladder pump, was analyzed for parameters identical to groundwater samples. Trip blanks, provided by the laboratory, were stored with collected samples throughout the sampling event, and shipped with the samples to STL for VOC analysis. Two duplicate samples, one field (MW-03-D) and one blind (MW-20), were collected with the sample collected for MW-03. The duplicate samples were analyzed for parameters identical to the original sample.

Analytical results for the QA/QC samples are summarized in Table 3-3, and analytical reports are included in Appendix D. Toluene was detected in the rinsate blank sample at 3.9 micrograms per liter (ug/L). No other organic constituents were detected in the rinse blank sample. Toluene was detected in only one groundwater sample (MW-03) and its duplicates at estimated concentrations (between 0.64 and 0.77 ug/L). The low-level detection of toluene may be the

result of sample handling or conditions in the field. Trace levels of metals (aluminum calcium, potassium, magnesium, and zinc) were detected in the rinsate blank sample. Calcium was the only metal reported above the detection limit in the rinsate blank sample. All of these metals are naturally occurring in water and soil. The calcium detected in Rinsate 4 may be the result of minor residue from groundwater sampling. All groundwater samples contained high concentrations of calcium (e.g., 10,000 ug/L or greater) relative to the rinsate blank.

One trip blank (TB-4) contained methylene chloride at an estimated concentration of 0.57 ug/L. Methylene chloride was detected at similar estimated levels in only one groundwater sample (MW-03) and its associated duplicates. Methylene chloride is commonly used in laboratories and these detections likely represent laboratory contamination. No other constituents were detected in the trip blank samples. Duplicate results were within acceptable relative percent differences (<15%).

3.1.2.3 Groundwater Analytical Results

A total of seven groundwater samples (excluding QA/QC samples) were collected on 22 and 23 February 2007. All groundwater samples were submitted to STL and analyzed for TCL VOCs, -SVOCs, -pesticides, -PCBs, TAL metals, and cyanide. Chain-of-custody records are included in Appendix B. Laboratory analytical reports and validation reports are included in Appendix D. The complete laboratory analytical reports are presented in Appendix D.

Groundwater sample analytical results are summarized in Table 3-4. Analytical results of groundwater samples are compared to EPA MCLs listed in the National Primary Drinking Water Regulations (NPDWR, or primary standards), National Secondary Drinking Water Regulations (NSDWR, or secondary standards), and Virginia's Groundwater Quality Standards (VAGWQS). Region 3 Risk Based Concentrations (RBCs) for tap water are also included for reference.

VOCs

Acetone, methylene chloride, methyl ethyl ketone (MEK), tetrachloroethene (PCE), and toluene were the only VOCs reported in groundwater samples at the WWTP site. Acetone (52 ug/L) and MEK (17 ug/L) were detected only in groundwater sampled from MW-03. Both constituents are commonly used in laboratories. PCE was detected at 4.4 ug/L was detected in the groundwater sampled from upgradient well MW-01, exceeding the tap water RBC of 0.1 ug/L. An estimated concentration of 0.77 ug/L toluene was detected in the groundwater sampled from MW-03. None of the VOC detections exceeded EPA primary or secondary drinking water standards or VAGWQSs. No other VOCs were detected in groundwater sampled from the seven newly installed wells.

SVOCs

Four SVOCs were detected at estimated concentrations in at least one of the groundwater samples collected from the WWTP site. No SVOCs were detected in groundwater sampled from MW-02, MW-04, and MW-05. Bis (2-ethylhexyl) phthalate was detected at an estimated concentration of 1.5 ug/L in groundwater sampled from MW-01 and at an estimated concentration of 1.1 ug/L in groundwater sampled from MW-06. Diethyl phthalate was detected at an estimated concentration of 0.73 ug/L in groundwater sampled from MW-07. Phenol (estimated concentration of 8.6 ug/L) and 3 & 4 methylphenol (estimated concentration of 7.8 ug/L) were detected in groundwater sampled from MW-03. The estimated concentrations of phenol and 3 & 4 methylphenol in MW-03 exceed their respective VAGWQS (1 ug/L for both).

Pesticides and PCBs

No pesticides or PCBs were detected in any of the groundwater samples.

Metals

Metals were detected in all of the groundwater samples. Arsenic, detected at 13 ug/L in groundwater sampled from monitor well MW-03 (former trickling filter location), was the only

metal to exceed its EPA MCL (10 ug/L). Arsenic was detected at 10 ug/L in the groundwater sample collected from MW-05 (downgradient of the WWTP structures). These concentrations exceed the tap water RBC of 0.045 ug/L. It should be noted that all of the detections of arsenic are flagged as biased high based on QC data. Arsenic was not detected in any of the other groundwater samples. Aluminum was detected in all groundwater samples at levels exceeding the EPA secondary drinking water standard (200 ug/L). Aluminum concentrations ranged from 620 ug/L in groundwater sampled from MW-02 (upgradient well) to 2,200 ug/L in groundwater sampled from MW-06 (cross-gradient well). Iron was detected in all groundwater samples at levels exceeding the EPA secondary drinking water standard (300 ug/L) and VAGQWS criterion (300 ug/L) with the exception of upgradient well MW-02. Iron concentrations ranged from 170 ug/L in groundwater sampled from upgradient well MW-02 to 10,000 ug/L in groundwater sampled from the well at the former trickling filter location (MW-03). Manganese was detected at concentrations exceeding the EPA secondary drinking water standard (50 ug/L) and VAGWQS criterion (50 ug/L) in wells MW-03 through MW-06. Manganese concentrations ranged from 34 ug/L in groundwater sampled from MW-01 (upgradient well) to 1,500 ug/L in groundwater sampled from MW-06 (cross-gradient well). The manganese concentration detected in groundwater sampled from MW-06 also exceeded the tap water RBC of 730 ug/L). No other metals were detected at concentrations equal to or exceeding EPA drinking water standards or VAGWQSs.

3.2 Soil/Sediment/Surface Water Sampling Investigation

The soil, sediment, and surface water sampling investigation included advancement of seven soil borings at monitor well installation locations, and collection of eight additional soil samples, two sediment samples, and one surface water sample. Sample locations are shown in Figure 3-1. The purpose of the investigation was to assess these media for impact from previous WWTP activities.

3.2.1 Field Quality Assurance/Quality Control Samples

Analytical results for the QA/QC samples are summarized in Table 3-3 (rinsate and trip blanks) and Table 3-5 (solid duplicates). Analytical reports are included in Appendix D. Rinsate blanks for the soil sampling activities were collected by pouring reagent water over a decontaminated stainless-steel split spoon sampler (Rinsate 1), hand auger bucket (Rinsate 2), and bowl (Rinsate 3) and analyzed for parameters identical to soil samples. Trip blanks (TB-1, TB-2, and TB-3), provided by the laboratory, were stored with collected samples throughout the sampling event, and shipped with the samples to STL for VOC analysis.

Four duplicate samples, two field (SS-1D, SS-5D) and two blind (SS-6, and SS-7), were collected with soil samples SS-1 and SS-5. The duplicate samples were analyzed for parameters identical to the original sample. Duplicate results were within acceptable relative percent differences (<21%).

3.2.2 Soil Boring Samples

Soil boring samples were collected during monitor well installation to evaluate surface and subsurface soils in monitor well areas and assess for potential leaching of contaminants from soil.

3.2.2.1 Soil Boring Sampling Methodology

During monitor well installation split-spoon samples were collected at 2-foot intervals until first saturation. During drilling activities, a photo ionization detector (PID) was used to screen soils. Information collected during the logging of these soils is included in boring logs in Appendix C.

Soil samples were collected from 0.0-to-0.5 feet; 0.5-to-2.0 feet, and immediately above the water table, with the exceptions of the borings advanced at MW-03 and MW-07. At the MW-03 trickling filter location the soils to 4 feet were not collected since original soils were previously removed and clean fill material emplaced. At the MW-07 location the water table was too shallow for collection of an additional deep subsurface sample.

An EnCore® sampler was used to collect the soil sample for TCL VOC analysis. After this sample was collected, the rest of the sample was homogenized (mixed) and then introduced into the individual sample containers for TCL-SVOC, -pesticide/PCB, TAL metals and cyanide analyses. Laboratory prepared glass containers with Teflon®-lined caps provided under custody seal from the laboratory were used to collect and store each individual sample. Following collection of a sample, each jar was sealed in a plastic bag and stored on ice for shipment under chain-of-custody procedures to STL.

3.2.2.2 Soil Boring Analytical Results

A total of 18 soil boring samples were collected on 19 through 21 February 2007. All soil samples were submitted to STL and analyzed for TCL-VOCs, -SVOCs, -pesticides, -PCBs, TAL metals, and cyanide. Chain-of-custody records are included in Appendix B. Laboratory analytical reports and validation reports are included in Appendix D. Soil sample analytical results are summarized in Table 3-6.

VOCs

Acetone, MEK, methyl isobutyl ketone (MIBK), toluene, and xylenes were the only VOCs reported in soil boring samples at the WWTP site. Acetone was detected in all soil boring samples at concentrations ranging from 9.5 µg/kg (an estimated concentration) in the 2 to 4 foot sample collected from the MW-06 location, to 310 µg/kg in the surface sample (0-0.5 ft bgs) collected from the MW-01 location. MEK was detected in nine of the 18 soil boring samples. Detected values ranged from estimated concentration of 4.6 ug/kg in soil sampled from 0.5 to 2 ft bgs at the MW-04 location, to 37 ug/kg in soil sampled from 2 to 4 ft bgs at the MW-03 location. MIBK was also detected in nine of the 18 soil boring samples. Detected values ranged from an estimated concentration of 5.1 ug/kg in soil sampled from 0 to 0.5 ft bgs at the MW-01 location, to 340 ug/kg in soil sampled from 0 to 0.5 ft bgs at the MW-02 location. Toluene was detected at an estimated concentration of 2.3 ug/kg in soil sampled from 0 to 0.5 ft bgs at the MW-01 location and at the same concentration in soil sampled from 4 to 6 ft bgs at the MW-03 location. Xylenes were detected at 9.3 µg/kg in soil sampled from 4 to 6 ft bgs at the MW-03

location. No other VOCs were detected in soil sampled from the seven monitor well locations. None of the VOCs detected in soil boring samples exceeded their respective EPA Region 3 RBCs for direct contact exposure or EPA Region 3 soil-to-groundwater migration Soil Screening Levels (SSLs).

SVOCs

No SVOCs were detected in any of the soil boring samples.

Pesticides and PCBs

Three pesticides were detected in the soil boring samples. 4,4'-dichlorodiphenyldichloroethane (DDD), 4,4'-dichlorodiphenyldichloroethylene (DDE), and 4,4'-dichlorodiphenyltrichloroethane (DDT) were detected only at the 0 to 0.5-foot sampling interval for all soil boring locations, with the exception of the MW-06 location, where at least one of these pesticides was also detected at 0.5 to 2 ft bgs and 2 to 4 ft bgs. 4,4'-DDD was detected only in soils sampled at the MW-06 and MW-07 locations, at estimated concentrations of 0.72 ug/kg and 0.78 ug/kg, respectively. 4,4'-DDE was detected in soils sampled from all of the monitor well locations, at concentrations ranging from an estimated concentration of 0.56 ug/kg in surface soil sampled at the MW-05 location to 14 ug/kg in surface soil sampled at the MW-06 location. 4,4'-DDT was detected in surface soils sampled at locations MW-02, MW-04, MW-06, and MW-07 at concentrations ranging from an estimated concentration of 0.79 ug/kg (MW-04 location) to 8.0 ug/kg at the MW-06 location. No other pesticides were detected in soil sampled from the seven monitor well locations. None of the pesticides detected in soil boring samples exceeded RBCs or SSLs.

No PCBs were detected in any of the soil boring samples.

Metals

Metals were detected in all of the soil boring samples. Arsenic, chromium, and manganese were the only metals detected at concentrations exceeding their respective RBCs and SSLs. Arsenic was detected in soil samples collected from all monitor well locations excepting MW-03.

Arsenic concentrations ranged from an estimated 0.76 mg/kg in the 2 to 4 foot sample collected at the MW-05 location to 5.4 mg/kg detected in the 0 to 0.5 foot sample collected at the MW-07 location. These arsenic concentrations exceed the soil-to-groundwater migration SSL of 0.0013 milligrams per kilogram (mg/kg) and the RBC for direct contact in a residential zone of 0.43 mg/kg. The RBC for arsenic direct contact in an industrial zone (1.9 mg/kg) was exceeded at all locations excepting MW-03 and MW-06. Chromium was detected in soil samples collected from all monitor well locations. Total chromium concentrations ranged from an estimated 1.6 mg/kg in the 2 to 4 foot sample collected at the MW-06 location to 13 mg/kg in the 0 to 0.5 foot sample at the MW-07 location. These chromium concentrations exceed the soil-to-groundwater migration SSL for hexavalent chromium (chromium VI) (2.1 mg/kg) in all samples at all depths with the exception of MW-06 where only the 0 to 0.5 foot concentration exceeds the SSL. However, none of the chromium concentrations detected in soil exceed the trivalent chromium (chromium III) SSL (99,000,000 mg/kg). Because no significant levels of chromium are detected in groundwater samples (see Table 3-4), it is likely that the chromium detected in soils is naturally occurring chromium III, which is largely immobile and has limited water solubility. Manganese was detected in soil samples collected from all monitor well locations. Manganese concentrations ranged from an 5.5 mg/kg in the 2 to 4 foot sample collected at the MW-06 location to 320 mg/kg in the 0 to 0.5 foot sample at the MW-01 location. Manganese was detected at levels exceeding the soil-to-groundwater migration SSL for manganese in all locations in at least one of the sample depths collected, with the exception of location MW-03, where a 4 to 6 feet was the only depth sampled. No other metals were detected at concentrations exceeding their respective RBCs or SSLs.

3.2.3 Soil Samples

Soil samples were collected from the former transformer location (SS-1), each of four possible sludge piles (SS-2 through SS-5), at the discharge point of the outflow pipe (SS-8), and from below a rocky/gravely layer observed at the base of each of two sludge drying beds (SS-9 and SS-10). Soil samples were collected to evaluate these potential source areas for contamination.

3.2.3.1 Soil Sampling Methodology

Soil was composited from 0 to 2 feet at five locations within each possible sludge pile and below the rocky/gravely layer observed at the base of the sludge drying beds, and from four locations around the former transformer location. The suspected sludge piles were hand augered to visually inspect for signs of sludge material similar to the material observed in the sludge drying beds, but no similar material was found.

An EnCore® sampler was used to collect the initial soil sample collected from each of these locations for TCL VOC analysis. After this sample was collected, the rest of the sample was homogenized (mixed) and then introduced into the individual sample containers for TCL-SVOC, -pesticide/PCB, TAL metals and cyanide analyses. Laboratory prepared glass containers with Teflon®-lined caps provided under custody seal from the laboratory were used to collect and store each individual sample. Following collection of a sample, each jar was sealed in a plastic bag and stored on ice for shipment under chain-of-custody procedures to STL.

3.2.3.2 Soil Analytical Results

A total of 8 soil samples were collected on 20 through 23 February 2007. All soil samples were submitted to STL, and analyzed for TCL-VOCs, -SVOCs, -pesticides, -PCBs, TAL metals, and cyanide. Chain-of-custody records are included in Appendix B. Laboratory analytical reports and validation reports are included in Appendix D. Soil sample analytical results are summarized in Table 3-7.

VOCs

Acetone, MEK, and PCE were the only VOCs reported in soil samples at the WWTP site. Acetone was detected at 210 ug/kg, and MEK was detected at an estimated concentration of 19 ug/kg in the soil sample collected from the former transformer location. Acetone and MEK were detected in soil sampled from two of the suspect sludge piles (SS-2 and SS-3). Acetone was detected at 50 ug/kg and 57 ug/kg, respectively, and MEK was detected at estimated

concentrations of 7.3 and 7.1 ug/kg, respectively. Acetone and MEK were also detected in the soil sample collected from the discharge point of the overflow pipe. Acetone was detected at 120 ug/kg and MEK was detected at an estimated concentration of 14 ug/kg. Acetone and MEK concentrations did not exceed their respective RBCs or SSLs in any of the soil samples. These constituents are used in laboratory procedures and detections may be the result of laboratory contamination. PCE was detected in the soil sample collected from one of the sludge drying beds (SS-9) at a concentration of 5.0 ug/kg, exceeding the soil-to-groundwater migration SSL of 0.23 ug/kg. No other VOCs were detected in soil samples.

SVOCs

No SVOCs were detected in any of the soil boring samples.

Pesticides and PCBs

Pesticides were not detected in two of the suspect sludge pile locations (SS-2 and SS-3) or at the discharge location of the overflow pipe (SS-8). Estimated concentrations of 4,4'-DDE were the only pesticide detections in the two remaining suspect sludge pile locations (SS-4 and SS-5) and in one of the sludge drying bed locations (SS-9). 4,4'-DDE concentrations reported for samples SS-4 and SS-5 were 0.42 ug/kg and 0.41 ug/kg, respectively. SS-9 contained 4,4'-DDE at an estimated concentration of 0.77 ug/kg. 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were detected at estimated concentrations in the soil sample collected from the second sludge drying bed location (SS-10). 4,4'-DDD and 4,4'-DDT were detected at estimated concentrations of 3.8 ug/kg and 4,4'-DDE was detected at an estimated concentration of 3.2 ug/kg. None of these concentrations exceed the respective RBCs. No PCBs were detected in these soil samples

Four pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and dieldrin) were detected in the soil sample collected from the former transformer location (SS-1). 4,4'-DDD, 4,4'-DDE and 4,4'-DDT were detected at 12 ug/kg, an estimated concentration 6 ug/kg, and 20 ug/kg, respectively. Dieldrin was detected at an estimated concentration of 0.92 ug/kg, exceeding the soil-to-groundwater migration SSL of 0.11 ug/kg. One PCB (Aroclor 1260) was detected in soil sample SS-1, collected

from the former transformer location. Aroclor 1260 was detected at 280 ug/kg, below its RBCs. No other pesticides or PCBs were detected in the sample collected from the former transformer location.

Metals

Metals were detected in all of the soil samples. Antimony, arsenic, chromium, and manganese were detected at concentrations exceeding their respective SSLs. Arsenic was the only metal detected at concentrations also exceeding its RBCs. Antimony was detected at 2.8 mg/kg in soil sampled from the former transformer area, exceeding the soil-to-groundwater migration SSL of 0.66 mg/kg. No other soil samples contained antimony at levels above the reporting limit. Arsenic was detected in soil samples collected from all soil locations at concentrations exceeding the soil-to-groundwater migration SSL (0.0013 mg/kg) and the RBC for direct contact exposure in a residential scenario (0.43 mg/kg). All samples, with the exception of SS-10, collected from one of the sludge drying beds, also exceeded the arsenic direct contact exposure RBC in an industrial scenario (1. 9 mg/kg). Arsenic concentrations ranged from 1.3 mg/kg (SS-10) to 4.8 mg/kg (SS-8, discharge location of the overflow pipe). Total chromium was detected in soil samples collected from all soil locations at concentrations exceeding the soil-to-groundwater migration SSL for chromium VI (2.1 mg/kg). Chromium concentrations ranged from 4.7 mg/kg, in soil collected from one of the suspect sludge piles (SS-4) to 12 mg/kg, in soil collected from the discharge location of the overflow pipe (SS-8). None of the chromium concentrations detected in soil exceed the chromium III SSL (99,000,000 mg/kg). Because no significant levels of chromium are detected in groundwater samples (see Table 3-4), it is likely that the chromium detected in soils is naturally occurring chromium III, which is largely immobile and has limited water solubility. Manganese was detected at concentrations exceeding its soil-to-groundwater migration SSL of 48 mg/kg in five of the eight soil sample locations. Manganese concentrations ranged from 15 mg/kg, in soil collected from the sludge drying beds (SS-9 and SS-10), to 140 mg/kg, in soil collected from one of the suspect sludge piles (SS-5). No other metals were detected at concentrations exceeding their respective RBCs or SSLs.

3.2.4 Sediment and Surface Water Samples

Two sediment samples were collected from the intermittent stream. One sediment sample was collected from the closest point beneath the effluent outfall (SD-2), and a second sediment sample was collected at the confluence of the intermittent streams downstream of the outfall (SD-1). A surface water sample (SW-1), co-located with the sediment sample collected at SD-1, was collected from the sediment location at the confluence of the intermittent streams downstream of the outfall. The effluent outfall pipe was verified by digging to expose the piping. Surface water and sediment samples were collected to assess for potential impact from the outfall.

3.2.4.1 Sediment and Surface Water Sampling Methodology

Sediment samples were collected at 0-3 inches bgs at two locations in the intermittent stream. Each sediment sample was collected using dedicated stainless-steel scoops and bowls decontaminated prior to use. Water samples were collected by lowering a dedicated container into the water to collect the sample.

An EnCore® sampler was used to collect the TCL VOC portion of the sediment samples. After this sample was collected, the rest of the sample was homogenized (mixed) and then introduced into the individual sample containers for TCL-SVOC, -pesticide/PCB, TAL metals and cyanide analyses. Laboratory prepared glass containers with Teflon®-lined caps provided under custody seal from the laboratory were used to collect and store each individual sample. Following collection of a sample, each jar was sealed in a plastic bag and stored on ice for shipment under chain-of-custody procedures to STL.

3.2.4.2 Sediment and Surface Water Analytical Results

Two sediment samples and one surface water samples were collected on 21 February 2007. All samples were submitted to STL and analyzed for TCL-VOCs, -SVOCs, -pesticides, -PCBs, TAL metals, and cyanide. Chain-of-custody records are included in Appendix B. Laboratory

analytical reports and validation reports are included in Appendix D. Sediment and surface water sample analytical results are summarized in Table 3-8.

VOCs

Acetone, chloromethane, and MEK were the only VOCs reported in sediment and surface water samples. Acetone was detected in sediment sample SD-1 at an estimated concentration of 3.6 ug/kg and at 230 ug/kg in sediment sample SD-2. Acetone was not detected in the surface water sample. Chloromethane was detected at an estimated concentration of 0.53 ug/L in the surface water sample. Chloromethane was not detected in the sediment samples. MEK was detected at an estimated concentration of 16 ug/kg in sediment sample SD-2. Acetone, chloromethane, and MEK are also constituents used in laboratory procedures. Detections may be the result of laboratory contamination. No other VOCs were detected in sediment or surface water samples.

SVOCs

No SVOCs were detected in any of the sediment or surface water samples.

Pesticides and PCBs

4,4'-DDE and 4,4'-DDT were detected at estimated concentrations in sediment samples SD-1 and SD-2. Concentrations of 4,4'-DDE were 1.8 ug/kg and 2.6 ug/kg in samples SD-1 and SD-02, respectively. Concentrations of 4,4'-DDT were 0.77 ug/kg and 1.6 ug/kg in samples SD-1 and SD-2, respectively. An estimated concentration of 1.3 ug/kg 4,4'-DDE was detected in sediment sample SD-2. No other pesticides were detected in sediment samples. No pesticides were detected in the surface water sample.

No PCBs were detected in surface water or sediment samples.

Metals

Metals were detected in all of the sediment and surface water samples. Sediment contamination criteria have not been established, but when comparing metals concentrations in sediment to soil RBCs, arsenic is the only metal to exceed the RBCs for direct contact exposure. Arsenic concentrations exceeded the RBC for arsenic in a residential scenario (0.43 mg/kg) in both sediment samples (WFF1-SD1 and WFF1-SD2), and in an industrial scenario (1.9 mg/kg) in sediment sample WFF1-SD2 (2.7 mg/kg), the closest sampling location to the effluent outfall. Arsenic concentrations in both sediment samples fall within the range of arsenic levels in soil provided in the Background Soil and Groundwater Report for the Main Base (TetraTech/NUS, 2004) (0.96 to 3.1 mg/kg). Iron (7,200 ug/L) was detected at a concentration exceeding the Virginia Surface Water Quality Standard (VASWQS) of 300 ug/L in the surface water sample. No other metal concentrations exceeded the respective VASWQS.

3.3 Sludge and Wastewater Sampling

Three sludge samples and one wastewater sample were collected at the WWTP site. One sludge sample (SL-01) and one wastewater sample (WW-01) were collected from the primary settling tank. Very little sludge and very little wastewater was observed to be present at the settling tank location. It should be noted that the settling tank is not covered and is open to the outside. As a result, the tank continues to receive rainwater and material from outside the clarifier tank. Five-point composite samples were collected from each of the two sludge drying beds (SL-02 and SL-03). The sludge drying beds were observed to contain approximately 6 inches of sludge underlain by approximately 1.5 feet of gravel and rock which, in turn, overlie what appears to be native soil. No sludge was observed in the pump house wet well location, so no sample was collected from this location. Samples were collected to evaluate these areas for residual materials derived from the WWTP processes.

3.3.1 Sludge and Wastewater Sampling Methodology

Stainless-steel augers or scoops were used to collect sludge and wastewater directly from the primary settling tank. Samples from the sludge drying beds were composited from five points within each bed. Laboratory prepared glass containers with Teflon®-lined caps provided under custody seal from the laboratory were used to collect and store each individual sample. Following collection of a sample, each jar was sealed in a plastic bag and stored on ice for shipment under chain-of-custody procedures to STL.

3.3.2 Sludge and Wastewater Analytical Results

Three sludge samples and one wastewater sample were collected on 21 through 22 February 2007. All samples were submitted to STL, and analyzed for TCL-VOCs, -SVOCs, -pesticides, -PCBs, TAL metals, and cyanide. Chain-of-custody records are included in Appendix B. Laboratory analytical reports and validation reports are included in Appendix D. Sludge and wastewater sample analytical results are summarized in Table 3-9.

VOCs

Trace acetone (an estimated concentration of 8.9 ug/L) and MEK (an estimated concentration of 3.8 ug/L) were reported in the wastewater sample collected from the primary settling tank (WW-01). No other VOCs were detected in this sample. The sludge sample collected from this location (SL-01) contained primarily trace levels of a number of VOCs at estimated concentrations, including acetone (630 ug/kg), 2-hexanone (130 ug/kg), MEK (210 ug/kg), MIBK (91 ug/kg), and 1,1,2,2-tetrachloroethane (29 ug/kg). In addition, sludge sample SL-01 contained toluene at 1,200 ug/kg. No other VOCs were detected in the sludge sample collected from the primary settling tank.

Sludge samples collected from the sludge drying beds (SL-02 and SL03) contained acetone, MEK, PCE and toluene. SL-02 contained acetone at 880 ug/kg and MEK at 92 ug/kg, and estimated concentrations of PCE (6.1 ug/kg) and toluene (7.4 ug/kg). Sludge sample SL-03

contained only acetone at an estimated concentration of 75 ug/kg. No other VOCs were detected in sludge or wastewater samples.

SVOCs

A number of SVOCs were detected in sludge and wastewater samples at estimated concentrations. The SL-01 sludge sample contained chrysene (4,700 ug/kg), fluoranthene (9,000 ug/kg), and pyrene (6,300 ug/kg). The SL-02 sludge sample contained chrysene at 570 mg/kg. All other detections of SVOCs were estimated concentrations.

Pesticides and PCBs

No PCBs were detected in the sludge or wastewater samples. No pesticides were detected in the wastewater sample. Relatively low levels of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT (61 ug/kg, estimated concentrations of 30 ug/kg and 11 ug/kg, respectively) were detected in the sludge sample collected from the primary settling tank (SL-01). Levels of 4'-DDD, 4,4'-DDE and 4,4'-DDT ranging from 910 ug/kg to 1,500 ug/kg were detected in the sludge samples collected from the sludge drying beds (SL-02 and SL-03). Dieldrin was also detected in samples SL-02 and SL-03, at estimated concentrations of 6 ug/kg and 5.6 ug/kg, respectively. No other pesticides were detected in the sludge samples..

Metals

Metals were detected in all of the sludge and wastewater samples. Levels in the wastewater (WW-01) and sludge (SL-01) samples collected from the primary settling tank are comparable to other water and soil samples collected as part of the SI field activities. Levels of antimony, chromium, copper, lead, and silver are elevated in the sludge samples collected from the sludge drying beds (SL-02 and SL-03) relative to other soil and sediment samples collected at the site.

4.0 HUMAN HEALTH SCREENING LEVEL RISK ASSESSMENT

4.1 Introduction

The following presents the preliminary human health risk screenings at the WWTP site. Newly collected data, as described in Section 3 of this report, is included in these assessments. The media being evaluated include the following: soil, sludge, sediment, groundwater, and surface water. A conservative screening was conducted as presented below.

4.2 Data Usability and Data Validation

Data quality can be evaluated in five general categories: data quality objectives (DQOs), documentation, analytical methods/detection limits (DLs), data quality indicators (DQIs), and data validation. The DQOs refer to whether the type and scope of the data collection and analyses are applicable for risk assessment purposes. Documentation ensures that the data collection, handling, transport, and analysis are sufficiently recorded and in compliance with the DQOs. The analytical methods/DLs are reviewed to confirm that the chemical analyses performed are appropriate for use in the risk assessment. Factors evaluated as part of the DQIs include completeness, comparability, precision, accuracy, representativeness, and sensitivity. Data validation includes reviewing and evaluating the chemical data and can be performed to meet varying levels. Available data will be reviewed for quality and usability prior to inclusion in the SI in accordance with applicable project sampling and quality assurance plans.

4.2.1 Guidelines for Data Reduction

The following guidelines for data reduction were to produce the data summaries for each medium at the Site and background location. These approaches are consistent with *Risk Assessment Guidance for Superfund (RAGS),* Volume 1, *Human Health Evaluation Manual (Part A)* (EPA, 1989) and EPA Region 3 guidance for risk assessment (EPA, 1991):

- If a chemical is not positively identified in any sample for a given medium because it is reported as a non-detect (indicated by a "U" qualifier), because it was present as a result of blank contamination (indicated by a "B" qualifier), or because it was rejected by the data validator (indicated by an "R" qualifier), it was not addressed for that medium;

- Data with "J" qualifiers were assumed to be positive identifications for those media. "J" indicates that the numerical value is an estimated concentration (i.e., it is reported below the minimum confident sample quantitation limit);

- "U" qualified data represent non-detect samples for the chemical evaluated. A value of one-half the sample quantitation limit (SQL) was used for non-detect samples in subsequent calculations (i.e., the 95% upper-confidence limit of the mean [95% UCL]); and

- If a sample duplicate was collected and analyzed, the average of the two reported concentrations was used for subsequent calculations unless there was a greater than 50% difference in soil, sediment, and tissue concentrations and a 30% difference in water concentrations, in which case the higher of the two concentrations was used. In the case of a detected sample and a non-detect duplicate, the detected concentration was carried through subsequent calculations.

4.3 Human Health Screening

4.3.1 Comparison to Screening Criteria

The potential for site contaminant concentrations in soil, sludge, sediment, surface water, and groundwater to be hazardous to human health will be determined by comparing the maximum detected concentrations for each chemical in each medium to medium-specific human health benchmarks calculated based on default exposure assumptions. Separate screenings will be performed for each of the data sets indicated above. The benchmarks used for screening will be the EPA Region 3 RBCs (EPA, 2007). A medium will be determined to be potentially hazardous to human health if the maximum concentration of any chemical in a given medium exceeds the appropriate RBC. EPA Region 3 has developed RBCs for several media, including soil and tap water. To determine if any chemicals in the soil are detected at concentrations that may be hazardous to human health, the maximum concentrations in the surface soil and aggregate soil datasets will be compared to the soil RBCs based on residential exposure parameters. Currently, there are no RBCs for sediment exposure. Therefore, in order to determine if any chemicals in sediments are detected at concentrations that may be hazardous to human health, maximum

concentrations in sediment will be compared to the residential soil RBCs multiplied by a factor of 10.

To determine if any chemicals in the groundwater are detected at concentrations that may be hazardous to human health, the maximum concentrations will be evaluated against RBCs for tap water, VAGWQSs, and EPA National Primary and Secondary Drinking Water Regulations. Currently, there are no RBCs for surface water exposure. Therefore, in order to determine if any chemicals in the surface water are detected at concentrations that may be hazardous to human health, the maximum detected concentrations will be compared to the tap water RBCs multiplied by a factor of 10.

For soil and groundwater screening, a target hazard quotient (THQ) for noncancer-based RBCs of 0.1 will be used and a target risk (TR) for cancer-based RBCs of one-in-a-million (expressed as 1E-06) will be used. For the sediment and surface water screening, the THQ and TR will be 10 times the soil and groundwater values or, 1.0 and 1E-05, respectively. In cases where a chemical has both a cancer and noncancer RBC, the lower (i.e., more stringent) of the two values will be used for screening.

If the maximum medium-specific concentration for all chemicals is less than their respective RBCs, no further human health evaluation is needed. Metals that exceed their RBCs will also be compared with background concentrations, where available.

4.3.2 Comparison to Background Concentrations

Certain chemicals detected at the site may be naturally occurring or regionally anthropogenic. Soils in the vicinity of the WWTP site have been classified as Molena loamy sand (MoD). For WWTP-specific groundwater, soil, sludge, and sediment data sets with at least 10 samples, statistical comparisons with the appropriate background data sets will be performed using the background data and methodologies presented in the NASA (TetraTech, 2004) background report. For data sets that have less than 10 samples, simple comparisons will be performed and include a comparison of the Site and background maximum detected concentrations and

arithmetic means. These approaches are consistent with current guidance as presented in EPA's *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (EPA, 2002), among others. While a comparison to background concentrations is not a criterion for eliminating media from evaluation, it will be conducted to provide information for management decisions. WWTP surface water data will not be compared to any background data set.

4.4 Human Health Screening Process and Results

A selection process will be conducted to identify a subset of chemicals that were detected in the various media at the WWTP site at levels that could pose a potential risk to exposed human receptors. The criteria that will be used to determine these chemicals include:

- A comparison of maximum concentrations to EPA Region 3 RBCs (EPA, 2007), and
- Comparisons to background data for informational purposes.

In addition, detected metals considered to be essential nutrients will be eliminated from consideration as a potential risk. If a chemical is not positively detected in any samples for a given medium, it will not be evaluated for that medium.

4.4.1 Screening Results

Soils

Table 4-1 presents the data summary and screening results for the aggregate soil at the WWTP site. The following analytes along with their ratios of exceedance of their RBC values were:

- Benzo(a)pyrene – 1.6
- Dibenz(a,h)anthracene – 2.3
- Aluminum – 1.7
- Antimony – 1.0
- Arsenic – 13
- Iron – 1.8

- Lead – 1.2
- Manganese – 2.1
- Vanadium – 3.1

The data suggest that the potential impacts of benzo(a)pyrene, dibenz(a,h)anthracene, aluminum, antimony, iron, lead, and manganese on soil are modest, whereas arsenic and vanadium are more significant. A qualitative comparison between arsenic and vanadium site soils and background soils is discussed in Section 4.4.2.

Sludge

Table 4-2 presents the data summary and screening results for the sludge samples at the WWTP site. The following 15 analytes along with their ratios of exceedance of their RBC values were:

- Benz(a)anthracene – 9.6
- Benzo(a)pyrene – 41
- Benzo(b)fluoranthene – 22
- Benzo(k)fluoranthene – 1.1
- Dibenz(a,h)anthracene – 3.5
- Indeno(1,2,3-cd)pyrene – 6.4
- Antimony – 6.4
- Arsenic – 7.5
- Chromium – 2.8
- Iron – 2.7
- Lead – 1.3
- Manganese – 1.7
- Mercury – 36
- Silver – 3.3
- Vanadium – 2.3

The potential impacts of benzo(k)fluoranthene, chromium, iron, lead, manganese, and vanadium on sludge appear to be minimal, whereas impacts from the remaining nine chemicals are more significant. Benzo(a)pyrene, mercury, and benzo(b)fluoranthene had the highest exceedances with ratios of 41, 36, and 22, respectively. A qualitative comparison between antimony, arsenic, mercury, and silver site soils and background soils is discussed in Section 4.4.2.

Sediment

Table 4-3 presents the data summary and screening results for the sediment at the WWTP site. All samples were below their respective benchmarks, therefore this medium was eliminated from further evaluation

Groundwater

Table 4-4 presents the data summary and screening results for the groundwater at the WWTP site. Seven analytes exceeded their benchmark. The ratios of exceedance of their RBC values were:

- 2,4-Dimethylphenol – 1.4
- PCE – 43
- Aluminum – 11
- Arsenic – 336
- Chromium – 1.6
- Iron – 37
- Manganese – 30

The data suggest that the potential impacts of 2,4-dimethyphenol and chromium on groundwater are modest, whereas the other five analytes were more significant. Although, PCE exceeded its RBC by a ratio of 43, it was detected in only one of the seven samples. A qualitative comparison between aluminum, arsenic, iron, and manganese site soils and background soils is discussed in Section 4.4.2.

Surface Water

Table 4-5 presents the data summary and screening results for surface water at the WWTP site. There were only two surface water samples, one was collected at the confluence of the intermittent streams downstream of the outfall, and the other was collected from the primary settling tank (wastewater sample). Very little wastewater was observed to be present at the settling tank location. Only lead exceeded its RBC with a ratio of 1.9. This exceedance suggests

that the potential impacts on surface water are modest and is noteworthy to point out that it is based on one detected occurrence of 29 µg/L.

4.4.2 Qualitative Background Soil, Sludge, and Groundwater Comparison

A qualitative comparison between site soil, sludge, and groundwater with background soil and groundwater was performed for each of the metals identified in Section 4.2.1 that had maximum detected concentrations greater than their respective benchmarks. Since no analytes exceeded their respective sediment benchmarks, a background comparison was not performed for sediment.

Soils

The results of the qualitative comparison between site soil with background soil are presented in Table 4-6. Seven metals exceeded their RBCs in the soil screen (aluminum, antimony, arsenic, iron, lead, manganese, and vanadium). With the exception of arsenic and vanadium, the ratio of RBC exceedances were all below 3.0 and considered not cause for concern. The ratio of RBC exceedances for arsenic and vanadium were 13 and 3.1, respectively. Inspection of the background soils data show that arsenic and vanadium background means are greater than site means. Therefore, the potential human health risk associated with these metals may not be attributable to previous site activities, but rather may be due to naturally occurring concentrations of these metals in the soil.

Sludge

The results of the qualitative comparison between site sludge with background surface soil (TetraTech/NUS, 2004) are presented in Table 4-7. Nine metals exceeded their RBCs in the sludge screen (antimony, arsenic, chromium, iron, lead, manganese, mercury, silver, and vanadium). Chromium, iron, lead, manganese, and vanadium all had ratio of RBC exceedances below 3.0 and considered not a cause for human health concern. The ratio of RBC exceedances for antimony, arsenic, mercury, and silver were 6.4, 7.5, 36, and 3.3, respectively. Antimony was

not detected in background sludge and therefore no comparison could be made. Inspection of the background soils data show that the arsenic background mean is greater than the site mean. Therefore, the potential human health risk associated with arsenic may not be attributable to previous site activities, but rather may be due to naturally occurring concentrations in the sludge. Mercury and silver were both greater than background.

Groundwater

The results of the qualitative comparison between site groundwater with background groundwater are presented in Table 4-8. Five metals exceeded their RBCs in the groundwater screen (aluminum, arsenic, chromium, iron, and manganese). Chromium had a ratio of exceedances of 1.6, which is considered not cause for human health concern. The ratio of exceedances for aluminum, arsenic, iron, and manganese were 11, 336, 37, and 30, respectively. Inspection of the background soils data show that aluminum and arsenic site maximum detected concentrations are greater than the maximum background concentrations by ratios of 1.1 and 5, respectively. Furthermore, arsenic was only detected in 2 of the 7 groundwater samples. Neither ratio is remarkably high but further sampling may be needed to determine the extent of groundwater contamination. Both iron and manganese had background maximum concentrations greater than site maximum concentrations.

4.5 Conclusions

Soils at the WWTP site do not appear to be at levels that could pose a potential risk to exposed human receptors. All exceedances were relatively low and arsenic site data was qualitatively similar to background data as the background mean was greater than the site mean. Sludge at the WWTP site had the most exceedances of all five media. Six polycyclic nuclear hydrocarbons (PAH) and nine metals exceeded the soil benchmarks. Consequently, there may be a potential risk to human health receptors from sludge due to these PAHs and metals.

Although, the groundwater data at the WWTP site had several high RBC exceedances, they were in some cases based on few detects and few samples. A further in-depth analysis might be warranted to determine if there is a potential risk to human health receptors.

Two sediment and two surface water samples were collected and all but one analyte were below their respective benchmarks. Lead exceeded its surface water action level in one sample by a factor of 1.9.

In conclusion, this preliminary screening suggests that soil, sediment, and surface water do not pose a potential risk to human health receptors, whereas sludge and groundwater may pose a potential risk to human health receptors.

5.0 ECOLOGICAL SCREENING

5.1 Introduction

A screening level ecological risk assessment (SLERA) was performed to evaluate the actual or potential ecological effects from exposures to the contaminants at the WWTP site. Detailed descriptions of the approach and methodologies used in this assessment were initially provided in the *Site Investigation Work Plan for the Old Wastewater Treatment Plant* dated January 2007 (WESTON, 2007).

5.1.1 Ecological Site Description

The WWTP site is located on the Main Base Area of WFF in Accomack County, Virginia. The WWTP consists of three cinder-block and concrete structures (control/pump house, process tanks [clarifiers], and sludge drying beds). Potential sources of contamination include mounded material identified in previous investigations as residual sludge piles, located approximately 150 to 200 feet north of the WWTP facility buildings. The sludge drying beds may contain residual sludge materials associated with former WWTP activities.

Currently, the WWTP site is an abandoned area contained within the Main Base of WFF, which functions as an industrial launch facility and airport. The WWTP site is not expected to be developed for future use given its location immediately adjacent to the principal runways for WFF. WFF is expected to continue operation as a launch facility and airport. Virginia's goal is to establish WFF as a major spaceport supports this assertion. Closure of the facility is unlikely based on reasons related to orbital trajectory and economics that can be achieved from launches at the WFF latitude which cannot be achieved at facilities elsewhere.

There does not appear to be regular activity at the WWTP site with the exception of periodic maintenance along Runways 10-28 and 17-35 which lie adjacent to the site. Presently, there is not residential housing or commercial development located in close proximity.

5.1.1.1 Habitat Identification

At the WWTP site, forested areas dominated by overstories of sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum)*), black cherry (*Prunus serotina*) and loblolly pines (*Pinus taeda)*, and understories of greenbriar (*Smilax rotundifolia*), wax myrtle (*Morella cerfera*), and ostrich fern (*Matteuccia struthiopteris*). This type of habitat is common in the forested floodplains of coastal northern Virginia.

The majority of the cover at the main base is developed land, consisting of impervious surfaces such as runways, parking lots, roads, and buildings. Vegetation generally consists of planted lawn grasses and areas of landscaping trees and shrubs. Small areas of old fields are found immediately to the north, east, and west of the northern-most section of runway. These old fields are dominated by switchgrass (*Panicum virgatum*), broomsedge (*Andropogon virginicus*), and fescue grass (*Festuca* sp.). Loblolly pine (*Pinus taeda*) and sweetgum (*Liquidambar styraciflua*) saplings, as well as a variety of blackberries (*Rubus* sp.) and multiflora rose (*Rosa multiflora*) are also present in this habitat.

In the northern-most section of WFF, the largest parcel of natural terrestrial habitat occurs – a mixed deciduous/pine forest, which borders Little Mosquito Creek. This forest consists of a dense canopied stand of loblolly and Virginia pine (*P. taeda* and *Pinus virginiana*), willow and black oak (*Quercus phellos* and *Quercus velutina*), sweetgum, and red maple (*Acer rubrum*). Shrub and herb layers are sparse throughout the forest, except in the occasional open areas. In the shrubby areas, spicebush (*Lindera benzoin*), Tartarian honeysuckle (*Lonicera tatarica*), and principal canopy trees are found. Bracken (*Pteridium aquilinum*) and partridgeberry (*Mitchella repens*), as well as unidentified grasses are found in the forest.

Brackish wetlands are found along Little Mosquito Creek, and there is a combination of freshwater and brackish wetlands along its unnamed tributary. The unnamed tributary is actually an intermittent stream that flows through the WWTP site and eventually drains into Little Mosquito Creek. This intermittent stream receives runoff from the nearby runway, taxiways and

ramp areas, and the WWTP site during precipitation events. Site personnel indicated that the flow is intermittent or non-flowing during periods without precipitation.

The wetlands are tidally-influenced and primarily herbaceous. Principal species include Spartina grasses (*Spartina alterniflora*, *S. patens*, and *S. cynosuroides*) and threesquare (*Scirpus pungent*). In the delta where the intermittent stream flows into Little Mosquito Creek, there is a moderately large area of tidally-influenced wetland scrub/shrub. This habitat is dominated by wax myrtle (*Myrica cerifera*), buttonbush (*Cephalanthus occidentalis*), and groundsel bush (*Baccharia halimifolia*). Some small trees are also found scattered in this area – primarily black willow (*Salix nigra*) and red maple. Cinnamon fern (*Osmunda cinnamomea*) and royal fern (*Osmunda regalis*) are the primary herbs found in the scrub/shrub.

A very narrow margin of deciduous forested wetland exists along most of the length of the intermittent stream of the scrub/shrub area. These wetlands are not tidally-influenced and are dominated by small trees (6-10 inches diameter at breast height) with a 60-foot tall canopy. The primary species found there are red maple, black willow, and sweetgum. Spicebush is the most commonly found shrub, with sensitive fern (*Onoclea sensibilis*), royal fern, and cinnamon fern being the most common herbs.

Since there has been no biological sampling conducted, it is not known whether the intermittent stream supports freshwater aquatic invertebrates. In Little Mosquito Creek, spot (*Leiostomus xanthurus*) and bay anchovy (*Anchoa mitchilli*) are seasonally most common. Common amphibians and reptiles in the area include Fowler's toad (*Bufo fowleri*), green tree frog (*Hyla cinerea*), black rat snake (*Elapha obsolete*), hognose snake (*Heterodon platyrhinos*), and box turtle (*Terrapine carolina*). A considerable variety of birds is likely to inhabit WFF throughout the year, owing to its location along the primary migratory corridor of the East Coast. Upland bird families expected to utilize WFF habitats include owls, hawks, woodpeckers, flycatchers, swallows, crows and jays, chickadees, nuthatches, wrens, thrushes (including robins), vireos, warblers, blackbirds, and sparrows. Some of the most common terrestrial birds on the facility include red-tailed hawk (*Buteo jamaicensis*), mockingbird (*Mimus polyglottos*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), starling (*Sturnus vulgaris*), house

sparrow (*Passer domesticus*), and song sparrow (*Melospiza melodia*). Other more aquatic-oriented birds, such as great blue heron (*Ardea herodias*), herring gull (*Larus argentatus*), laughing gull (*Larus atricialla*), and willet (*Catoptrophorus semipalmatus*) are common in the open tidal wetland areas along Little Mosquito Creek. Mammals that are most likely to occur in the vicinity of the WFF Main Base include masked shrew (*Sorex cinereus*), northern short-tailed shrew (*Blarina brevicauda*), gray squirrel (*Sciurus carolinensis*), white-footed mouse (*Peromyscus leucopus*), meadow vole (*Microtus pennsylvanicus*), marsh rice rat (*Oryzomys palustris*), eastern cottontail (*Sylvilagus floridanus*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes)* and white-tailed deer (*Odocoileus virginianus*). It should be noted that the WFF Main Base possesses a sizable captive white-tailed deer population (i.e., movement restricted by fences).

A site visit was conducted on 20 October 2004 by WESTON to further refine and confirm the identification of potential wildlife communities and the species present in each habitat type. Additionally, in 2004, information was obtained from USFWS (August 2004) regarding federally listed or proposed endangered or threatened species and designated critical habitat for the WFF. As recommended by USFWS, the Virginia Department of Game and Inland Fisheries (VDGIF), Environmental Services Section and the Virginia Department of Conservation and Recreation (VDCR), Division of Natural Heritage databases were searched to obtain additional information that was to be included in the SLERA (VDGIF, 2007 and VDCR, 2006). Attachments F-1 through F-3, included in Appendix F, contain these three reports.

VDCR noted that the WWTP site is located within the Little Mosquito Creek Conservation Site. Conservation sites represent key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. The conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element, and where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. The Little Mosquito Creek Conservation Site has been assigned a biodiversity significance ranking of B4, which represents a site of general significance. (Scale = 1 to 5 with 1 being the most significant.)

The special status species lists resulting from the searches are presented in Table 5-1. Of these species, only the bald eagle is known to have been observed on the WFF Main base. The species has nested at one location on Little Mosquito Creek.

5.1.2 Chemical Data Collection and Review

5.1.2.1 Data Reduction

The analysis of the data contained in this SLERA was based on guidance presented in *Guidance for Data Usability in Risk Assessment, Part A* (EPA, 1992). The guidelines listed below were used when evaluating data qualifiers, sample quantitation limits, and duplicate samples, prior to the data summarization. Note that the data used in the human health screening level risk assessment (Section 4) were treated in like fashion. See Section 3.2 for a discussion of soil, sediment, and surface water sampling investigations and Figure 3-1 for sample locations.

- All U-qualified data represents a non-detect for the parameter evaluated. The concentration was assumed to be present in the sample at one-half the SQL.
- All data with "J" qualifiers were assumed to be positive identifications. "J" indicates that the numerical value is an estimated concentration (e.g., is reported below the minimum confident sample quantitation limit).
- All mercury data with "R" qualifiers were eliminated from use as the results were rejected based upon non-adherence to standards set by the laboratory or data validator.
- If a sample duplicate was collected and analyzed and detected, the average of the two reported concentrations was used for subsequent calculations unless there was a greater than 30% difference in surface water concentrations or a greater than 50% difference in soil or sediment concentrations, in which case the higher of the two concentrations was used. However, if only one of the two samples indicated a detected concentration for a chemical, that detected concentration was used as the value for the sample.

Summary information provided for each data group includes frequency of detection, range of detected concentrations, location of maximum detected concentration, range of sample quantitation limits, and arithmetic mean concentrations. The surface soil summary statistics are presented in Table 5-2. Summary statistics for sludge, sediment, and surface water are presented

in the HH screening level risk assessment section of this report; Section 4 (Tables 4-2, 4-3, and 4-5, respectively).

5.1.2.2 Background Comparison

Certain chemicals detected at the site may be naturally occurring or regionally anthropogenic. The background surface soil screening levels for inorganic chemicals were obtained from the NASA (2004) background report – *Background Soils and Groundwater Investigation Report for the Main Base*. Soils in the vicinity of the WWTP site have been classified as Molena loamy sand (MoD). For WWTP-specific soil, sludge, and sediment data sets with at least 10 samples, statistical comparisons with the appropriate background data sets were performed using methodologies presented in the NASA (2004) background report.

For data sets that have less than 10 samples, simple comparisons were performed (i.e., a comparison of the Site and background maximum detected concentrations and arithmetic means). These approaches are consistent with current guidance as presented in EPA's *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (EPA, 2002), among others. While a comparison to background concentrations is not a criterion for eliminating contaminants from evaluation, it was conducted for media other than surface water to provide information for subsequent management decisions.

5.1.2.3 Comparison with Screening Level Benchmarks

Numerous types of screening level ecological toxicity benchmarks have been developed to be protective of organisms in a variety of habitats. As a consequence, the ecological benchmarks represent medium-specific contaminant concentrations considered protective of biota inhabiting that medium. Ecological benchmarks were obtained primarily from the EPA Region 3 Biological Technical Assistance Group (BTAG) Screening Values which are available for freshwater, marine water and freshwater sediment. These values facilitate consistency in screening level ecological assessment throughout Region 3 and are used to screen exposure through routes other

than food chain exposure. In addition, federal and state values, when available, were used for screening.

If the maximum detected concentration of a chemical exceeds its medium-specific benchmark (i.e., Hazard Quotient (HQ) ≥ 1), that medium may need to be considered for further evaluation. Within the site, the potential direct exposure media include soil, sludge, sediment, and surface water. As such, the ecological benchmarks that were used to evaluate the potential for ecological risks from each of these media are presented below.

Soil Benchmarks

Soil samples were collected from the former transformer location (SS-1), each of four possible sludge piles (SS-2 through SS-5), at the discharge point of the outflow pipe (SS-8), and from below a rocky/gravely layer observed at the base of each of two sludge drying beds (SS-9 and SS-10). Surface soil samples from these locations were composited from 0 to 2 feet. Soil samples were also collected during monitor well installation to evaluate surface soils in monitor well areas and assess for potential leaching of contaminants from soil. Surface soil samples (0-0.5 feet) were collected from MW-01 through MW-07, with the exception of the boring at MW-03. At the MW-03 trickling filter location the soils to 2 feet were not collected since original soils were previously removed and clean fill material emplaced. Surface soil samples used in this evaluation from these locations were collected from 0 to 0.5 feet.

In addition to the soil samples collected, three sludge samples were collected at the WWTP site. One sludge sample (SL-01) was collected from the primary settling tank. Very little sludge was observed to be present at the settling tank location. It should be noted that the settling tank is not covered and is open to the outside. As a result, the tank continues to receive rainwater and material from outside the clarifier tank. Five-point composite samples were collected from each of the two sludge drying beds (SL-02 and SL-03).

This assessment used EPA Region 3 BTAG screening values as the primary benchmark source, except in instances where subsequent releases of EPA ecological soil screening levels values

were available. If a BTAG value for a chemical was not available, Region 3 ecological risk assessment guidance does recommend considering soil values from the following sources when conducting an ecological risk screen.

The following sources were used to obtain soil benchmarks:

- ***EPA (2005a through i; 2006a and b)***—The EPA has developed specific numeric ecological soil screening levels (Eco-SSLs) for twelve chemicals: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, silver, and vanadium. The lowest (i.e., most conservative) of the available plant, soil invertebrate, avian, and mammalian Eco-SSL for a specific chemical was selected for use in the screening.

- ***EPA (1995)—***Region 3 BTAG Screening Levels. BTAG screening levels are conservative guidelines for the evaluation of soil data at Superfund sites. BTAG screening levels are based on the lowest value from a combination of sources considered to be protective of the most sensitive organisms in soil. Sources for the development of these screening values included peer-reviewed literature, regulatory agency criteria, and technical expertise from various agencies. EPA Region 3 is in the process of updating these benchmarks. In the meantime, EPA's Eco-SSLs are to be used instead of the 1995 EPA Region 3 BTAG value, when available.

In the absence of soil screening benchmarks from either of the above sources, the following source hierarchy was used to select benchmarks. Note that Region 3 BTAG includes the Efroymson et al. (i.e., Oak Ridge National Laboratory) values in its alternate value list (EPA, 2007e).

- ***Efroymson et al. (1997a)—***Preliminary Remediation Goals for Ecological Endpoints. Wildlife preliminary remediation goals (PRGs) for soil were derived by iteratively calculating exposure estimates using different soil concentrations and soil-to-biota contaminant uptake models. Uptake models for plants, earthworms, and small mammals were derived from various sources. Because diets dramatically influence exposures and sensitivity to contaminants varies among species, PRGs were developed for six species: short-tail shrew, white-footed mouse, red fox, white-tailed deer, American woodcock, and red-tailed hawk. In this Tier I ecological risk assessment (ERA), the species that provides the most conservative estimate of exposure will be used. The wildlife screening values (i.e., PRGs) were based on the lowest-observed-adverse-effect levels (LOAELs) of the selected toxicity studies. By definition, a LOAEL is the lowest dose of a chemical that produces statistically or biologically significant increases in the frequency or severity of adverse effects between the exposed population and its appropriate control (Dourson

and Stara, 1983). The LOAEL values were converted to no-observed-adverse-effect level (NOAEL) values by dividing by a factor of 10. Note that although the factor of 10 is a commonly applied conversion between LOAELs and NOAELs, it is felt to be an upper-bound estimate of the potential extrapolation. Comparisons of studies (McNamara, 1976; Weil and McCollister, 1963) for which NOAELs and LOAELs were provided indicate that 96% of the chemicals evaluated for both rodent and non-rodent receptors had LOAEL/NOAEL ratios of five or less (Dourson and Stara, 1983). It is expected that a 10-fold extrapolation factor may over-estimate the potential ecological risk.

- ***Efroymson et al. (1997b)—***Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes. Earthworm and microbial benchmarks were derived by rank-ordering lowest observed effect concentration (LOEC) values gathered from an extensive literature search, then selecting the 10th percentile LOEC value as the benchmark. The 10th percentile LOEC value was selected as the benchmark, so the "assessor should be 90% certain of protecting plants growing in the site soil."

- ***Efroymson et al. (1997c)—***Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants. Phytotoxicological benchmarks were derived using the same methodology used to generate the earthworm benchmarks. Phytotoxicological benchmarks were derived by rank-ordering the lowest observed effect concentration (LOEC) values drawn from the literature.

- ***EPA Region 5 (2003)—***Resource Conservation and Recovery Act (RCRA) Ecological Screening Levels (ESLs). The ESLs (previously known as ecological data quality levels or EDQLs) are the initial tool utilized in assessing adverse risk to the environment through the RCRA Corrective Action and Permit programs within Region 5. The ESLs provide protective benchmarks for 223 contaminants and four environmental media, including air, water, sediment, and soil. With few exceptions, the majority of soil ESLs is based on exposure to a masked shrew (*Sorex cinerus*).

The results of the maximum detected concentration to soil benchmark comparison are presented in Table 5-2. In addition to surface soil, a soil benchmark comparison was conducted for sludge on a sample-by-sample basis and is presented in Table 5-3.

Sediment Benchmarks

Two sediment samples were collected from the intermittent stream (see Figure 3-1). One sediment sample was collected from the closest point beneath the effluent outfall (SD-2), and a second sediment sample was collected at the confluence of the intermittent streams downstream of the outfall (SD-1). A surface water sample (SW-1), co-located with the sediment sample

collected at SD-1, was collected from the sediment location at the confluence of the intermittent streams downstream of the outfall. Surface water and sediment samples were collected to assess for potential impact from the outfall.

The limited aquatic habitats location at the WWTP site are freshwater habitats, therefore only freshwater sediment benchmarks will be used. EPA Region 3 BTAG values were used in the sediment screening. A description of the BTAG values, as well as the hierarchy and sources description for other potential sediment benchmarks are listed below.

- ***EPA Region 3 (2006c)—***BTAG freshwater screening values represent screening values for flora and fauna that inhabit sediments. Preference was given to benchmarks based on chronic direct exposure, non-lethal endpoint studies designed to be protective of sensitive species. Values derived by statistical- or consensus-based evaluation of multiple studies were given first priority. Equilibrium partitioning values were selected for contaminants with $2.0 < \log K_{ow} < 6.0$ if empirical values based on multiple studies were not available. Absent consensus or equilibrium partitioning values, single study toxicity values were selected.

- ***MacDonald et al. (2000)—Consensus-based Values.*** MacDonald et al. evaluated the predictive ability of previously derived probable effect concentrations for major classes of compounds including metals, PAHs, pesticides and PCBs. A database was developed from 92 published reports that included a total of 1657 samples with high-quality matching sediment toxicity and chemistry data. The database was composed primarily of 10- to 14-day or 28- to 42-day toxicity tests with the amphipod *Hyalella azteca* (designated as the HA10 or HA28 tests) and 10- to 14-day toxicity tests with the midges *Chironomus tentans* or *C. riparius* (designated as the CS10 test). Endpoints reported in these tests were primarily survival or growth. From these data, both threshold effect concentrations (TECs) and probable effect concentrations (PECs) were developed. TECs identify contaminant concentrations below which harmful effects on sediment-dwelling organisms are not expected. To be conservative, TECs will be used to select COECs for this Tier I ERA. TECs include the following SQGs: threshold effect levels (TELs), effect range low (ERL) values, lowest effect levels (LELs), minimal effect thresholds (METs), and sediment quality advisory levels (SQALs). TECs were calculated by determining the geometric mean of the SQGs. Consensus-based TECs were calculated only if three or more published SQGs were available for a chemical.

- ***VDEQ 99th Percentiles (2005) –*** 99th percentile freshwater sediment concentrations are available for a few chemicals. It is recommended that these values be used in the absence of consensus-based sediment screening values (e.g., MacDonald et al., 2000).

The results of the sediment benchmark comparison on a sample-by-sample basis are presented in Tables 5-4.

Surface Water Benchmarks

As mentioned previously, one surface water sample (SW-1), co-located with the sediment sample collected at SD-1, was collected from the sediment location at the confluence of the intermittent streams downstream of the effluent outfall. Additionally, one wastewater sample (WW-01) was collected from the primary settling tank and for this assessment is treated as a surface water sample. Very little wastewater was observed to be present at the settling tank location.

Freshwater benchmarks were used to screen for chemicals detected at concentrations in the clarifier tanks and stormwater outfalls that may cause ecological harm. Sources for surface water benchmarks are listed below.

- ***EPA Region 3 BTAG Freshwater Screening Benchmarks (EPA, 2006d)—***These screening benchmarks were compiled from various sources, and selected based on the following hierarchy: 1) preference was given to the benchmarks based on chronic exposure, non-lethal endpoint studies designed to be protective of sensitive species; 2) absent chronic exposure benchmarks, values based on acute studies for multiple species adjusted with acute to chronic ratios were selected; 3) food chain values for water from the EPA Great Lakes Water Quality Initiative were included based on the extent of benchmark evaluation process and the approval of models for DDT, mercury, 2,3,7,8-tetrachlorodibenzofuran (TCDD), and PCBs; and 4) other food chain values were given preference over direct toxicity values only if the direct toxicity value was for a marine environment. In addition, priority was given to values based on direct toxicity over food chain modeling, since site specific food chain exposure modeling and assessment is strongly encouraged for all bioaccumulative compounds. Acute and subacute exposures and lethal endpoints were accepted if appropriate safety factors were applied.

- ***Virginia Surface Water Quality Standards (VDEQ, 2006)*** **–** 9 VAC 25-260 lists Virginia's numerical water quality criteria for surface water. This document provides both acute and chronic criteria. For the acute criteria, one-hour average concentration is not to be exceeded more than once every 3 years on the average; whereas for the chronic criteria, the four-day average concentration is not to be exceeded more than once every 3 years on the average. Note that several of the metals criteria are hardness-dependent and a default hardness of 100 mg/L was used to derive all hardness-dependent values.

- ***Federal Ambient Water Quality Criteria (AWQC) for the Protection of Aquatic Life (EPA, 2006e) —*** This document provides a compilation of the national recommended water quality criteria (WQC) for a wide variety of pollutants, predominantly metals and pesticides. Two sets of criteria are provided in this guidance, i.e., criteria maximum concentrations (CMCs), and criteria continuous concentrations (CCCs). CMCs represent acute criteria applied as 1-hour average concentrations not to be exceeded more than once in any 3-year period. CCCs represent chronic criteria applied as 4-day average concentrations not to be exceeded more than once in any 3-year period. CCCs will be used in this ecological screening. As with the Virginia criteria, several of the metals criteria are hardness-dependent. The same approach to calculating hardness-dependent criteria will apply.

- ***EPA Region 5 (2003)—***RCRA Ecological Screening Levels (ESLs). The ESLs (previously known as ecological data quality levels or EDQLs) are the initial tool utilized in assessing adverse risk to the environment through the RCRA Corrective Action and Permit programs within Region 5. The ESLs provide protective benchmarks for 223 contaminants and four environmental media, including air, water, sediment, and soil. Many of the water ESLs are based on exposure to the mink (*Mustela vison*) or the belted kingfisher (*Ceryle alcyon*). Although not explicitly recommended by Region 3 BTAG, this source was considered in the screening of bioaccumulative chemicals since food-chain based values are available therein.

The results of the surface water benchmark comparison on a sample-by-sample basis are presented in Tables 5-5.

5.2 SLERA Results

5.2.1 Surface Soil Benchmark Comparison

Maximum detected concentrations in surface soil for the WWTP site were compared with soil benchmarks developed for the protection of terrestrial plants, soil invertebrates and soil microbial processes; the results of these comparisons are presented in Table 5-2. The results of this comparison indicate that all of the maximum detected concentrations of the organic chemicals detected in surface soils did not exceed the lowest ecological screening value presented, with the exception of Aroclor 1260 (HQ = 2.90E+00). However, Aroclor 1260 was only detected in one surface soil sample (WFFI-SS1) and therefore, only one sample exceeded the lowest screening benchmark.

Of the 21 inorganic chemicals detected, nine had maximum detected concentrations that exceeded the lowest ecological screening value. These inorganic chemicals along with their respective HQs include:

Aluminum (HQ = 1.30E+04)
Antimony (HQ = 1.19E+01)
Cadmium (HQ = 1.03E+00)
Iron (HQ = 8.33E+02)
Lead (HQ = 4.18E+01)
Mercury (HQ = 4.31E+00)
Vanadium (HQ = 3.08E+00)
Zinc (HQ = 2.50E+01)
Cyanide (HQ = 6.80E+01)

Antimony was only detected in 4 of 14 surface soil samples and these 4 samples (WFFI-MW4, WFFI-MW7, WFFI-SS1, and WFF1-SS10) marginally exceeded the soil screening benchmark with HQs ranging from 2.00E+00 to 1.19E+01. Cadmium was only detected in 3 of 14 samples and only 1 (WFFI-SS1) of these samples exceeded the soil screening benchmark with a HQ of 1.03E+00. Although lead was detected in all 14 surface soil samples, only 2 (WFFI-MW7 and WFFI-SS1) of these were found to exceed the lowest soil screening benchmark with a HQ of 1.82E+00 and 4.18E+01, respectively. Mercury was detected in 14 of 14 samples. However, only 4 (WFFI-MW7, WFFI-SS1, WFFI-SS8, and WFFI-SS10) of these 14 samples exceeded the soil screening benchmark with HQs ranging from of 1.71E+00 to 4.31E+00. Lastly, cyanide was detected in only 1 of 16 samples and that sample (WFFI-MW6) exceeded the soil screening benchmark with a HQ of 6.80E+01.

Of the remaining 12 inorganic chemicals detected at the site, 3 are essential nutrients (calcium, potassium, and sodium), and ecological screening criteria have not been developed for these substances. The remaining 9 inorganic chemicals detected at the site did not exceed their respective ecological screening level benchmarks.

5.2.1.1 Statistical Background Soil Comparison

The WWTP surface soils data for 18 inorganic chemicals were statistically compared with the Molena background soils data and are presented in Table 5-6. The results of the statistical

comparison indicate that the soil concentrations of 13 of the 18 inorganic chemicals (aluminum, arsenic, barium, beryllium, chromium, cobalt, copper, magnesium, manganese, mercury, nickel, vanadium, and zinc) were similar to or less than reference concentrations. Site soil concentrations for cadmium, iron, and lead exceeded both their respective soil screening benchmark and the background soil concentrations. Although silver was found to be statistically significantly different from background soils, it did not exceed its respective soil screening benchmark.

Note that a statistical comparison of the concentrations of antimony in surface soils with background soils was not performed because it was not detected in the background soils.

5.2.2 Sludge Benchmark Comparison

Table 5-3 presents the 3 sludge samples that were collected at the WWTP site and a comparison with soil benchmarks. Of the 28 organics detected in one or more of the sludge samples, 16 exceeded their respective soil screening benchmark in at least one sample (HQs ranging from 1.10E+00 to 9.00E+01). These chemicals include:

Toluene	Fluoranthene
Anthracene	Fluorene
Benzo(a)anthracene	Indeno(1,2,3-cd)pyrene
Benzo(a)pyrene	Phenanthrene
Benzo(b)fluoranthene	Pyrene
Benzo(g,h,i)perylene	DDD
Benzo(k)fluoranthene	DDE
Chrysene	DDT

The remaining 11 organics (acetone, 2-hexanone, MEK, MIBK, 1,1,2,2-tetrachloroethane, PCE, bis(2-ethylhexyl)phthalate, dibenz(a,h)anthracene, 1,4-dichlorobenzene, di-n-butyl phthalate, and dieldrin) detected at the site did not exceed their respective ecological screening level benchmarks. Note that carbazole did not have an available ecological soil screening value.

Of the 22 inorganic chemicals detected, 12 had detected concentrations that exceeded the lowest ecological screening value in at least one sample with HQs ranging from 1.38E+00 to 6.90E+03. These inorganic chemicals include:

Aluminum	Lead
Antimony	Mercury
Cadmium	Silver
Chromium	Vanadium
Copper	Zinc
Iron	Cyanide

Of the remaining 10 inorganic chemicals detected at the site, three are essential nutrients (calcium, potassium, and sodium) and ecological screening criteria have not been developed for these substances. The final seven inorganic chemicals (arsenic, barium, beryllium, cobalt, magnesium, manganese, and nickel) detected at the site did not exceed their respective ecological screening level benchmarks.

5.2.2.1 Statistical Background Sludge Comparison

The WWTP site sludge data for 17 inorganic chemicals were compared with the Molena background soils data and are presented in Table 5-7. Due to an insufficient sample size, a statistical comparison could not be conducted and therefore a simple comparison of the Site and background maximum detected concentrations and arithmetic means was performed. Of the 17 inorganic chemicals detected in Molena background soils, 10 had average site concentrations exceeding average background concentrations. These inorganic chemicals include:

Barium	Lead
Cadmium	Mercury
Chromium	Nickel
Copper	Silver
Iron	Zinc

Note that a comparison of the concentrations of antimony in sludge with background soils was not performed because it was not detected in the background soils. The remaining seven inorganic chemicals (aluminum, arsenic, beryllium, cobalt, magnesium, manganese, and vanadium) were found at levels below the Molena background surface soil levels.

5.2.3 Sediment Benchmark Comparisons

Table 5-4 presents a benchmark comparison for the 2 sediment samples collected at the WWTP site. None of the 5 detected organics or 19 detected inorganic chemicals exceeded their respective ecological benchmark in either of the two samples. However, two of the five detected organic chemicals (acetone and MEK) and eight of detected inorganic chemicals (aluminum, barium, beryllium, calcium, magnesium, potassium, sodium, and vanadium) could not be evaluated due to a lack of an ecological sediment screening value.

5.2.3.1 Statistical Background Sediment Comparison

The WWTP sediment data for 15 inorganic chemicals were compared with the Molena background soils data and are presented in Table 5-8. Due to an insufficient sample size, a statistical comparison could not be conducted and therefore a simple comparison of the Site and background maximum detected concentrations and arithmetic means was performed. All of the 15 inorganic chemicals detected in Molena background soils had maximum detected and average site concentrations below the maximum detected and average background concentrations.

Note that a comparison of the concentrations of antimony in sediment with background soils was not performed because it was not detected in the background soils.

5.2.4 Surface Water Benchmark Comparisons

Table 5-5 presents a benchmark comparison for the 2 surface water samples collected at the WWTP site. Of the 6 detected organic chemicals, fluoranthene, phenanthrene, and pyrene had concentrations in sample WFFI-WW01 that exceeded the ecological screening level benchmark with HQs ranging from 2.28E+00 to 4.80E+01. Chloromethane did not have an available

screening benchmark and therefore could not be evaluated. The remaining two organics (acetone and MEK) were found to have concentrations below the screening level benchmark.

Five (aluminum, barium, iron, lead, and manganese) of the 13 detected inorganic chemicals exceeded their surface water screening benchmark in at least one sample. HQs for these five inorganic chemicals range from 1.42E+00 to 5.00E+01. The remaining eight inorganic chemicals did not exceed their respective screening benchmark in either of the two surface water samples. As noted previously, a surface water background comparison was not conducted.

5.3 Conclusions

5.3.1 Soil

The PCB Aroclor 1260 was the only organic chemical with a maximum detected concentration in exceedance of the lowest ecological soil screening benchmark. As mentioned previously, the benchmark was exceeded by only one detected sample (WFFI-SS1) by less than a factor of 10 (HQ of 2.90E+00) and therefore is unlikely to pose a potential risk to terrestrial receptors at the WWTP site. Of the nine inorganic chemicals (aluminum, antimony, cadmium, iron, lead, mercury, vanadium, zinc, and cyanide) that exceeded the lowest soil screening benchmark, four (aluminum, mercury, vanadium, and zinc) were similar to or less than the Molena background soil concentrations levels. Additionally, cadmium only marginally exceeded its soil screening benchmark with a HQ of 1.03E+00 and is therefore not likely to pose a significant risk. Although antimony, lead, and cyanide had HQs in exceedance of the soil screening value and were found to be significantly different from background (with the exception of cyanide), they had relatively low frequencies of exceedance. These three inorganic chemicals also had low HQs associated with these exceedances, with the exception of antimony and lead in sample WFFI-SS1 and cyanide in sample WFFI-MW6 (See Section 5.2.1 for a more detailed discussion), and are therefore not considered likely to pose a significant risk. Although based on measure concentrations, iron may pose a potential risk to terrestrial receptors, it is worth noting that the Eco-SSL guidance for iron (EPA, 2003b) states that identifying an iron benchmark for soil is difficult since iron bioavailability to plants is dependent upon site-specific conditions. However,

they did conclude that in well-aerated soils, with pH between 5 and 8, the iron demand of plants is higher than the amount available and that toxicity is not expected. The Molena soil series generally has a pH of 4.5 to 6.5, and being sandy in the upper horizons, is relatively well aerated. Therefore, conditions are present at the site which may render much of the iron non-toxic, and iron is therefore not considered likely to pose a significant risk.

5.3.2 Sludge

Fifteen of the 28 detected organic chemicals in sludge exceeded their respective soil screening benchmark. In general, the soil screening benchmark was exceeded by less than a factor of 10 in both WFF1-SL02 and WFF1-SL03 for organics. However, several organics had higher HQs at sample WFF1-SL01 and consequently there may be a potential risk of localized exposure to terrestrial receptors (note that WFF1-SL01 was collected from the primary settling tank and very little sludge was observed to be present at the settling tank location).

Of the 12 inorganic chemicals that had benchmark exceedances in at least sample, 3 (cadmium, chromium, and copper) exceeded by less than a factor of 10 and are not likely to pose a risk to ecological receptors. Additionally, aluminum and vanadium were similar to or less than the Molena background soil concentrations levels and are also not likely to pose a risk to ecological receptors. The remaining seven inorganic chemicals (antimony, iron, lead, mercury, silver, zinc and cyanide) may pose a potential risk to ecological receptors due to sludge exposure at the WWTP site.

5.3.3 Sediment

None of the detected chemicals in sediment exceeded their available sediment screening benchmark. However, no screening benchmarks were available for acetone, MEK, aluminum, barium, beryllium, calcium, magnesium, potassium, sodium, and vanadium. As mentioned previously, three are essential nutrients (calcium, potassium, and sodium), and ecological screening criteria have not been developed for these substances. In addition, all of the inorganic chemicals detected in Molena background surface soils had site sediment concentrations less

than background. Consequently, sediment exposure is not likely to pose a risk to ecological receptors inhabiting the WWTP site.

5.3.4 Surface Water

Fluoranthene, phenanthrene, and pyrene were the only organics that exceeded the surface water screening benchmark and were only detected in one of the two surface water samples (WFFI-WW01). Phenanthrene exceeded the benchmark by less than a factor of 10, with a HQ of 2.28E+00 and therefore is unlikely to pose a potential risk to aquatic receptors. Fluoranthene and pyrene exceeded their lowest ecological surface water screening benchmark with a HQ of 3.75E+01 and 4.80E+01, respectively. As mentioned previously, sample WFFI-W001 was collected from the primary settling tank and very little wastewater was observed to be present at the settling tank location. Although, ecological effects are possible for aquatic receptors, the reality is that since the surface water is standing water and only temporarily available in this area, the presence of a robust benthic invertebrate population is unlikely.

Five of the 13 detected inorganic chemicals exceeded their respective screening benchmarks in at least one surface water sample. Manganese exceeded the benchmark in both samples by less than a factor of 10. Additionally, aluminum and lead in sample WFFI-WW01 and barium in sample WFFI-SW1 only marginally exceeded their respective screening benchmarks and are not likely to pose a potential risk to ecological receptors. Aluminum and iron in sample WFFI-SW1 and barium and iron in sample WFFI-WW01 exceed their benchmarks with HQs ranging from 2.40E+01 to 5.00E+01. The aluminum benchmark value is based on the chronic non-priority pollutant federal AWQC (EPA, 2006e). The barium benchmark value is based on the Tier II secondary chronic value (Suter and Tsao, 1996). The iron benchmark value is based on the Canadian Environmental Quality Guidelines (CCME, 2003). Surface water exposure may pose a potential risk to aquatic receptors inhabiting the WWTP site for aluminum, barium, and iron.

6.0 SUMMARY AND CONCLUSIONS

The WWTP site was identified for investigation in a 1990 ESS Report based on a lack of historical data and potential environmental significance. During a Phase II investigation performed in 1993, six soil gas samples were collected, and recommendations were made for subsequent collection of subsurface soil samples. Groundwater results from an investigation in 1999 indicated aluminum, iron, and manganese above guidance concentrations and a Relative Risk Evaluation, performed using existing data found the relative risk to be high, resulting in the current SI. A site walk conducted in 2005, prior to the SI activities, resulted in the discovery and subsequent removal of a trickling filter which had leaked elemental mercury.

Several areas were identified as requiring further characterization. These included a former transformer pad location, four potential sludge piles, the discharge point of an outflow pipe, the base of two sludge drying beds, the area of the former trickling filter, material remaining in process tanks, surface water and sediment in an adjacent intermittent stream, and groundwater. The results of sampling and analyses of these media are discussed below.

6.1 Soil

Soil samples collected at select locations and during well installation across the WWTP site did not contain VOCs, SVOCs, pesticides, or PCBs at levels considered to be a risk for migration to groundwater or to human health and/or ecological receptors. Several metals were detected in soil at levels exceeding soil-to-groundwater migration SSLs, and at levels that present a potential risk to human health and/or ecological receptors (see Tables 3-6 and 3-7 and Figures 6-1 and 6-2).

Antimony, arsenic, chromium, and manganese concentrations exceeded the soil-to-groundwater migration SSL in one or more soil samples. Of these metals, arsenic and manganese were also detected in groundwater samples at levels exceeding EPA and VDEQ guidance concentrations, indicating they could potentially be leaching from site soils to the groundwater. However, these metals appeared ubiquitously in both background and site soils.

Analytes that exceeded RBC values where the data also suggested a potentially significant impact to human health include arsenic and vanadium. However, qualitative comparison between site soil and background soils indicated that arsenic and vanadium background means are greater than site means.

Based on measure concentrations, iron was found to pose a potential risk to terrestrial receptors. However, as was explained in Section 5.3.1, the iron is likely naturally occurring, and on-site soil conditions may render much of the iron non-toxic.

In summary, arsenic, manganese, vanadium, and iron were detected in soils at levels that exceeded soil-to-groundwater migration SSLs, or at levels that present a potential risk to human health and/or ecological receptors. However, these metals are naturally occurring and were not detected at concentrations or locations that would indicate they are the result of past site activities. The presence of these metals in soil, therefore, does not appear to be the result of previous activities at the site. The presence of these metals in site soils may be the result of historical base-wide practices (e.g., arsenic may be related to the use of arsenic in pesticides across WFF).

6.2 Surface Water and Sediment Results

Surface water and sediment collected in the intermittent stream did not contain VOCs, SVOCs, pesticides, or PCBs at levels exceeding guidance concentrations or at levels considered to be a risk to human health and/or ecological receptors. Iron was the only metal detected in surface water at a concentration exceeding the VASWQS. Iron is naturally occurring in soil, and does not appear to be related to previous site activities (i.e., elevated iron levels are not associated with the site, but are found in background and site soils at similar levels). It is possible that site groundwater may be a source area for the elevated iron in surface water quality. However, because site soils and sludge do not have elevated iron levels, leaching from these media to groundwater at the WWTP site would be assumed historical. Because background levels of iron in groundwater (TetraTech/NUS, 2004) also exceed Virginia Groundwater Quality Standards, groundwater beneath

the WWTP site would be only one of many point sources contributing to elevated iron levels in the surface water.

The human health and ecological risk assessment evaluated the wastewater sample from the clarifying tank, which is uncovered to the outside, as a surface water sample. There is no available outlet for the wastewater in the tank to drain or exit the base of the system, nor is there a way for material to enter other than from the open air. Several SVOCs and metals were detected in the wastewater sample at levels that present a potential risk to human health and/or ecological receptors if discharged as surface water. Lead exceeded its RBC at a concentration suggesting potential impacts on surface water. Fluoranthene and pyrene exceeded the surface water screening benchmark at levels that may pose a potential risk to aquatic receptors. Aluminum, iron, and barium in wastewater could also pose a potential risk to ecological receptors. These constituents may be residual contaminants from sludge left in the clarifying tanks following closure of the WWTP, or may be settled particulate from historical site activities that was airborne to this area. If the process tank structures were to be used for different purposes, or were to be removed, it is recommended that the residue in the clarifier tanks be re-sampled and evaluated for disposal rather than discharge to the ground.

6.3 Sludge

Sludge was sampled from the base of the process tanks and from the two sludge drying beds. There was no sludge present to sample in the pump house wet well.

Benzo(a)pyrene, benzo(b)fluoranthene, arsenic, chromium, iron, lead, manganese, and mercury were detected in sludge samples at levels exceeding their RBC values where impacts to human health could be significant.

Fifteen of 28 detected organic chemicals in sludge exceeded their respective soil screening benchmark. In general, the soil screening benchmark was exceeded by less than a factor of 10, but several organics had higher HQs (in the sample collected from the bottom of the primary settling tank) and consequently there may be a potential risk of localized exposure to terrestrial

receptors. Additionally, antimony, iron, lead, mercury, silver, zinc and cyanide were detected at levels indicating they may pose a potential risk to ecological receptors.

Constituents detected in the sludge at the WWTP site appear to be immobile and do not appear to be migrating to groundwater or surface water. Sludge at the site is contained in the clarifier tanks and in the sludge drying beds. The clarifier tanks contain the sludge material, though they are uncovered and open to the outside. The sludge in the sludge drying beds are uncovered and open to the outside, and are not contained underneath, but are separated from underlying soils by a gravel layer. Based on soil samples collected beneath the sludge drying beds, constituents of concern do not appear to be leaching to soil and subsequently to groundwater. If the structures were to be used for different purposes, or if they were removed, it is recommended that the sludge be re-sampled and evaluated for disposal.

6.4 Groundwater Results

The current site characterization documented the presence of metals in groundwater at levels exceeding EPA and Virginia guidance concentrations (see Figure 6-3). VOCs, SVOCs, pesticides, and PCBs were generally not detected at levels either exceeding guidance concentrations or considered to be a risk to human health and/or ecological receptors.

Arsenic was the only constituent detected in groundwater at levels exceeding the EPA MCL. Arsenic was detected at 13 ug/L (exceeding the EPA MCL of 10 ug/L) in groundwater sampled from the well located in the area of the former trickling filter. It should be noted that all detections of arsenic were biased high based on QC data. Aluminum, iron, and manganese were detected in groundwater samples at levels exceeding secondary guidance criteria (i.e., nonenforceable guidelines, generally related to the aesthetic effects a contaminant may have). Elevated aluminum and iron appear to be naturally occurring in groundwater, as elevated concentrations are detected in both up and downgradient wells. Elevated manganese in groundwater may be the result of site activities or site-specific conditions, as all exceedances are localized to the site area (i.e., not elevated in groundwater sampled in the upgradient wells or the most downgradient well). Manganese does not appear to be migrating from the site. Arsenic

appears to be site-related as the only exceedance to the guidance concentration was in the area of the former trickling filter. Arsenic in groundwater appears to decrease prior to migrating off-site, based on decreased levels in groundwater sampled from a cross-gradient well and no detections of arsenic in the farthest downgradient well.

6.5 Conclusions

Soils at the WWTP site contain arsenic, manganese, vanadium, and iron at elevated concentrations, but the metals are naturally occurring and were not detected at concentrations or locations that would indicate they are the result of past site activities. The presence of these metals in soil, therefore, does not appear to be the result of previous activities at the site.

Sludge at the WWTP site had the most exceedances of all five media, and elevated levels of PAHs and metals may be a potential risk to human health and ecological receptors. Constituents detected in the sludge, contained in the clarifier tanks and sludge drying beds, appear to be immobile and do not appear to be migrating to groundwater or surface water. Similarly, wastewater held in the clarifier tank contained several SVOCs and metals that present a potential risk to human health and/or ecological receptors if discharged as surface water. The wastewater currently has no outlet to the surrounding environment.

Minor detections of PAHs, arsenic, and aluminum, iron and manganese at elevated levels relative to RBCs indicate that groundwater may pose a potential risk to human health receptors. Additional sampling of groundwater would allow better assessment of this potential risk.

Sediment and surface water samples did not contain constituents exceeding their respective benchmarks.

In conclusion, this preliminary screening suggests that soil, sediment, and surface water do not pose a potential risk, whereas sludge and groundwater may pose a potential risk to human health and/or ecological receptors.

6.6 Recommendations

Recommendations for additional investigations for the WWTP site are as follows:

- Confirmation sampling of groundwater for arsenic.
- Confirmation sampling of sludge and wastewater from the clarifying tanks and assessment for potential disposal. Sludge and wastewater will be characterized to determine proper disposal in accordance with applicable or relevant and appropriate requirements (ARARs).
- Confirmation sampling of sludge from the sludge drying beds and assessment for potential disposal. The sludge will be characterized to determine proper disposal in accordance with ARARs.
- Assessment for proper closure of components of the former WWTP in accordance with ARARs.

Following evaluation of confirmation samples, removal of sludge and wastewater should be considered. If arsenic in groundwater at elevated concentrations is confirmed, additional monitoring may be required.

7.0 REFERENCES

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FIGURES

LEGEND

Base map is a portion of NASA 2007 color digitial orthophoto of the Wallops Flight Facility.

Surface Water Flow Direction

0.1 0 0.1 0.2 0.3 0.4 0.5 Miles

500 0 500 1000 1500 2000 2500 Feet

0.25 0 0.25 0.5 0.75 Kilometers

SITE LOCATION MAP

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

WESTON SOLUTIONS
Restoring Resource Efficiency

W.O. No.: 03886-183-010	DRAWN BY: P. Schrot	DATE: 05/30/2007
FILE LOCATION/NAME: I:\GIS_DATA\Projects\Wallops\WWTP\SI\SI Report.APR		FIGURE 2-1

Base Map is a portion of the following 7.5 x 7.5' USGS Quadrangle(s):

Chincoteague West, VA., 1965;
Photorevised 1986; Photoinspected 1989.
1:24,000-Scale.

Contour Interval = 5 Feet

Surface Water Flow Direction

LEGEND

0.1 0 0.1 0.2 0.3 0.4 0.5 Miles

500 0 500 1000 1500 2000 2500 3000 3500 4000 Feet

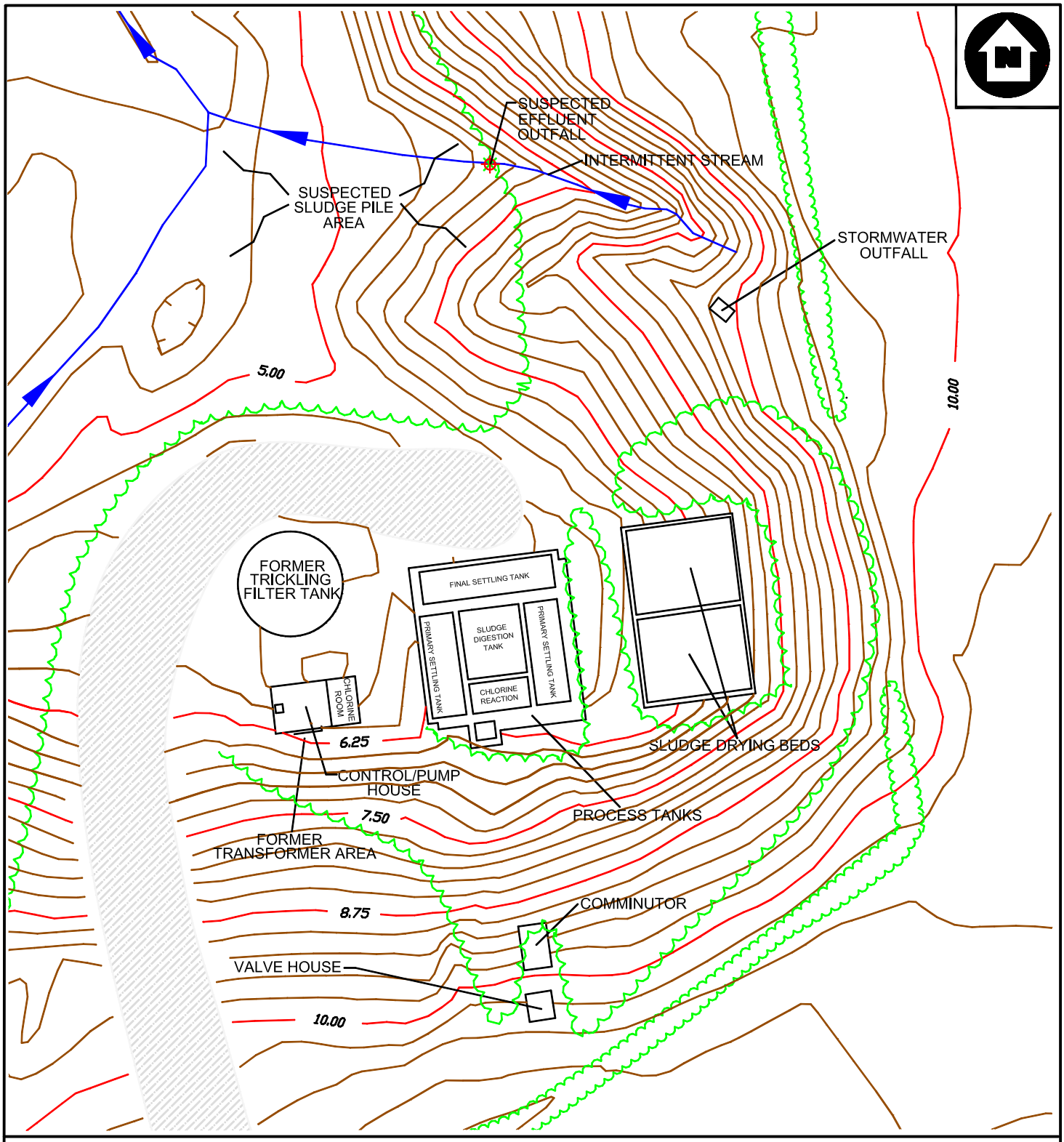
0.25 0 0.25 0.5 0.75 1 Kilometers

SITE TOPOGRAPHY AND MAIN BASE POTABLE WELL LOCATIONS MAP

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

WESTON SOLUTIONS
Restoring Resource Efficiency

W.O. No.: 03886-183-010	DRAWN BY: P. Schrot	DATE: 05/30/2007
FILE LOCATION\NAME: I:\GIS_DATA\Projects\Wallops\WWTP\SI\SI Report.APR		FIGURE 2-2



LEGEND

DIRT ROAD

GRAVEL/CRUSH AND RUN ROAD

8.75 METERS ABOVE MEAN SEA LEVEL

TOPOGRAPHIC CONTOUR LINE (0.25-METER INTERVAL)

TREES/VEGETATION

SCALE: 1" = APPROX. 30'

SITE LAYOUT MAP

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

WESTON SOLUTIONS
Restoring Resource Efficiency

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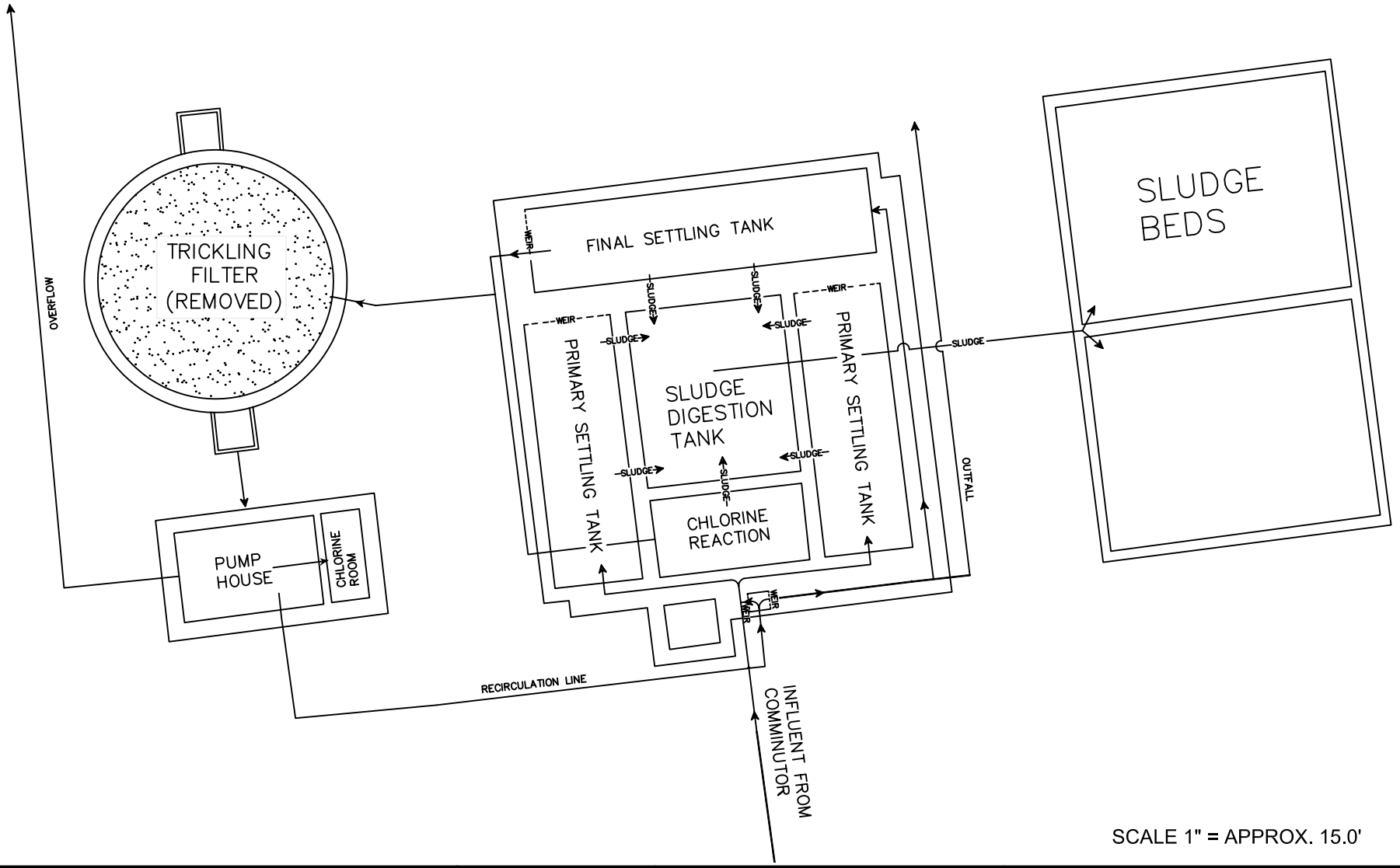

SCALE 1" = APPROX. 15.0'

PROCESS FLOW DIAGRAM

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

N

FIGURE	2-4
DATE:	06/01/2007
REVISION:	3
DRAWN BY:	G. FORD
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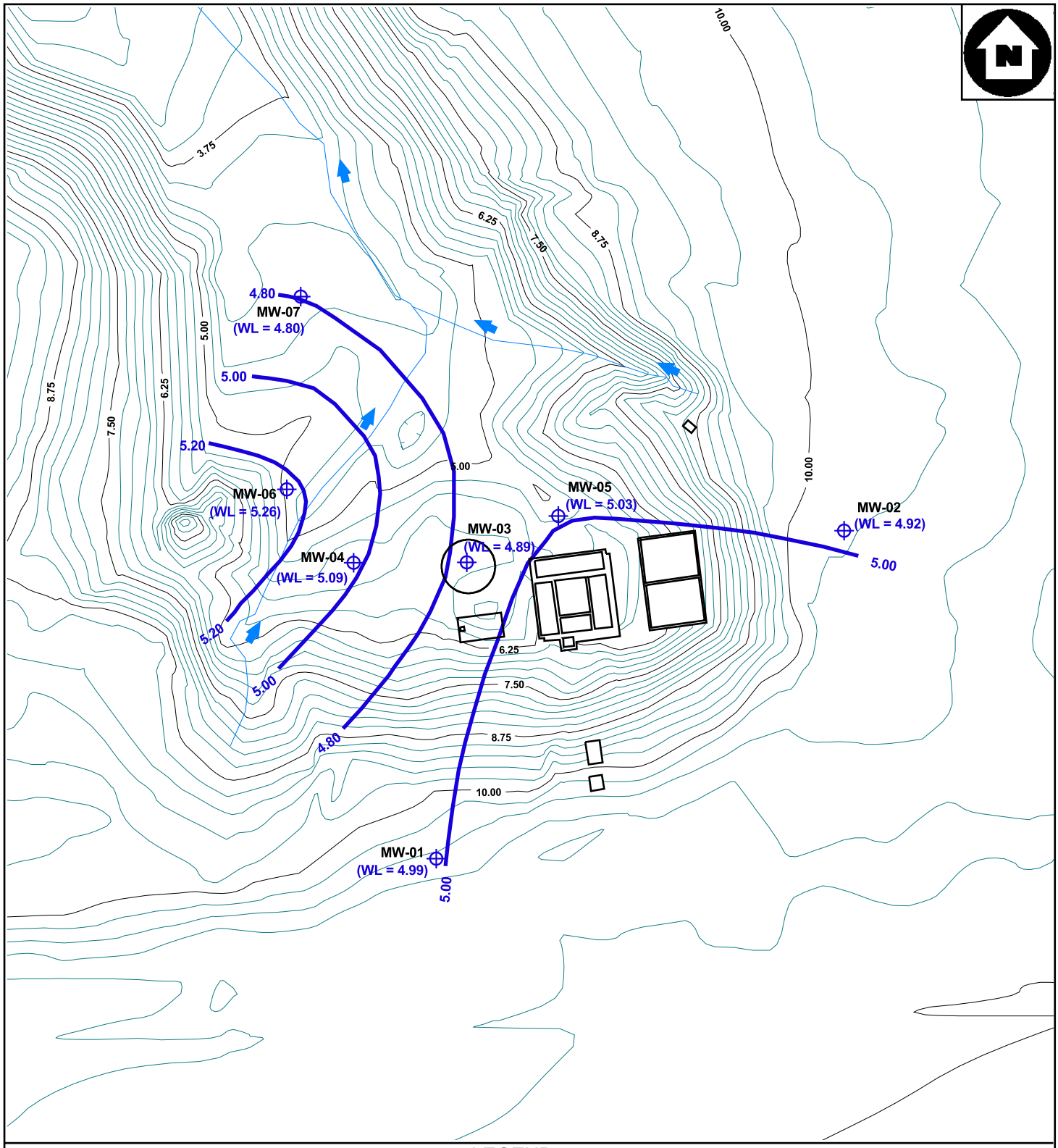
WESTON SOLUTIONS
Restoring Resource Efficiency



LEGEND

Note(s):

Topographic contour lines are in 0.25-meter intervals. Contour lines with listed values are in meters above mean sea level.

WL — Groundwater Level Elevation, meters above mean sea level, February 2007

5.00 — Potentiometric contour (Interval = 0.2 meters)

Surface Water Flow Direction

Monitoring Well

20 0 20 40 60 80 100 Feet

10 0 10 20 Meters

GROUNDWATER ELEVATIONS AND POTENTIOMETRIC SURFACE MAP

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

WESTON SOLUTIONS
Restoring Resource Efficiency

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LEGEND

Note(s): Wastewater sample location WFF1-WW-01 and sludge sample location WFF1-SL1 are approximate, as geographic coordinates are not available for these sample locations.

Topographic contour lines are in 0.25-meter intervals. Contour lines with listed values are in meters above mean sea level.

Base map is a portion of NASA 2007 color digitial orthophoto of the Wallops Flight Facility.

- MONITORING WELL
- SOIL SAMPLE
- FLOW DIRECTION
- SEDIMENT SAMPLE
- SLUDGE SAMPLE
- WASTEWATER SAMPLE
- SURFACE WATER SAMPLE
- STORMWATER DRAIN

20 0 20 40 60 80 100 Feet

10 0 10 20 30 Meters

SAMPLE LOCATION MAP

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

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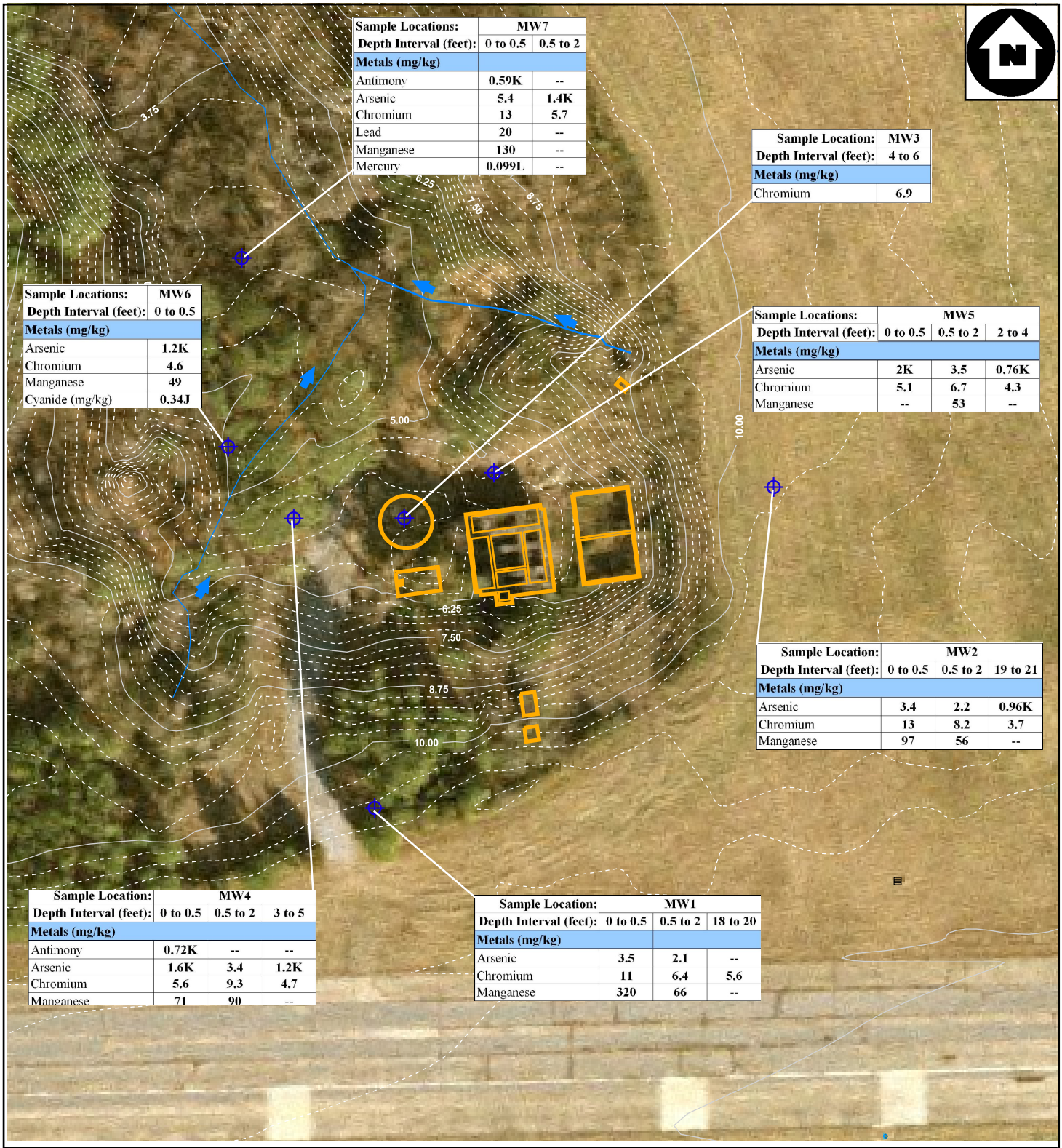
FILE LOCATION/NAME: I:\GIS_DATA\Projects\Wallops\WWTP\SI\SI Report.APR		FIGURE 3-1



Sample Locations:	MW7	
Depth Interval (feet):	0 to 0.5	0.5 to 2
Metals (mg/kg)		
Antimony	0.59K	--
Arsenic	5.4	1.4K
Chromium	13	5.7
Lead	20	--
Manganese	130	--
Mercury	0.099L	--

Sample Location:	MW3
Depth Interval (feet):	4 to 6
Metals (mg/kg)	
Chromium	6.9

Sample Locations:	MW6
Depth Interval (feet):	0 to 0.5
Metals (mg/kg)	
Arsenic	1.2K
Chromium	4.6
Manganese	49
Cyanide (mg/kg)	0.34J

Sample Locations:	MW5		
Depth Interval (feet):	0 to 0.5	0.5 to 2	2 to 4
Metals (mg/kg)			
Arsenic	2K	3.5	0.76K
Chromium	5.1	6.7	4.3
Manganese	--	53	--

Sample Location:	MW2		
Depth Interval (feet):	0 to 0.5	0.5 to 2	19 to 21
Metals (mg/kg)			
Arsenic	3.4	2.2	0.96K
Chromium	13	8.2	3.7
Manganese	97	56	--

Sample Location:	MW4		
Depth Interval (feet):	0 to 0.5	0.5 to 2	3 to 5
Metals (mg/kg)			
Antimony	0.72K	--	--
Arsenic	1.6K	3.4	1.2K
Chromium	5.6	9.3	4.7
Manganese	71	90	--

Sample Location:	MW1		
Depth Interval (feet):	0 to 0.5	0.5 to 2	18 to 20
Metals (mg/kg)			
Arsenic	3.5	2.1	--
Chromium	11	6.4	5.6
Manganese	320	66	--

Note(s): Values shown exceeded guidance concentration (RBC, SSL, or HQ>1).

Topographic contour lines are in 0.25-meter intervals. Contour lines with listed values are in meters above mean sea level.

Base map is a portion of NASA 2007 color digitial orthophoto of the Wallops Flight Facility.

LEGEND

MONITORING WELL

FLOW DIRECTION

STORMWATER DRAIN

20 0 20 40 60 80 100 Feet

10 0 10 20 30 Meters

SOIL ANALYTICAL RESULTS, MONITOR WELL LOCATIONS, FEBRUARY 2007

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

WESTON SOLUTIONS
Restoring Resource Efficiency

W.O. No.: 03886-183-010 | DRAWN BY: P. Schrot | DATE: 09/13/2007

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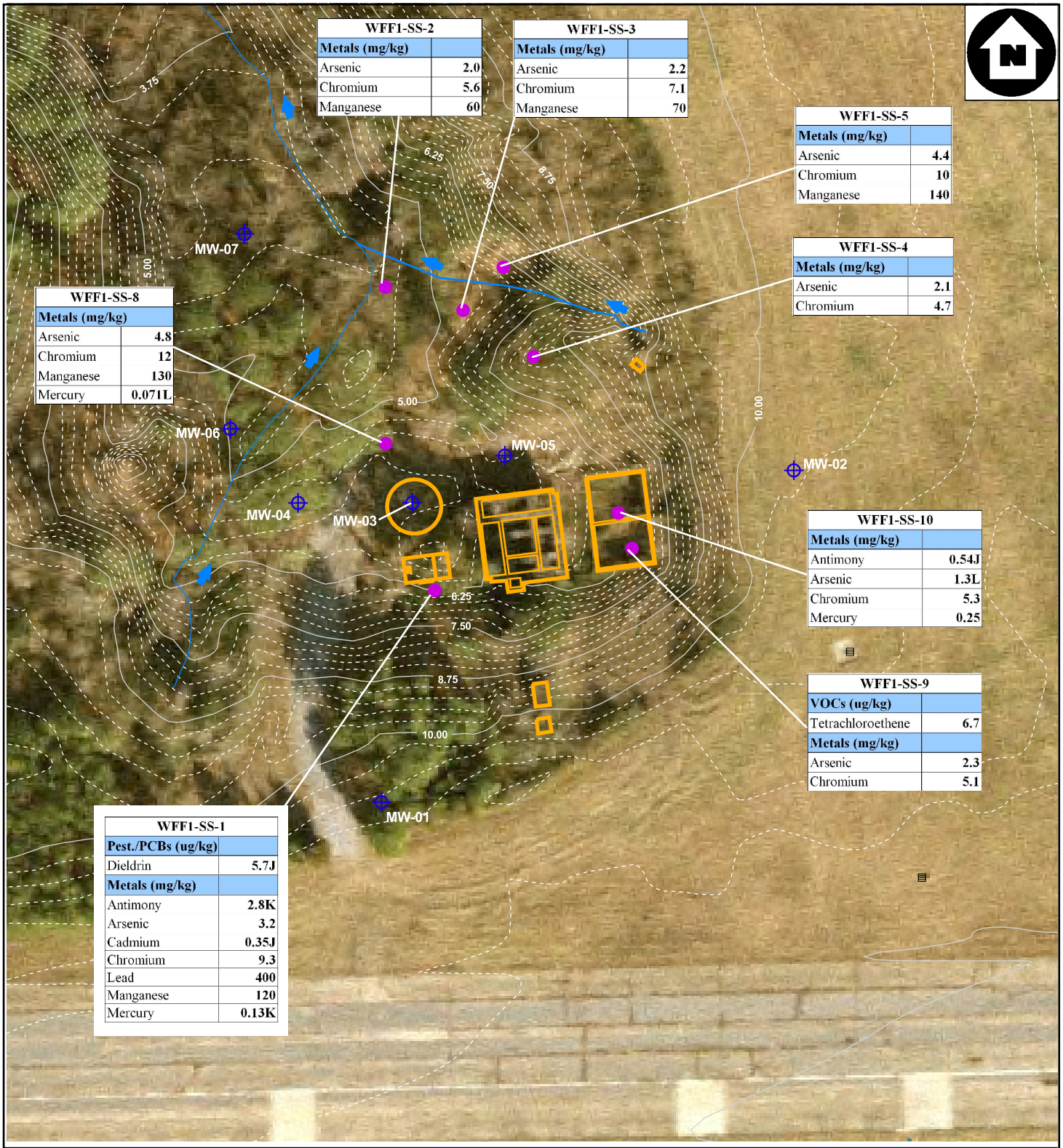
FIGURE 6-1



Note(s): Values shown exceeded guidance concentration (RBC, SSL, or HQ>1).

Topographic contour lines are in 0.25-meter intervals. Contour lines with listed values are in meters above mean sea level.

Base map is a portion of NASA 2007 color digitial orthophoto of the Wallops Flight Facility.

LEGEND

- MONITORING WELL
- SOIL SAMPLE
- FLOW DIRECTION
- STORMWATER DRAIN

20 0 20 40 60 80 100 Feet

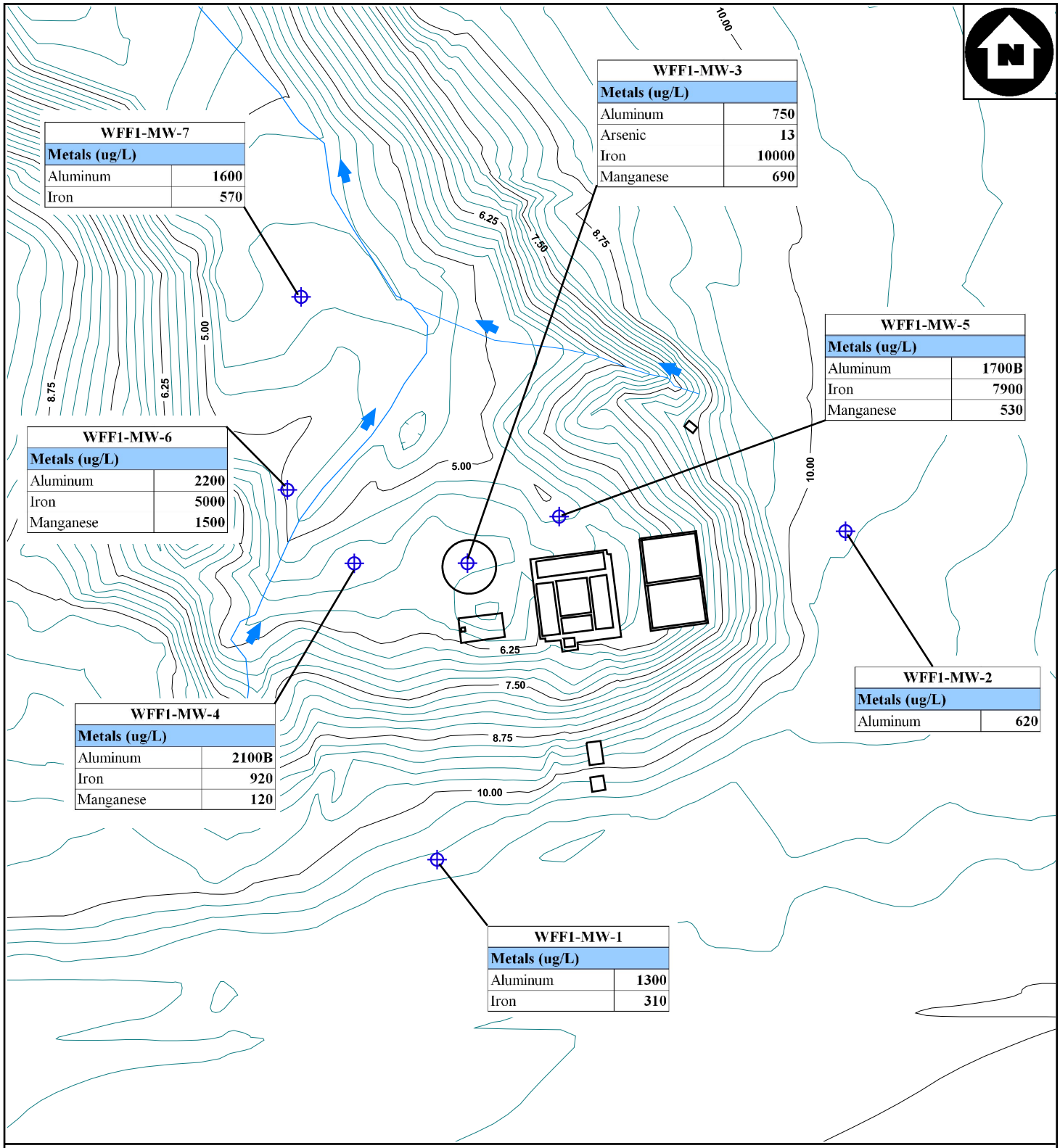
10 0 10 20 30 Meters

SOIL SAMPLING ANALYTICAL RESULTS, FEBRUARY 2007

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

WESTON SOLUTIONS
Restoring Resource Efficiency

W.O. No.: 03886-183-010	DRAWN BY: P. Schrot	DATE: 09/13/2007
FILE LOCATION/NAME: I:\GIS_DATA\Projects\Wallops\WWTP\SI\SI Report.APR		FIGURE 6-2



WFF1-MW-3	
Metals (ug/L)	
Aluminum	**750**
Arsenic	**13**
Iron	**10000**
Manganese	**690**

WFF1-MW-7	
Metals (ug/L)	
Aluminum	**1600**
Iron	**570**

WFF1-MW-5	
Metals (ug/L)	
Aluminum	**1700B**
Iron	**7900**
Manganese	**530**

WFF1-MW-6	
Metals (ug/L)	
Aluminum	**2200**
Iron	**5000**
Manganese	**1500**

WFF1-MW-2	
Metals (ug/L)	
Aluminum	**620**

WFF1-MW-4	
Metals (ug/L)	
Aluminum	**2100B**
Iron	**920**
Manganese	**120**

WFF1-MW-1	
Metals (ug/L)	
Aluminum	**1300**
Iron	**310**

LEGEND

Note(s): Topographic contour lines are in 0.25-meter intervals. Contour lines with listed values are in meters above mean sea level.

Values shown exceeded guidance concentration (EPA MCL, EPA SMCL, or VAGWQS).

Surface Water Flow Direction

Monitoring Well

20 0 20 40 60 80 100 Feet

10 0 10 20 30 Meters

GROUNDWATER SAMPLING ANALYTICAL RESULTS, FEBRUARY 2007

OLD WASTEWATER TREATMENT PLANT
WALLOPS FLIGHT FACILITY
WALLOPS MAIN BASE
ACCOMACK COUNTY, VIRGINIA

WESTON SOLUTIONS
Restoring Resource Efficiency

W.O. No.: 03886-183-010 | DRAWN BY: P. Schrot | DATE: 09/13/2007

FILE LOCATION/NAME: I:\GIS_DATA\Projects\Wallops\WWTP\SI\SI Report_Final.APR

FIGURE 6-3

TABLES

Table 2-1

Groundwater Elevations - February 2007
Old WWTP Site - Wallops Flight Facility

Well ID	Top of Inner Casing Elevation (ft amsl)	Water Level (ft btoc)	Water Level Elevation (ft amsl)	Water Level Elevation (m amsl)
MW-01	36.59	20.22	16.37	4.99
MW-02	35.65	19.51	16.14	4.92
MW-03	21.99	5.96	16.03	4.89
MW-04	21.60	4.89	16.71	5.09
MW-05	19.34	2.84	16.50	5.03
MW-06	18.35	1.10	17.25	5.26
MW-07	16.65	0.90	15.75	4.80

Notes:
ft - feet
m - meters
amsl - above mean sea level
btoc - below top of casing

Table 3-1

Monitor Well Construction Summary
Old WWTP Site - Wallops Flight Facility

Well ID	Date Installed	Northing (ft)	Easting (ft)	Casing Diam.	Location Elevation [1] (ft amsl)		Total Depth		Screened Interval		Description of Material in Screened Interval
		Virginia State Plane Coordinates - South, North American Datum 1983, ft		(inches)	Ground Surface	Top of Inner Casing	(ft bgs)	(ft amsl)	Depth (ft bgs)	Elevation (ft amsl)	
MW-01	2/21/2007	3881302.3080	12357100.2520	2	34.00	36.59	26.5	7.5	16.0 to 26.0	18.0 to 8.0	Overburden - silty sand
MW-02	2/19/2007	3881448.9110	12357282.5320	2	32.80	35.65	27.5	5.3	16.0 to 26.0	16.8 to 6.8	Overburden - silty sand
MW-03	2/20/2007	3881434.6540	12357113.8090	2	19.30	21.99	13.5	5.8	3.0 to 13.0	16.3 to 6.3	Overburden - silty sand with some gravel
MW-04	2/20/2007	3881434.5370	12357063.2990	2	18.40	21.60	13.5	4.9	3.0 to 13.0	15.4 to 5.4	Overburden - silty sand
MW-05	2/20/2007	3881455.4560	12357154.8020	2	16.10	19.34	12.5	3.6	2.0 to 12.0	14.1 to 4.1	Overburden - silty sand
MW-06	2/20/2007	3881467.3410	12357033.4200	2	15.70	18.35	12.5	3.2	2.0 to 12.0	13.7 to 3.7	Overburden - silty sand
MW-07	2/20/2007	3881553.5110	12357039.5570	2	13.30	16.65	12.5	0.8	2.0 to 12.0	11.3 to 1.3	Overburden - silty sand

Notes:

[1] Well measuring point and ground surface elevations surveyed by Baldwin & Gregg, Ltd, 23 Feb 2007

ft - feet

amsl - above mean sea level

bgs - below ground surface

Table 3-2

Analytical Results Summary
IDW Samples
Old WWTP Site - Wallops Flight Facility

Sample Type: / Laboratory Sample ID:	SOIL CUTTINGS 680-24532-13	PURGE WATER 680-24622-15
ANALYTES		
TCLP VOCs (mg/L)		
Benzene	0.020 U	0.020 U
Carbon tetrachloride	0.020 U	0.020 U
Chlorobenzene	0.020 U	0.020 U
Chloroform	0.020 U	0.020 U
1,2-Dichloroethane	0.020 U	0.020 U
1,1-Dichloroethene	0.020 U	0.020 U
Methyl Ethyl Ketone	0.10 U	0.20 U
Tetrachloroethene	0.020 U	0.020 U
Trichloroethene	0.020 U	0.020 U
Vinyl chloride	0.040 U	0.040 U
TCLP SVOCs (mg/L)		
1,4-Dichlorobenzene	0.050 U	0.050 U
2,4-Dinitrotoluene	0.050 U	0.050 U
Hexachloroethane	0.050 U	0.050 U
Hexachlorobenzene	0.050 U	0.050 U
Hexachlorobutadiene	0.050 U	0.050 U
Methyl Phenols,Total	0.050 U	0.050 U
Nitrobenzene	0.050 U	0.050 U
Pentachlorophenol	0.25 U	0.25 U
Pyridine	0.25 U	0.25 U
2,4,5-Trichlorophenol	0.050 U	0.050 U
2,4,6-Trichlorophenol	0.050 U	0.050 U
TCLP Pesticides (mg/L)		
Chlordane (technical)	0.025 U	0.025 U
Endrin	0.0050 U	0.0050 U
gamma-BHC (Lindane)	0.0025 U	0.0025 U
Heptachlor	0.0025 U	0.0025 U
Heptachlor epoxide	0.0025 U	0.0025 U
Methoxychlor	0.025 U	0.025 U
Toxaphene	0.25 U	0.25 U
TCLP Herbicides (mg/L)		
2,4-D	0.025 U	0.025 U
Silvex (2,4,5-TP)	0.025 U	0.025 U
TCLP Metals (mg/L)		
Arsenic	0.20 U	0.20 U
Barium	0.18 J	0.091 J
Cadmium	0.10 U	0.10 U
Chromium	0.012 J	0.20 U
Lead	0.20 U	0.20 U
Selenium	0.50 U	0.50 U
Silver	0.10 U	0.10 U
Other		
Reactive Cyanide (mg/kg)	100 U	100 U
Reactive Sulfide (mg/kg)	58 U	50 U
Flash Point (degrees F)	--	>140
Ignitability (mm/sec)	NB	--
Corrosivity as pH (SU)	7.03	6.36 H

Notes:

VOCs = volatile organic compounds
SVOCs = semivolatile organic compounds
TCLP = Toxicity Characteristic Leaching Procedure
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
mm/sec = millimeters per second
SU = standard units
NB = no burn
degrees F = degrees Fahrenheit

-- = indicates the analysis was not performed on the sample.
H = indicates the sample was prepped or analyzed beyond the specified holding time.
J = indicates the associated quantitation is an estimated value.
U = indicates analyzed for but not detected at the reported value.

Table 3-3
Analytical Results Summary
Water QA/QC Samples
Old WWTP Site - Wallops Flight Facility

Sample Type:	Rinsate Blanks				Trip Blanks				
Field Sample ID:	Rinsate 1	Rinsate 2	Rinsate 3	Rinsate 4	TB-1	TB-2	TB-3	TB-4	TB-5
Laboratory Sample ID:	680-24532-16	680-24532-12	680-24622-7	680-24622-16	680-24460-20	680-24460-21	680-24532-15	680-24622-21	680-24622-22
VOCs (ug/L)									
Methyl Chloride	5.0 U	5.0 U	5.0 U	5.0 U	0.55 J	0.47 J	0.45 J	0.57 J	5.0 U
Methyl isobutyl ketone	10 U	7.3 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	5.1	5.0	4.6	3.9	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SVOCs (ug/L)									
	None Detected				NA				
Pest./PCBs (ug/L)									
	None Detected				NA				
Metals (ug/L)									
Aluminum	200 U	200 U	89 B	99 B	NA	NA	NA	NA	NA
Calcium	210 J	130 J	100 J	610	NA	NA	NA	NA	NA
Chromium	3.4 B	10 U	10 U	10 U	NA	NA	NA	NA	NA
Iron	2100	50 U	50 U	50 U	NA	NA	NA	NA	NA
Magnesium	12 J	500 U	500 U	14 J	NA	NA	NA	NA	NA
Manganese	23	10 U	10 U	10 U	NA	NA	NA	NA	NA
Nickel	5.9 J	40 U	40 U	40 U	NA	NA	NA	NA	NA
Potassium	1000 U	1000 U	1000 U	23 J	NA	NA	NA	NA	NA
Zinc	4.9 B	4.4 B	14 B	9.5 B	NA	NA	NA	NA	NA
Cyanide									
	None Detected				NA				

Notes:

VOCs = volatile organic compounds

SVOCs = semivolatile organic compounds

Pest./PCBs = pesticides/polychlorinated biphenyls

ug/L = micrograms per liter

B = indicates the analyte was detected in the blank and in the sample.

J = indicates the associated quantitation is an estimated value.

U = indicates analyzed for but not detected at the reported value.

NA = not analyzed

Table 3-3 (cont.)
Analytical Results Summary
Water QA/QC Samples
Old WWTP Site - Wallops Flight Facility

Field Sample ID:	WFF1-MW3	WFF1-MW-3D	WFF1-MW-20
Laboratory Sample ID:	680-24622-8	680-24622-8	680-24622-8
Sample Type:	MW-3 Original	MW-3 Duplicate	MW-3 Blind Duplicate
Volatile Organic Compounds (ug/L)			
Acetone	52 J	50 J	47 J
Methylene Chloride	0.65 B	0.57 B	0.58 B
Methyl Ethyl Ketone	17	16 J	15 J
Toluene	0.77 B	0.66 B	0.64 B
Semivolatile Organic Compounds (ug/L)			
2,4-Dimethylphenol	9.6 U	10 U	100
3 & 4 Methylphenol	7.8 J	4.7 J	11
Phenol	8.6 J	7.8 J	12
Pesticides/Polychlorinated Biphenyls			
None Detected			
Metals (ug/L)			
Aluminum	750	780	730
Arsenic	13 K	11 K	15 K
Barium	53	54	55
Beryllium	4 U	0.14 B	0.14 B
Calcium	62000	63000	64000
Cobalt	6.0 J	6.8 B	6.6 J
Iron	10000	10000	11000
Magnesium	3300	3300	3400
Manganese	690	700	720
Mercury	0.20 U	0.13 B	0.20 U
Nickel	2.7 B	2.1 B	2.9 B
Potassium	2000	2100	2100
Sodium	13000	13000	14000
Zinc	11 B	6.2 B	8.3 B
Cyanide			
None Detected			

Notes: Only constituents detected in at least one sample are provided.

ug/L = micrograms per liter

B = indicates the analyte was detected in the blank and in the sample.

J indicates the associated quantitation is an estimated value.

K = Value is biased high based on QC data.

U indicates analyzed for but not detected at the reported value.

Table 3-4

Analytical Results Summary
Groundwater Samples
Old WWTP Site - Wallops Flight Facility

Field SampleID: / Laboratory Sample ID: / Sample Location:	WFF1-MW-1 680-24622-20 (upgradient)	WFF1-MW-2 680-24622-19 (upgradient)	WFF1-MW-3 680-24622-8 (fmr. trickling filter)	WFF1-MW-4 680-24622-18 (crossgradient)	WFF1-MW-5 680-24622-17 (downgradient)	WFF1-MW-6 680-24622-1 (crossgradient)	WFF1-MW-7 680-24622-6 (downgradient)	EPA Drinking Water Standard[1]	EPA Region 3 RBCs Tap Water[2]	VAGWQS
VOCs (ug/L)										
Acetone	25 U	25 U	52 J	25 U	25 U	25 U	25 U	-	5500	-
Methylene Chloride	5.0 U	5.0 U	0.65 B	5.0 U	5.0 U	5.0 U	5.0 U	5	4.1	-
Methyl Ethyl Ketone	10 U	10 U	17	10 U	10 U	10 U	10 U	-	7000	-
Tetrachloroethene	4.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5	0.1	-
Toluene	1.0 U	1.0 U	0.77 B	1.0 U	1.0 U	1.0 U	1.0 U	1000	2300	-
SVOCs (ug/L)										
Bis(2-ethylhexyl) phthalate	1.5 J	9.8 U	9.6 U	10 U	10 U	1.1 J	9.4 U	6	4.8	-
Diethyl phthalate	9.7 U	9.8 U	9.6 U	10 U	10 U	10 U	0.73 J	-	29000	-
3 & 4 Methylphenol	9.7 U	9.8 U	**7.8** J	10 U	10 U	10 U	9.4 U	-	1800	1
Phenol	9.7 U	9.8 U	**8.6** J	10 U	10 U	10 U	9.4 U	-	11000	1
Pest./PCBs										
None Detected										
Metals (ug/L)										
Aluminum	**1300**	**620**	**750**	**2100** B	**1700** B	**2200**	**1600**	200**	37,000	-
Arsenic	10 U	10 U	**13** K	10 U	**10** K	10 U	10 U	10	0.045	50
Barium	24	23	53	46	38	57	24	2000	7300	1000
Beryllium	0.16 B	4 U	4 U	0.2 J	0.19 J	0.19 B	0.19 B	4	73	-
Calcium	11000	12000	62000	22000	45000	45000	10000	-	--	-
Chromium	1.6 B	17	10 U	1.8 J	2 J	2.2 B	4.1 B	100	110	50
Cobalt	10 U	10 U	6 J	3.9 J	10 U	7.1 J	10 U	-	--	-
Iron	**310**	170	**10000**	**920**	**7900**	**5000**	**570**	300**	26000	300***
Magnesium	4100	3300	3300	1800	3600	4300	4500	-	--	-
Manganese	34	41	**690**	**120**	**530**	**1500**	22	50**	730	50***
Nickel	2.3 B	40 U	2.7 B	40 U	40 U	3.4 B	40 U	-	730	-
Potassium	1400	3400	2000	2700	3400	3000	1900	-	--	-
Sodium	5600	5400	13000	12000	7500	16000	6900	-	--	270000
Vanadium	10 U	10 U	10 U	2.5 J	1.8 J	1.9	1.6 J	-	--	-
Zinc	9 B	6.3 B	11 B	5.5 J B	5.8 J B	7.8 B	8.6 B	5000**	11,000	50
Cyanide										
None Detected										

Notes:

Only constituents detected in at least one sample are provided in this table.

VOCs = volatile organic compounds

SVOCs = semivolatile organic compounds

Pest./PCBs = pesticides/polychlorinated biphenyls

ug/L = micrograms per liter

B = indicates the analyte was detected in the blank and in the sample.

J = indicates the associated quantitation is an estimated value.

K=value is biased high based on QC data

U = indicates analyzed for but not detected at the reported value.

[1] Value listed is US. EPA Maximum Contaminant Level (National Primary or Secondary Drinking Water Regulations)

[2] Value listed is US. EPA Region 3 Risk Based Concentration for tap water, 6 April 2007

** indicates National Secondary Drinking Water Regulation

VAGWQS = Virginia Groundwater Quality Standards, as listed in 9 VAC 25-280, State Water Control Board Groundwater Standards. Effective February 12, 2004.

***VAGWQS Groundwater Criteria, Coastal Plain - provided as a guidance concentration, but not enforceable standard

Bold indicates value exceeds guidance concentration

- indicates no listing

Table 3-5
Analytical Results Summary
Soil QA/QC Samples
Old WWTP Site - Wallops Flight Facility

Field Sample ID:	WFF1-SS1	WFF1-SS1-D	WFF1-SS6	WFF1-SS5	WFF1-SS5-D	WFF1-SS7
Laboratory Sample ID:	680-24460-17	680-24460-18	680-24460-19	680-24622-12	680-24622-23	680-24622-13
SampleType:	(fmr. transformer)	(field dup. of SS1)	(blind dup. of SS1)	(sludge pile)	(field dup. of SS5)	(blind dup. of SS5)
VOCs (ug/kg)						
Acetone	210	180	210	50 U	47 U	84 J
Methyl Ethyl Ketone	19 J	26 U	23 J	25 U	24 U	8.3 J
Methyl isobutyl ketone	26 U	26 U	13 J	25 U	24 U	21 U
Tetrachloroethene	5.2 U	5.1 U	5.8 U	5.0 U	4.7 U	4.2 U
Xylenes, Total	10 U	10 U	12 U	10 U	9.4 U	8.3 U
SVOCs (ug/kg)						
Di-n-butyl phthalate	410 U	400 U	400 U	390 U	390 U	36 J
Pest./PCBs (ug/kg)						
4,4'-DDD	12	12 J	6.2 J	3.9 U	3.8 U	3.8 U
4,4'-DDE	6.0 J	6.9 L	11 L	0.41 J	0.65 J	0.76 J
4,4'-DDT	37 L	30 L	43 L	3.9 U	3.8 U	3.8 U
Dieldrin	5.7 J	8.1 U	3.9 J	3.9 U	3.8 U	3.8 U
PCB-1260	290	290	190	39 U	38 U	38 U
Metals (mg/kg)						
Aluminum	8400	7900	9500	9700	13000	10000
Antimony	2.8	3.0 K	3.2 K	2.2 U	2.3 U	2.2 U
Arsenic	3.2	2.6	3.2	4.4	4.7	4.2
Barium	100	69	67	45	52	45
Beryllium	0.25 J	0.24 J	0.27 J	0.35 J	0.41 J	0.34 J
Cadmium	0.35 J	0.35 J	0.37 J	0.55 U	0.56 U	0.55 U
Calcium	2500	2400	2300	910	750	900
Chromium	9.3	9.2	11	10	13	11
Cobalt	2.0	2.0	2.2	2.6	3.3	2.8
Copper	13	15	12	3.8	4.5	4.0
Iron	5500	5300	6500	8300	10000	8400
Lead	400 B	460	400	7.5	8.1	8.0
Magnesium	620	610	690	810	1000	850
Manganese	120	130	120	140	180	150
Mercury	0.13	0.14 K	0.13 K	0.044	0.047	0.043
Nickel	5.8	5.6	6.2	6.3	7.7	6.7
Potassium	470 B	440 B	500	510 K	640 K	560 K
Silver	1.1 U	0.12 J	0.17 J	1.1 U	1.1 U	1.1 U
Sodium	100 J	100 J	100 K	76 JL	91 JL	75 L
Vanadium	18	18	19	16	20	17
Zinc	240	250	230	20	23	20
Cyanide						
None Detected						

Notes: Only constituents detected in at least one sample are provided in this table.
VOCs = volatile organic compounds
SVOCs = semivolatile organic compounds
Pest./PCBs = pesticides/polychlorinated biphenyls
ug/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
B = indicates the analyte was detected in the blank and in the sample.
J = indicates the associated quantitation is an estimated value.
K = Value is biased high based on QC data.
L = Value is biased low based on QC data.
U = indicates analyzed for but not detected at the reported value.

Table 3-6

Analytical Results Summary
Soil Boring Samples
Old WWTP Site - Wallops Flight Facility

Sample Location:	MW1			MW2			MW3	MW4			RBCs		SSLs
Field Sample ID:	WFF1-MW1-0-0.5	WFF1-MW1-0.5-2	WFF1-MW1-18-20	WFF1-MW2-0-0.5	WFF1-MW2-0.5-2	WFF1-MW2-19-21	WFF1-MW3-4-6	WFF1-MW4-0-0.5	WFF1-MW4-0.5-2	WFF1-MW4-3-5	Direct Contact Exposure Pathway		Soil-to-Groundwater
Laboratory Sample ID:	680-24532-3	680-24532-4	680-24532-6	680-24460-1	680-24460-2	680-24460-3	680-24532-2	680-24460-12	680-24460-13	680-24460-14			
Depth Interval (feet):	0 to 0.5	0.5 to 2	18 to 20	0 to 0.5	0.5 to 2	19 to 21	4 to 6	0 to 0.5	0.5 to 2	3 to 5	Residential	Industrial	Migration
VOCs (ug/kg)													
Acetone	370 J	190 J	32 J	170	36 J	29 J	170 J	110	33 J	22 J	70000000	920000000	1100
Methyl Ethyl Ketone	23 J	14 J	25 U	33 J	6.1 J	26 U	46	24 U	4.6 J	19 U	47000000	610000000	1500
Methyl isobutyl ketone	6.1 J	24 U	8.5 J	340	140	150	24 U	24 U	12 J	19 U	--	--	2900
Toluene	2.7 J	4.8 U	5.1 U	7.3 U	4.3 U	5.1 U	2.9 J	4.8 U	4.5 U	3.8 U	6300000	82000000	1300
Xylenes, Total	9.7 U	9.7 U	10 U	15 U	8.7 U	10 U	12	9.6 U	9.0 U	7.5 U	200000000	16000000	150
SVOCs (ug/kg)													
Benzo(a)pyrene	380 U	390 U	370 U	34 J	360 U	30 J	390 U	390 U	360 U	380 U	22	390	6.1
Benzo(g,h,i)perylene	380 U	390 U	370 U	52 J	31 J	46 J	390 U	390 U	63 J	380 U	--	--	--
Bis(2-ethylhexyl) phthalate	380 U	390 U	370 U	400 U	360 U	390 U	390 U	59 J	59 J	380 U	46000	200000	140000
Dibenz(a,h)anthracene	380 U	390 U	370 U	50 J	360 U	44 J	390 U	390 U	46 J	380 U	22	390	23
Diethyl phthalate	380 U	390 U	370 U	27 B	360 U	390 U	390 U	390 U	360 U	380 U	--	--	--
Di-n-butyl phthalate	380 U	390 U	370 U	400 U	360 U	390 U	390 U	390 U	58 J	380 U	--	--	--
Indeno(1,2,3-cd)pyrene	380 U	390 U	370 U	52 J	360 U	40 J	390 U	390 U	43.0 J	380 U	220	3900	210
Pest./PCBs (ug/kg)													
4,4'-DDD	3.8 U	3.9 U	3.7 U	4.0 U	3.6 U	3.9 U	3.9 U	0.57 J	3.6 U	3.8 U	2700	12000	580
4,4'-DDE	2.4 J	3.9 U	3.7 U	7.2	3.6 U	3.9 U	3.9 U	4.2 J	3.6 U	3.8 U	1900	8400	1800
4,4'-DDT	3.8 U	3.9 U	3.7 U	1.1 J	3.6 U	3.9 U	3.9 U	0.79 J	3.6 U	3.8 U	1900	8400	560
Metals (mg/kg)													
Aluminum	8100	6100	4300	13000	8100	2600	5600	4600	9700	3800	78000	1000000	--
Antimony	2.1 U	2.2 U	2.1 U	2.2 U	2.0 U	2.2 U	2.1 U	**0.72** K	2.0 U	2.2 U	31	410	0.66
Arsenic	**3.5**	**2.1**	1.0 U	**3.4**	**2.2**	**0.96** K	1.1 U	**1.6** K	**3.4**	**1.2** K	0.43	1.9	0.0013
Barium	66	23	19	43	25	11	16	18	38	14	16000	200000	300
Beryllium	0.44	0.21 J	0.10 J	0.33 J	0.21 J	0.084 J	0.18 J	0.13 B	0.29 J	0.13 B	160	2000	58
Calcium	42000	490	160	970	490	140	3000	530	420	200	--	--	--
Chromium	**11**	**6.4**	**5.6**	**13**	**8.2**	**3.7**	**6.9**	**5.6**	**9.3**	**4.7**	230 / 120000*	00 / 150000	2.1/ 99000000*
Cobalt	2.4	1.2	0.46 J	2.8	1.4	0.39 J	0.79 J	0.98 J	2.0	0.69 J	--	--	--
Copper	4.8	2.1 J	2.1	3.6	2.6	0.85 J	1.9 J	3.0	2.6	1.3 J	3100	41000	530
Iron	6300	3600	1800	8400	4500	1400	2500	3600	6500	2300	55000	720000	--
Lead	7.3	3.3	1.2 L	5.3	3.0	1.1 B	3.1	6.7	4.8	2.3	--	--	--
Magnesium	970	370	240	790	410	140	370	430	720	250	--	--	--
Manganese	**320**	**66**	23	**97**	**56**	26	23	**71**	**90**	28	1600	20000	48
Mercury	0.037 L	0.018 L	0.022 U	0.027 L	0.023 L	0.020 U	0.010 J	0.046 L	0.020 L	0.015 L	--	--	--
Nickel	4.9	2.5 J	1.3 J	6.2	3.9 J	1.2 J	2.2 B	4.5 J	4.7	1.7 B	20000	1600	--
Potassium	450	310	250	540	340	180	300	380	460	240	--	--	--
Silver	1.0 U	1.1 U	1.0 U	1.1 U	0.99 U	1.1 U	1.1 U	1.1 U	1.0 U	1.1 U	390	5100	1.6
Sodium	480	74 J	66 J	94 K	67 K	73 K	93 J	96 K	85 K	66 K	--	--	--
Vanadium	14	7.9	4.9	18	9.8	2.9	6.9	22	14	5.4	1000	78	37
Zinc	22	16	4.9	14	7.2	3.8	10	14	13	5.8	23000	310000	680
Cyanide (mg/kg)													
Cyanide	0.57 U	0.57 U	0.55 U	0.58 U	0.54 U	0.58 U	0.59 U	0.59 U	0.54 U	0.57 U	1600	20000	7.4

Notes: Only constituents detected in at least one sample are provided in this table.
RBCs = EPA Region 3 Risk Based Concentrations
SSLs = Soil Screening Levels for Soil-to-Groundwater Migration
Dilution Attenuation Factor (DAF) = 1
VOCs = volatile organic compounds
SVOCs = semivolatile organic compounds
Pest./PCBs = pesticides/polychlorinated biphenyls
ug/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

B = indicates the analyte was detected in the blank and in the sample.
J = Estimated value.
K = Value is biased high based on QC data.
L = Value is biased low based on QC data.
U = indicates analyzed for but not detected at the reported value.
Bold indicates exceeds guidance concentration
*chromium VI / chromium III

Table 3-6 (cont.)

Analytical Results Summary
Soil Boring Samples
Old WWTP Site - Wallops Flight Facility

Sample Locations:	MW5			MW6			MW7		RBCs		SSLs
Laboratory Sample ID:	WFF1-MW5-0-0.5	WFF1-MW5-0.5-2	WFF1-MW5-2-4	WFF1-MW6-0-0.5	WFF1-MW6-0.5-2	WFF1-MW6-2-4	WFF1-MW7-0-0.5	WFF1-MW7-0.5-2	Direct Contact Exposure Pathway		Soil-to-Groundwater
Depth Interval (feet):	680-24460-9 0 to 0.5	680-24460-10 0.5 to 2	680-24460-11 2 to 4	680-24460-4 0 to 0.5	680-24460-5 0.5 to 2	680-24460-6 2 to 4	680-24460-7 0 to 0.5	680-24460-8 0.5 to 2	Residential	Industrial	Migration
VOCs (ug/kg)											
Acetone	64	37 J	48	220	31 J	9.5 J	160	58	70000000	920000000	1100
Methyl Ethyl Ketone	7.7 J	23 U	7.7 J	9.0 J	26 U	24 U	14 J	25 U	47000000	610000000	1500
Methyl isobutyl ketone	25 U	23 U	23 U	7.4 J	26 U	280	24 J	25 U	--	--	2900
Toluene	5.0 U	4.6 U	4.6 U	5.8 U	5.2 U	4.9 U	5.3 U	5.1 U	6300000	82000000	1300
Xylenes, Total	10 U	9.1 U	9.3 U	12 U	10 U	9.7 U	11 U	10 U	200000000	16000000	150
SVOCs (ug/kg)											
Benzo(a)pyrene	370 U	370 U	380 U	380 U	380 U	400 U	440 U	410 U	22	390	6.1
Benzo(g,h,i)perylene	370 U	370 U	380 U	35 J	380 U	400 U	440 U	410 U	--	--	--
Bis(2-ethylhexyl) phthalate	370 U	370 U	380 U	380 U	380 U	400 U	440 U	410 U	46000	200000	140000
Dibenz(a,h)anthracene	370 U	370 U	380 U	33 J	380 U	400 U	440 U	410 U	22	390	23
Diethyl phthalate	370 U	370 U	380 U	380 U	380 U	400 U	440 U	410 U	--	--	--
Di-n-butyl phthalate	370 U	370 U	380 U	380 U	380 U	400 U	440 U	410 U	--	--	--
Indeno(1,2,3-cd)pyrene	370 U	370 U	380 U	30 J	380 U	400 U	440 U	410 U	220	3900	210
Pest./PCBs (ug/kg)											
4,4'-DDD	3.7 U	3.7 U	3.8 U	1.9 J	3.8 U	4.0 U	0.78 J	4.1 U	2700	12000	580
4,4'-DDE	0.56 J	3.7 U	3.8 U	14	0.48 J	1.5 J	11	4.1 U	1900	8400	1800
4,4'-DDT	3.7 U	3.7 U	3.8 U	8.0 J	3.8 U	0.79 J	2.0 J	4.1 U	1900	8400	560
Metals (mg/kg)											
Aluminum	4400	8100	4300	3000	1400	1300	12000	5100	78000	1000000	--
Antimony	2.2 U	2.1 U	2.1 U	2.1 U	2.2 U	2.2 U	0.59 K	2.2 U	31	410	0.66
Arsenic	**2.0** K	**3.5**	**0.76** K	**1.2** K	1.1 U	1.1 U	**5.4**	**1.4** K	0.43	1.9	0.0013
Barium	15	27	21	13	7.1	5.9	54	20	16000	200000	300
Beryllium	0.15 J	0.23 J	0.16 J	0.087 J	0.046 B	0.044 B	0.42 J	0.16 J	160	2000	58
Calcium	160	200	170	570	79 B	96 B	1200	270	--	--	--
Chromium	**5.1**	**6.7**	**4.3**	**4.6**	2.0	1.6 B	**13**	**5.7**	230 / 120000*	3100 / 1500000*	2.1/ 99000000*
Cobalt	0.84 J	1.4	1.0 J	0.57 J	0.26 J	0.23 J	3.3	0.92 J	--	--	--
Copper	1.7 J	2.4	1.2 B	1.5 J	0.41 B	0.31 B	6.7	2.3	3100	41000	530
Iron	3000	4200	2600	2600	940 B	620 B	8800	2500	55000	720000	--
Lead	5.4	2.5	1.9 K	6.1	1.7 B	0.85 B	20	5.0	--	--	--
Magnesium	340	350	320	280	100	85	1100	390	--	--	--
Manganese	42	**53**	20	**49**	9.5	5.5	**130**	15	1600	20000	48
Mercury	0.024 L	0.016 L	0.012 L	0.028 L	0.0046 L	0.0055 L	0.099 L	0.027 L	--	--	--
Nickel	2.1 B	2.9 B	2.5 B	2.9 B	0.76 B	0.65 B	7.7	3.0 B	20000	1600	--
Potassium	300	320	250	250	120	130	540	280	--	--	--
Silver	1.1 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	0.20 J	1.1 U	390	5100	1.6
Sodium	68 K	62 K	67 K	83 J	64 K	71 K	120 K	78 K	--	--	--
Vanadium	7.4	9.1	6.9	14	2.4	1.8	24	7.7	1000	78	37
Zinc	13	11	6.4	13	2.5 B	1.8 B	60	27	23000	310000	680
Cyanide (mg/kg)											
Cyanide	0.55 U	0.55 U	0.56 U	0.34 J	0.56 U	0.59 U	0.65 U	0.61 U	1600	20000	7.4

Notes: Only constituents detected in at least one sample are provided in this table.
RBCs = EPA Region 3 Risk Based Concentrations
SSLs = Soil Screening Levels for Soil-to-Groundwater Migration
Dilution Attenuation Factor (DAF) = 1
VOCs = volatile organic compounds
SVOCs = semivolatile organic compounds
Pest./PCBs = pesticides/polychlorinated biphenyls
ug/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

B = indicates the analyte was detected in the blank and in the sample.
J = Estimated value.
K = Value is biased high based on QC data.
L = Value is biased low based on QC data.
U = indicates analyzed for but not detected at the reported value.
Bold indicates exceeds guidance concentration
*chromium VI / chromium III
-- = no value listed

Table 3-7

Analytical Results Summary
Soil Samples
Old WWTP Site - Wallops Flight Facility

Field Sample ID:	WFF1-SS-1	WFF1-SS-2	WFF1-SS-3	WFF1-SS-4	WFF1-SS-5	WFF1-SS-8	WFF1-SS-9	WFF1-SS-10	RBCs		SSLs
Laboratory Sample ID:	680-24460-17	680-24460-15/ 680-24532-10	680-24460-16/ 680-24532-11	680-24622-11/ 680-24532-1	680-24622-12	680-24532-14	680-24622-4	680-24622-5	Direct Contact Exposure Pathway		Soil-to-Groundwater
Sample Location:	(fmr. transformer)	(sludge pile)	(sludge pile)	(sludge pile)	(sludge pile)	(overflow pipe)	(sludge drying bed)	(sludge drying bed)	Residential	Industrial	Migration
VOCs (ug/kg)											
Acetone	210	50	57	80 J	50 U	140 J	49 U	52 U	70000000	920000000	1100
Methyl Ethyl Ketone	19 J	7.3 J	7.1 J	15 J	25 U	16 J	25 U	26 U	47000000	610000000	1500
Tetrachloroethene	5.2 U	5.0 U	5.5 U	5.2 U	5.0 U	5.0 U	**6.7**	5.2 U	5300	1200	0.23
SVOCs (ug/kg)											
None Detected											
Pest./PCBs (ug/kg)											
4,4'-DDD	12	3.6 U	3.6 U	3.5 U	3.9 U	3.7 U	4.3 U	3.8 J	2700	12000	560
4,4'-DDE	6.0 L	3.6 U	3.6 U	0.42 J	0.41 J	3.7 U	0.77 J	3.2 J	1900	8400	1800
4,4'-DDT	37 L	3.6 U	3.6 U	3.5 U	3.9 U	3.7 U	4.3 U	3.8 J	1900	8400	580
Dieldrin	**5.7** J	3.6 U	3.6 U	3.5 U	3.9 U	3.7 U	4.3 U	4.1 U	40	180	0.11
PCB-1260	290	36 U	36 U	35 U	39 U	37 U	43 U	41 U	320	1400	--
Metals (mg/kg)											
Aluminum	8400	5000	6300	4700	9700	10000	4600	4800	78000	1000000	--
Antimony	**2.8** K	2.0 U	2.0 U	2.0 U	2.2 U	2.1 U	2.5 U	0.54 J	31	410	0.66
Arsenic	**3.2**	**2.0**	**2.2**	**2.1**	**4.4**	**4.8**	**2.3**	**1.3** L	0.43	1.9	0.0013
Barium	100	18	25	19	45	50	13	20	16000	200000	300
Beryllium	0.25 J	0.17 J	0.21 J	0.18 J	0.35 J	0.37 J	0.16 J	0.17 J	160	2000	58
Cadmium	0.35 J	0.5 U	0.29 J	0.49 U	0.55 U	0.52 U	0.62 U	0.30 J	39	510	1.4
Calcium	2500	220	320	190 B	910	750	170	320	--	--	--
Chromium	**9.3**	**5.6**	**7.1**	**4.7**	**10**	**12**	**5.1**	**5.3**	230 / 120000*	3100 / 1500000*	2.1/ 99000000*
Cobalt	2.0	1.2	1.3	1.0	2.6	2.5	0.63 J	0.57 J	--	--	--
Copper	13	1.8 J	3.7	1.4 J	3.8	4.2	1.9 J	6.7	3100	41000	530
Iron	5500	3400	3900	3100	8300	7500	2800	2700	55000	720000	--
Lead	400	2.8	7.9	2.6	7.5	8.9	2.2	4.9	--	--	--
Magnesium	620	360	420	320	810	860	330	300	--	--	--
Manganese	**120**	**60**	**70**	42	**140**	**130**	15	15	1600	20000	48
Mercury	0.13 K	0.020 L	0.024 L	0.0096 J	0.044	0.071 L	0.040	0.25	--	--	--
Nickel	5.8	2.7 J	3.1 J	2.4 J	6.3	6.1	2.3 J	2.8 J	20000	1600	--
Potassium	470	280	320	270 K	510 K	520	370 K	300 K	--	--	--
Silver	1.1 U	1.0 U	1.0 U	0.98 U	1.1 U	1.0 U	1.2 U	0.64 J	390	5100	1.6
Sodium	100 K	58 J	63 J	57 L	76 JL	71 J	85 L	71 L	--	--	--
Vanadium	18	7.8	9.3	7.0	16	16	6.0	6.2	1000	78	37
Zinc	240	10	72	6.8	20	34	37	160	23000	310000	680
Cyanide (mg/kg)											
None Detected											

Notes:
Only constituents detected in at least one sample are provided in this table.
RBCs = EPA Region 3 Risk Based Concentrations
SSLs = Soil Screening Levels for Soil-to-Groundwater Migration, Dilution Attenuation Factor (DAF) = 1
VOCs = volatile organic compounds
SVOCs = semivolatile organic compounds
Pest./PCBs = pesticides/polychlorinated biphenyls
ug/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
B = indicates the analyte was detected in the blank and in the sample.
J = indicates the associated quantitation is an estimated value.
K = Value is biased high based on QC data.
L = Value is biased low based on QC data.
U = indicates analyzed for but not detected at the reported value.
Bold indicates exceeds guidance concentration
*chromium VI / chromium III
-- = no value listed

Table 3-8

Analytical Results Summary
Sediment and Surface Water Samples
Old WWTP Site - Wallops Flight Facility

Sample Type:	SEDIMENT		SURFACE WATER
Field Sample ID:	WFF1-SD-1	WFF1-SD-2	WFF1-SW-1
Laboratory Sample ID:	680-24532-7	680-24532-8	680-24532-5
VOCs	**(ug/kg)**		**(ug/L)**
Acetone	45 J	270	25 U
Chloromethane	5.3 U	5.2 U	0.53 J
Methyl Ethyl Ketone	26 U	18 J	10 U
SVOCs			
None Detected			
Pest./PCBs	**(ug/kg)**		**(ug/L)**
4,4'-DDD	4.3 U	2.7 J	0.096 U
4,4'-DDE	1.8 J	2.6 J	0.096 U
4,4'-DDT	0.77 J	1.6 J	0.096 U
Metals	**(mg/kg)**		**(ug/L)**
Aluminum	3400	5500	2500
Arsenic	1.4 L	2.7	10 U
Barium	16	23	31
Beryllium	0.11 J	0.18 J	4.0 U
Calcium	200	650	8800
Chromium	4.2	6.8	2.9 B
Cobalt	0.74 J	1.9	3.5 J
Copper	1.3 J	2.9	20 U
Iron	2600	4100	**7200**
Lead	4.0	7.9	5.0 U
Magnesium	260	440	1200
Manganese	44	95	460
Mercury	0.0093 L	0.044 L	0.20 U
Nickel	1.8 J	3.1 J	40 U
Potassium	220	320	1600
Sodium	71 J	60 J	6300
Vanadium	5.9	8.8	3.5 J
Zinc	9.6	20	18 B
Cyanide			
None Detected			

Notes:

Only constituents detected in at least one sample are provided in this table.

VAWQS = Virginia Water Quality Standards, as listed in 9 VAC 25-260. Public Water Supply

VOCs = volatile organic compounds

SVOCs = semivolatile organic compounds

Pest./PCBs = pesticides/polychlorinated biphenyls

ug/L = micrograms per liter

ug/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

B = indicates the analyte was detected in the blank and in the sample.

J = indicates the associated quantitation is an estimated value.

K = Value is biased high based on QC data.

L = Value is biased low based on QC data.

U = indicates analyzed for but not detected at the reported value.

Bold indicates exceeds guidance concentration

-- = no value listed

Table 3-9

Analytical Results Summary
Sludge and Wastewater Samples
Old WWTP Site - Wallops Flight Facility

Sample Type:	SLUDGE			WASTEWATER
Field Sample ID:	WFF1-SL1	WFF1-SL2	WFF1-SL3	WFF1-WW01
Laboratory Sample ID:	680-24622-14	680-24622-2	680-24622-3	680-24532-9
VOCs	**(ug/kg)**			**(ug/L)**
Acetone	630 J	740	55 J	8.9 J
2-Hexanone	130 J	47 U	55 U	10 U
Methyl Ethyl Ketone	210 J	77	55 U	3.8 J
Methyl isobutyl ketone	91 J	47 U	55 U	10 U
1,1,2,2-Tetrachloroethane	29 J	9.5 U	11 U	1.0 U
Tetrachloroethene	71 UJ	5.1 J	11 U	1.0 U
Toluene	1200 J	6.2 J	11 U	1.0 U
SVOCs	**(ug/kg)**			**(ug/L)**
Anthracene	630 J	74 J	64 J	9.8 U
Benzo[a]anthracene	2100 J	400 J	290 J	9.8 U
Benzo[a]pyrene	910 J	490 J	290 J	9.8 U
Benzo[b]fluoranthene	4800 J	870	550	9.8 U
Benzo[g,h,i]perylene	1200 J	390 J	270 J	9.8 U
Benzo[k]fluoranthene	2400 J	590	290 J	9.8 U
Bis(2-ethylhexyl) phthalate	4400 U	79 J	540 U	9.8 U
Carbazole	4400 U	53 J	540 U	9.8 U
Chrysene	4700 J	570	480 J	9.8 U
Dibenz(a,h)anthracene	4400 U	520 U	76 J	9.8 U
1,4-Dichlorobenzene	4400 U	84 J	84 J	9.8 U
Di-n-butyl phthalate	4400 U	110 J	89 J	9.8 U
Fluoranthene	9000 J	500 J	410 J	1.5 J
Fluorene	360 J	520 U	540 U	9.8 U
Indeno[1,2,3-cd]pyrene	1400 J	330 J	230 J	9.8 U
Phenanthrene	3000 J	200 J	170 J	0.91 J
Pyrene	6300	420 J	360 J	1.2 J
Pest./PCBs	**(ug/kg)**			**(ug/L)**
4,4'-DDD	110 J	1100 J	1200 J	0.098 U
4,4'-DDE	67 J	1400	1300	0.098 U
4,4'-DDT	110 J	890 J	1100 J	0.098 U
Dieldrin	440 U	9.9 J	5.6 J	0.098 U

Notes:

Only constituents detected in at least one sample are provided in this table.

SL = sludge sample

VOCs = volatile organic compounds

SVOCs = semivolatile organic compounds

Pest./PCBs = pesticides/polychlorinated biphenyls

ug/L = micrograms per liter

ug/kg = micrograms per kilogram

J = indicates the associated quantitation is an estimated value.

U = indicates the compound was analyzed for, but not detected. The associated numerical value is the reporting limit (RL).

Table 3-9 (cont.)

Analytical Results Summary
Sludge and Wastewater Samples
Old WWTP Site - Wallops Flight Facility

Sample Type:	SLUDGE			WASTEWATER
Field Sample ID:	WFF1-SL1	WFF1-SL2	WFF1-SL3	WFF1-WW01
Laboratory Sample ID:	680-24622-14	680-24622-2	680-24622-3	680-24532-9
Metals	**(mg/kg)**			**(ug/L)**
Aluminum	680	5800	6900	240
Antimony	24 U	20	12	20 U
Arsenic	12 U	2.6	3.2	10 U
Barium	130	270	270	100
Beryllium	4.8 U	0.36 J	0.46 J	4.0 U
Cadmium	6 U	2.2	3.7	5.0 U
Calcium	13000	3900	4600	27000
Chromium	6.0 J	65	36	5.1 B
Cobalt	12 U	2.0	2.6	10 U
Copper	11 J	180	180	4.4 J
Iron	15000	14000	12000	15000
Lead	130	530	360	29
Magnesium	730	780	950	2800
Manganese	270	160 K	190 K	170
Mercury	0.17	24 J	28 J	0.13 B
Nickel	4.0 J	7.2	8.9	40 U
Potassium	1300	640 K	680 K	10000
Silver	12 U	130	110	10 U
Sodium	680 J	130 L	130 L	8800
Vanadium	7.2 J	16	18	1.8 J
Zinc	680	440	420	98
Cyanide	**(mg/kg)**			**(mg/L)**
Cyanide	6.4 U	1.5	1.5	0.010 U

Notes:

Only constituents detected in at least one sample are provided in this table.

ug/L = micrograms per liter

ug/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

B = indicates the analyte was detected in the blank and in the sample.

J = indicates the associated quantitation is an estimated value.

K = Value is biased high based on QC data.

U = indicates analyzed for but not detected at the reported value.

Table 4-1

Summary of Analytes Detected in Soil (0-10 ft)
Old Wastewater Treatment Plant
WALLOPS FLIGHT FACILITY, VIRGINIA

Analyte	Frequency of Detection[a]	Range of Detected Concentrations (mg/kg)	Location of Maximum Detected Concentration	Range of Detection Limits (mg/kg)	Arithmetic Mean Concentration[b] (mg/kg)	Residential Soil RBC[c] (mg/kg)	Ratio of Maximum Detect to RBC
Organics							
Acetone	22 / 25	9.50E-03 - 3.70E-01	WFF1-MW1-0-0.5	4.70E-02 - 5.80E-02	9.68E-02	7.04E+03 N	5.26E-05
Aroclor 1260	1 / 24	1.90E-01 - 2.90E-01	WFF1-SS1	3.50E-02 - 4.40E-02	2.91E-02	3.19E-01 C	9.08E-01
Benzo[a]pyrene	1 / 24	3.40E-02 - 3.40E-02	WFF1-MW2-0-0.5	3.60E-01 - 4.40E-01	1.87E-01	2.20E-02 C	1.55E+00
Benzo[g,h,i]perylene	4 / 24	3.10E-02 - 6.30E-02	WFF1-MW4-0.5-2	3.60E-01 - 4.40E-01	1.70E-01	2.35E+02 N	2.68E-04
bis(2-Ethylhexyl) phthalate	1 / 24	5.90E-02 - 5.90E-02	WFF1-MW4-0.5-2	3.60E-01 - 4.40E-01	1.89E-01	4.56E+01 C	1.29E-03
di-n-Butyl phthalate	2 / 24	3.60E-02 - 5.80E-02	WFF1-MW4-0.5-2	3.60E-01 - 4.40E-01	1.82E-01	7.82E+02 N	7.42E-05
Dibenz(a,h)anthracene	3 / 24	3.30E-02 - 5.00E-02	WFF1-MW2-0-0.5	3.60E-01 - 4.40E-01	1.75E-01	2.20E-02 C	2.27E+00
Dieldrin	1 / 24	3.90E-03 - 5.70E-03	WFF1-SS1	3.50E-03 - 8.10E-03	2.04E-03	3.99E-02 C	1.43E-01
4,4'-DDD	5 / 24	5.70E-04 - 1.20E-02	WFF1-SS1	3.50E-03 - 4.30E-03	2.30E-03	2.66E+00 C	4.51E-03
4,4'-DDE	13 / 24	4.10E-04 - 1.40E-02	WFF1-MW6-0-0.5	3.60E-03 - 4.10E-03	3.26E-03	1.88E+00 C	7.45E-03
4,4'-DDT	7 / 24	7.90E-04 - 4.30E-02	WFF1-SS6	3.50E-03 - 4.30E-03	3.55E-03	1.88E+00 C	2.29E-02
Indeno[1,2,3-cd]pyrene	3 / 24	3.00E-02 - 5.20E-02	WFF1-MW2-0-0.5	3.60E-01 - 4.40E-01	1.75E-01	2.20E-01 C	2.36E-01
Methyl ethyl ketone	16 / 25	4.60E-03 - 4.60E-02	WFF1-MW3-4-6	1.90E-02 - 2.90E-02	1.40E-02	4.69E+03 N	9.80E-06
Methyl isobutyl ketone	8 / 25	6.10E-03 - 3.40E-01	WFF1-MW2-0-0.5	1.90E-02 - 2.90E-02	4.13E-02	5.28E+02 N [d]	---
Tetrachloroethene	1 / 25	6.70E-03 - 6.70E-03	WFF1-SS9	3.80E-03 - 7.30E-03	2.70E-03	1.18E+00 C	5.66E-03
Toluene	2 / 25	2.70E-03 - 2.90E-03	WFF1-MW3-4-6	3.80E-03 - 7.30E-03	2.56E-03	6.26E+02 N	4.63E-06
Xylenes, total	1 / 25	1.20E-02 - 1.20E-02	WFF1-MW3-4-6	7.50E-03 - 1.50E-02	5.34E-03	1.56E+03 N	7.67E-06
Inorganics							
Aluminum	24 / 24	1.30E+03 - 1.30E+04	WFF1-MW2-0-0.5	NA	6.40E+03	7.82E+03 N	1.66E+00
Antimony	4 / 24	5.40E-01 - 3.20E+00	WFF1-SS6	2.00E+00 - 2.50E+00	1.09E+00	3.13E+00 N	1.02E+00
Arsenic	21 / 24	7.60E-01 - 5.40E+00	WFF1-MW7-0-0.5	1.10E+00 - 1.10E+00	2.31E+00	4.26E-01 C	1.27E+01
Barium	24 / 24	5.90E+00 - 1.00E+02	WFF1-SS1	NA	2.82E+01	1.56E+03 N	6.39E-02
Beryllium	20 / 24	8.70E-02 - 4.40E-01	WFF1-MW1-0-0.5	4.40E-02 - 1.30E-01	2.05E-01	1.56E+01 N	2.81E-02
Cadmium	3 / 24	2.90E-01 - 3.70E-01	WFF1-SS6	4.90E-01 - 6.20E-01	2.76E-01	7.82E+00 N	4.73E-02
Calcium	21 / 24	1.60E+02 - 4.20E+04	WFF1-MW1-0-0.5	7.90E+01 - 1.90E+02	2.33E+03	NUT	---
Chromium	23 / 24	2.00E+00 - 1.30E+01	WFF1-MW2-0-0.5	1.60E+00 - 1.60E+00	7.01E+00	2.35E+01 N	5.54E-01
Cobalt	24 / 24	2.30E-01 - 3.30E+00	WFF1-MW7-0-0.5	NA	1.37E+00	1.38E+02 N [d]	2.39E-02
Copper	21 / 24	1.30E+00 - 1.50E+01	WFF1-SS1-D	3.10E-01 - 1.20E+00	3.11E+00	3.13E+02 N	4.79E-02
Cyanide, total	1 / 26	3.40E-01 - 3.40E-01	WFF1-MW6-0-0.5	5.30E-01 - 6.50E-01	2.87E-01	1.56E+02 N	2.17E-03
Iron	22 / 24	2.30E+03 - 1.00E+04	WFF1-SS5-D	6.20E+02 - 9.40E+02	4.18E+03	5.48E+03 N	1.83E+00
Lead	22 / 24	1.90E+00 - 4.60E+02	WFF1-SS1-D	8.50E-01 - 1.70E+00	2.23E+01	4.00E+02	1.15E+00
Magnesium	24 / 24	8.50E+01 - 1.10E+03	WFF1-MW7-0-0.5	NA	4.75E+02	NUT	---
Manganese	24 / 24	5.50E+00 - 3.20E+02	WFF1-MW1-0-0.5	NA	7.03E+01	1.56E+02 N	2.05E+00
Mercury	24 / 24	4.60E-03 - 2.50E-01	WFF1-SS10	NA	4.19E-02	7.82E-01 N	3.20E-01
Nickel	15 / 24	2.30E+00 - 7.70E+00	WFF1-MW7-0-0.5	6.50E-01 - 3.00E+00	3.16E+00	1.56E+02 N	4.92E-02
Potassium	24 / 24	1.20E+02 - 6.40E+02	WFF1-SS5-D	NA	3.46E+02	NUT	---
Silver	3 / 24	1.20E-01 - 6.40E-01	WFF1-SS10	9.80E-01 - 1.20E+00	5.05E-01	3.91E+01 N	1.64E-02

Table 4-1

Summary of Analytes Detected in Soil (0-10 ft)
Old Wastewater Treatment Plant
WALLOPS FLIGHT FACILITY, VIRGINIA

Analyte	Frequency of Detection[a]	Range of Detected Concentrations (mg/kg)	Location of Maximum Detected Concentration	Range of Detection Limits (mg/kg)	Arithmetic Mean Concentration[b] (mg/kg)	Residential Soil RBC[c] (mg/kg)	Ratio of Maximum Detect to RBC
Sodium	24 / 24	5.70E+01 - 4.80E+02	WFF1-MW1-0-0.5	NA	9.39E+01	NUT	---
Vanadium	24 / 24	1.80E+00 - 2.40E+01	WFF1-MW7-0-0.5	NA	1.08E+01	7.82E+00 N	3.07E+00
Zinc	22 / 24	5.80E+00 - 2.50E+02	WFF1-SS1-D	1.80E+00 - 2.50E+00	3.40E+01	2.35E+03 N	1.07E-01

Note: Highlighting indicates that the maximum detected concentration is greater than the RBC.

C = Cancer based, target risk is one-in-a-million (1E-06).

mg/kg = Milligrams per kilogram.

N = Noncancer based, target hazard quotient is 0.1.

NA = Not available.

NBA = No benchmark available.

NUT = Essential nutrient.

RBC = Risk-based concentration.

[a] Number of samples in which analyte was detected compared with total number of samples collected where primary and duplicate samples were considered one sample.

[b] Non-detects were included at one-half the detection limit.

[c] Unless otherwise footnoted, the Region 3 RBC Table was used (EPA, 2007).

[d] Region 9 PRG used for screening (EPA, 2004).

Table 4-2

Summary of Analytes Detected in Sludge
Old Wastewater Treatment Plant
WALLOPS FLIGHT FACILITY, VIRGINIA

Analyte	Frequency of Detection[a]	Range of Detected Concentrations (mg/kg)	Location of Maximum Detected Concentration	Range of Detection Limits (mg/kg)	Arithmetic Mean Concentration[b] (mg/kg)	Residential Soil RBC[c] (mg/kg)	Ratio of Maximum Detect to RBC
Organics							
Acetone	3 / 3	5.50E-02 - 7.40E-01	WFF1-SL02	NA	4.75E-01	7.04E+03 N	1.05E-04
Anthracene	3 / 3	6.40E-02 - 6.30E-01	WFF1-SL1	NA	2.56E-01	2.35E+03 N	2.68E-04
Benzo[a]anthracene	3 / 3	2.90E-01 - 2.10E+00	WFF1-SL1	NA	9.30E-01	2.20E-01 C	9.55E+00
Benzo[a]pyrene	3 / 3	2.90E-01 - 9.10E-01	WFF1-SL1	NA	5.63E-01	2.20E-02 C	4.14E+01
Benzo[b]fluoranthene	3 / 3	5.50E-01 - 4.80E+00	WFF1-SL1	NA	2.07E+00	2.20E-01 C	2.18E+01
Benzo[g,h,i]perylene	3 / 3	2.70E-01 - 1.20E+00	WFF1-SL1	NA	6.20E-01	2.35E+02 N	5.11E-03
Benzo[k]fluoranthene	3 / 3	2.90E-01 - 2.40E+00	WFF1-SL1	NA	1.09E+00	2.20E+00 C	1.09E+00
bis(2-Ethylhexyl) phthalate	1 / 3	7.90E-02 - 7.90E-02	WFF1-SL02	5.40E-01 - 4.40E+00	8.50E-01	4.56E+01 C	1.73E-03
Carbazole	1 / 3	5.30E-02 - 5.30E-02	WFF1-SL02	5.40E-01 - 4.40E+00	8.41E-01	3.19E+01 C	1.66E-03
Chrysene	3 / 3	4.80E-01 - 4.70E+00	WFF1-SL1	NA	1.92E+00	2.20E+01 C	2.14E-01
di-n-Butyl phthalate	2 / 3	8.90E-02 - 1.10E-01	WFF1-SL02	4.40E+00 - 4.40E+00	8.00E-01	7.82E+02 N	1.41E-04
Dibenz(a,h)anthracene	1 / 3	7.60E-02 - 7.60E-02	WFF1-SL03	5.20E-01 - 4.40E+00	8.45E-01	2.20E-02 C	3.45E+00
1,4-Dichlorobenzene	2 / 3	8.40E-02 - 8.40E-02	WFF1-SL02	4.40E+00 - 4.40E+00	7.89E-01	2.66E+01 C	3.16E-03
Dieldrin	2 / 3	5.60E-03 - 9.90E-03	WFF1-SL02	4.40E-01 - 4.40E-01	7.85E-02	3.99E-02 C	2.48E-01
4,4'-DDD	3 / 3	1.10E-01 - 1.20E+00	WFF1-SL03	NA	8.03E-01	2.66E+00 C	4.51E-01
4,4'-DDE	3 / 3	6.70E-02 - 1.40E+00	WFF1-SL02	NA	9.22E-01	1.88E+00 C	7.45E-01
4,4'-DDT	3 / 3	1.10E-01 - 1.10E+00	WFF1-SL03	NA	7.00E-01	1.88E+00 C	5.86E-01
Fluoranthene	3 / 3	4.10E-01 - 9.00E+00	WFF1-SL1	NA	3.30E+00	3.13E+02 N	2.88E-02
Fluorene	1 / 3	3.60E-01 - 3.60E-01	WFF1-SL1	5.20E-01 - 5.40E-01	2.97E-01	3.13E+02 N	1.15E-03
2-Hexanone	1 / 3	1.30E-01 - 1.30E-01	WFF1-SL1	4.70E-02 - 5.50E-02	6.03E-02	NBA	---
Indeno[1,2,3-cd]pyrene	3 / 3	2.30E-01 - 1.40E+00	WFF1-SL1	NA	6.53E-01	2.20E-01 C	6.36E+00
Methyl ethyl ketone	2 / 3	7.70E-02 - 2.10E-01	WFF1-SL1	5.50E-02 - 5.50E-02	1.05E-01	4.69E+03 N	4.47E-05
Methyl isobutyl ketone	1 / 3	9.10E-02 - 9.10E-02	WFF1-SL1	4.70E-02 - 5.50E-02	4.73E-02	5.28E+02 N[d]	---
Pyrene	3 / 3	3.60E-01 - 6.30E+00	WFF1-SL1	NA	2.36E+00	2.35E+02 N	2.68E-02
Phenanthrene	3 / 3	1.70E-01 - 3.00E+00	WFF1-SL1	NA	1.12E+00	2.35E+02 N[e]	1.28E-02
Tetrachloroethene	1 / 3	5.10E-03 - 5.10E-03	WFF1-SL02	1.10E-02 - 7.10E-02	1.54E-02	1.18E+00 C	4.31E-03
1,1,2,2-Tetrachloroethane	1 / 3	2.90E-02 - 2.90E-02	WFF1-SL1	9.50E-03 - 1.10E-02	1.31E-02	3.19E+00 C	9.08E-03
Toluene	2 / 3	6.20E-03 - 1.20E+00	WFF1-SL1	1.10E-02 - 1.10E-02	4.04E-01	6.26E+02 N	1.92E-03
Inorganics							
Aluminum	3 / 3	6.80E+02 - 6.90E+03	WFF1-SL03	NA	4.46E+03	7.82E+03 N	8.82E-01
Antimony	2 / 3	1.20E+01 - 2.00E+01	WFF1-SL02	2.40E+01 - 2.40E+01	1.47E+01	3.13E+00 N	6.39E+00
Arsenic	2 / 3	2.60E+00 - 3.20E+00	WFF1-SL03	1.20E+01 - 1.20E+01	3.93E+00	4.26E-01 C	7.51E+00
Barium	3 / 3	1.30E+02 - 2.70E+02	WFF1-SL02	NA	2.23E+02	1.56E+03 N	1.73E-01
Beryllium	2 / 3	3.60E-01 - 4.60E-01	WFF1-SL03	4.80E+00 - 4.80E+00	1.07E+00	1.56E+01 N	2.94E-02
Cadmium	2 / 3	2.20E+00 - 3.70E+00	WFF1-SL03	6.00E+00 - 6.00E+00	2.97E+00	7.82E+00 N	4.73E-01
Calcium	3 / 3	3.90E+03 - 1.30E+04	WFF1-SL1	NA	7.17E+03	NUT	---
Chromium	2 / 3	3.60E+01 - 6.50E+01	WFF1-SL02	6.00E+00 - 6.00E+00	3.47E+01	2.35E+01 N	2.77E+00

Table 4-2

Summary of Analytes Detected in Sludge
Old Wastewater Treatment Plant
WALLOPS FLIGHT FACILITY, VIRGINIA

Analyte	Frequency of Detection[a]	Range of Detected Concentrations (mg/kg)	Location of Maximum Detected Concentration	Range of Detection Limits (mg/kg)	Arithmetic Mean Concentration[b] (mg/kg)	Residential Soil RBC[c] (mg/kg)	Ratio of Maximum Detect to RBC
Cobalt	2 / 3	2.00E+00 - 2.60E+00	WFF1-SL03	1.20E+01 - 1.20E+01	3.53E+00	1.38E+02 N [d]	1.88E-02
Copper	3 / 3	1.10E+01 - 1.80E+02	WFF1-SL02	NA	1.24E+02	3.13E+02 N	5.75E-01
Cyanide, total	2 / 3	1.50E+00 - 1.50E+00	WFF1-SL02	6.40E+00 - 6.40E+00	2.07E+00	1.56E+02 N	9.59E-03
Iron	3 / 3	1.20E+04 - 1.50E+04	WFF1-SL1	NA	1.37E+04	5.48E+03 N	2.74E+00
Lead	3 / 3	1.30E+02 - 5.30E+02	WFF1-SL02	NA	3.40E+02	4.00E+02	1.33E+00
Magnesium	3 / 3	7.30E+02 - 9.50E+02	WFF1-SL03	NA	8.20E+02	NUT	---
Manganese	3 / 3	1.60E+02 - 2.70E+02	WFF1-SL1	NA	2.07E+02	1.56E+02 N	1.73E+00
Mercury	3 / 3	1.70E-01 - 2.80E+01	WFF1-SL03	NA	1.74E+01	7.82E-01 N	3.58E+01
Nickel	3 / 3	4.00E+00 - 8.90E+00	WFF1-SL03	NA	6.70E+00	1.56E+02 N	5.69E-02
Potassium	3 / 3	6.40E+02 - 1.30E+03	WFF1-SL1	NA	8.73E+02	NUT	---
Silver	2 / 3	1.10E+02 - 1.30E+02	WFF1-SL02	1.20E+01 - 1.20E+01	8.20E+01	3.91E+01 N	3.32E+00
Sodium	3 / 3	1.30E+02 - 6.80E+02	WFF1-SL1	NA	3.13E+02	NUT	---
Vanadium	3 / 3	7.20E+00 - 1.80E+01	WFF1-SL03	NA	1.37E+01	7.82E+00 N	2.30E+00
Zinc	3 / 3	4.20E+02 - 6.80E+02	WFF1-SL1	NA	5.13E+02	2.35E+03 N	2.90E-01

Note: Highlighting indicates that the maximum detected concentration is greater than the RBC.

C = Cancer based, target risk is one-in-a-million (1E-06).

mg/kg = Milligrams per kilogram.

N = Noncancer based, target hazard quotient is 0.1.

NA = Not available.

NBA = No benchmark available.

NUT = Essential nutrient.

RBC = Risk-based concentration.

[a] Number of samples in which analyte was detected compared with total number of samples collected where primary and duplicate samples were considered one sample.

[b] Non-detects were included at one-half the detection limit.

[c] Unless otherwise footnoted, the Region 3 RBC Table was used (EPA, 2007).

[d] Region 9 PRG used for screening (EPA, 2004).

[e] Pyrene RBC was used as a surrogate for screening purposes.

Table 4-3

Summary of Analytes Detected in Sediment
Old Wastewater Treatment Plant
WALLOPS FLIGHT FACILITY, VIRGINIA

Analyte	Frequency of Detection[a]	Range of Detected Concentrations (mg/kg)	Location of Maximum Detected Concentration	Range of Detection Limits (mg/kg)	Arithmetic Mean Concentration[b] (mg/kg)	Residential Soil RBC[c] (mg/kg)	Ratio of Maximum Detect to RBC
Organics							
Acetone	2 / 2	4.50E-02 - 2.70E-01	WFF1-SD2	NA	1.58E-01	7.04E+04 N	3.84E-06
4,4'-DDD	1 / 2	2.70E-03 - 2.70E-03	WFF1-SD2	4.30E-03 - 4.30E-03	2.43E-03	2.66E+01 C	1.01E-04
4,4'-DDE	2 / 2	1.80E-03 - 2.60E-03	WFF1-SD2	NA	2.20E-03	1.88E+01 C	1.38E-04
4,4'-DDT	2 / 2	7.70E-04 - 1.60E-03	WFF1-SD2	NA	1.19E-03	1.88E+01 C	8.52E-05
Methyl ethyl ketone	1 / 2	1.80E-02 - 1.80E-02	WFF1-SD2	2.60E-02 - 2.60E-02	1.55E-02	4.69E+04 N	3.84E-07
Inorganics							
Aluminum	2 / 2	3.40E+03 - 5.50E+03	WFF1-SD2	NA	4.45E+03	7.82E+04 N	7.03E-02
Arsenic	2 / 2	1.40E+00 - 2.70E+00	WFF1-SD2	NA	2.05E+00	4.26E+00 C	6.34E-01
Barium	2 / 2	1.60E+01 - 2.30E+01	WFF1-SD2	NA	1.95E+01	1.56E+04 N	1.47E-03
Beryllium	2 / 2	1.10E-01 - 1.80E-01	WFF1-SD2	NA	1.45E-01	1.56E+02 N	1.15E-03
Calcium	2 / 2	2.00E+02 - 6.50E+02	WFF1-SD2	NA	4.25E+02	NUT	---
Chromium	2 / 2	4.20E+00 - 6.80E+00	WFF1-SD2	NA	5.50E+00	2.35E+02 N	2.90E-02
Cobalt	2 / 2	7.40E-01 - 1.90E+00	WFF1-SD2	NA	1.32E+00	1.38E+03 N[d]	1.38E-03
Copper	2 / 2	1.30E+00 - 2.90E+00	WFF1-SD2	NA	2.10E+00	3.13E+03 N	9.27E-04
Iron	2 / 2	2.60E+03 - 4.10E+03	WFF1-SD2	NA	3.35E+03	5.48E+04 N	7.49E-02
Lead	2 / 2	4.00E+00 - 7.90E+00	WFF1-SD2	NA	5.95E+00	4.00E+02	1.98E-02
Magnesium	2 / 2	2.60E+02 - 4.40E+02	WFF1-SD2	NA	3.50E+02	NUT	---
Manganese	2 / 2	4.40E+01 - 9.50E+01	WFF1-SD2	NA	6.95E+01	1.56E+03 N	6.07E-02
Mercury	2 / 2	9.30E-03 - 4.40E-02	WFF1-SD2	NA	2.67E-02	7.82E+00 N	5.63E-03
Nickel	2 / 2	1.80E+00 - 3.10E+00	WFF1-SD2	NA	2.45E+00	1.56E+03 N	1.98E-03
Potassium	2 / 2	2.20E+02 - 3.20E+02	WFF1-SD2	NA	2.70E+02	NUT	---
Sodium	2 / 2	6.00E+01 - 7.10E+01	WFF1-SD1	NA	6.55E+01	NUT	---
Vanadium	2 / 2	5.90E+00 - 8.80E+00	WFF1-SD2	NA	7.35E+00	7.82E+01 N	1.13E-01
Zinc	2 / 2	9.60E+00 - 2.00E+01	WFF1-SD2	NA	1.48E+01	2.35E+04 N	8.52E-04

C = Cancer based, target risk is one-in-a-hundred thousand (1E-05).
mg/kg = Milligrams per kilogram.
N = Noncancer based, target hazard quotient is 1.0.
NA = Not available.
NBA = No benchmark available.
NUT = Essential nutrient.
RBC = Risk-based concentration.

[a] Number of samples in which analyte was detected compared with total number of samples collected where primary and duplicate samples were considered one sample.

[b] Non-detects were included at one-half the detection limit.

[c] Unless otherwise footnoted, the Region 3 RBC Table was used (EPA, 2007).

[d] Region 9 PRG used for screening (EPA, 2004).

Table 4-4

Summary of Analytes Detected in Groundwater
Old Wastewater Treatment Plant
WALLOPS FLIGHT FACILITY, VIRGINIA

Analyte	Frequency of Detection[a]	Range of Detected Concentrations (µg/L)	Location of Maximum Detected Concentration	Range of Detection Limits (µg/L)	Arithmetic Mean Concentration[b] (µg/L)	Tap Water RBC[c] (µg/L)	Ratio of Maximum Detect to RBC
Organics							
Acetone	1 / 7	4.70E+01 - 5.20E+01	WFF1-MW3	2.50E+01 - 2.50E+01	1.78E+01	5.48E+02 N	9.50E-02
bis(2-Ethylhexyl) phthalate	2 / 7	1.10E+00 - 1.50E+00	WFF1-MW1	9.40E+00 - 1.00E+01	3.88E+00	4.78E+00 C	3.14E-01
Diethyl Phthalate	1 / 7	7.30E-01 - 7.30E-01	WFF1-MW7	9.60E+00 - 1.00E+01	4.34E+00	2.92E+03 N	2.50E-04
2,4-Dimethylphenol	1 / 7	1.00E+02 - 1.00E+02	WFF1-MW20	9.40E+00 - 1.00E+01	1.85E+01	7.30E+01 N	1.37E+00
Methyl ethyl ketone	1 / 7	1.50E+01 - 1.70E+01	WFF1-MW3	1.00E+01 - 1.00E+01	6.57E+00	6.97E+02 N	2.44E-02
3 & 4 Methylphenol	1 / 7	4.70E+00 - 1.10E+01	WFF1-MW20	9.40E+00 - 1.00E+01	5.78E+00	1.83E+01 N	6.03E-01
Phenol	1 / 7	7.80E+00 - 1.20E+01	WFF1-MW20	9.40E+00 - 1.00E+01	5.92E+00	1.10E+03 N	1.10E-02
Tetrachloroethene	1 / 7	4.40E+00 - 4.40E+00	WFF1-MW1	1.00E+00 - 1.00E+00	1.06E+00	1.04E-01 C	4.25E+01
Inorganics							
Aluminum	7 / 7	6.20E+02 - 2.20E+03	WFF1-MW6	NA	1.47E+03	2.00E+02 [d]	1.10E+01
Arsenic	2 / 7	1.00E+01 - 1.50E+01	WFF1-MW20	1.00E+01 - 1.00E+01	7.14E+00	4.46E-02 C	3.36E+02
Barium	7 / 7	2.30E+01 - 5.70E+01	WFF1-MW6	NA	3.80E+01	7.30E+02 N	7.81E-02
Calcium	7 / 7	1.00E+04 - 6.40E+04	WFF1-MW20	NA	2.97E+04	NUT	---
Chromium	1 / 7	1.70E+01 - 1.70E+01	WFF1-MW2	1.60E+00 - 1.00E+01	3.98E+00	1.10E+01 N	1.55E+00
Cobalt	2 / 7	6.00E+00 - 7.10E+00	WFF1-MW6	3.90E+00 - 1.00E+01	5.05E+00	7.30E+01 N	9.73E-02
Iron	7 / 7	1.70E+02 - 1.10E+04	WFF1-MW20	NA	3.60E+03	3.00E+02 [e]	3.67E+01
Magnesium	7 / 7	1.80E+03 - 4.50E+03	WFF1-MW7	NA	3.56E+03	NUT	---
Manganese	7 / 7	2.20E+01 - 1.50E+03	WFF1-MW6	NA	4.21E+02	5.00E+01 [e]	3.00E+01
Potassium	7 / 7	1.40E+03 - 3.40E+03	WFF1-MW2	2.10E+03 NA 2.10E+03	2.55E+03	NUT	---
Sodium	7 / 7	5.40E+03 - 1.60E+04	WFF1-MW6	NA	9.53E+03	NUT	---
Vanadium	2 / 7	1.60E+00 - 1.90E+00	WFF1-MW6	1.80E+00 - 1.00E+01	2.95E+00	3.65E+00 N	5.21E-01

Note: Highlighting indicates that the maximum detected concentration is greater than the RBC.

C = Cancer based, target risk is one-in-a-million (1E-06).

µg/L = Micrograms per liter.

N = Noncancer based, target hazard quotient is 0.1.

NA = Not available.

NUT = Essential nutrient.

RBC = Risk-based concentration.

[a] Number of samples in which analyte was detected compared with total number of samples collected where primary and duplicate samples were considered one sample.

[b] Non-detects were included at one-half the detection limit.

[c] Unless otherwise noted, the Region 3 Tap Water RBC was used for screening. The Virginia Groundwater Quality Standards and National Primary and Secondary Drinking Water MCLs were adopted and footnoted if they more restrictive than the RBC.

[d] Secondary MCL. The secondary MCL for Aluminum was presented as a range of 50 - 200 µg/L (EPA, 2006).

[e] Virginia Groundwater Quality Standard (VA DEQ, 2006).

Table 4-5

Summary of Analytes Detected in Surface Water
Old Wastewater Treatment Plant
WALLOPS FLIGHT FACILITY, VIRGINIA

Analyte	Frequency of Detection[a]	Range of Detected Concentrations (µg/L)	Location of Maximum Detected Concentration	Range of Detection Limits (µg/L)	Arithmetic Mean Concentration[b] (µg/L)	Tap Water RBC[c] (µg/L)	Ratio of Maximum Detect to RBC
Organics							
Acetone	1 / 2	8.90E+00 - 8.90E+00	WFF1-WW01	2.50E+01 - 2.50E+01	1.07E+01	5.48E+03 N	1.63E-03
Chloromethane	1 / 2	5.30E-01 - 5.30E-01	WFF1-SW1	1.00E+00 - 1.00E+00	5.15E-01	1.90E+02 N	2.79E-03
Fluoranthene	1 / 2	1.50E+00 - 1.50E+00	WFF1-WW01	9.40E+00 - 9.40E+00	3.10E+00	1.46E+03 N	1.03E-03
Methyl ethyl ketone	1 / 2	3.80E+00 - 3.80E+00	WFF1-WW01	1.00E+01 - 1.00E+01	4.40E+00	6.97E+03 N	5.45E-04
Phenanthrene	1 / 2	9.10E-01 - 9.10E-01	WFF1-WW01	9.40E+00 - 9.40E+00	2.81E+00	1.83E+02 N	4.99E-03
Pyrene	1 / 2	1.20E+00 - 1.20E+00	WFF1-WW01	9.40E+00 - 9.40E+00	2.95E+00	1.83E+02 N	6.58E-03
Inorganics							
Aluminum	2 / 2	2.40E+02 - 2.50E+03	WFF1-SW1	NA	1.37E+03	3.65E+04 N	6.85E-02
Barium	2 / 2	3.10E+01 - 1.00E+02	WFF1-WW01	NA	6.55E+01	7.30E+03 N	1.37E-02
Calcium	2 / 2	8.80E+03 - 2.70E+04	WFF1-WW01	NA	1.79E+04	NUT	---
Cobalt	1 / 2	3.50E+00 - 3.50E+00	WFF1-SW1	1.00E+01 - 1.00E+01	4.25E+00	7.30E+02 N	4.79E-03
Copper	1 / 2	4.40E+00 - 4.40E+00	WFF1-WW01	2.00E+01 - 2.00E+01	7.20E+00	1.46E+03 N	3.01E-03
Iron	2 / 2	7.20E+03 - 1.50E+04	WFF1-WW01	NA	1.11E+04	2.56E+04 N	5.87E-01
Lead	1 / 2	2.90E+01 - 2.90E+01	WFF1-WW01	5.00E+00 - 5.00E+00	1.58E+01	1.50E+01 [d]	1.93E+00
Magnesium	2 / 2	1.20E+03 - 2.80E+03	WFF1-WW01	NA	2.00E+03	NUT	---
Manganese	2 / 2	1.70E+02 - 4.60E+02	WFF1-SW1	NA	3.15E+02	7.30E+02 N	6.30E-01
Potassium	2 / 2	1.60E+03 - 1.00E+04	WFF1-WW01	NA	5.80E+03	NUT	---
Sodium	2 / 2	6.30E+03 - 8.80E+03	WFF1-WW01	NA	7.55E+03	NUT	---
Vanadium	2 / 2	1.80E+00 - 3.50E+00	WFF1-SW1	NA	2.65E+00	3.65E+01 N	9.59E-02
Zinc	1 / 2	9.80E+01 - 9.80E+01	WFF1-WW01	1.80E+01 - 1.80E+01	5.35E+01	1.10E+04 N	8.95E-03

Note: Highlighting indicates that the maximum detected concentration is greater than the RBC.

C = Cancer based, target risk is one-in-a-million (1E-05).

µg/L = Micrograms per liter.

N = Noncancer based, target hazard quotient is 1.0.

NA = Not available.

NUT = Essential nutrient.

RBC = Risk-based concentration.

[a] Number of samples in which analyte was detected compared with total number of samples collected where primary and duplicate samples were considered one sample.

[b] Non-detects were included at one-half the detection limit.

[c] Unless otherwise noted, the Region 3 Tap Water RBC was used for screening.

[d] Lead Action Level.

Table 4-6

Aggregate Soil Background Comparison
Old Wastewater Treatment Plant
Wallops Island Flight Facility

COEC	Old WWTP		Molena Background		Data Distribution[a]		Statistical Test	Probability of Accepting the Null Hypothesis	Conclusion at p = 0.05
	Average (mg/kg)	Standard Deviation (mg/kg)	Average (mg/kg)	Standard Deviation (mg/kg)	Old WWTP	Background			
Aluminum	6.40E+03	3.14E+03	1.18E+04	5.08E+03	Normal	Normal	AW	0.000062	S*
Antimony	1.09E+00	4.38E-01	ND		Non-Parametric	---	---	---	---
Arsenic	2.31E+00	1.36E+00	3.85E+00	2.81E+00	Normal	Gamma	MW	0.009129	S*
Iron	4.18E+03	2.43E+03	8.60E+03	5.35E+03	Non-Parametric	Normal	MW	0.000297	S*
Lead	2.23E+01	8.48E+01	1.89E+01	3.02E+01	Non-Parametric	Non-Parametric	MW	0.00031	S
Manganese	7.03E+01	6.83E+01	2.14E+02	2.08E+02	Gamma	Gamma	MW	0.001049	S*
Vanadium	1.08E+01	6.00E+00	1.86E+01	8.20E+00	Normal	Gamma	MW	0.000626	S*

mg/kg = Milligrams per kilogram.

ND = Not detected.

AW = Aspin-Welch Unequal-Variance Test.

EV = Equal-Variance T-Test.

MW = Mann-Whitney Test.

NS = Site concentrations not significantly different from background ($\alpha = 0.05$.)

S = Site concentrations significantly different from background ($\alpha = 0.05$.)

S* = Site concentrations significantly different from background ($\alpha = 0.05$.); however, background mean is greater than the site.

[a] Based on ProUCL recommendation

Table 4-7

Sludge Background Comparison*
Old Wastewater Treatment Plant
Wallops Island Flight Facility

COEC	Old WWTP		Molena Background Surface Soil	
	Maximum Detected Concentration (mg/kg)	Average (mg/kg)	Maximum Detected Concentration (mg/kg)	Average (mg/kg)
Arsenic	3.2E+00	3.93E+00	1.42E+01	4.20E+00
Chromium	6.5E+01	3.47E+01	1.84E+01	9.57E+00
Iron	1.5E+04	1.37E+04	1.09E+04	7.59E+03
Lead	5.3E+02	3.40E+02	1.24E+02	3.06E+01
Manganese	2.7E+02	2.07E+02	7.81E+02	3.68E+02
Mercury	2.8E+01	1.74E+01	2.50E-01	6.88E-02
Silver	1.3E+02	8.20E+01	3.00E-01	1.12E-01
Vanadium	1.8E+01	1.37E+01	2.85E+01	1.69E+01

mg/kg = Milligrams per kilogram.

*Due to an insufficient sediment sample size, a statistical comparison could not be conducted.

Table 4-8

Groundwater Background Comparison*
Old Wastewater Treatment Plant
Wallops Island Flight Facility

COEC	Old WWTP		GW Background	
	Maximum Detected Concentration (µg/L)	Average (µg/L)	Maximum Detected Concentration (µg/L)	Average (µg/L)
Aluminum	2.20E+03	1.47E+03	2.03E+03	1.89E+02
Arsenic	1.50E+01	7.14E+00	3.00E+00	2.63E+00
Chromium	1.70E+01	3.98E+00	2.30E+00	2.21E+00
Iron	1.10E+04	3.60E+03	3.32E+04	4.47E+03
Manganese	1.50E+03	4.21E+02	3.08E+03	2.86E+02

µg/L = Micrograms per liter.

*Due to an insufficient sediment sample size, a statistical comparison could not be conducted.

Table 5-1
Special Status Species
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Scientific Name	Common Name	Status
Source: Commonwealth of Virginia, Department of Game and Inland Fisheries, Compiled 16 January 2007. Based on a 3 mile radius around the Old WWTP.		
Fish		
Acipenser oxyrhynchus	Atlantic sturgeon	FS/SS
Reptiles		
Caretta caretta	Loggerhead sea turtle	FT/ST
Chelonia mydas	Green sea turtle	FT/ST
Dermochelys coriacea	Leatherback sea turtle	FE/SE
Eretmochelys imbricata	Hawksbill sea turtle	FE/SE
Lepidochelys kempii	Kemp's Ridley sea turtle	FE/SE
Malaclemys terrapin terrapin	Northern diamond-backed terrapin	FS
Birds		
Aegolius acadicus	Northern saw-whet owl	SS
Ammodramus caudacutus	Saltmarsh sharp-tailed sparrow	SS
Ammodramus henslowii	Henslow's sparrow	FS/ST
Ardea alba egretta	Great egret	SS
Bartramia longicauda	Upland sandpiper	ST
Carpodacus purpureus	Purple finch	SS
Catharus guttatus	Hermit thrush	SS
Certhia americana	Brown creeper	SS
Charadrius melodus	Piping plover	FT/ST
Charadrius wilsonia	Wilson's plover	SE
Circus cyaneus	Northern harrier	SS
Cistothorus platensis	Sedge wren	SS
Dendroica cerulean	Cerulean warbler	FS
Dendroica magnolia	Magnolia warbler	SS
Egretta caerulea caerulea	Little blue heron	SS
Egretta tricolor	Tricolored heron	SS
Empidonax alnorum	Alder flycatcher	SS
Empidonax flaviventris	Yellow-bellied flycatcher	SS
Falco peregrinus	Peregrine falcon	ST
Falco peregrinus tundrius	Arctic peregrine falcon	ST
Gallinula chloropus cachinnans	Common moorhen	SS

Table 5-1, Continued
Special Status Species
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Scientific Name	Common Name	Status
Haliaeetus leucocephalus	Bald eagle	FT/ST
Lanius ludovicianus	Loggerhead shrike	ST
Lanius ludovicianus migrans	Migrant loggerhead shrike	FS/ST
Laterallus jamaicensis	Black rail	FS
Loxia curvirostra	Red crossbill	SS
Nyctanassa violacea violacea	Yellow-crowned night-heron	SS
Pelecanus occidentalis carolinensis	Brown pelican	SS
Plegadis falcinellus	Glossy ibis	SS
Regulus satrapa	Golden-crowned kinglet	SS
Sitta Canadensis	Red-breasted nuthatch	SS
Sterna antillarum	Least tern	SS
Sterna caspia	Caspian tern	SS
Sterna dougallii dougallii	Roseate tern	FE/SE
Sterna forsteri	Forster's tern	SS
Sterna nilotica	Gull-billed tern	ST
Sterna sandvicensis acuflavidus	Sandwich tern	SS
Troglodytes troglodytes	Winter wren	SS
Tyto alba pratincola	Barn owl	SS
Mammals		
Condylura cristata parva	Star-nosed mole	SS
Lontra canadensis lataxina	Northern river otter	SS
Sciurus niger cinereus	Delmarva peninsula fox squirrel	FE/SE
Source: Commonwealth of Virginia, Department of Conservation and Recreation Natural Heritage Search, 9 November 2006. Status presented as Global Rank/State Rank/Federal Status/State Status		
Invertebrates		
Cordulegaster diastatops	Delat-spotted spiketail	G5/S1/NL/NL
Birds		
Haliaeetus leucocephalus	Bald eagle	G5/S2S3B,S3N/FT/ST
Source: USFWS, 2004 Natural Heritage Search		
Vascular Plants		
Amaranthus pumilus	Seabeach amaranth	FT
Polygonum glaucum	Sea-beach knotweed	G3/FS

Table 5-1, Continued
Special Status Species
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Scientific Name	Common Name	Status
Trillium pusillum var. virginianum	Virginia least trillium	G3T2/FS
Invertebrates		
Cicindela dorsalis dorsalis	Northeastern beach tiger beetle	FT
Reptiles		
Caretta caretta	Loggerhead sea turtle	FT
Birds		
Charadrius melodus	Piping plover	FT
Haliaeetus leucocephalus	Bald eagle	FT
Mammals		
Sciurus niger cinereus	Delmarva peninsula fox squirrel	FE

FE – Federal endangered.

FS – Federal species of concern (Not a legal status).

FT – Federal threatened.

G3 – Either very rare and local throughout its range or found locally (abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.

G5 – Demonstrably widespread, abundant, and secure.

NL – Not listed.

S1 – Critically imperiled in the state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer populations or occurrences; or very few remaining individuals (<1,000).

S2 – Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 populations or occurrences or few remaining individuals (1,000 to 3,000).

S3B – Breeding status of animal within the state is vulnerable either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 populations or occurrences (1,000 to 3,000).

S3N – Non-breeding status of animal within the state. Usually applied to winter resident species. Is vulnerable either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 populations or occurrences (1,000 to 3,000).

SE – State endangered.

SS – State species of concern (Not a legal status).

ST – State threatened.

T2 – Subspecies or variety is very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it vulnerable to extinction.

Table 5-2

Summary and Comparison of Maximum Detected Concentrations in Surface Soil to Soil Benchmarks
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Chemical	Frequency of Detection[a]	Range of Detected Concentrations (mg/kg)	Location of Maximum Detected Concentration	Range of Detection Limits (mg/kg)	Arithmetic Mean Concentration[b] (mg/kg)	Soil Screening Benchmarks[c] (mg/kg)	Surface Soil Ratio of Maximum Detected Detected Concentration to Soil Screening Benchmark
Volatiles							
Acetone	12 / 15	5.00E-02 - 3.70E-01	WFF1-MW1-0-0.5	4.70E-02 - 5.80E-02	1.19E-01	2.50E+00 [d]	1.48E-01
Methyl ethyl ketone	11 / 15	7.10E-03 - 3.30E-02	WFF1-MW2-0-0.5	2.40E-02 - 2.90E-02	1.42E-02	8.96E+01 [d]	3.68E-04
Methyl isobutyl ketone	5 / 15	6.10E-03 - 3.40E-01	WFF1-MW2-0-0.5	2.10E-02 - 2.90E-02	3.45E-02	1.00E+02 [e]	3.40E-03
Tetrachloroethene	1 / 15	6.70E-03 - 6.70E-03	WFF1-SS9	4.20E-03 - 7.30E-03	2.94E-03	3.00E-01 [f]	2.23E-02
Toluene	1 / 15	2.70E-03 - 2.70E-03	WFF1-MW1-0-0.5	4.20E-03 - 7.30E-03	2.67E-03	1.00E-01 [f]	2.70E-02
Semivolatiles							
Benzo[a]pyrene	1 / 14	3.40E-02 - 3.40E-02	WFF1-MW2-0-0.5	3.60E-01 - 4.40E-01	1.84E-01	1.00E-01 [e]	3.40E-01
Benzo[g,h,i]perylene	2 / 14	3.50E-02 - 5.20E-02	WFF1-MW2-0-0.5	3.60E-01 - 4.40E-01	1.74E-01	1.00E-01 [f]	5.20E-01
Dibenz(a,h)anthracene	2 / 14	3.30E-02 - 5.00E-02	WFF1-MW2-0-0.5	3.60E-01 - 4.40E-01	1.73E-01	1.00E-01 [f]	5.00E-01
Di-n-butyl phthalate	1 / 14	3.60E-02 - 3.60E-02	WFF1-SS7	3.60E-01 - 4.40E-01	1.84E-01	2.00E+02 [g]	1.80E-04
Indeno[1,2,3-cd]pyrene	2 / 14	3.00E-02 - 5.20E-02	WFF1-MW2-0-0.5	3.60E-01 - 4.40E-01	1.73E-01	1.00E-01 [f]	5.20E-01
Pesticides							
4,4'-DDD	5 / 14	5.70E-04 - 1.20E-02	WFF1-SS1	3.50E-03 - 4.30E-03	2.58E-03	1.00E-01 [f]	1.20E-01
4,4'-DDE	11 / 14	4.10E-04 - 1.40E-02	WFF1-MW6-0-0.5	3.60E-03 - 3.70E-03	4.35E-03	1.00E-01 [f]	1.40E-01
4,4'-DDT	6 / 14	7.90E-04 - 4.30E-02	WFF1-SS6	3.50E-03 - 4.30E-03	4.81E-03	1.00E-01 [f]	4.30E-01
Dieldrin	1 / 14	3.90E-03 - 5.70E-03	WFF1-SS1	3.50E-03 - 8.10E-03	2.14E-03	1.00E-01 [f]	5.70E-02
Polychlorinated biphenyls							
PCB-1260	1 / 14	1.90E-01 - 2.90E-01	WFF1-SS1	3.50E-02 - 4.40E-02	3.63E-02	1.00E-01 [g, h]	2.90E+00
Inorganics							
Aluminum	14 / 14	3.00E+03 - 1.30E+04	WFF1-MW2-0-0.5	NA	7.14E+03	1.00E+00 [i]	1.30E+04
Antimony	4 / 14	5.40E-01 - 3.20E+00	WFF1-SS6	2.00E+00 - 2.50E+00	1.11E+00	2.70E-01 [j, k]	1.19E+01
Arsenic	14 / 14	1.20E+00 - 5.40E+00	WFF1-MW7-0-0.5	NA	2.80E+00	1.80E+01 [j, l]	3.00E-01
Barium	14 / 14	1.30E+01 - 1.00E+02	WFF1-SS1	NA	3.43E+01	3.30E+02 [j, m]	3.03E-01
Beryllium	13 / 14	8.70E-02 - 4.40E-01	WFF1-MW1-0-0.5	1.30E-01 - 1.30E-01	2.41E-01	2.10E+01 [j, k]	2.10E-02
Cadmium	3 / 14	2.90E-01 - 3.70E-01	WFF1-SS6	4.90E-01 - 6.20E-01	2.82E-01	3.60E-01 [j, k]	1.03E+00
Calcium	13 / 14	1.60E+02 - 4.20E+04	WFF1-MW1-0-0.5	1.90E+02 - 1.90E+02	3.61E+03	NBA	---
Chromium	14 / 14	4.60E+00 - 1.30E+01	WFF1-MW2-0-0.5	NA	8.09E+00	2.60E+01 [j, n, o]	5.00E-01
Cobalt	14 / 14	5.70E-01 - 3.30E+00	WFF1-MW7-0-0.5	NA	1.65E+00	1.30E+01 [j, l]	2.54E-01
Copper	14 / 14	1.40E+00 - 1.50E+01	WFF1-SS1-D	NA	4.17E+00	2.80E+01 [j, n]	5.36E-01
Iron	14 / 14	2.60E+03 - 1.00E+04	WFF1-SS5-D	NA	5.05E+03	1.20E+01 [e]	8.33E+02

Table 5-2

Summary and Comparison of Maximum Detected Concentrations in Surface Soil to Soil Benchmarks
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Chemical	Frequency of Detection[a]	Range of Detected Concentrations (mg/kg)	Location of Maximum Detected Concentration	Range of Detection Limits (mg/kg)	Arithmetic Mean Concentration[b] (mg/kg)	Soil Screening Benchmarks[c] (mg/kg)	Surface Soil Ratio of Maximum Detected Detected Concentration to Soil Screening Benchmark
Lead	14 / 14	2.20E+00 - 4.60E+02	WFF1-SS1-D	NA	3.63E+01	1.10E+01 [j, n]	4.18E+01
Magnesium	14 / 14	2.80E+02 - 1.10E+03	WFF1-MW7-0-0.5	NA	5.73E+02	4.40E+03 [f]	2.50E-01
Manganese	14 / 14	1.50E+01 - 3.20E+02	WFF1-MW1-0-0.5	NA	9.44E+01	3.30E+02 [f]	9.70E-01
Mercury	14 / 14	9.60E-03 - 2.50E-01	WFF1-SS10	NA	6.10E-02	5.80E-02 [f]	4.31E+00
Nickel	12 / 14	2.30E+00 - 7.70E+00	WFF1-MW7-0-0.5	2.10E+00 - 2.90E+00	4.14E+00	3.80E+01 [j, l]	2.03E-01
Potassium	14 / 14	2.50E+02 - 6.40E+02	WFF1-SS5-D	NA	3.97E+02	NBA	---
Silver	3 / 14	1.20E-01 - 6.40E-01	WFF1-SS10	9.80E-01 - 1.20E+00	4.88E-01	4.20E+00 [j, n]	1.52E-01
Sodium	14 / 14	5.70E+01 - 4.80E+02	WFF1-MW1-0-0.5	NA	1.09E+02	NBA	---
Vanadium	14 / 14	6.00E+00 - 2.40E+01	WFF1-MW7-0-0.5	NA	1.34E+01	7.80E+00 [j, n]	3.08E+00
Zinc	14 / 14	6.80E+00 - 2.50E+02	WFF1-SS1-D	NA	5.12E+01	1.00E+01 [i]	2.50E+01
Miscellaneous							
Total cyanide	1 / 16	3.40E-01 - 3.40E-01	WFF1-MW6-0-0.5	5.30E-01 - 6.50E-01	2.89E-01	5.00E-03 [e]	6.80E+01

Note: Shading indicates the maximum detection exceeds the benchmark.

mg/kg = Milligrams per kilogram.

NBA = No benchmark available.

[a] Number of samples in which analyte was detected compared with total number of samples collected where primary and duplicate samples were considered one sample.

[b] Non-detects were included at one-half the detection limit.

[c] Value represents Region III BTAG (EPA, 1995) unless otherwise noted.

[d] EPA Region 5 RCRA Ecological Screening Levels (ESLs) (EPA, 2003).

[e] Region III BTAG soil screening level for fauna.

[f] Region III BTAG soil screening level for flora and fauna.

[g] Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants (Efroymson et al., 1997c).

[h] PCBS, total value used as a surrogate.

[i] Region III BTAG soil screening level for flora.

[j] Value represents the lowest Eco-SSL (EPA, 2005a through i and 2006a and b).

[k] Mammalian value.

[l] Plant value.

[m] Soil invertebrate value.

[n] Avian value.

[o] Chromium III value used.

Table 5-3

Comparison of Detected Concentrations in Sludge to Soil Benchmarks
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Chemical	Sample WFF1-SL1 (mg/kg)	Sample WFF1-SL02 (mg/kg)	Sample WFF1-SL03 (mg/kg)	Soil Screening Benchmarks (mg/kg)[a]	Ratio of WFF1-SL1 Detected Concentration to Soil Screening Benchmark	Ratio of WFF1-SL02 Detected Concentration to Soil Screening Benchmark	Ratio of WFF1-SL03 Detected Concentration to Soil Screening Benchmark
Volatiles							
Acetone	6.30E-01	7.40E-01	5.50E-02	2.50E+00 [b]	2.52E-01	2.96E-01	2.20E-02
2-Hexanone	1.30E-01	ND	ND	1.26E+01 [b]	1.03E-02	---	---
Methyl ethyl ketone	2.10E-01	7.70E-02	ND	8.96E+01 [b]	2.34E-03	8.59E-04	---
Methyl isobutyl ketone	9.10E-02	ND	ND	1.00E+02 [c]	9.10E-04	---	---
1,1,2,2-Tetrachloroethane	2.90E-02	ND	ND	1.27E-01 [b]	2.28E-01	---	---
Tetrachloroethene	ND	5.10E-03	ND	3.00E-01 [d]	---	1.70E-02	---
Toluene	1.20E+00	6.20E-03	ND	1.00E-01 [d]	1.20E+01	6.20E-02	---
Semivolatiles							
Anthracene	6.30E-01	7.40E-02	6.40E-02	1.00E-01 [d]	6.30E+00	7.40E-01	6.40E-01
Benzo[a]anthracene	2.10E+00	4.00E-01	2.90E-01	1.00E-01 [d]	2.10E+01	4.00E+00	2.90E+00
Benzo[a]pyrene	9.10E-01	4.90E-01	2.90E-01	1.00E-01 [c]	9.10E+00	4.90E+00	2.90E+00
Benzo[b]fluoranthene	4.80E+00	8.70E-01	5.50E-01	1.00E-01 [d]	4.80E+01	8.70E+00	5.50E+00
Benzo[g,h,i]perylene	1.20E+00	3.90E-01	2.70E-01	1.00E-01 [d]	1.20E+01	3.90E+00	2.70E+00
Benzo[k]fluoranthene	2.40E+00	5.90E-01	2.90E-01	1.00E-01 [d]	2.40E+01	5.90E+00	2.90E+00
Bis(2-ethylhexyl) phthalate	ND	7.90E-02	ND	9.25E-01 [b]	---	8.54E-02	---
Carbazole	ND	5.30E-02	ND	NBA	---	---	---
Chrysene	4.70E+00	5.70E-01	4.80E-01	1.00E-01 [d]	4.70E+01	5.70E+00	4.80E+00
Dibenz(a,h)anthracene	ND	ND	7.60E-02	1.00E-01 [d]	---	---	7.60E-01
1,4-Dichlorobenzene	ND	8.40E-02	8.40E-02	1.00E-01 [d]	---	8.40E-01	8.40E-01
Di-n-butyl phthalate	ND	1.10E-01	8.90E-02	2.00E+02 [e]	---	5.50E-04	4.45E-04
Fluoranthene	9.00E+00	5.00E-01	4.10E-01	1.00E-01 [d]	9.00E+01	5.00E+00	4.10E+00
Fluorene	3.60E-01	ND	ND	1.00E-01 [d]	3.60E+00	---	---
Indeno[1,2,3-cd]pyrene	1.40E+00	3.30E-01	2.30E-01	1.00E-01 [d]	1.40E+01	3.30E+00	2.30E+00
Phenanthrene	3.00E+00	2.00E-01	1.70E-01	1.00E-01 [d]	3.00E+01	2.00E+00	1.70E+00
Pyrene	6.30E+00	4.20E-01	3.60E-01	1.00E-01 [d]	6.30E+01	4.20E+00	3.60E+00
Pesticides							
4,4'-DDD	1.10E-01	1.10E+00	1.20E+00	1.00E-01 [d]	1.10E+00	1.10E+01	1.20E+01
4,4'-DDE	6.70E-02	1.40E+00	1.30E+00	1.00E-01 [d]	6.70E-01	1.40E+01	1.30E+01
4,4'-DDT	1.10E-01	8.90E-01	1.10E+00	1.00E-01 [d]	1.10E+00	8.90E+00	1.10E+01
Dieldrin	ND	9.90E-03	5.60E-03	1.00E-01 [d]	---	9.90E-02	5.60E-02
Inorganics							
Aluminum	6.80E+02	5.80E+03	6.90E+03	1.00E+00 [f]	6.80E+02	5.80E+03	6.90E+03
Antimony	ND	2.00E+01	1.20E+01	2.70E-01 [g, h]	---	7.41E+01	4.44E+01

Table 5-3

Comparison of Detected Concentrations in Sludge to Soil Benchmarks
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Chemical	Sample WFF1-SL1 (mg/kg)	Sample WFF1-SL02 (mg/kg)	Sample WFF1-SL03 (mg/kg)	Soil Screening Benchmarks (mg/kg)[a]	Ratio of WFF1-SL1 Detected Concentration to Soil Screening Benchmark	Ratio of WFF1-SL02 Detected Concentration to Soil Screening Benchmark	Ratio of WFF1-SL03 Detected Concentration to Soil Screening Benchmark
Arsenic	ND	2.60E+00	3.20E+00	1.80E+01 [g, i]	---	1.44E-01	1.78E-01
Barium	1.30E+02	2.70E+02	2.70E+02	3.30E+02 [g, j]	3.94E-01	8.18E-01	8.18E-01
Beryllium	ND	3.60E-01	4.60E-01	2.10E+01 [g, h]	---	1.71E-02	2.19E-02
Cadmium	ND	2.20E+00	3.70E+00	3.60E-01 [g, h]	---	6.11E+00	1.03E+01
Calcium	1.30E+04	3.90E+03	4.60E+03	NBA	---	---	---
Chromium	ND	6.50E+01	3.60E+01	2.60E+01 [g, k, l]	---	2.50E+00	1.38E+00
Cobalt	ND	2.00E+00	2.60E+00	1.30E+01 [g, i]	---	1.54E-01	2.00E-01
Copper	1.10E+01	1.80E+02	1.80E+02	2.80E+01 [g, k]	3.93E-01	6.43E+00	6.43E+00
Iron	1.50E+04	1.40E+04	1.20E+04	1.20E+01 [c]	1.25E+03	1.17E+03	1.00E+03
Lead	1.30E+02	5.30E+02	3.60E+02	1.10E+01 [g, k]	1.18E+01	4.82E+01	3.27E+01
Magnesium	7.30E+02	7.80E+02	9.50E+02	4.40E+03 [d]	1.66E-01	1.77E-01	2.16E-01
Manganese	2.70E+02	1.60E+02	1.90E+02	3.30E+02 [d]	8.18E-01	4.85E-01	5.76E-01
Mercury	1.70E-01	2.40E+01	2.80E+01	5.80E-02 [d]	2.93E+00	4.14E+02	4.83E+02
Nickel	4.00E+00	7.20E+00	8.90E+00	3.80E+01 [g, i]	1.05E-01	1.89E-01	2.34E-01
Potassium	1.30E+03	6.40E+02	6.80E+02	NBA	---	---	---
Silver	ND	1.30E+02	1.10E+02	4.20E+00 [g, k]	---	3.10E+01	2.62E+01
Sodium	6.80E+02	1.30E+02	1.30E+02	NBA	---	---	---
Vanadium	7.20E+00	1.60E+01	1.80E+01	7.80E+00 [g, k]	9.23E-01	2.05E+00	2.31E+00
Zinc	6.80E+02	4.40E+02	4.20E+02	1.00E+01 [f]	6.80E+01	4.40E+01	4.20E+01
Miscellaneous							
Total cyanide	ND	1.50E+00	1.50E+00	5.00E-03 [c]	---	3.00E+02	3.00E+02

Note: Shading indicates the detected concentration exceeds the benchmark.

mg/kg = Milligrams per kilogram.

NBA = No benchmark available.

[a] Value represents Region III BTAG (EPA, 1995) unless otherwise noted.

[b] EPA Region 5 RCRA Ecological Screening Levels (ESLs) (EPA, 2003).

[c] Region III BTAG soil screening level for fauna.

[d] Region III BTAG soil screening level for flora and fauna.

[e] Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants (Efroymson et al., 1997c).

PCBS, total value used as a surrogate.

[f] Region III BTAG soil screening level for flora.

[g] Value represents the lowest Eco-SSL (EPA, 2005a through i and 2006a and b).

[h] Mammalian value.

[i] Plant value.

[j] Soil invertebrate value.

[k] Avian value.

[l] Chromium III value used.

Table 5-4

Comparison of Detected Concentrations in Sediment to Sediment Benchmarks
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Chemical	Sample WFFI-SD1 (mg/kg)	Sample WFFI-SD2 (mg/kg)	Sediment Screening Benchmarks (mg/kg)[a]	Ratio of WFFI-SD1 Detected Concentration to Sediment Screening Benchmark	Ratio of WFFI-SD2 Detected Concentration to Sediment Screening Benchmark
Volatiles					
Acetone	4.50E-02	2.70E-01	NBA	---	---
Methyl ethyl ketone	ND	1.80E-02	NBA	---	---
Pesticides					
4,4'-DDD	ND	2.70E-03	4.88E-03	---	5.53E-01
4,4'-DDE	1.80E-03	2.60E-03	3.16E-03	5.70E-01	8.23E-01
4,4'-DDT	7.70E-04	1.60E-03	4.16E-03 [b]	1.85E-01	3.85E-01
Inorganics					
Aluminum	3.40E+03	5.50E+03	NBA	---	---
Arsenic	1.40E+00	2.70E+00	9.80E+00	1.43E-01	2.76E-01
Barium	1.60E+01	2.30E+01	NBA	---	---
Beryllium	1.10E-01	1.80E-01	NBA	---	---
Calcium	2.00E+02	6.50E+02	NBA	---	---
Chromium	4.20E+00	6.80E+00	4.34E+01	9.68E-02	1.57E-01
Cobalt	7.40E-01	1.90E+00	5.00E+01	1.48E-02	3.80E-02
Copper	1.30E+00	2.90E+00	3.16E+01	4.11E-02	9.18E-02
Iron	2.60E+03	4.10E+03	2.00E+04	1.30E-01	2.05E-01
Lead	4.00E+00	7.90E+00	3.58E+01	1.12E-01	2.21E-01
Magnesium	2.60E+02	4.40E+02	NBA	---	---
Manganese	4.40E+01	9.50E+01	4.60E+02	9.57E-02	2.07E-01
Mercury	9.30E-03	4.40E-02	1.80E-01	5.17E-02	2.44E-01
Nickel	1.80E+00	3.10E+00	2.27E+01	7.93E-02	1.37E-01
Potassium	2.20E+02	3.20E+02	NBA	---	---
Sodium	7.10E+01	6.00E+01	NBA	---	---
Vanadium	5.90E+00	8.80E+00	NBA	---	---
Zinc	9.60E+00	2.00E+01	1.21E+02	7.93E-02	1.65E-01

Note: Shading indicates the detected concentration exceeds the benchmark.

mg/kg = Milligrams per kilogram.

NBA = No benchmark available.

[a] Value represents Region III BTAG (EPA, 2006c) unless otherwise noted.

[b] DDT, total value used as the surrogate.

Table 5-5

Comparison of Maximum Detected Concentrations in Surface Water to Surface Water Benchmarks
Old Wastewater Treatment Plant
Wallops Island Flight Facility

Chemical	Sample WFFI-SW1 (µg/L)	Sample WFFI-WW01 (µg/L)	Surface Water Screening Benchmarks (µg/L)[a]	Ratio of WFFI-SW1 Detected Concentration to Surface Water Screening Benchmark	Ratio of WFFI-WW01 Detected Concentration to Surface Water Screening Benchmark
Volatiles					
Acetone	ND	8.90E+00	1.50E+03	---	5.93E-03
Chloromethane	5.30E-01	ND	NBA	---	---
Methyl ethyl ketone	ND	3.80E+00	1.40E+04	---	2.71E-04
Semivolatiles					
Fluoranthene	ND	1.50E+00	4.00E-02	---	3.75E+01
Phenanthrene	ND	9.10E-01	4.00E-01	---	2.28E+00
Pyrene	ND	1.20E+00	2.50E-02	---	4.80E+01
Inorganics					
Aluminum	2.50E+03	2.40E+02	8.70E+01	2.87E+01	2.76E+00
Barium	3.10E+01	1.00E+02	4.00E+00	7.75E+00	2.50E+01
Calcium	8.80E+03	2.70E+04	1.16E+05	7.59E-02	2.33E-01
Cobalt	3.50E+00	ND	2.30E+01	1.52E-01	---
Copper	ND	4.40E+00	9.00E+00 [b]	---	4.89E-01
Iron	7.20E+03	1.50E+04	3.00E+02	2.40E+01	5.00E+01
Lead	ND	2.90E+01	2.50E+00 [b]	---	1.16E+01
Magnesium	1.20E+03	2.80E+03	8.20E+04	1.46E-02	3.41E-02
Manganese	4.60E+02	1.70E+02	1.20E+02	3.83E+00	1.42E+00
Potassium	1.60E+03	1.00E+04	5.30E+04	3.02E-02	1.89E-01
Sodium	6.30E+03	8.80E+03	6.80E+05	9.26E-03	1.29E-02
Vanadium	3.50E+00	1.80E+00	2.00E+01	1.75E-01	9.00E-02
Zinc	ND	9.80E+01	1.20E+02 [b]	---	8.17E-01

Note: Shading indicates the detected concentration exceeds the benchmark.

µg/L = Micrograms per liter.

[a] Value represents Region III BTAG (EPA, 2006d) unless otherwise noted.

[b] Criterion is a function of hardness (mg/L as CaCO3), in the water column. Values are based on a default hardness of 100 mg/L.

Table 5-6

Surface Soil Background Comparison
Old Wastewater Treatment Plant
Wallops Island Flight Facility

COEC	Old WWTP		Molena Background		Data Distribution[a]		Statistical Test	Probability of Accepting the Null Hypothesis	Conclusion at p = 0.05
	Average (mg/kg)	Standard Deviation (mg/kg)	Average (mg/kg)	Standard Deviation (mg/kg)	Old WWTP	Background			
Aluminum	7.14E+03	3.25E+03	9.46E+03	4.23E+03	Normal	Normal	EV	0.087325	NS
Antimony	1.11E+00	5.81E-01	ND		Non-Parametric	---	---	---	---
Arsenic	2.80E+00	1.33E+00	4.20E+00	3.77E+00	Normal	Gamma	MW	0.250018	NS
Barium	3.43E+01	2.18E+01	7.21E+01	3.32E+01	Gamma	Normal	MW	0.006176	S*
Beryllium	2.41E-01	1.23E-01	6.41E-01	3.54E-01	Normal	Normal	AW	0.002155	S*
Cadmium	2.82E-01	2.94E-02	2.09E-01	2.53E-01	Normal	Gamma	MW	0.007262	S
Chromium	8.09E+00	3.38E+00	9.57E+00	4.72E+00	Non-Parametric	Normal	MW	0.476321	NS
Cobalt	1.65E+00	9.72E-01	3.60E+00	1.97E+00	Normal	Normal	AW	0.005959	S*
Copper	4.17E+00	3.17E+00	8.91E+00	1.02E+01	Gamma	Lognormal	MW	0.07399	NS
Iron	5.05E+03	2.46E+03	7.59E+03	2.99E+03	Gamma	Normal	MW	0.028509	S
Lead	3.63E+01	1.11E+02	3.06E+01	4.01E+01	Non-Parametric	Non-Parametric	MW	0.012725	S
Magnesium	5.73E+02	2.90E+02	9.68E+02	4.34E+02	Non-Parametric	Normal	MW	0.015208	S*
Manganese	9.44E+01	7.88E+01	3.68E+02	2.37E+02	Gamma	Normal	MW	0.002589	S*
Mercury	6.10E-02	6.40E-02	6.88E-02	6.87E-02	Gamma	Gamma	MW	0.493612	NS
Nickel	4.14E+00	2.15E+00	6.14E+00	2.81E+00	Normal	Normal	EV	0.0419	S*
Silver	4.88E-01	1.40E-01	1.12E-01	1.00E-01	Non-Parametric	Lognormal	MW	0.001135	S
Vanadium	1.34E+01	6.13E+00	1.69E+01	7.82E+00	Normal	Normal	EV	0.213486	NS
Zinc	5.12E+01	6.77E+01	2.94E+01	2.88E+01	Gamma	Gamma	MW	0.912781	NS

mg/kg = Milligrams per kilogram.

ND = Not detected.

AW = Aspin-Welch Unequal-Variance Test.

EV = Equal-Variance T-Test.

MW = Mann-Whitney Test.

NS = Site concentrations not significantly different from background ($\alpha = 0.05$.)

S = Site concentrations significantly different from background ($\alpha = 0.05$.)

S* = Site concentrations significantly different from background ($\alpha = 0.05$.); however, background mean is greater than the site.

[a] Based on ProUCL recommendation

Table 5-7

Sludge Background Comparison*
Old Wastewater Treatment Plant
Wallops Island Flight Facility

COEC	Old WWTP		Molena Background	
	Maximum Detected Concentration (mg/kg)	Average (mg/kg)	Maximum Detected Concentration (mg/kg)	Average (mg/kg)
Aluminum	6.9E+03	4.46E+03	1.39E+04	9.46E+03
Arsenic	3.2E+00	3.93E+00	1.42E+01	4.20E+00
Barium	2.7E+02	2.23E+02	1.14E+02	7.21E+01
Beryllium	4.6E-01	1.07E+00	1.20E+00	6.41E-01
Cadmium	3.7E+00	2.97E+00	8.40E-01	2.09E-01
Chromium	6.5E+01	3.47E+01	1.84E+01	9.57E+00
Cobalt	2.6E+00	3.53E+00	7.30E+00	3.60E+00
Copper	1.8E+02	1.24E+02	3.30E+01	8.91E+00
Iron	1.5E+04	1.37E+04	1.09E+04	7.59E+03
Lead	5.3E+02	3.40E+02	1.24E+02	3.06E+01
Magnesium	9.5E+02	8.20E+02	1.45E+03	9.68E+02
Manganese	2.7E+02	2.07E+02	7.81E+02	3.68E+02
Mercury	2.8E+01	1.74E+01	2.50E-01	6.88E-02
Nickel	8.9E+00	6.70E+00	1.06E+01	6.14E+00
Silver	1.3E+02	8.20E+01	3.00E-01	1.12E-01
Vanadium	1.8E+01	1.37E+01	2.85E+01	1.69E+01
Zinc	6.8E+02	5.13E+02	1.04E+02	2.94E+01

mg/kg = Milligrams per kilogram.

*Due to an insufficient sediment sample size, a statistical comparison could not be conducted.

Table 5-8

Sediment Background Comparison*
Old Wastewater Treatment Plant
Wallops Island Flight Facility

COEC	Old WWTP		Molena Background	
	Maximum Detected Concentration (mg/kg)	Average (mg/kg)	Maximum Detected Concentration (mg/kg)	Average (mg/kg)
Aluminum	5.5E+03	4.45E+03	1.39E+04	9.46E+03
Arsenic	2.7E+00	2.05E+00	1.42E+01	4.20E+00
Barium	2.3E+01	1.95E+01	1.14E+02	7.21E+01
Beryllium	1.8E-01	1.45E-01	1.20E+00	6.41E-01
Chromium	6.8E+00	5.50E+00	1.84E+01	9.57E+00
Cobalt	1.9E+00	1.32E+00	7.30E+00	3.60E+00
Copper	2.9E+00	2.10E+00	3.30E+01	8.91E+00
Iron	4.1E+03	3.35E+03	1.09E+04	7.59E+03
Lead	7.9E+00	5.95E+00	1.24E+02	3.06E+01
Magnesium	4.4E+02	3.50E+02	1.45E+03	9.68E+02
Manganese	9.5E+01	6.95E+01	7.81E+02	3.68E+02
Mercury	4.4E-02	2.67E-02	2.50E-01	6.88E-02
Nickel	3.1E+00	2.45E+00	1.06E+01	6.14E+00
Vanadium	8.8E+00	7.35E+00	2.85E+01	1.69E+01
Zinc	2.0E+01	1.48E+01	1.04E+02	2.94E+01

mg/kg = Milligrams per kilogram.

*Due to an insufficient sediment sample size, a statistical comparison could not be conducted.

APPENDIX A
PREVIOUS INVESTIGATIONS

01.03.00.0014
0021

NASA WALLOPS FLIGHT FACILITY
WALLOPS ISLAND, VIRGINIA

COPY

SITE INSPECTION FOR MISCELLANEOUS SITES AT WALLOPS FLIGHT FACILITY

VOLUME II
Preliminary Reports Prepared Under DO 14, Phases I-II, Field Surveys

March 27, 1996

Environmental A/E Services
Contract NAS5-35042
Delivery Order 14

Submitted to:

National Aeronautics and Space Administration
Wallops Flight Facility
Wallops Island, Virginia

Metcalf & Eddy
An Air & Water Technologies Company

SITE INSPECTIONS FOR MISCELLANEOUS SITES AT WALLOPS FLIGHT FACILITY

VOLUME II,
PRELIMINARY REPORTS PREPARED UNDER DO 14, PHASES I-II, FIELD SURVEYS

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Submitted to:
National Aeronautics and Space Administration
Wallops Flight Facility
Wallops Island, Virginia

Environmental A/E Services
Contract NAS5-35042
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NASA WALLOPS FLIGHT FACILITY SITE INSPECTION PRELIMINARY REPORT #1 UNEXPLODED ORDNANCE/MAGNETOMETER SURVEY RESULTS

REVISED

July 23, 1993

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NASA WALLOPS FLIGHT FACILITY SITE INSPECTION
PRELIMINARY REPORT #1
UNEXPLODED ORDNANCE/MAGNETOMETER SURVEY RESULTS

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CHAPTER 1.0

INTRODUCTION

1.1 PURPOSE

This preliminary report is being prepared for the National Aeronautics and Space Administration (NASA), Goddard Space Flight Center (GSFC), Wallops Flight Facility (WFF), Wallops Island, Virginia. The report is being prepared under contract NAS5-35042, Delivery Order 14: Wallops Flight Facility Site Inspection. The Site Inspection (SI) project includes investigation of fifteen separate sites identified in 1990 during an Environmental Site Survey as being potentially affected by past activities. The Environmental Site Survey (NASA, 1990c) is being used in the place of a Preliminary Assessment (PA) for the sites and will be referred to as such throughout this report.

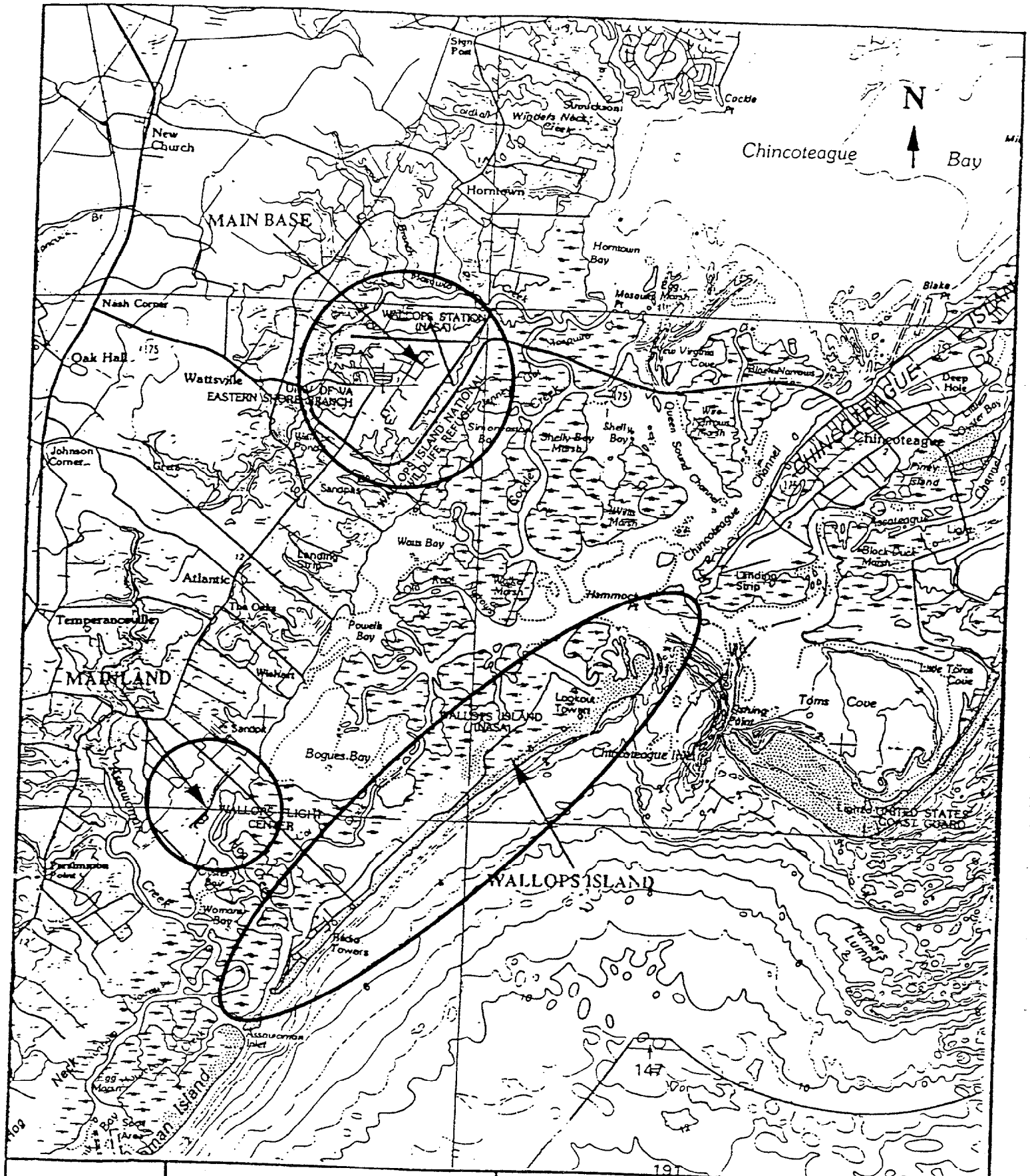
The SI is being conducted in phases due to the magnitude of the task. Preliminary preparation for the SI included collection of background data and a walk-through site survey. Phase I of the field investigations consisted of unexploded ordnance (UXO) and magnetometer surveys at nine of the fifteen sites. The purpose of this document is to present the preliminary findings of the UXO and magnetometer surveys which were performed between March 1 - March 11, 1993 and the excavation performed between June 29 - July 1, 1993. Field methodologies are briefly described, and preliminary conclusions and recommendations for each site are also provided. A similar document will be prepared for the additional field activities which are being conducted in other phases of the SI, as described in the "NASA Wallops Flight Facility Site Inspection Work Plan", prepared by Metcalf & Eddy in March 1993. A Final Site Inspection Report will be prepared at the conclusion of the field investigations, and will include results and discussion of each of the individual field efforts.

1.2 SITE LOCATIONS

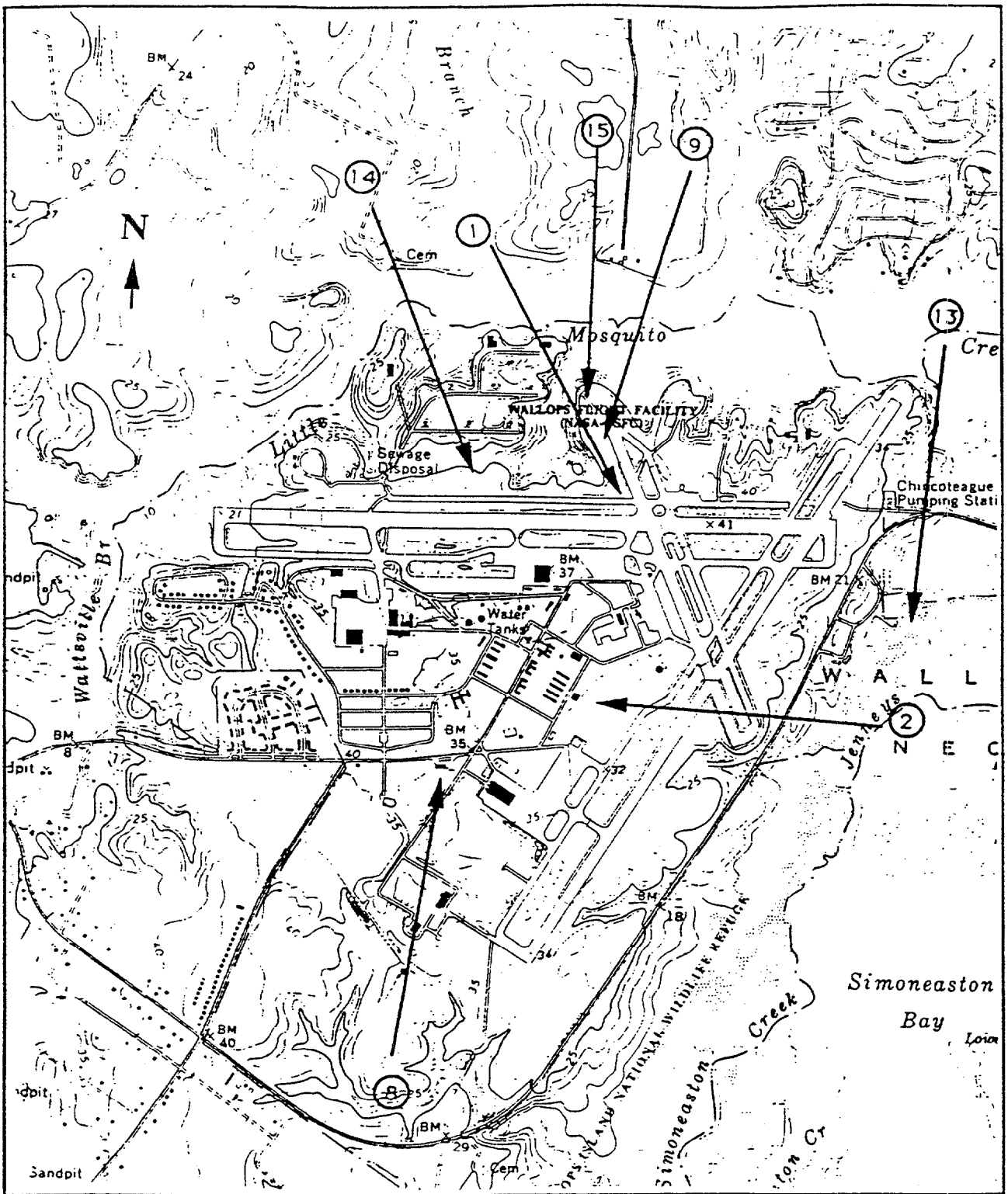
WFF is composed of three separate specific areas in close proximity to each other--the Main Base, the Mainland, and Wallops Island (Figure 1-1). WFF is located in the temperate zone at approximately 37° 56' north latitude and 75° 27' west longitude. WFF is within the political boundaries of Accomack County on the Eastern Shore of the Commonwealth of Virginia. WFF is approximately 40 miles southeast of Salisbury, Maryland, and 90 miles north by northeast of the Tidewater Regional area. Chincoteague Island is approximately five miles to the northeast of the Main Base.

UXO/magnetometer surveys were performed at nine of the fifteen areas of concern identified in the 1990 PA. The nine areas are listed below, and a description of each site is provided in Section 1.3. The location of each area is illustrated on Figures 1-2 and 1-3, and individual maps for each site are included in Chapter 2.0.

SITE NAME	LOCATION
Site 1 - Old Wastewater Treatment Plant	Main Base
Site 2 - Maintenance Facility	Main Base - Building E-52
Site 4 - Debris Pile	Wallops Island - North End
Site 6 - Former Island Fueling System	Wallops Island - Building X-5 and X-10



M&E Metcalf & Eddy	FIGURE 1-1 SCALE - 1:100,000	WFF VICINITY MAP SOURCE: USGS NATIONAL OCEAN SURVEY



SCALE - 1=24,000

Metcalf & Eddy	FIGURE 1-2	MAIN BASE SITES SOURCE: USGS

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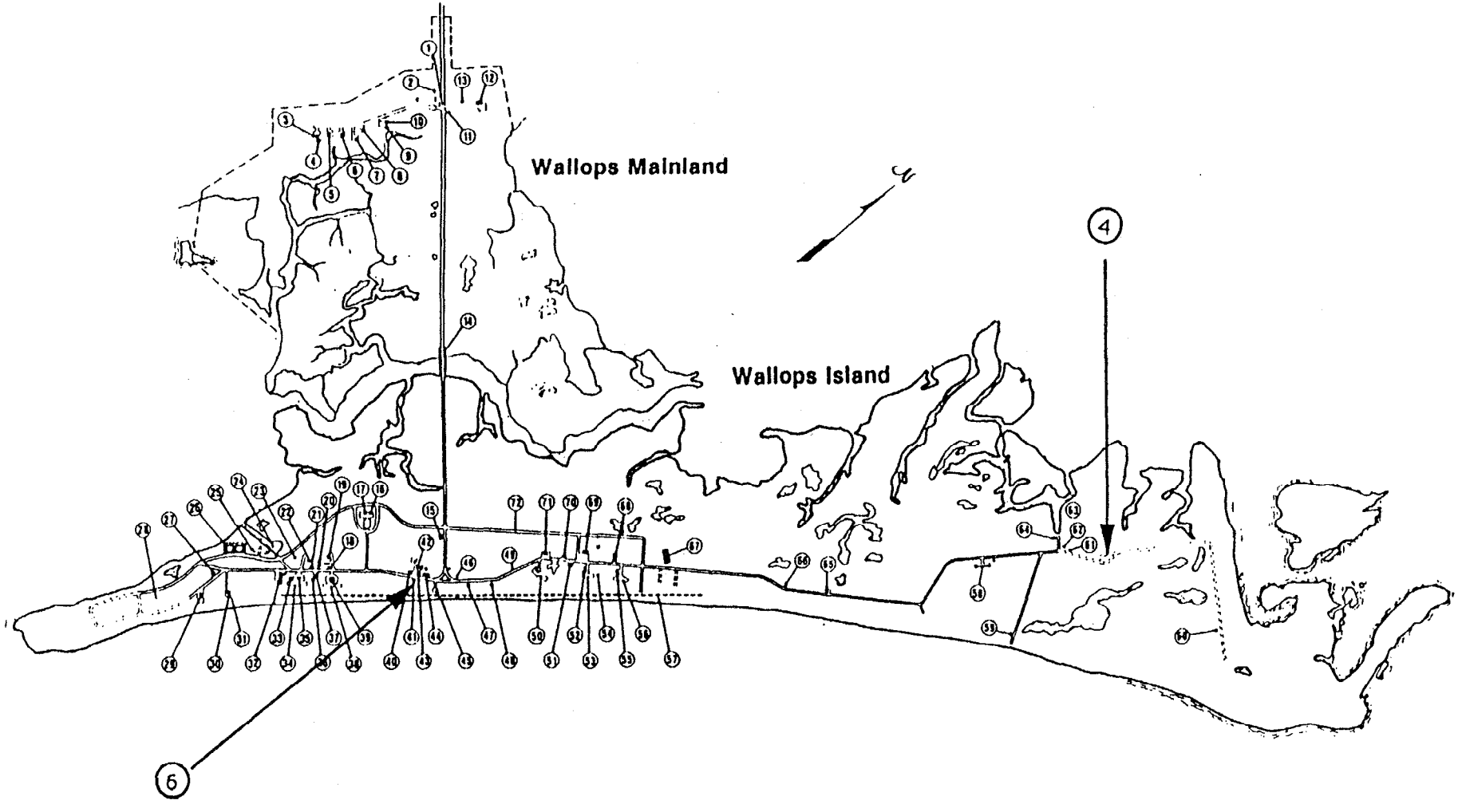


Metcalf & Eddy

FIGURE 1-3

WALLOPS ISLAND SITES

SOURCE: NASA

APPROX. SCALE - 1"= 4000'

SITE NAME	LOCATION
Site 8 - Former Main Base Fueling System	Main Base - Building N-134
Site 9 - Abandoned Drum Field	Main Base - Along Runway 17-35
Site 13 - Ordnance Disposal Area	Main Base - Boat Basin/Visitor Center
Site 14 - Debris Pile	Main Base - Along Runway 10-28
Site 15 - Debris Pile	Main Base - Along Runway 17-35

1.3 SITE DESCRIPTIONS

Site 1 - Old Wastewater Treatment Plant. The old wastewater treatment plant was constructed by the Navy, and was abandoned in 1957 when NASA took over the facility and constructed the current wastewater treatment plant. Structures and items noted during the initial site visit included: a plant control building, concrete process tanks and associated piping, sludge drying beds, a pump/valve building, a trickling filter, three transformers (possibly PCB), and two compressed gas cylinders (possibly chlorine). A NASA (NASA, 1988a) memo addressed to the Corps of Engineers indicated that a drainage swale located near the old plant was potentially used as an ordnance disposal site, but no evidence of ordnance was noted during the initial site survey.

Site 2 - Maintenance Facility, Building E-52. The facility is located adjacent to the former Aviation Fuel Tank Farm area, and was used by the Navy as a Motor Pool and more recently by NASA, as a landscaping facility. A soil gas survey (NASA, 1990b) of the area detected xylene isomers along the border between the tank farm and E-52, and a soil gas survey (NASA, 1992) detected perchloroethene in the same approximate area. Subsurface soil samples collected during the Supplemental Site Characterization (NASA, 1991) for the tank farm indicated fuel related chemicals and trichloroethene downgradient of E-52. Review of aerial photographs taken in the 1960's showed the presence of drum storage areas and at least one above ground tank. A 1990 survey of the facility indicated that petroleum products were stored in open containers around the perimeter of the building at that time (NASA, 1990a). Additionally, the annual safety and health survey conducted in 1988 (NASA, 1988b) indicated that excessive numbers of batteries were stored around the area, and that two 500 gallon fuel tanks were present at that time with no secondary containment. Extensive soil staining was noted around the building during the 1993 site walk-through. In addition, four protective bollards (posts) were noted near the building, which may have previously protected a fuel pump.

Site 4 - Debris Pile, North End of Wallops Island. Debris, metal, and telephone poles were disposed at the north end of the island. No further information is available.

Site 6 - Former Island Fueling System, Building X-10 and Building X-5. Building X-10 was the Former Island Fueling System. Drawings of the facility (NASA, 1948) indicate that there were two 30,000 above ground tanks, and five partially buried storage tanks of unknown size. Drawings and aerial photographs from the 1960's indicate that the tanks were surrounded by a concrete dike, and a concrete pad was located next to the underground tanks.

CHAPTER 2.0

UNEXPLODED ORDNANCE/MAGNETOMETER SURVEY METHODOLOGY

The first phase of the site investigations consisted of UXO/magnetometer surveys at nine of the fifteen sites. These surveys were performed by the UXO certified subcontractor, UXB International. Visual surface searches and electronic subsurface searches were conducted to locate the items of interest at each of the eight sites. Passive (ferrous) and active (all metals) magnetometers were used, and were set at the maximum sensitivities allowable by prevailing site conditions.

The Foerster Ferex Ordnance Locator and the White's commercial metal detector were both used to conduct the subsurface geophysical surveys. The following are descriptions of these two electronic detectors:

a. FOERSTER FEREX ELECTROMAGNETIC DETECTOR - The Foerster Ferex Ordnance Locator is the most recent military approved locator and is in use by the U.S. Military EOD forces. It is designated the MK 26 Ordnance Locator and is used for detecting subsurface ferrous ordnance items. The locator is a hand-held unit and uses 2 fluxgate magnetometers, aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal or disturbances caused by soil conditions. Both an audio and metered signal are provided to the operator. The metered signal indicates whether the disturbance is geodetic or metal-related. The detection capability of the Foerster Ferex is dependent on the size of the item versus its depth. The Foerster Ferex is capable of ordnance location to the following depths:

ITEM	DEPTH
Small Arms Round	1 ft
Hand Grenade	2 ft
Anti-Personnel Mine	3 ft
Anti-Tank Mine	4.5 ft
Medium Projectile	10 ft
Small Bomb	15 ft
Large Bomb	19 ft

Although the Foerster Ferex Ordnance Locator will detect disturbances caused by changes in soil conditions, its ability to detect metallic items is not affected by local soil conditions because it is nulled to accept local soil conditions as normal background readings on-site.

b. WHITE'S EAGLE II METAL DETECTOR - The White's Eagle II Metal Detector is a portable, microprocessor-controlled metal detector with a Liquid Crystal Display and a keypad user interface. This metal detector operates on the induction principle whereby a transmitter coil induces eddy currents within buried metal and these induced eddy currents are received

by a receiver unit. The advantage of this detector is that it can detect both ferrous and non-ferrous metals.

The instruments detailed above were used during the investigation to locate subsurface metallic objects. They were effective in locating specific objects in areas where there was sparse metallic contamination and, conversely, of limited usefulness in areas that were heavily saturated with miscellaneous metallic debris and slag. In areas of heavy metallic debris (e.g., the disposal areas), the instruments were used to delineate the edges of the disposal area.

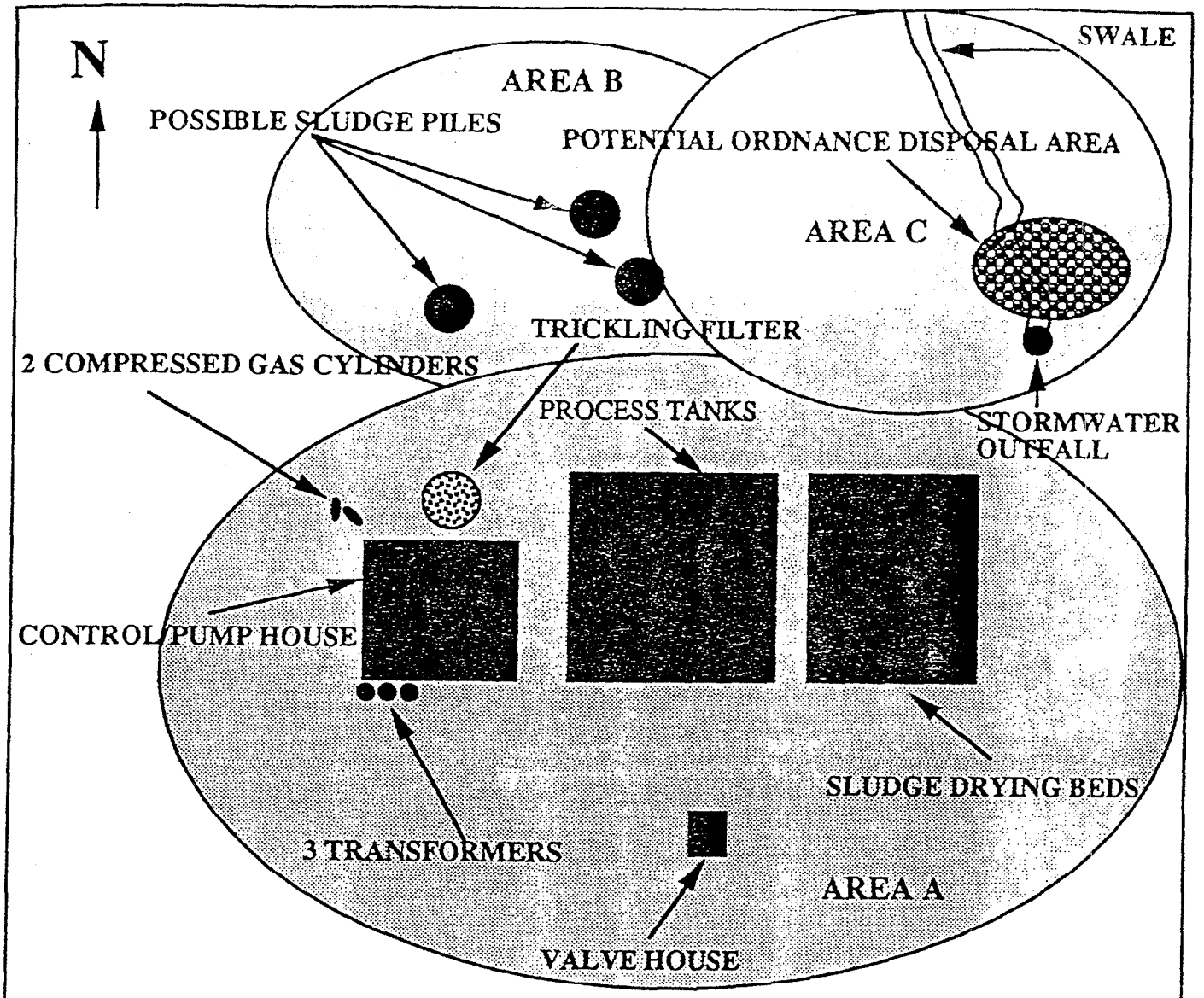
Prior to conducting the geophysical survey, the area to be surveyed was marked with wooden stakes based on aerial photos, maps, existing landmarks and/or other information provided by NASA. An M&E field operations representative assisted the UXB Project Leader in locating the correct survey areas.

The geophysical survey team consisted of two UXB UXO-certified technicians. The team searched the survey areas and marked all contacts of interest with orange pin flags or spray paint to facilitate avoidance by the soil gas survey crew. A visual survey was conducted simultaneously with the geophysical survey. During the surveys, photographic and written logbooks were maintained to document the site conditions and inspection activities.

The UXO/Magnetometer survey crew searched for the following items of interest at each of the nine sites (Figures 2-1 through 2-9):

SITE	ITEM OF INTEREST
Site 1 - Old Wastewater Treatment Plant	USTs, Pipes, UXO
Site 2 - Maintenance Facility, Building E-52	USTs, Pipes, Drums
Site 4 - Debris Pile, North End of Wallops Island	Edge of Debris Pile
Site 6 - Former Island Fueling System, Buildings X5 and X10	USTs, Pipes, Tank Saddles
Site 8 - Former Main Base Fueling System, Buildings N-134	UST, Pipes, Tank Saddles
Site 9 - Abandoned Drum Field, Along Runway 17-35	Drums
Site 13 - Ordnance Disposal Area	UXO
Site 14 - Debris Pile, North of Runway 10-28	Edge of Debris Pile
Site 15 - Debris Pile, Along Runway 17-35	Edge of Debris Pile

The excavation conducted at Site 2 - Maintenance Facility, Building E-52, was conducted by the NASA Plant Operations and Maintenance Branch (POMB). POMB personnel used a NASA backhoe to excavate and backfill approximately 50,000 cubic feet of soil (L:100 feet, W:100 feet, D:5 feet).



APPROXIMATE UXO/MAGNETOMETER SURVEY AREA NOT TO SCALE

Metcalf & Eddy	FIGURE 2-1	SITE 1 - OLD WASTEWATER TREATMENT PLANT UXO/MAGNETOMETER SURVEY AREA

CHAPTER 3.0

RESULTS AND CONCLUSIONS

Site 1 - Old Wastewater Treatment Plant. The area surrounding the Old Wastewater Treatment Plant (WWTP) was investigated to determine the presence of buried tanks, process piping, and UXO. Three separate areas (Figure 3-1) were investigated at this site: immediate area surrounding the Old WWTP (Area A), possible sludge disposal area (Area B), and possible ordnance disposal area (Area C).

Area A - Immediate Area Surrounding the Old WWTP - Approximately 10 subsurface contacts were located in this area and were marked with orange pin flags. Based upon the sizes (i.e., less than 2 feet in diameter) and orientations (i.e. not forming a line) of the contacts, UXB concluded they were not USTs or part of the WWTP process piping.

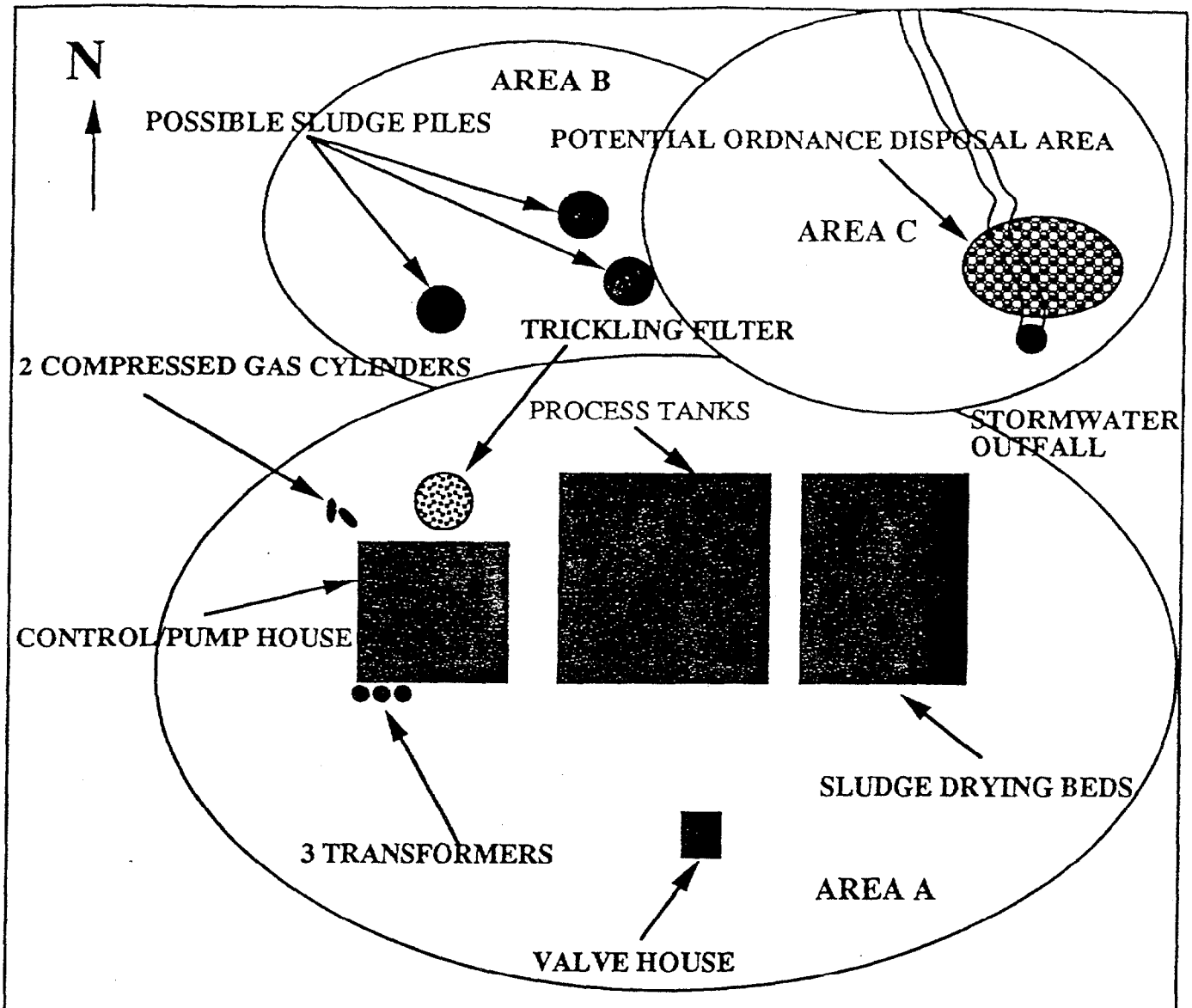
Area B - Possible Sludge Disposal Area - Approximately 30 subsurface contacts were located in this area and were marked with orange pin flags. Based upon the sizes (i.e., less than 2 feet in diameter) and orientations (i.e., not forming a line) of these contacts, UXB concluded they were not USTs or part of the WWTP process piping.

Area C - Possible Ordnance Disposal Area- After a debris (brush, fallen trees, concrete pieces, fence posts) clearing operation by NASA personnel at this portion of the site, approximately 50 subsurface contacts (less than 2 feet in diameter) were located and marked with orange pin flags. UXB detected no subsurface contacts in this area which were large enough to indicate a sizable ordnance disposal area. However, the identities of the 50 subsurface contacts were not determined.

Site 2 - Maintenance Facility, Building E-52. The area surrounding Building E-52 was investigated to determine the presence of buried tanks, pipes, and drums (Figure 3-2). Marston matting (steel sheeting commonly used by the military for temporary roads, parking lots, air strips, etc.) was observed on the surface, and based upon magnetometer readings, is buried to the north, east, and south of Building E-52. The marston matting caused interference with the magnetometers, therefore, it is not known whether additional buried objects are located beneath the marston matting in this area.

At the conclusion of the magnetometer survey conducted in the field to the east of Building E-52 and west of the former Aviation Fuel Tank Farm, UXB located and marked with fluorescent orange spray paint 88 subsurface contacts. These contacts range from minor contacts (i.e. less than two feet in diameter) to a large contact approximately 50 feet by 50 feet. Additionally, UXB suspected underground piping in this area. UXB marked the minor contacts with the symbol "O", larger contacts with the symbol "F", and suspected piping with dotted lines.

The area where the large contact was located was excavated. Minor debris was located such as: broken concrete pieces approximately 1 foot in diameter, and section of rebar approximately 1 foot in length, one section of I-beam approximately two feet in length, and one piece of wire approximately 5 feet in length.



AREA A - APPROXIMATELY 10 SMALL SUBSURFACE CONTACTS, NO INDICATION OF USTs OR OR BURIED PROCESS PIPING.

AREA B - APPROXIMATELY 30 SMALL SUBSURFACE CONTACTS, NO INDICATION OF USTs OR OR BURIED PROCESS PIPING.

AREA C- APPROXIMATELY 50 SMALL SUBSURFACE CONTACTS, NO INDICATION OF A SIZABLE ORDNANCE DISPOSAL AREA.

NOT TO SCALE

M&E Metcalf & Eddy	FIGURE 3-1	SITE 1 - OLD WASTE WATER TREATMENT PLANT UXO/MAGNETOMETER SURVEY RESULTS

CHAPTER 4.0

RECOMMENDATIONS

Based on the results of the UXO/magnetometer survey, recommendations are being made to survey the areas where significant contacts were recorded during Phase II of the SI. The flagging and painted areas were not intended to be permanent markers and are subject to environmental and human destruction.

Site 1 - Old Wastewater Treatment Plant.

Area A - No recommendation.

Area B - No recommendation.

Area C should be recorded as a possible ordnance disposal area on the Facilities Master Plan. Additional subsurface investigations (UXO survey) should be conducted prior to any intrusive activity at this site. This site will be forwarded to the Corps of Engineers for further evaluation.

Site 2 - Maintenance Facility, Building E-52. Due to the previously detected contamination in the proximity of this site, the marston matting surrounding the building should be removed to allow investigation of the subsurface.

Site 4 - Debris Pile, North End of Wallops Island. The edge of the debris pile should be surveyed during Phase III of the SI to insure a record of its location.

Site 6 - Former Island Fueling System, Building - X-5 and X-10
No recommendation.

Site 8 - Former Main Base Fueling System, Building N-134.
No recommendation.

Site 9 - Abandoned Drum Field, Along Runway 17-35. The 20 subsurface contacts in the abandoned drum field should be surveyed during Phase III of the SI to ensure a record of their locations.

Site 13 - Ordnance Disposal Area. The thirteen subsurface contacts located outside the fenced area should be surveyed during Phase III of the SI to ensure a record of their locations. This site will be forwarded to the Corps of Engineers for further evaluation.

Site 14 - Debris Pile, North of Runway 10-28. The edges of the debris piles should be surveyed during Phase III of the SI to ensure a record of their locations.

Site 15 - Debris Pile, Along Runway 17-35. The edge of the debris pile should be surveyed during Phase III of the SI to ensure a record of its location.

CHAPTER 5.0

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Submitted to:
National Aeronautics and Space Administration
Wallops Flight Facility
Wallops Island, Virginia

Environmental A/E Services
Contract NAS5-35042
Delivery Order: 14

NASA WALLOPS FLIGHT FACILITY SITE INSPECTION PRELIMINARY REPORT #2 SOIL GAS SURVEY RESULTS

April 28, 1993

Submitted by:
Metcalf & Eddy, Inc.
14502 Greenview Drive
Suite 500
Laurel, Maryland 20708

NASA WALLOPS FLIGHT FACILITY SITE INSPECTION
PRELIMINARY REPORT #2
SOIL GAS SURVEY RESULTS

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CHAPTER 1.0

INTRODUCTION

1.1 PURPOSE

This preliminary report is being prepared for the National Aeronautics and Space Administration (NASA), Goddard Space Flight Center (GSFC), Wallops Flight Facility (WFF), Wallops Island, Virginia. The report is being prepared under contract NAS5-35042, Delivery Order 14: Wallops Flight Facility Site Inspection. The Site Inspection (SI) project includes investigation of fourteen separate sites identified in 1990 during an Environmental Site Survey (NASA, 1990c) as being potentially affected by past activities. The Environmental Site Survey is being used in the place of a Preliminary Assessment (PA) for the sites and will be referred to as such throughout this report.

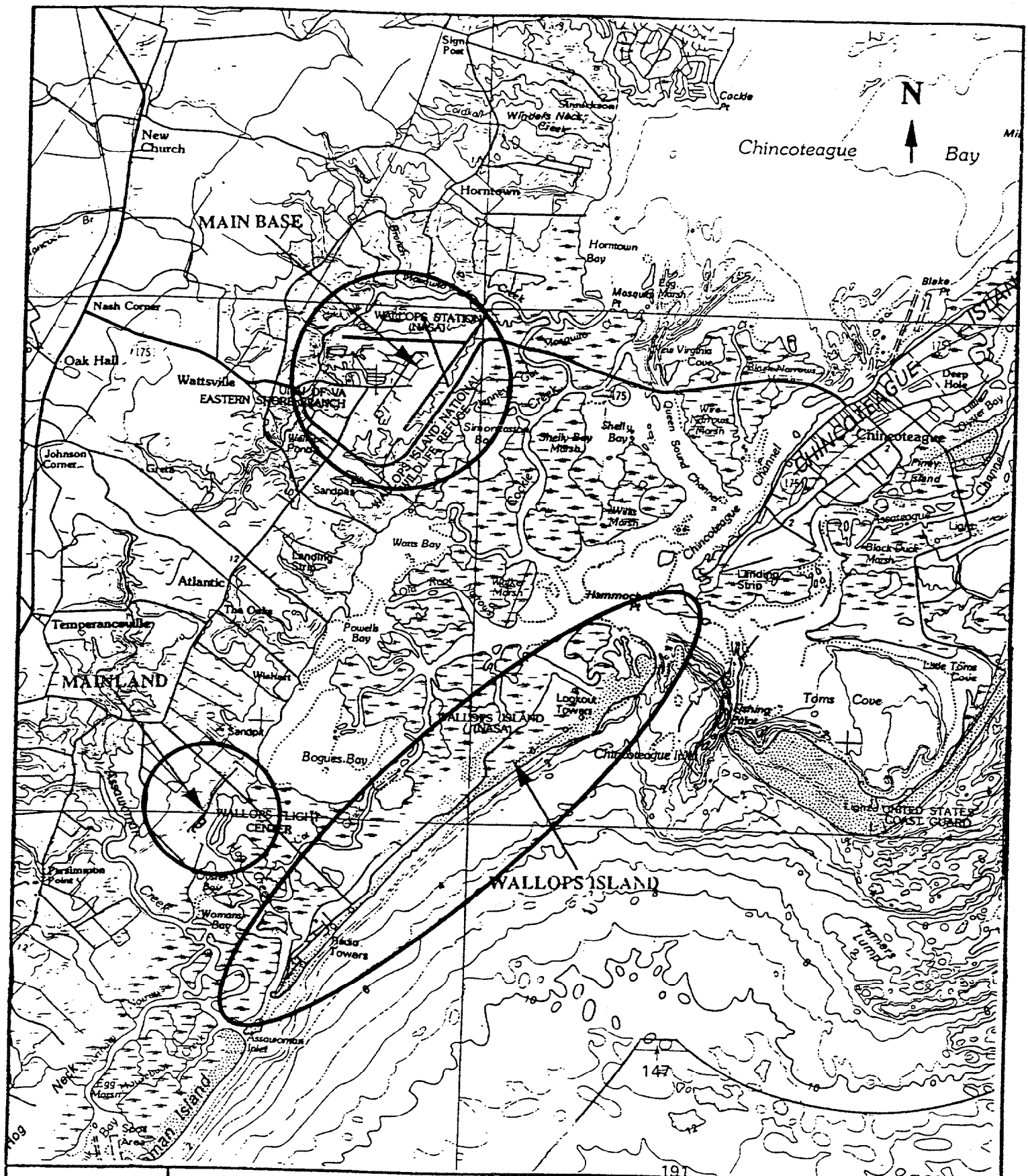
The SI is being conducted in phases due to the magnitude of the task. Preliminary preparation for the SI included collection of background data and a walk-through site survey. Phase I of the field investigations consisted of an unexploded ordnance (UXO) and magnetometer survey at eight of the fourteen sites. Phase II consisted of soil gas surveys at ten of the fourteen sites. The purpose of this document is to present the preliminary findings of the soil gas surveys, which were performed between March 8 - March 22, 1993. Field methodologies are briefly described, and preliminary conclusions and recommendations for each site are also provided. A similar document will be prepared for each of the other field activities which are being conducted in other phases of the SI, as described in the "NASA Wallops Flight Facility Site Inspection Work Plan", prepared by Metcalf & Eddy in March 1993. A Final Site Inspection Report will be prepared at the conclusion of the field investigations, and will include results and discussion of each of the individual field efforts.

1.2 SITE LOCATIONS

WFF is composed of three separate specific areas in close proximity to each other--the Main Base, the Mainland, and Wallops Island (Figure 1-1). WFF is located in the temperate zone at approximately 37° 56' north latitude and 75° 27' west longitude. WFF is within the political boundaries of Accomack County on the Eastern Shore of the Commonwealth of Virginia. WFF is approximately 40 miles southeast of Salisbury, Maryland, and 90 miles north by northeast of the Tidewater Regional area. Chincoteague Island is approximately five miles to the northeast of the Main Base.

Soil gas surveys were performed at ten of the fourteen areas of concern identified in the 1990 PA. The ten areas are listed below, and a description of each site is provided in Section 1.3. The locations of each area are illustrated on Figures 1-2 and 1-3, and individual maps for each site are included in Chapter 2.0.

SITE NAME	LOCATION
Site 1 - Old Wastewater Treatment Plant	Main Base
Site 2 - Maintenance Facility	Main Base - Building E-52
Site 3 - Two 600,000 Gallon Fuel Tanks	Main Base - Buildings A-46A, A-46B



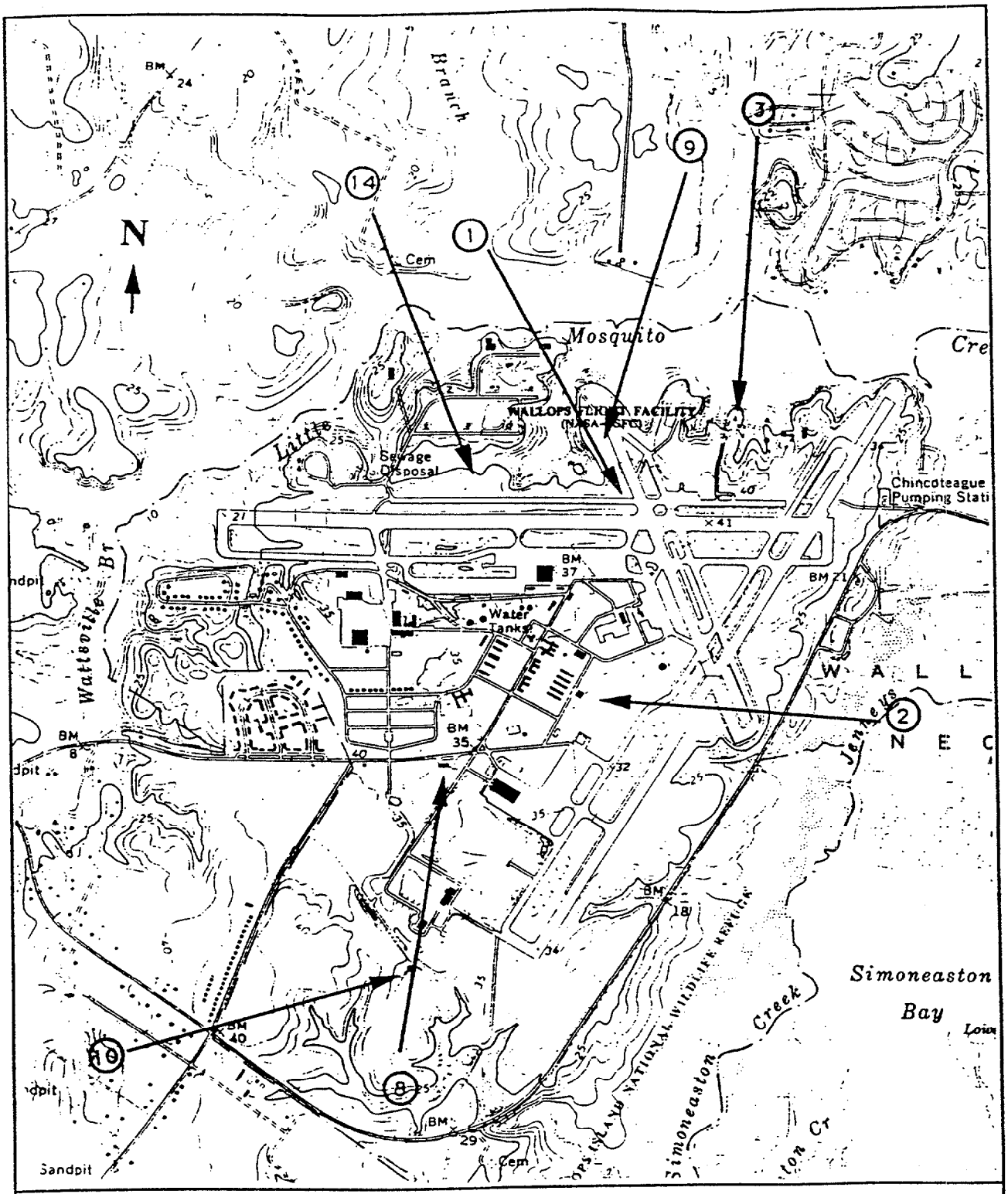
Metcalf & Eddy

FIGURE 1-1

SCALE - 1:100,000

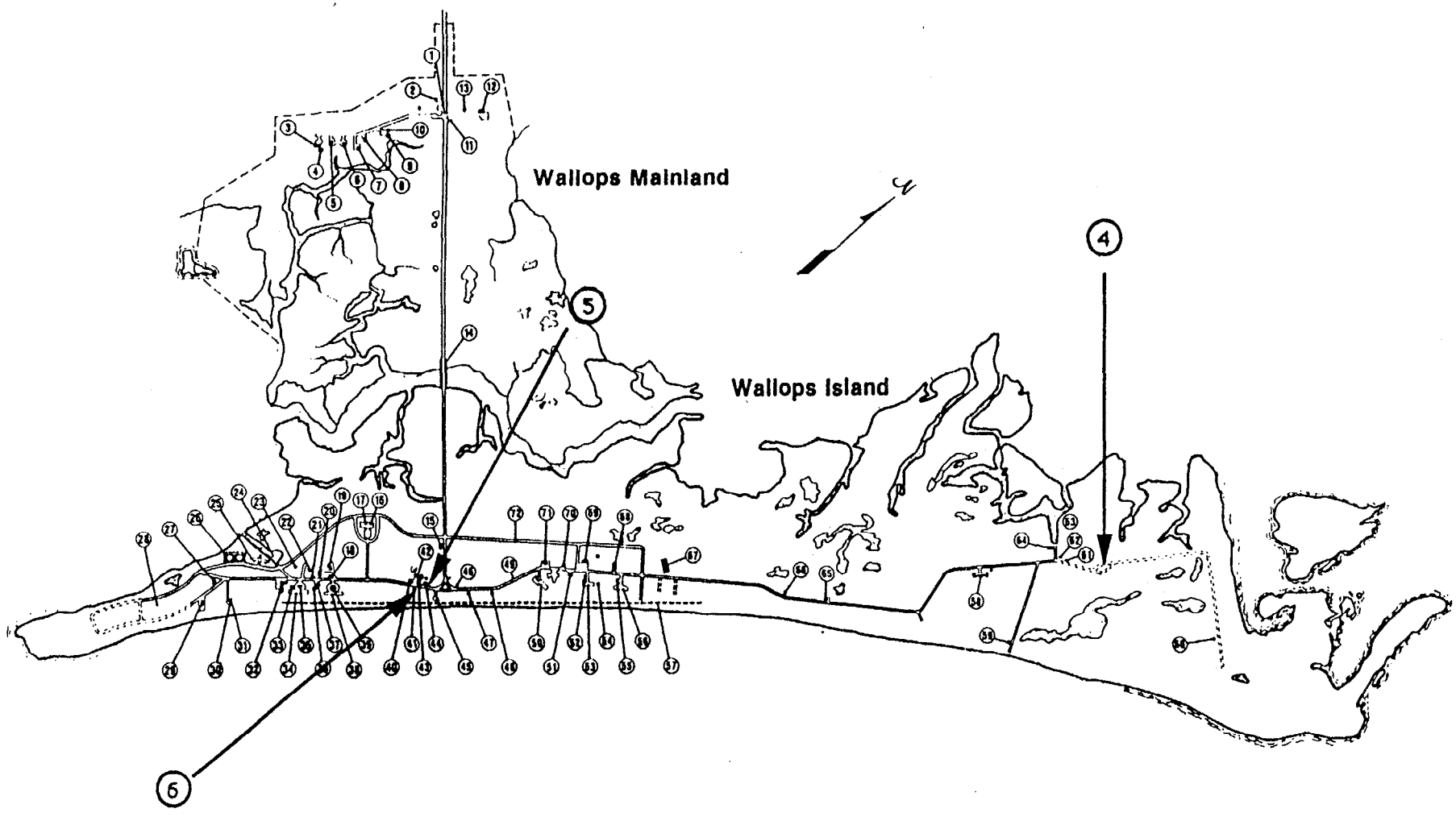
WFF VICINITY MAP

SOURCE: USGS NATIONAL OCEAN SURVEY



SCALE - 1=24,000

Metcalf & Eddy	FIGURE 1-2	MAIN BASE SITES SOURCE: USGS



Metcalf & Eddy

FIGURE 1-3

WALLOPS ISLAND SITES

SOURCE: NASA

APPROX. SCALE - 1"= 4000'

SITE NAME	LOCATION
Site 4 - Debris Pile	Wallops Island - North End
Site 5 - Paint Stain	Wallops Island - Building X-30
Site 6 - Former Island Fueling System	Wallops Island - Building X-5 and X-10
Site 8 - Former Main Base Fueling System	Main Base - Building N-134
Site 9 - Abandoned Drum Field/Debris Pile	Main Base - Along Runway 17-35
Site 10 - Advanced Data Acquisition Support Facility (ADAS)	Main Base - Building N-168
Site 14 - Debris Pile	Main Base - Along Runway 10-28

1.3 SITE DESCRIPTIONS

Site 1 - Old Wastewater Treatment Plant. The old wastewater treatment plant was constructed by the Navy, and was abandoned in 1957 when NASA took over the facility and constructed the current wastewater treatment plant. Structures and items noted during the initial site visit included: a plant control building, concrete process tanks and associated piping, sludge drying beds, a pump/valve building, a trickling filter, three transformers (possibly PCB), and two compressed gas cylinders (possibly chlorine). A 1988 NASA (NASA, 1988a) memo addressed to the Corps of Engineers indicated that a drainage swale located near the old plant was potentially used as an ordnance disposal site, but no evidence of ordnance was noted during the initial site survey.

Site 2 - Maintenance Facility, Building E-52. The facility is located adjacent to the former Aviation Fuel Tank Farm, and was used by the Navy as a Motor Pool and more recently by NASA as a landscaping facility. A 1989 soil gas survey (NASA, 1990b) of the area detected xylene isomers along the border between the tank farm and E-52, and a 1990 soil gas survey (NASA, 1992) detected perchloroethene in the same approximate area. Subsurface soil samples collected during the Supplemental Site Characterization (NASA, 1991) for the tank farm indicated fuel related chemicals and trichloroethene downgradient of E-52. Review of aerial photographs taken in the 1960's showed the presence of drum storage areas and at least one above ground tank. A 1990 survey of the facility indicated that petroleum products were stored in open containers around the perimeter of the building at that time (NASA, 1990a). Additionally, the annual safety and health survey conducted in 1988 (NASA, 1988b) indicated that excessive numbers of batteries were stored around the area, and that two 500 gallon fuel tanks were present at that time with no secondary containment. Extensive soil staining was noted around the building during the 1993 site walk-through. In addition, four protective bollards (posts) were noted near the building, which may have previously protected a fuel pump.

Site 3 - Two 600,000 Gallon Fuel Tanks, Building A-46A and A-46B. The two tanks, designated A-46A and A-46B, and the pump house are located north of taxiway 10-28. The tanks were used by the Navy for storage of JP-4 fuel. Interviews with personnel revealed that the tanks were emptied and filled with salt water. The tanks were never used by NASA

CHAPTER 2.0

FIELD METHODOLOGIES

2.1 SOIL GAS SAMPLING PROCEDURES

Steel soil gas probes were used to collect soil gas samples at the ten sites. The depths for sample collection were variable and were field determined based on the nature of the suspected contamination and site characteristics. After the probe was driven to the appropriate sample depth, a length of Teflon tubing was inserted into the top of the probe. The tubing was then connected to a vacuum box, and all connections were sealed. The box was used to purge atmospheric air from the probe, and then to fill a Tedlar bag with soil gas. The soil gas sample bag was connected to the analyzer and a sample extracted into the detector via the instrument's internal vacuum pump.

A MicroTip photoionization detector (PID) was originally planned for analysis of the soil gas samples. A Foxboro organic vapor analyzer (OVA) was also used for confirmation of PID results. Soil gas sample results obtained from both the PID and OVA are presented in Chapter 3.0. Both detectors were calibrated at least twice daily. The OVA measures organic vapor levels including methane and ethane, whereas the PID will not detect methane or ethane. Therefore, positive results obtained by the OVA were checked with a carbon scrubber, which filters out VOCs, but allows methane and ethane to pass through. Any OVA results obtained with the carbon scrubber in place were considered to be potentially methane, an anaerobic degradation product commonly found in soil when carbonaceous material is present, and the results were confirmed by using the PID.

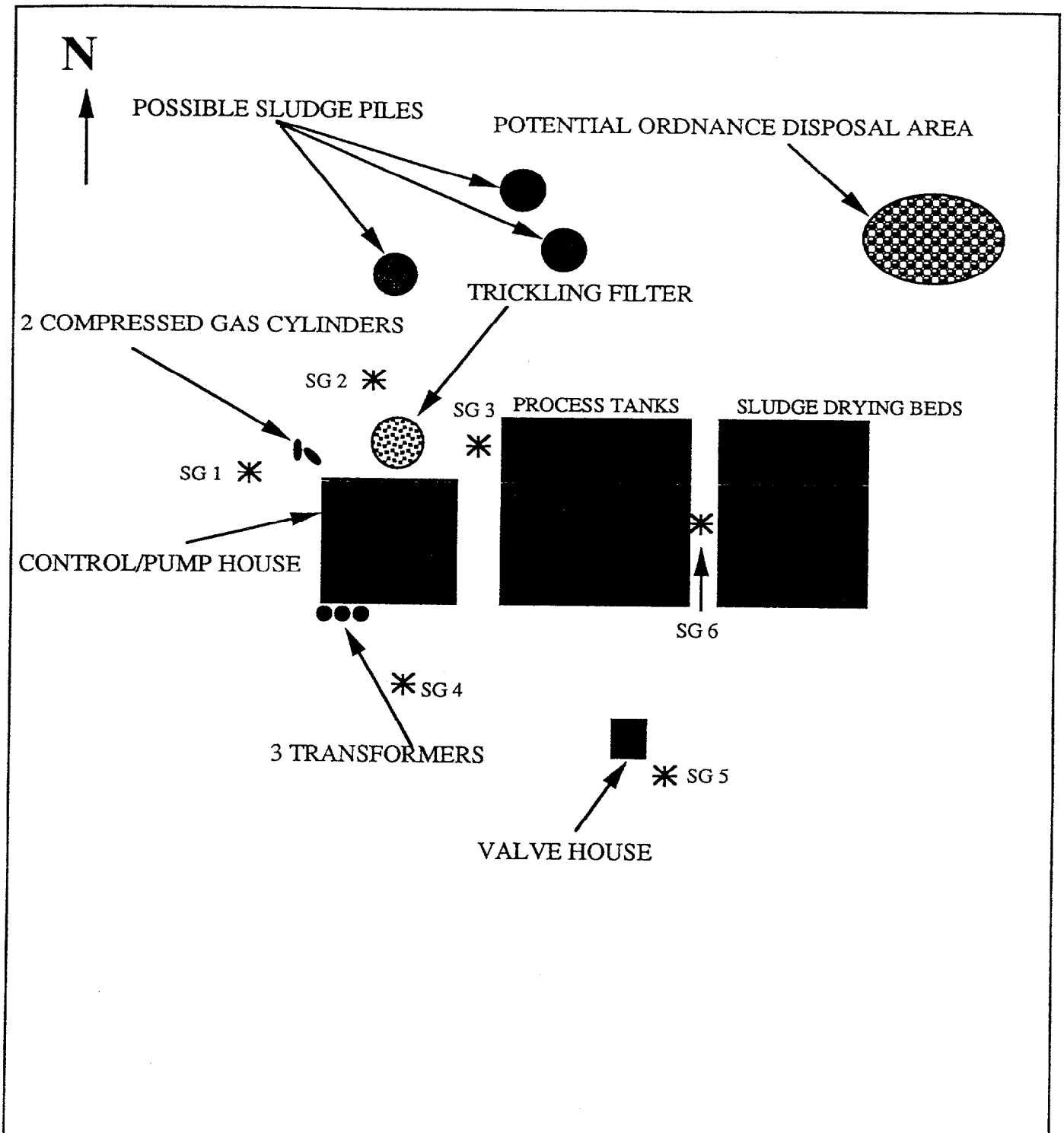
2.2 SAMPLE IDENTIFICATION AND COLLECTION

Soil gas surveys were conducted at sites 1, 2, 3, 4, 5, 6, 8, 9, 10 and 14. Soil gas probes were driven by hand or with an electric rotary hammer, powered by a small, portable generator. Soil gas sample locations are shown on Figures 2-1 through 2-10 on pages 2-4 through 2-13. Sample identifications, collection dates, and depths are listed in Table 2-1 at the end of the chapter.

Soil gas surveys were performed at the following ten sites:

Site 1 - Old Wastewater Treatment Plant. Six soil gas samples were collected (Figure 2-1) around the old wastewater treatment plant at depths from 2.5 to 5 feet. The purpose of the soil gas survey at this site was to locate subsurface volatile contamination in the vicinity of the plant, if any. There were no specific suspect areas. Sample locations and depths were chosen to provide data representative of conditions around the plant. Therefore, locations were chosen to surround the plant, and variable depths were used. Soil gas sampling was not performed in areas of suspected UXO due to the danger of explosion.

Site 2 - Maintenance Facility, Building E-52. Fourteen soil gas samples were (Figure 2-2) collected around Building E-52 at various depths ranging from 2.5 to 8 feet. Sample locations were chosen in areas of soil staining, areas where volatile contamination was previously detected, and other suspect areas such as previous drum storage and above ground tank locations. Variable depths were chosen to provide representative data.



✳ SOIL GAS SAMPLE LOCATION

APPROX. SCALE - 1 " = 100'

Metcalf & Eddy

FIGURE 2-1
SOIL GAS SAMPLE LOCATIONS

SITE 1 - OLD WASTEWATER TREATMENT PLANT

TABLE 2-1 SOIL GAS SAMPLE IDENTIFICATION

SAMPLE ID	DATE COLLECTED	DEPTH (FT)
Site 1 - Old Wastewater Treatment Plant		
WFF1-SG1	3/11/93	5
WFF1-SG2	3/11/93	3
WFF1-SG3	3/11/93	5
WFF1-SG4	3/11/93	4
WFF1-SG5	3/11/93	2.5
WFF1-SG6	3/11/93	5
Site 2 - Building E-52		
WFF2-SG1	3/22/93	4
WFF2-SG2	3/22/93	4
WFF2-SG3	3/22/93	5
WFF2-SG4	3/22/93	6
WFF2-SG5	3/22/93	8
WFF2-SG6	3/22/93	2
WFF2-SG7	3/22/93	2.5
WFF2-SG8	3/22/93	4
WFF2-SG9	3/22/93	8
WFF2-SG10	3/22/93	8
WFF2-SG11	3/22/93	8
WFF2-SG12	3/22/93	2.5
WFF2-SG13	3/22/93	7
WFF2-SG14	3/22/93	7

CHAPTER 3.0

SOIL GAS SURVEY RESULTS AND CONCLUSIONS

Soil gas samples were analyzed with both photoionization (PID) and flame ionization (OVA) detectors. Analytical results for each site are presented in Table 3-1 at the end of the chapter. PID and OVA detector responses may differ for some compounds due to differences in the instruments' relative response factors for various compounds. In addition, the detectors perform differently under different environmental conditions (i.e., cold temperatures and moisture). For example, the PID may give a false positive result if a sample has a high moisture content, but this data will not be confirmed by the OVA. Therefore, some variation is seen in the data from the two instruments. However, qualitative conclusions can be drawn from the comparison of the two data sets.

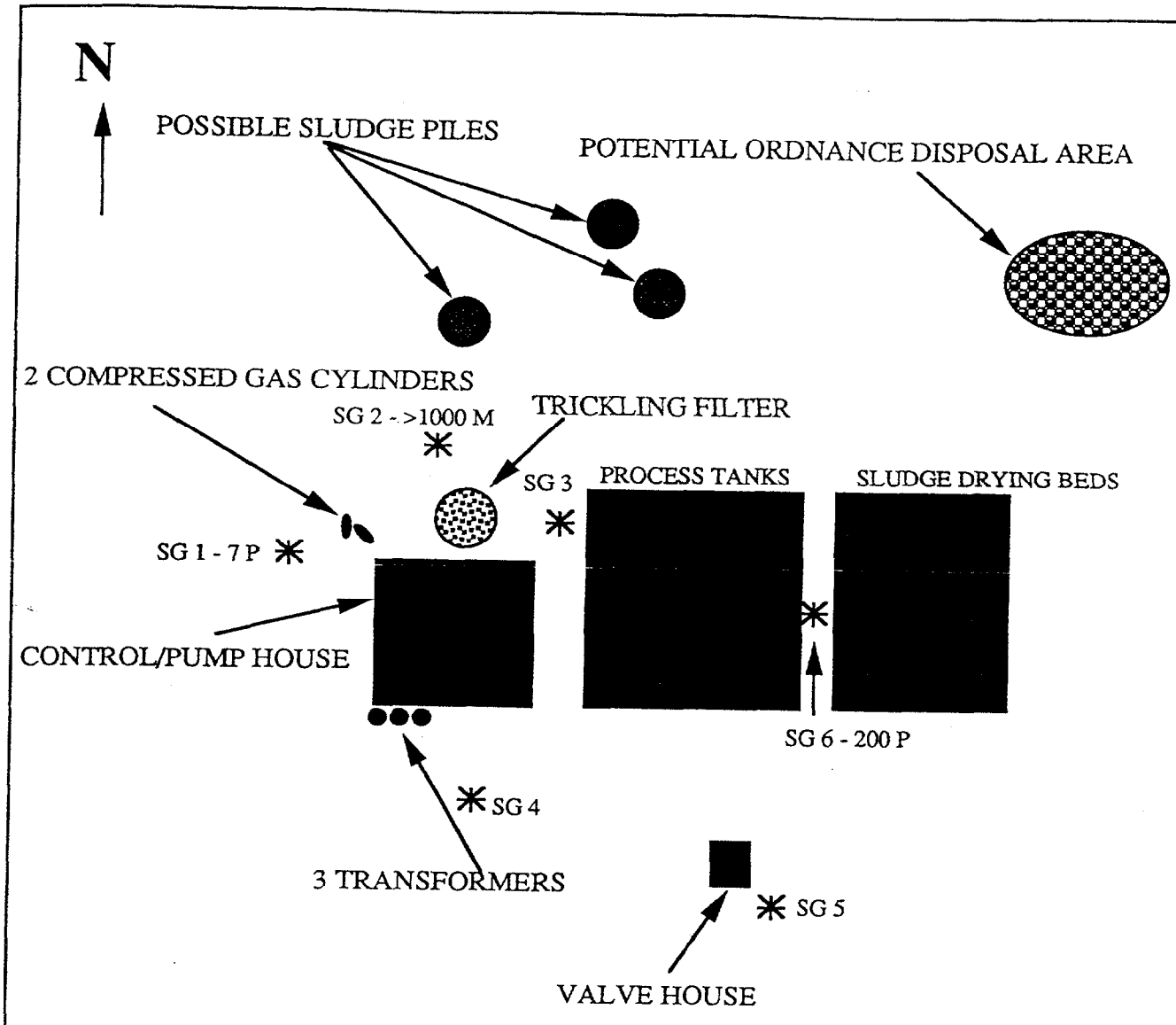
Site 1 - Old Wastewater Treatment Plant. Positive PID readings of 7 ppm and 200 ppm were obtained from samples WFF1-SG1 and WFF1-SG6, respectively (Figure 3-1). WFF1-SG1 was collected to the west of the control house, near a subsurface contact identified by the magnetometer survey. WFF1-SG6 was collected between the process tanks and the sludge beds. The OVA detected no VOCs in either of these samples. This discrepancy is most likely explained by the presence of moisture in the samples. This could be confirmed by collecting soil samples at those locations.

The OVA had a detection greater than the instrument's maximum detection limit (i.e., > 1,000 ppm) from sample WFF1-SG3. This positive response was checked with a carbon scrubber, described in Chapter 2.0. The same value was obtained with the scrubber, therefore it is assumed that WFF1-SG3 contained greater than 1000 ppm of methane, which is a common anaerobic degradation product. This result could be indicative of buried debris and/or wastewater sludge at that location or nearby. WFF1-SG2 is located north/northwest of the trickling filter.

Site 2 - Building E-52. Detector readings of < 10 ppm (Figure 3-2 and Table 3-1) were obtained at various locations around Building E-52 (WFF2-SG1, WFF2-SG2, WFF2-SG4, WFF2-SG6, WFF2-SG7, WFF2-SG9, and WFF2-SG12-14). Sample results are both illustrated on Figure 3-2 and presented in Table 3-1. A strong odor was detected in WFF2-SG13, and soil staining was noted at approximately 6-8 feet. The PID detected 0.5 ppm, and the OVA detected 1.0 ppm for this sample. This sample was collected in the approximate location of a former above ground storage tank noted in aerial photographs from the 1960's. The strong odor and low-level detection indicate that this contamination may be a heavy petroleum product such as diesel fuel.

Methane was detected in samples WFF2-SG1 (3.2 ppm), WFF2-SG2 (> 1000 ppm), WFF2-SG5 (0.6 ppm) and WFF2-SG14 (1.0 ppm). This may be indicative of degradation of some type of subsurface carbonaceous material. The low level detections obtained in areas of soil staining (WFF2-SG6, WFF2-SG7, and WFF2-SG12) indicate that this staining may be due to a nonvolatile substance, or that the VOCs have volatilized.

Site 3 - Two 600,000 Gallon Fuel Tanks, Buildings A-46A and A-46B. Detector readings of < 5 ppm (Figure 3-3 and Table 3-1) were obtained in eleven of the thirteen samples



LEGEND:
P = PID VOC (ppm)
O = OVA VOC (ppm)
M = METHANE (ppm)

✳ SOIL GAS SAMPLE LOCATION

APPROX. SCALE - 1"=100'

Metcalf & Eddy	**FIGURE 3-1** **POSITIVE SOIL GAS RESULTS**	**SITE 1 - OLD WASTEWATER TREATMENT PLANT**

TABLE 3-1 SOIL GAS SURVEY RESULTS

SAMPLE ID	DATE COLLECTED	DEPTH (FT)	VOC RESULTS (PPM) PID	OVA (minus methane)	NOTES
Site 1 - Old Wastewater Treatment Plant					
WFF1-SG1	3/11/93	5	7	ND	-
WFF1-SG2	3/11/93	3	ND	ND	> 1000 ppm methane detected
WFF1-SG3	3/11/93	5	ND	ND	-
WFF1-SG4	3/11/93	4	ND	ND	-
WFF1-SG5	3/11/93	2.5	ND	ND	-
WFF1-SG6	3/11/93	5	200	ND	-
Site 2 - Building E-52					
WFF2-SG1	3/22/93	4	0.2	1.0	3.2 ppm methane detected
WFF2-SG2	3/22/93	4	2.0	ND	> 1000 ppm methane detected
WFF2-SG3	3/22/93	5	ND	ND	-
WFF2-SG4	3/22/93	6	0.1	8.0	-
WFF2-SG5	3/22/93	8	ND	ND	0.6 ppm methane detected
WFF2-SG6	3/22/93	2	0.1	NR	-
WFF2-SG7	3/22/93	2.5	0.4	ND	-
WFF2-SG8	3/22/93	4	ND	NR	-
WFF2-SG9	3/22/93	8	0.4	ND	-
WFF2-SG10	3/22/93	8	ND	ND	-
WFF2-SG11	3/22/93	8	ND	ND	-

CHAPTER 4.0

RECOMMENDATIONS

Site 1 - Old Wastewater Treatment Plant. M&E recommends collection of subsurface soil samples at three locations: soil gas sample location WFF1-SG2, the sludge piles located north of WFF1-SG2, and soil gas sample location WFF1-SG6. One soil sample at WFF1-SG2 should be collected at a depth of 3 feet to determine what is causing the high level of methane in that area. The methane may be due to the presence of decaying debris, such as wood, or due to the presence of another carbonaceous material, such as sewage sludge. It is recommended that this sample be analyzed for the organic compounds on the target compound list (TCL), the target analyte list (TAL), and for fecal coliforms. A positive detection of fecal coliforms may indicate that sewage sludge is present, and could be causing the methane levels. The TCL is a list of 125 organic compounds, including 34 volatiles, 65 semivolatiles, and 26 pesticides/PCBs. The TAL is a list of 23 metals, plus cyanide. One sample should be collected in the sludge drying beds, and one to three samples should be collected in the potential sludge piles to the north of WFF1-SG2 for the same reason, and analyzed for the same parameters. One soil sample at WFF1-SG6 should be collected at a depth of 5 feet to determine whether organic or metal contamination is present at this location. This sample should be analyzed for TCL and TAL. This site will be forwarded to the Corps of Engineers for further evaluation.

Site 2 - Maintenance Facility, Building E-52. M&E recommends conducting an expanded soil gas survey at Building E-52. This survey should consist of a grid pattern in the areas surrounding the building. The purpose of the survey would be to locate and delineate the source(s) of contamination which was identified in previous soil gas surveys, and to locate additional sources which have not yet been discovered, if any. After completion of the expanded soil gas survey, M&E recommends selection of several soil sampling locations based on the results obtained from soil gas.

In addition to sample locations based on soil gas results, M&E recommends collection of the following samples:

Sample #	Location	Depth	Analysis	Rational
1	WFF2-SG6, stained area	0-6 inches	TCL, TAL, TPH	identify source of soil staining
2	Stained area South of bollards	0-6 inches	TCL, TAL, TPH	identify source of soil staining
3	WFF2-SG7, stained area	0-6 inches	TCL, TAL, TPH	identify source of soil staining
4	WFF2-SG12, stained area	0-6 inches	TCL, TAL, TPH	identify source of soil staining
5	Stained area SW corner of E-52	0-6 inches	TCL, TAL, TPH	identify source of soil staining

Note*: TPH - Total Petroleum Hydrocarbons

CHAPTER 5.0

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NASA WALLOPS FLIGHT FACILITY SITE INSPECTION PRELIMINARY REPORT #2 SOIL GAS SURVEY RESULTS

REVISED

July 23, 1993

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NASA WALLOPS FLIGHT FACILITY SITE INSPECTION
PRELIMINARY REPORT #2
SOIL GAS SURVEY RESULTS
REVISED
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CHAPTER 1.0

INTRODUCTION

1.1 PURPOSE

This preliminary report is being prepared for the National Aeronautics and Space Administration (NASA), Goddard Space Flight Center (GSFC), Wallops Flight Facility (WFF), Wallops Island, Virginia. The report is being prepared under contract NAS5-35042, Delivery Order 14: Wallops Flight Facility Site Inspection. The Site Inspection (SI) project includes investigation of fifteen separate sites identified in 1990 during an Environmental Site Survey (NASA, 1990c) as being potentially affected by past activities. The Environmental Site Survey is being used in the place of a Preliminary Assessment (PA) for the sites and will be referred to as such throughout this report.

The SI is being conducted in phases due to the magnitude of the task. Preliminary preparation for the SI included collection of background data and a walk-through site survey. Phase I of the field investigations consisted of an unexploded ordnance (UXO) and magnetometer survey at nine of the fifteen sites. Phase II consisted of soil gas surveys at eleven of the fifteen sites between March 8 - March 22, 1993, and expanded soil gas surveys at three of the eleven sites between June 7 - June 14, 1993. The purpose of this document is to present the results of the soil gas surveys. Field methodologies are briefly described, and preliminary conclusions and recommendations for each site are also provided. A similar document will be prepared for each of the other field activities which are being conducted in other phases of the SI, as described in the "NASA Wallops Flight Facility Site Inspection Work Plan", prepared by Metcalf & Eddy in March 1993. A Final Site Inspection Report will be prepared at the conclusion of the field investigations, and will include results and discussion of each of the individual field efforts.

1.2 SITE LOCATIONS

WFF is composed of three separate specific areas in close proximity to each other--the Main Base, the Mainland, and Wallops Island (Figure 1-1). WFF is located in the temperate zone at approximately 37° 56' north latitude and 75° 27' west longitude. WFF is within the political boundaries of Accomack County on the Eastern Shore of the Commonwealth of Virginia. WFF is approximately 40 miles southeast of Salisbury, Maryland, and 90 miles north by northeast of the Tidewater Regional area. Chincoteague Island is approximately five miles to the northeast of the Main Base.

Soil gas surveys were performed at eleven of the fifteen areas of concern identified in the 1990 PA. The eleven areas are listed below, and a description of each site is provided in Section 1.3. The locations of each area are illustrated on Figures 1-2 and 1-3, and individual maps for each site are included in Chapter 2.0.

SITE NAME	LOCATION
Site 1 - Old Wastewater Treatment Plant	Main Base
Site 2 - Maintenance Facility	Main Base - Building E-52

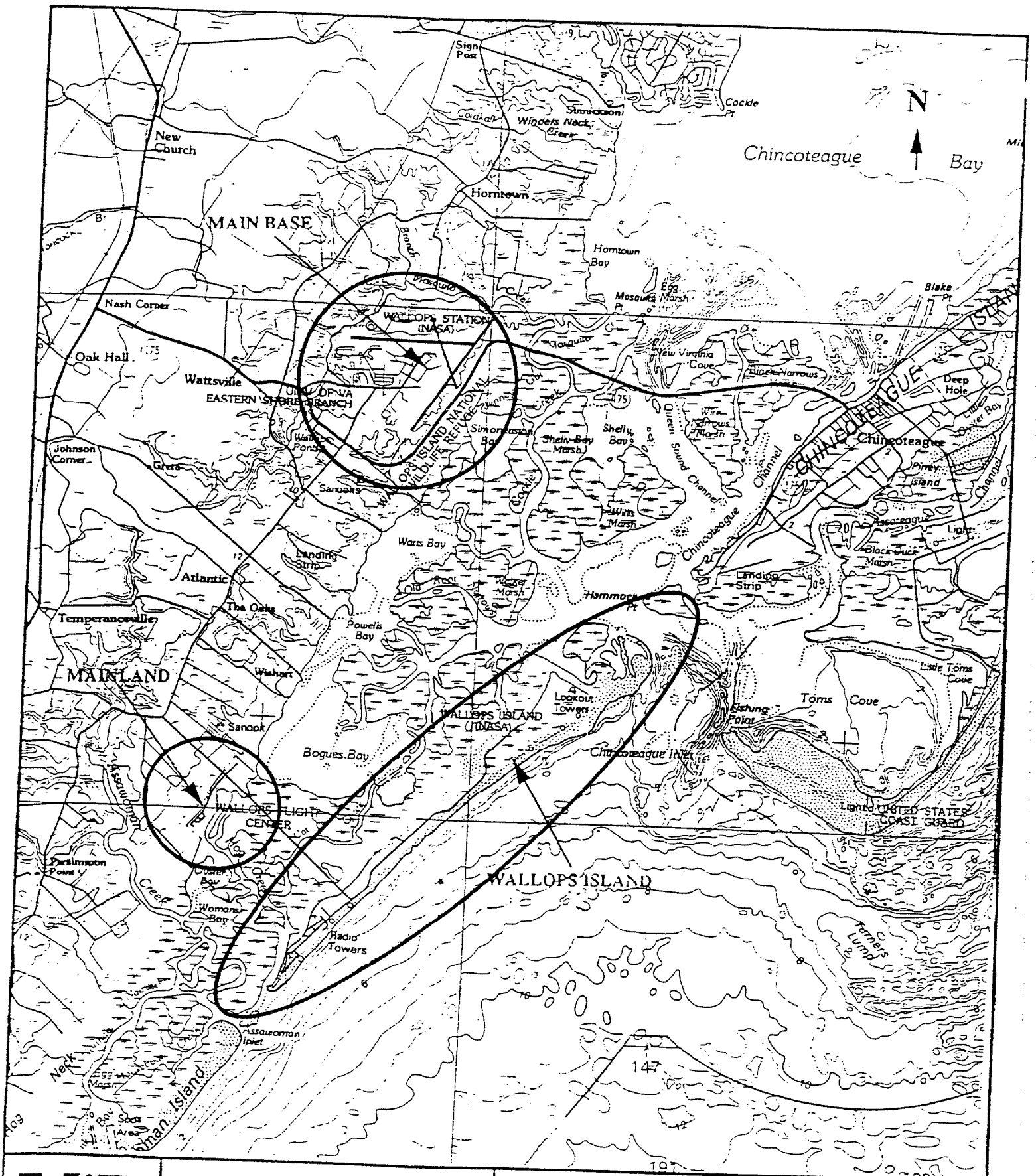

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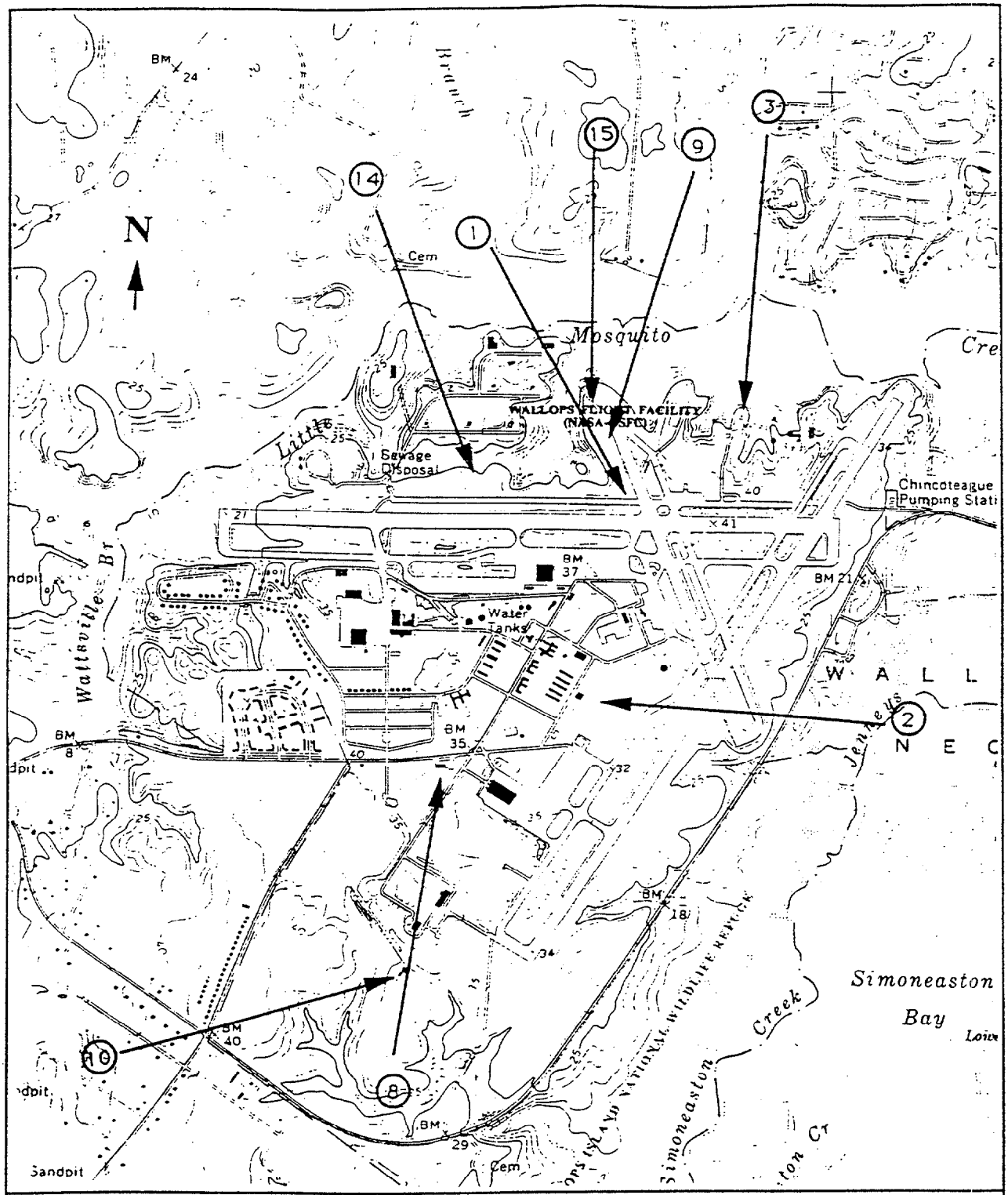
FIGURE 1-1

SCALE - 1:100,000

WFF VICINITY MAP

SOURCE: USGS NATIONAL OCEAN SURVEY



SCALE - 1=24,000

Metcalf & Eddy	FIGURE 1-2	MAIN BASE SITES SOURCE: USGS

7/23/93

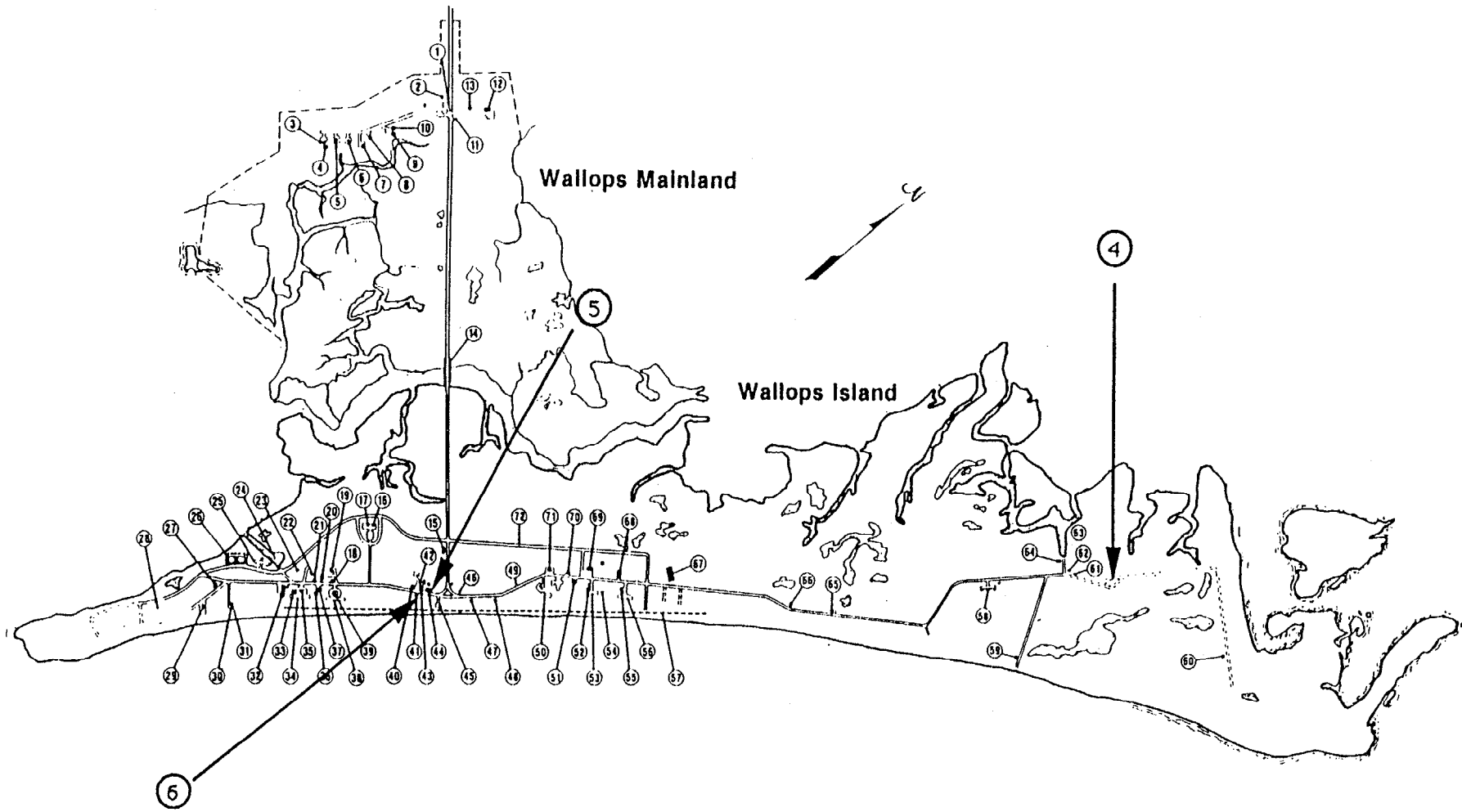


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FIGURE 1-3

WALLOPS ISLAND SITES

SOURCE: NASA

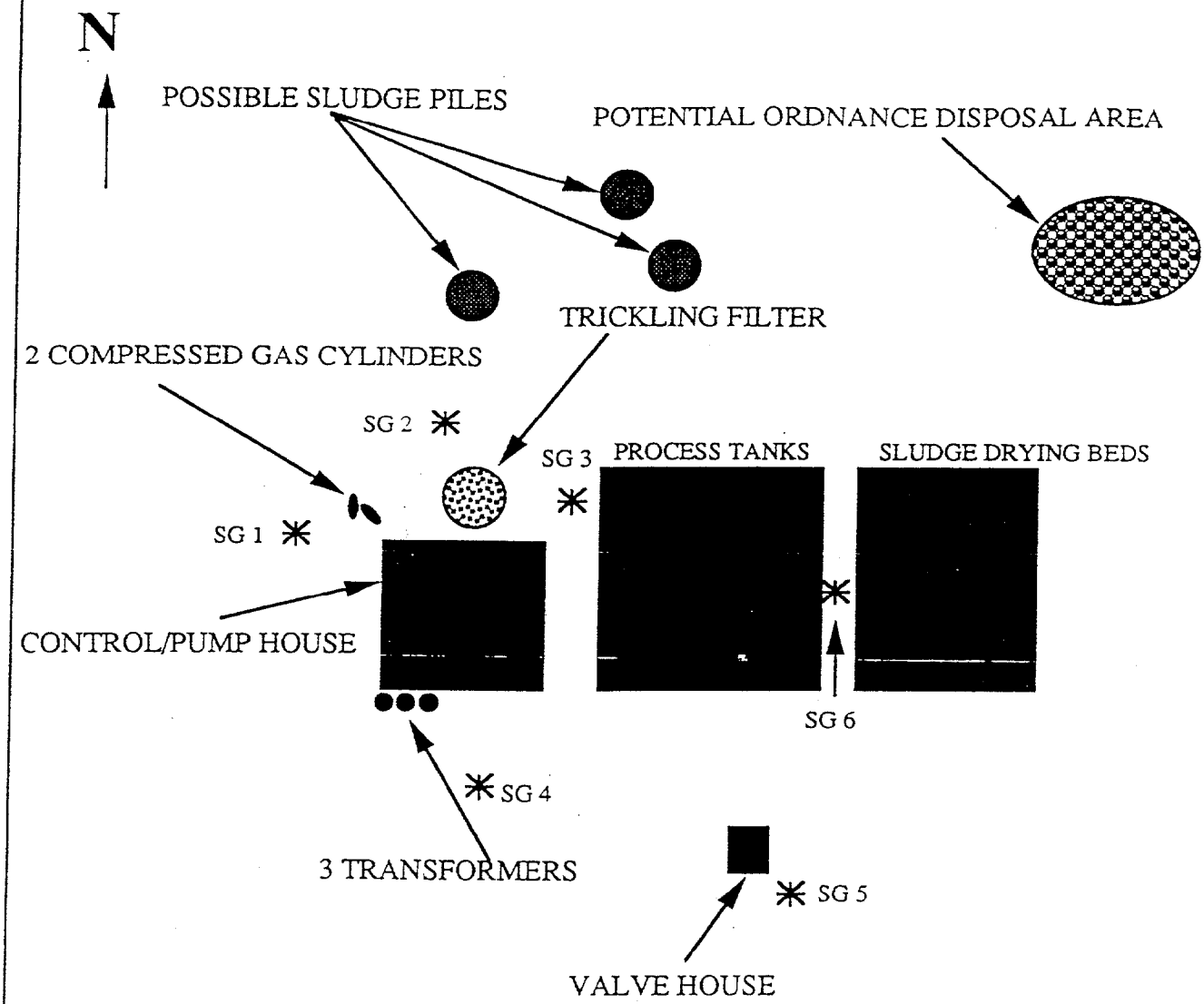
APPROX. SCALE - 1"= 4000'

SITE NAME	LOCATION
Site 3 - Two 600,000 Gallon Fuel Tanks	Main Base - Buildings A-46A, A-46B
Site 4 - Debris Pile	Wallops Island - North End
Site 5 - Paint Stain	Wallops Island - Building X-30
Site 6 - Former Island Fueling System	Wallops Island - Building X-5 and X-10
Site 8 - Former Main Base Fueling System	Main Base - Building N-134
Site 9 - Abandoned Drum Field	Main Base - Along Runway 17-35
Site 10 - Advanced Data Acquisition Support Facility (ADAS)	Main Base - Building N-168
Site 14 - Debris Pile	Main Base - Along Runway 10-28
Site 15 - Debris Pile	Main Base - Along Runway 17-35

1.3 SITE DESCRIPTIONS

Site 1 - Old Wastewater Treatment Plant. The old wastewater treatment plant was constructed by the Navy, and was abandoned in 1957 when NASA took over the facility and constructed the current wastewater treatment plant. Structures and items noted during the initial site visit included: a plant control building, concrete process tanks and associated piping, sludge drying beds, a pump/valve building, a trickling filter, three transformers (possibly PCB), and two compressed gas cylinders (possibly chlorine). A 1988 NASA (NASA, 1988a) memo addressed to the Corps of Engineers indicated that a drainage swale located near the old plant was potentially used as an ordnance disposal site, but no evidence of ordnance was noted during the initial site survey.

Site 2 - Maintenance Facility, Building E-52. The facility is located adjacent to the former Aviation Fuel Tank Farm, and was used by the Navy as a Motor Pool and more recently by NASA as a landscaping facility. A 1989 soil gas survey (NASA, 1990b) of the area detected xylene isomers along the border between the tank farm and E-52, and a 1990 soil gas survey (NASA, 1992) detected perchloroethene in the same approximate area. Subsurface soil samples collected during the Supplemental Site Characterization (NASA, 1991) for the tank farm indicated fuel related chemicals and trichloroethene downgradient of E-52. Review of aerial photographs taken in the 1960's showed the presence of drum storage areas and at least one above ground tank. A 1990 survey of the facility indicated that petroleum products were stored in open containers around the perimeter of the building at that time (NASA, 1990a). Additionally, the annual safety and health survey conducted in 1988 (NASA, 1988b) indicated that excessive numbers of batteries were stored around the area, and that two 500 gallon fuel tanks were present at that time with no secondary containment. Extensive soil staining was noted around the building during the 1993 site walk-through. In addition, four protective bollards (posts) were noted near the building, which may have previously protected a fuel pump.



✳ SOIL GAS SAMPLE LOCATION

APPROX. SCALE - 1 " = 100'

M&E Metcalf & Eddy	FIGURE 2-1 SOIL GAS SAMPLE LOCATIONS	SITE 1 - OLD WASTEWATER TREATMENT PLANT

TABLE 2-1 SOIL GAS SAMPLE IDENTIFICATION

SAMPLE ID	DATE COLLECTED	DEPTH (FT)
Site 1 - Old Wastewater Treatment Plant		
WFF1-SG1	3/11/93	5
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WFF1-SG3	3/11/93	5
WFF1-SG4	3/11/93	4
WFF1-SG5	3/11/93	2.5
WFF1-SG6	3/11/93	5
Site 2 - Building E-52		
WFF2-SG1	3/22/93	4
WFF2-SG2	3/22/93	4
WFF2-SG3	3/22/93	5
WFF2-SG4	3/22/93	6
WFF2-SG5	3/22/93	8
WFF2-SG6	3/22/93	2
WFF2-SG7	3/22/93	2.5
WFF2-SG8	3/22/93	4
WFF2-SG9	3/22/93	8
WFF2-SG10	3/22/93	8
WFF2-SG11	3/22/93	8
WFF2-SG12	3/22/93	2.5
WFF2-SG13	3/22/93	7
WFF2-SG14	3/22/93	7

CHAPTER 3.0

SOIL GAS SURVEY RESULTS AND CONCLUSIONS

Soil gas samples were analyzed with both photoionization (detection range 0.1 - 999 parts per million (ppm)) and flame ionization (detection limit 0.2-1000 ppm) detectors. Analytical results for each site are presented in Table 3-1 at the end of the chapter. PID and OVA detector responses may differ for some compounds due to differences in the instruments' relative response factors for various compounds. In addition, the detectors perform differently under different environmental conditions (i.e., cold temperatures and moisture). For example, the PID may give a false reading if a sample has a high moisture content, but this data will not be confirmed by the OVA. Therefore, some variation is seen in the data from the two instruments. However, qualitative conclusions can be drawn from the comparison of the two data sets.

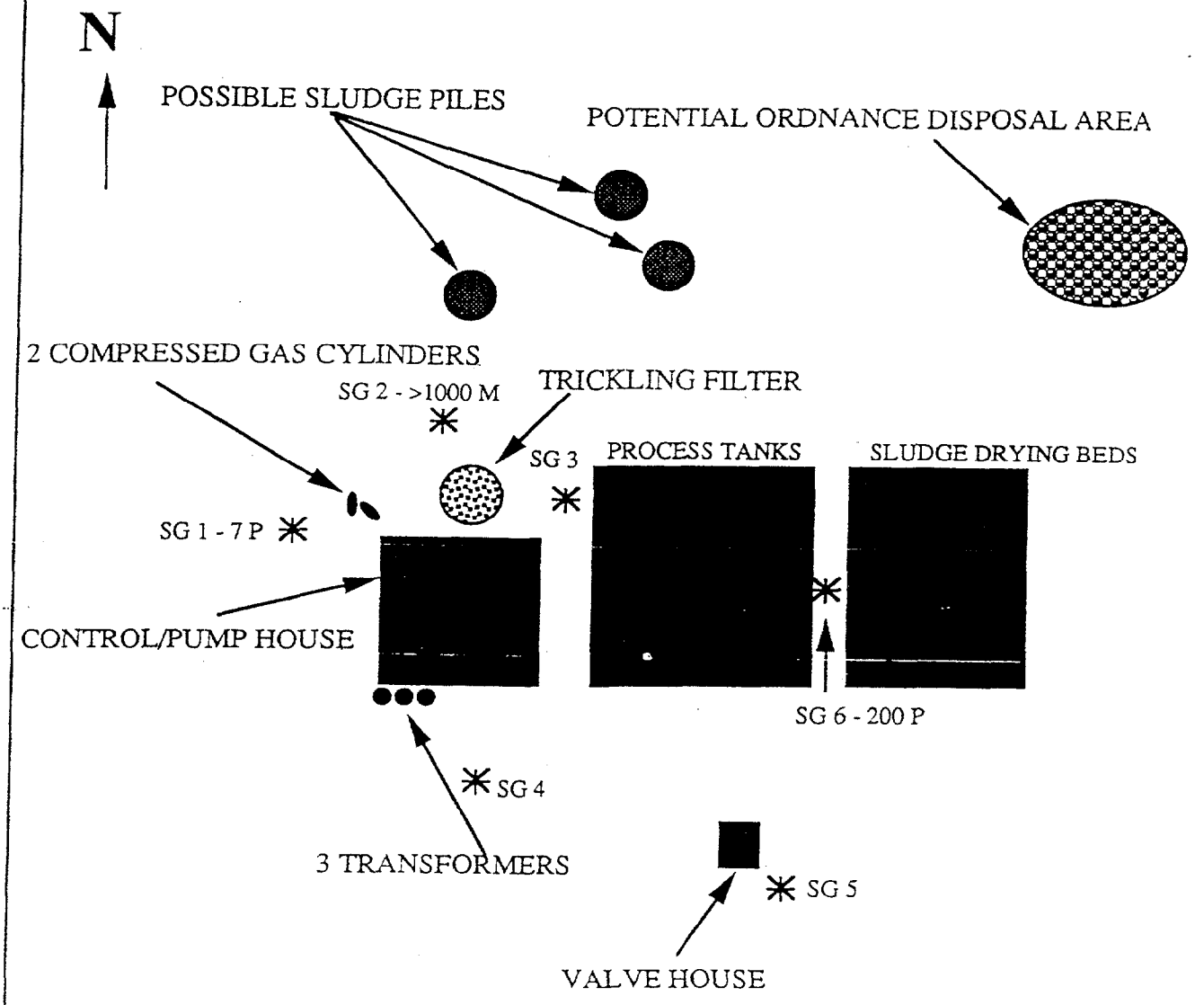
Site 1 - Old Wastewater Treatment Plant. PID readings of 7 ppm and 200 ppm were obtained from samples WFF1-SG1 and WFF1-SG6, respectively (Figure 3-1). WFF1-SG1 was collected to the west of the control house, near a subsurface contact identified by the magnetometer survey. WFF1-SG6 was collected between the process tanks and the sludge beds. The OVA detected no VOCs in either of these samples. This discrepancy is most likely explained by the presence of moisture in the samples.

The OVA had one analytical level greater than the instrument's maximum detection limit (i.e., $>1{,}000$ ppm) from sample WFF1-SG3. This reading was checked with a carbon scrubber, described in Chapter 2.0. The same value was obtained with the scrubber, therefore, it is assumed that WFF1-SG3 contained greater than 1000 ppm of methane, which is a common anaerobic degradation product. This may be indicative of degradation of some type of subsurface carbonaceous material. WFF1-SG2 is located north/northwest of the trickling filter.

Site 2 - Building E-52. Detector readings ranging from non-detect to 289 ppm were obtained at various locations around Building E-52. Sample results are both illustrated on Figure 3-2 and presented in Table 3-1. A strong odor was detected in WFF2-SG13, and soil staining was noted at approximately 6-8 feet. This sample was collected in the approximate location of a former above ground storage tank noted in aerial photographs from the 1960's.

Methane was detected in samples WFF2-SG1 (3.2 ppm), WFF2-SG2 (>1000 ppm), WFF2-SG5 (0.6 ppm), WFF2-SG14 (1.0 ppm), WFF2-SG21 (390 ppm), WFF2-SG27 (450 ppm), WFF2-SG36 (>1000 ppm), and WFF2-SG43 (>1000 ppm). This may be indicative of degradation of some type of subsurface carbonaceous material. The low level detections obtained in areas of soil staining (WFF2-SG6, WFF2-SG7, and WFF2-SG12) indicate that this staining may be due to a nonvolatile substance, or that the VOCs have volatilized.

Site 3 - Two 600,000 Gallon Fuel Tanks, Buildings A-46A and A-46B. Detector readings of <5 ppm (Figure 3-3 and Table 3-1) were obtained in eleven of the thirteen samples collected around these tanks and associated pipelines. The OVA detected 37.4 ppm in sample WFF3-SG1, which is located near monitoring well MW-41. This result, combined with a



LEGEND:
P = PID VOC (ppm)
O = OVA VOC (ppm)
M = METHANE (ppm)

✳ SOIL GAS SAMPLE LOCATION

APPROX. SCALE - 1"=100'

M&E Metcalf & Eddy	**FIGURE 3-1** **POSITIVE SOIL GAS RESULTS**	**SITE 1 - OLD WASTEWATER TREATMENT PLANT**

TABLE 3-1 SOIL GAS SURVEY RESULTS

SAMPLE ID	DATE COLLECTED	DEPTH (FT)	VOC RESULTS (PPM) PID	OVA (minus methane)	NOTES
Site 1 - Old Wastewater Treatment Plant					
WFF1-SG1	3/11/93	5	7	ND	-
WFF1-SG2	3/11/93	3	ND	ND	> 1000 ppm methane detected
WFF1-SG3	3/11/93	5	ND	ND	-
WFF1-SG4	3/11/93	4	ND	ND	-
WFF1-SG5	3/11/93	2.5	ND	ND	-
WFF1-SG6	3/11/93	5	200	ND	-
Site 2 - Building E-52					
WFF2-SG1	3/22/93	4	0.2	1.0	3.2 ppm methane detected
WFF2-SG2	3/22/93	4	2.0	ND	> 1000 ppm methane detected
WFF2-SG3	3/22/93	5	ND	ND	-
WFF2-SG4	3/22/93	6	0.1	8.0	-
WFF2-SG5	3/22/93	8	ND	ND	0.6 ppm methane detected
WFF2-SG6	3/22/93	2	0.1	NR	-
WFF2-SG7	3/22/93	2.5	0.4	ND	-
WFF2-SG8	3/22/93	4	ND	NR	-
WFF2-SG9	3/22/93	8	0.4	ND	-
WFF2-SG10	3/22/93	8	ND	ND	-
WFF2-SG11	3/22/93	8	ND	ND	-

CHAPTER 4.0

RECOMMENDATIONS

Site 1 - Old Wastewater Treatment Plant. M&E recommends collection of subsurface soil samples at three locations: soil gas sample location WFF1-SG2, the sludge piles located north of WFF1-SG2, and soil gas sample location WFF1-SG6. One soil sample at WFF1-SG2 should be collected at a depth of 3 feet to determine what is causing the high level of methane in that area. The methane may be due to the presence of decaying debris, such as wood, or due to the presence of another carbonaceous material, such as sewage sludge. It is recommended that this sample be analyzed for the organic compounds on the target compound list (TCL), the target analyte list (TAL), and for fecal coliforms. A positive detection of fecal coliforms may indicate that sewage sludge is present, and could be causing the methane levels. The TCL is a list of 125 organic compounds, including 34 volatiles, 65 semivolatiles, and 26 pesticides/PCBs. The TAL is a list of 23 metals, plus cyanide. One sample should be collected in the sludge drying beds, and one to three samples should be collected in the potential sludge piles to the north of WFF1-SG2 for the same reason, and analyzed for the same parameters. One soil sample at WFF1-SG6 should be collected at a depth of 5 feet to determine whether organic or metal contamination is present at this location. This sample should be analyzed for TCL and TAL. This site will be forwarded to the Corps of Engineers for further evaluation.

Site 2 - Maintenance Facility, Building E-52. M&E recommends collection of soil samples at the following locations:

Sample #	Location	Depth	Analysis	Rational
1	WFF2-SG2	Field Determined	TCL, TAL, TPH	identify source of soil gas
2	WFF2-SG4	Field Determined	TCL, TAL, TPH	identify source of soil gas
3	WFF2-SG13	Field Determined	TCL, TAL, TPH	identify source of soil gas
4	WFF2-SG18	Field Determined	TCL, TAL, TPH	identify source of soil gas
5	WFF2-SG21	Field Determined	TCL, TAL, TPH	identify source of soil gas
6	WFF2-SG27	Field Determined	TCL, TAL, TPH	identify source of soil gas

Sample #	Location	Depth	Analysis	Rational
7	WFF2-SG35	Field Determined	TCL, TAL, TPH	identify source of soil gas
8	WFF2-SG36	Field Determined	TCL, TAL, TPH	identify source of soil gas
9	WFF2-SG37	Field Determined	TCL, TAL, TPH	identify source of soil gas
10	WFF2-SG43	Field Determined	TCL, TAL, TPH	identify source of soil gas
11	WFF2-SG6, stained area	0-6 inches	TCL, TAL, TPH	identify source of soil staining
12	Stained area South of bollards	0-6 inches	TCL, TAL, TPH	identify source of soil staining
13	WFF2-SG7, stained area	0-6 inches	TCL, TAL, TPH	identify source of soil staining
14	WFF2-SG12, stained area	0-6 inches	TCL, TAL, TPH	identify source of soil staining
15	Stained area SW corner of E-52	0-6 inches	TCL, TAL, TPH	identify source of soil staining

Note*: TPH - Total Petroleum Hydrocarbons

Site 3 - Two 600,000 Gallon Fuel Tanks, Buildings A46-A and A46-B. M&E recommends collection of eight deep soil samples around the former tanks and pipelines. Sample depths should be field determined, and should be based on visual examination, PID/OVA readings, depth of groundwater table, and/or maximum feasible augering depth. One sample should be collected at WFF3-SG1 due to the high soil gas reading and the previous petroleum detection in the nearby well. In addition one sample should be collected on each of the sides of the tanks, at soil gas locations WFF3-SG2, WFF3-SG3, WFF3-SG8, and WFF3-SG10. One sample should be collected along the pipeline, at WFF3-SG5, and two samples should be collected at the valve pits near runway 10-28. All samples should be analyzed for TPH, benzene, toluene, ethyl benzene, xylenes (BTEX), and lead. This site will be forwarded to the Corps of Engineers for further evaluation.

Site 4 - Debris Pile, North End of Wallops Island. M&E recommends collection of shallow (i.e., at or above the groundwater table) subsurface soil samples at each of the three soil gas locations where soil gas OVA levels were detected: WFF4-SG1, WFF4-SG2 and WFF4-SG5. These locations are well-spaced throughout the debris pile and were chosen due to the presence of suspect objects such as drums. In addition, M&E recommends collection of four water and sediment samples from the swale to the east side of the pile. These samples should provide data on compounds which may be leaching from the pile. All of the above samples should be analyzed for the full TCL/TAL parameters, and TPH with fingerprinting. Two background soil, two sediment and two surface water samples should also be collected outside the perimeter of the site on the north end of Wallops Island. Background samples should be

CHAPTER 5.0

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APPENDIX B
FIELD NOTES, DEVELOPMENT FORMS, PURGE FORMS, CHAINS OF CUSTODY

WWTP #1 SI
Wallops Flight Facility

"Rite in the Rain"®

ALL - WEATHER

Environmental

FIELD BOOK

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ALL-WEATHER

ENVIRONMENTAL FIELD BOOK

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Project Wallops Flight Facility, WWTP #1 SI

This book is printed on "Rite in the Rain" A' er Writing Paper - A unique paper created to shed water and enhanc. .en image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

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153 Soil Classification
154 Conversions (Length, Weight, Volume, Temp, etc...)
155 Conversions (Concentrations, Volume/Flow or Time, Velocity, Acceleration)
156 Maximum Concentration of Contaminants for the Toxicity Characteristic

Location WFF WWTP #1 Date 2/19/07

Project / Client ST - USACE 20°F clear, windy

0800 Westan Solutions Inc (WSI) arrives at Wallops Flight Facility (WFF) and gets security passes for Ed Mackey (EM) and Kevin Johnson (KJ).

0830 EM + KJ get IMS drillers security passes.

0850 Team proceeds to T.J Meyer (NASA) office to get radio + check in.

0915 Team proceeds to site to offload equipment. TJ + EM walk site, TJ indicates MW-2 location was dug to 6' last week so good to go will start there.

0940 Crew is getting water for decon, KJ setting lab bottles EM organizing equipment. Greg Ford (GF), in Raleigh, NC texting sampling equipment, tax for soil, titration.

1630 Drillers building decon pad, Rob Krall USACE arrives on site.

1130 Augers decon'd, HASP briefing conducted, HASPs signed, mobbing

Location WWTP #1 Date 2/19/07

Project / Client ST - USACE 20°s F clear + windy

to MW-2. Boring logs + sampling information on seperate sheets form.

1150 Begin at MW-2.

1210 Collect soil sample WFF1-MW2-0.0.5

1220 Collect soil sample WFF1-MW2-C.S-2

1400 At MW-2 at 20', sand saturated. Collected sample WFF1-MW2-19-21 will drill to 27' + set well

1510 Drillers having trouble w/ heaving sands, have to pull augers, clean + re drill prior to building well.

1540 Tagged water level at 19' BGS, so will set well depth at 26'.

1630 MW-2 grouted + built

1710 Drillers decon augers + prep for tuesday.

1745 Team off site for day.

end of day 2/19/07

SJM

Location WWTP #1 Date 2/20/07

Project / Client WFF pt Cloudy 40°s F

0600 Weston team (Ed Mackey, Greg Ford, Kevin Johnson) on site getting badges

0625 Team at WWTP #1 with IMS three person drill team. ———

0730 Team set to drill at MW-6 after morning tt+s briefing. ———

0745 Team samples MW-6-0-0.5 for VOC SVOC, pest/PCB, inorganics, & cyanide

0755 Team samples WFF1-MW6-0.5-2 for VOC SVOC, pest/PCB, inorganics & cyanide

0810 Groundwater encountered at 3' BGS

0815 Sample collected WFF1-MW6-2-4 for suite

0820 Begin building well per attached sheet

0825 Rob Reali on site, agrees w/ MW-6 build

0845 EM calls Theresa Offner (fm) to inform on well spec

0920 MW-6 built except for grout, team mobs to MW-7. GF + KS work w/ Rob Reali measuring locations of sludge piles. ———

0950 Collect sample WFF1-MW7-0-0.5 for suite

1000 Collect sample WFF1-M7-0.5-2 for suite. GW intercepted at 2' BGS. Rob Reali + EM decide to build MW-7 the same as MW-6 so, top of screen may not be above water table. This was done to ensure

EJM

Location WWTP #1 Date 2/26/07

Project / Client WFF pt cloudy 40°s F

a good bentonite + grout seal to prevent surface water infiltration

1030 IMS building well. Note that a 3rd sample not collected at MW-7. Reali requests use this sample at sludge drying beds in sand beneath beds (rock).

1045 Mob to MW-5, no metallic objects in drill zone, as was the case for MW-7. ———

1055 Collect sample WFF1-MW5-0-0.5 for suite

1105 Collect sample WFF1-MW5-0.5-2 for suite

1115 Groundwater at 3' BGS. ———

1125 Collect sample at WFF1-MW5-2-4 for suite

1140 Drilling to 12.5' BGS to set well.

1230 MW-5 wellset, mob to MW-4. No metallic reading, using last decon cutter head + decon'd augers. ———

1045 Collect sample WFF1-MW4-0-0.5

1300 Collect sample WFF1-MW4-0.5-2

1320 Groundwater at 5', will set well to 13'

1330 Collect sample WFF1-MW4-3-5

1345 Building MW-4. ———

1410 STL calls, courier is minutes from gate

EJM

Location WWTP #1 Date 2/20/07

Project / Client WFF

1450 Team sends collected soil to gate for STL courier.

1500 Drillers begin drilling at MW-3 Will not collect soil samples from 0-0.5 and 0.5-2 as drilling though former trickling filter and soils to 4' are fill sand.

1520 Groundwater at 5' BGS for MW-3

1525 Collected soil sample WFF1-MW3-4-6 for suite

1535 Building well MW3, TD = 13.5' BGS

1600 MW-3 built. Drillers decanning + general housekeeping.

1630 EM off-site to purchase ladder for process area entry.

Late notes by Greg Ford

G. Ford writing: Team - G. Ford & K. Johnson

0700 G. Ford leads Safety Meeting: Topics: Hard Hat Around Drill Rig, Hearing Protection, Extreme Trip Hazard With Cut Down Vegetation - Step Carefully.

0850 G. Ford, K. Johnson and R. Reali Scott Locations of Possible Sludge Piles. Appear To Be A Contiguous Band of Sm

Location Old WWTP #1 Date 2/20/07

Project / Client WFF - Main Base / USACE

G. Ford

Mounding Rather Than Discrete Piles. Locations Sited, GF & KJ Begin Sample Collection.

0845 Collect WFF1-SS2 For Suite.

Decon Procedure For Augers, Bowls And Spoons:

1) DI Rinse To Remove Gross Dirt
2) Liquinox Solution With Brush.
3) DI Water Rinse
4) HNO3 Spray
5) DI Water Rinse
6) Methanol Spray
7) Air Dry On Poly Sheet.

1045 Collect WFF1-SS3 For Suite.

1250 Clear Vegetation From Transformer Pad Area.

1345 Collect Composite Samples WFF1-SS1, WFF1-SS1-D, & WFF1-SS6 (Blind Dup.)

1415 Prep Samples For STL Courier.

1445 GF Takes Samples To Main Gate For Driver.

1510 Collect WFF1-SS4 For Suite.

1620 Collect ~~Rinsate~~ - Drillers Split Spoon.

Location WFF WWTP #1 Date 2/21/07

Project / Client USACE

0810 Team on-site, exchanging radio
0900 K Johnson leads safety brief for day
0910 Collect sample WFF1-MW1-0-0.5 for suite
0920 Collect sample WFF1-MW1-0.5-2 for suite
0940 Drilling at MW-1.
1130 Saturation at 19' BGS at MW-1
1130 Collect soil sample WFF1-MW-1-18-20
1140 Drilling to 26.5' BGS
1245 well set.
1445 Prep to develop MW-6.
1545 MW is developed @ about 75-80 gal
1605 Prep to develop MW-7.
1710 MW-7 developed at 118 gal.

Late notes by Greg Ford

G. Ford Writing: Team - G. Ford & K. Johnson

1040 Locate WFF1-SW-1 & WFF1-SD1 At Confluence Of Intermittent Streams Downstream Of Outfall.
1100 Collect WFF1-SW1
1135 Collect WFF1-SD1
1155 Collect WFF1-SD2: No Surface Water At This Location. P. Pearl Chose Location Because It Is The Location Closest To The 1st Stormwater Outfall That Can Be Sampled.

Location QD WWTP #1 Date 2/21/07

Project / Client WFF-MAIN BASE / USACE

G. FORD

1420 Collect WFF1-WW01 From ~~East~~ (GLF) West Primary Settling Tank. Coring Tube Collection Method For Sludge Sample WFF1-SL01 Not Working. Will Order Ponar And Collect Sample Later.
1500 Due To A Miscommunication With R. Pearl We Will Re-Sample Possible Sludge Piles For SVOC, Pest/PCB, Cyanide & Metals As Composite Samples - Grab VOCs Will Be Kept.
1550 Collect WFF1-SS2-A
1605 Collect WFF1-SS3-A
1635 Collect Rinsate 2 (Hand Auger Rinsate Blank).

Location WWTP #1 Date 2/22/07

Project / Client SI - USACE

0735 Team on site for day w/IMS
0810 H+S briefing
0845 EM, RR, +IMS develop MW-2 + build well head.
0950 MW-2 developed.
1035 Team begins develop at MW-5
1040 Team begins develop at MW-3
1210 MW-3 developed at 110 gallons
1235 MW-5 developed at 215 gallons
1320 Begin development at MW-1
1355 Development complete MW-1 @ 80 gal
1435 Begin purge for sampling @ MW-6
1504 Purge complete at MW-6
1515 Sampled MW-6 for VOC, SVOC, pest/PCB, metals cyanide
1550 Rain storm passing through
1610 Purge begins at MW-7.
1652 Purge complete at MW-7 @ 5.5 gal
1700 Sample MW-7 for suite.

Late notes by Greg Ford

G. Ford Writing: Team - G. Ford & R. Johnson

1000 GF & RJ Prepare To Collect Soil Cuttings Sample For TCLP Analysis.
55 Gal Drums Are Previously Labeled By Well #. All Drums Are Opened And 2 Scoops

SM

Location WFF - Main Base Date 2/22/07

Project / Client SI - Old WWTP #1 / USACE

G. Ford

Are Taken From Each Drum. Material Is Composited In Large Stainless Bowl.
1035 Collect "Soil Cuttings" Sample For TCLP.
1150 R. Read Locates Poisible Terra Cotta Overflow Pipe. GF & RJ Will Try To Locate End Of Pipe And Collect Discretionary Sample WFF1-SS8.
1250 Located Suspected End Of Pipe.
1300 Collect WFF1-SS8.
1325 PZed Samples For STL Courier Pick Up.
1335 GF Takes Sample To Front Gate Of Base.
1410 GF & RJ Prepare To Collect Samples From Sludge Drying Beds
1520 Collect SPT Composite Sludge Sample WFF1-SL02
1530 Collect WFF1-SL03.
WFF1-SS09 & SS10 Will Be Collected From Below Center Point Of The SPT Composite Location For SL02 & SL03
1640 Collect WFF1-SS09 } Discretionary Samples,
1645 Collect WFF1-SS10 } Not In Work Plan
1730 GF & RJ Collect Rinsate 3' - Stainless Steel Bowl Rinsate Blank.

GC

12

Location WWTP #1 Date 3/23/07

Project / Client SI

0740 EM + KJ on-site, GF getting ice + decon water.

0750 Surveyor on site, setting up. Today EM will be gw sampling, GF + KJ will collect samples in cistern + settling tank, SS-4 SS-5 (QA/QC), + GPS.

0930 EM purges + samples MW-3 for suite, plus QA/QC MW-30 + blind MW-20 (1010)

1150 EM purges + samples MW-5 for suite

1300 EM purges + samples MW-4 for suite

1430 EM purges + samples MW-2 for suite

1525 EM purges + samples MW-1 for suite

Late notes by Greg Ford

0725 GF Will Depart Site To Buy Supplies And Battery For F250.

0905 GF Back On Site.

1020 Collect WFF1-SS4-A For Suite, This Is MS/MSD Sample.

1115 Collect WFF1-SS5, SS5-D, & SS7 (Blind Dup) Collection Time For WFF1-SS7 is 1130

1205 Prepare To Collect WFF1-SL01.

GF

SJR

13

Location WFF - Main Base Date 3/23/07

Project / Client SI - OLD WWTP #1

1235 GF & KS Using Ponar To Collect Sludge Sample From West Primary Settling Tank. Same Location As WFF1-WW01. Having Difficulty Finding A Flat Spot In Primary Settling Tank. Walls Are Sloped Below Water Line - Ponar Is Sliding Down Slope. Material Coming Up Appears To Be Almost Exclusively Plant Material.

1545 Collect WFF1-SL1

1600 Prepare To Collect Purge Water For Waste Characterization. Collect Volume From Each Drum Through Bung Hole Using Bailer - Composite In Container.

1615 Collect "Purge Water"

1740 Collect "Rinsate 4" - Rinsate Blank From Bladder Pump.

1800 Pred Site For Departure.

Location WWTP #1 Date 2/24/07

Project / Client STL

0800 Em + KJ on way to meet STL

1000 Samples picked up by STL in Norfolk

end of log

2/24/07

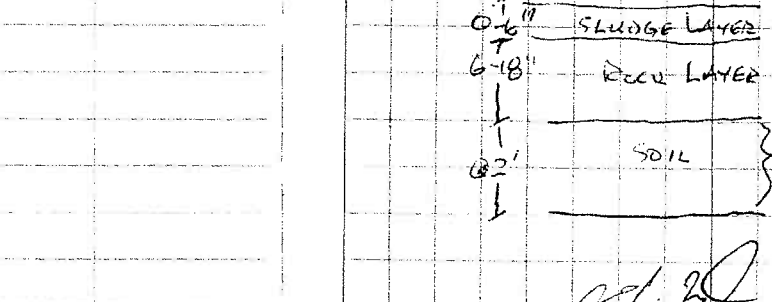
Location WFF - MAIN BASE Date 3/16/07

Project / Client USACE

SUMMARY OF DEVIATIONS FROM WORK PLAN

THE FOLLOWING LIST OF DEVIATIONS FROM THE WORK PLAN WERE BASED ON THE DISCRETION OF R. REAL, (USACE).

1) THE LOCATION OF POSSIBLE SLUDGE PILE SAMPLE WFF-SSS WAS MOVED EAST TO THE BANK OF THE RISE GOING UP TO THE RUNWAY ON THE HOT PAD SIDE.
2) THERE WAS NO SLUDGE OR SEDIMENT PRESENT IN THE WET WELL OF THE PUMP HOUSE - WFF1-SL04 WAS OMITTED.
3) WFF1-SS8 WAS A DISCRETIONARY SAMPLE BASED ON THE SUSPECTED LOCATION OF THE OVERFLOW END OF PIPE.
4) A SOIL SAMPLE WAS COLLECTED FROM EACH OF THE SLUDGE DRYING BEDS. A LAYER OF ROCK WAS REMOVED TO REACH SOIL.



GEOLIS Well Development Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE/AREA: WFF

LOCATION ID: MW-1
DATE: 2/22/07
MEASURED BY:
SIGNATURE:

ONE WELL VOLUME: start 1300 gallons WELL TD: ft TOC

Well Volume (gallons/foot): 2-inch = 0.16, 4-inch = 0.65, 6-inch = 1.47, 8-inch = 2.61

TIME	ACTIVITY CODE	DEPTH TO WATER (ft)	PURGE RATE (gpm)	PURGE VOLUME (gal)	FIELD MEASUREMENTS				TURBIDITY	COMMENTS
					Tem	Con	DO	pH		ORP
1320	DOB		2	20	15.78	.102	2.86	6.06	6.8	-154.2
45			2	50	15.81	.102	3.05	6.06	186	-177.1
				70	15.76	.104	3.25	6.06	311	-179.7
1355				80	16.43	.101	2.79	6.01	5.18	-175.0
	FINAL									

FINAL WELL YIELD: GPM PUMP RATE - ESTIMATED CORRESPONDING DRAWDOWN: FT

DEVELOPMENT ACTIVITY CODES

DBB - Begin Bailing
DOB - Begin Overpumping
DRB - Begin Rawhiding
DCB - Begin Recirculation
DHB - Begin Hydraulic Jetting
DAB - Begin Air Surging
DSB - Begin Surge Blocking
DXB - Begin Other
Specify other method:
FMT - Field Measurements (select from codes at right)

DBE - End Bailing
DOE - End Overpumping
DRE - End Rawhiding
DCE - End Recirculation
DHE - End Hydraulic Jetting
DAE - End Air Surging
DSE - End Surge Blocking
DXE - End Other

FIELD MEASUREMENT CODES

MTP - Temperature
MSC - Specific Conductance
MPD - Photolonizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MDO - Dissolved Oxygen
MPH - pH
MEH - Eh
MMC - Imhoff Cone
MO1 - Other:
MO2 - Other:

TURBIDITY

Enter Turbidity Meter Reading (Final should be < 5 NTU)
OR
Enter Qualitative Observations
H - High: Opaque/Muddy/Silty
M - Medium: Translucent/Cloudy
L - Low: Transparent/Some Silt
N - None: Clear/No Visible Silt

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22.59

GEOLIS® Well Purging Form

COMPANY: WSI
CLIENT: USACE
PROJECT: 51
SITE / AREA: WFF
LOCATION ID: MW-1
DATE: 2/23/07
SAMPLER:
SIGNATURE:

WELL OBSERVATIONS

CASING & LID: OK - DAMAGED - HEAVED - NO LID LOCKED: YES - NO KEY NO: _____ STICKUP: _____ FT-M
WELL DIAMETER: 2" - 4" - 6" - 8" - OTH: _____ BOREHOLE DIAMETER: 6 1/4 IN-CM MEASURING POINT: TIC - TOC - GRS
VAPOR READINGS: PID - FID - OTHER: _____ BACKGROUND: _____ INSIDE WELL: _____
CHECKED FOR NAPL LAYER: YES - NO OBSERVED: NON - FLT - SNK THICKNESS: _____ IN-CM SHEEN: YES - NO

PURGING CALCULATIONS

(A) DEPTH TO WELL BOTTOM: 26 FT-M BMP
(B) DEPTH TO WATER: 20.22 FT-M BMP
(C) SAND PACK LENGTH _____ FT-M
(D) WATER COLUMN HEIGHT (A - B): 5.78 FT-M
(E) CASING VOLUME FACTOR: _____ GPF-LPM
(F) SAND PACK VOLUME FACTOR: _____ GPF-LPM
(G) CASING VOLUME (D x E): _____ GAL-L
(H) SAND PACK VOLUME (C x F): _____ GAL-L

Casing Factor (GPF for inches) = 0.041 (Well Diameter)²
2" = 0.16; 4" = 0.65; 6" = 1.47; 8" = 2.61 GPF

Sand Pack Factor (GPF for inches)
= [0.041 (Hole Diameter)² - 0.041 (Well Diameter)²] 0.45

(I) TOTAL WELL VOLUME (G + H): 0.92 GAL-L
(J) VOLUMES TO BE PURGED: 3
(K) TOTAL PURGE VOLUME (I x J): 2.77 GAL-L

PURGING INFORMATION

PURGE ENDPOINT: VOLUME - TIME - PARAMETER STABILIZATION - TURBIDITY CRITERIA: _____
PURGING METHOD: BAILER - SUB. PUMP - CENT. PUMP - PACKER & PUMP - OTHER: _____
DEVICE DESCRIPTION: Bladder DEVICE No.: _____
PUMP/BAILER INTAKE: SCREEN TOP - SCREEN/WELL BOTTOM - MID SCREEN/WELL - WATER LEVEL - MOVED UP/DOWN
PURGE WATER: DISCHARGED - TREATED - STORED ONSITE STORED IN: TANKS - DRUMS NO.: _____
FIELD MEASURMENTS IN: FLOW THRU CHAMBER - OPEN JAR CASCADING WATER: YES - NO DEPTH: _____ FT-M BMP
WELL PURGING INTERVAL: _____ TO _____ FT-M BMP PURGE DEPTH TO WATER (MAX): _____ FT-M BMP

TIME	DEPTH TO WATER (FT-M BMP)	PURGE RATE or VOLUME (GPM-GAL)	TURBID -ITY (NTU)	FIELD MEASUREMENTS AND UNITS						COMMENTS
				MTP °C.	Cond	DO	pH	ORP		
1456		.1	84.7	13.64	.106	2.82	6.03	-142.3		Pre Purge Readings
1512			79.9	14.93	.107	2.86	5.86	-142.4		
1515		1.5	52.6	15.33	.106	2.96	5.90	-147.7		
1518		2	28.2	15.36	.102	2.89	5.86	-148.8		
1521		2.5	19.6	15.33	.103	2.98	5.89	-147.8		
1523		2.8	6.29	15.33	.103	3.01	5.86	-148.2		
										Post Purge Readings

TOTAL PURGE TIME: _____ HRS TOTAL PURGE VOLUME: _____ GAL - L RECOVERY: FAST - SLOW - V.SLOW

FIELD MEASUREMENT CODES

MTP - Temperature (°C.)
MSC - Specific Conductance (mS/cm)
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MCL - Color
MPH - pH
MEH - Eh
MAL - Alkalinity
MDO - Dissolved Oxygen (mg/L)
MO1 - Other: _____
MO2 - Other: _____
MO3 - Other: _____
MD1 - DTW in Well _____
MD2 - DTW in Well _____
MD3 - DTW in Well _____
MD4 - DTW in Well _____

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Sampled @ 1525

GEOLIS Well Development Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE/AREA: WFF1

LOCATION ID: MW-2
DATE: 2/22/07
MEASURED BY: SJM
SIGNATURE:

ONE WELL VOLUME: _____ gallons WELL TD: _____ ft TOC

Well Volume (gallons/foot): 2-inch = 0.16 4-inch = 0.65 6-inch = 1.47 8-inch = 2.61

TIME	ACTIVITY CODE	DEPTH TO WATER (ft)	PURGE RATE (gpm)	PURGE VOLUME (gal)	FIELD MEASUREMENTS pH	cond (mS/cm)	DO (mg/L)	ORP	TURBIDITY	COMMENTS Temp °C
0850	DOB	19.22	2	20	6.18	.108	6.00	-176.8	1048	15.08
				30	6.06	.107	6.16	-172.9	168	15.86
				40	6.06	.116	5.27	-135.7	418	15.58
				55	6.07	.115	5.81	-142.4	183	15.05
				65	6.08	.120	5.25	-142.5	822	15.72
0956				75	6.07	.120	5.33	-145.0	5.94	15.57
	FINAL									

Developed SJM

FINAL WELL YIELD: _____ GPM PUMP RATE - ESTIMATED CORRESPONDING DRAWDOWN: _____ FT

DEVELOPMENT ACTIVITY CODES

DBB - Begin Bailing
DOB - Begin Overpumping
DRB - Begin Rawhiding
DCB - Begin Recirculation
DHB - Begin Hydraulic Jetting
DAB - Begin Air Surging
DSB - Begin Surge Blocking
DXB - Begin Other
DBE - End Bailing
DOE - End Overpumping
DRE - End Rawhiding
DCE - End Recirculation
DHE - End Hydraulic Jetting
DAE - End Air Surging
DSE - End Surge Blocking
DXE - End Other
Specify other method: _____
FMT - Field Measurements (select from codes at right)

FIELD MEASUREMENT CODES

MTP - Temperature
MSC - Specific Conductance
MPD - Photolonizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MDO - Dissolved Oxygen
MPH - pH
MEH - Eh
MMC - Imhoff Cone
MO1 - Other: _____
MO2 - Other: _____

TURBIDITY

Enter Turbidity Meter Reading (Final should be < 5 NTU)
OR
Enter Qualitative Observations
H - High: Opaque/Muddy/Silty
M - Medium: Translucent/Cloudy
L - Low: Transparent/Some Silt
N - None: Clear/No Visible Silt

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21.20

GEOLIS® Well Purging Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE / AREA: WEF
LOCATION ID: MW-2
DATE: 2/23/07
SAMPLER:
SIGNATURE:

WELL OBSERVATIONS

CASING & LID: OK - DAMAGED - HEAVED - NO LID LOCKED: YES - NO KEY NO: _____ STICKUP: _____ FT-M
WELL DIAMETER: 2" - 4" - 6" - 8" - OTH: _____ BOREHOLE DIAMETER: 6 1/2 IN-CM MEASURING POINT: TIC - TOC - GRS
VAPOR READINGS: PID - FID - OTHER: _____ BACKGROUND: _____ INSIDE WELL: _____
CHECKED FOR NAPL LAYER: YES - NO OBSERVED: NON - FLT - SNK THICKNESS: _____ IN-CM SHEEN: YES - NO

PURGING CALCULATIONS

(A) DEPTH TO WELL BOTTOM: 26 FT-M BMP
(B) DEPTH TO WATER: 19.51 FT-M BMP
(C) SAND PACK LENGTH _____ FT-M
(D) WATER COLUMN HEIGHT (A - B): 6.49 FT-M
(E) CASING VOLUME FACTOR: _____ GPF-LPM
(F) SAND PACK VOLUME FACTOR: _____ GPF-LPM
(G) CASING VOLUME (D x E): _____ GAL-L
(H) SAND PACK VOLUME (C x F): _____ GAL-L

Casing Factor (GPF for inches) = 0.041(Well Diameter)²
2" = 0.16; 4" = 0.65; 6" = 1.47; 8" = 2.61 GPF

Sand Pack Factor (GPF for inches)
= [0.041(Hole Diameter)² - 0.041(Well Diameter)²] 0.45

(I) TOTAL WELL VOLUME (G + H): 1.04 GAL-L
(J) VOLUMES TO BE PURGED: 3
(K) TOTAL PURGE VOLUME (I x J): 3.12 GAL-L

PURGING INFORMATION

PURGE ENDPOINT: VOLUME - TIME - PARAMETER STABILIZATION - TURBIDITY CRITERIA: _____
PURGING METHOD: BAILER - SUB. PUMP - CENT. PUMP - PACKER & PUMP - OTHER: _____
DEVICE DESCRIPTION: Bladder geotech DEVICE No.: _____
PUMP/BAILER INTAKE: SCREEN TOP - SCREEN/WELL BOTTOM - MID SCREEN/WELL - WATER LEVEL - MOVED UP/DOWN
PURGE WATER: DISCHARGED - TREATED - STORED ONSITE STORED IN: TANKS - DRUMS NO.: _____
FIELD MEASURMENTS IN: FLOW THRU CHAMBER - OPEN JAR CASCADING WATER: YES - NO DEPTH: _____ FT-M BMP
WELL PURGING INTERVAL: _____ TO _____ FT-M BMP PURGE DEPTH TO WATER (MAX): _____ FT-M BMP

TIME	DEPTH TO WATER (FT-M BMP)	PURGE RATE or VOLUME (GPM-GAL)	TURBID-ITY (NTU)	FIELD MEASUREMENTS AND UNITS						COMMENTS
				MTP °C.	Con	DO	pH	ORP		
1349		0.1	342	13.42	.130	2.79	6.22	-155.7		Pre Purge Readings
1359		1	157	14.39	.121	2.51	6.19	-154.9		
1404		2	81.4	14.95	.117	2.56	6.13	-157.8		
1414		2.5	33.4	14.88	.113	2.51	6.15	-14.8		
1417		2.8	13.4	14.84	.110	2.47	6.11	-157.2		
1424		3.5	8.17	14.83	.108	2.52	6.10	-160.7		
										Post Purge Readings

TOTAL PURGE TIME: _____ HRS TOTAL PURGE VOLUME: _____ GAL - L RECOVERY: FAST - SLOW - V.SLOW

FIELD MEASUREMENT CODES

MTP - Temperature (°C.)
MSC - Specific Conductance (mS/cm)
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MCL - Color
MPH - pH
MEH - Eh
MAL - Alkalinity
MDO - Dissolved Oxygen (mg/L)
MO1 - Other: _____
MO2 - Other: _____
MO3 - Other: _____
MD1 - DTW in Well _____
MD2 - DTW in Well _____
MD3 - DTW in Well _____
MD4 - DTW in Well _____

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Sampled at 1430

GEOLIS Well Development Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE/AREA: WEFI

LOCATION ID: MW-3
DATE: 2/22/07
MEASURED BY: EJM
SIGNATURE:

ONE WELL VOLUME: _____ gallons WELL TD: _____ ft TOC

Well Volume (gallons/foot): 2-inch = 0.16 4-inch = 0.65 6-inch = 1.47 8-inch = 2.61

TIME	ACTIVITY CODE	DEPTH TO WATER (ft)	PURGE RATE (gpm)	PURGE VOLUME (gal)	FIELD MEASUREMENTS				TURBIDITY	COMMENTS
					Temp	Cond	DO	pH		ORP
1040		5.48	2	20	11.17	.357	1.76	6.80	High	-214.9
				30	11.39	.335	1.22	6.80	433	-214.7
				45	11.37	.330	0.78	6.80	25.6	-223.0
				65	11.44	.316	0.46	6.77	123	-227.2
				75	11.42	.317	0.48	6.76	23.3	-229.1
				80	11.44	.318	0.58	6.75	13.3	-230.9
				100	11.51	.312	0.64	6.76	51.2	-235.8
				105	11.48	.319	.44	6.75	16.5	-227.7
1210				110	11.46	.318	.29	6.75	9.6	-227.9
	FINAL									

developed
2/22/07 EJM

FINAL WELL YIELD: _____ GPM PUMP RATE - ESTIMATED CORRESPONDING DRAWDOWN: _____ FT

DEVELOPMENT ACTIVITY CODES

DBB - Begin Bailing
DOB - Begin Overpumping
DRB - Begin Rawhiding
DCB - Begin Recirculation
DHB - Begin Hydraulic Jetting
DAB - Begin Air Surging
DSB - Begin Surge Blocking
DXB - Begin Other
DBE - End Bailing
DOE - End Overpumping
DRE - End Rawhiding
DCE - End Recirculation
DHE - End Hydraulic Jetting
DAE - End Air Surging
DSE - End Surge Blocking
DXE - End Other
Specify other method: _____
FMT - Field Measurements (select from codes at right)

FIELD MEASUREMENT CODES

MTP - Temperature
MSC - Specific Conductance
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MDO - Dissolved Oxygen
MPH - pH
MEH - Eh
MMC - Imhoff Cone
MO1 - Other: _____
MO2 - Other: _____

TURBIDITY

Enter Turbidity Meter Reading (Final should be < 5 NTU)
OR
Enter Qualitative Observations
H - High: Opaque/Muddy/Silty
M - Medium: Translucent/Cloudy
L - Low: Transparent/Some Silt
N - None: Clear/No Visible Silt

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Casing 2.41A

GEOLIS® Well Purging Form

COMPANY: WSI
CLIENT: USACE
PROJECT: S1
SITE / AREA: WFT
LOCATION ID: MW-3
DATE: 2/23/02
SAMPLER:
SIGNATURE: S1M

WELL OBSERVATIONS

CASING & LID: OK - DAMAGED - HEAVED - NO LID LOCKED: YES - NO KEY NO: _____ STICKUP: 2.41 FT-M
WELL DIAMETER: 2" - 4" - 6" - 8" - OTH: _____ BOREHOLE DIAMETER: 6 1/2 IN-CM MEASURING POINT: TIC - TOC - GRS
VAPOR READINGS: PID - FID - OTHER: _____ BACKGROUND: _____ INSIDE WELL: _____
CHECKED FOR NAPL LAYER: YES - NO OBSERVED: NON - FLT - SNK THICKNESS: _____ IN-CM SHEEN: YES - NO

PURGING CALCULATIONS

(A) DEPTH TO WELL BOTTOM: 13 FT-M BMP
(B) DEPTH TO WATER: 5.96 8.37 S1M FT-M BMP
(C) SAND PACK LENGTH _____ FT-M
(D) WATER COLUMN HEIGHT (A - B): _____ FT-M
(E) CASING VOLUME FACTOR: _____ GPF-LPM
(F) SAND PACK VOLUME FACTOR: _____ GPF-LPM
(G) CASING VOLUME (D x E): _____ GAL-L
(H) SAND PACK VOLUME (C x F): 1.13 GAL-L

Casing Factor (GPF for inches) = 0.041(Well Diameter)²
2" = 0.16; 4" = 0.65; 6" = 1.47; 8" = 2.61 GPF

Sand Pack Factor (GPF for inches)
= [0.041(Hole Diameter)² - 0.041(Well Diameter)²] 0.45

(I) TOTAL WELL VOLUME (G + H): 1.13 GAL-L
(J) VOLUMES TO BE PURGED: 3
(K) TOTAL PURGE VOLUME (I x J): 3.38 GAL-L

PURGING INFORMATION

PURGE ENDPOINT: VOLUME - TIME - PARAMETER STABILIZATION - TURBIDITY CRITERIA: _____
PURGING METHOD: BAILER - SUB. PUMP - CENT. PUMP - PACKER & PUMP - OTHER: _____
DEVICE DESCRIPTION: _____ DEVICE No.: _____
PUMP/BAILER INTAKE: SCREEN TOP - SCREEN/WELL BOTTOM - MID SCREEN/WELL - WATER LEVEL - MOVED UP/DOWN
PURGE WATER: DISCHARGED - TREATED - STORED ONSITE STORED IN: TANKS - DRUMS NO.: _____
FIELD MEASURMENTS IN: FLOW THRU CHAMBER - OPEN JAR CASCADING WATER: YES - NO DEPTH: _____ FT-M BMP
WELL PURGING INTERVAL: _____ TO _____ FT-M BMP PURGE DEPTH TO WATER (MAX): _____ FT-M BMP

TIME	DEPTH TO WATER (FT-M BMP)	PURGE RATE or VOLUME (GPM-GAL)	TURBID-ITY (NTU)	FIELD MEASUREMENTS AND UNITS						COMMENTS
				MTP °C.	COND	DO	PH	ORP		
0840		0.5	111	9.29	.385	2.15	7.49	-224.9		Pre Purge Readings begin purge
0850		1.	87	9.95	.355	0.78	7.49	-223.9		
0857		1.6	51.3	9.96	.341	.77	7.33	-212.2		
0902		2.5	31.8	9.96	.338	.54	7.24	-207.2		
0910		4	17.2	10.01	.335	.52	7.28	-214.3		
0912		4.25	9.08	9.96	.336	.51	7.24	-210.9		
										Post Purge Readings

TOTAL PURGE TIME: _____ HRS TOTAL PURGE VOLUME: _____ GAL - L RECOVERY: FAST - SLOW - V.SLOW

FIELD MEASUREMENT CODES

MTP - Temperature (°C.)
MSC - Specific Conductance (mS/cm)
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MCL - Color
MPH - pH
MEH - Eh
MAL - Alkalinity
MDO - Dissolved Oxygen (mg/L)
MO1 - Other: _____
MO2 - Other: _____
MO3 - Other: _____
MD1 - DTW in Well _____
MD2 - DTW in Well _____
MD3 - DTW in Well _____
MD4 - DTW in Well _____

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0930 prime + MSMSD 0945 - dup

GEOLIS Well Development Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE/AREA: WFF

LOCATION ID: MW-4
DATE: 2/22/07
MEASURED BY: EJM
SIGNATURE:

ONE WELL VOLUME: _____ gallons WELL TD: _____ ft TOC

Well Volume (gallons/foot): 2-inch = 0.16 4-inch = 0.65 6-inch = 1.47 8-inch = 2.61

TIME	ACTIVITY CODE	DEPTH TO WATER (ft)	PURGE RATE (gpm)	PURGE VOLUME (gal)	FIELD MEASUREMENTS Tem	Cnd	DO	pH	TURBIDITY	COMMENTS ORP
1155	DOB	5'	2	20	12.09	.167	1.43	6.31	H,	-222.3
				30	12.20	.173	1.40	6.34	185	-221.1
1220				50	12.26	.175	1.35	6.23	381	-225.7
				80	12.14	.171	1.38	6.41	946	-225.1
				140	12.23	.173	1.33	6.25	194	-221.7
				150	12.16	.172	1.39	6.33	28.3	-222.1
				160	12.14	.172	1.51	6.31	11.7	-221.1
1315				165	12.20	.172	1.55	6.11	8.5	-220.3
	FINAL									

Developed

EJM

FINAL WELL YIELD: _____ GPM PUMP RATE - ESTIMATED CORRESPONDING DRAWDOWN: _____ FT

DEVELOPMENT ACTIVITY CODES

DBB - Begin Bailing
DOB - Begin Overpumping
DRB - Begin Rawhiding
DCB - Begin Recirculation
DHB - Begin Hydraulic Jetting
DAB - Begin Air Surging
DSB - Begin Surge Blocking
DXB - Begin Other
DBE - End Bailing
DOE - End Overpumping
DRE - End Rawhiding
DCE - End Recirculation
DHE - End Hydraulic Jetting
DAE - End Air Surging
DSE - End Surge Blocking
DXE - End Other
Specify other method: _____
FMT - Field Measurements (select from codes at right)

FIELD MEASUREMENT CODES

MTP - Temperature
MSC - Specific Conductance
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MDO - Dissolved Oxygen
MPH - pH
MEH - Eh
MMC - Imhoff Cone
MO1 - Other: _____
MO2 - Other: _____

TURBIDITY

Enter Turbidity Meter Reading (Final should be < 5 NTU)
OR
Enter Qualitative Observations
H - High: Opaque/Muddy/Silty
M - Medium: Translucent/Cloudy
L - Low: Transparent/Some Silt
N - None: Clear/No Visible Silt

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TOC 7.94

GEOLIS® Well Purging Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE / AREA: WFF
LOCATION ID: MW-4
DATE: 2/23/07
SAMPLER:
SIGNATURE:

WELL OBSERVATIONS

CASING & LID: OK - DAMAGED - HEAVED - NO LID LOCKED: YES - NO KEY NO: _____ STICKUP: _____ FT-M
WELL DIAMETER: 2" - 4" - 6" - 8" - OTH: _____ BOREHOLE DIAMETER: _____ IN-CM MEASURING POINT: TIC - TOC - GRS
VAPOR READINGS: PID - FID - OTHER: _____ BACKGROUND: _____ INSIDE WELL: _____
CHECKED FOR NAPL LAYER: YES - NO OBSERVED: NON - FLT - SNK THICKNESS: _____ IN-CM SHEEN: YES - NO

PURGING CALCULATIONS

(A) DEPTH TO WELL BOTTOM: 13 FT-M BMP
(B) DEPTH TO WATER: 4.89 FT-M BMP
(C) SAND PACK LENGTH 8 FT-M
(D) WATER COLUMN HEIGHT (A - B): 8.17 FT-M
(E) CASING VOLUME FACTOR: _____ GPF-LPM
(F) SAND PACK VOLUME FACTOR: _____ GPF-LPM
(G) CASING VOLUME (D x E): _____ GAL-L
(H) SAND PACK VOLUME (C x F): _____ GAL-L

Casing Factor (GPF for inches) = 0.041(Well Diameter)²
2" = 0.16; 4" = 0.65; 6" = 1.47; 8" = 2.61 GPF

Sand Pack Factor (GPF for inches)
= [0.041(Hole Diameter)² - 0.041(Well Diameter)²] 0.45

(I) TOTAL WELL VOLUME (G + H): 1.30 GAL-L
(J) VOLUMES TO BE PURGED: 3
(K) TOTAL PURGE VOLUME (I x J): 3.89 GAL-L

PURGING INFORMATION

PURGE ENDPOINT: VOLUME - TIME - PARAMETER STABILIZATION - TURBIDITY CRITERIA: _____
PURGING METHOD: BAILER - SUB. PUMP - CENT. PUMP - PACKER & PUMP - OTHER: _____
DEVICE DESCRIPTION: bladder DEVICE No.: _____
PUMP/BAILER INTAKE: SCREEN TOP - SCREEN/WELL BOTTOM - MID SCREEN/WELL - WATER LEVEL - MOVED UP/DOWN
PURGE WATER: DISCHARGED - TREATED - STORED ONSITE STORED IN: TANKS - DRUMS NO.: _____
FIELD MEASURMENTS IN: FLOW THRU CHAMBER - OPEN JAR CASCADING WATER: YES - NO DEPTH: _____ FT-M BMP
WELL PURGING INTERVAL: _____ TO _____ FT-M BMP PURGE DEPTH TO WATER (MAX): _____ FT-M BMP

TIME	DEPTH TO WATER (FT-M BMP)	PURGE RATE or VOLUME (GPM-GAL)	TURBID -ITY (NTU)	FIELD MEASUREMENTS AND UNITS MTP °C.	Con	DO	PH	ORP		COMMENTS
1222		.2	252	10.64	.166	1.60	5.98	-175.4		Pre Purge Readings
1231		1.2	146	11.19	.162	1.63	5.78	-181.4		
1238		2	74.7	11.25	.161	1.59	5.71	-181.6		
1244		2.9	43.6	11.28	.161	1.68	5.66	-186.3		
1251		3.9	20.7	11.22	.162	1.66	5.68	-185.4		
1255		4.5	8.38	11.24	.163	1.71	5.70	-183.1		
										Post Purge Readings

TOTAL PURGE TIME: _____ HRS TOTAL PURGE VOLUME: _____ GAL - L RECOVERY: FAST - SLOW - V.SLOW

FIELD MEASUREMENT CODES

MTP - Temperature (°C.)
MSC - Specific Conductance (mS/cm)
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MCL - Color
MPH - pH
MEH - Eh
MAL - Alkalinity
MDO - Dissolved Oxygen (mg/L)
MO1 - Other: _____
MO2 - Other: _____
MO3 - Other: _____
MD1 - DTW in Well _____
MD2 - DTW in Well _____
MD3 - DTW in Well _____
MD4 - DTW in Well _____

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Sampled 1300

GEOLIS Well Development Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE/AREA: WFF
LOCATION ID: MW-5
DATE: 2/22/07
MEASURED BY: SAR
SIGNATURE:

ONE WELL VOLUME: 1028 start gallons WELL TD: ft TOC

Well Volume (gallons/foot) 2-inch = 0.16 4-inch = 0.65 6-inch = 1.47 8-inch = 2.61

TIME	ACTIVITY CODE	DEPTH TO WATER (ft)	PURGE RATE (gpm)	PURGE VOLUME (gal)	FIELD MEASUREMENTS				TURBIDITY	COMMENTS
					Tem	con	DO	pH		ORP
1035	DOB	2.47	2	20	11.81	.255	1.72	6.69	5338	-208.1
				35	11.91	.261	1.48	6.86	692	-213.8
				50	11.92	.261	0.77	6.88	906	-220.1
				70	11.96	.260	0.80	6.87	200	-221.0
				85	11.25	.265	1.04	6.89	2067	-233.8
				125	11.97	.257	0.66	6.85	319	-226.6
				140	12.03	.269	.45	6.85	157	-229.6
				165	12.11	.240	0.56	6.66	72.1	-228.4
1215				185	12.10	.255	0.63	6.69	165	-228.9
				195	12.21	.253	0.60	6.56	108.5	
				205	12.09	.252	.48	6.71	14.3	-233.1
				210	12.11	.252	.67	6.74	10.16	-228.2
1235				215	12.14	.252	.71	6.77	7.67	-227.9
					developed					
	FINAL									

FINAL WELL YIELD: GPM PUMP RATE - ESTIMATED CORRESPONDING DRAWDOWN: FT

DEVELOPMENT ACTIVITY CODES

DBB - Begin Bailing
DOB - Begin Overpumping
DRB - Begin Rawhiding
DCB - Begin Recirculation
DHB - Begin Hydraulic Jetting
DAB - Begin Air Surging
DSB - Begin Surge Blocking
DXB - Begin Other
Specify other method:
FMT - Field Measurements (select from codes at right)

DBE - End Bailing
DOE - End Overpumping
DRE - End Rawhiding
DCE - End Recirculation
DHE - End Hydraulic Jetting
DAE - End Air Surging
DSE - End Surge Blocking
DXE - End Other

FIELD MEASUREMENT CODES

MTP - Temperature
MSC - Specific Conductance
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MDO - Dissolved Oxygen
MPH - pH
MEH - Eh
MMC - Imhoff Cone
MO1 - Other:
MO2 - Other:

TURBIDITY

Enter Turbidity Meter Reading (Final should be < 5 NTU)
OR
Enter Qualitative Observations
H - High: Opaque/Muddy/Silty
M - Medium: Translucent/Cloudy
L - Low: Transparent/Some Silt
N - None: Clear/No Visible Silt

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GEOLIS® Well Purging Form

DTW TOC 5.88

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE / AREA: WFT

LOCATION ID: MW-5
DATE: 2/23/07
SAMPLER:
SIGNATURE:

WELL OBSERVATIONS

CASING & LID: (OK) - DAMAGED - HEAVED - NO LID LOCKED: YES - NO KEY NO: _____ STICKUP: _____ FT-M

WELL DIAMETER: (2") - 4" - 6" - 8" - OTH: _____ BOREHOLE DIAMETER: _____ IN-CM MEASURING POINT: TIC - TOC - GRS

VAPOR READINGS: PID - FID - OTHER: _____ BACKGROUND: _____ INSIDE WELL: _____

CHECKED FOR NAPL LAYER: YES - NO OBSERVED: NON - FLT - SNK THICKNESS: _____ IN-CM SHEEN: YES - NO

PURGING CALCULATIONS

(A) DEPTH TO WELL BOTTOM: 12 FT-M BMP
(B) DEPTH TO WATER: 2.84 FT-M BMP
(C) SAND PACK LENGTH _____ FT-M
(D) WATER COLUMN HEIGHT (A - B): 9.16 FT-M
(E) CASING VOLUME FACTOR: _____ GPF-LPM
(F) SAND PACK VOLUME FACTOR: _____ GPF-LPM
(G) CASING VOLUME (D x E): _____ GAL-L
(H) SAND PACK VOLUME (C x F): _____ GAL-L

Casing Factor (GPF for inches) = 0.041(Well Diameter)²
2" = 0.16; 4" = 0.65; 6" = 1.47; 8" = 2.61 GPF

Sand Pack Factor (GPF for inches)
= [0.041(Hole Diameter)² - 0.041(Well Diameter)²] 0.45

(I) TOTAL WELL VOLUME (G + H): 1.47 GAL-L
(J) VOLUMES TO BE PURGED: 3
(K) TOTAL PURGE VOLUME (I x J): 4.40 GAL-L

PURGING INFORMATION

PURGE ENDPOINT: VOLUME - TIME - PARAMETER STABILIZATION - TURBIDITY CRITERIA: _____

PURGING METHOD: BAILER - SUB. PUMP - CENT. PUMP - PACKER & PUMP - OTHER: _____

DEVICE DESCRIPTION: Bladder DEVICE No.: _____

PUMP/BAILER INTAKE: SCREEN TOP - SCREEN/WELL BOTTOM - MID SCREEN/WELL - WATER LEVEL - MOVED UP/DOWN

PURGE WATER: DISCHARGED - TREATED - STORED ONSITE STORED IN: TANKS - DRUMS NO.: _____

FIELD MEASURMENTS IN: FLOW THRU CHAMBER - OPEN JAR CASCADING WATER: YES - NO DEPTH: _____ FT-M BMP

WELL PURGING INTERVAL: _____ TO _____ FT-M BMP PURGE DEPTH TO WATER (MAX): _____ FT-M BMP

TIME	DEPTH TO WATER (FT-M BMP)	PURGE RATE or VOLUME (GPM-GAL)	TURBID-ITY (NTU)	FIELD MEASUREMENTS AND UNITS MTP °C.	COND	DO	PH	ORP		COMMENTS
1120		0.2	218	9.82	.256	1.18	7.14	-162.6		Pre Purge Readings
1130		1	84.9	10.91	.257	.51	7.08	-210.5		
1135		1.8	61.0	11.11	.250	.41	7.08	-213.1		
1139		2.5	27.1	11.19	.250	.44	7.07	-219.7		
1142		3.8	7.99	11.19	.257	.43	7.06	-221.9		
										Post Purge Readings

TOTAL PURGE TIME: _____ HRS TOTAL PURGE VOLUME: _____ GAL - L RECOVERY: FAST - SLOW - V.SLOW

FIELD MEASUREMENT CODES

MTP - Temperature (°C)
MSC - Specific Conductance (mS/cm)
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MCL - Color
MPH - pH
MEH - Eh
MAL - Alkalinity
MDO - Dissolved Oxygen (mg/L)
MO1 - Other: _____
MO2 - Other: _____
MO3 - Other: _____
MD1 - DTW in Well _____
MD2 - DTW in Well _____
MD3 - DTW in Well _____
MD4 - DTW in Well _____

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Sampled 1150

GEOLIS Well Development Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE/AREA: WFF

LOCATION ID: MW-6
DATE: 2/21/07
MEASURED BY: SJM
SIGNATURE:

ONE WELL VOLUME: _____ gallons WELL TD: _____ ft TOC

Well Volume (gallons/foot): 2-inch = 0.16 4-inch = 0.65 6-inch = 1.47 6-inch = 2.61

TIME	ACTIVITY CODE	DEPTH TO WATER (ft)	PURGE RATE (gpm)	PURGE VOLUME (gal)	FIELD MEASUREMENTS pH	Cond mS/cm	DO mg/L	ORP	TURBIDITY NTU	COMMENTS Temp °C
1455	DOB	2.0	2gpm	3	6.44	0.24	10.48	-197.6	7675	11.21
1511			2gpm	20	6.48	0.264	11.47	-202	65.2	11.77
1516				30	6.37	0.263	4.19	-190.2	3115	11.89
1525				50	6.25	.261	3.18	-208.4	1283	11.60
1530				55	6.27	.269	2.72	-204.7	67.5	11.92
1535				60	6.30	.265	2.72	-197.4	21.3	11.89
1538				65	6.28	.265	2.76	-201.6	14.9	11.83
1542				75	6.32	.266	2.77	-199.5	6.63	11.82
			Purged							
	FINAL									

FINAL WELL YIELD: _____ GPM PUMP RATE - ESTIMATED CORRESPONDING DRAWDOWN: _____ FT

DEVELOPMENT ACTIVITY CODES

DBB - Begin Bailing
DOB - Begin Overpumping
DRB - Begin Rawhiding
DCB - Begin Recirculation
DHB - Begin Hydraulic Jetting
DAB - Begin Air Surging
DSB - Begin Surge Blocking
DXB - Begin Other
DBE - End Bailing
DOE - End Overpumping
DRE - End Rawhiding
DCE - End Recirculation
DHE - End Hydraulic Jetting
DAE - End Air Surging
DSE - End Surge Blocking
DXE - End Other
Specify other method: _____
FMT - Field Measurements (select from codes at right)

FIELD MEASUREMENT CODES

MTP - Temperature
MSC - Specific Conductance
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MDO - Dissolved Oxygen
MPH - pH
MEH - Eh
MMC - Imhoff Cone
MO1 - Other: _____
MO2 - Other: _____

TURBIDITY

Enter Turbidity Meter Reading (Final should be < 5 NTU)
OR
Enter Qualitative Observations
H - High: Opaque/Muddy/Silty
M - Medium: Translucent/Cloudy
L - Low: Transparent/Some Silt
N - None: Clear/No Visible Silt

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note DTW @ TOC = 4.9c

GEOLIS® Well Purging Form

COMPANY: _____ LOCATION ID: MW-6
CLIENT: _____ DATE: _____
PROJECT: _____ SAMPLER: _____
SITE / AREA: _____ SIGNATURE: _____

WELL OBSERVATIONS

CASING & LID: OK - DAMAGED - HEAVED - NO LID LOCKED: YES - NO KEY NO: _____ STICKUP: _____ FT-M
WELL DIAMETER: 2" - 4" - 6" - 8" - OTH: _____ BOREHOLE DIAMETER: 6 1/2 IN-CM MEASURING POINT: TIC - TOC - GRS
VAPOR READINGS: PID - FID - OTHER: _____ BACKGROUND: _____ INSIDE WELL: _____
CHECKED FOR NAPL LAYER: YES - NO OBSERVED: NON - FLT - SNK THICKNESS: _____ IN-CM SHEEN: YES - NO

PURGING CALCULATIONS

(A) DEPTH TO WELL BOTTOM:	12.5	FT-M BMP	
(B) DEPTH TO WATER:	1.10	FT-M BMP	
(C) SAND PACK LENGTH		FT-M	
(D) WATER COLUMN HEIGHT (A - B):	11.4	FT-M	
(E) CASING VOLUME FACTOR:	0.16	GPF-LPM	
(F) SAND PACK VOLUME FACTOR:		GPF-LPM	
(G) CASING VOLUME (D x E):		GAL-L	
(H) SAND PACK VOLUME (C x F):		GAL-L	

Casing Factor (GPF for inches) = 0.041(Well Diameter)²
2" = 0.16; 4" = 0.65; 6" = 1.47; 8" = 2.61 GPF

Sand Pack Factor (GPF for inches)
= [0.041(Hole Diameter)² - 0.041(Well Diameter)²] 0.45

(I) TOTAL WELL VOLUME (G + H): 1.82 GAL-L
(J) VOLUMES TO BE PURGED: 3
(K) TOTAL PURGE VOLUME (I x J): 5.47 GAL-L

PURGING INFORMATION

PURGE ENDPOINT: VOLUME - TIME - PARAMETER STABILIZATION - TURBIDITY CRITERIA: _____
PURGING METHOD: BAILER - SUB. PUMP - CENT. PUMP - PACKER & PUMP - OTHER: Low Flow 0.5 L/min
DEVICE DESCRIPTION: bladder DEVICE No.: _____
PUMP/BAILER INTAKE: SCREEN TOP - SCREEN/WELL BOTTOM - MID SCREEN/WELL - WATER LEVEL - MOVED UP/DOWN
PURGE WATER: DISCHARGED - TREATED - STORED ONSITE STORED IN: TANKS - DRUMS NO.: _____
FIELD MEASURMENTS IN: FLOW THRU CHAMBER - OPEN JAR CASCADING WATER: YES - NO DEPTH: _____ FT-M BMP
WELL PURGING INTERVAL: _____ TO _____ FT-M BMP PURGE DEPTH TO WATER (MAX): _____ FT-M BMP

TIME	DEPTH TO WATER (FT-M BMP)	PURGE RATE or VOLUME (GPM-GAL)	TURBIDITY (NTU)	FIELD MEASUREMENTS AND UNITS MTP °C.	CON mS/cm³	DO mg/L	PH	ORP	Turb	COMMENTS
1425				12.17						Pre Purge Readings begin purge
1431		1 gal	65.4	12.17	.308	1.75	6.08	-204.8		
1436		2.5	65.4	11.85	.299	1.84	6.06	-207.5		
1439		3	46.4	11.90	.297	1.58	6.03	-212.7		
1443		3.6	29.5	11.84	.296	1.73	6.04	-213.0		
1445		4.1	19.2	11.85	.291	1.69	6.08	-208.3		5 min break
1455		5	12.9	11.88	.295	1.72	6.10	-210.3		Post Purge Readings
1458		5.5	21.9	11.78	.298	1.81	6.15	-209.4		

TOTAL PURGE TIME: _____ HRS TOTAL PURGE VOLUME: _____ GAL - L RECOVERY: FAST - SLOW - V.SLOW

FIELD MEASUREMENT CODES

MTP - Temperature (°C.)
MSC - Specific Conductance (mS/cm)
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MCL - Color
MPH - pH
MEH - Eh
MAL - Alkalinity
MDO - Dissolved Oxygen (mg/L)
MO1 - Other: _____
MO2 - Other: _____
MO3 - Other: _____
MD1 - DTW in Well _____
MD2 - DTW in Well _____
MD3 - DTW in Well _____
MD4 - DTW in Well _____

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1500 6.0 12.6 11.79 .296 1.76 6.13 -204.6
1504 6.2 9.15 11.78 .292 1.77 6.12 -209.3

sampled @ 1515

GEOLIS Well Development Form

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE/AREA: WEF

LOCATION ID: MW-7
DATE: 2/21/07
MEASURED BY:
SIGNATURE:

ONE WELL VOLUME: _____ gallons WELL TD: _____ ft TOC

Well Volume (gallons/foot): 2-inch = 0.16 4-inch = 0.65 6-inch = 1.47 8-inch = 2.61

TIME	ACTIVITY CODE	DEPTH TO WATER (ft)	PURGE RATE (gpm)	PURGE VOLUME (gal)	FIELD MEASUREMENTS pH	Cond	DO	ORP	TURBIDITY	COMMENTS
										TEMP
1607	OOB	0.9	2	12	6.19	.123	2.76	-184.6	1033	12.44
1615				22	6.02	.111	3.10	-184.7	293	12.95
1620				32	5.99	.109	3.35	-183.6	209	13.05
										1637 restart
1642				48	5.95	.115	3.76	-191.8	157	12.85
1652				78	4.69	.113	4.71	-196.0	30.7	12.88
1655				84	5.56	.112	4.66	-202.7	23.3	13.03
1700				94	5.96	.115	4.76	-200.4	19.4	13.00
1704				110	5.96	.113	4.70	-203.6	11.2	13.21
1706				118	6.06	.113	5.19	-199.9	9.8	12.82
					developed					
	FINAL									

FINAL WELL YIELD: _____ GPM PUMP RATE - ESTIMATED CORRESPONDING DRAWDOWN: _____ FT

DEVELOPMENT ACTIVITY CODES

DBB - Begin Bailing
DOB - Begin Overpumping
DRB - Begin Rawhiding
DCB - Begin Recirculation
DHB - Begin Hydraulic Jetting
DAB - Begin Air Surging
DSB - Begin Surge Blocking
DXB - Begin Other
DBE - End Bailing
DOE - End Overpumping
DRE - End Rawhiding
DCE - End Recirculation
DHE - End Hydraulic Jetting
DAE - End Air Surging
DSE - End Surge Blocking
DXE - End Other
Specify other method: _____
FMT - Field Measurements (select from codes at right)

FIELD MEASUREMENT CODES

MTP - Temperature
MSC - Specific Conductance
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MDO - Dissolved Oxygen
MPH - pH
MEH - Eh
MMC - Imhoff Cone
MO1 - Other: _____
MO2 - Other: _____

TURBIDITY

Enter Turbidity Meter Reading (Final should be < 5 NTU)
OR
Enter Qualitative Observations
H - High: Opaque/Muddy/Silty
M - Medium: Translucent/Cloudy
L - Low: Transparent/Some Silt
N - None: Clear/No Visible Silt

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TOC DTW = 3.46'

GEOLIS® Well Purging Form

1610 begin purge

COMPANY: WSI
CLIENT: USACE
PROJECT: SI
SITE / AREA: WFF

LOCATION ID: MW-7
DATE: 2/22/07
SAMPLER:
SIGNATURE: EJM

WELL OBSERVATIONS

CASING & LID: (OK) - DAMAGED - HEAVED - NO LID LOCKED: (YES) - NO KEY NO: _____ STICKUP: _____ FT-M

WELL DIAMETER: (2") - 4" - 6" - 8" - OTH: _____ BOREHOLE DIAMETER: 6 1/2 IN-CM MEASURING POINT: TIC - (TOC) - GRS

VAPOR READINGS: PID - FID - OTHER: _____ BACKGROUND: _____ INSIDE WELL: _____

CHECKED FOR NAPL LAYER: (YES) - NO OBSERVED: (NON) - FLT - SNK THICKNESS: _____ IN-CM SHEEN: YES - (NO)

PURGING CALCULATIONS

(A) DEPTH TO WELL BOTTOM:	12	FT-M BMP	Casing Factor (GPF for inches) = 0.041(Well Diameter)² 2" = 0.16; 4" = 0.65; 6" = 1.47; 8" = 2.61 GPF
(B) DEPTH TO WATER:	0.90	FT-M BMP	
(C) SAND PACK LENGTH		FT-M	Sand Pack Factor (GPF for inches) = [0.041(Hole Diameter)² - 0.041(Well Diameter)²] 0.45
(D) WATER COLUMN HEIGHT (A - B):	8.90	FT-M	
(E) CASING VOLUME FACTOR:	0.16	GPF-LPM	(I) TOTAL WELL VOLUME (G + H): 1.78 GAL-L
(F) SAND PACK VOLUME FACTOR:		GPF-LPM	(J) VOLUMES TO BE PURGED: 3
(G) CASING VOLUME (D x E):		GAL-L	
(H) SAND PACK VOLUME (C x F):	11.1	GAL-L	(K) TOTAL PURGE VOLUME (I x J): 5.33 GAL-L

PURGING INFORMATION

PURGE ENDPOINT: VOLUME - TIME - (PARAMETER STABILIZATION) - TURBIDITY CRITERIA: _____

PURGING METHOD: BAILER - SUB. PUMP - CENT. PUMP - PACKER & PUMP - OTHER: _____

DEVICE DESCRIPTION: bladder DEVICE No.: _____

PUMP/BAILER INTAKE: SCREEN TOP - (SCREEN/WELL BOTTOM) - MID SCREEN/WELL - WATER LEVEL - MOVED UP/DOWN

PURGE WATER: DISCHARGED - TREATED - (STORED ONSITE) STORED IN: TANKS - (DRUMS) NO.: _____

FIELD MEASURMENTS IN: FLOW THRU CHAMBER - (OPEN JAR) CASCADING WATER: YES - (NO) DEPTH: _____ FT-M BMP

WELL PURGING INTERVAL: _____ TO _____ FT-M BMP PURGE DEPTH TO WATER (MAX): _____ FT-M BMP

TIME	DEPTH TO WATER (FT-M BMP)	PURGE RATE or VOLUME (GPM-GAL)	TURBIDITY (NTU)	FIELD MEASUREMENTS AND UNITS: MTP °C.	COND	DO	pH	ORP		COMMENTS
1610	0.9	0.54/m	240	11.58	.111	1.88	6.56	-183.1		Pre Purge Readings
1617		1 gal	117	12.51	.108	1.66	6.06	-174.3		
1623		1.8	72.8	12.50	.111	1.77	6.02	-165.5		
1633		3.6	44.6	12.52	.108	1.81	5.95	-172.4		
1638		4.2	22.9	12.55	.112	1.77	5.91	-174.8		
1645		5	12.4	12.51	.108	1.87	5.96	-173.7		
1652		5.5	8.87	12.55	.108	1.88	5.99	-171.8		Post Purge Readings

TOTAL PURGE TIME: _____ HRS TOTAL PURGE VOLUME: _____ GAL - L RECOVERY: FAST - SLOW - V.SLOW

FIELD MEASUREMENT CODES

MTP - Temperature (°C.)
MSC - Specific Conductance (mS/cm)
MPD - Photoionizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MCL - Color
MPH - pH
MEH - Eh
MAL - Alkalinity
MDO - Dissolved Oxygen (mg/L)
MO1 - Other: _____
MO2 - Other: _____
MO3 - Other: _____
MD1 - DTW in Well _____
MD2 - DTW in Well _____
MD3 - DTW in Well _____
MD4 - DTW in Well _____

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Sampled @ 1700

Serial Number 94413

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

⊗ **STL Savannah**
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
WFF - WWTP - #1		VA
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Abbie Post	0057557	
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Theresa Offner	770-325-7961	
CLIENT NAME	CLIENT E-MAIL	
Weston Solutions	Teresa.Offner@weston	
CLIENT ADDRESS		
5430 Metric Pl Ste 100 Norcross GA 30092		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE 1 OF

STANDARD REPORT DELIVERY ⊗
DATE DUE

EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX: AQUEOUS (WATER)	MATRIX: SOLID OR SEMISOLID	MATRIX: AIR	MATRIX: NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: VOC	REQUIRED ANALYSIS: SVOC, Pest, PCB	REQUIRED ANALYSIS: Cyanide	REQUIRED ANALYSIS: Metals (Mercury)	PRESERVATIVE	NUMBER OF CONTAINERS SUBMITTED	REMARKS
2/19/07	1210	WFF1-MW2-0-0.5			X			X	X	X	X			
↓	1220	WFF1-MW2-0.5-2			X			X	X	X	X			
↓	1400	WFF1-MW2-19-21			X			X	X	X	X			
2/20/07	0740	WFF1-MW6-0-0.5			X			X	X	X	X			
	0755	WFF1-MW6-0.5-2			X			X	X	X	X			
	0815	WFF1-MW6-2-4			X			X	X	X	X			
	0950	WFF1-MW7-0-0.5			X			X	X	X	X			
	1010	WFF1-MW7-0.5-2			X			X	X	X	X			
	1055	WFF1-MW5-0-0.5			X			X	X	X	X			
	1105	WFF1-MW5-0.5-2			X			X	X	X	X			
	1125	WFF1-MW5-2-4			X			X	X	X	X			
↓	1245	WFF1-MW4-0-0.5			X			X	X	X	X			

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	2/20/07	1440						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Marsha Kennedy	2/20/07	1440						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL8240-680 (12/02)

Serial Number 94414

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

(X) **STL Savannah**
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
		VA
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
	57557	
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
	757 235 7561	
CLIENT NAME	CLIENT E-MAIL	
CLIENT ADDRESS		
GA 30052		
COMPANY CONTRACTING THIS WORK (if applicable)		

MATRIX TYPE — COMPOSITE (C) OR GRAB (G) INDICATE

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	NUMBER OF CONTAINERS SUBMITTED	REMARKS
4/10/12	1300	MW-1-MW4-0.5-2		X			4	
	1320	MW-1-MW4-3-5		X			4	
	0940	SB-1-S-2		X			4	
	1045	SB-1-S-3		X			4	
	1345	SB-1-S-4		X			4	
	1345	SB-1-S-5		X			4	FIELD DUPLICATE
	1345	SB-1-S-6		X			4	
	—	TB-1	X				1	
		TB-2						

REQUIRED ANALYSIS — PAGE 2 OF

- VOC
- Cyanide
- Metals/Mercury

STANDARD REPORT DELIVERY (X)
DATE DUE _____
EXPEDITED REPORT DELIVERY (SURCHARGE) ( )
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	4/10/12	1440						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Cornelius Kennedy	4/10/12	1440						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ( ) NO ( )	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

Serial Number 94411

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

(X) **STL Savannah**
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
WWF - WWTP #1		VA
STL (LAB) PROJECT MANAGER: ABBIE PAGE	P.O. NUMBER: 0057557	CONTRACT NO.
CLIENT (SITE) PM: THERESA OFFNER	CLIENT PHONE: 770-325-7961	CLIENT FAX
CLIENT NAME: WESTON SOLUTIONS	CLIENT E-MAIL: THERESA.OFFNER@WESTONSOLUTIONS.COM	
CLIENT ADDRESS: 2420 METRIC PL (STE 100) NORCROSS, GA 30092		
COMPANY CONTRACTING THIS WORK (if applicable)		

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS: VOC; SVOC, PEST, PCB; CYANIDE; METALS/MERCURY

PAGE ____ OF ____

STANDARD REPORT DELIVERY (X)
DATE DUE ____
EXPEDITED REPORT DELIVERY (SURCHARGE) ( )
DATE DUE ____

PRESERVATIVE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	NUMBER OF CONTAINERS SUBMITTED: VOC (4)	SVOC, PEST, PCB (2)	CYANIDE (2)	METALS/MERCURY (2)	REMARKS
3/20/07	1510	WFF1-SS4			X			X	X	X	X	MS/MSD
	1525	WFF1-MW3-4-6			X			X	X	X	X	
4/4/07	0910	WFF1-MW1-0-0.5			X			X	X	X	X	
	0920	WFF1-MW1-0.5-2			X			X	X	X	X	
	1100	WFF1-SW1		X				X	X	X	X	
	1130	WFF1-MW1-18-20			X			X	X	X	X	
	1135	WFF1-SD1			X			X	X	X	X	
	1155	WFF1-SD2			X			X	X	X	X	
	1420	WFF1-WW01		X				X	X	X	X	
	1510	WFF1-SS2-A			X			X	X	X	X	
	1605	WFF1-SS3-A			X			X	X	X	X	
	1635	(EB) RINSATE 2		X				X	X	X	X	HAND AUGER RINSE BLANK

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	3/22/07	1340						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
	3/22/07	1341						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ( ) NO ( )	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL8240-680 (12/02)

Serial Number 93811

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

(X) **STL Savannah**
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
WFF NWTF #1		VA
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
ABBIE PAGE	0017557	
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
THERESA OFFNER	770-312-7161	
CLIENT NAME	CLIENT E-MAIL	
JACOBS SOLUTIONS	THERESA.OFFNER@JACOBS.COM	
CLIENT ADDRESS		
470 MERRILL CIR (STE 100) NORCROSS GA 30092		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE ____ OF ____

STANDARD REPORT DELIVERY (X)

DATE DUE _____

EXPEDITED REPORT DELIVERY (SURCHARGE) ( )

DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX: AQUEOUS (WATER)	MATRIX: SOLID OR SEMISOLID	MATRIX: AIR	MATRIX: NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: TCLP: VOC, SVOC, PCB, PEST, HERB, METALS, HEG	REQUIRED ANALYSIS: TCLP VOA	REQUIRED ANALYSIS: IGNIT, PH, REACTIVE CYANIDE, REACTIVE SULFIDE	REQUIRED ANALYSIS: VOC	REQUIRED ANALYSIS: SVOC, PEST/PCB	REQUIRED ANALYSIS: CYANIDE	REQUIRED ANALYSIS: HEXAVALENT CHROMIUM / MERC.	REMARKS
								NUMBER OF CONTAINERS SUBMITTED							
2/22/07	1035	SOIL CUTTINGS			X			X	X	X					
1	1300	DFFI-SSB			X						X	X	X	X	
	—	TB-3		X							X				

PRESERVATIVE

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
	2/27/07	1340						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ( ) NO ( )	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL8240-680 (12/02)

Serial Number 93812

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

(X) **STL Savannah**
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
WFF1		
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
ABBIE MAGE		
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
CLIENT NAME	CLIENT E-MAIL	
CLIENT ADDRESS		
COMPANY CONTRACTING THIS WORK (if applicable)		

MATRIX TYPE — COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS — VOC; SVOC, PEST/PCB; CYANIDE; METALS, MERCURY

PAGE 1 OF 3

STANDARD REPORT DELIVERY (X)

DATE DUE _____

EXPEDITED REPORT DELIVERY (SURCHARGE) ( )

DATE DUE _____

PRESERVATIVE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	NUMBER OF CONTAINERS SUBMITTED	REMARKS
7/2/07	1715	~~WFF1~~ WFF1-MW06		X				X X X X	
	1520	WFF1-SL02			X			X X X X	
	1530	WFF1-SL03			X			X X X X	
	1610	WFF1-SL04			X			X X X X	
	1645	WFF1-SB10			X			X X X X	
	1700	WFF1-MW07		X				X X X X	
	1730	CYANIDE 3		X				X X X X	PRESERVED WITH NaOH
7/3/07	0930	WFF1-MW03		X				X X X X	MS/MSD
	0945	WFF1-MW03-D		X				X X X X	
	1010	WFF1-MW20		X				X X X X	
	1020	WFF1-SS4-A			X			X X X X	M/MD
	115	WFF1-SS5			X			X X X X	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	7/3/07	1000						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[signature]	7/3/07	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ( ) NO ( )	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

Serial Number 9356L

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

(X) **STL Savannah**
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
WFF1 - IWTP #1		VA
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Alice Hall	00 3557	
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Tracy Ocfemia	770 325 7561	
CLIENT NAME	CLIENT E-MAIL	
Weston		
CLIENT ADDRESS		
5435 Peachtree Pkwy Ste 100, Norcross, GA		
COMPANY CONTRACTING THIS WORK (if applicable)		

MATRIX TYPE — COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS — VOC; SVOC Part/list; CYANIDE; Metals/MRC; SVOC; Part/list; Waste Char; PRESERVATIVE

PAGE 2 OF 3

STANDARD REPORT DELIVERY (X)
DATE DUE _____
EXPEDITED REPORT DELIVERY (SURCHARGE) ( )
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS SUBMITTED	REMARKS
2/23/07	1120	WFF1-SS7		
	1325	WFF1-SD1		
	1615	Rinse water		
	1740	Rinse #2-4		
2/23/07	1515	WFF1-MW6		S/M
	1700	WFF1-MW7		S/M
2/23/07	0920	WFF1-MW3		
	0945	WFF1-MW3-D		
	1010	WFF1-MW20		
	1150	WFF1-MW5		
	1300	WFF1-MW4		
	1430	WFF1-MW2		

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
SJ Mathey	2/24/07	1000						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ( ) NO ( )	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

Serial Number 94410

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

(X) **STL Savannah**
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

( ) Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
WFF - WWTP #1		
STL (LAB) PROJECT MANAGER: Abbie Post	P.O. NUMBER: 0057557	CONTRACT NO.
CLIENT (SITE) PM: Teresa Offner	CLIENT PHONE	CLIENT FAX
CLIENT NAME: Weston	CLIENT E-MAIL	
CLIENT ADDRESS		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ( )
DATE DUE _____
EXPEDITED REPORT DELIVERY (SURCHARGE) ( )
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	VOC	SVOC	Pest/PCB	Metals/Sample	Cyanide	PRESERVATIVE	REMARKS
2/22/07	1525	WFF1-MW1		X				X	X	X	X	X		
		TB-4		X				X						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	2/24/07	1000						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[signature]	2-24-07	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ( ) NO ( )	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

Gravel road leading to WWTP and control/pump house, viewed from northwest.

View of process tanks from former trickling filter tank area.

Process tanks viewed from above.

Primary settling tank viewed from above.

Control/Pump House viewed from process tanks.

Sludge drying beds, viewed from process tanks.

Intermittent stream.

Possible sludge pile.

APPENDIX C
BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

BOREHOLE LOG

GROUNDWATER MONITOR WELL NUMBER: MW-1

PAGE NUMBER: 1 OF 1

PROJECT NAME: WWTP #1
W.O.#: 03886.183.010.0400
LOCATION: WALLOPS FLIGHT FACILITY, VIRGINIA
DRILLING COMPANY: IMS
RIG TYPE: B47 MOBILE
DRILLING METHOD: HOLLOW STEM AUGER
SAMPLING METHOD: SPLIT SPOONS WHERE INDICATED
LOGGED BY: E. MACKEY WEATHER:
DATE BEGUN: 02/21/07 DATE COMPLETED: 02/21/07

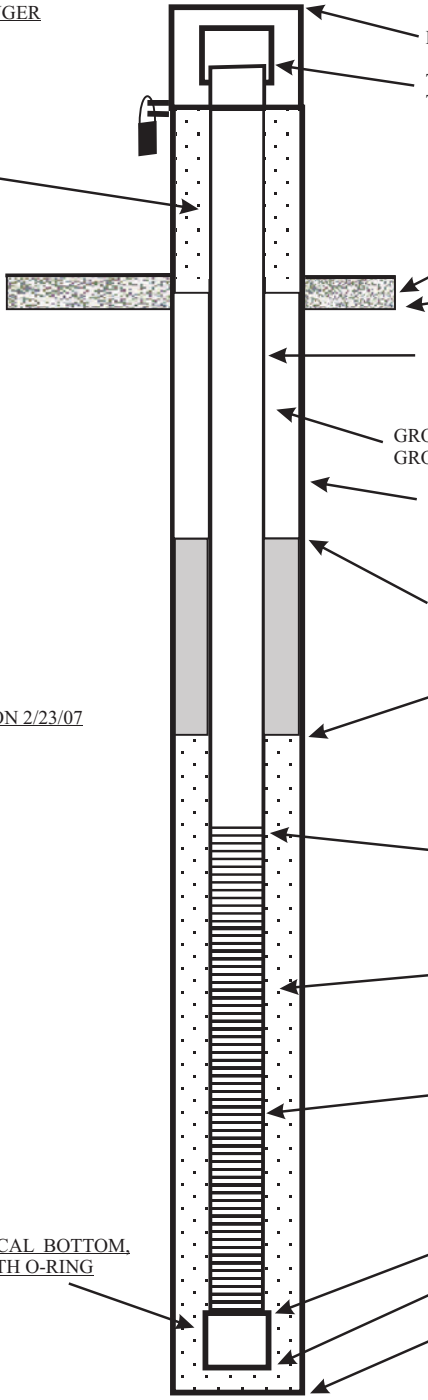
TOTAL DEPTH: 26.5 FT BGS
NORTHING: 3881302.3080
EASTING: 12357100.2520
SURFACE ELEV.: 34.0
INITIAL WATER LEVEL: 20 FT BGS
AIR MONITORING INSTRUMENT: Photo-Ionizer (PID)
BOREHOLE DIAMETER: 6.5 INCH
P.G. SIGNATURE:

DEPTH FT BGS	BLOW COUNT	SAMPLE ID	RECOVERY	LITHOLOGIC DESCRIPTION	MUNSELL SOIL COLOR CODE	PID READING (PPM)	COMMENT
0							*land surface*
	4-11-21-20	WFF1-MW1-0-0.5; 0.5-2	1.6	4" ORGANIC ZONE; YELLOWISH BROWN SILTY SAND	10YR 5/6	2.4	
	6-6-5-7		1.9	YELLOWISH BROWN SILTY SAND	10YR 5/6	22.2	
5	4-6-9-12		1.1	YELLOWISH BROWN CLAYEY SILTY SAND	10YR 5/8	13.5	
	11-13-12-1		1.5	YELLOW SILTY SAND, LITTLE CLAY	10YR 7/6	12.6	
	7-10-11-12		1.6	YELLOW SILTY SAND	10YR 8/6	3.8	SOME BANDING NOTED
10	7-10-11-12		1.0	YELLOW SILTY SAND	10YR 8/6	2.4	
	7-11-13-11		1.2	YELLOW SILTY SAND	10YR 8/6	2.6	
15	6-6-7-11		1.2	YELLOW SILTY SAND	10YR 8/6	0.5	OXIDATION BANDING MORE PREVALENT
	7-10-16-21		1.2	BROWNISH YELLOW SILTY SAND	10YR 6/6	1.8	
	6-9-12-13	WFF1-MW1-18-20	1.3	YELLOW SILTY SAND	10YR 8/6	2.4	SATURATION AT 19 FT BGS
20							
25				BORING TERMINATED AT 26.5 FT BGS			
30							
35							

MW-1

STATE PLANE COORDINATES:
NORTHING: 3881302.3080
EASTING: 12357100.2520

DRILLING METHOD: HOLLOW-STEM AUGER
DRILLING COMPANY: IMS
DATE OF CONSTRUCTION: 02/21/07



PROBE COVER: LOCKING METAL STANDPIPE

TYPE OF WELL CAP: 2 INCH EXPANSION CAP
TOP OF PVC CASING ELEVATION: 36.59 FEET MSL

PROTECTIVE CASING SAND

TYPE OF SURFACE SEAL: CEMENT PAD

GROUND SURFACE ELEVATION: 34.0 FEET MSL

RISER PIPE ID: 2 IN
TYPE: SCHEDULE 40 PVC
LENGTH OF RISER: 10.0 FT

GROUT/CEMENT SEAL: 0 TO 12 FT BGS
GROUT/CEMENT PLACEMENT METHOD: GRAVITY

BOREHOLE DIAMETER: 6.5 INCH

WELL DEVELOPMENT DETAILS

DEVELOPMENT METHOD: PUMP
DATE/TIME START: 2/22/07 13:00
DATE/TIME FINISH: 2/22/07 13:55
TOTAL TIME PURGED: 55 MINUTES
VOLUME PURGED: 80 GALLONS
INITIAL WATER LEVEL: APPROX. 20 FT BGS ON 2/23/07

DEPTH TO TOP OF SEAL: 12 FT BGS
TYPE OF SEAL: 3/8" INCH BENTONITE
SEAL PLACEMENT METHOD: GRAVITY
HYDRATED FOLLOWING PLACEMENT

DEPTH TO TOP OF SAND: 14.0 FT BGS

DEPTH TO TOP OF SCREEN: 16.0 FT BGS
RISER AND SCREEN JOINT TYPE: FLUSH THREADED WITH O-RING

FILTER PACK MATERIAL/SIZE: MORIE #2 SAND
FILTER PACK PLACEMENT METHOD: GRAVITY

SCREEN ID: 2 INCH
TYPE OF SCREEN: SLOTTED SCHEDULE 40 PVC
SCREEN SLOT SIZE: 0.010 INCH
LENGTH OF SCREEN: 10.0 FT

TYPE OF END CAP SUMP: PVC CYLINDRICAL BOTTOM, THREADED WITH O-RING
LENGTH OF END CAP SUMP: 0.5 FEET

DEPTH TO BOTTOM OF SCREEN: 26.0 FT BGS

DEPTH TO BOTTOM OF WELL: 26.5 FT BGS

DEPTH TO BOTTOM OF BOREHOLE: 26.5 BGS

DEPTH TO WATER: ~20 FEET BGS

FIGURE IS NOT DRAWN TO SCALE

WASTEWATER TREATMENT PLANT #1
WALLOPS FLIGHT FACILITY
ACCOMACK COUNTY, VIRGINIA

GROUNDWATER MONITOR WELL MW-1

CONSTRUCTION DIAGRAM

DRAWN	DATE	WORK ORDER NO.	FILE NAME
TSR	03/21/07	03886.183.010.0400	WWTP_MW1.cdr

BOREHOLE LOG

GROUNDWATER MONITOR WELL NUMBER: MW-2

PAGE NUMBER: 1 OF 1

PROJECT NAME: WWTP #1
W.O.#: 03886.183.010.0400
LOCATION: WALLOPS FLIGHT FACILITY, VIRGINIA
DRILLING COMPANY: IMS
RIG TYPE: B47 MOBILE
DRILLING METHOD: HOLLOW STEM AUGER
SAMPLING METHOD: SPLIT SPOONS WHERE INDICATED
LOGGED BY: E. MACKEY WEATHER:
DATE BEGUN: 02/19/07 DATE COMPLETED: 02/19/07

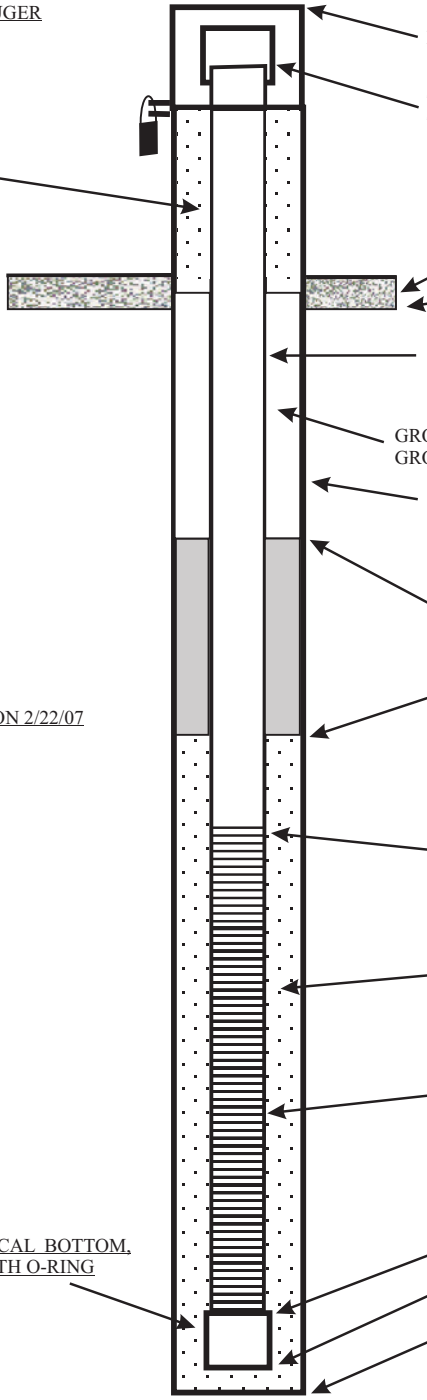
TOTAL DEPTH: 27.5 FT BGS
NORTHING: 3881448.9110
EASTING: 12357282.5320
SURFACE ELEV.: 32.8
INITIAL WATER LEVEL: 19 FT BGS
AIR MONITORING INSTRUMENT: Photo-Ionizer (PID)
BOREHOLE DIAMETER: 6.5 INCH
P.G. SIGNATURE:

DEPTH FT BGS	BLOW COUNT	SAMPLE ID	RECOVERY	LITHOLOGIC DESCRIPTION	MUNSELL SOIL COLOR CODE	PID READING (PPM)	COMMENT
0							*land surface*
	2-6-10-15	WFF1-MW2-0-0.5; 0.5-2	1.5	ORGANIC; STRONG BROWN SANDY SILT	7.5YR 5/8	0.0	
	0-0-1-1		0.5	YELLOWISH BROWN SILTY SAND	10YR 5/8	0.0	
5	3-4-4-3		1.0	YELLOWISH BROWN SILTY SAND	10YR 5/8	0.0	
	3-4-4-3		1.0	DARK BROWN	10YR 3/3	---	
	---		0.0	NO RECOVERY; CEDAR TREE ROOT	---	---	
10	5-3-3-4		0.3	DARK YELLOWISH BROWN SILTY SAND	10YR 3/6	0.0	
	7-5-6-9		0.0	NO RECOVERY	---	---	
15	14-16-16-19		0.0	NO RECOVERY; CEDAR TREE ROOT	---	---	
	8-10-14-16		1.2	YELLOW SILTY SAND	10YR 7/6	2.1	
	5-7-8-10		1.3	YELLOW SILTY SAND	10YR 7/6	2.4	GW AT 19 FT BGS
20	4-5-7-8	WFF1-MW2-19-21	---	---	---	---	
25				BORING TERMINATED AT 27.5 FT BGS			
30							
35							

MW-2

STATE PLANE COORDINATES:
NORTHING: 3881448.9110
EASTING: 12357282.5320

DRILLING METHOD: HOLLOW-STEM AUGER
DRILLING COMPANY: IMS
DATE OF CONSTRUCTION: 02/19/07



PROBE COVER: LOCKING METAL STANDPIPE

TYPE OF WELL CAP: 2 INCH EXPANSION CAP
TOP OF PVC CASING ELEVATION: 35.65 FEET MSL

PROTECTIVE CASING SAND

TYPE OF SURFACE SEAL:
CEMENT PAD

GROUND SURFACE ELEVATION:
32.8 FEET MSL

RISER PIPE ID: 2 IN
TYPE: SCHEDULE 40 PVC
LENGTH OF RISER: 10.0 FT

GROUT/CEMENT SEAL: 0 TO 12 FT BGS
GROUT/CEMENT PLACEMENT METHOD: GRAVITY

BOREHOLE DIAMETER: 6.5 INCH

WELL DEVELOPMENT DETAILS

DEVELOPMENT METHOD: PUMP
DATE/TIME START: 2/22/07 08:50
DATE/TIME FINISH: 2/22/07 09:56
TOTAL TIME PURGED: 66 MIN
VOLUME PURGED: 75 GALLONS
INITIAL WATER LEVEL: APPROX. 19 FT BGS ON 2/22/07

DEPTH TO TOP OF SEAL: 12 FT BGS
TYPE OF SEAL: 3/8" INCH BENTONITE
SEAL PLACEMENT METHOD: GRAVITY
HYDRATED FOLLOWING PLACEMENT

DEPTH TO TOP OF SAND: 14.0 FT BGS

DEPTH TO TOP OF SCREEN: 16.0 FT BGS
RISER AND SCREEN JOINT TYPE: FLUSH THREADED WITH O-RING

FILTER PACK MATERIAL/SIZE: MORIE #2 SAND
FILTER PACK PLACEMENT METHOD: GRAVITY

SCREEN ID: 2 INCH
TYPE OF SCREEN: SLOTTED SCHEDULE 40 PVC
SCREEN SLOT SIZE: 0.010 INCH
LENGTH OF SCREEN: 10.0 FT

TYPE OF END CAP SUMP: PVC CYLINDRICAL BOTTOM, THREADED WITH O-RING
LENGTH OF END CAP SUMP: 0.5 FEET

DEPTH TO BOTTOM OF SCREEN: 26.0 FT BGS

DEPTH TO BOTTOM OF WELL: 26.5 FT BGS

DEPTH TO BOTTOM OF BOREHOLE: 27.5 BGS

DEPTH TO WATER: ~19 FEET BGS

FIGURE IS NOT DRAWN TO SCALE

WASTEWATER TREATMENT PLANT #1
WALLOPS FLIGHT FACILITY
ACCOMACK COUNTY, VIRGINIA

GROUNDWATER MONITOR WELL
MW-2

CONSTRUCTION DIAGRAM

WESTON SOLUTIONS

DRAWN	DATE	WORK ORDER NO.	FILE NAME
TSR	03/21/07	03886.183.010.0400	WWTP_MW2.cdr

BOREHOLE LOG

GROUNDWATER MONITOR WELL NUMBER: MW-3

PAGE NUMBER: 1 OF 1

PROJECT NAME: WWTP #1
W.O.#: 03886.183.010.0400
LOCATION: WALLOPS FLIGHT FACILITY, VIRGINIA
DRILLING COMPANY: IMS
RIG TYPE: B47 MOBILE
DRILLING METHOD: HOLLOW STEM AUGER
SAMPLING METHOD: SPLIT SPOONS WHERE INDICATED
LOGGED BY: E. MACKEY WEATHER:
DATE BEGUN: 02/20/07 DATE COMPLETED: 02/20/07

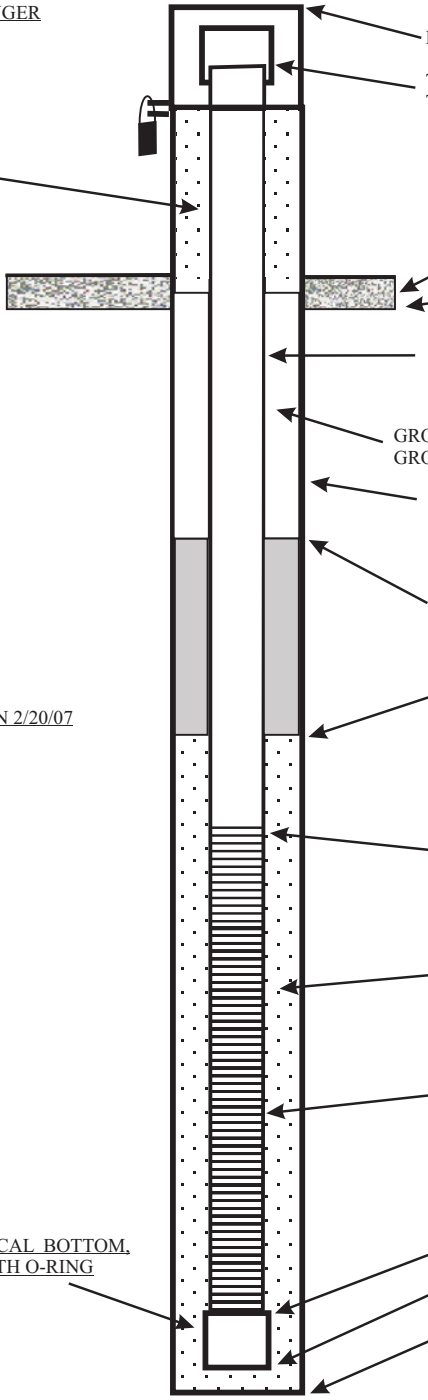
TOTAL DEPTH: 13.5 FT BGS
NORTHING: 3881434.6540
EASTING: 12357113.8090
SURFACE ELEV.: 19.3
INITIAL WATER LEVEL: 6 FT BGS
AIR MONITORING INSTRUMENT: Photo-Ionizer (PID)
BOREHOLE DIAMETER: 6.5 INCH
P.G. SIGNATURE:

DEPTH FT BGS	BLOW COUNT	SAMPLE ID	RECOVERY	LITHOLOGIC DESCRIPTION	MUNSELL SOIL COLOR CODE	PID READING (PPM)	COMMENT
0							*land surface*
	---	WFF1-MW3-2-4	---	FILL SAND FROM TRICKLING FILTER REMOVAL	---	---	
5	5-7-8-10		1.0	STRONG BROWN SILTY SAND; SOME GRAVEL	7.5YR 5/6	0.4	SATURATED AT 5 FT BGS
	7-5-6-9		---	STRONG BROWN SILTY SAND; SOME GRAVEL	7.5YR 5/6	---	GW AT 6 FT BGS
10							
				BORING TERMINATED AT 13.5 FT BGS			
15							
20							
25							
30							
35							

MW-3

STATE PLANE COORDINATES:
NORTHING: 3881434.6540
EASTING: 12357113.8090

DRILLING METHOD: HOLLOW-STEM AUGER
DRILLING COMPANY: IMS
DATE OF CONSTRUCTION: 02/20/07



PROBE COVER: LOCKING METAL STANDPIPE

TYPE OF WELL CAP: 2 INCH EXPANSION CAP
TOP OF PVC CASING ELEVATION: 21.99 FEET MSL

PROTECTIVE CASING SAND

TYPE OF SURFACE SEAL: CEMENT PAD

GROUND SURFACE ELEVATION: 19.3 FEET MSL

RISER PIPE ID: 2 IN
TYPE: SCHEDULE 40 PVC
LENGTH OF RISER: 10.0 FT

GROUT/CEMENT SEAL: 0 TO 1 FT BGS
GROUT/CEMENT PLACEMENT METHOD: GRAVITY

BOREHOLE DIAMETER: 6.5 INCH

WELL DEVELOPMENT DETAILS

DEVELOPMENT METHOD: PUMP
DATE/TIME START: 2/22/07 10:40
DATE/TIME FINISH: 2/22/07 12:20
TOTAL TIME PURGED: 100 MIN
VOLUME PURGED: 110 GALLONS
INITIAL WATER LEVEL: APPROX. 6 FT BGS ON 2/20/07

DEPTH TO TOP OF SEAL: 1 FT BGS
TYPE OF SEAL: 3/8" INCH BENTONITE
SEAL PLACEMENT METHOD: GRAVITY
HYDRATED FOLLOWING PLACEMENT

DEPTH TO TOP OF SAND: 2.0 FT BGS

DEPTH TO TOP OF SCREEN: 3.0 FT BGS
RISER AND SCREEN JOINT TYPE: FLUSH THREADED WITH O-RING

FILTER PACK MATERIAL/SIZE: MORIE #2 SAND
FILTER PACK PLACEMENT METHOD: GRAVITY

SCREEN ID: 2 INCH
TYPE OF SCREEN: SLOTTED SCHEDULE 40 PVC
SCREEN SLOT SIZE: 0.010 INCH
LENGTH OF SCREEN: 10.0 FT

TYPE OF END CAP SUMP: PVC CYLINDRICAL BOTTOM, THREADED WITH O-RING
LENGTH OF END CAP SUMP: 0.5 FEET

DEPTH TO BOTTOM OF SCREEN: 13.0 FT BGS

DEPTH TO BOTTOM OF WELL: 13.5 FT BGS

DEPTH TO BOTTOM OF BOREHOLE: 13.5 BGS

DEPTH TO WATER: ~6 FEET BGS

FIGURE IS NOT DRAWN TO SCALE

WASTEWATER TREATMENT PLANT #1
WALLOPS FLIGHT FACILITY
ACCOMACK COUNTY, VIRGINIA

GROUNDWATER MONITOR WELL MW-3

CONSTRUCTION DIAGRAM

WESTON SOLUTIONS

DRAWN	DATE	WORK ORDER NO.	FILE NAME
TSR	03/21/07	03886.183.010.0400	WWTP_MW3.cdr

BOREHOLE LOG

GROUNDWATER MONITOR WELL NUMBER: MW-4

PAGE NUMBER: 1 OF 1

PROJECT NAME: WWTP #1
W.O.#: 03886.183.010.0400
LOCATION: WALLOPS FLIGHT FACILITY, VIRGINIA
DRILLING COMPANY: IMS
RIG TYPE: B47 MOBILE
DRILLING METHOD: HOLLOW STEM AUGER
SAMPLING METHOD: SPLIT SPOONS WHERE INDICATED
LOGGED BY: E. MACKEY WEATHER:
DATE BEGUN: 02/20/07 DATE COMPLETED: 02/20/07

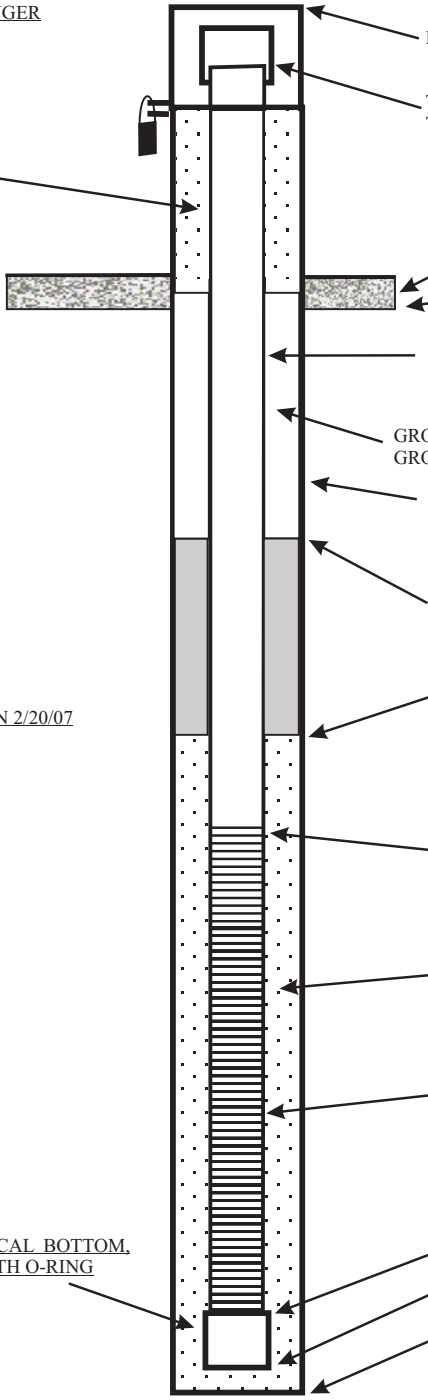
TOTAL DEPTH: 13.5 FT BGS
NORTHING: 3881434.5370
EASTING: 12357063.2990
SURFACE ELEV.: 18.4
INITIAL WATER LEVEL: 5 FT BGS
AIR MONITORING INSTRUMENT: Photo-Ionizer (PID)
BOREHOLE DIAMETER: 6.5 INCH
P.G. SIGNATURE:

DEPTH FT BGS	BLOW COUNT	SAMPLE ID	RECOVERY	LITHOLOGIC DESCRIPTION	MUNSELL SOIL COLOR CODE	PID READING (PPM)	COMMENT
0							*land surface*
	2-2-4-6	WFF1-MW4-0-0.5; 0.5-2	1.7	3" ORGANIC LAYER; YELLOWISH RED SILTY FINE SAND	5YR 4/6	36.8	
	5-8-9-6		1.6	YELLOW COARSER SILTY SAND	10YR 7/6	0.2	
5	2-3-1-1	WFF1-MW4-3-5	1.0	---	---	---	GW AT 5 FT BGS
				BORING TERMINATED AT 13.5 FT BGS			
10							
15							
20							
25							
30							
35							

MW-4

STATE PLANE COORDINATES:
NORTHING: 3881434.5370
EASTING: 12357063.2990

DRILLING METHOD: HOLLOW-STEM AUGER
DRILLING COMPANY: IMS
DATE OF CONSTRUCTION: 02/20/07



PROBE COVER: LOCKING METAL STANDPIPE

TYPE OF WELL CAP: 2 INCH EXPANSION CAP
TOP OF PVC CASING ELEVATION: 21.60FEET MSL

PROTECTIVE CASING SAND

TYPE OF SURFACE SEAL:
CEMENT PAD

GROUND SURFACE ELEVATION:
18.4 FEET MSL

RISER PIPE ID: 2 IN
TYPE: SCHEDULE 40 PVC
LENGTH OF RISER: 10.0 FT

GROUT/CEMENT SEAL: 0 TO 1 FT BGS
GROUT/CEMENT PLACEMENT METHOD: GRAVITY

BOREHOLE DIAMETER: 6.5 INCH

WELL DEVELOPMENT DETAILS

DEVELOPMENT METHOD: PUMP
DATE/TIME START: 2/22/07 11:55
DATE/TIME FINISH: 2/22/07 13:15
TOTAL TIME PURGED: 80 MIN
VOLUME PURGED: 165 GALLONS
INITIAL WATER LEVEL: APPROX. 5 FT BGS ON 2/20/07

DEPTH TO TOP OF SEAL: 1 FT BGS
TYPE OF SEAL: 3/8" INCH BENTONITE
SEAL PLACEMENT METHOD: GRAVITY
HYDRATED FOLLOWING PLACEMENT

DEPTH TO TOP OF SAND: 2.0 FT BGS

DEPTH TO TOP OF SCREEN: 3.0 FT BGS
RISER AND SCREEN JOINT TYPE: FLUSH THREADED WITH O-RING

FILTER PACK MATERIAL/SIZE: MORIE #2 SAND
FILTER PACK PLACEMENT METHOD: GRAVITY

SCREEN ID: 2 INCH
TYPE OF SCREEN: SLOTTED SCHEDULE 40 PVC
SCREEN SLOT SIZE: 0.010 INCH
LENGTH OF SCREEN: 10.0 FT

TYPE OF END CAP SUMP: PVC CYLINDRICAL BOTTOM, THREADED WITH O-RING
LENGTH OF END CAP SUMP: 0.5 FEET

DEPTH TO BOTTOM OF SCREEN: 13.0 FT BGS

DEPTH TO BOTTOM OF WELL: 13.5 FT BGS

DEPTH TO BOTTOM OF BOREHOLE: 13.5 BGS

DEPTH TO WATER: ~5 FEET BGS

FIGURE IS NOT DRAWN TO SCALE

WASTEWATER TREATMENT PLANT #1
WALLOPS FLIGHT FACILITY
ACCOMACK COUNTY, VIRGINIA

GROUNDWATER MONITOR WELL
MW-4

CONSTRUCTION DIAGRAM

WESTON SOLUTIONS

DRAWN	DATE	WORK ORDER NO.	FILE NAME
TSR	03/21/07	03886.183.010.0400	WWTP_MW4.cdr

BOREHOLE LOG

GROUNDWATER MONITOR WELL NUMBER: MW-5

PROJECT NAME: WWTP #1
W.O.#: 03886.183.010.0400
LOCATION: WALLOPS FLIGHT FACILITY, VIRGINIA
DRILLING COMPANY: IMS
RIG TYPE: B47 MOBILE
DRILLING METHOD: HOLLOW STEM AUGER
SAMPLING METHOD: SPLIT SPOONS WHERE INDICATED
LOGGED BY: E. MACKEY WEATHER:
DATE BEGUN: 02/20/07 DATE COMPLETED: 02/20/07

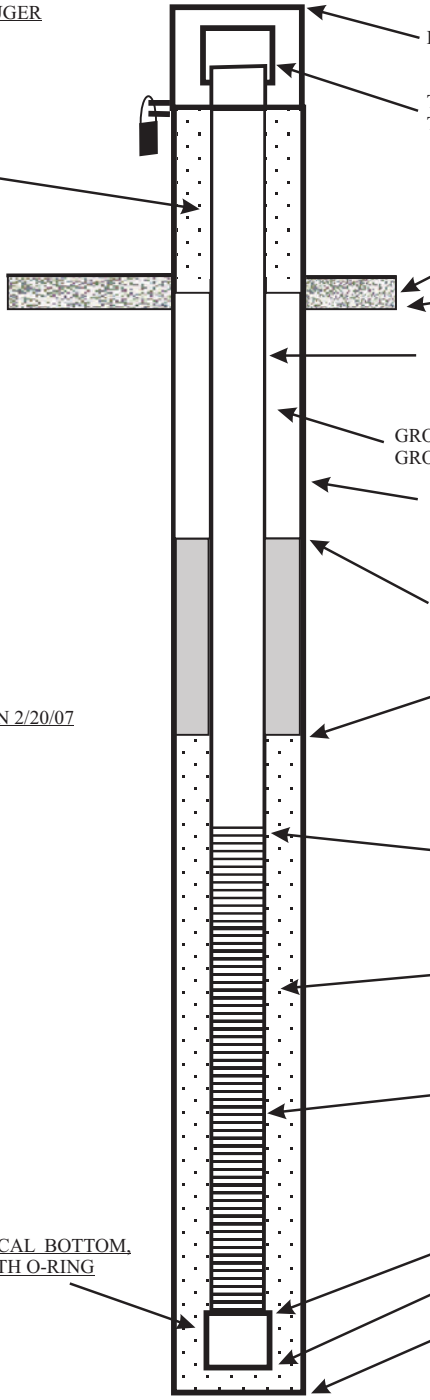
TOTAL DEPTH: 12.5 FT BGS
NORTHING: 3881455.4560
EASTING: 12357154.8020
SURFACE ELEV.: 16.1
INITIAL WATER LEVEL: 3 FT BGS
AIR MONITORING INSTRUMENT: Photo-Ionizer (PID)
BOREHOLE DIAMETER: 6.5 INCH
P.G. SIGNATURE:

DEPTH FT BGS	BLOW COUNT	SAMPLE ID	RECOVERY	LITHOLOGIC DESCRIPTION	MUNSELL SOIL COLOR CODE	PID READING (PPM)	COMMENT
0							*land surface*
	2-2-3-3	WFF1-MW5-0-0.5; 0.5-2	2.0	3" ORGANIC LAYER; BROWNISH YELLOW SILTY SAND	10YR 6/6	0.5	
	4-3-3-4	WFF1-MW5-2-4	1.5	YELLOWISH BROWN SILTY SAND	10YR 5/4	1.5	GW AT 3 FT BGS
5	3-1-2-1	---		YELLOWISH BROWN SILTY SAND	10YR 5/4	---	
10				BORING TERMINATED AT 12.5 FT BGS			
15							
20							
25							
30							
35							

MW-5

STATE PLANE COORDINATES:
NORTHING: 3881455.4560
EASTING: 12357154.8020

DRILLING METHOD: HOLLOW-STEM AUGER
DRILLING COMPANY: IMS
DATE OF CONSTRUCTION: 02/20/07



PROBE COVER: LOCKING METAL STANDPIPE

TYPE OF WELL CAP: 2 INCH EXPANSION CAP
TOP OF PVC CASING ELEVATION: 19.34 FEET MSL

PROTECTIVE CASING SAND

TYPE OF SURFACE SEAL: CEMENT PAD

GROUND SURFACE ELEVATION: 16.1 FEET MSL

RISER PIPE ID: 2 IN
TYPE: SCHEDULE 40 PVC
LENGTH OF RISER: 10.0 FT

GROUT/CEMENT SEAL: 0 TO 1 FT BGS
GROUT/CEMENT PLACEMENT METHOD: GRAVITY

BOREHOLE DIAMETER: 6.5 INCH

WELL DEVELOPMENT DETAILS

DEVELOPMENT METHOD: PUMP
DATE/TIME START: 2/22/07 10:28
DATE/TIME FINISH: 2/22/07 12:35
TOTAL TIME PURGED: 127 MIN
VOLUME PURGED: 215 GALLONS
INITIAL WATER LEVEL: APPROX. 3 FT BGS ON 2/20/07

DEPTH TO TOP OF SEAL: 1 FT BGS
TYPE OF SEAL: 3/8" INCH BENTONITE
SEAL PLACEMENT METHOD: GRAVITY
HYDRATED FOLLOWING PLACEMENT

DEPTH TO TOP OF SAND: 1.5 FT BGS

DEPTH TO TOP OF SCREEN: 2.0 FT BGS
RISER AND SCREEN JOINT TYPE: FLUSH THREADED WITH O-RING

FILTER PACK MATERIAL/SIZE: MORIE #2 SAND
FILTER PACK PLACEMENT METHOD: GRAVITY

SCREEN ID: 2 INCH
TYPE OF SCREEN: SLOTTED SCHEDULE 40 PVC
SCREEN SLOT SIZE: 0.010 INCH
LENGTH OF SCREEN: 10.0 FT

TYPE OF END CAP SUMP: PVC CYLINDRICAL BOTTOM, THREADED WITH O-RING
LENGTH OF END CAP SUMP: 0.5 FEET

DEPTH TO BOTTOM OF SCREEN: 12.0 FT BGS

DEPTH TO BOTTOM OF WELL: 12.5 FT BGS

DEPTH TO BOTTOM OF BOREHOLE: 12.5 BGS

DEPTH TO WATER: ~3 FEET BGS

FIGURE IS NOT DRAWN TO SCALE

WASTEWATER TREATMENT PLANT #1
WALLOPS FLIGHT FACILITY
ACCOMACK COUNTY, VIRGINIA

GROUNDWATER MONITOR WELL MW-5

CONSTRUCTION DIAGRAM

WESTON SOLUTIONS

DRAWN	DATE	WORK ORDER NO.	FILE NAME
TSR	03/21/07	03886.183.010.0400	WWTP_MW5.cdr

BOREHOLE LOG

GROUNDWATER MONITOR WELL NUMBER: MW-6

PAGE NUMBER: 1 OF 1

PROJECT NAME: WWTP #1
W.O.#: 03886.183.010.0400
LOCATION: WALLOPS FLIGHT FACILITY, VIRGINIA
DRILLING COMPANY: IMS
RIG TYPE: B47 MOBILE
DRILLING METHOD: HOLLOW STEM AUGER
SAMPLING METHOD: SPLIT SPOONS WHERE INDICATED
LOGGED BY: E. MACKEY WEATHER:
DATE BEGUN: 02/20/07 DATE COMPLETED: 02/20/07

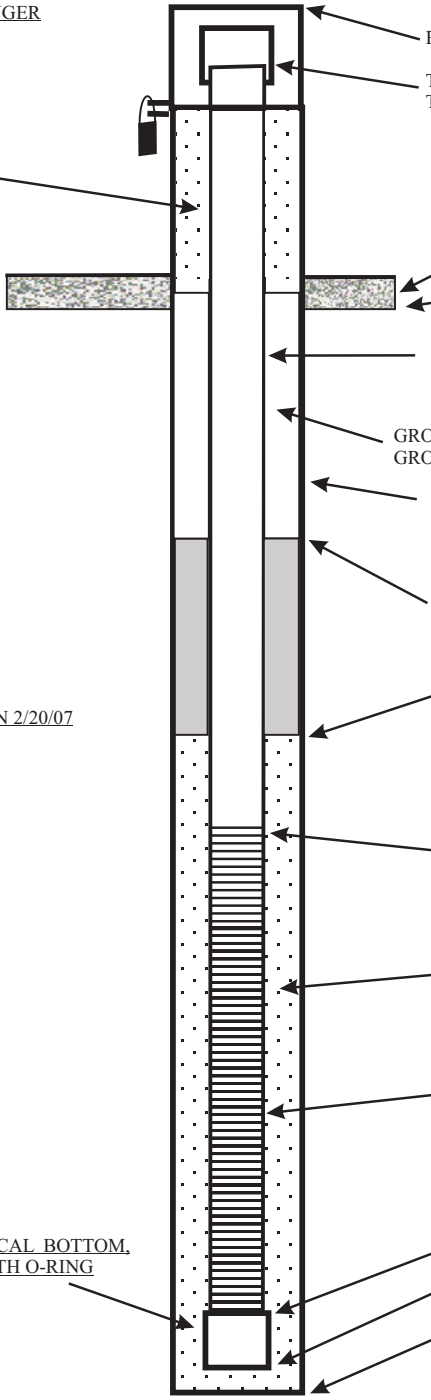
TOTAL DEPTH: 12.5 FT BGS
NORTHING: 3881467.3410
EASTING: 12357033.4200
SURFACE ELEV.: 15.7
INITIAL WATER LEVEL: 3 FT BGS
AIR MONITORING INSTRUMENT: Photo-Ionizer (PID)
BOREHOLE DIAMETER: 6.5 INCH
P.G. SIGNATURE:

DEPTH FT BGS	BLOW COUNT	SAMPLE ID	RECOVERY	LITHOLOGIC DESCRIPTION	MUNSELL SOIL COLOR CODE	PID READING (PPM)	COMMENT
0							*land surface*
	4-4-4-3	WFF1-MW6-0-0.5; 0.5-2	1.2	2" ORGANIC LAYER; REDDISH YELLOW SILTY SAND	7.5YR 6/6	0.0	
	3-3-3-3	WFF1-MW6-2-4	1.5	YELLOW SILTY SAND	10YR 7/8	0.0	GW AT 3 FT BGS
5	1-1-2-1	---	---	YELLOW SILTY SAND	10YR 7/8	---	
10				BORING TERMINATED AT 12.5 FT BGS			
15							
20							
25							
30							
35							

MW-6

STATE PLANE COORDINATES:
NORTHING: 3881467.3410
EASTING: 12357033.4200

DRILLING METHOD: HOLLOW-STEM AUGER
DRILLING COMPANY: IMS
DATE OF CONSTRUCTION: 02/20/07



PROBE COVER: LOCKING METAL STANDPIPE

TYPE OF WELL CAP: 2 INCH EXPANSION CAP
TOP OF PVC CASING ELEVATION: 18.35 FEET MSL

PROTECTIVE CASING SAND

TYPE OF SURFACE SEAL:
CEMENT PAD

GROUND SURFACE ELEVATION:
15.7 FEET MSL

RISER PIPE ID: 2 IN
TYPE: SCHEDULE 40 PVC
LENGTH OF RISER: 10.0 FT

GROUT/CEMENT SEAL: 0 TO 1 FT BGS
GROUT/CEMENT PLACEMENT METHOD: GRAVITY

BOREHOLE DIAMETER: 6.5 INCH

WELL DEVELOPMENT DETAILS

DEVELOPMENT METHOD: PUMP
DATE/TIME START: 2/21/07 14:55
DATE/TIME FINISH: 2/21/07 15:42
TOTAL TIME PURGED: 53 MIN
VOLUME PURGED: 75 GALLONS
INITIAL WATER LEVEL: APPROX. 3 FT BGS ON 2/20/07

DEPTH TO TOP OF SEAL: 1 FT BGS
TYPE OF SEAL: 3/8" INCH BENTONITE
SEAL PLACEMENT METHOD: GRAVITY
HYDRATED FOLLOWING PLACEMENT

DEPTH TO TOP OF SAND: 1.5 FT BGS

DEPTH TO TOP OF SCREEN: 2.0 FT BGS
RISER AND SCREEN JOINT TYPE: FLUSH THREADED WITH O-RING

FILTER PACK MATERIAL/SIZE: MORIE #2 SAND
FILTER PACK PLACEMENT METHOD: GRAVITY

SCREEN ID: 2 INCH
TYPE OF SCREEN: SLOTTED SCHEDULE 40 PVC
SCREEN SLOT SIZE: 0.010 INCH
LENGTH OF SCREEN: 10.0 FT

TYPE OF END CAP SUMP: PVC CYLINDRICAL BOTTOM, THREADED WITH O-RING
LENGTH OF END CAP SUMP: 0.5 FEET

DEPTH TO BOTTOM OF SCREEN: 12.0 FT BGS

DEPTH TO BOTTOM OF WELL: 12.5 FT BGS

DEPTH TO BOTTOM OF BOREHOLE: 12.5 BGS

DEPTH TO WATER: ~3 FEET BGS

FIGURE IS NOT DRAWN TO SCALE

WASTEWATER TREATMENT PLANT #1
WALLOPS FLIGHT FACILITY
ACCOMACK COUNTY, VIRGINIA

GROUNDWATER MONITOR WELL
MW-6

CONSTRUCTION DIAGRAM

WESTON SOLUTIONS

DRAWN	DATE	WORK ORDER NO.	FILE NAME
TSR	03/21/07	03886.183.010.0400	WWTP_MW6.cdr

BOREHOLE LOG

GROUNDWATER MONITOR WELL NUMBER: MW-7

PAGE NUMBER: 1 OF 1

PROJECT NAME: WWTP #1
W.O.#: 03886.183.010.0400
LOCATION: WALLOPS FLIGHT FACILITY, VIRGINIA
DRILLING COMPANY: IMS
RIG TYPE: B47 MOBILE
DRILLING METHOD: HOLLOW STEM AUGER
SAMPLING METHOD: SPLIT SPOONS WHERE INDICATED
LOGGED BY: E. MACKEY WEATHER:
DATE BEGUN: 02/20/07 DATE COMPLETED: 02/20/07

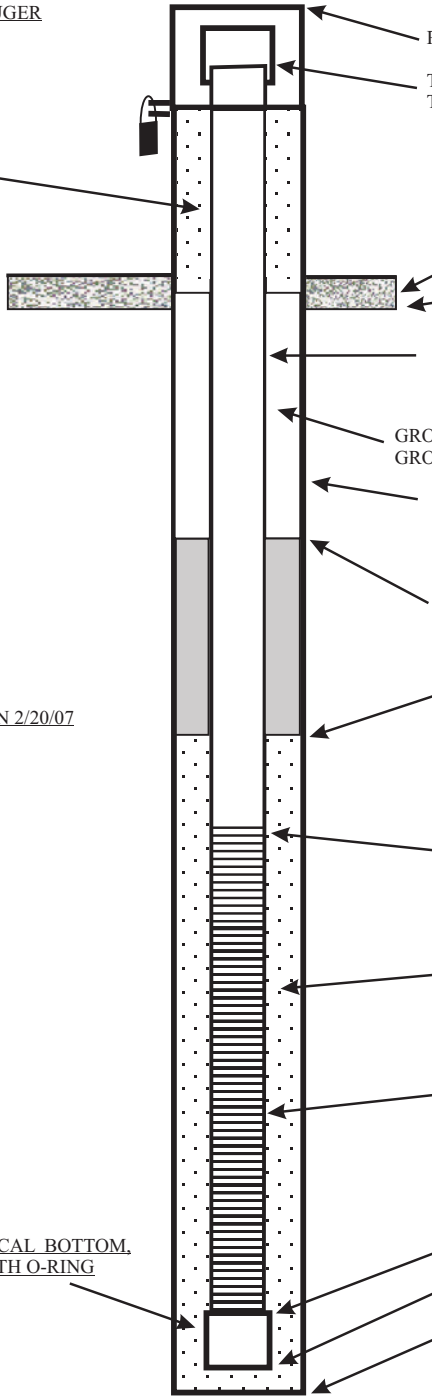
TOTAL DEPTH: 12.5 FT BGS
NORTHING: 3881553.5110
EASTING: 12357039.5570
SURFACE ELEV.: 13.3
INITIAL WATER LEVEL: 2 FT BGS
AIR MONITORING INSTRUMENT: Photo-Ionizer (PID)
BOREHOLE DIAMETER: 6.5 INCH
P.G. SIGNATURE:

DEPTH FT BGS	BLOW COUNT	SAMPLE ID	RECOVERY	LITHOLOGIC DESCRIPTION	MUNSELL SOIL COLOR CODE	PID READING (PPM)	COMMENT
0							*land surface*
	1-1-2-2	WFF1-MW7-0-0.5; 0.5-2	1.8	2" ORGANIC LAYER; REDDISH YELLOW SILTY SAND	7.5YR 6/6	0.0	GW AT 2 FT BGS
5							
10							
				BORING TERMINATED AT 12.5 FT BGS			
15							
20							
25							
30							
35							

MW-7

STATE PLANE COORDINATES:
NORTHING: 3881553.5110
EASTING: 12357039.5570

DRILLING METHOD: HOLLOW-STEM AUGER
DRILLING COMPANY: IMS
DATE OF CONSTRUCTION: 02/20/07



PROBE COVER: LOCKING METAL STANDPIPE

TYPE OF WELL CAP: 2 INCH EXPANSION CAP
TOP OF PVC CASING ELEVATION: 16.65FEET MSL

PROTECTIVE CASING SAND

TYPE OF SURFACE SEAL:
CEMENT PAD

GROUND SURFACE ELEVATION:
13.3 FEET MSL

RISER PIPE ID: 2 IN
TYPE: SCHEDULE 40 PVC
LENGTH OF RISER: 10.0 FT

GROUT/CEMENT SEAL: 0 TO 1 FT BGS
GROUT/CEMENT PLACEMENT METHOD: GRAVITY

BOREHOLE DIAMETER: 6.5 INCH

WELL DEVELOPMENT DETAILS

DEVELOPMENT METHOD: PUMP
DATE/TIME START: 2/21/07 16:07
DATE/TIME FINISH: 2/21/07 17:06
TOTAL TIME PURGED: 59 MIN
VOLUME PURGED: 118 GALLONS
INITIAL WATER LEVEL: APPROX. 2 FT BGS ON 2/20/07

DEPTH TO TOP OF SEAL: 1 FT BGS
TYPE OF SEAL: 3/8" INCH BENTONITE
SEAL PLACEMENT METHOD: GRAVITY
HYDRATED FOLLOWING PLACEMENT

DEPTH TO TOP OF SAND: 1.5 FT BGS

DEPTH TO TOP OF SCREEN: 2.0 FT BGS
RISER AND SCREEN JOINT TYPE: FLUSH THREADED WITH O-RING

FILTER PACK MATERIAL/SIZE: MORIE #2 SAND
FILTER PACK PLACEMENT METHOD: GRAVITY

SCREEN ID: 2 INCH
TYPE OF SCREEN: SLOTTED SCHEDULE 40 PVC
SCREEN SLOT SIZE: 0.010 INCH
LENGTH OF SCREEN: 10.0 FT

TYPE OF END CAP SUMP: PVC CYLINDRICAL BOTTOM, THREADED WITH O-RING
LENGTH OF END CAP SUMP: 0.5 FEET

DEPTH TO BOTTOM OF SCREEN: 12.0 FT BGS

DEPTH TO BOTTOM OF WELL: 12.5 FT BGS

DEPTH TO BOTTOM OF BOREHOLE: 12.5 BGS

DEPTH TO WATER: ~2 FEET BGS

FIGURE IS NOT DRAWN TO SCALE

WASTEWATER TREATMENT PLANT #1
WALLOPS FLIGHT FACILITY
ACCOMACK COUNTY, VIRGINIA

GROUNDWATER MONITOR WELL
MW-7

CONSTRUCTION DIAGRAM

WESTON SOLUTIONS

DRAWN	DATE	WORK ORDER NO.	FILE NAME
TSR	03/21/07	03886.183.010.0400	WWTP_MW7.cdr

APPENDIX D
ANALYTICAL DATA REPORTS, VALIDATION REPORTS

TABLE 1
DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW2-0-0.5	WFFI-MW2-0.5-2	WFFI-MW2-19-21	WFFI-MW4-0-0.5	WFFI-MW4-0.5-2
	Sample Date	2/19/2007	2/19/2007	2/19/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Percent Solids	83.4	91.5	83.8	85.0	90.9
CRQL	**Analyte**					
20	Aluminum	**13000**	**8100**	**2600**	**4600**	**9700**
6.0	Antimony	2.2 U	2.0 U	2.2 U	**0.72 K**	2.0 U
1.0	Arsenic	**3.4**	**2.2**	**0.96 K**	**1.6 K**	**3.4**
20	Barium	**43**	**25**	**11**	**18**	**38**
0.5	Beryllium	**0.33 J**	**0.21 J**	**0.084 J**	**0.13 B**	**0.29 J**
0.5	Cadmium	0.55 U	0.50 U	0.55 U	0.56 U	0.51 U
500	Calcium	**970**	**490**	**140**	**530**	**420**
1.0	Chromium	**13**	**8.2**	**3.7**	**5.6**	**9.3**
5.0	Cobalt	**2.8**	**1.4**	**0.39 J**	**0.98 J**	**2.0**
2.5	Copper	**3.6**	**2.6**	**0.85 J**	**3.0**	**2.6**
10	Iron	**8400**	**4500**	**1400**	**3600**	**6500**
1.0	Lead	**5.3**	**3.0**	**1.1 B**	**6.7**	**4.8**
500	Magnesium	**790**	**410**	**140**	**430**	**720**
1.5	Manganese	**97**	**56**	**26**	**71**	**90**
0.1	Mercury	**0.027 L**	**0.023 L**	0.020 UL	**0.046 L**	**0.020 L**
4.0	Nickel	**6.2**	**3.9 J**	**1.2 J**	**4.5 J**	**4.7**
500	Potassium	**540**	**340**	**180**	**380**	**460**
3.5	Selenium	2.8 U	2.5 U	2.7 U	2.8 U	2.5 U
1.0	Silver	1.1 U	0.99 U	1.1 U	1.1 U	1.0 U
500	Sodium	**94 K**	**67 K**	**73 K**	**96 K**	**85 K**
2.5	Thallium	2.8 U	2.5 U	2.7 U	2.8 U	2.5 U
5.0	Vanadium	**18**	**9.8**	**2.9**	**22**	**14**
6.0	Zinc	**14**	**7.2**	**3.8**	**14**	**13**
2.5	Total Cyanide	0.58 U	0.54 U	0.58 U	0.59 U	0.54 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
mg/Kg	Milligram per kilogram
Bold	Reported value is above the lab method detection limit

TABLE 2
DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW4-3-5	WFFI-MW5-0-0.5	WFFI-MW5-0.5-2	WFFI-MW5-2-4	WFFI-MW6-0-0.5
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Percent Solids	87.2	89.4	89.9	86.9	86.4
CRQL	**Analyte**					
20	Aluminum	**3800**	**4400**	**8100**	**4300**	**3000**
6.0	Antimony	2.2 U	2.2 U	2.1 U	2.1 U	2.1 U
1.0	Arsenic	**1.2 K**	**2.0 K**	**3.5**	**0.76 K**	**1.2 K**
20	Barium	**14**	**15**	**27**	**21**	**13**
0.5	Beryllium	**0.13 B**	**0.15 J**	**0.23 J**	**0.16 J**	**0.087 J**
0.5	Cadmium	0.55 U	0.54 U	0.52 U	0.51 U	0.54 U
500	Calcium	**200**	**160**	**200**	**170**	**570**
1.0	Chromium	**4.7**	**5.1**	**6.7**	**4.3**	**4.6**
5.0	Cobalt	**0.69 J**	**0.84 J**	**1.4**	**1.0 J**	**0.57 J**
2.5	Copper	**1.3 J**	**1.7 J**	**2.4**	**1.2 B**	**1.5 J**
10	Iron	**2300**	**3000**	**4200**	**2600**	**2600**
1.0	Lead	**2.3**	**5.4**	**2.5**	**1.9 K**	**6.1**
500	Magnesium	**250**	**340**	**350**	**320**	**280**
1.5	Manganese	**28**	**42**	**53**	**20**	**49**
0.1	Mercury	**0.015 L**	**0.024 L**	**0.016 L**	**0.012 L**	**0.028 L**
4.0	Nickel	**1.7 B**	**2.1 B**	**2.9 B**	**2.5 B**	**2.9 B**
500	Potassium	**240**	**300**	**320**	**250**	**250**
3.5	Selenium	2.7 U	2.7 U	2.6 U	2.6 U	2.7 U
1.0	Silver	1.1 U	1.1 U	1.0 U	1.0 U	1.1 U
500	Sodium	**66 K**	**68 K**	**62 K**	**67 K**	**83 K**
2.5	Thallium	2.7 U	2.7 U	2.6 U	2.6 U	2.7 U
5.0	Vanadium	**5.4**	**7.4**	**9.1**	**6.9**	**14**
6.0	Zinc	**5.8**	**13**	**11**	**6.4**	**13**
2.5	Total Cyanide	0.57 U	0.55 U	0.55 U	0.56 U	**0.34 J**

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
mg/Kg	Milligram per kilogram
Bold	Reported value is above the lab method detection limit

TABLE 3
DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW6-0.5-2	WFFI-MW6-2-4	WFFI-MW7-0-0.5	WFFI-MW7-0.5-2
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	87.1	82.7	74.6	80.7
CRQL	**Analyte**				
20	Aluminum	**1400**	**1300**	**12000**	**5100**
6.0	Antimony	2.2 U	2.2 U	**0.59 K**	2.2 U
1.0	Arsenic	1.1 U	1.1 U	**5.4**	**1.4 K**
20	Barium	**7.1**	**5.9**	**54**	**20**
0.5	Beryllium	**0.046 B**	**0.044 B**	**0.42 J**	**0.16 J**
0.5	Cadmium	0.55 U	0.56 U	0.62 U	0.56 U
500	Calcium	**79 B**	**96 B**	**1200**	**270**
1.0	Chromium	**2.0**	**1.6 B**	**13**	**5.7**
5.0	Cobalt	**0.26 J**	**0.23 J**	**3.3**	**0.92 J**
2.5	Copper	**0.41 B**	**0.31 B**	**6.7**	**2.3**
10	Iron	**940 B**	**620 B**	**8800**	**2500**
1.0	Lead	**1.7 B**	**0.85 B**	**20**	**5.0**
500	Magnesium	**100**	**85**	**1100**	**390**
1.5	Manganese	**9.5**	**5.5**	**130**	**15**
0.1	Mercury	**0.0046 L**	**0.0055 L**	**0.099 L**	**0.027 L**
4.0	Nickel	**0.76 B**	**0.65 B**	**7.7**	**3.0 B**
500	Potassium	**120**	**130**	**540**	**280**
3.5	Selenium	2.8 U	2.8 U	3.1 U	2.8 U
1.0	Silver	1.1 U	1.1 U	**0.20 J**	1.1 U
500	Sodium	**64 K**	**71 K**	**120 K**	**78 K**
2.5	Thallium	2.8 U	2.8 U	3.1 U	2.8 U
5.0	Vanadium	**2.4**	**1.8**	**24**	**7.7**
6.0	Zinc	**2.5 B**	**1.8 B**	**60**	**27**
2.5	Total Cyanide	0.56 U	0.59 U	0.65 U	0.61 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
mg/Kg	Milligram per kilogram
Bold	Reported value is above the lab method detection limit

TABLE 4
DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS1	WFFI-SS1-D	WFFI-SS2	WFFI-SS3	WFFI-SS6
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Percent Solids	81.0	81.5	89.8	89.6	81.9
CRQL	**Analyte**					
20	Aluminum	**8400**	**7900**	NA	NA	**9500**
6.0	Antimony	**2.8 K**	**3.0 K**	NA	NA	**3.2 K**
1.0	Arsenic	**3.2**	**2.6**	NA	NA	**3.2**
20	Barium	**100**	**69**	NA	NA	**67**
0.5	Beryllium	**0.25 J**	**0.24 J**	NA	NA	**0.27 J**
0.5	Cadmium	**0.35 J**	**0.35 J**	NA	NA	**0.37 J**
500	Calcium	**2500**	**2400**	NA	NA	**2300**
1.0	Chromium	**9.3**	**9.2**	NA	NA	**11**
5.0	Cobalt	**2.0**	**2.0**	NA	NA	**2.2**
2.5	Copper	**13**	**15**	NA	NA	**12**
10	Iron	**5500**	**5300**	NA	NA	**6500**
1.0	Lead	**400**	**460**	NA	NA	**400**
500	Magnesium	**620**	**610**	NA	NA	**690**
1.5	Manganese	**120**	**130**	NA	NA	**120**
0.1	Mercury	**0.13 K**	**0.14 K**	NA	NA	**0.13 K**
4.0	Nickel	**5.8**	**5.6**	NA	NA	**6.2**
500	Potassium	**470**	**440**	NA	NA	**500**
3.5	Selenium	2.8 U	2.8 U	NA	NA	2.8 U
1.0	Silver	1.1 U	**0.12 J**	NA	NA	**0.17 J**
500	Sodium	**100 K**	**100 J**	NA	NA	**100 K**
2.5	Thallium	2.8 U	2.8 U	NA	NA	2.8 U
5.0	Vanadium	**18**	**18**	NA	NA	**19**
6.0	Zinc	**240**	**250**	NA	NA	**230**
2.5	Total Cyanide	0.60 U	0.61 U	0.54 U	0.53 U	0.59 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
NA	Not analyzed
mg/Kg	Milligram per kilogram
Bold	Reported value is above the lab method detection limit

TABLE 1A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW2-0-0.5	WFFI-MW2-0.5-2	WFFI-MW2-19-21	WFFI-MW4-0-0.5
	Sample Date	2/19/2007	2/19/2007	2/19/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	83.4	91.5	83.8	85.0
CRQL	**Volatile Organic Compounds**				
10	Acetone	**170**	**36 J**	**29 J**	**110**
5.0	Benzene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Bromoform	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Bromomethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Carbon disulfide	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Carbon tetrachloride	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Chlorobenzene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Chlorodibromomethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Chloroethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Chloroform	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Chloromethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	cis-1,2-Dichloroethene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	cis-1,3-Dichloropropene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Dichlorobromomethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	1,1-Dichloroethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	1,2-Dichloroethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	1,1-Dichloroethene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	1,2-Dichloropropane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Ethylbenzene	7.3 U	4.3 U	5.1 U	4.8 U
10	2-Hexanone	37 U	22 U	26 U	24 U
5.0	Methylene Chloride	7.3 U	4.3 U	5.1 U	4.8 U
10	Methyl Ethyl Ketone	**33 J**	**6.1 J**	26 U	24 U
10	Methyl isobutyl ketone	**340**	**140**	**150**	24 U
5.0	Styrene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	1,1,2,2-Tetrachloroethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Tetrachloroethene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Toluene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	trans-1,2-Dichloroethene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	trans-1,3-Dichloropropene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	1,1,1-Trichloroethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	1,1,2-Trichloroethane	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Trichloroethene	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Vinyl chloride	7.3 U	4.3 U	5.1 U	4.8 U
5.0	Xylenes, Total	15 U	8.7 U	10 U	9.6 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

TABLE 1B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW4-0.5-2	WFFI-MW4-3-5	WFFI-MW5-0-0.5	WFFI-MW5-0.5-2
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	90.9	87.2	89.4	89.9
CRQL	**Volatile Organic Compounds**				
10	Acetone	**33 J**	**22 J**	**64**	**37 J**
5.0	Benzene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Bromoform	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Bromomethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Carbon disulfide	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Carbon tetrachloride	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Chlorobenzene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Chlorodibromomethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Chloroethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Chloroform	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Chloromethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	cis-1,2-Dichloroethene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	cis-1,3-Dichloropropene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Dichlorobromomethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	1,1-Dichloroethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	1,2-Dichloroethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	1,1-Dichloroethene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	1,2-Dichloropropane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Ethylbenzene	4.5 U	3.8 U	5.0 U	4.6 U
10	2-Hexanone	23 U	19 U	25 U	23 U
5.0	Methylene Chloride	4.5 U	3.8 U	5.0 U	4.6 U
10	Methyl Ethyl Ketone	**4.6 J**	19 U	**7.7 J**	23 U
10	Methyl isobutyl ketone	**12 J**	19 U	25 U	23 U
5.0	Styrene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	1,1,2,2-Tetrachloroethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Tetrachloroethene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Toluene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	trans-1,2-Dichloroethene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	trans-1,3-Dichloropropene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	1,1,1-Trichloroethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	1,1,2-Trichloroethane	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Trichloroethene	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Vinyl chloride	4.5 U	3.8 U	5.0 U	4.6 U
5.0	Xylenes, Total	9.0 U	7.5 U	10 U	9.1 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

TABLE 1C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW5-2-4	WFFI-MW6-0-0.5	WFFI-MW6-0.5-2	WFFI-MW6-2-4
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	86.9	86.4	87.1	82.7
CRQL	**Volatile Organic Compounds**				
10	Acetone	**48**	**220**	**31 J**	**9.5 J**
5.0	Benzene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Bromoform	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Bromomethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Carbon disulfide	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Carbon tetrachloride	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Chlorobenzene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Chlorodibromomethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Chloroethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Chloroform	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Chloromethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	cis-1,2-Dichloroethene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	cis-1,3-Dichloropropene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Dichlorobromomethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	1,1-Dichloroethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	1,2-Dichloroethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	1,1-Dichloroethene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	1,2-Dichloropropane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Ethylbenzene	4.6 U	5.8 U	5.2 U	4.9 U
10	2-Hexanone	23 U	29 U	26 U	24 U
5.0	Methylene Chloride	4.6 U	5.8 U	5.2 U	4.9 U
10	Methyl Ethyl Ketone	**7.7 J**	**9.0 J**	26 U	24 U
10	Methyl isobutyl ketone	23 U	**7.4 J**	26 U	**280**
5.0	Styrene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	1,1,2,2-Tetrachloroethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Tetrachloroethene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Toluene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	trans-1,2-Dichloroethene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	trans-1,3-Dichloropropene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	1,1,1-Trichloroethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	1,1,2-Trichloroethane	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Trichloroethene	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Vinyl chloride	4.6 U	5.8 U	5.2 U	4.9 U
5.0	Xylenes, Total	9.3 U	12 U	10 U	9.7 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

TABLE 1D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW7-0-0.5	WFFI-MW7-0.5-2
	Sample Date	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0
	Percent Solids	74.6	80.7
CRQL	**Volatile Organic Compounds**		
10	Acetone	**160**	**58**
5.0	Benzene	5.3 U	5.1 U
5.0	Bromoform	5.3 U	5.1 U
5.0	Bromomethane	5.3 U	5.1 U
5.0	Carbon disulfide	5.3 U	5.1 U
5.0	Carbon tetrachloride	5.3 U	5.1 U
5.0	Chlorobenzene	5.3 U	5.1 U
5.0	Chlorodibromomethane	5.3 U	5.1 U
5.0	Chloroethane	5.3 U	5.1 U
5.0	Chloroform	5.3 U	5.1 U
5.0	Chloromethane	5.3 U	5.1 U
5.0	cis-1,2-Dichloroethene	5.3 U	5.1 U
5.0	cis-1,3-Dichloropropene	5.3 U	5.1 U
5.0	Dichlorobromomethane	5.3 U	5.1 U
5.0	1,1-Dichloroethane	5.3 U	5.1 U
5.0	1,2-Dichloroethane	5.3 U	5.1 U
5.0	1,1-Dichloroethene	5.3 U	5.1 U
5.0	1,2-Dichloropropane	5.3 U	5.1 U
5.0	Ethylbenzene	5.3 U	5.1 U
10	2-Hexanone	27 U	25 U
5.0	Methylene Chloride	5.3 U	5.1 U
10	Methyl Ethyl Ketone	**14 J**	25 U
10	Methyl isobutyl ketone	**24 J**	25 U
5.0	Styrene	5.3 U	5.1 U
5.0	1,1,2,2-Tetrachloroethane	5.3 U	5.1 U
5.0	Tetrachloroethene	5.3 U	5.1 U
5.0	Toluene	5.3 U	5.1 U
5.0	trans-1,2-Dichloroethene	5.3 U	5.1 U
5.0	trans-1,3-Dichloropropene	5.3 U	5.1 U
5.0	1,1,1-Trichloroethane	5.3 U	5.1 U
5.0	1,1,2-Trichloroethane	5.3 U	5.1 U
5.0	Trichloroethene	5.3 U	5.1 U
5.0	Vinyl chloride	5.3 U	5.1 U
5.0	Xylenes, Total	11 U	10 U

Notes: B - Present in laboratory blank and/or field QC blanks
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/Kg - Microgram per kilogram
Bold - Reported value is above lab method detection limit

TABLE 1E
DATA SUMMARY FORM: ORGANIC COMPOUONDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS1	WFFI-SS1-D	WFFI-SS2	WFFI-SS3	WFFI-SS6
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Percent Solids	81.0	81.5	89.8	89.6	81.9
CRQL	**Volatile Organic Compounds**					
10	Acetone	**210**	**180**	**50**	**57**	**210**
5.0	Benzene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Bromoform	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Bromomethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Carbon disulfide	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Carbon tetrachloride	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Chlorobenzene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Chlorodibromomethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Chloroethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Chloroform	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Chloromethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	cis-1,2-Dichloroethene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	cis-1,3-Dichloropropene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Dichlorobromomethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	1,1-Dichloroethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	1,2-Dichloroethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	1,1-Dichloroethene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	1,2-Dichloropropane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Ethylbenzene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
10	2-Hexanone	26 U	26 U	25 U	27 U	29 U
5.0	Methylene Chloride	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
10	Methyl Ethyl Ketone	**19 J**	26 U	**7.3 J**	**7.1 J**	**23 J**
10	Methyl isobutyl ketone	26 U	26 U	25 U	27 U	**13 J**
5.0	Styrene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	1,1,2,2-Tetrachloroethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Tetrachloroethene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Toluene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	trans-1,2-Dichloroethene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	trans-1,3-Dichloropropene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	1,1,1-Trichloroethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	1,1,2-Trichloroethane	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Trichloroethene	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Vinyl chloride	5.2 U	5.1 U	5.0 U	5.5 U	5.8 U
5.0	Xylenes, Total	10 U	10 U	9.9 U	11 U	12 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

TABLE 1F
DATA SUMMARY FORM: ORGANIC COMPOUNDS
WATER QC SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	TB-1	TB-2
	Sample Date	2/20/2007	2/20/2007
	Location	Trip Blank	Trip Blank
	Dilution Factor	1.0	1.0
CRQL	**Volatile Organic Compounds**		
25	Acetone	25 U	25 U
1.0	Benzene	1.0 U	1.0 U
1.0	Bromoform	1.0 U	1.0 U
1.0	Bromomethane	1.0 U	1.0 U
2.0	Carbon disulfide	2.0 U	2.0 U
1.0	Carbon tetrachloride	1.0 U	1.0 U
1.0	Chlorobenzene	1.0 U	1.0 U
1.0	Chlorodibromomethane	1.0 U	1.0 U
1.0	Chloroethane	1.0 U	1.0 U
1.0	Chloroform	1.0 U	1.0 U
1.0	Chloromethane	1.0 U	1.0 U
1.0	cis-1,2-Dichloroethene	1.0 U	1.0 U
1.0	cis-1,3-Dichloropropene	1.0 U	1.0 U
1.0	Dichlorobromomethane	1.0 U	1.0 U
1.0	1,1-Dichloroethane	1.0 U	1.0 U
1.0	1,2-Dichloroethane	1.0 U	1.0 U
1.0	1,1-Dichloroethene	1.0 U	1.0 U
1.0	1,2-Dichloropropane	1.0 U	1.0 U
1.0	Ethylbenzene	1.0 U	1.0 U
10	2-Hexanone	10 U	10 U
5.0	Methylene Chloride	**0.55 J**	**0.47 J**
10	Methyl Ethyl Ketone	10 U	10 U
10	Methyl isobutyl ketone	10 U	10 U
1.0	Styrene	1.0 U	1.0 U
1.0	1,1,2,2-Tetrachloroethane	1.0 U	1.0 U
1.0	Tetrachloroethene	1.0 U	1.0 U
1.0	Toluene	1.0 U	1.0 U
1.0	trans-1,2-Dichloroethene	1.0 U	1.0 U
1.0	trans-1,3-Dichloropropene	1.0 U	1.0 U
1.0	1,1,1-Trichloroethane	1.0 U	1.0 U
1.0	1,1,2-Trichloroethane	1.0 U	1.0 U
1.0	Trichloroethene	1.0 U	1.0 U
1.0	Vinyl chloride	1.0 U	1.0 U
2.0	Xylenes, Total	2.0 U	2.0 U

Notes: B - Present in laboratory blank and/or field QC blanks
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/L - Microgram per liter
Bold - Reported value is above lab method detection limit

TABLE 2A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW2-0-0.5	WFFI-MW2-0.5-2	WFFI-MW2-19-21	WFFI-MW4-0-0.5
	Sample Date	2/19/2007	2/19/2007	2/19/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	83.4	91.5	83.8	85.0
CRQL	**Semivolatile Organic Compounds**				
330	Acenaphthene	400 UJ	360 UJ	390 UJ	390 U
330	Acenaphthylene	400 UJ	360 UJ	390 UJ	390 U
330	Anthracene	400 UJ	360 UJ	390 UJ	390 U
330	Benzo[a]anthracene	400 UJ	360 UJ	390 UJ	390 U
330	Benzo[a]pyrene	**34 J**	360 UJ	**30 J**	390 U
330	Benzo[b]fluoranthene	400 UJ	360 UJ	390 UJ	390 U
330	Benzo[g,h,i]perylene	**52 J**	**31 J**	**46 J**	390 U
330	Benzo[k]fluoranthene	400 UJ	360 UJ	390 UJ	390 U
330	Bis(2-chloroethoxy)methane	400 UJ	360 UJ	390 UJ	390 U
330	Bis(2-chloroethyl)ether	400 UJ	360 UJ	390 UJ	390 U
330	bis(chloroisopropyl) ether	400 UJ	360 UJ	390 UJ	390 U
330	Bis(2-ethylhexyl) phthalate	400 UJ	360 UJ	390 UJ	390 U
330	4-Bromophenyl phenyl ether	400 UJ	360 UJ	390 UJ	390 U
330	Butyl benzyl phthalate	400 UJ	360 UJ	390 UJ	390 U
330	Carbazole	400 UJ	360 UJ	390 UJ	390 U
660	4-Chloroaniline	790 UJ	720 UJ	790 UJ	780 U
330	4-Chloro-3-methylphenol	400 UJ	360 UJ	390 UJ	390 U
330	2-Chloronaphthalene	400 UJ	360 UJ	390 UJ	390 U
330	2-Chlorophenol	400 UJ	360 UJ	390 UJ	390 U
330	4-Chlorophenyl phenyl ether	400 UJ	360 UJ	390 UJ	390 U
330	Chrysene	400 UJ	360 UJ	390 UJ	390 U
330	Dibenz(a,h)anthracene	**50 J**	360 UJ	**44 J**	390 U
330	Dibenzofuran	400 UJ	360 UJ	390 UJ	390 U
330	1,3-Dichlorobenzene	400 UJ	360 UJ	390 UJ	390 U
330	1,4-Dichlorobenzene	400 UJ	360 UJ	390 UJ	390 U
330	1,2-Dichlorobenzene	400 UJ	360 UJ	390 UJ	390 U
660	3,3'-Dichlorobenzidine	790 UJ	720 UJ	790 UJ	780 U
330	2,4-Dichlorophenol	400 UJ	360 UJ	390 UJ	390 U
330	Diethyl phthalate	**27 B**	360 UJ	390 UJ	390 U
330	2,4-Dimethylphenol	400 UJ	360 UJ	390 UJ	390 U
330	Dimethyl phthalate	400 UJ	360 UJ	390 UJ	390 U
330	Di-n-butyl phthalate	400 UJ	360 UJ	390 UJ	390 U
1700	4,6-Dinitro-2-methylphenol	2000 UJ	1900 UJ	2000 UJ	2000 U
1700	2,4-Dinitrophenol	2000 UJ	1900 UJ	2000 UJ	2000 U
330	2,4-Dinitrotoluene	400 UJ	360 UJ	390 UJ	390 U
330	2,6-Dinitrotoluene	400 UJ	360 UJ	390 UJ	390 U
330	Di-n-octyl phthalate	400 UJ	360 UJ	390 UJ	390 U
330	Fluoranthene	400 UJ	360 UJ	390 UJ	390 U

TABLE 2A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW2-0-0.5	WFFI-MW2-0.5-2	WFFI-MW2-19-21	WFFI-MW4-0-0.5
	Sample Date	2/19/2007	2/19/2007	2/19/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	83.4	91.5	83.8	85.0
CRQL	**Semivolatile Organic Compounds**				
330	Fluorene	400 UJ	360 UJ	390 UJ	390 U
330	Hexachlorobenzene	400 UJ	360 UJ	390 UJ	390 U
330	Hexachlorobutadiene	400 UJ	360 UJ	390 UJ	390 U
330	Hexachlorocyclopentadiene	400 UJ	360 UJ	390 UJ	390 U
330	Hexachloroethane	400 UJ	360 UJ	390 UJ	390 U
330	Indeno[1,2,3-cd]pyrene	**52 J**	360 UJ	**40 J**	390 U
330	Isophorone	400 UJ	360 UJ	390 UJ	390 U
330	2-Methylnaphthalene	400 UJ	360 UJ	390 UJ	390 U
330	2-Methylphenol	400 UJ	360 UJ	390 UJ	390 U
330	3 & 4 Methylphenol	400 UJ	360 UJ	390 UJ	390 U
330	Naphthalene	400 UJ	360 UJ	390 UJ	390 U
1700	2-Nitroaniline	2000 UJ	1900 UJ	2000 UJ	2000 U
1700	3-Nitroaniline	2000 UJ	1900 UJ	2000 UJ	2000 U
1700	4-Nitroaniline	2000 UJ	1900 UJ	2000 UJ	2000 U
330	Nitrobenzene	400 UJ	360 UJ	390 UJ	390 U
330	2-Nitrophenol	400 UJ	360 UJ	390 UJ	390 U
1700	4-Nitrophenol	2000 UJ	1900 UJ	2000 UJ	2000 U
330	N-Nitrosodi-n-propylamine	400 UJ	360 UJ	390 UJ	390 U
330	N-Nitrosodiphenylamine	400 UJ	360 UJ	390 UJ	390 U
1700	Pentachlorophenol	2000 UJ	1900 UJ	2000 UJ	2000 U
330	Phenanthrene	400 UJ	360 UJ	390 UJ	390 U
330	Phenol	400 UJ	360 UJ	390 UJ	390 U
330	Pyrene	400 UJ	360 UJ	390 UJ	390 U
330	1,2,4-Trichlorobenzene	400 UJ	360 UJ	390 UJ	390 U
330	2,4,6-Trichlorophenol	400 UJ	360 UJ	390 UJ	390 U
330	2,4,5-Trichlorophenol	400 UJ	360 UJ	390 UJ	390 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW4-0.5-2	WFFI-MW4-3-5	WFFI-MW5-0-0.5	FI-MW5-0.5-2
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	90.9	87.2	89.4	89.9
CRQL	**Semivolatile Organic Compounds**				
330	Acenaphthene	360 UJ	380 U	370 U	370 U
330	Acenaphthylene	360 UJ	380 U	370 U	370 U
330	Anthracene	360 UJ	380 U	370 U	370 U
330	Benzo[a]anthracene	360 UJ	380 U	370 U	370 U
330	Benzo[a]pyrene	360 UJ	380 U	370 U	370 U
330	Benzo[b]fluoranthene	360 UJ	380 U	370 U	370 U
330	Benzo[g,h,i]perylene	**63 J**	380 U	370 U	370 U
330	Benzo[k]fluoranthene	360 UJ	380 U	370 U	370 U
330	Bis(2-chloroethoxy)methane	360 UJ	380 U	370 U	370 U
330	Bis(2-chloroethyl)ether	360 UJ	380 U	370 U	370 U
330	bis(chloroisopropyl) ether	360 UJ	380 U	370 U	370 U
330	Bis(2-ethylhexyl) phthalate	**59 J**	380 U	370 U	370 U
330	4-Bromophenyl phenyl ether	360 UJ	380 U	370 U	370 U
330	Butyl benzyl phthalate	360 UJ	380 U	370 U	370 U
330	Carbazole	360 UJ	380 U	370 U	370 U
660	4-Chloroaniline	730 UJ	760 U	740 U	730 U
330	4-Chloro-3-methylphenol	360 UJ	380 U	370 U	370 U
330	2-Chloronaphthalene	360 UJ	380 U	370 U	370 U
330	2-Chlorophenol	360 UJ	380 U	370 U	370 U
330	4-Chlorophenyl phenyl ether	360 UJ	380 U	370 U	370 U
330	Chrysene	360 UJ	380 U	370 U	370 U
330	Dibenz(a,h)anthracene	**46 J**	380 U	370 U	370 U
330	Dibenzofuran	360 UJ	380 U	370 U	370 U
330	1,3-Dichlorobenzene	360 UJ	380 U	370 U	370 U
330	1,4-Dichlorobenzene	360 UJ	380 U	370 U	370 U
330	1,2-Dichlorobenzene	360 UJ	380 U	370 U	370 U
660	3,3'-Dichlorobenzidine	730 UJ	760 U	740 U	730 U
330	2,4-Dichlorophenol	360 UJ	380 U	370 U	370 U
330	Diethyl phthalate	360 UJ	380 U	370 U	370 U
330	2,4-Dimethylphenol	360 UJ	380 U	370 U	370 U
330	Dimethyl phthalate	360 UJ	380 U	370 U	370 U
330	Di-n-butyl phthalate	**58 J**	380 U	370 U	370 U
1700	4,6-Dinitro-2-methylphenol	1900 UJ	1900 U	1900 U	1900 U
1700	2,4-Dinitrophenol	1900 UJ	1900 UJ	1900 U	1900 U
330	2,4-Dinitrotoluene	360 UJ	380 U	370 U	370 U
330	2,6-Dinitrotoluene	360 UJ	380 U	370 U	370 U
330	Di-n-octyl phthalate	360 UJ	380 U	370 U	370 U
330	Fluoranthene	360 UJ	380 U	370 U	370 U

TABLE 2B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW4-0.5-2	WFFI-MW4-3-5	WFFI-MW5-0-0.5	FI-MW5-0.5-2
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	90.9	87.2	89.4	89.9
CRQL	**Semivolatile Organic Compounds**				
330	Fluorene	360 UJ	380 U	370 U	370 U
330	Hexachlorobenzene	360 UJ	380 U	370 U	370 U
330	Hexachlorobutadiene	360 UJ	380 U	370 U	370 U
330	Hexachlorocyclopentadiene	360 UJ	380 U	370 U	370 U
330	Hexachloroethane	360 UJ	380 U	370 U	370 U
330	Indeno[1,2,3-cd]pyrene	**43 J**	380 U	370 U	370 U
330	Isophorone	360 UJ	380 U	370 U	370 U
330	2-Methylnaphthalene	360 UJ	380 U	370 U	370 U
330	2-Methylphenol	360 UJ	380 U	370 U	370 U
330	3 & 4 Methylphenol	360 UJ	380 U	370 U	370 U
330	Naphthalene	360 UJ	380 U	370 U	370 U
1700	2-Nitroaniline	1900 UJ	1900 U	1900 U	1900 U
1700	3-Nitroaniline	1900 UJ	1900 U	1900 U	1900 U
1700	4-Nitroaniline	1900 UJ	1900 U	1900 U	1900 U
330	Nitrobenzene	360 UJ	380 U	370 U	370 U
330	2-Nitrophenol	360 UJ	380 U	370 U	370 U
1700	4-Nitrophenol	1900 UJ	1900 U	1900 U	1900 U
330	N-Nitrosodi-n-propylamine	360 UJ	380 U	370 U	370 U
330	N-Nitrosodiphenylamine	360 UJ	380 U	370 U	370 U
1700	Pentachlorophenol	1900 UJ	1900 U	1900 U	1900 U
330	Phenanthrene	360 UJ	380 U	370 U	370 U
330	Phenol	360 UJ	380 U	370 U	370 U
330	Pyrene	360 UJ	380 U	370 U	370 U
330	1,2,4-Trichlorobenzene	360 UJ	380 U	370 U	370 U
330	2,4,6-Trichlorophenol	360 UJ	380 U	370 U	370 U
330	2,4,5-Trichlorophenol	360 UJ	380 U	370 U	370 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2C
DATA SUMMARY FORM: ORGANIC COMPOUONDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW5-2-4	WFFI-MW6-0-0.5	WFFI-MW6-0.5-2	WFFI-MW6-2-4
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	86.9	86.4	87.1	82.7
CRQL	**Semivolatile Organic Compounds**				
330	Acenaphthene	380 U	380 UJ	380 U	400 U
330	Acenaphthylene	380 U	380 UJ	380 U	400 U
330	Anthracene	380 U	380 UJ	380 U	400 U
330	Benzo[a]anthracene	380 U	380 UJ	380 U	400 U
330	Benzo[a]pyrene	380 U	380 UJ	380 U	400 U
330	Benzo[b]fluoranthene	380 U	380 UJ	380 U	400 U
330	Benzo[g,h,i]perylene	380 U	**35 J**	380 U	400 U
330	Benzo[k]fluoranthene	380 U	380 UJ	380 U	400 U
330	Bis(2-chloroethoxy)methane	380 U	380 UJ	380 U	400 U
330	Bis(2-chloroethyl)ether	380 U	380 UJ	380 U	400 U
330	bis(chloroisopropyl) ether	380 U	380 UJ	380 U	400 U
330	Bis(2-ethylhexyl) phthalate	380 U	380 UJ	380 U	400 U
330	4-Bromophenyl phenyl ether	380 U	380 UJ	380 U	400 U
330	Butyl benzyl phthalate	380 U	380 UJ	380 U	400 U
330	Carbazole	380 U	380 UJ	380 U	400 U
660	4-Chloroaniline	760 U	760 UJ	760 U	800 U
330	4-Chloro-3-methylphenol	380 U	380 UJ	380 U	400 U
330	2-Chloronaphthalene	380 U	380 UJ	380 U	400 U
330	2-Chlorophenol	380 U	380 UJ	380 U	400 U
330	4-Chlorophenyl phenyl ether	380 U	380 UJ	380 U	400 U
330	Chrysene	380 U	380 UJ	380 U	400 U
330	Dibenz(a,h)anthracene	380 U	**33 J**	380 U	400 U
330	Dibenzofuran	380 U	380 UJ	380 U	400 U
330	1,3-Dichlorobenzene	380 U	380 UJ	380 U	400 U
330	1,4-Dichlorobenzene	380 U	380 UJ	380 U	400 U
330	1,2-Dichlorobenzene	380 U	380 UJ	380 U	400 U
660	3,3'-Dichlorobenzidine	760 U	760 UJ	760 U	800 U
330	2,4-Dichlorophenol	380 U	380 UJ	380 U	400 U
330	Diethyl phthalate	380 U	380 UJ	380 U	400 U
330	2,4-Dimethylphenol	380 U	380 UJ	380 U	400 U
330	Dimethyl phthalate	380 U	380 UJ	380 U	400 U
330	Di-n-butyl phthalate	380 U	380 UJ	380 U	400 U
1700	4,6-Dinitro-2-methylphenol	2000 U	2000 UJ	2000 U	2100 U
1700	2,4-Dinitrophenol	2000 UJ	2000 UJ	2000 U	2100 U
330	2,4-Dinitrotoluene	380 U	380 UJ	380 U	400 U
330	2,6-Dinitrotoluene	380 U	380 UJ	380 U	400 U
330	Di-n-octyl phthalate	380 U	380 UJ	380 U	400 U
330	Fluoranthene	380 U	380 UJ	380 U	400 U

TABLE 2C
DATA SUMMARY FORM: ORGANIC COMPOUONDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW5-2-4	WFFI-MW6-0-0.5	WFFI-MW6-0.5-2	WFFI-MW6-2-4
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	86.9	86.4	87.1	82.7
CRQL	**Semivolatile Organic Compounds**				
330	Fluorene	380 U	380 UJ	380 U	400 U
330	Hexachlorobenzene	380 U	380 UJ	380 U	400 U
330	Hexachlorobutadiene	380 U	380 UJ	380 U	400 U
330	Hexachlorocyclopentadiene	380 U	380 UJ	380 U	400 U
330	Hexachloroethane	380 U	380 UJ	380 U	400 U
330	Indeno[1,2,3-cd]pyrene	380 U	**30 J**	380 U	400 U
330	Isophorone	380 U	380 UJ	380 U	400 U
330	2-Methylnaphthalene	380 U	380 UJ	380 U	400 U
330	2-Methylphenol	380 U	380 UJ	380 U	400 U
330	3 & 4 Methylphenol	380 U	380 UJ	380 U	400 U
330	Naphthalene	380 U	380 UJ	380 U	400 U
1700	2-Nitroaniline	2000 U	2000 UJ	2000 U	2100 U
1700	3-Nitroaniline	2000 U	2000 UJ	2000 U	2100 U
1700	4-Nitroaniline	2000 U	2000 UJ	2000 U	2100 U
330	Nitrobenzene	380 U	380 UJ	380 U	400 U
330	2-Nitrophenol	380 U	380 UJ	380 U	400 U
1700	4-Nitrophenol	2000 U	2000 UJ	2000 U	2100 U
330	N-Nitrosodi-n-propylamine	380 U	380 UJ	380 U	400 U
330	N-Nitrosodiphenylamine	380 U	380 UJ	380 U	400 U
1700	Pentachlorophenol	2000 U	2000 UJ	2000 U	2100 U
330	Phenanthrene	380 U	380 UJ	380 U	400 U
330	Phenol	380 U	380 UJ	380 U	400 U
330	Pyrene	380 U	380 UJ	380 U	400 U
330	1,2,4-Trichlorobenzene	380 U	380 UJ	380 U	400 U
330	2,4,6-Trichlorophenol	380 U	380 UJ	380 U	400 U
330	2,4,5-Trichlorophenol	380 U	380 UJ	380 U	400 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW7-0-0.5	WFFI-MW7-0.5-2
	Sample Date	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0
	Percent Solids	74.6	80.7
CRQL	**Semivolatile Organic Compounds**		
330	Acenaphthene	440 U	410 U
330	Acenaphthylene	440 U	410 U
330	Anthracene	440 U	410 U
330	Benzo[a]anthracene	440 U	410 U
330	Benzo[a]pyrene	440 U	410 U
330	Benzo[b]fluoranthene	440 U	410 U
330	Benzo[g,h,i]perylene	440 U	410 U
330	Benzo[k]fluoranthene	440 U	410 U
330	Bis(2-chloroethoxy)methane	440 U	410 U
330	Bis(2-chloroethyl)ether	440 U	410 U
330	bis(chloroisopropyl) ether	440 U	410 U
330	Bis(2-ethylhexyl) phthalate	440 U	410 U
330	4-Bromophenyl phenyl ether	440 U	410 U
330	Butyl benzyl phthalate	440 U	410 U
330	Carbazole	440 U	410 U
660	4-Chloroaniline	880 U	820 U
330	4-Chloro-3-methylphenol	440 U	410 U
330	2-Chloronaphthalene	440 U	410 U
330	2-Chlorophenol	440 U	410 U
330	4-Chlorophenyl phenyl ether	440 U	410 U
330	Chrysene	440 U	410 U
330	Dibenz(a,h)anthracene	440 U	410 U
330	Dibenzofuran	440 U	410 U
330	1,3-Dichlorobenzene	440 U	410 U
330	1,4-Dichlorobenzene	440 U	410 U
330	1,2-Dichlorobenzene	440 U	410 U
660	3,3'-Dichlorobenzidine	880 U	820 U
330	2,4-Dichlorophenol	440 U	410 U
330	Diethyl phthalate	440 U	410 U
330	2,4-Dimethylphenol	440 U	410 U
330	Dimethyl phthalate	440 U	410 U
330	Di-n-butyl phthalate	440 U	410 U
1700	4,6-Dinitro-2-methylphenol	2300 U	2100 U
1700	2,4-Dinitrophenol	2300 U	2100 U
330	2,4-Dinitrotoluene	440 U	410 U
330	2,6-Dinitrotoluene	440 U	410 U
330	Di-n-octyl phthalate	440 U	410 U

TABLE 2D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW7-0-0.5	WFFI-MW7-0.5-2
	Sample Date	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0
	Percent Solids	74.6	80.7
CRQL	**Semivolatile Organic Compounds**		
330	Fluoranthene	440 U	410 U
330	Fluorene	440 U	410 U
330	Hexachlorobenzene	440 U	410 U
330	Hexachlorobutadiene	440 U	410 U
330	Hexachlorocyclopentadiene	440 U	410 U
330	Hexachloroethane	440 U	410 U
330	Indeno[1,2,3-cd]pyrene	440 U	410 U
330	Isophorone	440 U	410 U
330	2-Methylnaphthalene	440 U	410 U
330	2-Methylphenol	440 U	410 U
330	3 & 4 Methylphenol	440 U	410 U
330	Naphthalene	440 U	410 U
1700	2-Nitroaniline	2300 U	2100 U
1700	3-Nitroaniline	2300 U	2100 U
1700	4-Nitroaniline	2300 U	2100 U
330	Nitrobenzene	440 U	410 U
330	2-Nitrophenol	440 U	410 U
1700	4-Nitrophenol	2300 U	2100 U
330	N-Nitrosodi-n-propylamine	440 U	410 U
330	N-Nitrosodiphenylamine	440 U	410 U
1700	Pentachlorophenol	2300 U	2100 U
330	Phenanthrene	440 U	410 U
330	Phenol	440 U	410 U
330	Pyrene	440 U	410 U
330	1,2,4-Trichlorobenzene	440 U	410 U
330	2,4,6-Trichlorophenol	440 U	410 U
330	2,4,5-Trichlorophenol	440 U	410 U

Notes: B - Present in laboratory blank and/or field QC blanks
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/Kg - Microgram per kilogram
Bold - Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2E
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS1	WFFI-SS1-D	WFFI-SS2	WFFI-SS3	WFFI-SS6
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Percent Solids	81.0	81.5	89.8	89.6	81.9
CRQL	**Semivolatile Organic Compounds**					
330	Acenaphthene	410 U	400 U	NA	NA	400 U
330	Acenaphthylene	410 U	400 U	NA	NA	400 U
330	Anthracene	410 U	400 U	NA	NA	400 U
330	Benzo[a]anthracene	410 U	400 U	NA	NA	400 U
330	Benzo[a]pyrene	410 U	400 U	NA	NA	400 U
330	Benzo[b]fluoranthene	410 U	400 U	NA	NA	400 U
330	Benzo[g,h,i]perylene	410 U	400 U	NA	NA	400 U
330	Benzo[k]fluoranthene	410 U	400 U	NA	NA	400 U
330	Bis(2-chloroethoxy)methane	410 U	400 U	NA	NA	400 U
330	Bis(2-chloroethyl)ether	410 U	400 U	NA	NA	400 U
330	bis(chloroisopropyl) ether	410 U	400 U	NA	NA	400 U
330	Bis(2-ethylhexyl) phthalate	410 U	400 U	NA	NA	400 U
330	4-Bromophenyl phenyl ether	410 U	400 U	NA	NA	400 U
330	Butyl benzyl phthalate	410 U	400 U	NA	NA	400 U
330	Carbazole	410 U	400 U	NA	NA	400 U
660	4-Chloroaniline	810 U	810 U	NA	NA	810 U
330	4-Chloro-3-methylphenol	410 U	400 U	NA	NA	400 U
330	2-Chloronaphthalene	410 U	400 U	NA	NA	400 U
330	2-Chlorophenol	410 U	400 U	NA	NA	400 U
330	4-Chlorophenyl phenyl ether	410 U	400 U	NA	NA	400 U
330	Chrysene	410 U	400 U	NA	NA	400 U
330	Dibenz(a,h)anthracene	410 U	400 U	NA	NA	400 U
330	Dibenzofuran	410 U	400 U	NA	NA	400 U
330	1,3-Dichlorobenzene	410 U	400 U	NA	NA	400 U
330	1,4-Dichlorobenzene	410 U	400 U	NA	NA	400 U
330	1,2-Dichlorobenzene	410 U	400 U	NA	NA	400 U
660	3,3'-Dichlorobenzidine	810 U	810 U	NA	NA	810 U
330	2,4-Dichlorophenol	410 U	400 U	NA	NA	400 U
330	Diethyl phthalate	410 U	400 U	NA	NA	400 U
330	2,4-Dimethylphenol	410 U	400 U	NA	NA	400 U
330	Dimethyl phthalate	410 U	400 U	NA	NA	400 U
330	Di-n-butyl phthalate	410 U	400 U	NA	NA	400 U
1700	4,6-Dinitro-2-methylphenol	2100 U	2100 U	NA	NA	2100 U
1700	2,4-Dinitrophenol	2100 U	2100 U	NA	NA	2100 U
330	2,4-Dinitrotoluene	410 U	400 U	NA	NA	400 U
330	2,6-Dinitrotoluene	410 U	400 U	NA	NA	400 U
330	Di-n-octyl phthalate	410 U	400 U	NA	NA	400 U
330	Fluoranthene	410 U	400 U	NA	NA	400 U

TABLE 2E
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS1	WFFI-SS1-D	WFFI-SS2	WFFI-SS3	WFFI-SS6
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Percent Solids	81.0	81.5	89.8	89.6	81.9
CRQL	**Semivolatile Organic Compounds**					
330	Fluorene	410 U	400 U	NA	NA	400 U
330	Hexachlorobenzene	410 U	400 U	NA	NA	400 U
330	Hexachlorobutadiene	410 U	400 U	NA	NA	400 U
330	Hexachlorocyclopentadiene	410 U	400 U	NA	NA	400 U
330	Hexachloroethane	410 U	400 U	NA	NA	400 U
330	Indeno[1,2,3-cd]pyrene	410 U	400 U	NA	NA	400 U
330	Isophorone	410 U	400 U	NA	NA	400 U
330	2-Methylnaphthalene	410 U	400 U	NA	NA	400 U
330	2-Methylphenol	410 U	400 U	NA	NA	400 U
330	3 & 4 Methylphenol	410 U	400 U	NA	NA	400 U
330	Naphthalene	410 U	400 U	NA	NA	400 U
1700	2-Nitroaniline	2100 U	2100 U	NA	NA	2100 U
1700	3-Nitroaniline	2100 U	2100 U	NA	NA	2100 U
1700	4-Nitroaniline	2100 U	2100 U	NA	NA	2100 U
330	Nitrobenzene	410 U	400 U	NA	NA	400 U
330	2-Nitrophenol	410 U	400 U	NA	NA	400 U
1700	4-Nitrophenol	2100 U	2100 U	NA	NA	2100 U
330	N-Nitrosodi-n-propylamine	410 UL	400 UL	NA	NA	400 UL
330	N-Nitrosodiphenylamine	410 U	400 U	NA	NA	400 U
1700	Pentachlorophenol	2100 U	2100 U	NA	NA	2100 U
330	Phenanthrene	410 U	400 U	NA	NA	400 U
330	Phenol	410 U	400 U	NA	NA	400 U
330	Pyrene	410 U	400 U	NA	NA	400 U
330	1,2,4-Trichlorobenzene	410 UL	400 UL	NA	NA	400 UL
330	2,4,6-Trichlorophenol	410 U	400 U	NA	NA	400 U
330	2,4,5-Trichlorophenol	410 U	400 U	NA	NA	400 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
NA	Not analyzed
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW2-0-0.5	WFFI-MW2-0.5-2	WFFI-MW2-19-21	WFFI-MW4-0-0.5
	Sample Date	2/19/2007	2/19/2007	2/19/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	83.4	91.5	83.8	85.0
CRQL	**Pesticide Compounds**				
1.7	Aldrin	2.0 U	1.9 U	2.0 UJ	2.0 UJ
1.7	alpha-BHC	2.0 U	1.9 U	2.0 UJ	2.0 UJ
1.7	beta-BHC	2.0 U	1.9 U	2.0 UJ	2.0 UJ
1.7	Chlordane (technical)	20 U	19 U	20 UJ	20 UJ
3.3	4,4'-DDD	4.0 U	3.6 U	3.9 UJ	**0.57 J**
3.3	4,4'-DDE	**7.2**	3.6 U	3.9 UJ	**4.2 J**
3.3	4,4'-DDT	**1.1 J**	3.6 U	3.9 UJ	**0.79 J**
1.7	delta-BHC	2.0 U	1.9 U	2.0 UJ	2.0 UJ
3.3	Dieldrin	4.0 U	3.6 U	3.9 UJ	3.9 UJ
1.7	Endosulfan I	2.0 U	1.9 U	2.0 UJ	2.0 UJ
3.3	Endosulfan II	4.0 U	3.6 U	3.9 UJ	3.9 UJ
3.3	Endosulfan sulfate	4.0 U	3.6 U	3.9 UJ	3.9 UJ
3.3	Endrin	4.0 U	3.6 U	3.9 UJ	3.9 UJ
3.3	Endrin aldehyde	4.0 U	3.6 U	3.9 UJ	3.9 UJ
3.3	Endrin ketone	4.0 U	3.6 U	3.9 UJ	3.9 UJ
1.7	gamma-BHC (Lindane)	2.0 U	1.9 U	2.0 UJ	2.0 UJ
1.7	Heptachlor	2.0 U	1.9 U	2.0 UJ	2.0 UJ
1.7	Heptachlor epoxide	2.0 U	1.9 U	2.0 UJ	2.0 UJ
17	Methoxychlor	20 U	19 U	20 UJ	20 UJ
33	PCB-1016	40 U	36 U	39 UJ	39 UJ
67	PCB-1221	80 U	73 U	80 UJ	79 UJ
33	PCB-1232	40 U	36 U	39 UJ	39 UJ
33	PCB-1242	40 U	36 U	39 UJ	39 UJ
33	PCB-1248	40 U	36 U	39 UJ	39 UJ
33	PCB-1254	40 U	36 U	39 UJ	39 UJ
33	PCB-1260	40 U	36 U	39 UJ	39 UJ
170	Toxaphene	200 U	190 U	200 UJ	200 UJ

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW4-0.5-2	WFFI-MW4-3-5	WFFI-MW5-0-0.5	WFFI-MW5-0.5-2
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	90.9	87.2	89.4	89.9
CRQL	**Pesticides Compounds**				
1.7	Aldrin	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ
1.7	alpha-BHC	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ
1.7	beta-BHC	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ
1.7	Chlordane (technical)	19 UJ	19 UJ	19 U	19 UJ
3.3	4,4'-DDD	3.6 UJ	3.8 UJ	3.7 U	3.7 UJ
3.3	4,4'-DDE	3.6 UJ	3.8 UJ	**0.56 J**	3.7 UJ
3.3	4,4'-DDT	3.6 UJ	3.8 UJ	3.7 U	3.7 UJ
1.7	delta-BHC	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ
3.3	Dieldrin	3.6 UJ	3.8 UJ	3.7 U	3.7 UJ
1.7	Endosulfan I	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ
3.3	Endosulfan II	3.6 UJ	3.8 UJ	3.7 U	3.7 UJ
3.3	Endosulfan sulfate	3.6 UJ	3.8 UJ	3.7 U	3.7 UJ
3.3	Endrin	3.6 UJ	3.8 UJ	3.7 U	3.7 UJ
3.3	Endrin aldehyde	3.6 UJ	3.8 UJ	3.7 U	3.7 UJ
3.3	Endrin ketone	3.6 UJ	3.8 UJ	3.7 U	3.7 UJ
1.7	gamma-BHC (Lindane)	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ
1.7	Heptachlor	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ
1.7	Heptachlor epoxide	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ
17	Methoxychlor	19 UJ	19 UJ	19 U	19 UJ
33	PCB-1016	36 UJ	38 UJ	37 U	37 UJ
67	PCB-1221	74 UJ	77 UJ	75 U	74 UJ
33	PCB-1232	36 UJ	38 UJ	37 U	37 UJ
33	PCB-1242	36 UJ	38 UJ	37 U	37 UJ
33	PCB-1248	36 UJ	38 UJ	37 U	37 UJ
33	PCB-1254	36 UJ	38 UJ	37 U	37 UJ
33	PCB-1260	36 UJ	38 UJ	37 U	37 UJ
170	Toxaphene	190 UJ	190 UJ	190 U	190 UJ

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3C
DATA SUMMARY FORM: ORGANIC COMPOUONDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW5-2-4	WFFI-MW6-0-0.5	WFFI-MW6-0.5-2	WFFI-MW6-2-4
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	86.9	86.4	87.1	82.7
CRQL	**Pesticides Compounds**				
1.7	Aldrin	1.9 UJ	2.0 U	1.9 UJ	2.1 U
1.7	alpha-BHC	1.9 UJ	2.0 U	1.9 UJ	2.1 U
1.7	beta-BHC	1.9 UJ	2.0 U	1.9 UJ	2.1 U
1.7	Chlordane (technical)	19 UJ	20 U	19 UJ	21 U
3.3	4,4'-DDD	3.8 UJ	**1.9 J**	3.8 UJ	4.0 U
3.3	4,4'-DDE	3.8 UJ	**14**	**0.48 J**	**1.5 J**
3.3	4,4'-DDT	3.8 UJ	**8.0 J**	3.8 UJ	**0.79 J**
1.7	delta-BHC	1.9 UJ	2.0 U	1.9 UJ	2.1 U
3.3	Dieldrin	3.8 UJ	3.8 U	3.8 UJ	4.0 U
1.7	Endosulfan I	1.9 UJ	2.0 U	1.9 UJ	2.1 U
3.3	Endosulfan II	3.8 UJ	3.8 U	3.8 UJ	4.0 U
3.3	Endosulfan sulfate	3.8 UJ	3.8 U	3.8 UJ	4.0 U
3.3	Endrin	3.8 UJ	3.8 U	3.8 UJ	4.0 U
3.3	Endrin aldehyde	3.8 UJ	3.8 U	3.8 UJ	4.0 U
3.3	Endrin ketone	3.8 UJ	3.8 U	3.8 UJ	4.0 U
1.7	gamma-BHC (Lindane)	1.9 UJ	2.0 U	1.9 UJ	2.1 U
1.7	Heptachlor	1.9 UJ	2.0 U	1.9 UJ	2.1 U
1.7	Heptachlor epoxide	1.9 UJ	2.0 U	1.9 UJ	2.1 U
17	Methoxychlor	19 UJ	20 U	19 UJ	21 U
33	PCB-1016	38 UJ	38 U	38 UJ	40 U
67	PCB-1221	77 UJ	77 U	77 UJ	81 U
33	PCB-1232	38 UJ	38 U	38 UJ	40 U
33	PCB-1242	38 UJ	38 U	38 UJ	40 U
33	PCB-1248	38 UJ	38 U	38 UJ	40 U
33	PCB-1254	38 UJ	38 U	38 UJ	40 U
33	PCB-1260	38 UJ	38 U	38 UJ	40 U
170	Toxaphene	190 UJ	200 U	190 UJ	210 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW7-0-0.5	WFFI-MW7-0.5-2
	Sample Date	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0
	Percent Solids	74.6	80.7
CRQL	**Pesticides/PCBs**		
1.7	Aldrin	2.3 U	2.1 U
1.7	alpha-BHC	2.3 U	2.1 U
1.7	beta-BHC	2.3 U	2.1 U
1.7	Chlordane (technical)	23 U	21 U
3.3	4,4'-DDD	**0.78 J**	4.1 U
3.3	4,4'-DDE	**11**	4.1 U
3.3	4,4'-DDT	**2.0 J**	4.1 U
1.7	delta-BHC	2.3 U	2.1 U
3.3	Dieldrin	4.4 U	4.1 U
1.7	Endosulfan I	2.3 U	2.1 U
3.3	Endosulfan II	4.4 U	4.1 U
3.3	Endosulfan sulfate	4.4 U	4.1 U
3.3	Endrin	4.4 U	4.1 U
3.3	Endrin aldehyde	4.4 U	4.1 U
3.3	Endrin ketone	4.4 U	4.1 U
1.7	gamma-BHC (Lindane)	2.3 U	2.1 U
1.7	Heptachlor	2.3 U	2.1 U
1.7	Heptachlor epoxide	2.3 U	2.1 U
17	Methoxychlor	23 U	21 U
33	PCB-1016	44 U	41 U
67	PCB-1221	90 U	83 U
33	PCB-1232	44 U	41 U
33	PCB-1242	44 U	41 U
33	PCB-1248	44 U	41 U
33	PCB-1254	44 U	41 U
33	PCB-1260	44 U	41 U
170	Toxaphene	230 U	210 U

Notes: B - Present in laboratory blank and/or field QC blank sample
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/Kg - Microgram per kilogram
Bold - Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3E
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS1	WFFI-SS1-D	WFFI-SS2	WFFI-SS3	WFFI-SS6
	Sample Date	2/20/2007	2/20/2007	2/20/2007	2/20/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	2.0	2.0	1.0	1.0	1.0
	Percent Solids	81.0	81.5	89.8	89.6	81.9
CRQL	**Pesticides Compounds**					
1.7	Aldrin	4.2 U	4.2 U	NA	NA	2.1 U
1.7	alpha-BHC	4.2 U	4.2 U	NA	NA	2.1 U
1.7	beta-BHC	4.2 U	4.2 U	NA	NA	2.1 U
1.7	Chlordane (technical)	42 U	42 U	NA	NA	21 U
3.3	4,4'-DDD	**12**	**12 J**	NA	NA	**6.2 J**
3.3	4,4'-DDE	**6.0 L**	**6.9 L**	NA	NA	**11 L**
3.3	4,4'-DDT	**37 L**	**30 L**	NA	NA	**43 L**
1.7	delta-BHC	4.2 U	4.2 U	NA	NA	2.1 U
3.3	Dieldrin	**5.7 J**	8.1 U	NA	NA	**3.9 J**
1.7	Endosulfan I	4.2 U	4.2 U	NA	NA	2.1 U
3.3	Endosulfan II	8.1 U	8.1 U	NA	NA	4.0 U
3.3	Endosulfan sulfate	8.1 UL	8.1 UL	NA	NA	4.0 UL
3.3	Endrin	8.1 U	8.1 U	NA	NA	4.0 U
3.3	Endrin aldehyde	8.1 U	8.1 U	NA	NA	4.0 U
3.3	Endrin ketone	8.1 U	8.1 U	NA	NA	4.0 U
1.7	gamma-BHC (Lindane)	4.2 U	4.2 U	NA	NA	2.1 U
1.7	Heptachlor	4.2 U	4.2 U	NA	NA	2.1 U
1.7	Heptachlor epoxide	4.2 U	4.2 U	NA	NA	2.1 U
17	Methoxychlor	42 U	42 U	NA	NA	21 U
33	PCB-1016	81 U	81 U	NA	NA	40 U
67	PCB-1221	170 U	160 U	NA	NA	82 U
33	PCB-1232	81 U	81 U	NA	NA	40 U
33	PCB-1242	81 U	81 U	NA	NA	40 U
33	PCB-1248	81 U	81 U	NA	NA	40 U
33	PCB-1254	81 U	81 U	NA	NA	40 U
33	PCB-1260	**290**	**290**	NA	NA	**190**
170	Toxaphene	420 U	420 U	NA	NA	210 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
NA	Not analyzed
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 1
DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW1-0-0.5	WFFI-MW1-0.5-2	WFFI-MW1-18-20	WFFI-MW3-4-6	WFFI-SS2-A
	Sample Date	2/21/2007	2/21/2007	2/21/2007	2/20/2007	2/21/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Percent Solids	85.8	84.5	88.0	84.3	90.5
CRQL	**Analyte**					
20	Aluminum	**8100**	**6100**	**4300**	**5600**	**5000**
6.0	Antimony	2.1 U	2.2 U	2.1 U	2.1 U	2.0 U
1.0	Arsenic	**3.5**	**2.1**	1.0 UL	1.1 UL	**2.0**
20	Barium	**66**	**23**	**19**	**16**	**18**
0.5	Beryllium	**0.44**	**0.21 J**	**0.10 J**	**0.18 J**	**0.17 J**
0.5	Cadmium	0.52 U	0.55 U	0.52 U	0.53 U	0.50 U
500	Calcium	**42000**	**490**	**160**	**3000**	**220**
1.0	Chromium	**11**	**6.4**	**5.6**	**6.9**	**5.6**
5.0	Cobalt	**2.4**	**1.2**	**0.46 J**	**0.79 J**	**1.2**
2.5	Copper	**4.8**	**2.1 J**	**2.1**	**1.9 J**	**1.8 J**
10	Iron	**6300**	**3600**	**1800**	**2500**	**3400**
1.0	Lead	**7.3**	**3.3**	**1.2 L**	**3.1**	**2.8**
500	Magnesium	**970**	**370**	**240**	**370**	**360**
1.5	Manganese	**320**	**66**	**23**	**23**	**60**
0.1	Mercury	**0.037 L**	**0.018 L**	0.022 UL	**0.010 JL**	**0.020 L**
4.0	Nickel	**4.9**	**2.5 J**	**1.3 J**	**2.2 B**	**2.7 J**
500	Potassium	**450**	**310**	**250**	**300**	**280**
3.5	Selenium	2.6 U	2.7 U	2.6 U	2.7 U	2.5 U
1.0	Silver	1.0 U	1.1 U	1.0 U	1.1 U	1.0 U
500	Sodium	**480**	**74 J**	**66 J**	**93 J**	**58 J**
2.5	Thallium	2.6 U	2.7 U	2.6 U	2.7 U	2.5 U
5.0	Vanadium	**14**	**7.9**	**4.9**	**6.9**	**7.8**
6.0	Zinc	**22**	**16**	**4.9**	**10**	**10**
2.5	Total Cyanide	0.57 U	0.57 U	0.55 U	0.59 U	0.53 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
mg/Kg	Milligram per kilogram
Bold	Reported value is above laboratory method detection limit

TABLE 2
DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS3-A	WFFI-SS8	WFFI-SD1	WFFI-SD2
	Sample Date	2/21/2007	2/22/2007	2/21/2007	2/21/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	90.2	87.7	76.6	81.3
CRQL	**Analyte**				
20	Aluminum	**6300**	**10000**	**3400**	**5500**
6.0	Antimony	2.0 U	2.1 U	2.5 U	2.4 U
1.0	Arsenic	**2.2**	**4.8**	**1.4 L**	**2.7**
20	Barium	**25**	**50**	**16**	**23**
0.5	Beryllium	**0.21 J**	**0.37 J**	**0.11 J**	**0.18 J**
0.5	Cadmium	**0.29 J**	0.52 U	0.62 U	0.59 U
500	Calcium	**320**	**750**	**200**	**650**
1.0	Chromium	**7.1**	**12**	**4.2**	**6.8**
5.0	Cobalt	**1.3**	**2.5**	**0.74 J**	**1.9**
2.5	Copper	**3.7**	**4.2**	**1.3 J**	**2.9**
10	Iron	**3900**	**7500**	**2600**	**4100**
1.0	Lead	**7.9**	**8.9**	**4.0**	**7.9**
500	Magnesium	**420**	**860**	**260**	**440**
1.5	Manganese	**70**	**130**	**44**	**95**
0.1	Mercury	**0.024 L**	**0.071 L**	**0.0093 L**	**0.044 L**
4.0	Nickel	**3.1 J**	**6.1**	**1.8 J**	**3.1 J**
500	Potassium	**320**	**520**	**220**	**320**
3.5	Selenium	2.5 U	2.6 U	3.1 U	3.0 U
1.0	Silver	1.0 U	1.0 U	1.2 U	1.2 U
500	Sodium	**63 J**	**71 J**	**71 J**	**60 J**
2.5	Thallium	2.5 U	2.6 U	3.1 U	3.0 U
5.0	Vanadium	**9.3**	**16**	**5.9**	**8.8**
6.0	Zinc	**72**	**34**	**9.6**	**20**
2.5	Total Cyanide	0.54 U	0.56 U	0.62 U	0.60 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
mg/kg	Milligram per kilogram
Bold	Reported value is above lab method detection limit

TABLE 3
DATA SUMMARY FORM: INORGANICS

WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SW1	WFFI-WW01	RINSATE 1	RINSATE 2
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/21/2007
	Location	WWTP#1	WWTP#1	QC	QC
	Dilution Factor	1.0	1.0	1.0	1.0
CRQL	**Analyte**				
200	Aluminum	**2500**	**240**	200 U	200 U
60	Antimony	20 U	20 U	20 U	20 U
10	Arsenic	10 UL	10 UL	10 UL	10 UL
200	Barium	**31**	**100**	10 U	10 U
5.0	Beryllium	4.0 U	4.0 U	4.0 U	4.0 U
5.0	Cadmium	5.0 U	5.0 U	5.0 U	5.0 U
5000	Calcium	**8800**	**27000**	**210 J**	**130 J**
10	Chromium	**2.9 B**	**5.1 B**	**3.4 B**	10 U
50	Cobalt	**3.5 J**	10 U	10 U	10 U
25	Copper	20 U	**4.4 J**	20 U	20 U
100	Iron	**7200**	**15000**	**2100**	50 UL
10.0	Lead	5.0 UL	**29**	5.0 UL	5.0 UL
5000	Magnesium	**1200**	**2800**	**12 J**	500 U
15	Manganese	**460**	**170**	**23**	10 U
0.2	Mercury	0.20 U	**0.13 B**	0.20 U	0.20 U
40	Nickel	40 U	40 U	**5.9 J**	40 U
5000	Potassium	**1600**	**10000**	1000 U	1000 U
35	Selenium	10 U	10 U	10 U	10 U
10	Silver	10 U	10 U	10 U	10 U
5000	Sodium	**6300**	**8800**	1000 U	1000 U
25	Thallium	25 U	25 U	25 U	25 U
50	Vanadium	**3.5 J**	**1.8 J**	10 U	10 U
60	Zinc	**18 B**	**98**	**4.9 B**	**4.4 B**
10	Total Cyanide	10 U	10 U	10 U	10 U

Notes:		
	B	Present in laboratory blank and/or field QC samples
	CRQL	Contract Required Quantitation Limit
	J	Estimated value
	K	Value is biased high based on QC data
	L	Value is biased low based on QC data
	U	Analyzed for but not detected at the reported value
	µg/L	Microgram per liter
	Bold	Reported value is above lab method detection limit

TABLE 1A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW1-0-0.5	WFFI-MW1-0.5-2	WFFI-MW1-18-20	WFFI-MW3-4-6
	Sample Date	2/21/2007	2/21/2007	2/21/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	85.8	84.5	88.0	84.3
CRQL	**Volatile Organic Compounds**				
10	Acetone	**370 J**	**190 J**	**32 J**	**170 J**
5.0	Benzene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Bromoform	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Bromomethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Carbon disulfide	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Carbon tetrachloride	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Chlorobenzene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Chlorodibromomethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Chloroethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Chloroform	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Chloromethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	cis-1,2-Dichloroethene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	cis-1,3-Dichloropropene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Dichlorobromomethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	1,1-Dichloroethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	1,2-Dichloroethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	1,1-Dichloroethene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	1,2-Dichloropropane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Ethylbenzene	4.9 U	4.8 U	5.1 U	4.8 U
10	2-Hexanone	24 U	24 U	25 U	24 U
5.0	Methylene Chloride	4.9 U	4.8 U	5.1 U	4.8 U
10	Methyl Ethyl Ketone	**23 J**	**14 J**	25 U	**46**
10	Methyl isobutyl ketone	**6.1 J**	24 U	**8.5 J**	24 U
5.0	Styrene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	1,1,2,2-Tetrachloroethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Tetrachloroethene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Toluene	**2.7 J**	4.8 U	5.1 U	**2.9 J**
5.0	trans-1,2-Dichloroethene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	trans-1,3-Dichloropropene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	1,1,1-Trichloroethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	1,1,2-Trichloroethane	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Trichloroethene	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Vinyl chloride	4.9 U	4.8 U	5.1 U	4.8 U
5.0	Xylenes, Total	9.7 U	9.7 U	10 U	**12**

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

TABLE 1B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS2-A	WFFI-SS3-A	WFFI-SS4	WFFI-SS8
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	NA	NA	91.3	87.7
CRQL	**Volatile Organic Compounds**				
10	Acetone	NA	NA	**80 J**	**140 J**
5.0	Benzene	NA	NA	5.2 UJ	5.0 U
5.0	Bromoform	NA	NA	5.2 U	5.0 U
5.0	Bromomethane	NA	NA	5.2 U	5.0 U
5.0	Carbon disulfide	NA	NA	5.2 U	5.0 U
5.0	Carbon tetrachloride	NA	NA	5.2 U	5.0 U
5.0	Chlorobenzene	NA	NA	5.2 U	5.0 U
5.0	Chlorodibromomethane	NA	NA	5.2 U	5.0 U
5.0	Chloroethane	NA	NA	5.2 U	5.0 U
5.0	Chloroform	NA	NA	5.2 U	5.0 U
5.0	Chloromethane	NA	NA	5.2 U	5.0 U
5.0	cis-1,2-Dichloroethene	NA	NA	5.2 U	5.0 U
5.0	cis-1,3-Dichloropropene	NA	NA	5.2 U	5.0 U
5.0	Dichlorobromomethane	NA	NA	5.2 U	5.0 U
5.0	1,1-Dichloroethane	NA	NA	5.2 U	5.0 U
5.0	1,2-Dichloroethane	NA	NA	5.2 U	5.0 U
5.0	1,1-Dichloroethene	NA	NA	5.2 UJ	5.0 U
5.0	1,2-Dichloropropane	NA	NA	5.2 U	5.0 U
5.0	Ethylbenzene	NA	NA	5.2 U	5.0 U
10	2-Hexanone	NA	NA	26 U	25 U
5.0	Methylene Chloride	NA	NA	5.2 U	5.0 U
10	Methyl Ethyl Ketone	NA	NA	**15 J**	**16 J**
10	Methyl isobutyl ketone	NA	NA	26 U	25 U
5.0	Styrene	NA	NA	5.2 U	5.0 U
5.0	1,1,2,2-Tetrachloroethane	NA	NA	5.2 U	5.0 U
5.0	Tetrachloroethene	NA	NA	5.2 U	5.0 U
5.0	Toluene	NA	NA	5.2 UJ	5.0 U
5.0	trans-1,2-Dichloroethene	NA	NA	5.2 U	5.0 U
5.0	trans-1,3-Dichloropropene	NA	NA	5.2 U	5.0 U
5.0	1,1,1-Trichloroethane	NA	NA	5.2 U	5.0 U
5.0	1,1,2-Trichloroethane	NA	NA	5.2 U	5.0 U
5.0	Trichloroethene	NA	NA	5.2 UJ	5.0 U
5.0	Vinyl chloride	NA	NA	5.2 U	5.0 U
5.0	Xylenes, Total	NA	NA	10 U	10 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
NA	Not analyzed
Bold	Reported value is above laboratory method detection limit

TABLE 1C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SEDIMENT SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SD1	WFFI-SD2
	Sample Date	2/21/2007	2/21/2007
	Location	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0
	Percent Solids	76.6	81.3
CRQL	**Volatile Organic Compounds**		
10	Acetone	**45 J**	**270 J**
5.0	Benzene	5.3 U	5.2 U
5.0	Bromoform	5.3 U	5.2 U
5.0	Bromomethane	5.3 U	5.2 U
5.0	Carbon disulfide	5.3 U	5.2 U
5.0	Carbon tetrachloride	5.3 U	5.2 U
5.0	Chlorobenzene	5.3 U	5.2 U
5.0	Chlorodibromomethane	5.3 U	5.2 U
5.0	Chloroethane	5.3 U	5.2 U
5.0	Chloroform	5.3 U	5.2 U
5.0	Chloromethane	5.3 U	5.2 U
5.0	cis-1,2-Dichloroethene	5.3 U	5.2 U
5.0	cis-1,3-Dichloropropene	5.3 U	5.2 U
5.0	Dichlorobromomethane	5.3 U	5.2 U
5.0	1,1-Dichloroethane	5.3 U	5.2 U
5.0	1,2-Dichloroethane	5.3 U	5.2 U
5.0	1,1-Dichloroethene	5.3 U	5.2 U
5.0	1,2-Dichloropropane	5.3 U	5.2 U
5.0	Ethylbenzene	5.3 U	5.2 U
10	2-Hexanone	26 U	26 U
5.0	Methylene Chloride	5.3 U	5.2 U
10	Methyl Ethyl Ketone	26 U	**18 J**
10	Methyl isobutyl ketone	26 U	26 U
5.0	Styrene	5.3 U	5.2 U
5.0	1,1,2,2-Tetrachloroethane	5.3 U	5.2 U
5.0	Tetrachloroethene	5.3 U	5.2 U
5.0	Toluene	5.3 U	5.2 U
5.0	trans-1,2-Dichloroethene	5.3 U	5.2 U
5.0	trans-1,3-Dichloropropene	5.3 U	5.2 U
5.0	1,1,1-Trichloroethane	5.3 U	5.2 U
5.0	1,1,2-Trichloroethane	5.3 U	5.2 U
5.0	Trichloroethene	5.3 U	5.2 U
5.0	Vinyl chloride	5.3 U	5.2 U
5.0	Xylenes, Total	11 U	10 U

Notes: B - Present in laboratory blank and/or field QC blanks
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/Kg - Microgram per kilogram
Bold - Reported value is above lab method detection limit

TABLE 1D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SW1	WFFI-WW01	RINSATE 1	RINSATE 2	TB-3
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/21/2007	2/22/2007
	Location	WWTP#1	WWTP#1	Field QC	Field QC	Field QC
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
CRQL	**Volatile Organic Compounds**					
25	Acetone	25 U	**8.9 J**	25 U	25 U	25 U
1.0	Benzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Bromoform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2.0	Carbon disulfide	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1.0	Carbon tetrachloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chlorodibromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloromethane	**0.53 J**	1.0 U	1.0 U	1.0 U	1.0 U
1.0	cis-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	cis-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Dichlorobromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
10	2-Hexanone	10 U	10 U	10 U	10 U	10 U
5.0	Methylene Chloride	5.0 U	5.0 U	5.0 U	5.0 U	**0.45 J**
10	Methyl Ethyl Ketone	10 U	**3.8 J**	10 U	10 U	10 U
10	Methyl isobutyl ketone	10 U	10 U	10 U	**7.3 J**	10 U
1.0	Styrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Toluene	1.0 U	1.0 U	**5.1**	**5.0**	1.0 U
1.0	trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	trans-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Vinyl chloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2.0	Xylenes, Total	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
Bold	Reported value is above laboratory method detection limit

TABLE 2A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW1-0-0.5	WFFI-MW1-0.5-2	WFFI-MW1-18-20	WFFI-MW3-4-6
	Sample Date	2/21/2007	2/21/2007	2/21/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	85.8	84.5	88.0	84.3
CRQL	**Semivolatile Organic Compounds**				
330	Acenaphthene	380 U	390 U	370 U	390 U
330	Acenaphthylene	380 U	390 U	370 U	390 U
330	Anthracene	380 U	390 U	370 U	390 U
330	Benzo[a]anthracene	380 U	390 U	370 U	390 U
330	Benzo[a]pyrene	380 U	390 U	370 U	390 U
330	Benzo[b]fluoranthene	380 U	390 U	370 U	390 U
330	Benzo[g,h,i]perylene	380 U	390 U	370 U	390 U
330	Benzo[k]fluoranthene	380 U	390 U	370 U	390 U
330	Bis(2-chloroethoxy)methane	380 U	390 U	370 U	390 U
330	Bis(2-chloroethyl)ether	380 U	390 U	370 U	390 U
330	bis(chloroisopropyl) ether	380 U	390 U	370 U	390 U
330	Bis(2-ethylhexyl) phthalate	380 U	390 U	370 U	390 U
330	4-Bromophenyl phenyl ethe	380 U	390 U	370 U	390 U
330	Butyl benzyl phthalate	380 U	390 U	370 U	390 U
330	Carbazole	380 U	390 U	370 U	390 U
660	4-Chloroaniline	770 U	780 U	750 U	780 U
330	4-Chloro-3-methylphenol	380 U	390 U	370 U	390 U
330	2-Chloronaphthalene	380 U	390 U	370 U	390 U
330	2-Chlorophenol	380 U	390 U	370 U	390 U
330	4-Chlorophenyl phenyl ethe	380 U	390 U	370 U	390 U
330	Chrysene	380 U	390 U	370 U	390 U
330	Dibenz(a,h)anthracene	380 U	390 U	370 U	390 U
330	Dibenzofuran	380 U	390 U	370 U	390 U
330	1,3-Dichlorobenzene	380 U	390 U	370 U	390 U
330	1,4-Dichlorobenzene	380 U	390 U	370 U	390 U
330	1,2-Dichlorobenzene	380 U	390 U	370 U	390 U
660	3,3'-Dichlorobenzidine	770 U	780 U	750 U	780 U
330	2,4-Dichlorophenol	2000 U	390 U	370 U	390 U
330	Diethyl phthalate	380 U	390 U	370 U	390 U
330	2,4-Dimethylphenol	380 U	390 U	370 U	390 U
330	Dimethyl phthalate	380 U	390 U	370 U	390 U
330	Di-n-butyl phthalate	380 U	390 U	370 U	390 U
1700	4,6-Dinitro-2-methylphenol	2000 U	2000 U	1900 U	2000 U
1700	2,4-Dinitrophenol	2000 U	2000 U	1900 U	2000 U
330	2,4-Dinitrotoluene	380 U	390 U	370 U	390 U
330	2,6-Dinitrotoluene	380 U	390 U	370 U	390 U
330	Di-n-octyl phthalate	380 U	390 U	370 U	390 U
330	Fluoranthene	380 U	390 U	370 U	390 U

TABLE 2A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW1-0-0.5	WFFI-MW1-0.5-2	WFFI-MW1-18-20	WFFI-MW3-4-6
	Sample Date	2/21/2007	2/21/2007	2/21/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	85.8	84.5	88.0	84.3
CRQL	**Semivolatile Organic Compounds**				
330	Fluorene	380 U	390 U	370 U	390 U
330	Hexachlorobenzene	380 U	390 U	370 U	390 U
330	Hexachlorobutadiene	380 U	390 U	370 U	390 U
330	Hexachlorocyclopentadiene	380 U	390 U	370 U	390 U
330	Hexachloroethane	380 U	390 U	370 U	390 U
330	Indeno[1,2,3-cd]pyrene	380 U	390 U	370 U	390 U
330	Isophorone	380 U	390 U	370 U	390 U
330	2-Methylnaphthalene	380 U	390 U	370 U	390 U
330	2-Methylphenol	380 U	390 U	370 U	390 U
330	3 & 4 Methylphenol	380 U	390 U	370 U	390 U
330	Naphthalene	380 U	390 U	370 U	390 U
1700	2-Nitroaniline	2000 U	2000 U	1900 U	2000 U
1700	3-Nitroaniline	2000 U	2000 U	1900 U	2000 U
1700	4-Nitroaniline	2000 U	2000 U	1900 U	2000 U
330	Nitrobenzene	380 U	390 U	370 U	390 U
330	2-Nitrophenol	380 U	390 U	370 U	390 U
1700	4-Nitrophenol	2000 U	2000 U	1900 U	2000 U
330	N-Nitrosodi-n-propylamine	380 U	390 U	370 U	390 U
330	N-Nitrosodiphenylamine	380 U	390 U	370 U	390 U
1700	Pentachlorophenol	2000 U	2000 U	1900 U	2000 U
330	Phenanthrene	380 U	390 U	370 U	390 U
330	Phenol	380 U	390 U	370 U	390 U
330	Pyrene	380 U	390 U	370 U	390 U
330	1,2,4-Trichlorobenzene	380 U	390 U	370 U	390 U
330	2,4,6-Trichlorophenol	380 U	390 U	370 U	390 U
330	2,4,5-Trichlorophenol	380 U	390 U	370 U	390 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS2-A	WFFI-SS3-A	WFFI-SS4	WFFI-SS8
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	90.5	90.2	NA	87.7
CRQL	**Semivolatile Organic Compounds**				
330	Acenaphthene	360 U	370 U	NA	380 UL
330	Acenaphthylene	360 U	370 U	NA	380 UL
330	Anthracene	360 U	370 U	NA	380 UL
330	Benzo[a]anthracene	360 U	370 U	NA	380 UL
330	Benzo[a]pyrene	360 U	370 U	NA	380 UL
330	Benzo[b]fluoranthene	360 U	370 U	NA	380 UL
330	Benzo[g,h,i]perylene	360 U	370 U	NA	380 UL
330	Benzo[k]fluoranthene	360 U	370 U	NA	380 UL
330	Bis(2-chloroethoxy)methan	360 U	370 U	NA	380 UL
330	Bis(2-chloroethyl)ether	360 U	370 U	NA	380 UL
330	bis(chloroisopropyl) ether	360 U	370 U	NA	380 UL
330	Bis(2-ethylhexyl) phthalate	360 U	370 U	NA	380 UL
330	4-Bromophenyl phenyl eth	360 U	370 U	NA	380 UL
330	Butyl benzyl phthalate	360 U	370 U	NA	380 UL
330	Carbazole	360 U	370 U	NA	380 UL
660	4-Chloroaniline	730 U	730 U	NA	750 UL
330	4-Chloro-3-methylphenol	360 U	370 U	NA	380 UL
330	2-Chloronaphthalene	360 U	370 U	NA	380 UL
330	2-Chlorophenol	360 U	370 U	NA	380 UL
330	4-Chlorophenyl phenyl eth	360 U	370 U	NA	380 UL
330	Chrysene	360 U	370 U	NA	380 UL
330	Dibenz(a,h)anthracene	360 U	370 U	NA	380 UL
330	Dibenzofuran	360 U	370 U	NA	380 UL
330	1,3-Dichlorobenzene	360 U	370 U	NA	380 UL
330	1,4-Dichlorobenzene	360 U	370 U	NA	380 UL
330	1,2-Dichlorobenzene	360 U	370 U	NA	380 UL
660	3,3'-Dichlorobenzidine	730 U	730 U	NA	750 UL
330	2,4-Dichlorophenol	360 U	370 U	NA	380 UL
330	Diethyl phthalate	360 U	370 U	NA	380 UL
330	2,4-Dimethylphenol	360 U	370 U	NA	380 UL
330	Dimethyl phthalate	360 U	370 U	NA	380 UL
330	Di-n-butyl phthalate	360 U	370 U	NA	380 UL
1700	4,6-Dinitro-2-methylpheno	1900 U	1900 U	NA	1900 UL
1700	2,4-Dinitrophenol	1900 U	1900 U	NA	1900 UL
330	2,4-Dinitrotoluene	360 U	370 U	NA	380 UL
330	2,6-Dinitrotoluene	360 U	370 U	NA	380 UL
330	Di-n-octyl phthalate	360 U	370 U	NA	380 UL
330	Fluoranthene	360 U	370 U	NA	380 UL

TABLE 2B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS2-A	WFFI-SS3-A	WFFI-SS4	WFFI-SS8
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	90.5	90.2	NA	87.7
CRQL	**Semivolatile Organic Compounds**				
330	Fluorene	360 U	370 U	NA	380 UL
330	Hexachlorobenzene	360 U	370 U	NA	380 UL
330	Hexachlorobutadiene	360 U	370 U	NA	380 UL
330	Hexachlorocyclopentadien	360 U	370 U	NA	380 UL
330	Hexachloroethane	360 U	370 U	NA	380 UL
330	Indeno[1,2,3-cd]pyrene	360 U	370 U	NA	380 UL
330	Isophorone	360 U	370 U	NA	380 UL
330	2-Methylnaphthalene	360 U	370 U	NA	380 UL
330	2-Methylphenol	360 U	370 U	NA	380 UL
330	3 & 4 Methylphenol	360 U	370 U	NA	380 UL
330	Naphthalene	360 U	370 U	NA	380 UL
1700	2-Nitroaniline	1900 U	1900 U	NA	1900 UL
1700	3-Nitroaniline	1900 U	1900 U	NA	1900 UL
1700	4-Nitroaniline	1900 U	1900 U	NA	1900 UL
330	Nitrobenzene	360 U	370 U	NA	380 UL
330	2-Nitrophenol	360 U	370 U	NA	380 UL
1700	4-Nitrophenol	1900 U	1900 U	NA	1900 UL
330	N-Nitrosodi-n-propylamine	360 U	370 U	NA	380 UL
330	N-Nitrosodiphenylamine	360 U	370 U	NA	380 UL
1700	Pentachlorophenol	1900 U	1900 U	NA	1900 UL
330	Phenanthrene	360 U	370 U	NA	380 UL
330	Phenol	360 U	370 U	NA	380 UL
330	Pyrene	360 U	370 U	NA	380 UL
330	1,2,4-Trichlorobenzene	360 U	370 U	NA	380 UL
330	2,4,6-Trichlorophenol	360 U	370 U	NA	380 UL
330	2,4,5-Trichlorophenol	360 U	370 U	NA	380 UL

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
NA	Not analyzed
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SEDIMENT SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SD1	WFFI-SD2
	Sample Date	2/21/2007	2/21/2007
	Location	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0
	Percent Solids	76.6	81.3
CRQL	**Semivolatile Organic Compounds**		
330	Acenaphthene	430 U	410 U
330	Acenaphthylene	430 U	410 U
330	Anthracene	430 U	410 U
330	Benzo[a]anthracene	430 U	410 U
330	Benzo[a]pyrene	430 U	410 U
330	Benzo[b]fluoranthene	430 U	410 U
330	Benzo[g,h,i]perylene	430 U	410 U
330	Benzo[k]fluoranthene	430 U	410 U
330	Bis(2-chloroethoxy)methan	430 U	410 U
330	Bis(2-chloroethyl)ether	430 U	410 U
330	bis(chloroisopropyl) ether	430 U	410 U
330	Bis(2-ethylhexyl) phthalate	430 U	410 U
330	4-Bromophenyl phenyl ethe	430 U	410 U
330	Butyl benzyl phthalate	430 U	410 U
330	Carbazole	430 U	410 U
660	4-Chloroaniline	860 U	810 U
330	4-Chloro-3-methylphenol	430 U	410 U
330	2-Chloronaphthalene	430 U	410 U
330	2-Chlorophenol	430 U	410 U
330	4-Chlorophenyl phenyl ethe	430 U	410 U
330	Chrysene	430 U	410 U
330	Dibenz(a,h)anthracene	430 U	410 U
330	Dibenzofuran	430 U	410 U
330	1,3-Dichlorobenzene	430 U	410 U
330	1,4-Dichlorobenzene	430 U	410 U
330	1,2-Dichlorobenzene	430 U	410 U
660	3,3'-Dichlorobenzidine	860 U	810 U
330	2,4-Dichlorophenol	430 U	410 U
330	Diethyl phthalate	430 U	410 U
330	2,4-Dimethylphenol	430 U	410 U
330	Dimethyl phthalate	430 U	410 U
330	Di-n-butyl phthalate	430 U	410 U
1700	4,6-Dinitro-2-methylphenol	2200 U	2100 U
1700	2,4-Dinitrophenol	2200 U	2100 U
330	2,4-Dinitrotoluene	430 U	410 U
330	2,6-Dinitrotoluene	430 U	410 U
330	Di-n-octyl phthalate	430 U	410 U
330	Fluoranthene	430 U	410 U

TABLE 2C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SEDIMENT SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SD1	WFFI-SD2
	Sample Date	2/21/2007	2/21/2007
	Location	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0
	Percent Solids	76.6	81.3
CRQL	**Semivolatile Organic Compounds**		
330	Fluorene	430 U	410 U
330	Hexachlorobenzene	430 U	410 U
330	Hexachlorobutadiene	430 U	410 U
330	Hexachlorocyclopentadien	430 U	410 U
330	Hexachloroethane	430 U	410 U
330	Indeno[1,2,3-cd]pyrene	430 U	410 U
330	Isophorone	430 U	410 U
330	2-Methylnaphthalene	430 U	410 U
330	2-Methylphenol	430 U	410 U
330	3 & 4 Methylphenol	430 U	410 U
330	Naphthalene	430 U	410 U
1700	2-Nitroaniline	2200 U	2100 U
1700	3-Nitroaniline	2200 U	2100 U
1700	4-Nitroaniline	2200 U	2100 U
330	Nitrobenzene	430 U	410 U
330	2-Nitrophenol	430 U	410 U
1700	4-Nitrophenol	2200 U	2100 U
330	N-Nitrosodi-n-propylamine	430 U	410 U
330	N-Nitrosodiphenylamine	430 U	410 U
1700	Pentachlorophenol	2200 U	2100 U
330	Phenanthrene	430 U	410 U
330	Phenol	430 U	410 U
330	Pyrene	430 U	410 U
330	1,2,4-Trichlorobenzene	430 U	410 U
330	2,4,6-Trichlorophenol	430 U	410 U
330	2,4,5-Trichlorophenol	430 U	410 U

Notes: B - Present in laboratory blank and/or field QC blanks
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/Kg - Microgram per kilogram
Bold - Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SW1	WFFI-WW01	RINSATE 1	RINSATE 2
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/21/2007
	Location	WWTP#1	WWTP#1	Field QC	Field QC
	Dilution Factor	1.0	1.0	1.0	1.0
	Sample Volume (ml)	1060	1020	1060	1020
CRQL	**Semivolatile Organic Compounds**				
10	Acenaphthene	9.4 U	9.8 U	9.4 U	9.8 U
10	Acenaphthylene	9.4 U	9.8 U	9.4 U	9.8 U
10	Anthracene	9.4 U	9.8 U	9.4 U	9.8 U
10	Benzo[a]anthracene	9.4 U	9.8 U	9.4 U	9.8 U
10	Benzo[a]pyrene	9.4 U	9.8 U	9.4 U	9.8 U
10	Benzo[b]fluoranthene	9.4 U	9.8 U	9.4 U	9.8 U
10	Benzo[g,h,i]perylene	9.4 U	9.8 U	9.4 U	9.8 U
10	Benzo[k]fluoranthene	9.4 U	9.8 U	9.4 U	9.8 U
10	Bis(2-chloroethoxy)methane	9.4 U	9.8 U	9.4 U	9.8 U
10	Bis(2-chloroethyl)ether	9.4 U	9.8 U	9.4 U	9.8 U
10	bis(chloroisopropyl) ether	9.4 U	9.8 U	9.4 U	9.8 U
10	Bis(2-ethylhexyl) phthalate	9.4 U	9.8 U	9.4 U	9.8 U
10	4-Bromophenyl phenyl ether	9.4 U	9.8 U	9.4 U	9.8 U
10	Butyl benzyl phthalate	9.4 U	9.8 U	9.4 U	9.8 U
10	Carbazole	9.4 U	9.8 U	9.4 U	9.8 U
20	4-Chloroaniline	19 U	20 U	19 U	20 U
10	4-Chloro-3-methylphenol	9.4 U	9.8 U	9.4 U	9.8 U
10	2-Chloronaphthalene	9.4 U	9.8 U	9.4 U	9.8 U
10	2-Chlorophenol	9.4 U	9.8 U	9.4 U	9.8 U
10	4-Chlorophenyl phenyl ether	9.4 U	9.8 U	9.4 U	9.8 U
10	Chrysene	9.4 U	9.8 U	9.4 U	9.8 U
10	Dibenz(a,h)anthracene	9.4 U	9.8 U	9.4 U	9.8 U
10	Dibenzofuran	9.4 U	9.8 U	9.4 U	9.8 U
10	1,3-Dichlorobenzene	9.4 U	9.8 U	9.4 U	9.8 U
10	1,4-Dichlorobenzene	9.4 U	9.8 U	9.4 U	9.8 U
10	1,2-Dichlorobenzene	9.4 U	9.8 U	9.4 U	9.8 U
20	3,3'-Dichlorobenzidine	19 U	20 U	19 U	20 U
10	2,4-Dichlorophenol	9.4 U	9.8 U	9.4 U	9.8 U
10	Diethyl phthalate	9.4 U	9.8 U	9.4 U	9.8 U
10	2,4-Dimethylphenol	9.4 U	9.8 U	9.4 U	9.8 U
10	Dimethyl phthalate	9.4 U	9.8 U	9.4 U	9.8 U
10	Di-n-butyl phthalate	9.4 U	9.8 U	9.4 U	9.8 U
50	4,6-Dinitro-2-methylphenol	47 U	49 U	47 U	49 U
50	2,4-Dinitrophenol	47 U	49 U	47 U	49 U
10	2,4-Dinitrotoluene	9.4 U	9.8 U	9.4 U	9.8 U
10	2,6-Dinitrotoluene	9.4 U	9.8 U	9.4 U	9.8 U
10	Di-n-octyl phthalate	9.4 U	9.8 U	9.4 U	9.8 U
10	Fluoranthene	9.4 U	**1.5 J**	9.4 U	9.8 U
10	Fluorene	9.4 U	9.8 U	9.4 U	9.8 U

TABLE 2D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SW1	WFFI-WW01	RINSATE 1	RINSATE 2
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/21/2007
	Location	WWTP#1	WWTP#1	Field QC	Field QC
	Dilution Factor	1.0	1.0	1.0	1.0
	Sample Volume (ml)	1060	1020	1060	1020
CRQL	**Semivolatile Organic Compounds**				
10	Hexachlorobenzene	9.4 U	9.8 U	9.4 U	9.8 U
10	Hexachlorobutadiene	9.4 U	9.8 U	9.4 U	9.8 U
10	Hexachlorocyclopentadiene	9.4 U	9.8 U	9.4 U	9.8 U
10	Hexachloroethane	9.4 U	9.8 U	9.4 U	9.8 U
10	Indeno[1,2,3-cd]pyrene	9.4 U	9.8 U	9.4 U	9.8 U
10	Isophorone	9.4 U	9.8 U	9.4 U	9.8 U
10	2-Methylnaphthalene	9.4 U	9.8 U	9.4 U	9.8 U
10	2-Methylphenol	9.4 U	9.8 U	9.4 U	9.8 U
10	3 & 4 Methylphenol	9.4 U	9.8 U	9.4 U	9.8 U
10	Naphthalene	9.4 U	9.8 U	9.4 U	9.8 U
50	2-Nitroaniline	47 U	49 U	47 U	49 U
50	3-Nitroaniline	47 U	49 U	47 U	49 U
50	4-Nitroaniline	47 U	49 U	47 U	49 U
10	Nitrobenzene	9.4 U	9.8 U	9.4 U	9.8 U
50	2-Nitrophenol	9.4 U	9.8 U	9.4 U	9.8 U
50	4-Nitrophenol	47 U	49 U	47 U	49 U
10	N-Nitrosodi-n-propylamine	9.4 U	9.8 U	9.4 U	9.8 U
10	N-Nitrosodiphenylamine	9.4 U	9.8 U	9.4 U	9.8 U
50	Pentachlorophenol	47 U	49 U	47 U	49 U
10	Phenanthrene	9.4 U	**0.91 J**	9.4 U	9.8 U
10	Phenol	9.4 U	9.8 U	9.4 U	9.8 U
10	Pyrene	9.4 U	**1.2 J**	9.4 U	9.8 U
10	1,2,4-Trichlorobenzene	9.4 U	9.8 U	9.4 U	9.8 U
10	2,4,6-Trichlorophenol	9.4 U	9.8 U	9.4 U	9.8 U
10	2,4,5-Trichlorophenol	9.4 U	9.8 U	9.4 U	9.8 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
ml	Milliliter
NA	Not analyzed
Bold	Reported value is above laboratory method detection limit

Sample CRQL = Non-adjusted CRQL (1000ml ÷ sample volume)

TABLE 3A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW1-0-0.5	WFFI-MW1-0.5-2	WFFI-MW1-18-20	WFFI-MW3-4-6
	Sample Date	2/21/2007	2/21/2007	2/21/2007	2/20/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	85.8	84.5	88.0	84.3
CRQL	**Pesticide Compounds**				
1.7	Aldrin	2.0 U	2.0 U	1.9 U	2.0 U
1.7	alpha-BHC	2.0 U	2.0 U	1.9 U	2.0 U
1.7	beta-BHC	2.0 U	2.0 U	1.9 U	2.0 U
1.7	Chlordane (technical)	20 U	20 U	19 U	20 U
3.3	4,4'-DDD	3.8 U	3.9 U	3.7 U	3.9 U
3.3	4,4'-DDE	**2.4 J**	3.9 U	3.7 U	3.9 U
3.3	4,4'-DDT	3.8 U	3.9 U	3.7 U	3.9 U
1.7	delta-BHC	2.0 U	2.0 U	1.9 U	2.0 U
3.3	Dieldrin	3.8 U	3.9 U	3.7 U	3.9 U
1.7	Endosulfan I	2.0 U	2.0 U	1.9 U	2.0 U
3.3	Endosulfan II	3.8 U	3.9 U	3.7 U	3.9 U
3.3	Endosulfan sulfate	3.8 U	3.9 U	3.7 U	3.9 U
3.3	Endrin	3.8 U	3.9 U	3.7 U	3.9 U
3.3	Endrin aldehyde	3.8 U	3.9 U	3.7 U	3.9 U
3.3	Endrin ketone	3.8 U	3.9 U	3.7 U	3.9 U
1.7	gamma-BHC (Lindane)	2.0 U	2.0 U	1.9 U	2.0 U
1.7	Heptachlor	2.0 U	2.0 U	1.9 U	2.0 U
1.7	Heptachlor epoxide	2.0 U	2.0 U	1.9 U	2.0 U
17	Methoxychlor	20 U	20 U	19 U	20 U
33	PCB-1016	38 U	39 U	37 U	39 U
67	PCB-1221	78 U	78 U	75 U	79 U
33	PCB-1232	38 U	39 U	37 U	39 U
33	PCB-1242	38 U	39 U	37 U	39 U
33	PCB-1248	38 U	39 U	37 U	39 U
33	PCB-1254	38 U	39 U	37 U	39 U
33	PCB-1260	38 U	39 U	37 U	39 U
170	Toxaphene	200 U	200 U	190 U	200 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS2-A	WFFI-SS3-A	WFFI-SS4	WFFI-SS8
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	90.5	90.2	NA	87.7
CRQL	**Pesticides Compounds**				
1.7	Aldrin	1.9 U	1.9 U	NA	1.9 U
1.7	alpha-BHC	1.9 U	1.9 U	NA	1.9 U
1.7	beta-BHC	1.9 U	1.9 U	NA	1.9 U
1.7	Chlordane (technical)	19 U	19 U	NA	19 U
3.3	4,4'-DDD	3.6 U	3.6 U	NA	3.7 U
3.3	4,4'-DDE	3.6 U	3.6 U	NA	3.7 U
3.3	4,4'-DDT	3.6 U	3.6 U	NA	3.7 U
1.7	delta-BHC	1.9 U	1.9 U	NA	1.9 U
3.3	Dieldrin	3.6 U	3.6 U	NA	3.7 U
1.7	Endosulfan I	1.9 U	1.9 U	NA	1.9 U
3.3	Endosulfan II	3.6 U	3.6 U	NA	3.7 U
3.3	Endosulfan sulfate	3.6 U	3.6 U	NA	3.7 U
3.3	Endrin	3.6 U	3.6 U	NA	3.7 U
3.3	Endrin aldehyde	3.6 U	3.6 U	NA	3.7 U
3.3	Endrin ketone	3.6 U	3.6 U	NA	3.7 U
1.7	gamma-BHC (Lindane)	1.9 U	1.9 U	NA	1.9 U
1.7	Heptachlor	1.9 U	1.9 U	NA	1.9 U
1.7	Heptachlor epoxide	1.9 U	1.9 U	NA	1.9 U
17	Methoxychlor	19 U	19 U	NA	19 U
33	PCB-1016	36 U	36 U	NA	37 U
67	PCB-1221	74 U	74 U	NA	75 U
33	PCB-1232	36 U	36 U	NA	37 U
33	PCB-1242	36 U	36 U	NA	37 U
33	PCB-1248	36 U	36 U	NA	37 U
33	PCB-1254	36 U	36 U	NA	37 U
33	PCB-1260	36 U	36 U	NA	37 U
170	Toxaphene	190 U	190 U	NA	190 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
NA	Not analyzed
Bold	Reported valaue is above laboratory method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SEDIMENT SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SD1	WFFI-SD2
	Sample Date	2/21/2007	2/21/2007
	Location	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0
	Percent Solids	76.6	81.3
CRQL	**Pesticides/PCBs**		
1.7	Aldrin	2.2 U	2.1 U
1.7	alpha-BHC	2.2 U	2.1 U
1.7	beta-BHC	2.2 U	2.1 U
1.7	Chlordane (technical)	22 U	21 U
3.3	4,4'-DDD	4.3 U	**2.7 J**
3.3	4,4'-DDE	**1.8 J**	**2.6 J**
3.3	4,4'-DDT	**0.77 J**	**1.6 J**
1.7	delta-BHC	2.2 U	2.1 U
3.3	Dieldrin	4.3 U	4.0 U
1.7	Endosulfan I	2.2 U	2.1 U
3.3	Endosulfan II	4.3 U	4.0 U
3.3	Endosulfan sulfate	4.3 U	4.0 U
3.3	Endrin	4.3 U	4.0 U
3.3	Endrin aldehyde	4.3 U	4.0 U
3.3	Endrin ketone	4.3 U	4.0 U
1.7	gamma-BHC (Lindane)	2.2 U	2.1 U
1.7	Heptachlor	2.2 U	2.1 U
1.7	Heptachlor epoxide	2.2 U	2.1 U
17	Methoxychlor	22 U	21 U
33	PCB-1016	43 U	40 U
67	PCB-1221	87 U	81 U
33	PCB-1232	43 U	40 U
33	PCB-1242	43 U	40 U
33	PCB-1248	43 U	40 U
33	PCB-1254	43 U	40 U
33	PCB-1260	43 U	40 U
170	Toxaphene	220 U	210 U

Notes: B - Present in laboratory blank and/or field QC blanks
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/Kg - Microgram per kilogram
Bold - Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SW1	WFFI-WW01	RINSATE 1	RINSATE 2
	Sample Date	2/21/2007	2/21/2007	2/20/2007	2/21/2007
	Location	WWTP#1	WWTP#1	Field QC	Field QC
	Dilution Factor	1.0	1.0	1.0	1.0
	Sample Volume (ml)	1040	1020	1020	1060
CRQL	**Pesticides Compounds**				
0.050	Aldrin	0.048 U	0.049 UJ	0.049 U	0.047 U
0.050	alpha-BHC	0.048 U	0.049 UJ	0.049 U	0.047 U
0.050	beta-BHC	0.048 U	0.049 UJ	0.049 U	0.047 U
0.50	Chlordane (technical)	0.48 U	0.49 UJ	0.49 U	0.47 U
0.10	4,4'-DDD	0.096 U	0.098 UJ	0.098 U	0.094 U
0.10	4,4'-DDE	0.096 U	0.098 UJ	0.098 U	0.094 U
0.10	4,4'-DDT	0.096 U	0.098 UJ	0.098 U	0.094 U
0.50	delta-BHC	0.048 U	0.049 UJ	0.049 U	0.047 U
0.10	Dieldrin	0.096 U	0.098 UJ	0.098 U	0.094 U
0.050	Endosulfan I	0.048 U	0.049 UJ	0.049 U	0.047 U
0.10	Endosulfan II	0.096 U	0.098 UJ	0.098 U	0.094 U
0.10	Endosulfan sulfate	0.096 U	0.098 UJ	0.098 U	0.094 U
0.10	Endrin	0.096 U	0.098 UJ	0.098 U	0.094 U
0.10	Endrin aldehyde	0.096 U	0.098 UJ	0.098 U	0.094 U
0.10	Endrin ketone	0.096 U	0.098 UJ	0.098 U	0.094 U
0.050	gamma-BHC (Lindane)	0.048 U	0.049 UJ	0.049 U	0.047 U
0.050	Heptachlor	0.048 U	0.049 UJ	0.049 U	0.047 U
0.050	Heptachlor epoxide	0.048 U	0.049 UJ	0.049 U	0.047 U
0.50	Methoxychlor	0.48 U	0.49 UJ	0.49 U	0.47 U
1.0	PCB-1016	0.96 U	0.98 UJ	0.98 U	0.94 U
2.0	PCB-1221	1.9 U	2.0 UJ	2.0 U	1.9 U
1.0	PCB-1232	0.96 U	0.98 UJ	0.98 U	0.94 U
1.0	PCB-1242	0.96 U	0.98 UJ	0.98 U	0.94 U
1.0	PCB-1248	0.96 U	0.98 UJ	0.98 U	0.94 U
1.0	PCB-1254	0.96 U	0.98 UJ	0.98 U	0.94 U
1.0	PCB-1260	0.96 U	0.98 UJ	0.98 U	0.94 U
5.0	Toxaphene	4.8 U	4.9 UJ	4.9 U	4.7 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Micrograms per liter
ml	Milliliter
NA	Not analyzed
Bold	Reported concentrations above laboratory detection limit

* Sample CRQL = Non-adjusted CRQL (1000ml ÷ Sample Volume)

TABLE 1
DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS4-A	WFFI-SS5	WFFI-SS5-D	WFFI-SS7	WFFI-SS9
	Sample Date	2/23/2007	2/23/2007	2/23/2007	2/23/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Percent Solids	91.7	84.4	85.4	85.8	76.1
CRQL	**Analyte**					
20	Aluminum	**4700**	**9700**	**13000**	**10000**	**4600**
6.0	Antimony	2.0 U	2.2 U	2.3 U	**2.2 U**	2.5 U
1.0	Arsenic	**2.1**	**4.4**	**4.7**	**4.2**	**2.3**
20	Barium	**19**	**45**	**52**	**45**	**13**
0.5	Beryllium	**0.18 J**	**0.35 J**	**0.41 J**	**0.34 J**	**0.16 J**
0.5	Cadmium	0.49 U	0.55 U	0.56 U	0.55 U	0.62 U
500	Calcium	**190 B**	**910**	**750**	**900**	**170**
1.0	Chromium	**4.7**	**10**	**13**	**11**	**5.1**
5.0	Cobalt	**1.0**	**2.6**	**3.3**	**2.8**	**0.63 J**
2.5	Copper	**1.4 J**	**3.8**	**4.5**	**4.0**	**1.9 J**
10	Iron	**3100**	**8300**	**10000**	**8400**	**2800**
1.0	Lead	**2.6**	**7.5**	**8.1**	**8.0**	**2.2**
500	Magnesium	**320**	**810**	**1000**	**850**	**330**
1.5	Manganese	**42**	**140**	**180**	**150**	**15**
0.1	Mercury	**0.0096 J**	**0.044**	**0.047**	**0.043**	**0.040**
4.0	Nickel	**2.4 J**	**6.3**	**7.7**	**6.7**	**2.3 J**
500	Potassium	**270 K**	**510 K**	**640 K**	**560 K**	**370 K**
3.5	Selenium	2.5 U	2.8 U	2.8 U	2.7 U	3.1 U
1.0	Silver	0.98 U	1.1 U	1.1 U	1.1 U	1.2 U
500	Sodium	**57 L**	**76 JL**	**91 JL**	**75 L**	**85 L**
2.5	Thallium	2.5 U	2.8 U	2.8 U	2.7 U	3.1 U
5.0	Vanadium	**7.0**	**16**	**20**	**17**	**6.0**
6.0	Zinc	**6.8**	**20**	**23**	**20**	**37**
0.5	Total Cyanide	0.53 U	0.58 U	0.56 U	0.57 U	0.63 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
mg/Kg	Milligram per kilogram
Bold	Reported value is above the lab method detection limit

TABLE 2
DATA SUMMARY FORM: INORGANICS

SOIL SAMPLES
(mg/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-SS10	WFFI-SL1	WFFI-SL02	WFFI-SL03
	Sample Date	2/22/2007	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Percent Solids	79.3	7.5	62.9	61.3
CRQL	**Analyte**				
20	Aluminum	**4800**	**680**	**5800**	**6900**
6.0	Antimony	**0.54 J**	**24** U	**20**	**12**
1.0	Arsenic	**1.3 L**	**12 UL**	**2.6**	**3.2**
20	Barium	**20**	**130**	**270**	**270**
0.5	Beryllium	**0.17 J**	4.8 U	**0.36 J**	**0.46 J**
0.5	Cadmium	**0.30 J**	6.0 U	**2.2**	**3.7**
500	Calcium	**320**	**13000**	**3900**	**4600**
1.0	Chromium	**5.3**	**6.0 B**	**65**	**36**
5.0	Cobalt	**0.57 J**	12 U	**2.0**	**2.6**
2.5	Copper	**6.7**	**11 J**	**180**	**180**
10	Iron	**2700**	**15000**	**14000**	**12000**
1.0	Lead	**4.9**	**130**	**530**	**360**
500	Magnesium	**300**	**730**	**780**	**950**
1.5	Manganese	**15**	**270**	**160 K**	**190 K**
0.1	Mercury	**0.25**	**0.17 J**	**24 J**	**28 J**
4.0	Nickel	**2.8 J**	**4.0 J**	**7.2**	**8.9**
500	Potassium	**300 K**	**1300**	**640 K**	**680 K**
3.5	Selenium	**2.9 U**	30 U	3.6 U	3.7 U
1.0	Silver	**0.64 J**	12 U	**130**	**110**
500	Sodium	**71 L**	**680 L**	**130 L**	**130 L**
2.5	Thallium	**2.9 U**	30 U	3.6 U	3.7 U
5.0	Vanadium	**6.2**	**7.2** J	**16**	**18**
6.0	Zinc	**160**	**680**	**440**	**420**
2.5	Total Cyanide	0.61 U	6.4 U	**1.5**	**1.5**

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
mg/Kg	Milligram per kilogram
Bold	Reported value is above the lab method detection limit

TABLE 3
DATA SUMMARY FORM: INORGANICS

WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW1	WFFI-MW2	WFFI-MW3	WFFI-MW3-D	WFFI-MW4	WFFI-MW5
	Sample Date	2/23/2007	2/23/2007	2/23/2007	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0
CRQL	**Analyte**						
200	Aluminum	**1300**	**620**	**750**	**780**	**2100 L**	**1700**
20	Antimony	20 U	20 U	20 U	20 U	20 UL	20 U
10	Arsenic	10 U	10 U	**13 K**	**11 K**	10 UL	**10 K**
10	Barium	**24**	**23**	**53**	**54**	**46 L**	**38**
4.0	Beryllium	**0.16 B**	4.0 U	4.0 U	**0.14 B**	**0.2 B**	**0.19 B**
5.0	Cadmium	5.0 U	5.0 U	5.0 U	5.0 U	5.0 UL	5.0 U
500	Calcium	**11000**	**12000**	**62000**	**63000**	**22000 L**	**45000**
10	Chromium	**1.6 B**	**17**	10 U	10 U	**1.8 B**	**2.0 B**
10	Cobalt	10 U	10.0 U	**6.0 J**	**6.8 B**	**3.9 B**	10 U
20	Copper	20 U	20 U	20 U	20 U	20 UL	20 U
50	Iron	**310**	**170 L**	**10000**	**10000**	**920 L**	**7900**
5.0	Lead	5.0 UL	5.0 UL	5.0 UL	5.0 UL	5.0 UL	5.0 UL
500	Magnesium	**4100**	**3300**	**3300**	**3300**	**1800 L**	**3600**
10	Manganese	**34**	**41**	**690**	**700**	**120 L**	**530**
0.2	Mercury	0.20 U	0.20 U	0.20 U	**0.13 B**	0.20 UL	0.20 U
40	Nickel	**2.3 B**	40 U	**2.7 B**	**2.1 B**	40 UL	40 U
1000	Potassium	**1400**	**3400**	**2000**	**2100**	**2700 L**	**3400**
10	Selenium	10 U	10 U	10 U	10 U	10 UL	10 U
10	Silver	10 U	10 U	10 U	10 U	10 UL	10 U
1000	Sodium	**5600**	**5400**	**13000**	**13000**	**12000 L**	**7500**
25	Thallium	25 UL	25 UL	25 UL	25 UL	25 UL	25 UL
10	Vanadium	10 U	10 U	10 U	10 U	**2.5 B**	**1.8 B**
20	Zinc	**9 B**	**6.3 B**	**11 B**	**6.2 B**	**5.5 B**	**5.8 B**
10	Total Cyanide	10 U	10 U	10 U	10 U	10 UL	10 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Cor Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
Bold	Reported value is above the lab method detection limit

TABLE 4
DATA SUMMARY FORM: INORGANICS

WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFFI-MW6	WFFI-MW7	WFFI-MW20	RINSATE-3	RINSATE-4
	Sample Date	2/22/2007	2/22/2007	2/23/2007	2/22/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
CRQL	**Analyte**					
200	Aluminum	**2200**	**1600**	**730**	**89 B**	**99 B**
20	Antimony	20 U	20 U	20 U	20 U	20 U
10	Arsenic	10 U	10 U	**15 K**	10 U	10 U
10	Barium	**57**	**24**	**55**	10 U	10 U
4.0	Beryllium	**0.19 B**	**0.18 B**	**0.14 B**	4.0 U	4.0 U
5.0	Cadmium	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
500	Calcium	**45000**	**10000**	**64000**	**100 J**	**610**
10	Chromium	**2.2 B**	**4.1 B**	10 U	10 U	10 U
10	Cobalt	**7.1 J**	10 U	**6.6 J**	10 U	10 U
20	Copper	20 U	20 U	20 U	20 U	20 U
50	Iron	**5000**	**570**	**11000**	50 UL	50 UL
5.0	Lead	5.0 UL	5.0 UL	5.0 UL	5.0 UL	5.0 UL
500	Magnesium	**4300**	**4500**	**3400**	500 U	**14 J**
10	Manganese	**1500**	**22**	**720**	10 U	10 U
0.2	Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
40	Nickel	**3.4 B**	40 U	**2.9 B**	40 U	40 U
1000	Potassium	**3000**	**1900**	2100 U	1000 U	**23 J**
10	Selenium	10 UL	10 U	10 U	10 U	10 U
10	Silver	10 UL	10 U	10 U	10 U	10 U
1000	Sodium	**16000**	**6900**	**14000**	1000 U	1000 U
25	Thallium	25 UL	25 UL	25 UL	25 UL	25 UL
10	Vanadium	**1.9**	**1.6 J**	10 U	10 U	10 U
20	Zinc	**7.8 B**	**8.6 B**	**8.3 B**	**14 B**	**9.5 B**
10	Total Cyanide	10 U	10 U	10 U	10 U	10 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
Bold	Reported value is above the lab method detection limit

TABLE 1A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SS4-A	WFF1-SS5	WFF1-SS5-D
	Sample Date	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	91.7	84.4	85.4
CRQL	**Volatile Organic Compounds**			
10	Acetone	58 U	50 U	47 U
5.0	Benzene	5.8 U	5.0 U	4.7 U
5.0	Bromoform	5.8 U	5.0 U	4.7 U
5.0	Bromomethane	5.8 U	5.0 U	4.7 U
5.0	Carbon disulfide	5.8 U	5.0 U	4.7 U
5.0	Carbon tetrachloride	5.8 U	5.0 U	4.7 U
5.0	Chlorobenzene	5.8 U	5.0 U	4.7 U
5.0	Chlorodibromomethane	5.8 U	5.0 U	4.7 U
5.0	Chloroethane	5.8 U	5.0 U	4.7 U
5.0	Chloroform	5.8 U	5.0 U	4.7 U
5.0	Chloromethane	5.8 U	5.0 U	4.7 U
5.0	cis-1,2-Dichloroethene	5.8 U	5.0 U	4.7 U
5.0	cis-1,3-Dichloropropene	5.8 U	5.0 U	4.7 U
5.0	Dichlorobromomethane	5.8 U	5.0 U	4.7 U
5.0	1,1-Dichloroethane	5.8 U	5.0 U	4.7 U
5.0	1,2-Dichloroethane	5.8 U	5.0 U	4.7 U
5.0	1,1-Dichloroethene	5.8 U	5.0 U	4.7 U
5.0	1,2-Dichloropropane	5.8 U	5.0 U	4.7 U
5.0	Ethylbenzene	5.8 U	5.0 U	4.7 U
10	2-Hexanone	29 U	25 U	24 U
5.0	Methylene Chloride	5.8 U	5.0 U	4.7 U
10	Methyl Ethyl Ketone	29 U	25 U	24 U
10	Methyl isobutyl ketone	29 U	25 U	24 U
5.0	Styrene	5.8 U	5.0 U	4.7 U
5.0	1,1,2,2-Tetrachloroethane	5.8 U	5.0 U	4.7 U
5.0	Tetrachloroethene	5.8 U	5.0 U	4.7 U
5.0	Toluene	5.8 U	5.0 U	4.7 U
5.0	trans-1,2-Dichloroethene	5.8 U	5.0 U	4.7 U
5.0	trans-1,3-Dichloropropene	5.8 U	5.0 U	4.7 U
5.0	1,1,1-Trichloroethane	5.8 U	5.0 U	4.7 U
5.0	1,1,2-Trichloroethane	5.8 U	5.0 U	4.7 U
5.0	Trichloroethene	5.8 U	5.0 U	4.7 U
5.0	Vinyl chloride	5.8 U	5.0 U	4.7 U
5.0	Xylenes, Total	12 U	10 U	9.4 U

Notes:

B	Present in laboratory blank and/or field QC blanks
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 1B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SS7	WFF1-SS9	WFF1-SS10
	Sample Date	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	85.8	76.1	79.3
CRQL	**Volatile Organic Compounds**			
10	Acetone	**84 J**	49 U	52 U
5.0	Benzene	4.2 U	4.9 U	5.2 U
5.0	Bromoform	4.2 U	4.9 U	5.2 U
5.0	Bromomethane	4.2 U	4.9 U	5.2 U
5.0	Carbon disulfide	4.2 U	4.9 U	5.2 U
5.0	Carbon tetrachloride	4.2 U	4.9 U	5.2 U
5.0	Chlorobenzene	4.2 U	4.9 U	5.2 U
5.0	Chlorodibromomethane	4.2 U	4.9 U	5.2 U
5.0	Chloroethane	4.2 U	4.9 U	5.2 U
5.0	Chloroform	4.2 U	4.9 U	5.2 U
5.0	Chloromethane	4.2 U	4.9 U	5.2 U
5.0	cis-1,2-Dichloroethene	4.2 U	4.9 U	5.2 U
5.0	cis-1,3-Dichloropropene	4.2 U	4.9 U	5.2 U
5.0	Dichlorobromomethane	4.2 U	4.9 U	5.2 U
5.0	1,1-Dichloroethane	4.2 U	4.9 U	5.2 U
5.0	1,2-Dichloroethane	4.2 U	4.9 U	5.2 U
5.0	1,1-Dichloroethene	4.2 U	4.9 U	5.2 U
5.0	1,2-Dichloropropane	4.2 U	4.9 U	5.2 U
5.0	Ethylbenzene	4.2 U	4.9 U	5.2 U
10	2-Hexanone	21 U	25 U	26 U
5.0	Methylene Chloride	4.2 U	4.9 U	5.2 U
10	Methyl Ethyl Ketone	**8.3 J**	25 U	26 U
10	Methyl isobutyl ketone	21 U	25 U	26 U
5.0	Styrene	4.2 U	4.9 U	5.2 U
5.0	1,1,2,2-Tetrachloroethane	4.2 U	4.9 U	5.2 U
5.0	Tetrachloroethene	4.2 U	**6.7**	5.2 U
5.0	Toluene	4.2 U	4.9 U	5.2 U
5.0	trans-1,2-Dichloroethene	4.2 U	4.9 U	5.2 U
5.0	trans-1,3-Dichloropropene	4.2 U	4.9 U	5.2 U
5.0	1,1,1-Trichloroethane	4.2 U	4.9 U	5.2 U
5.0	1,1,2-Trichloroethane	4.2 U	4.9 U	5.2 U
5.0	Trichloroethene	4.2 U	4.9 U	5.2 U
5.0	Vinyl chloride	4.2 U	4.9 U	5.2 U
5.0	Xylenes, Total	8.3 U	9.8 U	10 U

Notes:

B	Present in laboratory blank and/or field QC blanks
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 1C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SLUDGE SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SL1	WFF1-SL02	WFF1-SL03
	Sample Date	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	7.5	62.9	61.3
CRQL	**Volatile Organic Compounds**			
10	Acetone	**630 J**	**740**	**55 J**
5.0	Benzene	71 UJ	9.5 U	11 U
5.0	Bromoform	71 UJ	9.5 U	11 U
5.0	Bromomethane	71 UJ	9.5 U	11 U
5.0	Carbon disulfide	71 UJ	9.5 U	11 U
5.0	Carbon tetrachloride	71 UJ	9.5 U	11 U
5.0	Chlorobenzene	71 UJ	9.5 U	11 U
5.0	Chlorodibromomethane	71 UJ	9.5 U	11 U
5.0	Chloroethane	71 UJ	9.5 U	11 U
5.0	Chloroform	71 UJ	9.5 U	11 U
5.0	Chloromethane	71 UJ	9.5 U	11 U
5.0	cis-1,2-Dichloroethene	71 UJ	9.5 U	11 U
5.0	cis-1,3-Dichloropropene	71 UJ	9.5 U	11 U
5.0	Dichlorobromomethane	71 UJ	9.5 U	11 U
5.0	1,1-Dichloroethane	71 UJ	9.5 U	11 U
5.0	1,2-Dichloroethane	71 UJ	9.5 U	11 U
5.0	1,1-Dichloroethene	71 UJ	9.5 U	11 U
5.0	1,2-Dichloropropane	71 UJ	9.5 U	11 U
5.0	Ethylbenzene	71 UJ	9.5 U	11 U
10	2-Hexanone	**130 J**	47 U	55 U
5.0	Methylene Chloride	71 UJ	9.5 U	11 U
10	Methyl Ethyl Ketone	**210 J**	**77**	55 U
10	Methyl isobutyl ketone	**91 J**	47 U	55 U
5.0	Styrene	71 UJ	9.5 U	11 U
5.0	1,1,2,2-Tetrachloroethane	**29 J**	9.5 U	11 U
5.0	Tetrachloroethene	71 UJ	**5.1 J**	11 U
5.0	Toluene	**1200 J**	**6.2 J**	11 U
5.0	trans-1,2-Dichloroethene	71 UJ	9.5 U	11 U
5.0	trans-1,3-Dichloropropene	71 UJ	9.5 U	11 U
5.0	1,1,1-Trichloroethane	71 UJ	9.5 U	11 U
5.0	1,1,2-Trichloroethane	71 UJ	9.5 U	11 U
5.0	Trichloroethene	71 UJ	9.5 U	11 U
5.0	Vinyl chloride	71 UJ	9.5 U	11 U
5.0	Xylenes, Total	140 UJ	19 U	22 U

Notes:

B	Present in laboratory blank and/or field QC blanks
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported concentrations above laboratory detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 1D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
GROUND WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-MW1	WFF1-MW2	WFF1-MW3	WFF1-MW3-D
	Sample Date	2/23/2007	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
CRQL	**Volatile Organic Compounds**				
25	Acetone	25 U	25 U	**52 J**	**50 J**
1.0	Benzene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Bromoform	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U
2.0	Carbon disulfide	2.0 U	2.0 U	2.0 U	2.0 U
1.0	Carbon tetrachloride	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chlorodibromomethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloroform	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloromethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	cis-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	cis-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Dichlorobromomethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
10	2-Hexanone	10 U	10 U	10 U	10 U
5.0	Methylene Chloride	5.0 U	5.0 U	**0.65 B**	**0.57 B**
10	Methyl Ethyl Ketone	10 U	10 U	**17**	**16 J**
10	Methyl isobutyl ketone	10 U	10 U	10 U	10 U
1.0	Styrene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Tetrachloroethene	**4.4**	1.0 U	1.0 U	1.0 U
1.0	Toluene	1.0 U	1.0 U	**0.77 B**	**0.66 B**
1.0	trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	trans-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Vinyl chloride	1.0 U	1.0 U	1.0 U	1.0 U
2.0	Xylenes, Total	2.0 U	2.0 U	2.0 U	2.0 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
NA	Not analyzed
Bold	Reported concentrations above laboratory detection limit

TABLE 1E
DATA SUMMARY FORM: ORGANIC COMPOUNDS
WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-MW4	WFF1-MW5	WFF1-MW6	WFF1-MW7	WFF1-MW20
	Sample Date	2/23/2007	2/23/2007	2/22/2007	2/22/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
CRQL	**Volatile Organic Compounds**					
25	Acetone	25 U	25 U	25 U	25 U	**47 J**
1.0	Benzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Bromoform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2.0	Carbon disulfide	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1.0	Carbon tetrachloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chlorodibromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloroform	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	cis-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	cis-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Dichlorobromomethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
10	2-Hexanone	10 U	10 U	10 U	10 U	10 U
5.0	Methylene Chloride	5.0 U	5.0 U	5.0 U	5.0 U	**0.58 B**
10	Methyl Ethyl Ketone	10 U	10 U	10 U	10 U	**15 J**
10	Methyl isobutyl ketone	10 U	10 U	10 U	10 U	10 U
1.0	Styrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Toluene	1.0 U	1.0 U	1.0 U	1.0 U	**0.64 B**
1.0	trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	trans-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Vinyl chloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2.0	Xylenes, Total	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
Bold	Reported value is above laboratory method detection limit

TABLE 1F
DATA SUMMARY FORM: ORGANIC COMPOUNDS
FIELD QC WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	Rinsate 3	Rinsate-4	TB-4	TB-5
	Sample Date	2/22/2007	2/23/2007	2/24/2007	2/24/2007
	Location	Field QC	Field QC	Field QC	Field QC
	Dilution Factor	1.0	1.0	1.0	1.0
CRQL	**Volatile Organic Compounds**				
25	Acetone	25 U	25 U	25 U	25 U
1.0	Benzene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Bromoform	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Bromomethane	1.0 U	1.0 U	1.0 U	1.0 U
2.0	Carbon disulfide	2.0 U	2.0 U	2.0 U	2.0 U
1.0	Carbon tetrachloride	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chlorodibromomethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloroform	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Chloromethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	cis-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	cis-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Dichlorobromomethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U
10	2-Hexanone	10 U	10 U	10 U	10 U
5.0	Methylene Chloride	5.0 U	5.0 U	**0.57 J**	5.0 U
10	Methyl Ethyl Ketone	10 U	10 U	10 U	10 U
10	Methyl isobutyl ketone	10 U	10 U	10 U	10 U
1.0	Styrene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Tetrachloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Toluene	**4.6**	**3.9**	1.0 U	1.0 U
1.0	trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	trans-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U
1.0	Vinyl chloride	1.0 U	1.0 U	1.0 U	1.0 U
2.0	Xylenes, Total	2.0 U	2.0 U	2.0 U	2.0 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
NA	Not analyzed
Bold	Reported value is above laboratory method detection limit

TABLE 2A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SS4-A	WFF1-SS5	WFF1-SS5-D
	Sample Date	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	91.7	84.4	85.4
CRQL	**Semivolatile Organic Compounds**			
330	Acenaphthene	360 UJ	390 UJ	390 UJ
330	Acenaphthylene	360 U	390 U	390 U
330	Anthracene	360 U	390 U	390 U
330	Benzo[a]anthracene	360 U	390 U	390 U
330	Benzo[a]pyrene	360 U	390 U	390 U
330	Benzo[b]fluoranthene	360 U	390 U	390 U
330	Benzo[g,h,i]perylene	360 U	390 U	390 U
330	Benzo[k]fluoranthene	360 U	390 U	390 U
330	Bis(2-chloroethoxy)methane	360 U	390 U	390 U
330	Bis(2-chloroethyl)ether	360 U	390 U	390 U
330	bis(chloroisopropyl) ether	360 U	390 U	390 U
330	Bis(2-ethylhexyl) phthalate	360 U	390 U	390 U
330	4-Bromophenyl phenyl ether	360 U	390 U	390 U
330	Butyl benzyl phthalate	360 U	390 U	390 U
330	Carbazole	360 U	390 U	390 U
660	4-Chloroaniline	720 U	780 U	770 U
330	4-Chloro-3-methylphenol	360 U	390 U	390 U
330	2-Chloronaphthalene	360 U	390 U	390 U
330	2-Chlorophenol	360 U	390 U	390 U
330	4-Chlorophenyl phenyl ether	360 U	390 U	390 U
330	Chrysene	360 U	390 U	390 U
330	Dibenz(a,h)anthracene	360 U	390 U	390 U
330	Dibenzofuran	360 U	390 U	390 U
330	1,3-Dichlorobenzene	360 U	390 U	390 U
330	1,4-Dichlorobenzene	360 U	390 U	390 U
330	1,2-Dichlorobenzene	360 U	390 U	390 U
660	3,3'-Dichlorobenzidine	720 U	780 U	770 U
330	2,4-Dichlorophenol	360 U	390 U	390 U
330	Diethyl phthalate	360 U	390 U	390 U
330	2,4-Dimethylphenol	360 U	390 U	390 U
330	Dimethyl phthalate	360 U	390 U	390 U
330	Di-n-butyl phthalate	360 U	390 U	390 U
1700	4,6-Dinitro-2-methylphenol	1900 U	2000 U	2000 U
1700	2,4-Dinitrophenol	1900 UJ	2000 UJ	2000 UJ
330	2,4-Dinitrotoluene	360 U	390 U	390 U
330	2,6-Dinitrotoluene	360 U	390 U	390 U
330	Di-n-octyl phthalate	360 U	390 U	390 U
330	Fluoranthene	360 U	390 U	390 U

TABLE 2A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SS4-A	WFF1-SS5	WFF1-SS5-D
	Sample Date	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	91.7	84.4	85.4
CRQL	**Semivolatile Organic Compounds**			
330	Fluorene	360 U	390 U	390 U
330	Hexachlorobenzene	360 U	390 U	390 U
330	Hexachlorobutadiene	360 U	390 U	390 U
330	Hexachlorocyclopentadiene	360 U	390 U	390 U
330	Hexachloroethane	360 U	390 U	390 U
330	Indeno[1,2,3-cd]pyrene	360 U	390 U	390 U
330	Isophorone	360 U	390 U	390 U
330	2-Methylnaphthalene	360 U	390 U	390 U
330	2-Methylphenol	360 U	390 U	390 U
330	3 & 4 Methylphenol	360 U	390 U	390 U
330	Naphthalene	360 U	390 U	390 U
1700	2-Nitroaniline	1900 U	2000 U	2000 U
1700	3-Nitroaniline	1900 U	2000 U	2000 U
1700	4-Nitroaniline	1900 U	2000 U	2000 U
330	Nitrobenzene	360 U	390 U	390 U
330	2-Nitrophenol	360 U	390 U	390 U
1700	4-Nitrophenol	1900 U	2000 U	2000 U
330	N-Nitrosodi-n-propylamine	360 UL	390 UL	390 UL
330	N-Nitrosodiphenylamine	360 U	390 U	390 U
1700	Pentachlorophenol	1900 U	2000 U	2000 U
330	Phenanthrene	360 U	390 U	390 U
330	Phenol	360 U	390 U	390 U
330	Pyrene	360 UJ	390 UJ	390 UJ
330	1,2,4-Trichlorobenzene	360 UL	390 UL	390 UL
330	2,4,6-Trichlorophenol	360 U	390 U	390 U
330	2,4,5-Trichlorophenol	360 U	390 U	390 U

Notes:

B	Present in laboratory blank and/or field QC samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SS7	WFF1-SS9	WFF1-SS10
	Sample Date	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	85.8	76.1	79.3
CRQL	**Semivolatile Organic Compounds**			
330	Acenaphthene	380 UJ	430 UJ	420 UJ
330	Acenaphthylene	380 U	430 U	420 U
330	Anthracene	380 U	430 U	420 U
330	Benzo[a]anthracene	380 U	430 U	420 U
330	Benzo[a]pyrene	380 U	430 U	420 U
330	Benzo[b]fluoranthene	380 U	430 U	420 U
330	Benzo[g,h,i]perylene	380 U	430 U	420 U
330	Benzo[k]fluoranthene	380 U	430 U	420 U
330	Bis(2-chloroethoxy)methane	380 U	430 U	420 U
330	Bis(2-chloroethyl)ether	380 U	430 U	420 U
330	bis(chloroisopropyl) ether	380 U	430 U	420 U
330	Bis(2-ethylhexyl) phthalate	380 U	430 U	420 U
330	4-Bromophenyl phenyl ether	380 U	430 U	420 U
330	Butyl benzyl phthalate	380 U	430 U	420 U
330	Carbazole	380 U	430 U	420 U
660	4-Chloroaniline	770 U	860 U	820 U
330	4-Chloro-3-methylphenol	380 U	430 U	420 U
330	2-Chloronaphthalene	380 U	430 U	420 U
330	2-Chlorophenol	380 U	430 U	420 U
330	4-Chlorophenyl phenyl ether	380 U	430 U	420 U
330	Chrysene	380 U	430 U	420 U
330	Dibenz(a,h)anthracene	380 U	430 U	420 U
330	Dibenzofuran	380 U	430 U	420 U
330	1,3-Dichlorobenzene	380 U	430 U	420 U
330	1,4-Dichlorobenzene	380 U	430 U	420 U
330	1,2-Dichlorobenzene	380 U	430 U	420 U
660	3,3'-Dichlorobenzidine	770 U	860 U	820 U
330	2,4-Dichlorophenol	380 U	430 U	420 U
330	Diethyl phthalate	380 U	430 U	420 U
330	2,4-Dimethylphenol	380 U	430 U	420 U
330	Dimethyl phthalate	380 U	430 U	420 U
330	Di-n-butyl phthalate	**36 J**	430 U	420 U
1700	4,6-Dinitro-2-methylphenol	2000 U	2200 U	2100 U
1700	2,4-Dinitrophenol	2000 UJ	2200 UJ	2100 UJ
330	2,4-Dinitrotoluene	380 U	430 U	420 U
330	2,6-Dinitrotoluene	380 U	430 U	420 U
330	Di-n-octyl phthalate	380 U	430 U	420 U
330	Fluoranthene	380 U	430 U	420 U

TABLE 2B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SS7	WFF1-SS9	WFF1-SS10
	Sample Date	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	85.8	76.1	79.3
CRQL	**Semivolatile Organic Compounds**			
330	Fluorene	380 U	430 U	420 U
330	Hexachlorobenzene	380 U	430 U	420 U
330	Hexachlorobutadiene	380 U	430 U	420 U
330	Hexachlorocyclopentadiene	380 U	430 U	420 U
330	Hexachloroethane	380 U	430 U	420 U
330	Indeno[1,2,3-cd]pyrene	380 U	430 U	420 U
330	Isophorone	380 U	430 U	420 U
330	2-Methylnaphthalene	380 U	430 U	420 U
330	2-Methylphenol	380 U	430 U	420 U
330	3 & 4 Methylphenol	380 U	430 U	420 U
330	Naphthalene	380 U	430 U	420 U
1700	2-Nitroaniline	2000 U	2200 U	2100 U
1700	3-Nitroaniline	2000 U	2200 U	2100 U
1700	4-Nitroaniline	2000 U	2200 U	2100 U
330	Nitrobenzene	380 U	430 U	420 U
330	2-Nitrophenol	380 U	430 U	420 U
1700	4-Nitrophenol	2000 U	2200 U	2100 U
330	N-Nitrosodi-n-propylamine	380 UL	430 UL	420 UL
330	N-Nitrosodiphenylamine	380 U	430 U	420 U
1700	Pentachlorophenol	2000 U	2200 U	2100 U
330	Phenanthrene	380 U	430 U	420 U
330	Phenol	380 U	430 U	420 U
330	Pyrene	380 UJ	430 UJ	420 UJ
330	1,2,4-Trichlorobenzene	380 UL	430 UL	420 UL
330	2,4,6-Trichlorophenol	380 U	430 U	420 U
330	2,4,5-Trichlorophenol	380 U	430 U	420 U

Notes:

B	Present in laboratory blank and/or field QC blanks
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SLUDGE SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SL1	WFF1-SL02	WFF1-SL03
	Sample Date	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	7.5	62.9	61.3
CRQL	**Semivolatile Organic Compounds**			
330	Acenaphthene	4400 UJ	520 U	540 U
330	Acenaphthylene	4400 UJ	520 U	540 U
330	Anthracene	**630 J**	**74 J**	**64 J**
330	Benzo[a]anthracene	**2100 J**	**400 J**	**290 J**
330	Benzo[a]pyrene	**910 J**	**490 J**	**290 J**
330	Benzo[b]fluoranthene	**4800 J**	**870**	**550**
330	Benzo[g,h,i]perylene	**1200 J**	**390 J**	**270 J**
330	Benzo[k]fluoranthene	**2400 J**	**590**	**290 J**
330	Bis(2-chloroethoxy)methane	4400 UJ	520 U	540 U
330	Bis(2-chloroethyl)ether	4400 UJ	520 U	540 U
330	bis(chloroisopropyl) ether	4400 UJ	520 U	540 U
330	Bis(2-ethylhexyl) phthalate	4400 UJ	**79 J**	540 U
330	4-Bromophenyl phenyl ether	4400 UJ	520 U	540 U
330	Butyl benzyl phthalate	4400 UJ	520 U	540 U
330	Carbazole	4400 UJ	**53 J**	540 U
660	4-Chloroaniline	8800 UJ	1000 U	1100 U
330	4-Chloro-3-methylphenol	4400 UJ	520 U	540 U
330	2-Chloronaphthalene	4400 UJ	520 U	540 U
330	2-Chlorophenol	4400 UJ	520 U	540 U
330	4-Chlorophenyl phenyl ether	4400 UJ	520 U	540 U
330	Chrysene	**4700 J**	**570**	**480 J**
330	Dibenz(a,h)anthracene	4400 UJ	520 U	**76 J**
330	Dibenzofuran	4400 UJ	520 U	540 U
330	1,3-Dichlorobenzene	4400 UJ	520 U	540 U
330	1,4-Dichlorobenzene	4400 UJ	**84 J**	**84 J**
330	1,2-Dichlorobenzene	4400 UJ	520 U	540 U
660	3,3'-Dichlorobenzidine	8800 UJ	1000 U	1100 U
330	2,4-Dichlorophenol	4400 UJ	520 UJ	540 UJ
330	Diethyl phthalate	4400 UJ	520 U	540 U
330	2,4-Dimethylphenol	4400 UJ	520 U	540 U
330	Dimethyl phthalate	4400 UJ	520 U	540 U
330	Di-n-butyl phthalate	4400 UJ	**110 J**	**89 J**
1700	4,6-Dinitro-2-methylphenol	23000 UJ	2700 U	2800 U
1700	2,4-Dinitrophenol	23000 UJ	2700 UJ	2800 UJ
330	2,4-Dinitrotoluene	4400 UJ	520 U	540 U
330	2,6-Dinitrotoluene	4400 UJ	520 U	540 U
330	Di-n-octyl phthalate	4400 UJ	520 U	540 U
330	Fluoranthene	**9000 J**	**500 J**	**410 J**

TABLE 2C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SLUDGE SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SL1	WFF1-SL02	WFF1-SL03
	Sample Date	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	7.5	62.9	61.3
CRQL	**Semivolatile Organic Compounds**			
330	Fluorene	**360 J**	520 U	540 U
330	Hexachlorobenzene	4400 UJ	520 U	540 U
330	Hexachlorobutadiene	4400 UJ	520 U	540 U
330	Hexachlorocyclopentadiene	4400 UJ	520 U	540 U
330	Hexachloroethane	4400 UJ	520 U	540 U
330	Indeno[1,2,3-cd]pyrene	**1400 J**	**330 J**	**230 J**
330	Isophorone	4400 UJ	520 U	540 U
330	2-Methylnaphthalene	4400 UJ	520 U	540 U
330	2-Methylphenol	4400 UJ	520 U	540 U
330	3 & 4 Methylphenol	4400 UJ	520 U	540 U
330	Naphthalene	4400 UJ	520 U	540 U
1700	2-Nitroaniline	23000 UJ	2700 U	2800 U
1700	3-Nitroaniline	23000 UJ	2700 U	2800 U
1700	4-Nitroaniline	23000 UJ	2700 U	2800 U
330	Nitrobenzene	4400 UJ	520 U	540 U
330	2-Nitrophenol	4400 UJ	520 U	540 U
1700	4-Nitrophenol	23000 UJ	2700 U	2800 U
330	N-Nitrosodi-n-propylamine	4400 UJ	520 U	540 U
330	N-Nitrosodiphenylamine	4400 UJ	520 U	540 U
1700	Pentachlorophenol	23000 UJ	2700 U	2800 U
330	Phenanthrene	**3000 J**	**200 J**	**170 J**
330	Phenol	4400 UJ	520 U	540 U
330	Pyrene	**6300 J**	**420 J**	**360 J**
330	1,2,4-Trichlorobenzene	4400 UJ	520 U	540 U
330	2,4,6-Trichlorophenol	4400 UJ	520 U	540 U
330	2,4,5-Trichlorophenol	4400 UJ	520 U	540 U

Notes:

B	Present in laboratory blank and/or field QC blanks
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 2D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
GROUND WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-MW1	WFF1-MW2	WFF1-MW3	WFF1-MW3-D
	Sample Date	2/23/2007	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Sample Volume	1030	1020	1040	1000
CRQL	**Semivolatile Organic Compounds**				
10	Acenaphthene	9.7 U	9.8 U	9.6 U	10 U
10	Acenaphthylene	9.7 U	9.8 U	9.6 U	10 U
10	Anthracene	9.7 U	9.8 U	9.6 U	10 U
10	Benzo[a]anthracene	9.7 U	9.8 U	9.6 U	10 U
10	Benzo[a]pyrene	9.7 U	9.8 U	9.6 U	10 U
10	Benzo[b]fluoranthene	9.7 U	9.8 U	9.6 U	10 U
10	Benzo[g,h,i]perylene	9.7 U	9.8 U	9.6 U	10 U
10	Benzo[k]fluoranthene	9.7 U	9.8 U	9.6 U	10 U
10	Bis(2-chloroethoxy)methan	9.7 U	9.8 U	9.6 U	10 U
10	Bis(2-chloroethyl)ether	9.7 U	9.8 U	9.6 U	10 U
10	bis(chloroisopropyl) ether	9.7 U	9.8 U	9.6 U	10 U
10	Bis(2-ethylhexyl) phthalate	**1.5 J**	9.8 U	9.6 U	10 U
10	4-Bromophenyl phenyl eth	9.7 U	9.8 U	9.6 U	10 U
10	Butyl benzyl phthalate	9.7 U	9.8 U	9.6 U	10 U
10	Carbazole	9.7 U	9.8 U	9.6 U	10 U
20	4-Chloroaniline	19 U	20 U	19 U	20 U
10	4-Chloro-3-methylphenol	9.7 U	9.8 U	9.6 U	10 U
10	2-Chloronaphthalene	9.7 U	9.8 U	9.6 U	10 U
10	2-Chlorophenol	9.7 U	9.8 U	9.6 U	10 U
10	4-Chlorophenyl phenyl eth	9.7 U	9.8 U	9.6 U	10 U
10	Chrysene	9.7 U	9.8 U	9.6 U	10 U
10	Dibenz(a,h)anthracene	9.7 U	9.8 U	9.6 U	10 U
10	Dibenzofuran	9.7 U	9.8 U	9.6 U	10 U
10	1,3-Dichlorobenzene	9.7 U	9.8 U	9.6 U	10 U
10	1,4-Dichlorobenzene	9.7 U	9.8 U	9.6 U	10 U
10	1,2-Dichlorobenzene	9.7 U	9.8 U	9.6 U	10 U
20	3,3'-Dichlorobenzidine	19 U	20 U	19 U	20 U
10	2,4-Dichlorophenol	9.7 U	9.8 U	9.6 U	10 U
10	Diethyl phthalate	9.7 U	9.8 U	9.6 U	10 U
10	2,4-Dimethylphenol	9.7 U	9.8 U	9.6 U	10 U
10	Dimethyl phthalate	9.7 U	9.8 U	9.6 U	10 U
10	Di-n-butyl phthalate	9.7 U	9.8 U	9.6 U	10 U
50	4,6-Dinitro-2-methylpheno	49 U	49 U	48 U	50 U
50	2,4-Dinitrophenol	49 UR	49 UR	48 UR	50 UR
10	2,4-Dinitrotoluene	9.7 U	9.8 U	9.6 U	10 U
10	2,6-Dinitrotoluene	9.7 U	9.8 U	9.6 U	10 U
10	Di-n-octyl phthalate	9.7 U	9.8 U	9.6 U	10 U
10	Fluoranthene	9.7 U	9.8 U	9.6 U	10 U
10	Fluorene	9.7 U	9.8 U	9.6 U	10 U

TABLE 2D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
GROUND WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-MW1	WFF1-MW2	WFF1-MW3	WFF1-MW3-D
	Sample Date	2/23/2007	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Sample Volume	1030	1020	1040	1000
CRQL	**Semivolatile Organic Compounds**				
10	Hexachlorobenzene	9.7 U	9.8 U	9.6 U	10 U
10	Hexachlorobutadiene	9.7 U	9.8 U	9.6 U	10 U
10	Hexachlorocyclopentadien	9.7 U	9.8 U	9.6 U	10 U
10	Hexachloroethane	9.7 U	9.8 U	9.6 U	10 U
10	Indeno[1,2,3-cd]pyrene	9.7 U	9.8 U	9.6 U	10 U
10	Isophorone	9.7 U	9.8 U	9.6 U	10 U
10	2-Methylnaphthalene	9.7 U	9.8 U	9.6 U	10 U
10	2-Methylphenol	9.7 U	9.8 U	9.6 U	10 U
10	3 & 4 Methylphenol	9.7 U	9.8 U	**7.8 J**	**4.7 J**
10	Naphthalene	9.7 U	9.8 U	9.6 U	10 U
50	2-Nitroaniline	49 U	49 U	48 U	50 U
50	3-Nitroaniline	49 U	49 U	48 U	50 U
50	4-Nitroaniline	49 U	49 U	48 U	50 U
10	Nitrobenzene	9.7 U	9.8 U	9.6 U	10 U
50	2-Nitrophenol	9.7 U	9.8 U	9.6 U	10 U
50	4-Nitrophenol	49 U	49 U	48 U	50 U
10	N-Nitrosodi-n-propylamine	9.7 U	9.8 U	9.6 U	10 U
10	N-Nitrosodiphenylamine	9.7 U	9.8 U	9.6 U	10 U
50	Pentachlorophenol	49 U	49 U	48 U	50 U
10	Phenanthrene	9.7 U	9.8 U	9.6 U	10 U
10	Phenol	9.7 U	9.8 U	**8.6 J**	**7.8 J**
10	Pyrene	9.7 U	9.8 U	9.6 U	10 U
10	1,2,4-Trichlorobenzene	9.7 U	9.8 U	9.6 U	10 U
10	2,4,6-Trichlorophenol	9.7 U	9.8 U	9.6 U	10 U
10	2,4,5-Trichlorophenol	9.7 U	9.8 U	9.6 U	10 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
ml	Milliliter
NA	Not analyzed
R	Rejected value based on QC data
Bold	Reported value is above laboratory method detection limit

* Sample CRQL = Non-adjusted CRQL (1000ml ÷ Sample Volume)

TABLE 2E
DATA SUMMARY FORM: ORGANIC COMPOUNDS
WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-MW4	WFF1-MW5	WFF1-MW6	WFF1-MW7	WFF1-MW20
	Sample Date	2/23/2007	2/23/2007	2/22/2007	2/22/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Sample Volume	1000	1000	1000	1060	1000
CRQL	**Semivolatile Organic Compounds**					
10	Acenaphthene	10 U	10 U	10 U	9.4 U	10 U
10	Acenaphthylene	10 U	10 U	10 U	9.4 U	10 U
10	Anthracene	10 U	10 U	10 U	9.4 U	10 U
10	Benzo[a]anthracene	10 U	10 U	10 U	9.4 U	10 U
10	Benzo[a]pyrene	10 U	10 U	10 U	9.4 U	10 U
10	Benzo[b]fluoranthene	10 U	10 U	10 U	9.4 U	10 U
10	Benzo[g,h,i]perylene	10 U	10 U	10 U	9.4 U	10 U
10	Benzo[k]fluoranthene	10 U	10 U	10 U	9.4 U	10 U
10	Bis(2-chloroethoxy)methane	10 U	10 U	10 U	9.4 U	10 U
10	Bis(2-chloroethyl)ether	10 U	10 U	10 U	9.4 U	10 U
10	bis(chloroisopropyl) ether	10 U	10 U	10 U	9.4 U	10 U
10	Bis(2-ethylhexyl) phthalate	10 U	10 U	**1.1 J**	9.4 U	10 U
10	4-Bromophenyl phenyl ether	10 U	10 U	10 U	9.4 U	10 U
10	Butyl benzyl phthalate	10 U	10 U	10 U	9.4 U	10 U
10	Carbazole	10 U	10 U	10 U	9.4 U	10 U
20	4-Chloroaniline	20 U	20 U	20 U	19 U	20 U
10	4-Chloro-3-methylphenol	10 U	10 U	10 U	9.4 U	10 U
10	2-Chloronaphthalene	10 U	10 U	10 U	9.4 U	10 U
10	2-Chlorophenol	10 U	10 U	10 U	9.4 U	10 U
10	4-Chlorophenyl phenyl ether	10 U	10 U	10 U	9.4 U	10 U
10	Chrysene	10 U	10 U	10 U	9.4 U	10 U
10	Dibenz(a,h)anthracene	10 U	10 U	10 U	9.4 U	10 U
10	Dibenzofuran	10 U	10 U	10 U	9.4 U	10 U
10	1,3-Dichlorobenzene	10 U	10 U	10 U	9.4 U	10 U
10	1,4-Dichlorobenzene	10 U	10 U	10 U	9.4 U	10 U
10	1,2-Dichlorobenzene	10 U	10 U	10 U	9.4 U	10 U
20	3,3'-Dichlorobenzidine	20 U	20 U	20 U	19 U	20 U
10	2,4-Dichlorophenol	10 U	10 U	10 U	9.4 U	10 U
10	Diethyl phthalate	10 U	10 U	10 U	**0.73 J**	10 U
10	2,4-Dimethylphenol	10 U	10 U	10 U	9.4 U	**100**
10	Dimethyl phthalate	10 U	10 U	10 U	9.4 U	10 U
10	Di-n-butyl phthalate	10 U	10 U	10 U	9.4 U	10 U
50	4,6-Dinitro-2-methylphenol	50 U	50 U	50 U	47 U	50 U
50	2,4-Dinitrophenol	50 UR	50 UR	50 UR	47 UR	50 UR
10	2,4-Dinitrotoluene	10 U	10 U	10 U	9.4 U	10 U
10	2,6-Dinitrotoluene	10 U	10 U	10 U	9.4 U	10 U
10	Di-n-octyl phthalate	10 U	10 U	10 U	9.4 U	10 U
10	Fluoranthene	10 U	10 U	10 U	9.4 U	10 U

TABLE 2E
DATA SUMMARY FORM: ORGANIC COMPOUNDS
WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-MW4	WFF1-MW5	WFF1-MW6	WFF1-MW7	WFF1-MW20
	Sample Date	2/23/2007	2/23/2007	2/22/2007	2/22/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Sample Volume	1000	1000	1000	1060	1000
CRQL	**Semivolatile Organic Compounds**					
10	Fluorene	10 U	10 U	10 U	9.4 U	10 U
10	Hexachlorobenzene	10 U	10 U	10 U	9.4 U	10 U
10	Hexachlorobutadiene	10 U	10 U	10 U	9.4 U	10 U
10	Hexachlorocyclopentadiene	10 U	10 U	10 U	9.4 U	10 U
10	Hexachloroethane	10 U	10 U	10 U	9.4 U	10 U
10	Indeno[1,2,3-cd]pyrene	10 U	10 U	10 U	9.4 U	10 U
10	Isophorone	10 U	10 U	10 U	9.4 U	10 U
10	2-Methylnaphthalene	10 U	10 U	10 U	9.4 U	10 U
10	2-Methylphenol	10 U	10 U	10 U	9.4 U	10 U
10	3 & 4 Methylphenol	10 U	10 U	10 U	9.4 U	**11**
10	Naphthalene	10 U	10 U	10 U	9.4 U	10 U
50	2-Nitroaniline	50 U	50 U	50 U	47 U	50 U
50	3-Nitroaniline	50 U	50 U	50 U	47 U	50 U
50	4-Nitroaniline	50 U	50 U	50 U	47 U	50 U
10	Nitrobenzene	10 U	10 U	10 U	9.4 U	10 U
50	2-Nitrophenol	10 U	10 U	10 U	9.4 U	10 U
50	4-Nitrophenol	50 U	50 U	50 U	47 U	50 U
10	N-Nitrosodi-n-propylamine	10 U	10 U	10 U	9.4 U	10 U
10	N-Nitrosodiphenylamine	10 U	10 U	10 U	9.4 U	10 U
50	Pentachlorophenol	50 U	50 U	50 U	47 U	50 U
10	Phenanthrene	10 U	10 U	10 U	9.4 U	10 U
10	Phenol	10 U	10 U	10 U	9.4 U	**12**
10	Pyrene	10 U	10 U	10 U	9.4 U	10 U
10	1,2,4-Trichlorobenzene	10 U	10 U	10 U	9.4 U	10 U
10	2,4,6-Trichlorophenol	10 U	10 U	10 U	9.4 U	10 U
10	2,4,5-Trichlorophenol	10 U	10 U	10 U	9.4 U	10 U

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
NA	Not analyzed
R	Rejected value based on QC data
Bold	Reported value is above laboratory method detection limit

* Sample CRQL = Non-adjusted CRQL (1000ml ÷ Sample Volume)

TABLE 2F
DATA SUMMARY FORM: ORGANIC COMPOUNDS
FIELD QC WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	Rinsate 3	Rinsate-4
	Sample Date	2/22/2007	2/23/2007
	Location	Field QC	Field QC
	Dilution Factor	1.0	1.0
	Sample Volume (ml)	1040	1000
CRQL	**Semivolatile Organic Compounds**		
10	Acenaphthene	9.6 U	10 U
10	Acenaphthylene	9.6 U	10 U
10	Anthracene	9.6 U	10 U
10	Benzo[a]anthracene	9.6 U	10 U
10	Benzo[a]pyrene	9.6 U	10 U
10	Benzo[b]fluoranthene	9.6 U	10 U
10	Benzo[g,h,i]perylene	9.6 U	10 U
10	Benzo[k]fluoranthene	9.6 U	10 U
10	Bis(2-chloroethoxy)methar	9.6 U	10 U
10	Bis(2-chloroethyl)ether	9.6 U	10 U
10	bis(chloroisopropyl) ether	9.6 U	10 U
10	Bis(2-ethylhexyl) phthalate	9.6 U	10 U
10	4-Bromophenyl phenyl eth	9.6 U	10 U
10	Butyl benzyl phthalate	9.6 U	10 U
10	Carbazole	9.6 U	10 U
20	4-Chloroaniline	19 U	20 U
10	4-Chloro-3-methylphenol	9.6 U	10 U
10	2-Chloronaphthalene	9.6 U	10 U
10	2-Chlorophenol	9.6 U	10 U
10	4-Chlorophenyl phenyl eth	9.6 U	10 U
10	Chrysene	9.6 U	10 U
10	Dibenz(a,h)anthracene	9.6 U	10 U
10	Dibenzofuran	9.6 U	10 U
10	1,3-Dichlorobenzene	9.6 U	10 U
10	1,4-Dichlorobenzene	9.6 U	10 U
10	1,2-Dichlorobenzene	9.6 U	10 U
20	3,3'-Dichlorobenzidine	19 U	20 U
10	2,4-Dichlorophenol	9.6 U	10 U
10	Diethyl phthalate	9.6 U	10 U
10	2,4-Dimethylphenol	9.6 U	10 U
10	Dimethyl phthalate	9.6 U	10 U
10	Di-n-butyl phthalate	9.6 U	10 U
50	4,6-Dinitro-2-methylpheno	48 U	50 U
50	2,4-Dinitrophenol	48 UR	50 UR
10	2,4-Dinitrotoluene	9.6 U	10 U
10	2,6-Dinitrotoluene	9.6 U	10 U
10	Di-n-octyl phthalate	9.6 U	10 U
10	Fluoranthene	9.6 U	10 U

TABLE 2F
DATA SUMMARY FORM: ORGANIC COMPOUNDS
FIELD QC WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	Rinsate 3	Rinsate-4
	Sample Date	2/22/2007	2/23/2007
	Location	Field QC	Field QC
	Dilution Factor	1.0	1.0
	Sample Volume (ml)	1040	1000
CRQL	**Semivolatile Organic Compounds**		
10	Fluorene	9.6 U	10 U
10	Hexachlorobenzene	9.6 U	10 U
10	Hexachlorobutadiene	9.6 U	10 U
10	Hexachlorocyclopentadien	9.6 U	10 U
10	Hexachloroethane	9.6 U	10 U
10	Indeno[1,2,3-cd]pyrene	9.6 U	10 U
10	Isophorone	9.6 U	10 U
10	2-Methylnaphthalene	9.6 U	10 U
10	2-Methylphenol	9.6 U	10 U
10	3 & 4 Methylphenol	9.6 U	10 U
10	Naphthalene	9.6 U	10 U
50	2-Nitroaniline	48 U	50 U
50	3-Nitroaniline	48 U	50 U
50	4-Nitroaniline	48 U	50 U
10	Nitrobenzene	9.6 U	10 U
50	2-Nitrophenol	9.6 U	10 U
50	4-Nitrophenol	48 U	50 U
10	N-Nitrosodi-n-propylamine	9.6 U	10 U
10	N-Nitrosodiphenylamine	9.6 U	10 U
50	Pentachlorophenol	48 U	50 U
10	Phenanthrene	9.6 U	10 U
10	Phenol	9.6 U	10 U
10	Pyrene	9.6 U	10 U
10	1,2,4-Trichlorobenzene	9.6 U	10 U
10	2,4,6-Trichlorophenol	9.6 U	10 U
10	2,4,5-Trichlorophenol	9.6 U	10 U

Notes: B - Present in laboratory blank and/or field QC samples
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/L - Microgram per liter
ml - Milliliter
NA - Not analyzed
R - Rejected value based on QC data
Bold - Reported value is above lab method detection limit
* Sample CRQL = Non-adjusted CRQL (1000ml ÷ Sample Vol)

TABLE 3A
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SS4-A	WFF1-SS5	WFF1-SS5-D
	Sample Date	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	91.7	84.4	85.4
CRQL	**Pesticide Compounds**			
1.7	Aldrin	1.8 U	2.0 U	2.0 U
1.7	alpha-BHC	1.8 U	2.0 U	2.0 U
1.7	beta-BHC	1.8 U	2.0 U	2.0 U
1.7	Chlordane (technical)	18 U	20 U	20 U
3.3	4,4'-DDD	3.5 U	3.9 U	3.8 U
3.3	4,4'-DDE	**0.42 J**	**0.41 J**	**0.65 J**
3.3	4,4'-DDT	3.5 U	3.9 U	3.8 U
1.7	delta-BHC	1.8 U	2.0 U	2.0 U
3.3	Dieldrin	3.5 U	3.9 U	3.8 U
1.7	Endosulfan I	1.8 U	2.0 U	2.0 U
3.3	Endosulfan II	3.5 U	3.9 U	3.8 U
3.3	Endosulfan sulfate	3.5 U	3.9 U	3.8 U
3.3	Endrin	3.5 U	3.9 U	3.8 U
3.3	Endrin aldehyde	3.5 U	3.9 U	3.8 U
3.3	Endrin ketone	3.5 U	3.9 U	3.8 U
1.7	gamma-BHC (Lindane)	1.8 U	2.0 U	2.0 U
1.7	Heptachlor	1.8 U	2.0 U	2.0 U
1.7	Heptachlor epoxide	1.8 U	2.0 U	2.0 U
17	Methoxychlor	18 U	20 U	20 U
33	PCB-1016	35 U	39 U	38 U
67	PCB-1221	72 U	79 U	77 U
33	PCB-1232	35 U	39 U	38 U
33	PCB-1242	35 U	39 U	38 U
33	PCB-1248	35 U	39 U	38 U
33	PCB-1254	35 U	39 U	38 U
33	PCB-1260	35 U	39 U	38 U
170	Toxaphene	180 U	200 U	200 U

Notes:

B	Present in laboratory blank and/or field QC blanks
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3B
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SOIL SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SS7	WFF1-SS9	WFF1-SS10
	Sample Date	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0
	Percent Solids	85.8	76.1	79.3
CRQL	**Pesticide Compounds**			
1.7	Aldrin	2.0 U	2.2 UJ	2.1 UJ
1.7	alpha-BHC	2.0 U	2.2 UJ	2.1 UJ
1.7	beta-BHC	2.0 U	2.2 UJ	2.1 UJ
1.7	Chlordane (technical)	20 U	22 UJ	21 UJ
3.3	4,4'-DDD	3.8 U	4.3 UJ	**3.8 J**
3.3	4,4'-DDE	**0.76 J**	**0.77 J**	**3.2 J**
3.3	4,4'-DDT	3.8 U	4.3 UJ	**3.8 J**
1.7	delta-BHC	2.0 U	2.2 UJ	2.1 UJ
3.3	Dieldrin	3.8 U	4.3 UJ	4.1 UJ
1.7	Endosulfan I	2.0 U	2.2 UJ	2.1 UJ
3.3	Endosulfan II	3.8 U	4.3 UJ	4.1 UJ
3.3	Endosulfan sulfate	3.8 U	4.3 UJ	4.1 UJ
3.3	Endrin	3.8 U	4.3 UJ	4.1 UJ
3.3	Endrin aldehyde	3.8 U	4.3 UJ	4.1 UJ
3.3	Endrin ketone	3.8 U	4.3 UJ	4.1 UJ
1.7	gamma-BHC (Lindane)	2.0 U	2.2 UJ	2.1 UJ
1.7	Heptachlor	2.0 U	2.2 UJ	2.1 UJ
1.7	Heptachlor epoxide	2.0 U	2.2 UJ	2.1 UJ
17	Methoxychlor	20 U	22 UJ	21 UJ
33	PCB-1016	38 U	43 UJ	41 UJ
67	PCB-1221	77 U	88 UJ	83 UJ
33	PCB-1232	38 U	43 UJ	41 UJ
33	PCB-1242	38 U	43 UJ	41 UJ
33	PCB-1248	38 U	43 UJ	41 UJ
33	PCB-1254	38 U	43 UJ	41 UJ
33	PCB-1260	38 U	43 UJ	41 UJ
170	Toxaphene	200 U	220 UJ	210 UJ

Notes:

B	Present in laboratory blank and/or field QC blanks
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above lab method detection limit

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3C
DATA SUMMARY FORM: ORGANIC COMPOUNDS
SLUDGE SAMPLES
(ug/Kg)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-SL1	WFF1-SL02	WFF1-SL03
	Sample Date	2/23/2007	2/22/2007	2/22/2007
	Location	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0/10[a]	5.0/50[a]	4.0/40[a]
	Percent Solids	10	62.9	61.3
CRQL	**Pesticide Compounds**			
1.7	Aldrin	220 UJ	13 U	11 U
1.7	alpha-BHC	220 UJ	13 U	11 U
1.7	beta-BHC	220 UJ	13 U	11 U
1.7	Chlordane (technical)	2200 UJ	130 U	110 U
3.3	4,4'-DDD	**110 J**	**1100 J**	**1200 J**
3.3	4,4'-DDE	**67 J**	**1400**	**1300**
3.3	4,4'-DDT	**110 J**	**890 J**	**1100 J**
1.7	delta-BHC	220 UJ	13 U	11 U
3.3	Dieldrin	440 UJ	**9.9 J**	**5.6 J**
1.7	Endosulfan I	220 UJ	13 U	11 U
3.3	Endosulfan II	440 UJ	26 U	21 U
3.3	Endosulfan sulfate	440 UJ	26 U	21 U
3.3	Endrin	440 UJ	26 U	21 U
3.3	Endrin aldehyde	440 UJ	26 U	21 U
3.3	Endrin ketone	440 UJ	26 U	21 U
1.7	gamma-BHC (Lindane)	220 UJ	13 U	11 U
1.7	Heptachlor	220 UJ	13 U	11 U
1.7	Heptachlor epoxide	220 UJ	13 U	11 U
17	Methoxychlor	2200 UJ	130 U	110 U
33	PCB-1016	4400 UJ	260 U	210 U
67	PCB-1221	8900 UJ	530 U	440 U
33	PCB-1232	4400 UJ	260 U	210 U
33	PCB-1242	4400 UJ	260 U	210 U
33	PCB-1248	4400 UJ	260 U	210 U
33	PCB-1254	4400 UJ	260 U	210 U
33	PCB-1260	4400 UJ	260 U	210 U
170	Toxaphene	22000 UJ	1300 U	1100 U

Notes:

B	Present in laboratory blank and/or field QC blanks
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/Kg	Microgram per kilogram
Bold	Reported value is above lab method detection limit
a	Second dilution performed for DDx compounds

* Dry Weight CRQL = Non-adjusted CRQL ÷ (% solids ÷ 100)

TABLE 3D
DATA SUMMARY FORM: ORGANIC COMPOUNDS
GROUND WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-MW1	WFF1-MW2	WFF1-MW3	WFF1-MW3-D
	Sample Date	2/23/2007	2/23/2007	2/23/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0
	Sample Volume (ml)	1040	1040	1060	1000
CRQL	**Pesticides Compounds**				
0.050	Aldrin	0.048 U	0.048 U	0.047 UJ	0.050 UJ
0.050	alpha-BHC	0.048 U	0.048 U	0.047 UJ	0.050 UJ
0.050	beta-BHC	0.048 U	0.048 U	0.047 UJ	0.050 UJ
0.50	Chlordane (technical)	0.48 U	0.48 U	0.47 UJ	0.50 UJ
0.10	4,4'-DDD	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.10	4,4'-DDE	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.10	4,4'-DDT	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.50	delta-BHC	0.048 U	0.048 U	0.047 UJ	0.050 UJ
0.10	Dieldrin	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.050	Endosulfan I	0.048 U	0.048 U	0.047 UJ	0.050 UJ
0.10	Endosulfan II	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.10	Endosulfan sulfate	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.10	Endrin	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.10	Endrin aldehyde	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.10	Endrin ketone	0.096 U	0.096 U	0.094 UJ	0.10 UJ
0.050	gamma-BHC (Lindane)	0.048 U	0.048 U	0.047 UJ	0.050 UJ
0.050	Heptachlor	0.048 U	0.048 U	0.047 UJ	0.050 UJ
0.050	Heptachlor epoxide	0.048 U	0.048 U	0.047 UJ	0.050 UJ
0.50	Methoxychlor	0.48 U	0.48 U	0.47 UJ	0.50 UJ
1.0	PCB-1016	0.96 U	0.96 U	0.94 UJ	1.0 UJ
2.0	PCB-1221	1.9 U	1.9 U	1.9 UJ	2.0 UJ
1.0	PCB-1232	0.96 U	0.96 U	0.94 UJ	1.0 UJ
1.0	PCB-1242	0.96 U	0.96 U	0.94 UJ	1.0 UJ
1.0	PCB-1248	0.96 U	0.96 U	0.94 UJ	1.0 UJ
1.0	PCB-1254	0.96 U	0.96 U	0.94 UJ	1.0 UJ
1.0	PCB-1260	0.96 U	0.96 U	0.94 UJ	1.0 UJ
5.0	Toxaphene	4.8 U	4.8 U	4.7 UJ	5.0 UJ

Notes:

B	Present in laboratory blank and/or field QC blank samples
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
ml	Milliliter
NA	Not analyzed
Bold	Reported value is above laboratory method detection limit

* Sample CRQL = Non-adjusted CRQL (1000ml ÷ Sample Vol)

TABLE 3E
DATA SUMMARY FORM: ORGANIC COMPOUNDS
GROUND WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant, Wallops Island Flight Facillity, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	WFF1-MW4	WFF1-MW5	WFF1-MW6	WFF1-MW7	WFF1-MW20
	Sample Date	2/23/2007	2/23/2007	2/22/2007	2/22/2007	2/23/2007
	Location	WWTP#1	WWTP#1	WWTP#1	WWTP#1	WWTP#1
	Dilution Factor	1.0	1.0	1.0	1.0	1.0
	Sample Volume (ml)	1000	1040	1000	1000	980
CRQL	**Pesticides Compounds**					
0.050	Aldrin	0.050 U	0.048 U	0.050 UJ	0.050 U	0.051 UJ
0.050	alpha-BHC	0.050 U	0.048 U	0.050 UJ	0.050 U	0.051 UJ
0.050	beta-BHC	0.050 U	0.048 U	0.050 UJ	0.050 U	0.051 UJ
0.50	Chlordane (technical)	0.50 U	0.48 U	0.50 UJ	0.50 U	0.51 UJ
0.10	4,4'-DDD	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.10	4,4'-DDE	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.10	4,4'-DDT	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.50	delta-BHC	0.050 U	0.048 U	0.050 UJ	0.050 U	0.051 UJ
0.10	Dieldrin	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.050	Endosulfan I	0.050 U	0.048 U	0.050 UJ	0.050 U	0.051 UJ
0.10	Endosulfan II	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.10	Endosulfan sulfate	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.10	Endrin	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.10	Endrin aldehyde	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.10	Endrin ketone	0.10 U	0.096 U	0.10 UJ	0.10 U	0.10 UJ
0.050	gamma-BHC (Lindane)	0.050 U	0.048 U	0.050 UJ	0.050 U	0.051 UJ
0.050	Heptachlor	0.050 U	0.048 U	0.050 UJ	0.050 U	0.051 UJ
0.050	Heptachlor epoxide	0.050 U	0.048 U	0.050 UJ	0.050 U	0.051 UJ
0.50	Methoxychlor	0.50 U	0.48 U	0.50 UJ	0.50 U	0.51 UJ
1.0	PCB-1016	1.0 U	0.96 U	1.0 UJ	1.0 U	1.0 UJ
2.0	PCB-1221	2.0 U	1.9 U	2.0 UJ	2.0 U	2.0 UJ
1.0	PCB-1232	1.0 U	0.96 U	1.0 UJ	1.0 U	1.0 UJ
1.0	PCB-1242	1.0 U	0.96 U	1.0 UJ	1.0 U	1.0 UJ
1.0	PCB-1248	1.0 U	0.96 U	1.0 UJ	1.0 U	1.0 UJ
1.0	PCB-1254	1.0 U	0.96 U	1.0 UJ	1.0 U	1.0 UJ
1.0	PCB-1260	1.0 U	0.96 U	1.0 UJ	1.0 U	1.0 UJ
5.0	Toxaphene	5.0 U	4.8 U	5.0 UJ	5.0 U	5.1 UJ

Notes:

B	Present in laboratory blank and/or field QC blank sample
CRQL	Contract Required Quantitation Limit
J	Estimated value
K	Value is biased high based on QC data
L	Value is biased low based on QC data
U	Analyzed for but not detected at the reported value
µg/L	Microgram per liter
ml	Milliliter
NA	Not analyzed
Bold	Reported value is above laboratory method detection limit

* Sample CRQL = Non-adjusted CRQL (1000ml ÷ Sample Vol)

TABLE 3F
DATA SUMMARY FORM: ORGANIC COMPOUNDS
FIELD QC WATER SAMPLES
(ug/L)

Site Name: Old Waste Water Treatment Plant
Wallops Island Flight Facility, VA
Contract No: W91236-05-D-0036
Sampling Dates: February 19-23, 2007

	Sample No.	Rinsate 3	Rinsate-4
	Sample Date	2/22/2007	2/23/2007
	Location	Field QC	Field QC
	Dilution Factor	1.0	1.0
	Sample Volume	1000	850
CRQL	**Pesticides Compounds**		
0.050	Aldrin	0.050 U	0.059 UJ
0.050	alpha-BHC	0.050 U	0.059 UJ
0.050	beta-BHC	0.050 U	0.059 UJ
0.50	Chlordane (technical)	0.50 U	0.59 UJ
0.10	4,4'-DDD	0.10 U	0.12 UJ
0.10	4,4'-DDE	0.10 U	0.12 UJ
0.10	4,4'-DDT	0.10 U	0.12 UJ
0.50	delta-BHC	0.050 U	0.059 UJ
0.10	Dieldrin	0.10 U	0.12 UJ
0.050	Endosulfan I	0.050 U	0.059 UJ
0.10	Endosulfan II	0.10 U	0.12 UJ
0.10	Endosulfan sulfate	0.10 U	0.12 UJ
0.10	Endrin	0.10 U	0.12 UJ
0.10	Endrin aldehyde	0.10 U	0.12 UJ
0.10	Endrin ketone	0.10 U	0.12 UJ
0.050	gamma-BHC (Lindane)	0.050 U	0.059 UJ
0.050	Heptachlor	0.050 U	0.059 UJ
0.050	Heptachlor epoxide	0.050 U	0.059 UJ
0.50	Methoxychlor	0.50 U	0.59 UJ
1.0	PCB-1016	1.0 U	1.2 UJ
2.0	PCB-1221	2.0 U	2.4 UJ
1.0	PCB-1232	1.0 U	1.2 UJ
1.0	PCB-1242	1.0 U	1.2 UJ
1.0	PCB-1248	1.0 U	1.2 UJ
1.0	PCB-1254	1.0 U	1.2 UJ
1.0	PCB-1260	1.0 U	1.2 UJ
5.0	Toxaphene	5.0 U	5.9 UJ

Notes: B - Present in the laboratory blank and/or field QC blanks
CRQL - Contract Required Quantitation Limit
J - Estimated value
K - Value is biased high based on QC data
L - Value is biased low based on QC data
U - Analyzed for but not detected at the reported value
µg/L - Microgram per liter
ml - Milliliter
NA - Not analyzed
Bold - Reported value is above lab method detection limit

* Sample CRQL = Non-adjusted CRQL (1000ml ÷ Sample Vol)

APPENDIX E
SOIL DISPOSAL DOCUMENTATION

Certification of Remediation and Recycling

Presented to

U. S. ARMY CORPS. OF ENGINEERS

Hereinafter known as the "Generator" of NON-HAZARDOUS ~~PETROLEUM CONTAMINATED~~ MATERIAL, which originated from Wallops Flight Facility, Chincoteague, Virginia.

As evidenced by the receipt of corresponding manifests, **8 drums** of material were delivered to the Chesapeake Facility for biological treatment and disposal at the SPSA Regional Landfill. Said material was received on April 20, 2007 and has been deemed acceptable for treatment according to all applicable Commonwealth of Virginia Department of Environmental Quality regulations.

The remediation and recycling activities are conducted in accordance with Commonwealth of Virginia Department of Environmental Quality Permit-by-Rule No. 510, which applies only to the remediation and recycling of non-hazardous materials.

Certification No. 27-1472
Presented this 30th day of April, 2007

SOILEX CORPORATION

Soilex Corporation
Post Office Box 1444
Chesapeake, VA 23327
(757) 549-8448
FAX: (757) 549-6668

NON-HAZARDOUS SHIPPING MANIFEST

MANIFEST NO. 782105

NAME U.S. Army Corps of Engineers TELEPHONE 757-362-1022

ADDRESS 803 Front Street CITY Norfolk STATE VA

SHIPMENT ORIGIN Wallops Flight Facility CITY Chincoteague STATE VA

AUTHORIZED AGENT IMS Environmental Services FIRM

ADDRESS 929 Professional Place, Chesapeake, VA 23320 OTHER Weston Solutions Project

MATERIAL CHARACTERIZATION

ACTIVITY GENERATING THIS MATERIAL: UST/AST REMOVAL X/10 OTHER Well Installation

PETROLEUM TYPE (S): VIRGIN PRODUCT X/10 NON-VIRGIN PRODUCT _____

PHYSICAL STATE: STOCKPILED _____ EXCAVATING _____ DRUMS 3 OTHER _____

HANDLING INSTRUCTIONS: **Transport To Facility Designated Below**

FIRE OR SPILL INSTRUCTIONS: **Non-Flammable / Non-Hazardous**

DESTINATION:

I hereby certify, to the best of my knowledge, the material characterized above is non-hazardous as defined by the Virginia Hazardous Waste Management Regulations, Federal Regulations under Subtitle C – RCRA, U.S. Department of Transportation, or local/state of origin regulations.

IMS
Signature of Generator / Agent

Stephen Cooper 1/19/07
Printed Name / Date

TRANSPORTER

TRANSPORTER NAME IMS Environmental Services TELEPHONE (757) 436-3100 TRUCK NO. 144

I certify that the materials described above were received by me for shipment and delivered to the designated facility.

Transporter Signature / Date

I certify that the materials described above were delivered to the facility and received by me.

ACCEPTED BY _____ DATE _____

REASONS FOR REJECTION _____

Gross Weight
Tare Weight
Net Weight
Tons

GENERATOR

Client: Weston Solutions, Inc.

Job Number: 680-24532-1
Sdg Number: 68024532

Client Sample ID: SOIL CUTTINGS

Lab Sample ID: 680-24532-13
Client Matrix: Solid

Date Sampled: 02/22/2007 1035
Date Received: 02/23/2007 0925

8260B Volatile Organic Compounds by GC/MS -TCLP

Method: 8260B
Preparation: 5030B
Dilution: 20
Date Analyzed: 03/02/2007 1722
Date Prepared: 03/02/2007 1722
Date Leached: 03/01/2007 1230

Analysis Batch: 680-68843

Leachate Batch: 680-68802

Instrument ID: GC/MS Volatiles - O
Lab File ID: o5190.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	DryWt Corrected: N	Result (ug/L)	Qualifier	MDL	RL
Benzene		20	U	11	20
Carbon tetrachloride		20	U	18	20
Chlorobenzene		20	U	8.2	20
Chloroform		20	U	10	20
1,2-Dichloroethane		20	U	5.6	20
1,1-Dichloroethene		20	U	19	20
Methyl Ethyl Ketone		100	U	14	100
Tetrachloroethene		20	U	15	20
Trichloroethene		20	U	14	20
Vinyl chloride		40	U	18	40

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene	101	77 - 120
Dibromofluoromethane	96	75 - 123
Toluene-d8 (Surr)	97	79 - 122

Client: Weston Solutions, Inc.

Job Number: 680-24532-1
Sdg Number: 68024532

Client Sample ID: **SOIL CUTTINGS**

Lab Sample ID: 680-24532-13
Client Matrix: Solid

Date Sampled: 02/22/2007 1035
Date Received: 02/23/2007 0925

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) -TCLP

Method: 8270C
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 03/07/2007 1859
Date Prepared: 03/05/2007 0841

Analysis Batch: 680-69175
Prep Batch: 680-68884

Instrument ID: GC/MS SemiVolatiles - N
Lab File ID: n6003.d
Initial Weight/Volume: 200 mL
Final Weight/Volume: 1 mL
Injection Volume:

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	MDL	RL
1,4-Dichlorobenzene		0.050	U	0.0026	0.050
2,4-Dinitrotoluene		0.050	U	0.0028	0.050
Hexachlorobenzene		0.050	U	0.0055	0.050
Hexachlorobutadiene		0.050	U	0.0050	0.050
Hexachloroethane		0.050	U	0.0050	0.050
Methyl Phenols,Total		0.050	U	0.0070	0.050
Nitrobenzene		0.050	U	0.0046	0.050
Pentachlorophenol		0.25	U	0.0030	0.25
Pyridine		0.25	U	0.0050	0.25
2,4,5-Trichlorophenol		0.050	U	0.0032	0.050
2,4,6-Trichlorophenol		0.050	U	0.0035	0.050

Surrogate	%Rec	Acceptance Limits
Terphenyl-d14	96	10 - 154
2,4,6-Tribromophenol	73	55 - 126
2-Fluorobiphenyl	64	59 - 103
2-Fluorophenol	66	56 - 100
Nitrobenzene-d5	66	60 - 102
Phenol-d5	66	55 - 104

Client: Weston Solutions, Inc.

Job Number: 680-24532-1
Sdg Number: 68024532

Client Sample ID: **SOIL CUTTINGS**

Lab Sample ID: 680-24532-13
Client Matrix: Solid

Date Sampled: 02/22/2007 1035
Date Received: 02/23/2007 0925

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography -TCLP

Method: 8081A_8082
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 03/06/2007 1239
Date Prepared: 02/26/2007 1134

Analysis Batch: 680-69382
Prep Batch: 680-68312

Instrument ID: GC SemiVolatiles - M
Lab File ID: mc05062.d
Initial Weight/Volume: 20 mL
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	MDL	RL
Chlordane (technical)		0.025	U	0.0085	0.025
Endrin		0.0050	U	0.00050	0.0050
gamma-BHC (Lindane)		0.0025	U	0.00028	0.0025
Methoxychlor		0.025	U	0.0012	0.025
Heptachlor		0.0025	U	0.00038	0.0025
Heptachlor epoxide		0.0025	U	0.00075	0.0025
Toxaphene		0.25	U	0.044	0.25

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	64	30 - 150
DCB Decachlorobiphenyl	65	30 - 150

Client: Weston Solutions, Inc.

Job Number: 680-24532-1
Sdg Number: 68024532

Client Sample ID: **SOIL CUTTINGS**

Lab Sample ID: 680-24532-13
Client Matrix: Solid

Date Sampled: 02/22/2007 1035
Date Received: 02/23/2007 0925

8151A Chlorinated Herbicides by GC -TCLP

Method: 8151A
Preparation: 8151A
Dilution: 1.0
Date Analyzed: 03/01/2007 2241
Date Prepared: 02/28/2007 0804
Date Leached: 02/26/2007 1728

Analysis Batch: 680-68793
Prep Batch: 680-68535
Leachate Batch: 680-68369

Instrument ID: GC SemiVolatiles - S
Lab File ID: sc01018.d
Initial Weight/Volume: 10 mL
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	MDL	RL
2,4-D		0.025	U	0.011	0.025
Silvex (2,4,5-TP)		0.025	U	0.0033	0.025

Surrogate	%Rec	Acceptance Limits
DCAA	79	35 - 134

Client: Weston Solutions, Inc.

Job Number: 680-24532-1
Sdg Number: 68024532

Client Sample ID: **SOIL CUTTINGS**

Lab Sample ID: 680-24532-13
Client Matrix: Solid

Date Sampled: 02/22/2007 1035
Date Received: 02/23/2007 0925

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry-TCLP

Method:	6010B	Analysis Batch: 680-68712		Instrument ID:	ICP/AES
Preparation:	3010A	Prep Batch: 680-68477		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 680-68369		Initial Weight/Volume:	5 mL
Date Analyzed:	03/01/2007 0513			Final Weight/Volume:	50 mL
Date Prepared:	02/27/2007 1336				
Date Leached:	02/26/2007 1728				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	MDL	RL
Arsenic		0.20	U	0.052	0.20
Barium		0.18	J	0.012	1.0
Cadmium		0.10	U	0.010	0.10
Chromium		0.012	J	0.0095	0.20
Lead		0.20	U	0.035	0.20
Selenium		0.50	U	0.054	0.50
Silver		0.10	U	0.010	0.10

7470A Mercury in Liquid Waste (Manual Cold Vapor Technique)-TCLP

Method:	7470A	Analysis Batch: 680-68749		Instrument ID:	LEEMAN1
Preparation:	7470A	Prep Batch: 680-68509		Lab File ID:	N/A
Dilution:	1.0	Leachate Batch: 680-68369		Initial Weight/Volume:	0.50 mL
Date Analyzed:	03/01/2007 1321			Final Weight/Volume:	50 mL
Date Prepared:	02/27/2007 1607				
Date Leached:	02/26/2007 1728				

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	MDL	RL
Mercury		0.020	U	0.0080	0.020

General Chemistry

Client Sample ID: **SOIL CUTTINGS**

Lab Sample ID: 680-24532-13
Client Matrix: Solid

Date Sampled: 02/22/2007 1035
Date Received: 02/23/2007 0925

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Reactive	100	U	mg/Kg	100	100	1.0	9014
Anly Batch: 680-68565	Date Analyzed		02/27/2007 1555			DryWt Corrected: N	
Prep Batch: 680-68560	Date Prepared:		02/27/2007 1010				
Sulfide, Reactive	58	U	mg/Kg	58	58	1.0	9034
Anly Batch: 680-68556	Date Analyzed		02/27/2007 1430			DryWt Corrected: Y	
Prep Batch: 680-68417	Date Prepared:		02/27/2007 0945				

Analyte	Result	Qual	Units	Dil	Method
Ignitability	NB		mm/sec	1.0	1030
Anly Batch: 680-68412	Date Analyzed		02/26/2007 1700	DryWt Corrected: N	
pH	7.03		SU	1.0	9045C
Anly Batch: 680-68630	Date Analyzed		02/27/2007 1535	DryWt Corrected: N	

Client Sample ID: **WFF1-SS8**

Lab Sample ID: 680-24532-14
Client Matrix: Solid

% Moisture: 12.3

Date Sampled: 02/22/2007 1300
Date Received: 02/23/2007 0925

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	0.56	U	mg/Kg	0.28	0.56	1.0	9012A
Anly Batch: 680-68609	Date Analyzed		02/28/2007 1239			DryWt Corrected: Y	
Prep Batch: 680-68607	Date Prepared:		02/28/2007 0630				

Client Sample ID: **RINSATE 1**

Lab Sample ID: 680-24532-16RB
Client Matrix: Water

Date Sampled: 02/20/2007 1620
Date Received: 02/23/2007 0925

Analyte	Result	Qual	Units	MDL	RL	Dil	Method
Cyanide, Total	0.010	U	mg/L	0.0050	0.010	1.0	9012A
Anly Batch: 680-68422	Date Analyzed		02/27/2007 0855				
Prep Batch: 680-68310	Date Prepared:		02/26/2007 0730				

DATA REPORTING QUALIFIERS

Client: Weston Solutions, Inc.

Job Number: 680-24532-1
Sdg Number: 68024532

Lab Section	Qualifier	Description
GC/MS VOA		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
GC/MS Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
	F	MS or MSD exceeds the control limits
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	H	Sample was prepped or analyzed beyond the specified holding time
	X	Surrogate exceeds the control limits
GC Semi VOA		
	U	Indicates the analyte was analyzed for but not detected.
	M	Manual integrated compound.
	F	MS or MSD exceeds the control limits
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	F	RPD of the MS and MSD exceeds the control limits
	X	Surrogate exceeds the control limits
	P	The lower of the two values is reported when the % difference between the results of two GC columns is greater than 40%

DATA REPORTING QUALIFIERS

Client: Weston Solutions, Inc.

Job Number: 680-24532-1
Sdg Number: 68024532

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample.
	U	Indicates the analyte was analyzed for but not detected.
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	U	Indicates the analyte was analyzed for but not detected.

SAMPLE RESULTS

1

ORGANIC ANALYSIS DATA SHEET
Volatile Organic Compounds by GC/MS
TCLP

Client Sample ID: SOIL CUTTINGS

Lab Name: STL Savannah | Job No.: 680-24532-1

SDG No.: 68024532

Matrix: Solid | Lab Sample ID: 680-24532-13

Sample wt/vol: 5 (mL) | Lab File ID: o5190.d

Level: (low/med) Low | Date Received: 02/23/2007

% Moisture: | Date Analyzed: 03/02/2007

GC Column: DB-624 ID: 0.18 (mm) | Dilution Factor: 20

Soil Extract Volume: | Soil Aliquot Volume:

CAS NO.	COMPOUND	UNITS: ug/L	Q
71-43-2	Benzene	20	U
56-23-5	Carbon tetrachloride	20	U
108-90-7	Chlorobenzene	20	U
67-66-3	Chloroform	20	U
107-06-2	1,2-Dichloroethane	20	U
75-35-4	1,1-Dichloroethene	20	U
78-93-3	Methyl Ethyl Ketone	100	U
127-18-4	Tetrachloroethene	20	U
79-01-6	Trichloroethene	20	U
75-01-4	Vinyl chloride	40	U

1

ORGANIC ANALYSIS DATA SHEET

Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

TCLP

Client Sample ID: SOIL CUTTINGS

Lab Name: STL Savannah

Job No.: 680-24532-1

SDG No.: 68024532

Matrix: Solid

Lab Sample ID: 680-24532-13

Sample wt/vol: 200 (mL)

Lab File ID: n6003.d

Level: (low/med) Low

Date Received: 02/23/2007

% Moisture:

Date Extracted: 03/05/2007

Concentrated Extract Volume: 1 (mL)

Date Analyzed: 03/07/2007

Injection Volume:

Dilution Factor: 1

GPC Cleanup: (Y/N) N

Extraction Method: 3520C

CAS NO.	COMPOUND	UNITS: mg/L	Q
106-46-7	1,4-Dichlorobenzene	0.050	U
121-14-2	2,4-Dinitrotoluene	0.050	U
67-72-1	Hexachloroethane	0.050	U
118-74-1	Hexachlorobenzene	0.050	U
87-68-3	Hexachlorobutadiene	0.050	U
1319-77-3	Methyl Phenols,Total	0.050	U
98-95-3	Nitrobenzene	0.050	U
87-86-5	Pentachlorophenol	0.25	U
110-86-1	Pyridine	0.25	U
95-95-4	2,4,5-Trichlorophenol	0.050	U
88-06-2	2,4,6-Trichlorophenol	0.050	U

1

ORGANIC ANALYSIS DATA SHEET

Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

TCLP

Client Sample ID: SOIL CUTTINGS

Lab Name: STL Savannah | Job No.: 680-24532-1

SDG No.: 68024532

Matrix: Solid | Lab Sample ID: 680-24532-13

Sample wt/vol: 20 (mL) | Lab File ID: mc05062.d

% Moisture: | Date Received: 02/23/2007

Extraction Method: 3520C | Date Extracted: 02/26/2007

Concentrated Extract Volume: 10 (mL) | Date Analyzed: 03/06/2007

Injection Volume: | Dilution Factor: 1

GPC Cleanup: (Y/N) N | GC Column: CLP II ID: 0.32 (mm)

CAS NO.	COMPOUND	UNITS: mg/L	Q
57-74-9	Chlordane (technical)	0.025	U
72-20-8	Endrin	0.0050	U
58-89-9	gamma-BHC (Lindane)	0.0025	U
72-43-5	Methoxychlor	0.025	U
76-44-8	Heptachlor	0.0025	U
1024-57-3	Heptachlor epoxide	0.0025	U
8001-35-2	Toxaphene	0.25	U

1

ORGANIC ANALYSIS DATA SHEET
Chlorinated Herbicides by GC
TCLP

Client Sample ID: SOIL CUTTINGS

Lab Name: STL Savannah | Job No.: 680-24532-1

SDG No.: 68024532

Matrix: Solid | Lab Sample ID: 680-24532-13

Sample wt/vol: 10 (mL) | Lab File ID: sc01018.d

% Moisture: | Date Received: 02/23/2007

Extraction Method: 8151A | Date Extracted: 02/28/2007

Concentrated Extract Volume: 10 (mL) | Date Analyzed: 03/01/2007

Injection Volume: | Dilution Factor: 1

GPC Cleanup: (Y/N) N | GC Column: DB-XLB ID: 0.32 (mm)

CAS NO.	COMPOUND	UNITS: mg/L	Q
94-75-7	2,4-D	0.025	U
93-72-1	Silvex (2,4,5-TP)	0.025	U

FORM I 8151A

STL SAVANNAH

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

SOIL CUTTINGS

Contract:

Lab Code: STLSAV Case No.: SAS No.: SDG NO.: 68024532

Matrix (soil/water): TCLP Lab Sample ID: 680-24532-13

Level (low/med): LOW Date Received: 2/23/2007

Concentration Units (mg/L or mg/kg dry weight): MG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	0.20	U		P
7440-39-3	Barium	0.18	J		P
7440-43-9	Cadmium	0.10	U		P
7440-47-3	Chromium	0.012	J		P
7439-92-1	Lead	0.20	U		P
7782-49-2	Selenium	0.50	U		P
7440-22-4	Silver	0.10	U		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

STL SAVANNAH

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

SOIL CUTTINGS

Contract:

Lab Code: STLSAV Case No.: SAS No.: SDG NO.: 68024532

Matrix (soil/water): TCLP Lab Sample ID: 680-24532-13

Level (low/med): LOW Date Received: 2/23/2007

Concentration Units (mg/L or mg/kg dry weight): MG/L

CAS No.	Analyte	Concentration	C	Q	M
7439-97-6	Mercury	0.020	U		CV

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

1B-IN

INORGANIC ANALYSIS DATA SHEET

Client ID: SOIL CUTTINGS

Lab Name: STL Savannah Job No.: 680-24532-1

SDG No.: 68024532

Matrix: Solid Lab Sample ID: 680-24532-13

Date Received: 02/23/2007 925 % Moisture:

CAS No.	Analyte	Conc.	Units	C	Q	Method
STL00045	Cyanide, Reactive	100	mg/Kg	U		9014
STL00261	Sulfide, Reactive	58	mg/Kg	U		9034
STL00250	Ignitability	NB	mm/sec			1030
STL00204	pH	7.03	SU			9045C

Comments:

FORM IB-IN

Serial Number 93811

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: WFF - WWTP #1	PROJECT NO.	PROJECT LOCATION (STATE): VA	PAGE / OF
STL (LAB) PROJECT MANAGER: ABBIE PAGE	P.O. NUMBER: 0057557	CONTRACT NO.	STANDARD REPORT DELIVERY ☆
CLIENT (SITE) PM: THERESA OFFNER	CLIENT PHONE: 770-325-7961	CLIENT FAX	DATE DUE
CLIENT NAME: WESTON SOLUTIONS	CLIENT E-MAIL: THERESA.OFFNER@WESTONSOLUTIONS.COM		EXPEDITED REPORT DELIVERY (SURCHARGE) ○
CLIENT ADDRESS: 5430 METRIC PL (STE 100) NORCROSS GA 30092			DATE DUE
COMPANY CONTRACTING THIS WORK (if applicable)			NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE — COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS — SVOC, TEST, TCLP: PCB, HERB, PESTICIDES, METALS; TCLP VOA; IGNIT, PH, REACTIVE CYANIDE REACTIVE SULFIDE; VOC; SVOC, PEST/PCB; CYANIDE; METALS / HGRC.

PRESERVATIVE

NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	SVOC, TEST, TCLP: PCB, HERB, PESTICIDES, METALS	TCLP VOA	IGNIT, PH, REACTIVE CYANIDE REACTIVE SULFIDE	VOC	SVOC, PEST/PCB	CYANIDE	METALS / HGRC.	REMARKS
2/22/07	1035	SOIL CUTTINGS			X			X	X	X					
1	1300	WFFI-SSB			X						X	X	X	X	
	—	TB-3		X							X				
2/20/07	1620	RINSATE 1 ☆									X	X	X	X	

1.0/1.1/0.1
TEMP. 3.0/2.8

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
T.C. [illegible]	2/22/07	1340	Amelia Kennedy	2/22/07	1630			
RECEIVED BY: (SIGNATURE) Amelia Kennedy	DATE 2/22/07	TIME 1340	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
[illegible]	022307	0925			680-24532	☆ analyze per Theresa Offner 2-26-07

STL8240-680 (12/02)

APPENDIX F
ECOLOGICAL RECEPTORS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

August 3, 2004

Project name: Wallops Flight Facility

Project number: 9017 City/County, VA: Accomack

Greetings:

The U.S. Fish and Wildlife Service has reviewed your request for information on federally listed or proposed endangered or threatened species and designated critical habitat for the above referenced project. The following comments are provided under provisions of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

X You requested scoping comments. Enclosed are county lists (with species fact sheets).

X The information you requested is available at our website at http://vafo.fws.gov.

X In order to ensure coordination with the State agencies, we recommend that you contact **both** of the State agencies listed below since each agency maintains a different database and has differing expertise and/or regulatory responsibility. If either of these agencies determines that your project may impact a federally listed, proposed, or candidate species OR federally designated critical habitat, please contact this office and provide a copy of the response letter from each agency and the above referenced project number; otherwise, further contact with this office is not necessary.

Virginia Dept of Game and Inland Fisheries
Environmental Services Section
P.O. Box 11104
Richmond, VA 23230
(804) 367-1000

Virginia Dept of Conservation and Recreation
Division of Natural Heritage
217 Governor Street, 2nd Floor
Richmond, VA 23219
(804) 786-7951

_____ Enclosed is information about communication towers and how certain categories of work may not require further coordination.

_____ We concur that the proposed action is not likely to adversely affect federally listed species.

If you have any questions, please contact Eric Davis at (804) 693-6694, ext. 104.

Sincerely,

for Karen L. Mayne
Supervisor
Virginia Field Office

KEY

LE - federally listed endangered.

LT - federally listed threatened.

PE - federally proposed endangered.

PT - federally proposed threatened.

EX - believed to be extirpated in Virginia.

LE(S/A) - federally listed endangered due to similarity of appearance to a federally listed species.

LT(S/A) - federally listed threatened due to similarity of appearance to a federally listed species.

C - candidate species; the U.S. Fish and Wildlife Service has enough information to list the species as threatened or endangered, but this action is precluded by other listing activities.

SOC - species of concern; those species that have been identified as potentially imperiled or vulnerable throughout their range or a portion of their range. These species are not protected under the Endangered Species Act.

G - global rank; the species rarity throughout its total range.

G1 - extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 - very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it vulnerable to extinction.

G3 - either very rare and local throughout its range or found locally (abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.

G_T_ - signifies the rank of a subspecies or variety. For example, a G3T1 would apply to a subspecies of a species that is very rare and local throughout its range or found locally in a restricted range (G3) but the subspecies warrants a rank of T1, critically imperiled.

G_Q - The taxon has a questionable taxonomic assignment.

ACCOMACK COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
BIRDS		
Charadrius melodus	Piping plover	LT
Haliaeetus leucocephalus	Bald eagle	LT
INVERTEBRATES		
Cicindela dorsalis dorsalis	Northeastern beach tiger beetle	LT
MAMMALS		
Sciurus niger cinereus	Delmarva peninsula fox squirrel	LE
REPTILES		
Caretta caretta	Loggerhead sea turtle	LT
VASCULAR PLANTS		
Amaranthus pumilus	Seabeach amaranth	LT

Species of Concern (No official Federal status)

VASCULAR PLANTS		
Polygonum glaucum	Sea-beach knotweed	G3
Trillium pusillum var virginianum	Virginia least trillium	G3T2

May 29, 2001
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

Piping Plover

Charadrius melodus

© J. Zickefoose

Description - Piping plovers occur in three disjunct populations in North America: Northern Great Plains, Great Lakes, and Atlantic Coast. The piping plover is a 5 ½ inch long pale grayish-brown shorebird with a white breast. During the breeding season, it has a black breast band which is sometimes incomplete and a black bar between its eyes. The bill is dull orange with a black tip and the legs and feet are orange.

Life History - The piping plover nesting season is from late April to late July with one brood raised per year. If there is a disturbance or the nest is lost, the birds may renest. Plovers nest on beaches, dunes, and washover areas. They also nest on areas where suitable dredged material is deposited. The nest is a shallow scrape in the sand dug by the adults and is usually lined with broken seashells and small pebbles. The female usually lays four eggs. The chicks are mobile and able to feed themselves within hours of hatching. Piping plovers feed on small invertebrates in intertidal surf zones, mud flats, tidal pool edges, barrier flats, and sand flats and along the ocean and barrier bays. Plovers migrate to breeding grounds from February through early April, and to wintering grounds from late July through September.

Conservation - The piping plover was federally listed as a threatened species along the Atlantic Coast on January 10, 1986. In the Northern Great Plains, it is federally listed threatened and in the Great Lakes, endangered. Destruction and degradation of habitat and disturbance during the nesting season by humans and pets are threats to this species. Piping plovers are extremely sensitive to disturbance during the nesting season. Predation by red foxes, skunks, raccoons, feral cats, herring gulls, fish crows, grackles, and ghost crabs is an additional threat to the eggs and young.

What You Can Do To Help - Respect all signed or fenced shorebird nesting areas; stay as far away from these areas as possible. The birds and their eggs blend in with the sand and are difficult to see. Young birds are particularly vulnerable before they can fly and can be killed by vehicles or trapped in vehicle tracks. Watch for signs of adult birds calling, displaying a feigned broken wing, or flying or running ahead of you. Keep pets leashed or indoors during the nesting season; both dogs and cats are known to prey on eggs and chicks. Take care not to discard trash or food scraps on beaches used by nesting birds, as they attract predators that may prey on eggs and/or chicks.

To find out more about the piping plover contact:

Virginia Department of Game and Inland Fisheries
P.O. Box 11104
Richmond, Virginia 23230
(804) 367-1000

References

Cross, R.C. 1991. Piping plover. Pages 501-502 in K. Terwilliger, ed. Virginia's Endangered Spcies, Proceddings of a Symposium. McDonald and Woodward Publishing Company, Blacksburg, Virginia.

U.S. Fish and Wildlife Service. 1985. Endangered and Threatened Wildlife and Plants: Determination of endangered and threatened status for the piping plover; final rule. Federal Register 50(238):50726-59734.

U.S. Fish and Wildlife Service, Region 5. 1994. You can help protect the piping plover. Newton Corner, Massachusetts.

U.S. Fish and Wildlife Service. 1996. Piping plover (*Charadrius melodus)* Atlantic Coast population, revised recovery plan. Hadley, Massachusetts.

U.S. Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, Virginia 23061
(804) 693-6694
http://www.fws.gov
August 1999

Bald Eagle

Haliaeetus leucocephalus

Description - The bald eagle occurs throughout the United States. It is a large bird-of-prey with dark brown plumage, a white head and tail, and a yellow bill, feet, and eyes. Juvenile eagles generally have a dark brown body, sometimes with white patches on the tail, belly, and underwings. The head and tail become completely white when full adult plumage is reached at four to five years of age.

Life History - The majority of Virginia's eagle population is found on the coastal plain. The bald eagle breeding season begins in mid-November when large nests are built (or the previous year's nest is repaired) usually in loblolly pine trees that are in close proximity to water. Eagles lay one to three eggs between mid-January and late March. In March, most eggs hatch and by June or July most young have fledged. However, the young will continue to use the nest for several weeks. In Virginia, during the summer and winter months, juvenile and nonbreeding adult eagles congregate along large rivers in areas with abundant food and little human disturbance. During the day, these eagles feed and perch along the river shoreline. In late afternoon, they move inland to roost either singly or communally. Roosts are typically located away from human disturbance and near water and a food source. Bald eagles feed primarily on fish, but will also eat carrion, waterfowl, small mammals, snakes, and turtles.

Conservation - The bald eagle was federally listed as an endangered species in the Chesapeake Bay Region on March 11, 1967. On July 12, 1995, the bald eagle was reclassified to threatened throughout the 48 lower states because the population had increased due to the banning persistent pesticides, habitat protection, and other recovery activities. On July 6, 1999, the bald eagle was proposed for removal from the list of endangered and threatened wildlife in the lower 48 states. This action was proposed because the available data indicated that this species has recovered. The recovery is due in part to habitat protection and management actions initiated under the Endangered Species Act. It is also due to reduction in levels of persistent pesticides occurring in the environment. If and when the eagle is no longer protected by the Endangered Species Act, it will still be protected by the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, and state laws. Until the eagle is officially delisted, it will continue to receive protection pursuant to the Endangered Species Act. Bald eagles in the Chesapeake Bay are increasing. However, habitat destruction through urban and residential development and human disturbance in nesting, roosting, and foraging habitats continue to be a threat.

What You Can Do To Help - If you know of a bald eagle nest on or near property proposed for clearing, development, or logging please contact one of the following agencies for assistance:

Virginia Department of Game and Inland Fisheries
P.O. Box 11104
Richmond, Virginia 23230
(804) 367-1000

U. S. Fish and Wildlife Service
6669 Short Lane
Gloucester, Virginia 23061
(804) 693-6694

References

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U.S. Fish and Wildlife Service. 1999. Proposed rule to remove the bald eagle in the lower 48 states from the list of endangered and threatened wildlife. Federal Register 64(128): 36453-36464.

Watts, B.D., K.W. Cline, and M.A. Byrd. 1994. The bald eagle in Virginia: An information booklet for land planners. The Center for Conservation Biology, College of William and Mary, Williamsburg, Virginia.

U.S. Fish and Wildlife Service
Virginia Field Office
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(804) 693-6694
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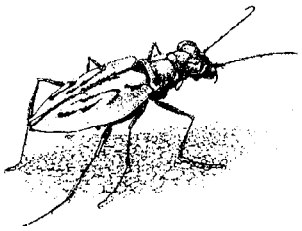
August 1999

Northeastern Beach Tiger Beetle

Cicindela dorsalis dorsalis



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Description - Historically, the northeastern beach tiger beetle was common on coastal beaches from Massachusetts to central New Jersey, and along the Chesapeake Bay in Maryland and Virginia. Currently, the only populations known to exist along the Atlantic Coast are in New Jersey and southeastern Massachusetts. The majority of populations occur in the Chesapeake Bay. This insect measures 0.5 inches in length. It has white to light tan wing covers, often with several fine grayish-green lines, and a bronze-green head and body.

Life History - Adult and larval tiger beetles are found on long, wide, dynamic beaches that have little human and vehicular activity, fine sand-particle size, and a high degree of exposure to tidal action. Adult beetles are present from June through August and are active on warm, sunny days where they can be seen feeding, mating, or basking along the water's edge. Adults are active predators that forage on small invertebrates or scavenge on dead fish, crabs, and amphipods. Larvae are sedentary predators that live in well-formed burrows from which they extend to capture passing prey. During the summer, adult tiger beetles lay eggs on the beach. After hatching, the larvae pass through three developmental stages and emerge from their burrows as adults two years following egg-laying.

Conservation - The northeastern beach tiger beetle was federally listed as a threatened species on August 7, 1990. Few northeastern beach tiger beetle sites are protected and many are threatened by human activities. Loss of this beetle from most of its range has been attributed primarily to destruction and disturbance of natural beach habitat from shoreline development, beach stabilization, and high levels of recreational use. Additional threats include pollution, pesticides, oil slicks, and off-road vehicle traffic. Natural limiting factors include winter storms, beach erosion, flood tides, hurricanes, parasites, and predators. Recovery for the tiger beetle depends to a large extent on re-establishing the subspecies across its former range along the Atlantic Coast and protecting it within the Chesapeake Bay.

What You Can Do To Help - If you plan to stabilize a tidal beach along the Chesapeake Bay or its tributaries, please contact the U.S. Fish and Wildlife Service. Such activity may require a federal permit, for more information contact:

U.S. Army Corps of Engineers
Norfolk District
803 Front Street
Norfolk, Virginia 23510-1096
(757) 441-7652

References

Knisley, C.B. 1991. Northeastern beach tiger beetle. Pages 233-234 in K. Terwilliger, ed. Virginia's Endangered Species, Proceedings of a Symposium. McDonald and Woodward Publishing Company, Blacksburg, Virginia.

Knisley, C.B., J.I. Luebke, and D.R. Beatty. 1987. Natural history and population decline of the coastal tiger beetle, *Cicindela dorsalis dorsalis* Say (Coleoptera: Cicindelidae). Virginia Journal of Science 38: 293-303.

U.S. Fish and Wildlife Service. 1994. Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis* Say) recovery plan. Hadley, Massachusetts.

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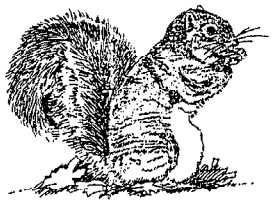
Delmarva Peninsula Fox Squirrel

Sciurus niger cinereus



Description - The Delmarva Peninsula fox squirrel is a light gray, large-bodied tree squirrel with a full, fluffy tail. The feet and underparts are white and the ears and face are whitish. This fox squirrel is easily confused with the more common gray squirrel. However, the gray squirrel is smaller with darker gray fur and its feet, tail, face, and back are rusty brown.

Distribution - Historically, the Delmarva Peninsula fox squirrel was distributed throughout the eastern shore of Maryland and Virginia, southeastern Pennsylvania, New Jersey, and Delaware. By the early 1900s, this squirrel was extinct in Virginia. However, it has been reintroduced at Chincoteague National Wildlife Refuge in Accomack County and property owned by The Nature Conservancy in Northampton County.

Habitat - This fox squirrel is typically found in open, mature loblolly pine and oak forests or in mixed stands of pine, beech, and sweetgum. Sites that contain mast and seed producing trees, have old trees that provide den sites, and have agricultural fields nearby are preferred by this squirrel.

Life History - The diet of the fox squirrel appears to be identical to that of the gray squirrel. In autumn, nuts and pine cones are usually plentiful and comprise a large portion of the fox squirrel's diet. In the spring, their diet shifts to tree buds and flowers, fruit, insects, seeds, and occasionally bird eggs and young. The fox squirrel prefers tree hollows for dens. They also construct nests composed of leaves and twigs. These nests are used for shelter and rearing young. Mating occurs in late winter and early spring and most young are born from February to April with a few as late as July or August. Offspring are raised solely by the female and food availability likely governs the size and number of the litters.

Conservation - The Delmarva Peninsula fox squirrel was federally listed as an endangered species on March 11, 1967. Destruction of habitat by timber harvest, short-rotation pine management, forest conversion to agriculture, and residential development is a continuing threat to this species. Pine-bark beetles, severe storms, and other factors causing forest die-offs are additional threats.

What You Can Do To Help - To learn more about the Delmarva Peninsula fox squirrel visit:

Chincoteague National Wildlife Refuge
U.S. Fish and Wildlife Service
P.O. Box 62
Chincoteague, Virginia 23336
(757) 336-6122

Or contact:

Virginia Department of Game and Inland Fisheries
P.O. Box 11104
Richmond, Virginia 23230
(804) 367-1000

References

Dueser, R.D. and C.O. Handley, Jr. 1991. Fox squirrel. Pages 585-587 in K. Terwilliger, ed. Virginia's Endangered Species, Proceedings of a Symposium. McDonald and Woodward Publishing Company, Blacksburg, Virginia.

U.S. Fish and Wildlife Service. 1993. Delmarva fox squirrel (*Sciurus niger cinereus*) recovery plan, second revision. Hadley, Massachusetts.

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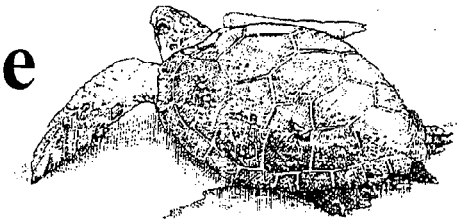
Loggerhead Sea Turtle

Caretta caretta



Description - The loggerhead sea turtle occurs in the Atlantic, Indian and Pacific Oceans; the Gulf of Mexico; and the Caribbean and Mediterranean Seas. In Virginia, loggerhead sea turtles are found throughout the Chesapeake Bay, around the barrier islands off the Eastern Shore, and off the coast in the Atlantic Ocean. The carapace (top shell) of the adult is hard, heart-shaped, and reddish-brown with an average length of 36.2 inches in the southeastern United States. The entire underside, sides of neck, and parts of the flippers are yellow or whitish. It has a large triangular head and each flipper has two claws.

Life History - This turtle is a marine species and spends most of its time in the ocean and estuaries where it feeds, breeds, and migrates. Loggerheads feed mainly on horseshoe crabs, but their diet also includes mollusks, crustaceans, jellyfish, fish, and various sea grasses. The loggerhead is the only sea turtle that nests as far north as Virginia. Loggerheads nest in small numbers along Virginia's coast and nesting usually occurs from April through September. Females dig shallow pits on the beach to deposit their eggs. Hatchlings emerge as a group and begin to crawl rapidly toward the ocean. After reaching the water, they find food and protection among floating mats of vegetation in the Gulf Stream. They can be found in Virginia's waters from May through November. They migrate south during the winter months.

Conservation - The loggerhead sea turtle was federally listed as a threatened species on July 28, 1978. Threats to this species are numerous: nest abandonment occurs from human disturbance; shoreline stabilization structures deter nesting; and beach development results in increased light intensity inland, causing hatchlings to become disoriented and travel inland where they die. Entanglement, ingestion, and contact with marine debris are hazards to sea turtles. Turtles can become entangled in trawling nets, pound nets, crab pot lines, and gill nets and subsequently drown. Boat propellers can wound or kill sea turtles.

What You Can Do To Help - Watch out for sea turtles while boating in Virginia's waters! If you find a stranded, wounded, or dead sea turtle please contact one of the following organizations:

Virginia Institute of Marine Science
(804) 642-7313

Virginia Marine Science Museum
(757) 437-4949

National Marine Fisheries Service
(508) 281-9291

References

Keinath, J.A. and J.A. Musick. 1991. Loggerhead sea turtle. Pages 445-448 in K. Terwilliger, ed. Virginia's Endangered Species, Proceedings of a Symposium. McDonald and Woodward Publishing Company, Blacksburg, Virginia.

Mitchell, J.C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington and London.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991. Recovery plan for U.S. population of loggerhead turtle. National Marine Fisheries Service, Washington, D.C.

Nelson, D.A. 1988. Life history and environmental requirements of loggerhead turtles. U.S. Fish and Wildlife Service Biological Report 88(23). U.S. Army Corps of Engineers TR EL-86-2(Rev).

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VAFWIS - Department of Game and Inland Fisheries

37,51,11.0 -75,28,28.0 is the Search Point

Submit Cancel

Search Point

- **Change** to "clicked" map point
- **Fixed** at 37,51,11.0 -75,28,28.0

Show Position Rings

Yes No

1 mile and 1/4 mile at the **Search Point**

Search Point is at map center

Base Map Choices

Topography

Map Overlay Choices

Current List: Position, Search

Map Overlay Legend

Virginia Fish and Wildlife Information Service

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Map Click: Pan Id M

Map Scale: In Zoom Out

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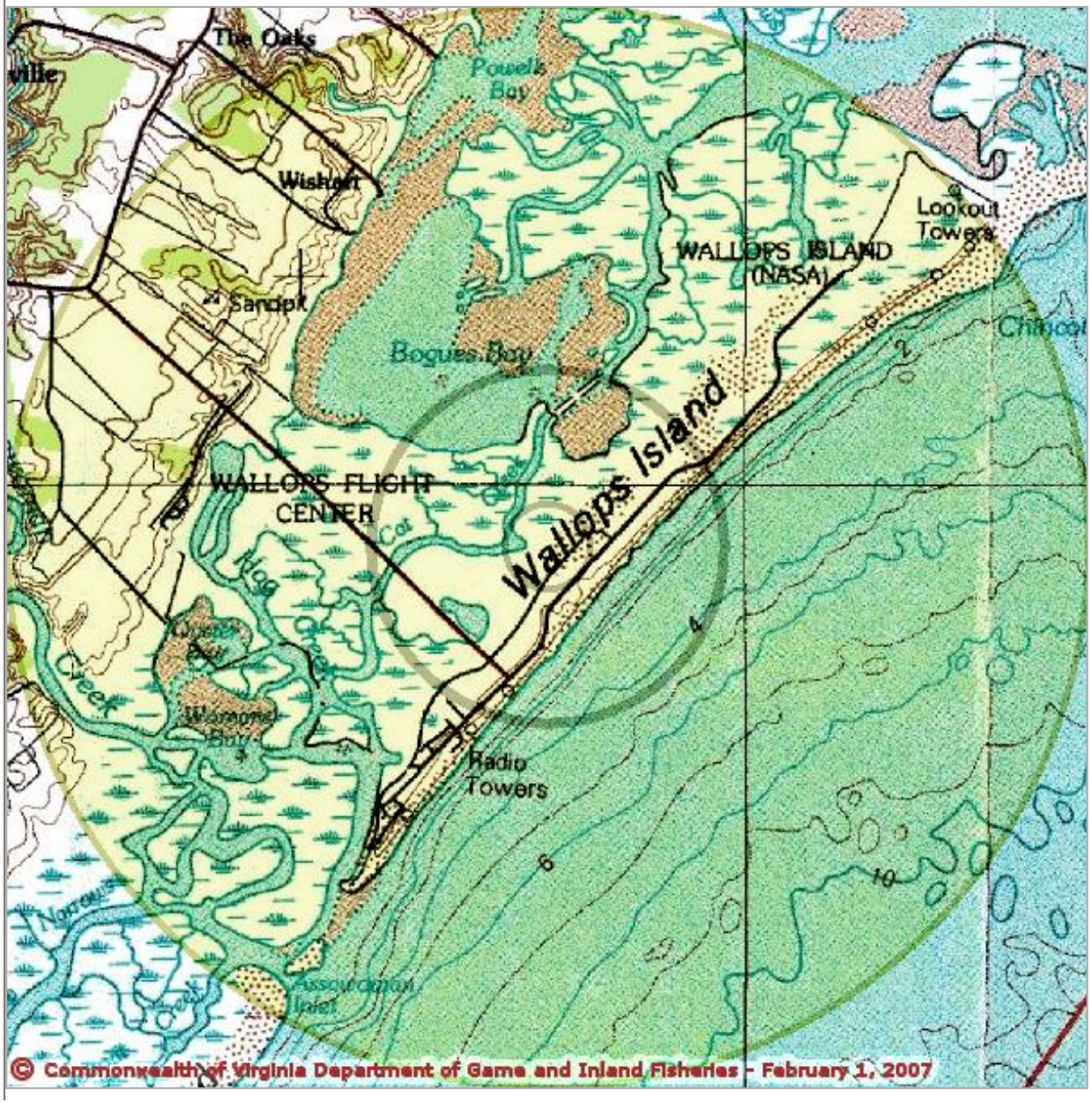

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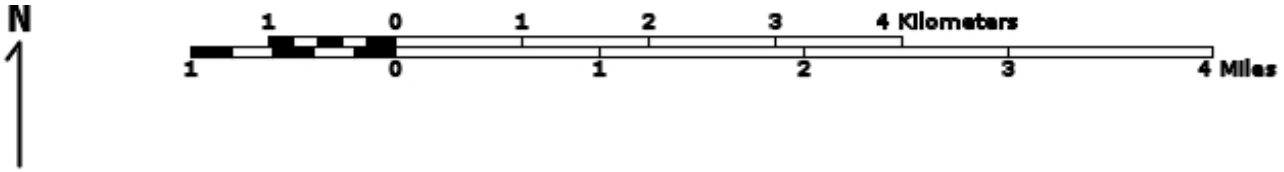
3 mile radius Search Area



Point of Search 37,51,11.0 -75,28,28.0

Map Location 37,51,11.0 -75,28,28.0

Select **Coordinate System:**

- ○ Degrees,Minutes,Seconds Latitude - Longitude
- ○ Decimal Degrees Latitude - Longitude
- ○ Meters UTM NAD83 East North Zone
- ○ Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see terraserver-usa.com for details)

Map projection is UTM Zone 18 NAD 1983 with left 453479 and top 4194431. Pixel size is 16 meters . Coordinates displayed are Degrees, Minutes, Seconds North and West.Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.16 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.59 square miles.

The United States Department of the Interior, United States Geological Survey is the source for topographic maps and Aerial photography. All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheries - February 1, 2007

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Virginia Fish and Wildlife Information Service

Species List Report

List of species known or likely to occur within a **3 mile radius of (at 37,51,11.0 -75,28,28.3)** in **001 Accomack, VA.**

1-491 Species Records

Bova Code	Status*	Common Name	Scientific Name
030073	FESE	Turtle, hawksbill (= carey) sea	Eretmochelys imbricata
030074	FESE	Turtle, Kemp?s (= Atlantic) Ridley sea	Lepidochelys kempii
030075	FESE	Turtle, leatherback sea	Dermochelys coriacea
040183	FESE	Tern, roseate	Sterna dougallii dougallii
050062	FESE	Squirrel, Delmarva Peninsula fox	Sciurus niger cinereus
040093	FTST	Eagle, bald	Haliaeetus leucocephalus
040120	FTST	Plover, piping	Charadrius melodus
030071	FTST	Turtle, loggerhead sea	Caretta caretta
030072	FTST	Turtle, green sea	Chelonia mydas
030067	FS	Terrapin, northern diamond-backed	Malaclemys terrapin terrapin
010032	FSSS	Sturgeon, Atlantic	Acipenser oxyrhynchus
040110	FS	Rail, black	Laterallus jamaicensis
040292	FSST	Shrike, migrant loggerhead	Lanius ludovicianus migrans
040320	FS	Warbler, cerulean	Dendroica cerulea
040379	FSST	Sparrow, Henslow?s	Ammodramus henslowii
040118	SE	Plover, Wilson?s	Charadrius wilsonia
040179	ST	Tern, gull-billed	Sterna nilotica
040129	ST	Sandpiper, upland	Bartramia longicauda

040293	ST	Shrike, loggerhead	Lanius ludovicianus
040096	ST	Falcon, peregrine	Falco peregrinus
040403	ST	Falcon, Arctic peregrine	Falco peregrinus tundrius
040381	SS	Sparrow, saltmarsh sharp-tailed	Ammodramus caudacutus
050110	SS	Mole, star-nosed	Condylura cristata parva
040366	SS	Finch, purple	Carpodacus purpureus
040372	SS	Crossbill, red	Loxia curvirostra
050045	SS	Otter, northern river	Lontra canadensis lataxina
040029	SS	Heron, little blue	Egretta caerulea caerulea
040032	SS	Egret, great	Ardea alba egretta
040034	SS	Heron, tricolored	Egretta tricolor
040036	SS	Night-heron, yellow-crowned	Nyctanassa violacea violacea
040020	SS	Pelican, brown	Pelecanus occidentalis carolinensis
040040	SS	Ibis, glossy	Plegadis falcinellus
040285	SS	Kinglet, golden-crowned	Regulus satrapa
040314	SS	Warbler, magnolia	Dendroica magnolia
040238	SS	Flycatcher, yellow-bellied	Empidonax flaviventris
040262	SS	Nuthatch, red-breasted	Sitta canadensis
040264	SS	Creeper, brown	Certhia americana
040266	SS	Wren, winter	Troglodytes troglodytes
040270	SS	Wren, sedge	Cistothorus platensis
040278	SS	Thrush, hermit	Catharus guttatus
040213	SS	Owl, northern saw-whet	Aegolius acadicus
040241	SS	Flycatcher, alder	Empidonax alnorum
040180	SS	Tern, Forster?s	Sterna forsteri
040094	SS	Harrier, northern	Circus cyaneus
040112	SS	Moorhen, common	Gallinula chloropus cachinnans
040186	SS	Tern, least	Sterna antillarum
040204	SS	Owl, barn	Tyto alba pratincola
040188	SS	Tern, sandwich	Sterna sandvicensis acuflavidus

040189	SS	Tern, Caspian	Sterna caspia
040190		Tern, black	Chlidonias niger
040191		Tern, white-winged	Chlidonias leucopterus
040192		Skimmer, black	Rynchops niger
040193		Razorbill	Alca torda
040195		Dovekie	Alle alle
040196		Puffin, Atlantic	Fratercula artica
040197		Pigeon, rock	Columba livia
040198		Dove, mourning	Zenaida macroura carolinensis
040202		Cuckoo, yellow-billed	Coccyzus americanus
040203		Cuckoo, black-billed	Coccyzus erythropthalmus
040205		Screech-owl, eastern	Megascops asio
040206		Owl, great horned	Bubo virginianus
040209		Owl, barred	Strix varia
040211		Owl, short-eared	Asio flammeus
040187		Tern, royal	Sterna maxima maximus
040185		Tern, bridled	Sterna anaethetus
040113		Coot, American	Fulica americana
040114		Oystercatcher, American	Haematopus palliatus
040115		Stilt, black-necked	Himantopus mexicanus
040116		Avocet, American	Recurvirostra americana
040117		Plover, semipalmated	Charadrius semipalmatus
040095		Osprey	Pandion haliaetus carolinensis
040111		Gallinule, purple	Porphyrula martinica
040181		Tern, common	Sterna hirundo
040119		Killdeer	Charadrius vociferus
040122		Golden-plover, American	Pluvialis dominicus
040123		Plover, black-bellied	Pluvialis squatarola
040124		Godwit, Hudsonian	Limosa haemastica
040125		Godwit, bar-tailed	Limosa lapponica lapponica

040126		Godwit, marbled	Limosa fedoa
040127		Whimbrel	Numenius phaeopus
040130		Yellowlegs, greater	Tringa melanoleuca
040131		Yellowlegs, lesser	Tringa flavipes
040133		Willet	Catoptrophorus semipalmatus semipalmatus
040134		Sandpiper, spotted	Actitis macularia
040135		Turnstone, ruddy	Arenaria interpres morinella
040136		Phalarope, Wilson?s	Phalaropus tricolor
040137		Phalarope, red-necked	Phalaropus lobatus
040138		Phalarope, red	Phalaropus fulicarius
040140		Woodcock, American	Scolopax minor
040141		Snipe, common	Gallinago gallinago
040142		Dowitcher, short-billed	Limnodromus griseus
040143		Dowitcher, long-billed	Limnodromus scolopaceus
040144		Knot, red	Calidris canutus rufus
040145		Sanderling	Calidris alba
040146		Sandpiper, semipalmated	Calidris pusilla
040147		Sandpiper, western	Calidris mauri
040149		Sandpiper, least	Calidris minutilla
040150		Sandpiper, white-rumped	Calidris fuscicollis
040151		Sandpiper, Baird?s	Calidris bairdii
040152		Sandpiper, pectoral	Calidris melanotos
040153		Sandpiper, purple	Calidris maritima
040154		Dunlin	Calidris alpina hudsonia
040155		Sandpiper, curlew	Calidris ferruginea
040156		Sandpiper, stilt	Calidris himantopus
040157		Sandpiper, buff-breasted	Tryngites subruficollis
040158		Ruff	Philomachus pugnax
040159		Jaeger, pomarine	Stercorarius pomarinus

040161		Jaeger, long-tailed	Stercorarius longicaudus
040162		Skua, great	Stercorarius skua
040163		Gull, glaucous	Larus hyperboreus
040165		Gull, great black-backed	Larus marinus
040166		Gull, lesser black-backed	Larus fuscus
040167		Gull, herring	Larus argentatus
040170		Gull, ring-billed	Larus delawarensis
040173		Gull, laughing	Larus atricilla
040176		Gull, little	Larus minutus
040177		Kittiwake, black-legged	Rissa tridactyla
040242		Flycatcher, least	Empidonax minimus
040243		Pewee, eastern wood	Contopus virens
040245		Lark, horned	Eremophila alpestris
040246		Swallow, tree	Tachycineta bicolor
040247		Swallow, bank	Riparia riparia
040248		Swallow, northern rough-winged	Stelgidopteryx serripennis
040249		Swallow, barn	Hirundo rustica
040250		Swallow, cliff	Petrochelidon pyrrhonota pyrrhonota
040251		Martin, purple	Progne subis
040252		Jay, blue	Cyanocitta cristata
040253		Magpie, black-billed	Pica hudsonia
040255		Crow, American	Corvus brachyrhynchos
040256		Crow, fish	Corvus ossifragus
040257		Chickadee, black-capped	Poecile atricapillus
040258		Chickadee, Carolina	Poecile carolinensis
040260		Titmouse, tufted	Baeolophus bicolor
040261		Nuthatch, white-breasted	Sitta carolinensis
040214		Chuck-will?s-widow	Caprimulgus carolinensis
040215		Whip-poor-will	Caprimulgus vociferus
040216		Nighthawk, common	Chordeiles minor

040217		Swift, chimney	Chaetura pelagica
040218		Hummingbird, ruby-throated	Archilochus colubris
040220		Kingfisher, belted	Ceryle alcyon
040221		Flicker, northern	Colaptes auratus
040222		Woodpecker, pileated	Dryocopus pileatus
040223		Woodpecker, red-bellied	Melanerpes carolinus
040224		Woodpecker, red-headed	Melanerpes erythrocephalus
040225		Sapsucker, yellow-bellied	Sphyrapicus varius
040226		Woodpecker, hairy	Picoides villosus
040227		Woodpecker, downy	Picoides pubescens medianus
040229		Kingbird, eastern	Tyrannus tyrannus
040230		Kingbird, gray	Tyrannus dominicensis
040231		Kingbird, western	Tyrannus verticalis
040234		Flycatcher, great crested	Myiarchus crinitus
040235		Flycatcher, ash-throated	Myiarchus cinerascens
040236		Phoebe, eastern	Sayornis phoebe
040281		Veery	Catharus fuscescens
040282		Bluebird, eastern	Sialia sialis
040283		Wheatear, northern	Oenanthe oenanthe
040284		Gnatcatcher, blue-gray	Polioptila caerulea
040271		Mockingbird, northern	Mimus polyglottos
040272		Catbird, gray	Dumetella carolinensis
040273		Thrasher, brown	Toxostoma rufum
040275		Robin, American	Turdus migratorius
040277		Thrush, wood	Hylocichla mustelina
040268		Wren, Carolina	Thryothorus ludovicianus
040269		Wren, marsh	Cistothorus palustris
040265		Wren, house	Troglodytes aedon
040263		Nuthatch, brown-headed	Sitta pusilla
040239		Flycatcher, Acadian	Empidonax virescens

040240		Flycatcher, willow	Empidonax traillii
040316		Warbler, black-throated blue	Dendroica caerulescens
040317		Warbler, yellow-rumped	Dendroica coronata cornata
040319		Warbler, black-throated green	Dendroica virens
040286		Kinglet, ruby-crowned	Regulus calendula
040287		Pipit, American	Anthus rubescens
040288		Pipit, Sprague?s	Anthus spragueii
040290		Waxwing, cedar	Bombycilla cedrorum
040294		Starling, European	Sturnus vulgaris
040295		Vireo, white-eyed	Vireo griseus
040297		Vireo, yellow-throated	Vireo flavifrons
040298		Vireo, blue-headed	Vireo solitarius
040299		Vireo, red-eyed	Vireo olivaceus
040302		Warbler, black-and-white	Mniotilta varia
040303		Warbler, prothonotary	Protonotaria citrea
040305		Warbler, worm-eating	Helmitheros vermivorus
040307		Warbler, blue-winged	Vermivora pinus
040310		Warbler, orange-crowned	Vermivora celata
040311		Warbler, Nashville	Vermivora ruficapilla
040312		Parula, northern	Parula americana
040313		Warbler, yellow	Dendroica petechia
040041		Ibis, white	Eudocimus albus
040042		Flamingo, greater	Phoenicopterus ruber
040043		Swan, mute	Cygnus olor
040044		Swan, tundra	Cygnus columbianus columbianus
040045		Goose, Canada	Branta canadensis
040046		Brant	Branta bernicla brota
040049		Goose, lesser snow	Chen caerulescens caerulescens
040050		Whistling-duck, fulvous	Dendrocygna bicolor
040051		Mallard	Anas platyrhynchos

040052		Duck, American black	Anas rubripes
040053		Gadwall	Anas strepera
040054		Pintail, northern	Anas acuta acuta
040055		Pintail, white-cheeked	Anas bahamensis
040056		Teal, green-winged	Anas crecca carolinensis
040057		Teal, blue-winged	Anas discors orphna
040058		Wigeon, Eurasian	Anas penelope
040059		Wigeon, American	Anas americana
040060		Shoveler, northern	Anas clypeata
040061		Duck, wood	Aix sponsa
040062		Redhead	Aythya americana
040064		Canvasback	Aythya valisineria
040065		Scaup, greater	Aythya marila
040066		Scaup, lesser	Aythya affinis
040067		Goldeneye, common	Bucephala clangula americana
040068		Bufflehead	Bucephala albeola
040069		Duck, long-tailed	Clangula hyemalis
040070		Duck, Harlequin	Histrionicus histrionicus
040071		Eider, common	Somateria mollissima
040072		Eider, king	Somateria spectabilis
040073		Scoter, white-winged	Melanitta fusca deglandi
040074		Scoter, surf	Melanitta perspicillata
040075		Scoter, black	Melanitta nigra americana
040076		Duck, ruddy	Oxyura jamaicensis
040077		Merganser, hooded	Lophodytes cucullatus
040078		Merganser, common	Mergus merganser americanus
040079		Merganser, red-breasted	Mergus serrator serrator
040080		Vulture, turkey	Cathartes aura
040081		Vulture, black	Coragyps atratus
040085		Hawk, sharp-shinned	Accipiter striatus velox

040086		Hawk, Cooper?s	Accipiter cooperii
040087		Hawk, red-tailed	Buteo jamaicensis
040088		Hawk, red-shouldered	Buteo lineatus lineatus
040089		Hawk, broad-winged	Buteo platypterus
040090		Hawk, rough-legged	Buteo lagopus johannis
040021		Booby, brown	Sula leucogaster
040023		Cormorant, great	Phalacrocorax carbo
040024		Cormorant, double-crested	Phalacrocorax auritus
040026		Frigatebird, magnificent	Fregata magnificens
040027		Heron, great blue	Ardea herodias herodias
040028		Heron, green	Butorides virescens
030068		Turtle, eastern box	Terrapene carolina carolina
040001		Loon, common	Gavia immer
040002		Loon, Arctic	Gavia arctica
040003		Loon, red-throated	Gavia stellata
040004		Grebe, red-necked	Podiceps grisegena
040005		Grebe, horned	Podiceps auritus
040006		Grebe, eared	Podiceps nigricollis
040008		Grebe, pied-billed	Podilymbus podiceps
040009		Fulmar, northern	Fulmarus glacialis
040011		Shearwater, greater	Puffinus gravis
040019		Pelican, American white	Pelecanus erythrorhynchos
040037		Bittern, least	Ixobrychus exilis exilis
040038		Bittern, American	Botaurus lentiginosus
040035		Night-heron, black-crowned	Nycticorax nycticorax hoactii
040033		Egret, snowy	Egretta thula
040030		Egret, cattle	Bubulcus ibis
040097		Merlin	Falco columbarius
040098		Kestrel, American	Falco sparverius sparverius
040100		Bobwhite, northern	Colinus virginianus

040101		Pheasant, ring-necked	Phasianus colchicus
040102		Turkey, wild	Meleagris gallopavo silvestris
040105		Rail, king	Rallus elegans
040106		Rail, clapper	Rallus longirostris crepitans
040107		Rail, Virginia	Rallus limicola
040108		Sora	Porzana carolina
040109		Rail, yellow	Coturnicops noveboracensis
010040		Shad, American	Alosa sapidissima
010045		Herring, blueback	Alosa aestivalis
010054		Mudminnow, eastern	Umbra pygmaea
010055		Pickerel, redfin	Esox americanus americanus
010056		Pickerel, chain	Esox niger
010068		Shiner, golden	Notemigonus crysoleucas
010106		Chubsucker, creek	Erimyzon oblongus
010123		Bullhead, brown	Ameiurus nebulosus
010129		Madtom, margined	Noturus insignis
010131		Eel, American	Anguilla rostrata
010140		Minnow, sheepshead	Cyprinodon variegatus
010143		Killifish, banded	Fundulus diaphanus
010148		Mosquitofish, eastern	Gambusia holbrooki
010163		Perch, pirate	Aphredoderus sayanus sayanus
010166		Perch, white	Morone americana
010178		Sunfish, bluespotted	Enneacanthus gloriosus
010182		Pumpkinseed	Lepomis gibbosus
010183		Bluegill	Lepomis macrochirus
010188		Bass, largemouth	Micropterus salmoides
010190		Crappie, black	Pomoxis nigromaculatus
010375		Shiner, ironcolor	Notropis chalybaeus
010397		Darter, tessellated	Etheostoma olmstedi
020004		Bullfrog, American	Rana catesbeiana

020006		Treefrog, Cope?s gray	Hyla chrysoscelis
020008		Frog, northern green	Rana clamitans melanota
020009		Treefrog, green	Hyla cinerea
020012		Frog, eastern cricket	Acris crepitans crepitans
020013		Frog, pickerel	Rana palustris
020016		Frog, southern leopard	Rana sphenocephala
020019		Frog, wood	Rana sylvatica
020029		Salamander, four-toed	Hemidactylium scutatum
020035		Salamander, marbled	Ambystoma opacum
020043		Salamander, eastern red-backed	Plethodon cinereus
020059		Toad, American	Bufo americanus
020061		Spadefoot, eastern	Scaphiopus holbrookii
020062		Toad, Fowler?s	Bufo fowleri
020065		Newt, red-spotted	Notophthalmus viridescens viridescens
020069		Salamander, eastern mud	Pseudotriton montanus montanus
020071		Peeper, northern spring	Pseudacris crucifer crucifer
020072		Frog, New Jersey chorus	Pseudacris feriarum kalmi
030002		Lizard, eastern fence	Sceloporus undulatus
030004		Skink, common five-lined	Eumeces fasciatus
030006		Skink, broad-headed	Eumeces laticeps
030007		Skink, little brown	Scincella lateralis
030016		Copperhead, northern	Agkistrodon contortrix mokasen
030018		Racer, northern black	Coluber constrictor constrictor
030019		Wormsnake, eastern	Carphophis amoenus amoenus
030020		Snake, northern ring-necked	Diadophis punctatus edwardsii
030021		Snake, southern ring-necked	Diadophis punctatus punctatus
030023		Ratsnake, black	Elaphe obsoleta obsoleta
030024		Snake, eastern hog-nosed	Heterodon platirhinos
030026		Kingsnake, eastern	Lampropeltis getula getula
030029		Milksnake, eastern	Lampropeltis triangulum triangulum

030034		Watersnake, northern	Nerodia sipedon sipedon
030038		Greensnake, northern rough	Opheodrys aestivus aestivus
030041		Brownsnake, northern	Storeria dekayi dekayi
030044		Gartersnake, eastern	Thamnophis sirtalis sirtalis
030045		Ribbonsnake, common	Thamnophis sauritus sauritus
030049		Earthsnake, eastern smooth	Virginia valeriae valeriae
030050		Turtle, eastern snapping	Chelydra serpentina serpentina
030051		Turtle, eastern mud	Kinosternon subrubrum subrubrum
030057		Cooter, northern red-bellied	Pseudemys rubriventris
030060		Turtle, eastern painted	Chrysemys picta picta
030063		Turtle, spotted	Clemmys guttata
050047		Skunk, striped	Mephitis mephitis nigra
050048		Skunk, striped	Mephitis mephitis mephitis
050049		Fox, red	Vulpes vulpes fulva
050050		Fox, common gray	Urocyon cinereoargenteus cinereoargenteus
050051		Bobcat	Lynx rufus rufus
050053		Nutria	Myocastor coypus
050054		Woodchuck	Marmota monax monax
050055		Chipmunk, Fisher?s eastern	Tamias striatus fisheri
050057		Squirrel, eastern gray	Sciurus carolinensis carolinensis
040373		Crossbill, white-winged	Loxia leucoptera
040375		Towhee, eastern	Pipilo erythrophthalmus
040377		Sparrow, savannah	Passerculus sandwichensis
040378		Sparrow, grasshopper	Ammodramus savannarum pratensis
040367		Finch, house	Carpodacus mexicanus
040370		Siskin, pine	Carduelis pinus
040371		Goldfinch, American	Carduelis tristis
050065		Squirrel, southern flying	Glaucomys volans volans
050069		Beaver, American	Castor canadensis

050074		Mouse, common white-footed	Peromyscus leucopus leucopus
050078		Rat, marsh rice	Oryzomys palustris palustris
050082		Vole, meadow	Microtus pennsylvanicus pennsylvanicus
050083		Vole, dark meadow	Microtus pennsylvanicus nigrans
050091		Vole, pine	Microtus pinetorum scalopsoides
050092		Muskrat, common	Ondatra zibethicus zibethicus
050093		Muskrat, large-toothed	Ondatra zibethicus macrodon
050095		Rat, Norway	Rattus norvegicus norvegicus
050098		Mouse, house	Mus musculus musculus
050099		Mouse, meadow jumping	Zapus hudsonius americanus
050103		Cottontail, eastern	Sylvilagus floridanus mallurus
050108		Deer, white-tailed	Odocoileus virginianus
050114		Deer, sika	Cervus nippon nippon
050125		Coyote	Canis latrans
060025		Mussel, eastern elliptio	Elliptio complanata
070120		CRAYFISH, WHITE RIVER	Procambarus acutus
070126		CRAYFISH	Fallicambarus fodiens
100040		Moth, codling	Cydia pomonella
100041		Borer, European corn	Ostrinia nubilatis
100042		Earworm, corn	Heliathis zea
100043		Armyworm	Pseudaletia unipuncta
100047		Moth, gypsy	Lymantria dispar
100079		Butterfly, monarch	Danaus plexippus
100082		Butterfly, silver-spotted skipper	Epargyreus clarus
100090		Butterfly, mourning cloak	Nymphalis antiopa
100092		Butterfly, black swallowtail	Papilio polyxenes asterius
100093		Butterfly, eastern tiger swallowtail	Papilio glaucus
100094		Butterfly, clouded sulphur	Colias philodice
100142		Butterfly, southern cloudywing	Thorybes bathyllus

100143		Butterfly, northern cloudywing	Thorybes pylades
100148		Butterfly, Juvenal?s duskywing	Erynnis juvenalis
100149		Butterfly, Horace?s duskywing	Erynnis horatius
100153		Butterfly, wild indigo duskywing	Erynnis baptisiae
100156		Butterfly, common checkered-skipper	Pyrgus communis
100157		Butterfly, common sootywing	Pholisora catullus
100159		Butterfly, clouded skipper	Lerema accius
100162		Butterfly, fiery skipper	Hylephila phyleus
100167		Butterfly, carus skipper	Polites carus
100174		Butterfly, sachem	Atalopedes campestris
100175		Butterfly, little glassywing	Pompeius verna
100181		Butterfly, Aaron?s skipper	Poanes aaroni
100184		Butterfly, Dion skipper	Euphyes dion
100196		Butterfly, Brazilian skipper	Calpodes ethlius
100198		Butterfly, salt marsh skipper	Panoquina panoquin
100201		Butterfly, giant swallowtail	Papilio cresphontes
100202		Butterfly, spicebush swallowtail	Papilio troilus
100203		Butterfly, Palamedes swallowtail	Papilio palamedes
100208		Butterfly, great southern white	Ascia monuste phileta
100209		Butterfly, falcate orangetip	Anthocharis midea
100211		Butterfly, orange sulphur	Colias eurytheme
100213		Butterfly, cloudless sulphur	Phoebis sennae eubule
100220		Butterfly, American copper	Lycaena phlaeas
100221		Butterfly, bronze copper	Lycaena hyllus
100227		Butterfly, white M hairstreak	Parrhasius m-album
100228		Butterfly, gray hairstreak	Strymon melinus
100235		Butterfly, red-banded hairstreak	Calycopis cecrops
100236		Butterfly, olive juniper hairstreak	Callophrys gryneus gryneus
100245		Butterfly, American snout	Libytheana carinenta

100247		Butterfly, variegated fritillary	Euptoieta claudia
100257		Butterfly, pearl crescent	Phyciodes tharos
100258		Butterfly, eastern comma	Polygonia comma
100262		Butterfly, American lady	Vanessa virginiensis
100264		Butterfly, red admiral	Vanessa atalanta
100265		Butterfly, common buckeye	Junonia coenia
100268		Butterfly, red-spotted purple	Limenitis arthemis astyanax
100269		Butterfly, tawny emperor	Asterocampa clyton
100273		Butterfly, southern pearly-eye	Enodia portlandia
100277		Butterfly, common wood-nymph	Cercyonis pegala
100278		Butterfly, Carolina satyr	Hermeuptychia sosybius
100279		Butterfly, little wood-satyr	Megisto cymela
100292		Moth, Promethea	Callosamia promethea
100359		Butterfly, Peck?s skipper	Polites peckius
110228		Tick, lone star	Amblyomma americanum
110229		Tick, winter	Dermacentor albipictus
110230		Tick, American dog	Dermacentor variabilis
110231		Tick, rabbit	Haemaphysalis leporispalustris
110232		Tick, brown dog	Rhipicephalus sanguineus
040382		Sparrow, seaside	Ammodramus maritimus
040383		Sparrow, vesper	Pooecetes gramineus
040387		Junco, dark-eyed	Junco hyemalis
040388		Sparrow, American tree	Spizella arborea
040389		Sparrow, chipping	Spizella passerina
040390		Sparrow, clay-colored	Spizella pallida
040391		Sparrow, field	Spizella pusilla
040393		Sparrow, white-crowned	Zonotrichia leucophrys
040394		Sparrow, white-throated	Zonotrichia albicollis
040395		Sparrow, fox	Passerella iliaca
040397		Sparrow, swamp	Melospiza georgiana

040398		Sparrow, song	Melospiza melodia
040400		Longspur, chestnut-collared	Calcarius ornatus
040401		Bunting, snow	Plectrophenax nivalis nivalis
040410		Goose, snow	Chen caerulescens
040412		Tern, elegant	Sterna elegans
040413		Sandpiper, sharp-tailed	Calidris acuminata
040416		Goose, Ross?	Chen rossii
040418		Sparrow, Nelson?s sharp-tailed	Ammodramus nelsoni
050001		Opossum, Virginia	Didelphis virginiana virginiana
050007		Shrew, southeastern	Sorex longirostris longirostris
050011		Shrew, southern short-tailed	Blarina carolinensis carolinensis
050015		Shrew, least	Cryptotis parva parva
050017		Mole, eastern	Scalopus aquaticus aquaticus
050020		Bat, little brown	Myotis lucifugus lucifugus
050022		Myotis, northern	Myotis septentrionalis septentrionalis
050025		Bat, silver-haired	Lasionycteris noctivagans
050027		Pipistrelle, eastern	Pipistrellus subflavus subflavus
050028		Bat, big brown	Eptesicus fuscus fuscus
050029		Bat, eastern red	Lasiurus borealis borealis
050030		Bat, hoary	Lasiurus cinereus cinereus
050033		Bat, evening	Nycticeius humeralis humeralis
050038		Raccoon	Procyon lotor lotor
050039		Raccoon	Procyon lotor maritimus
050041		Weasel, long-tailed	Mustela frenata noveboracensis
050042		Mink, common	Mustela vison mink
040321		Warbler, blackburnian	Dendroica fusca
040322		Warbler, yellow-throated	Dendroica dominica
040323		Warbler, chestnut-sided	Dendroica pensylvanica
040325		Warbler, blackpoll	Dendroica striata
040326		Warbler, pine	Dendroica pinus

040328		Warbler, prairie	Dendroica discolor
040329		Warbler, palm	Dendroica palmarum
040330		Ovenbird	Seiurus aurocapilla
040331		Waterthrush, northern	Seiurus noveboracensis
040332		Waterthrush, Louisiana	Seiurus motacilla
040333		Warbler, Kentucky	Oporornis formosus
040336		Yellowthroat, common	Geothlypis trichas
040337		Chat, yellow-breasted	Icteria virens virens
040338		Warbler, hooded	Wilsonia citrina
040340		Warbler, Canada	Wilsonia canadensis
040341		Redstart, American	Setophaga ruticilla
040342		Sparrow, house	Passer domesticus
040343		Bobolink	Dolichonyx oryzivorus
040344		Meadowlark, eastern	Sturnella magna
040346		Blackbird, red-winged	Agelaius phoeniceus
040347		Oriole, orchard	Icterus spurius
040348		Oriole, Baltimore	Icterus galbula
040351		Grackle, boat-tailed	Quiscalus major
040352		Grackle, common	Quiscalus quiscula
040353		Cowbird, brown-headed	Molothrus ater
040355		Tanager, scarlet	Piranga olivacea
040356		Tanager, summer	Piranga rubra
040357		Cardinal, northern	Cardinalis cardinalis
040358		Grosbeak, rose-breasted	Pheucticus ludovicianus
040360		Grosbeak, blue	Guiraca caerulea caerulea
040361		Bunting, indigo	Passerina cyanea
040365		Grosbeak, evening	Coccothraustes vespertinus

*FE=Federal Endangered; FT=Federal Threatened; FC=Federal Candidate; FS=Federal Species of Concern (not a legal status; list maintained by USFWS Virginia Field Office); SE=State Endangered; ST=State Threatened; SS=State Special Concern (not a legal status).

USGS Hydrological Unit(s): Mid Atlantic Region: Chincoteague Bay
Mid Atlantic Region: Eastern Lower Delmarva
Mid Atlantic Region: Lower Chesapeake Bay
Mid Atlantic Region: Pocomoke River
Mid Atlantic Region: Western Lower Delmarva

USGS 7.5' Quadrangles: Bloxom
Hallwood
Wallops Island
Chincoteague West

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Complied 2/1/2007 Visitor 115076

L. Preston Bryant, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951 FAX (804) 371-2674

FACSIMILE TRANSMISSION

DATE: 11.9.06

TO: Ed Mackey

COMPANY: Weston Solutions, Inc.

FAX #: 919.424.2201

FROM: Bridget McGoldrick

FAX # (804) 371-2674

TOTAL PAGES: 7 **(INCLUDES COVER PAGE)**

DESCRIPTION:

Comments on Project:
#43557: Occoquan Bible Church

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL (804) 786-7951

L. Preston Bryant, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951 FAX (804) 371-2674

November 9, 2006

Ed Mackey
Weston Solutions, Inc.
4917 Waters Edge, Suite 235
Raleigh, NC 27064

Re: Wallops Island Flight Facility

Dear Mr. Mackey:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, this site is located within the Little Mosquito Creek Conservation Site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Little Mosquito Creek Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of general significance. The natural heritage resources of concern at this site are Bald Eagle (*Haliaeetus leucocephalus*, G5/S2S3B,S3N/LT/LT) and Delta-spotted spiketail (*Cordulegaster diastatops*, G5/S1/NL/NL).

Bald Eagle nest sites are often found in the midst of large wooded areas near marshes or other bodies of water (Byrd, 1991). Bald Eagles feed on fish, waterfowl, seabirds (Campbell et. al., 1990), various mammals and carrion (Terres, 1980). Threats to this species include human disturbance of nest sites (Byrd, 1991), habitat loss, biocide contamination, decreasing food supply and illegal shooting (Herkert, 1992). Please note that this species is currently classified as threatened by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF). For this reason, DCR recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

Delta-spotted spiketail is found in small streams, seeps and trickles, but absent from the larger streams and small rivers. Area of adult foraging habitat surrounding breeding sites has indicated a range of 30 meters to 300 meters. Average distance traveled for a commuting flight (between reproductive and roosting or foraging sites) to be less than 200 m but sometimes greater than one km. Although little is known about dispersal, pond-breeding odonates may wander but generally stay within a few km of their emergence pond.

Adult Odonata (dragonflies and damselflies), commonly seen flitting and hovering along the shores of most freshwater habitats, are accomplished predators. Adults typically forage in clearings with scattered trees and shrubs near the parent river. They feed on mosquitoes and other smaller flying insects, and are thus considered highly beneficial. Odonates lay their eggs on emergent vegetation or debris at the water's edge. Unlike the adults, the larvae have an aquatic larval stage where they typically inhabit the sand and gravel of riffle areas. Wingless and possessing gills, they crawl about the submerged leaf litter and debris stalking their insect prey. The larvae seize unsuspecting prey with a long, hinged "grasper" that folds neatly under their chin. When larval development is complete, the aquatic larvae crawl from the water to the bank, climb up the stalk of the shoreline vegetation, and the winged adult emerges (Hoffman 1991; Thorpe and Covich 1991). Because of their aquatic lifestyle and limited mobility, the larvae are particularly vulnerable to shoreline disturbances that cause the loss of shoreline vegetation and siltation. They are also sensitive to alterations that result in poor water quality, aquatic substrate changes, and thermal fluctuations.

Due to the potential for this site to support populations of Delta-spotted spiketail, DCR recommends an inventory for the resource in the study area during the spring/summer months. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

Additionally, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Any absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks additional natural heritage resources. New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

A fee of $295.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, 203 Governor Street, Suite 414, Richmond, VA 23219, ATTN: Cashier. Payment is due within thirty days of the invoice date.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in this letter. Their database may be accessed from http://www.dgif.virginia.gov/wildlife/info_map/index.html , or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Michelle E. Edwards
Locality Liaison

Cc: Eric Davis, USFWS
Andy Zadnik, VDGIF

Literature Cited

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