# SITE INSPECTION REPORT

# U.S. Navy Richmond Naval Air Station Site

## PERRINE, MIAMI-DADE COUNTY, FLORIDA

**USEPA Identification No. FL6470032446**

**FDEP Comet # 55216**

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## PROFESSIONAL REVIEW CERTIFICATION

The Site Inspection described in this report was conducted, and the document prepared, in accordance with commonly accepted procedures consistent with the applied standards of practice under the direction of the undersigned professional geologist.

This report is based on the geologic investigation and associated information summarized in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned should be notified to evaluate the effects of any additional information on the report findings.

This Site Inspection Report was conducted at the USN Richmond NAS Site in Perrine, Miami-Dade County, Florida in material compliance with Florida Department of Environmental Protection directives and U.S. Environmental Protection Agency protocol, and the report should not be construed to apply for any other purpose or to any other site.

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## 1.0 INTRODUCTION

The Florida Department of Environmental Protection (FDEP) tasked MACTEC Engineering and Consulting, Inc., (MACTEC) to conduct a Site Inspection (SI) at the USN Richmond Naval Air Station (Richmond NAS) site, under contract No. HW526. The general purpose of this SI is to collect information on current site conditions including the nature of contamination, determine potential human and ecological exposure pathways, and determine the need for federal response under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 U.S.C. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986.

The objective of the SI is to determine the presence, nature, and origin of contamination at the sites that may have resulted in the potential release of hazardous substances into the environment. This SI report presents site background information, findings of previous investigations, identifies migration pathways, identifies the number of environmental samples and locations that were evaluated during the SI to characterize the nature of the contamination, describes sampling methodologies, and presents the results and findings of the SI.

During the SI, the Data Quality Objectives (DQO) were followed in material compliance with the prescribed guidance documents set forth by the United States Environmental Protection Agency (USEPA) Region IV including the USEPA Science and Ecosystem Support Division (SEDS) Region IV Field Branch Quality System and Technical Procedures, USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organics and Inorganics Analysis, and the National Functional Guidelines and Data Validation Standard Operating Procedure (SOP) for CLP Routine Analytical Services, Version 2.1. These DQOs specifically apply to sampling locations, sample types, sampling procedures, use of data, data types, and field quality assurance/quality control (QA/QC) samples.

FDEP used the data collected during this SI to score the site under the Hazard Ranking System (HRS). The HRS evaluation was completed as a separate document. The HRS is used by USEPA's Superfund program to assess the relative threat associated with actual or potential releases of hazardous substances. The HRS is the primary screening tool for determining whether or not a site is to be included on the National Priorities List (NPL).

The SI proposal, assessment, and report preparation activities were conducted by MACTEC for the Richmond NAS site and consisted of the following:

- Review and evaluate pertinent information regarding previous site history and site assessments of the RNAS site.
- FDEP consulted with the U.S. Army Corp of Engineers (USACE) Jacksonville office regarding the exchange of information relating to the USACE activities at the RNAS site under the Defense Environmental Restoration Program for Formerly Used Defense Site (DERP-FUDS).
- Propose a scope of work that would guide the collection of sufficient environmental data to determine whether or not this site poses a potential threat to human health, and sensitive environments that are threatened or potentially threatened by releases of hazardous materials from the site.
- Assess the site characteristics and characterize the potential contaminant sources at each of the five identified areas of concern (AOC), including waste type and volume.
- Identify the potential migration pathways under the USEPA's HRS for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and heavy metals contamination. In addition, selected soil samples were also analyzed for dioxin and furan compounds
- Identify the number of environmental samples and sampling locations at each AOC required to fill HRS data gaps and characterize the nature of the site related constituents of concern (COCs).
- Collect soil samples and groundwater samples for laboratory analysis to determine if contamination is present at the five individual AOCs at the Richmond NAS site. As a result of site access restrictions to

the secure DoD communications station, AOC-3 was not evaluated. The SI field investigation also consisted of collecting soil and groundwater samples in background areas. The data from the four remaining AOCs was compared to site-specific background results.

- Establish site-specific background screening concentrations for each medium being investigated for the HRS evaluation process.
- Compare environmental sample analytical results to USEPA Superfund and State Waste Cleanup criteria to determine if further actions are warranted by the USEPA, FDEP, and/or the USACE. The criteria used to evaluate the COCs includes:
  - FDEP's Soil Cleanup Target Levels (SCTLs) Chapter 62-777, Florida Administrative Code (FAC),
  - FDEP's Primary and Secondary Drinking Water Standards as specified in Chapter 62-550 FAC,
  - USEPA Federal Drinking Water Standards.
- Provide the FDEP, and the USEPA with the necessary information to make decisions on any other actions warranted at this site. Also provide information, as needed, to USACE to evaluate assess for consideration under the DERP-FUDS program.

## 2.0 SITE BACKGROUND

### 2.1 Site Location and Description

The former USN Richmond NAS was located south of SW 152nd Street (Coral Reef Drive) and east of SW 137th Avenue (Lindgren Avenue), Miami, Miami-Dade County, Florida (Figure 1). It was further bounded by SW 184 Street on the south, SW 117 Avenue on the east and the CSX railway to the west. The geographic coordinates, based on the former Headquarters Building (Building 25) location, are 25°7'11.41" N Latitude and 80° 23' 57.09" W Longitude. The Gold Coast Railroad Museum is located at the former Hangars #1 and 2 locations [1] (Figure 2) where much of this investigation was focused.

This former World War II era Naval Air Station, which encompassed 2,107 acres, was situated on portions of what are now the University of Miami South Campus (including Center for Southeastern Tropical Advanced Remote Sensing (CSTARS) and the Veterinary Primate Research Center), Federal Correctional Institute (FCI) of Miami, LTC Luis Martinez U.S. Army Reserve Center, Miami-Dade County's Metro Zoo, Gold Coast Railroad Museum, U.S. Weather Service, Larry and Penny Thompson Memorial Park & Campground, U.S. Coast Guard Station and Robert Morgan Education Center properties [42,47-52,54-58] (Figure 2).

There are five recognized areas of concern (AOCs) that were distinguished as individual sites in the workplan. The AOCs are as follows: AOC-1: Hangar #1 – this area includes several former maintenance buildings, an engine washing building and a boiler building, AOC-2: Incinerator building, AOC-3: Federal property to the north of Hangar #1 which includes two former maintenance buildings, a former paint and oil storage building and a former gas station, AOC-4: six former artillery and high explosive bunkers, and AOC-5: former boiler buildings and Hangar 3 located near the northeast portion of the Miami-Dade County Parks property.

### 2.2 Site Ownership

The former Richmond NAS is jointly owned by the Federal Bureau of Prisons, Miami-Dade County Department of Parks and Recreation, University of Miami, General Services Administration (GSA), Miami-Dade Public Schools and the U.S. Coast Guard [41].

Since the Richmond NAS is no longer in existence, the property has been sold over the years to multiple different owners. The following is a brief description of the current ownership of the subject properties.

The Miami Metro Zoo, Gold Coast Railroad Museum (GCRRM) and Larry and Penny Thompson Campground are currently owned by the Miami-Dade County Parks and Recreation Department. These properties contained the blimp hangars and associated maintenance shops, the former artillery and high explosive bunkers, boiler buildings, and the former rifle range. However, based on a review of historic aerial photographs, the site file, and the November 2, 2010 walkover, it does not appear that any military activities occurred on the Campground.

The Miami-FCI is owned by the US Bureau of Prisons. This property is the location of the former incinerator building as well as the location of the 50,000-gallon UST fuel farm.

The property to the north of the Hangar #1 is Federally-owned property where two maintenance buildings, a paint and oil storage building and a gasoline station where formerly located.

Other properties that were part of the Richmond NAS base but did not appear to have any activities or operations take place on them are the Robert Morgan Education Center which is currently owned by Miami-Dade Public Schools, and the US Coast Guard Communications base which is owned by the US Coast Guard.

## 2.3 Operational History

The Richmond NAS was a Lighter Than Air (LTA) Blimp base constructed during World War II. It also housed and supported a multitude of fixed wing aircraft. The base was the home of Fleet Airship Wing 2 and Airship Patrol Squadron ZP-21. The Goodyear Airship Corporation K series, and later M-Series Blimps, were used by the Navy to patrol the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico to spot German Nazi U-Boats, which were causing havoc on the Allied merchant marine fleet and restricting the use of shipping lanes. The spotted U-boats locations were radioed back to the base by the blimps where fixed-wing torpedo bombers would launch an attack and sink the identified U-Boats [47-49, 52, 54].

The base consisted of three blimp hangars (Hangars #1, 2 & 3), mooring-out sites (Landing Mats), a helium plant (including a Horton sphere), a maintenance shop, propeller shop, battery shop, welding shop, plating shop, paint shop and other support facilities. Most of the shops were located either in bays within Hangar #1 or north of Hangar #1 in separate areas.

A bunker area, high-explosives storage area, ammunition magazine storage area and a firing range reportedly existed on the southern part of the base, south of the largest landing mat. The other support facilities included barracks, officer's quarters, mess halls, and administrative buildings. Other NAS activities included training homing pigeons, helium equipment operators, and night torpedo crews. Hangar #1 was designated for repairs and minor overhauls. Hangars #2 and #3 were utilized for airship operations [47-49, 52, 54].

The hangars were constructed mostly of wood with concrete door supports. The hangars were between 1,059 to 1,076 feet in length, 175 feet high and were 297 feet wide. The total interior floor space covered approximately 7 acres. Up to eight inflated airships could be docked inside each of the hangars. A railroad track ran the length of the hangars to aid in maneuvering the blimps. These rails extended from one end of the hangars westward to the main Seaboard Coast railroad line. In March 1944, the base consisted of 99 officers, 607 enlisted men, and 202 civilians, including Goodyear technicians [47-49, 52, 54].

On September 15, 1945, a massive hurricane, with sustained winds of over 120 miles per hour, and an associated fire, starting in Hangar #1, destroyed the hangars, blimps, fixed wing aircraft, and many other structures associated with the base. Fueled by high-octane fuels, temperatures from the fire reportedly exceeded 2,000° F. The only remaining hangar structures were the concrete corner pillars. With the War over, the hangars were never rebuilt and the blimps never returned. The debris was subsequently cleared and the base's helium plant continued to supply Navy airships for years after the war. Several of the remaining buildings and facilities were used by Navy and Marine Corp Reserve Units. A Coast Guard Communication installation was also built at the former base. The RNAS remained active until the 1960's when most of its facilities were no longer needed. Between 1959 and 1985, the acreage of the former Richmond NAS was transferred, reassigned, or disposed of to several Federal agencies and Miami-Dade County. Portions of the Hangar #1 east corner door support, a series of reinforced concrete buttresses, two brick boiler buildings, a few former brick shop buildings and six high-explosives and ammunition magazine storage bunkers are remnants of the former NAS. The bunker area and a firing range are evident in a 1962 map of the former base. The bunkers and firing range located north of SW 184 Street and west of SW 124 Avenue, located on Miami Metro Zoo property, may be related to the U.S. Army Reserve Training Center. However, it is possible that they may have been holdovers from the former RNAS. A more complete chronology of major events is presented in Table 1 [1, 42, 47-52, 54-58].

## 2.4 Regulatory/Previous Assessment History

The Richmond NAS site was initially evaluated under the US Army Corp of Engineers (USACE) Defense Environmental Restoration Program-Formerly Used Defense Site (DERP-FUDS) program during the 1980's. Congress established this program in the mid-1980's for conducting environmental restoration at former Department of Defense (DoD) facilities, owned or used by the military services [35].

Four areas at Richmond NAS were deemed worthy of DERP-FUDs restoration. This included the area of the Gold Coast Railroad Museum where cleanup of unsafe and unsightly debris was conducted. This involved removal of trash and rubble on and around the two former blimp hangar foundation pads, cleaning debris from the remaining buildings, asbestos removal from an old boiler and replacing covers on utility manholes. A Building Demolition/Debris Removal was completed in 1985 at the Railroad Museum Property. However, prior to the SI, no soil, or groundwater contamination assessment was ever conducted in this area [59-69, 71, 79].

The second area involved a disposal area for laboratory wastes from biological and medical research. This area, approximately 1-acre in size, is located on the University of Miami South Campus and was reportedly used for the disposal of low level radioactive waste from 1946 to 1970. The waste consisted of liquid scintillation cocktail (LSC) vials, irradiated animal carcasses and other contaminated materials including paper, plastic, and glass. Approximately 25,000 LSC vials were reportedly disposed into 12 trenches, 25 feet long x 3 feet wide x 6 feet deep. A source removal, managed and overseen by the Nuclear Regulatory Commission (NRC), was undertaken and completed in 2003. Low levels of naturally occurring radioactive materials (NORM) were detected but the levels were consistent with nationwide background levels. However, subsequent soil testing indicated that arsenic is still present in soils above the State of Florida Chapter 62-777 FAC. Soil Cleanup Target Levels (SCTLs) for direct contact under a residential setting. The University of Miami, with Miami-Dade Environmental Resources Management (MDERM) oversight and guidance, is currently addressing these remaining contamination assessment issues. [76, 77, 92, 112, 124].

The third area included several underground and aboveground storage tanks (USTs & ASTs). This included two ASTs (10,000 to 12,000 gallons each) and one UST (1,000 gallons) in the area of the USAF Reservation. This area was situated on the Federal Bureau of Prisons and Federal Aviation Administration properties. The other area, located northwest of the Gold Coast Railroad Museum, was comprised of six 50,000 gallon USTs, a truck filling station, an air release pit and concrete hose and coupling house. This area also includes a pair of 6-inch underground pipelines which run from the tanks, southeast to the truck filling station. The USACE and its contractor have recently completed a remediation project at this location [70, 72, and 123].

A Preliminary Assessment (PA) was completed by the FDEP on August 16, 2010. This PA was performed with the cooperation and assistance of the USACE and with the concurrence of EPA. This PA involved a review of the site file, site history, evaluated possible waste characteristics, and included a receptor survey [126].

Based on the former operations, heavy metals (lead, chromium), degreasers and chlorinated solvents (dense non-aqueous phase liquids [DNAPLs]) and other volatile organic contaminants (VOCs) may be present at the base [36, 43]. Organic solvents and degreasers based on natural and plant based ingredients (i.e. coconut oil, etc.) were difficult to find during World War II. Due to this fact, cheaper, chemical based solvents were utilized. FDEP has no direct evidence any of these hazardous wastes are present at the former Richmond NAS. However, tetrachloroethene (PCE) and trichloroethene (TCE) were compounds widely used in solvents and degreasers in World War II. TCE was frequently used as a degreasing agent in metal fabricating operations. Lead and chromium may be present as a result of soldering and plating operations at the former NAS [121]. It is possible that the September 1945 hurricane and fire could have exacerbated any soil and/or groundwater contamination. Also, despite a source removal, and not directly related to former Richmond NAS operations, it appears that arsenic contamination still exists in soils near the former scintillation vials disposal area located to the north [92, 112]. However, it is possible that the elevated levels of arsenic remaining in the soils are related to anthropogenic, in particular agricultural practices, or naturally occurring elevated arsenic in soils. Since the disposal area was not a result of former Richmond NAS operations and is being enforced by MDERM, it was not evaluated as part of this study [118, 124]. Based on the results of the CERCLA assessment, additional CERCLA Superfund action was recommended by FDEP and subsequently approved by EPA.

On November 2, 2010, representatives from MACTEC, FDEP, MDERM, USACE and property representatives conducted a site walkover of the former Richmond NAS base. A more comprehensive breakdown of previous events, site history, and assessment activities is detailed in Table 1.

## 3.0 HYDROGEOLOGIC SETTING AND GROUNDWATER USE

### 3.1 Physiography, Surface Water and Critical Habitats

This site is situated on the Atlantic Coastal Ridge geomorphologic feature, within the Southern or Distal Geomorphologic Province of Florida. The Atlantic Coastal Ridge is a narrow, gently rolling limestone ridge that spans the eastern portion of Miami-Dade County. It extends from the Broward - Miami-Dade County line to as far south as Homestead. It ranges from 10 to 24 feet in elevation. The Ridge is formed of oolitic limestone (Miami Limestone) deposited as a shoal, under shallow water conditions, during the Pleistocene Epoch.

The majority of Miami-Dade County, with the exception of extreme northeastern Miami-Dade County, is situated on bare or thinly covered limestone. Sinkholes are not common in the area. When present, solution sinkholes dominate. They are generally shallow and broad. The sinkholes in this area tend to develop gradually. In the northeast part of the County, in the area of Aventura and North Miami Beach, the overburden varies between 30 and 200 feet think. The cover consists of incohesive, permeable sand. Sinkholes are generally few, shallow and of small diameter. They also tend to develop gradually. In this area, when present, cover-subsidence sinkholes prevail [8, 15].

### 3.2 Physiography, Surface Water and Critical Habitats

The Richmond NAS site is located approximately 10 feet above National Geodetic Vertical Datum (NGVD). Based on the topographic map, windshield survey and site reconnaissance, the site area is relatively flat. However, a number of shallow depressions are evident on the topographic map [1, 40] (Figure 1). Based on the FEMA floodplain map, this area is located in an area of minimal flooding and outside the 100-year floodplain zone [26]. Overland drainage is routed to a drainage ditch which loops through portions of the U.S. Coast Guard Communications Station, University of Miami, Gold Coast Railroad Museum, Miami-FCI, and Miami Metro Zoo properties. It is estimated that this ditch has an average flow rate of less than 10 cubic feet per second (cfs). The ditch, which is carved through the limestone bedrock, appears to jog west from the western edge of the Zoo and likely connects with Black Creek (Canal C1W), located approximately 0.5 miles west of the Zoo. Black Creek, which becomes Black Creek Canal C1 further downstream, flows southeast and south where it outfalls into the tidally influenced waters of Biscayne Bay, approximately 9 miles southeast and downstream of the site. A flood gate and salinity control structure exists on the Canal, approximately 3.75 and 8.2 miles, respectively, downstream of the site [1, 40]. As such, Black Creek/Black Creek Canal is fresh water for the majority of its length [46]. The annual mean flow in the Canal, measured at the floodgate, is 172 cfs [25].

No drinking water intakes are located within 15 downstream miles of the site [29]. Black Creek, Black Creek Canal C1 and Biscayne Bay are used for recreational fishing. Aquatic species, commonly caught in Black Creek and Black Creek Canal C1, includes butterfly peacock and largemouth bass. Snook may be caught near the lower stretches of the Black Creek canal, near Biscayne Bay. Salt water aquatic species, commonly caught in Biscayne Bay, include grouper, cobia, snook and sheepshead [37].

### 3.3 Physiography, Surface Water and Critical Habitats

Biscayne Bay and the lower reaches of the Black Creek Canal are critical habitats for the federally designated endangered West Indian manatee. Migration of the manatees up Black Creek Canal is more prevalent during the colder parts of the year when the tributary waters are warmer. However, sightings of manatees in the Black River are noted during all seasons of the year [34, 38, 44, 45, 46]. The State designated Biscayne Bay Aquatic Preserve supports diverse biological communities rich in fauna. This includes submerged aquatic, coastal wetland, intertidal and coastal upland habitats. Sea grasses, mangroves and salt marshes support a wide variety of habitats for fish, reptiles, wading birds and the West Indian manatee. Many of these species have been designated as threatened or endangered by the State and/or Federal governments [23, 27, 34, 44, 45, 46].

Potential releases of contaminants to surface water could threaten downstream fisheries and sensitive environments. As a result, the surface water migration pathway may be a concern. However, this is somewhat mitigated by the dilution effects prevalent in Biscayne Bay.

## 3.4 Groundwater Occurrence

Three major hydrogeologic units are present in Miami-Dade County. These units include the surficial aquifer system, intermediate aquifer system/confining unit and the Floridan aquifer system [5, 9, 12, 13, 14, 24].

The principal source of freshwater in Miami-Dade and Broward County is the surficial aquifer system. The Biscayne aquifer is the most productive unit of this system. Under Section 1424(e) of the Safe Drinking Water Act of 1974, the Biscayne aquifer was designated as a sole-source aquifer. This was based on the fact that it supplies at least 50% of the drinking water in the area and that there is no alternative drinking water source [22]. The surficial aquifer system is composed of upper Cenozoic sediments that are hydraulically connected. The surficial aquifer system includes, in ascending order, the Tamiami Formation (Fm), Caloosahatchee Fm, Fort Thompson Fm, Key Largo Limestone, Miami Limestone and the Pamlico Sand (undifferentiated Pleistocene-Holocene sediments). As a result of facies changes, it should be noted that not all the named units may be present at any one location in Miami-Dade County. The surficial aquifer system exists under water-table conditions and is found generally within 5 feet of land surface. It is overlain by a thin veneer of peat, muck (a mixture of silt and very fine-grained decomposed organic matter) or sand. The surficial aquifer system is composed of limestone, sandstone, sand, shell, lime mud, silt, clay, claystone, siltstone and a mixture of these materials. These sediments range in age from Pliocene to Holocene age. Carbonates of the Miami Limestone were observed outcropping at the surface and along the rock pit walls in the southern portion of the site area. The surficial aquifer system ranges in thickness from 140 feet (southeast Miami-Dade County) to more than 280 feet (northeast Miami-Dade County) in eastern Miami-Dade County. It is important to note that the carbonates of Biscayne aquifer exhibits numerous secondary porosity features such as solution cavities, channels and vugs. This secondary permeability is the result of solution enlarged carbonate grains, bedding plane cracks, root molds and paleo-karst surfaces [18 20]. As a result, the Biscayne aquifer meets the EPA criteria of a karst aquifer [21]. A wide range of permeabilities exist in the surficial aquifer system. Locally, the surficial aquifer system in Miami-Dade County can be divided into one or more aquifers separated by less permeable or semi-confining units. One of the informally named permeable units, underlying the Biscayne aquifer, is the “Grey Limestone aquifer”. This aquifer consists of gray, shelly, sandy limestone of the middle Tamiami Fm. It has been identified in western Miami-Dade County at depths of between 70 to 160 feet below land surface. It grades into a less permeable, sandy, clayey, limestone and sandstone to the east and south. As a whole however, it does not appear that continuous, lower permeability units having more than two orders of magnitude hydraulic conductivity difference exists in within the Biscayne aquifer Miami-Dade County. As a result, the surficial aquifer system, in particular the Biscayne aquifer, can be considered a single hydrologic unit in Miami-Dade County [4, 5, 9, 11, 12, 13, 14, 18, 21, 22, 24].

The principal source of recharge for the surficial aquifer system is local rainfall. During periods of low rainfall, the extensive canal system in Miami-Dade County provides a significant source of recharge. Discharge from the aquifer occurs by pumping and ground water flow into Biscayne Bay, the Atlantic Ocean and canals during the wet season. The regional ground water flow in Miami-Dade County is generally east or southeast toward the Atlantic Ocean. However, the presence of active well fields, surface water control canals and tidal fluctuations commonly cause local deviations in the regional flow pattern. The average transmissivity of the Biscayne aquifer unit ranges from 3 to 5 million gallons /day/foot. Yields from wells (6 inch wells) range from 1,000 to 1,500 gallons/minute. Water from this aquifer is generally colored either with organic material or iron in the upper part of the aquifer. Excessive amounts of iron are encountered in some parts of the aquifer. Salt-water encroachment along the coast, as a result of inland lowering of groundwater levels via well field pumping, is a problem along coastal Miami-Dade County [5, 9, 11, 12, 13, 14, 18, 22, 24].

The intermediate aquifer system/confining unit consists of the relatively impermeable marl; limestone; greenish-gray, sandy clay and silt units located in the lower part of the Tamiami Fm (Pliocene age) and Hawthorn Group. The Miocene age Hawthorn Group consists of the Arcadia and Peace River Fms in southern Florida. The Peace River Fm is composed of interbedded quartz sands, clays and carbonates. The carbonates consist of variably sandy, clayey phosphatic limestones and micro-to very fine crystalline, variably sandy phosphatic dolostones. However, the siliciclastic portion of the formation predominates. The underlying Arcadia Fm. consists of predominantly limestone and dolostone with varying amounts of quartz sand, clay and phosphate grains. Dolomite is the most abundant carbonate component of the Arcadia Fm. Well sorted medium grained sands interbedded with claystones or siltstones within the intermediate system yield low to moderate quantities of water. However, the intermediate system is not a major source of water in the County. The intermediate aquifer system/confining unit generally ranges from 550 feet to 800 feet thick in Miami-Dade County. The intermediate confining unit underlies the surficial aquifer system to a depth 975 feet in eastern Miami-Dade County and forms the upper confining unit for the Floridan aquifer system. The Hawthorn Group is found approximately 150 feet below land surface (bls) and is approximately 900 feet thick in the site area [5, 9, 10, 12].

The artesian Floridan aquifer system is composed of carbonate and evaporite units ranging from upper Paleocene to Oligocene age. The Floridan aquifer system consists of an upper Floridan aquifer and lower Floridan aquifer separated by a lower permeability unit called the middle confining unit. The upper Floridan aquifer system consists of, in descending order, the Suwannee Limestone, Ocala Limestone and upper portions of the Avon Park Fm. The lower Floridan aquifer consists of, in descending order, the lower part of the Avon Park Fm, the Oldsmar Fm and the upper part of the Cedar Keys Fm. The middle confining unit, which consists of lower permeability clays, micritic limestone and porous dolomite filled with anhydrite, exists in the middle portion of the Avon Park Fm. This unit restricts the movement of groundwater between the upper and lower Floridan aquifers. The top of the upper Floridan aquifer system is found ranging from approximately 1,000 feet below sea level in the northeast part of Miami-Dade County to approximately 900 feet below sea level in the southern part of the County. Water from the Floridan aquifer system is highly mineralized and without desalination treatment is unsuitable for potable water supplies in Miami-Dade County. In southeast Florida, an extremely permeable, cavernous zone, referred to as the "Boulder Zone" exists in the lower Floridan aquifer. This zone is encountered between 2,800 to 3,000 feet below sea level in Miami-Dade County. This zone contains brackish water and is used for the injection of sewage and industrial waste waters [5, 12, 14, 24].

## 3.5 Groundwater Usage

The majority of the population within a 4-mile radius of the site relies on water supplies provided by the Miami-Dade Water and Sewer Department (MDWSD). The MDWSD water system is broken into three regional water distribution systems in Miami-Dade County; the Hialeah and John E. Preston Water Treatment Plants (WTP), the Alexander Orr, Jr. WTP and the South Miami-Dade Water Supply system. It should be noted that the Hialeah/Preston WTPs and the Alexander Orr, Jr. WTP regional systems supply treated water to a common distribution system. It is estimated that the MDWSD system supplies 2,100,000 people with water in Miami-Dade County. The Hialeah and John E. Preston WTPs and South Miami-Dade Water Supply systems, and their associated well fields, are significantly more than 4 miles from the site [1, 28, 29, 30].

The Alexander Orr Jr. WTP and its associated well fields serve customers of central Miami-Dade County south of SW 8$^{th}$ Street to near SW 264$^{th}$ Street. This includes the former Richmond NAS area. The well fields belonging to this regional system include the Alexander Orr well field, Snapper Creek well field, Southwest well field and West well field. The majority of wells in these well fields tap the Biscayne aquifer. However, a few wells are open to the upper Floridan aquifer. Small amounts of this brackish water are blended with the Biscayne aquifer well water at the Alexander Orr Jr., WTP. The amounts of water blended into the system from the Floridan aquifer are limited as a result of increased sodium and chloride levels as well as increased total dissolved solids (TDS). Future plans may include using a reverse osmosis

treatment on the Floridan aquifer derived water to reduce those levels. However, as measured from the center of the Richmond NAS, just north of the former Hangars #1 & #2 area, the Alexander Orr Jr. WTP and its associated well fields are more than 4-miles from the former Richmond NAS site and therefore, beyond the EPA's Hazard Ranking System (HRS)[1] Target Distance Limit for the Groundwater Migration Pathway[1, 2, 4, 28, 29, 30].

Six non-community well systems have been identified within 4-miles of the site [1, 28]. These wells are open to upper portions of the Biscayne aquifer. These well systems collectively serve 264 people. The nearest well located at the Coral Reef Driver License office, reportedly serves 100 people and is located approximately 1 mile northeast of the former Richmond NAS. Six private drinking water wells, also open to upper portions of the Biscayne aquifer, were identified within 4 miles of the former Richmond NAS. The nearest private well was identified 1.8 miles southwest of the former Richmond NAS [1, 28]. A full breakdown of drinking water well systems within 4-miles of the site is presented in Table 2.

A number of contaminants associated with the former Richmond NAS, including heavy metals and VOCs, may be present in site soil and groundwater. The Biscayne aquifer has been designated as a sole-source aquifer and is karstic in nature. However, only a limited number of groundwater targets (i.e. drinking water wells) serving a small population exists within 4-miles of the site. Table 3 details the population density within 4 miles of the site.

## 3.6 Climate

The climate in Miami-Dade County is a tropical monsoon climate with an average temperature in Miami of 75.9° F. The proximity of Miami-Dade County to the Gulf Stream significantly influences its climate. The daily mean temperature varies from 67.29° F in January to 82.9° F in August. The rainy season occurs from May through Mid-October. Approximately half the total rainfall occurs during this time frame. During the summer months, convection thunderstorms can produce heavy but localized rainfall. Tropical storms and hurricanes can also produce copious amounts of rainfall. The Mean Annual, Net and 2-Year/24-Hour Precipitation for the site area are 55.91, 9.0, and 6.0 inches, respectively [6, 7, 19].

## 4.0 FIELD INVESTIGATION METHODOLOGY

The SI focused on areas where previous base activities may have adversely affected the environment, and environmental samples were collected from in and around those areas. This was accomplished by collecting soil and groundwater samples for laboratory analysis.

### 4.1 Site Reconnaissance

On November 2, 2010, MACTEC and FDEP conducted a site reconnaissance to walkover the site and surrounding areas and identify potential source areas at the five AOCs, speak with property owners and others familiar with past operational history of the Richmond NAS, locate utilities and determine accessibility for proposed sampling locations.

### 4.2 Sampling Locations and Rationale

The SI fieldwork was conducted from January 24 to 27, 2010. To assess the presence and nature of hazardous materials in the environment at the four AOCs, soil and groundwater samples were collected for laboratory analysis. Environmental samples were collected from areas at each site that have the highest probability for contaminants to be present based on historical activities, file review and site walkovers. To aid in the selection of the sample locations, a historical line drawing map of the Richmond NAS was used to reference for the locations of buildings and operations areas that may be of concern [122]. By utilizing this map, it was possible to identify where the AOCs were located during the years in operation and to see what properties are located at those areas today. This made it possible to identify the location of buildings and other pertinent site features that aided in the selection of sample locations at areas where buildings are no longer present. At many locations, the bunkers, buildings or parts of buildings/hangars are still in place today.

The soil and groundwater environmental samples for each of these AOCs (except the bunkers) were analyzed for the volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOC) analytes listed in the USEPA CLP Target Compound List (TCL) and for RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). The soil and groundwater samples collected from the incinerator building were also analyzed for dioxins and furans. The soil and groundwater samples collected from the bunker areas were analyzed for RCRA 8 metals only. The environmental samples were analyzed in accordance with USEPA CLP protocol. Identification of tentatively identified compounds (TICs) was also included in the analyses.

The laboratory analyses of soil and groundwater samples were conducted by following the USEPA CLP. The organic soil and groundwater samples and the inorganic soil samples were sent to Mitkem Corporation, Inc. in Warwick, Rhode Island. The inorganic groundwater samples were sent to the USEPA Region 4 Laboratory in Athens, Georgia. The dioxin and furans samples were sent to SGS North America in Wilmington, North Carolina. MACTEC utilized the Forms II Lite sample management program in accordance with the USEPA Region IV Field Branch Quality System and Engineering Procedures. Each environmental sample was collected, packaged, preserved, and transported in accordance with standard CompQAP protocol. Additionally, a standard chain-of-custody sheet for all of the samples was maintained and field notes made during the sampling events were recorded in a bound field book.

MACTEC collected global positioning satellite (GPS) coordinates of the sample locations using a hand-held GPS unit equipped with wide area augmentation system (WAAS) which can have a real-time accuracy of approximately 3 meters. The World Geodetic System (WGS) 84 datum was utilized.

Upon completion of the field work activities, the site was restored, as near as possible, to its original condition before the site inspection at the site was initiated. This included backfilling all borings to land surface with clean sand or grout in the case of temporary monitoring well borings, and patching any holes in concrete or asphalt, with like material, and repairing damage that was caused as a direct result of the activities being conducted.

Background and AOC specific sampling location and rationale are presented in the following paragraphs.

**Background Sample Locations –** Two background sample areas were selected in what appeared to be native, untouched wooded areas. Having two background locations allowed flexibility in case one of these areas was unexpectedly affected by past operations. The background locations for both soil and groundwater samples were located in wooded areas on the Miami-FCI property and the Miami-Dade County Parks and Recreation property at the farthest point east of the MetroZoo. The background location for surface soil (RNA-SF01), subsurface soil (RNA-SB01) and groundwater (RNA-GW01) samples was located in an undeveloped wooded area approximately 3,500 feet southeast of Hangar #1 (Figure 3). This property is currently owned by Miami-Dade County Parks and Recreation.

The background location for surface soil (RNA-SF02), and groundwater (RNA-GW02) samples was located in an undeveloped wooded area approximately 3,200 feet southwest of Hangar #1 (Figure 3). Due to saturated conditions, the predesignated subsurface soil (RNA-SB02) was not collected. This property is currently owned by Miami-FCI. Available historical aerial photographs indicate that these areas were never developed and no visible activities appeared to have taken place in these areas. Both locations were formerly part of the Richmond NAS but appear to be far away from any operational areas.

**AOC 1 - Former Hangar #1** – This AOC consists of former blimp Hangars #1 and #2 and is located just northwest of the MetroZoo parking area. Hangars #1 and #2 and property in the immediate vicinity are currently occupied by the Gold Coast Railroad Museum. All that remains of Hangar #1 is one of the large concrete pillars that anchored the large doors, four brick buildings that were part of the hangar, some concrete columns on the north side that appeared to be structural supports for the hangar and workshops that were formerly located there and the large concrete slab that was the floor of the hangar. Also located near Hangar #1 is a brick boiler building and a concrete block building that was used to wash engines. Reportedly, Hangar #1 is the only hangar where maintenance activities occurred. The entire northern side of the hangar was occupied by workshops and storage rooms but nothing remains today except for the brick workshops and concrete columns and supports. Reportedly, any maintenance type activities would have occurred in the brick workshops which were constructed of brick because flammable materials were used in these shops and there was a potential for fire [123]. Reportedly, Building 1 was used for carpentry. Building 2 was used for wood working and metal craft related tasks. Building 3 was the "dope shop" where they laminated the control surfaces on aircraft and blimps and treated parachutes. The use of Building 4 is unknown. The remnants of what appears to be an engine stand are located on the east side of Building 2. The white building currently used as an administration building is where they used to steam clean engines [125]. Therefore, it is possible that solvents, petroleum products and other contaminants would have been used in these buildings. Therefore, the investigation at AOC 1 focused on these areas as well as the engine washing building just north of Hangar #1. There is nothing left of Hangar #2 except for the concrete slab and steel tracks that were used to open and close the hangar doors.

Little else is known about the operations at the former Hangar #1 AOC, therefore, a series of micro-wells were installed at selected areas based on suspected activities to identify any impacts to the groundwater. Six temporary micro-wells were installed to assess groundwater quality at the site. One temporary micro-well was installed near the each of the four former workshops and two were located near the former engine wash building. These temporary wells (TMW03 through TMW08) were installed to approximate depth of 14 feet bls. Temporary well TMW-3, located at the northeast corner of the former engine wash building, was installed to a depth of 29 feet bls into the intermediate zone of the surficial aquifer to assess the presence of denser chlorinated solvents.

Soil samples were collected around each of the former workshops including the trench outside of the middle workshop and also from around the engine wash area building and concrete pad on the south side of this building. Surface soil samples (RNA-SF03 through RNA-SF26, RNA-SF28) were collected from 25 locations at AOC 1 and subsurface soil samples (RNA-SB03 through RNA-SB10, RNA-SB12, RNA-SB13, RNA-SB16, RNA-SB18 through RNA-SB26, RNA-SB28) were collected from 21 locations

(subsurface soil samples not collected at all locations due to elevated water table or refusal on concrete). Surface soil samples were collected from 0 to 2 feet bls and subsurface soil samples were collected from 2 to 4 feet bls or the water table interface. The environmental samples were analyzed for VOCs, SVOCs, and RCRA 8 Metals. Sample locations are presented on Figure 4.

**AOC 2 - Former Incinerator Building** – This AOC is located on the US Bureau of Prisons FCI property located near the northwest corner of the former Richmond NAS site. It is located approximately 2,850 feet northwest of Hangar #1. It is not known what was burned here but it is assumed that most of the base's wastes were incinerated at this location. Surface and subsurface soil samples were collected from eight locations around the incinerator building. Eight surface soil samples (RNA-SF29 through RNA-SF36) were collected from 0 to 2 feet bls and five subsurface soil samples (RNA-SB29, RNA-SB30, RNA-SB33 through RNA-SB35) were collected from 2 to 4 feet bls. The soil samples were analyzed for VOCs, SVOCs, RCRA 8 metals, and dioxins/furans.

One temporary well (TMW17) was installed southeast of the incinerator building to assess groundwater quality at this AOC. The groundwater sample was analyzed for VOCs, SVOCs, RCRA 8 metals, and dioxins/furans. Sample locations are presented on Figure 5.

**AOC 3 - Former Underground Storage Tanks, Gas Station, Maintenance Buildings, and Paint and Oil Storage Building** – The Federally-owned property just north of Hangar #1was not visited during the site reconnaissance. This area is reportedly used by the DoD as a communications center and requires a security clearance to access the property. It is currently under custodial care by the USACE-Mobile District. Due to the security clearance issue, this area was not investigated during the site investigation. According to the map of the base, this area contained two large maintenance buildings, a gasoline station and a building identified as paint and oil storage. The former paint/oil storage building remains today but nothing is left at the other two locations. Aerial photographs show the footprint of where the maintenance buildings were located and the service station parking lot can also be seen. No additional information is available for these sites. Future contamination assessment activities at AOC-3 are contingent upon USACE-Mobile, DoD and EPA cooperation.

**AOC 4 – Former Artillery and High Explosives Bunkers** – There are five buried concrete bunkers in or around the southern portion of the MetroZoo. These bunkers are constructed of concrete and buried under dirt and grass, except Bunker 2 which is a cinder block building. There is also a weigh scale located in front of Bunker 2, which was used to weigh trucks that carried away material from a quarry that was in operation in this area during the 1970s. They are numbered Bunkers 1 through 5. According to the Base map located in the Gold Coast Railroad Museum, Bunker #2 contained high explosives and Bunkers #1, 3, 4 and 5 contained ammunition magazines. Some of the bunkers were subsequently retrofitted by the government during the Cuban missile crisis of 1962. Currently, some of these bunkers are being used as storage or workshops for the zoo. Ten surface scrape samples (RNA-SF59 through RNA-SF68) were collected from 0 to 0.3 feet, two from each of the five bunkers.

At the Bunker #1 location, a temporary micro-well (TMW15) was installed to collect a groundwater sample. Since the potential for contamination is thought to be low at these bunkers, this well was considered representative of each bunker location. The soil and groundwater samples were analyzed for RCRA 8 metals. The sample locations are presented on Figure 6.

A former rifle range is located within the footprint of what is now a lake created from the former quarry operations. A remnant of this range remains near the southern end of the lake and surface soil samples were collected from two locations (RNA-SF73 and RNA-SF74) (Figure 6). The range is now located in the Larry & Penny Thompson Park property. There is a picnic area nearby with a playground and outdoor volleyball court.

During the investigation, the location of a sixth bunker located near the Robert Morgan Education Center property became known and was added to the investigation of the bunkers at AOC 4. Two surface scrape soil samples (RNA-SF76 and RNA-SF77) were collected from 0 to 0.3 feet at this location in a wooded area

west of the rear parking lot. Nothing remains of the bunker except a low mounded area and some rubble. The location of this bunker was identified from historical aerial photographs and with the aid of Robert Morgan personnel who had some recollection of the location of the bunker from when the school was being constructed (Figure 3).

**AOC 5 – Hangar #3 Boiler Buildings** – This AOC is the former location of Hangar #3. All that remains is the concrete slab and remnants of two boiler room buildings. Two soil borings were advanced at each of the two brick buildings and one temporary micro-well (TMW16) was installed at the northernmost building. Four surface soil samples (RNA-SF69 through RNA-SF72) were collected from 0 to 2 feet bls and four subsurface soil samples (RNA-SB69 through RNA-SB72) were collected from 2 to 4 feet bls. The soil and groundwater samples were analyzed for VOCs, SVOCs, and RCRA 8 Metals. Sample locations for soil borings and micro-wells are shown on Figure 7.

## 4.3 Soil Sampling

To evaluate the soil exposure pathway and to aid in identifying potential source areas, 77 soil borings were advanced at the remaining four AOCs identified at the Richmond NAS site (Figures 3 through 7). Soil samples were collected with a DPT rig and macro-core sampler. The DPT rig was provided by Probe Domain. Surface scrape samples were collected with a stainless steel spoon. The macro-core sampler consisted of a 1.5-inch diameter, 4 or 5-foot long stainless steel core tube with a polyethylene inner liner that is advanced on the end of the DPT rig's rods to the desired sample depth. Soil samples were collected at 2-foot depth intervals from land surface to the water table.

Ninety soil samples (including eight duplicate soil samples) were collected for laboratory analysis. At each boring location, surface soil samples were collected from 0 to 2 feet bls and subsurface soil samples were collected from 2 to 4 feet bls or water table interface for laboratory analysis. Surface scrape samples were collected from 0 to 0.3 feet bls at the bunker areas.

The sample aliquot for VOCs analysis was not mixed and was collected directly from the sample media in accordance with SW-846 Method 5035 protocol. More specifically, the VOC aliquots were collected using TerraCore™ samplers and vial kits. The remaining sample aliquots were composited in a stainless-steel bowl prior to filling the sample containers.

The soil samples were analyzed by a fixed base CLP laboratory for the VOC and SVOC analytes listed in the USEPA CLP TCL, and the RCRA 8 metals using USEPA CLP methodology. Soil samples collected from the former incinerator building, as well as the background soil samples, were also analyzed for dioxins and furans. Soil samples collected from the bunkers were analyzed for RCRA 8 metals only. Identification of TICs was also included for the analyses. The appropriate number of quality control samples was collected.

## 4.4 Temporary Micro-well Installation

Eleven temporary micro-wells were installed at locations selected to provide temporary points for confirmatory groundwater sampling (Figures 3 through 7). These wells were located in areas where groundwater may have been impacted based on historical data.

The temporary micro-wells were constructed of new 1-inch-diameter Schedule 40 PVC riser with 10-foot, pre-packed stainless steel screens. The wells were installed with the DPT rig using 3-inch inner diameter steel casing to set the wells. A 20/30-grade silica sand pack was installed around the pre-packed screen interval to a depth of 2 feet above the top of the screen to provide additional filter material. Upon completion, each monitoring well was developed by pumping with a peristaltic pump until it produced non-turbid, sediment free water. After the groundwater sample was collected, the well top of casing was surveyed and the depth to groundwater was measured, the micro-wells were abandoned by removing the riser pipe and grouting the borehole to the surface. Micro-well Construction Logs are included in Appendix F.

## 4.5 Groundwater Sampling

Prior to the groundwater sampling event, depth to water measurements was collected from each of the monitoring wells being sampled at the subject site. Groundwater measurements were collected from the north side of the top of casing of each monitoring well. The top of casing elevations for the new temporary micro-wells were surveyed relative to an arbitrary elevation to determine the groundwater flow direction at AOC 1. Groundwater flow at the other AOCs was not evaluated because only one well was located at each of the other AOCs.

Thirteen groundwater samples (including two duplicates) were collected from the 11 temporary micro-wells (Figures 3 through 7). Prior to collecting groundwater samples, each monitoring well was purged using low flow purging techniques with a peristaltic pump with new Teflon™ tubing. Field parameters (including temperature, pH, specific conductance, turbidity, dissolved oxygen and oxygen reduction potential) were measured following removal of each well volume. A minimum of three well volumes was purged from each micro-well.

Once the field parameters stabilized (i.e., two consecutive measurements are within 5%) and the water turbidity was less than 10 nephelometric turbidity units (NTU), the groundwater samples were collected. The metals aliquots were collected first, directly from the peristaltic pump discharge tubing. This was done to avoid agitating the water in the well and possibly affecting the turbidity. Then the VOC samples for laboratory analysis were collected with as little agitation or disturbance as possible. The VOC samples were collected utilizing the "back flow" method. This involved running the pump at a slower speed and filling the Teflon® tubing with the sample. The pump speed was then further reduced and the direction of flow reversed to push out the sample into the 40 milliliter sample vials. In order to prevent water that may have been in contact with the flexible pump head tubing, the sampler avoided completely emptying the tubing when filling the sample vials. The semi-volatile organic samples were collected using the peristaltic pump/vacuum jug assembly. The vacuum jug assembly, which includes an amber 1-liter glass sample bottle, was situated between the pump and the well for sample collection. All samples were shipped daily by overnight delivery to the designated CLP or EPA SESD Analytical Support Branch (ASB) laboratory under standard chain of custody protocol.

The groundwater samples were analyzed by a fixed base laboratory for the VOC and SVOC analytes listed in the USEPA CLP TCL, and the eight RCRA metals using USEPA CLP methodology. Groundwater samples collected from the former incinerator building were also analyzed for dioxins and furans. Groundwater samples collected from the bunkers were analyzed for RCRA 8 metals only. Identification of TICs was also included for the analyses. The appropriate number of quality control samples was also collected.

## 4.6 Site Quality Assurance/Quality Control Protocol

The sampling equipment was laboratory cleaned in accordance with the FDEP Comprehensive Quality Assurance Plan (CompQAP). Although an adequate supply of sampling equipment was brought to the site, field cleaning of augers, bowls and spoons was necessary due to the large amount of samples that were collected. Prior to sampling, equipment rinsate samples were collected from the laboratory-cleaned groundwater sampling equipment and the laboratory-cleaned soil sampling equipment as required by the CompQAP. Field decontamination procedures followed the same regiment as carried out in the laboratory setting for decontamination. In addition, trip blank samples were carried onsite and transported with the VOC samples as a check against cross contamination of the samples during transport.

Duplicate samples were collected for each media type and Matrix Spike (MS) and Matrix Spike Duplicate (MSD) sample aliquots were collected as required for CLP analytical protocol. Each sample was collected, labeled, packaged, preserved, and transported in accordance with standard CompQAP protocol. Additionally, a Traffic Report listing each of the samples was maintained and sampling field notes were recorded in a bound field book. MACTEC utilized the Forms II Lite sample program in accordance with the USEPA Region IV Field Branch Quality System and Technical Procedures.

The stainless-steel material was decontaminated in accordance with USEPA Region IV standard operating procedures, as described below:

(1) Liquinox™ and potable water scrub;
(2) potable water rinse;
(3) isopropanol rinse;
(4) organic-free/deionized water rinse; and
(5) air drying.

If the equipment was not used immediately, it was wrapped in new aluminum foil.

The down-hole drilling tools were decontaminated in accordance to FDEP's CompQAP and / or USEPA Region IV protocol, which includes the following steps:

(1) pressure washing with a steam cleaner; or brush cleaned with Liquinox™
(2) rinsing with potable water;
(3) organic-free/deionized water rinse; and
(4) air drying.

## 4.7 Investigation Derived Wastes

The wastes derived from the sampling effort (soil, purge water, and decontamination fluids) were disposed of in accordance with FDEP and USEPA guidelines. It was anticipated that hazardous materials would not be encountered at this site, and therefore, per the direction of FDEP and using both visual and screening methods, the investigation derived wastes were spread or discharged onto the ground in the immediate area of sample collection. Drill cuttings generated from monitoring well installation were placed back into the boring that they were generated from and development and purge water was discharged on to the ground adjacent to the well.

## 5.0 INVESTIGATION FINDINGS

The analytical results of the samples collected during this SI were compared to background screening concentrations in accordance with USEPA's Superfund Site Assessment criteria. In addition, the soil samples concentrations were compared to cleanup target levels contained in Soil Cleanup Target Levels, Chapter 62-777, FAC, and the groundwater results were compared with Federal MCLs for drinking water supplies and State groundwater standards in Chapter 62-550 FAC and Groundwater Cleanup Target Levels (GCTLs) under Chapter 62-777, FAC. All analytical reports are included in Appendix B. CLP Number Assignments, Lab Assignments, Work Order Sheets and Traffic Report/Chain of Custody (TR/COC) Sheets are included in Appendix C.

The background screening concentrations for soil and groundwater were established for the HRS evaluation process based on site-specific background concentrations. Background samples are used to determine whether an observed release can be demonstrated for a particular chemical. An observed release is demonstrated when the background concentration is less than the detection limit and the sample concentration exceeds the applicable quantitation limit; or the background concentration equals or exceeds the detection limit and the sample concentration is three times or more above the background concentration (refer to Table 2-3 in Section 2-3 of 40 CFR, Chapter 1, Part 300, Appendix A, HRS) [50].

Soil and groundwater background samples were collected from two locations in undeveloped areas at the site to ensure that at least one representative background sample could be attained to develop the background screening levels, since it was unknown if past base operations occurred in either of these areas. Based on the analytical results, the soil and groundwater samples collected from background location RNA01 including RNA-SF01 (surface soil), RNA-SB01 (subsurface soil) and RNA-GW01 (groundwater), were considered representative and used as the background screening concentration levels for each analyte for this SI.

### 5.1 Soil Assessment

Soil samples were collected for laboratory analysis at each soil boring location. Surface soil samples were collected from 0 to 2 feet bls and subsurface soil samples were collected from 2 to 4 feet bls. Surface soil samples collected from the bunker areas of AOC-4 were collected 0 to 0.3 feet depth. At the time of the field activities, the water table was encountered between approximately 5.6 to 10.75 feet bls at most locations depending on the elevation of the boring. However, in some borings on the Miami-FCI property at AOC 2, groundwater was encountered in some borings at just below 2 feet bls.

### 5.2 Surface Soil Analytical Results

The designated background surface soil sample (RNA-SF01 at station RNA01) was located in a wooded area at the farthest eastern point of the MetroZoo property approximately 3,500 feet southeast of Hangar #1 (Figure 3). This location was part of the Richmond NAS. This sample was used to determine background screening concentrations for target analytes for comparison purposes. A soil matrix spike/matrix spike duplicate was also collected from surface soil sample RNA-SF01.

The background surface soil sample did not contain any targeted VOCs above their MDLs (Table 7). The background surface soil sample did not contain any targeted SVOCs at concentrations above their MDLs (Table 9). Five metals (arsenic, barium, chromium, lead and mercury) were detected above their MDLs but did not exceed their SCTLs (Table 11) with the exception of arsenic, which did exceed its SCTL. The background surface soil sample is considered to be representative for the targeted analytes with the exception of arsenic.

Laboratory qualifiers for soil samples are as follows: U – the analyte was not detected at or above the reporting limit; J – identification of analyte is acceptable; reported value is an estimate; UJ – the reported value may not accurately represent the concentration necessary to positively detect the analyte in the

sample; R – The presence or absence of the analyte cannot be determined from the data due to severe quality control problems. The data are rejected and considered unusable.

***5.2.1 Volatile Organic Compounds.*** Six VOCs were detected in one or more of the surface soil samples collected from the site. The VOC target analytes detected in the surface soil samples include: acetone, chloroform, methyl butyl ketone, methyl ethyl ketone, methylene chloride and trichloroethene (TCE). Methylene chloride is a common laboratory contaminant. Acetone is often a remnant of the decontamination process.

Four VOCs were detected in one or more surface soil samples at a concentration that exceeded their respective background screening concentration including: acetone, chloroform, methyl ethyl ketone and TCE.

TCE exceeded its Leachability to Groundwater criteria under Chapter 62-777, FAC, in three surface soil samples. The locations and the details of the exceedances are discussed below.

***AOC 1 – Hangar #1***

TCE exceeded its Leachability to Groundwater criteria under Chapter 62-777, FAC, in three surface soil samples including RNA-SF20 (40 µg/kg), RNA-SF22 (35 µg/kg) and RNA-SF26 (29 µg/kg) (Figure 4A, Table 7).

***AOC 2 – Incinerator Building Area***

None of the surface soil samples collected from the incinerator building area contained any target VOC analytes at concentrations above the SCTLs under Chapter 62-777, FAC (Figure 5, Table 7).

***AOC 4 – Former Artillery Bunkers / Gun Range / Robert Morgan Education Center***

No surface soil samples were collected for VOCs because metals were the only concern at this AOC (Figure 6, Table 7).

***AOC 5 – Hangar #3 Boiler Buildings***

No soil samples reported with exceedances of SCTLs for VOCs (Figure 7, Table 7). TCE was detected in sample RNA-SF69 (9.9 µg/kg) at a concentration that exceeded the background screening concentration. However, it should be noted that TCE was not detected in the duplicate soil sample RNA-SF-69-DUP.

Table 7 provides a summary of the VOCs detected in surface soil samples along with a comparison against the Florida SCTLs for Leachability to Groundwater, and Residential and Industrial Direct Exposure criteria set forth in Chapter 62-777, FAC for each COC detected. Laboratory analytical data sheets are provided in Appendix B.

***5.2.2 Semi-Volatile Organic Compounds.*** Twenty-five SVOCs were detected in one or more surface soil samples collected from the site. The SVOC target analytes detected in the surface soil samples include: 1,1-biphenol, 2-methylnaphthalene, acenaphthene, acenaphthylene, acetophenone, anthracene, benzaldehyde, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzyl butyl phthalate, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, phenol and pyrene (Table 9).

Twenty-two SVOCs were detected in one or more subsurface soil sample at a concentration that exceeded their respective background screening concentration including: acenaphthene, acenaphthylene, acetophenone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzyl butyl phthalate, bis(2-chloroethyl)ether, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene and B(a)P Toxic Equivalents (TEQs).

Five of the detected target analytes exceeded their respective Leachability to Groundwater or Residential or Industrial Direct Exposure criteria under Chapter 62-777, FAC including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole and dibenzo(a,h)anthracene.

Benzo(a)pyrene equivalents [B(a)P TEQs] exceeded the Residential Direct Exposure criteria under Chapter 62-777, FAC in 28 surface soil samples including two duplicate samples and exceeded the Industrial Direct Exposure criteria in nine samples. It should be noted that several of the exceedances that were observed were due to elevated laboratory method detection limits that were qualified as U (not detected above the reporting limit); however, the B(a)P TEQ Conversion sheet does not take this into account when calculating the reported concentrations. B(a)P TEQs Calculation Sheets are provided in Appendix D.

Six of the surface soil samples contained one or more SVOCs at a concentration above their SCTL, not including B(a)P EQs. The locations and the details of the exceedances are discussed below.

***AOC 1 – Hangar #1***

Ten surface soil samples collected from AOC 1 contained one or more SVOC target analytes that at concentrations exceeded their respective background screening concentration (not including B(a)P EQs) (Figure 4A, Table 9).

Three surface soil samples collected from AOC 1 contained one or more analytes at concentrations that exceeded their respective SCTLs (not including B(a)P EQs).

Soil sample RNA-SF03 contained benzo(a)anthracene (1,500 µg/kg) and carbazole (250 µg/kg) at concentrations that exceeded the Leachability to Groundwater criteria under Chapter 62-777, FAC. The detected concentration of benzo(a)pyrene (1,300 ug/kg) exceeded the Industrial Direct Exposure criteria

Soil sample RNA-SF04 contained benzo(a)anthracene (1,300 µg/kg) and carbazole (490 µg/kg) at concentrations that exceeded the Leachability to Groundwater criteria under Chapter 62-777, FAC. The detected concentration of benzo(a)pyrene (1,400 ug/kg) exceeded the Industrial Direct Exposure criteria

Soil sample RNA-SF10 contained benzo(a)anthracene (15,000 µg/kg), benzo(a)pyrene (12,000 µg/kg), benzo(b)fluoranthene (15,000 J µg/kg), carbazole (1,500 µg/kg) and Dibenzo(a,h)anthracene (2,800 µg/kg) at concentrations that exceeded the Leachability to Groundwater criteria under Chapter 62-777, FAC. The detected concentration of benzo(a)pyrene also exceeded the Industrial Direct Exposure criteria.

The calculated concentrations for B(a)P EQs in the following surface soil samples exceeded the Residential (100 µg/kg) and/or Industrial (700 µg/kg) Direct Exposure criteria under Chapter 62-777, FAC: RNA-SF03 (2,137 µg/kg), RNA-SF04 (2,206 µg/kg), RNA-SF05 (731 µg/kg), RNA-SF06 (415 µg/kg), RNA-SF06-Dup (651 µg/kg), RNA-SF07 (318 µg/kg), RNA-SF08 (969 µg/kg), RNA-SF09 (368 µg/kg), RNA-SF10 (18,555 µg/kg), RNA-SF11 (323 µg/kg), RNA-SF13 (627 µg/kg), RNA-SF14 (198 µg/kg), RNA-SF15 (358 µg/kg), RNA-SF16 (338 µg/kg), RNA-SF17 (225 µg/kg), RNA-SF23 (201 µg/kg), RNA-SF24 (870 µg/kg), RNA-SF25 (163 µg/kg) and RNA-SF25-Dup (161 µg/kg).

***AOC 2 – Incinerator Building***

Four surface soil samples collected from AOC 2 contained one or more SVOC target analytes at concentrations that exceeded their respective background screening concentration (not including B(a)P TEQs) (Figure 5, Table 9).

One surface soil sample collected from AOC 2 contained one or more analytes at concentrations that exceeded their respective SCTLs (not including B(a)P EQs) (Table 9).

Soil sample RNA-SF33 contained benzo(a)anthracene (2,400 µg/kg) and benzo(b)fluoranthene (4,100 µg/kg) at concentrations that exceeded the Leachability to Groundwater criteria under Chapter 62-777, FAC. The detected concentration of benzo(a)pyrene (2,200 ug/kg) exceeded the Industrial Direct Exposure criteria.

The calculated concentrations for B(a)P TEQs in the following samples exceeded either the Residential (100 µg/kg) or Industrial (700 µg/kg) Direct Exposure criteria under Chapter 62-777, FAC: RNA-SF30 (158 µg/kg), RNA-SF31 (216 µg/kg), RNA-SF33 (3,500 µg/kg), RNA-SF34 (275 µg/kg) and RNA-SF35 (230 µg/kg).

***AOC 4 – Former Artillery Bunkers / Gun Range / Robert Morgan Education Center***

No surface soil samples were collected for SVOCs because metals were the only concern at this AOC.

***AOC 5 – Hangar #3 Boiler Buildings***

Two surface soil samples collected from AOC 5 contained one or more analytes at concentrations that exceeded their respective background screening concentration (not including B(a)P TEQs) (Figure 7, Table 9).

Two surface soil samples collected from AOC 5 contained one or more analytes at concentrations that exceeded their respective SCTLs (not including B(a)P EQs).

Surface soil sample RNA-SF71 contained benzo(a)anthracene (3,100 µg/kg) and benzo(b)fluoranthene (5,000 µg/kg) at concentrations that exceeded the Leachability to Groundwater criteria under Chapter 62-777, FAC. The detected concentration of benzo(a)pyrene (3,400 ug/kg) exceeded the Industrial Direct Exposure criteria.

Surface soil sample RNA-SF72 contained benzo(a)anthracene (2,100 µg/kg) and carbazole (300 µg/kg) at concentrations that exceeded the Leachability to Groundwater criteria under Chapter 62-777, FAC. The detected concentration of benzo(a)pyrene (1,500 ug/kg) exceeded the Industrial Direct Exposure criteria.

The calculated concentrations for B(a)P EQs in the following samples exceeded the Residential (100 µg/kg) and/or Industrial (700 µg/kg) Direct Exposure criteria under Chapter 62-777, FAC: RNA-SF71 (5,129 µg/kg) and RNA-SF72 (2,320 µg/kg).

Table 9 provides a summary of the SVOCs detected in surface soil samples along with a comparison against the Florida SCTLs for Leachability to Groundwater, and Residential and Industrial Direct Exposure criteria set forth in Chapter 62-777, FAC for each COC detected. Laboratory analytical data sheets are provided in Appendix B. Benzo(a)pyrene Conversion Tables are included in Appendix D.

***5.2.3 Inorganic Analytes.*** The surface soil samples were analyzed for RCRA 8 metals and the analytical results are detailed in Table 11. Each of the RCRA 8 metals were detected in one or more surface soil samples collected during the SI at a concentration above their respective MDLs including arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver.

Seven of the RCRA 8 metals were detected in one or more surface soil samples at a concentration that exceeded their respective background screening concentration including: arsenic, barium, cadmium, chromium, lead, mercury and silver.

Six of the detected RCRA 8 metals exceeded their respective Leachability to Groundwater or Residential or Industrial Direct Exposure criteria under Chapter 62-777, FAC including: arsenic, barium, cadmium, chromium, lead and silver. Arsenic was detected at concentrations that exceeded the SCTL in both background surface soil samples (RNA-SF01 and RNA-SF02).

Nineteen different surface soil samples contained one or more RCRA 8 metals at a concentration above their background screening concentration and 41 surface soil samples contained one or more RCRA 8 metals at a concentration above their SCTL. The locations and the details of the exceedances are discussed below.

***AOC 1 – Hangar #1***

Seven surface soil samples collected from AOC 1 contained one or more of the RCRA 8 metals at concentrations that exceeded their respective background screening concentration (Table 11).

Eleven surface soil samples collected from AOC 1 contained one or more of the RCRA 8 metals at concentrations that exceeded their respective SCTLs.

Arsenic was detected in the following 10 surface soil samples collected at AOC 1 at concentrations that exceeded its SCTL: RNA-SF11 (8.4 mg/kg), RNA-SF13 (3.6 mg/kg), RNA-SF15 (14 mg/kg), RNA-SF17 (2.6 mg/kg), RNA-SF19 (2.3 mg/kg), RNA-SF23 (5.3 mg/kg), RNA-SF24 (9.7 mg/kg), RNA-SF25 (3.6 mg/kg), RNA-SF26 (3.6 mg/kg) and RNA-SF28 (2.2 mg/kg). In comparison, the concentrations detected in the background samples were 3.6 mg/kg (RNA-SF01) and 4.3 mg/kg (RNA-SF02) for an average concentration of 3.95 mg/kg.

Soil sample RNA-SF11 also contained barium (530 mg/kg), cadmium (25 J mg/kg) and chromium (79 J mg/kg) at concentrations that exceeded the Leachability to Groundwater or Residential Direct Exposure criteria under Chapter 62-777, FAC. (Figure 4A, Table 11).

***AOC 2 – Incinerator Building***

Three surface soil samples collected from AOC 2 contained one or more of the RCRA 8 metals at concentrations that exceeded their respective background screening concentration (Figure 5, Table 11).

Seven surface soil samples collected from AOC 2 contained one or more of the RCRA 8 metals at concentrations that exceeded their respective SCTLs.

Arsenic was detected in the following seven surface soil samples collected at AOC 2 at concentrations that exceeded its SCTL: RNA-SF29 (3.4 mg/kg), RNA-SF30 (5.1 mg/kg), RNA-SF31 (2.9 mg/kg), RNA-SF32 (3.2 mg/kg), RNA-SF33 (3.6 mg/kg), RNA-SF34 (19 mg/kg) and RNA-SF35 (3.4 mg/kg). The arsenic detected in soil sample RNA-SF34 also exceeded the Industrial Direct Exposure criteria under Chapter 62-777, FAC.

Soil sample RNA-SF29 also contained chromium (41 J mg/kg) at a concentration that exceeded the Leachability to Groundwater criteria under Chapter 62-777, FAC.

Soil sample RNA-SF34 also contained chromium (46 J mg/kg) and silver (93 mg/kg) at concentrations that exceeded the Leachability to Groundwater criteria under Chapter 62-777, FAC.

***AOC 4 – Former Artillery Bunkers / Gun Range / Robert Morgan Education Center***

Six surface soil samples (including duplicates) collected from AOC 4 contained one or more of the RCRA 8 metals at concentrations that exceeded their respective background screening concentration (Figure 6, Table 11).

Sixteen surface soil samples collected from AOC 4 contained arsenic at concentrations that exceeded its SCTL including: RNA-SF59 (5.1 mg/kg), RNA-SF59-Dup (6.7 mg/kg), RNA-SF60 (5.4 mg/kg), RNA-SF61 (3.8 mg/kg), RNA-SF62 (4.9 mg/kg), RNA-SF63 (4.6 mg/kg), RNA-SF63-Dup (4.4 mg/kg), RNA-SF64 (3.3 mg/kg), RNA-SF65 (3.4 mg/kg), RNA-SF66 (3.3 mg/kg), RNA-SF67 (6.2 mg/kg), RNA-SF68 (7.8 mg/kg), RNA-SF73 (2.8 mg/kg), RNA-SF74 (4.5 mg/kg), RNA-SF76 (2.8 mg/kg) and RNA-SF77 (3.4 mg/kg).

***AOC 5 – Hangar #3 Boiler Buildings***

Lead (66 mg/kg) was detected in surface soil sample RNA-SF72 and exceeded their respective background screening concentration (Figure 7, Table 11).

Three surface soil samples collected from AOC 5 contained arsenic at concentrations that exceeded its SCTL including: RNA-SF69 (3 mg/kg), RNA-SF70 (4.1 mg/kg) and RNA-SF71 (4.1 mg/kg).

Table 11 provides a summary of the RCRA 8 Metals detected in surface soil samples along with a comparison against the Florida SCTLs for Leachability to Groundwater, and Residential and Industrial

Direct Exposure criteria set forth in Chapter 62-777, FAC for each COC detected. Laboratory analytical data sheets are provided in Appendix B.

***5.2.3 Dioxin and Furan Congeners.*** SCTL calculations for polychlorinated dibenzodioxin (PCDD) and polychlorinated dibenzofuran (PCDF) congeners are made by entering the detected values into a Dioxin Conversion Table which adds up all of the congeners to obtain a Total Dioxin Equivalent value and a Total Furan Equivalent value. These two values are then added to generate a Total TEQ for dioxins and furans (2,3,7,8-TCDD Equivalents) which is then compared to Direct Exposure SCTLs as set forth in Section V.C.7 "Development of SCTLs for Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs)" in Chapter 62-777, FAC. More specifically the Toxic Equivalency Factors (TEFs) used to express PCDD and PCDF concentrations as 2, 3, 7, 8-TCDD Equivalents were derived by a World Health Organization (WHO) workshop held in Stockholm, Sweden in 1997. The Residential Direct Exposure level is $7.0e^{-06}$ mg/kg and the Industrial Direct Exposure level is $3.0e^{-05}$ mg/kg.

Twenty-seven dioxin and furan congeners were detected in one or more of the surface soil samples collected from AOC-2 near the former incinerator building. These congeners are listed in Table 13 and shown on Figure 5.

Seven surface soil samples collected from AOC 2 contained one or more congeners that exceeded their respective background screening concentration. Three of these samples had a calculated dioxin Total TEQ that exceeded the background screening concentration.

Sixteen of the dioxin/furan congeners were detected in the eight surface soil samples collected from AOC 2 and in the two background samples at concentrations that exceeded the SCTL.

Ten surface soil samples contained dioxin Total TEQs at concentrations that exceeded the SCTL as set forth in Chapter 62-777, FAC including RNA-SF01 (0.0004007 mg/kg), RNA-SF02 (0.0005783 mg/kg), RNA-SF29 (0.0008006 mg/kg), RNA-SF30 (0.002601 mg/kg), RNA-SF31 (0.0008642 mg/kg), RNA-SF32 (0.0008511 mg/kg), RNA-SF33 (0.0010017 mg/kg), RNA-SF34 (0.0223920 mg/kg), RNA-SF35 (0.0049004) and RNA-SF36 (0.0002782). A number of the samples, including RAD-SF34 and RNA-SF35, had concentrations that exceeded the Industrial Direct Exposure criteria under Chapter 62-777, FAC.

Table 13 provides a summary of the dioxins and furans detected in surface soil samples along with a comparison against the Florida SCTLs for Residential and Industrial Direct Exposure criteria set forth in Chapter 62-777, FAC for each COC detected. Laboratory analytical data sheets are provided in Appendix B. Dioxin Conversion Tables are provided in Appendix E.

## 5.3 Subsurface Soil Analytical Results

The designated background subsurface soil sample (RNA-SB01 at station RNA01) was located in a wooded area at the farthest eastern point of the MetroZoo property approximately 3,500 feet southeast of Hangar #1 (Figure 3). This location was part of the Richmond NAS. This sample was used to determine background screening concentrations for target analytes for comparison purposes. A soil matrix spike/matrix spike duplicate was also collected from subsurface soil sample RNA-SB01.

The background subsurface soil sample did not contain any targeted VOCs above their MDLs (Table 8). The background subsurface soil sample contained only one targeted SVOC (acetophenone) at a concentration above the MDLs (Table 10). Five metals (arsenic, barium, chromium, lead and mercury) were detected above their MDLs but did not exceed their SCTLs (Table 12) with the exception of arsenic, which did exceed its SCTL. The background surface soil sample is considered to be representative for the targeted analytes with the exception of arsenic.

***5.3.1 Volatile Organic Compounds.*** Five VOCs were detected in one or more of the subsurface soil samples collected from the site. The VOC target analytes detected in the subsurface soil samples include: acetone, chloroform, methyl butyl ketone, methyl ethyl ketone, and TCE. Acetone is often a remnant of the decontamination process.

All five of the reported VOCs were detected in one or more subsurface soil sample at a concentration that exceeded their respective background screening concentration including: acetone, chloroform, methyl butyl ketone, methyl ethyl ketone and TCE.

TCE exceeded its Leachability to Groundwater criteria under Chapter 62-777, FAC, in one surface soil sample. The locations and the details of the exceedances are discussed below.

***AOC 1 – Hangar #1***

TCE exceeded its Leachability to Groundwater criteria under Chapter 62-777, FAC, in one surface soil sample; RNA-SB22 (60 µg/kg) (Figure 4A, Table 8).

Three samples (RNA-SB22, RNA-SB26 and RNA-SB28) contained one or more of the target analytes at concentrations exceeding the background screening concentrations for one or more the five reported VOCs.

***AOC 2 – Incinerator Building Area***

None of the subsurface soil samples collected from the incinerator building area contained any target VOC analytes at concentrations above the SCTLs under Chapter 62-777, FAC (Figure 5, Table 8).

***AOC 4 – Former Artillery Bunkers / Gun Range / Robert Morgan Education Center***

No subsurface soil samples were scheduled to be collected at this AOC. Subsurface soil sample collection was prohibited as a result of the shallow nature of the limestone bedrock in this AOC.

***AOC 5 – Hangar #3 Boiler Buildings***

No subsurface soil samples were collected from AOC 5 due to an elevated water table.

Table 8 provides a summary of the VOCs detected in subsurface soil samples along with a comparison against the Florida SCTLs for Leachability to Groundwater, and Residential and Industrial Direct Exposure criteria set forth in Chapter 62-777, FAC for each COC detected. Laboratory analytical data sheets are provided in Appendix B.

***5.3.2 Semi-Volatile Organic Compounds.*** Nine SVOCs were detected in one or more subsurface soil samples collected from the Richmond NAS site. The SVOC target analytes detected in the subsurface soil samples include: acetophenone, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene and pyrene (Table 10).

Two SVOCs were detected in one or more subsurface soil samples at a concentration that exceeded their respective background screening concentration including: fluoranthene and B(a)P TEQs.

None of the detected target analytes exceeded their respective Leachability to Groundwater or Residential or Industrial Direct Exposure criteria under Chapter 62-777, FAC.

B(a)P TEQs exceeded the Residential Direct Exposure criteria under Chapter 62-777, FAC in three subsurface soil samples. B(a)P TEQs Calculation Sheets are provided in Appendix D. The locations and the details of the exceedances are discussed below.

***AOC 1 – Hangar #1***

One subsurface soil sample collected from AOC 1 contained fluoranthene at a concentration that exceeded its respective background screening concentration (not including B(a)P EQs) (Figure 4A, Table 10).

No subsurface soil samples collected from AOC 1 contained any target analytes at concentrations that exceeded their respective SCTLs (not including B(a)P TEQs).

The calculated concentrations for B(a)P EQs in the following subsurface soil samples exceeded the Residential (100 µg/kg) Direct Exposure criteria under Chapter 62-777, FAC: RNA-SB04 (214 µg/kg), RNA-SB10 (163 µg/kg) and RNA-SB23 (212 µg/kg).

***AOC 2 – Incinerator Building***

No subsurface soil samples collected from AOC 2 contained any target analytes at concentrations that exceeded their respective background screening concentrations or their respective SCTLs, including B(a)P EQs (Figure 5, Table 10).

***AOC 4 – Former Artillery Bunkers / Gun Range / Robert Morgan Education Center***

No subsurface soil samples were scheduled to be collected at this AOC.

***AOC 5 – Hangar #3 Boiler Buildings***

No subsurface soil samples were collected from AOC 5 due to an elevated water table.

Table 10 provides a summary of the SVOCs detected in subsurface soil samples along with a comparison against the Florida SCTLs for Leachability to Groundwater, and Residential and Industrial Direct Exposure criteria set forth in Chapter 62-777, FAC for each COC detected. Laboratory analytical data sheets are provided in Appendix B. Benzo(a)pyrene Conversion Tables are included in Appendix D.

***5.3.3 Inorganic Analytes.*** The subsurface soil samples were analyzed for RCRA 8 metals and the analytical results are detailed in Table 12. Each of the RCRA 8 metals were detected in one or more subsurface soil samples collected during the SI at a concentration above their respective MDLs including arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver.

Only chromium was detected in two samples at concentrations that exceeded its respective background screening concentration. Both of these samples were collected from AOC 1 – RNASB05 (55 J mg/kg) and RNA-SB19 (49J mg/kg). These chromium concentrations exceed the SCTL for groundwater leachability. No other samples collected from the other AOCs contained any of the RCRA 8 metals at concentrations that exceeded their respective background screening concentrations.

Arsenic was found to exceed its Residential Direct Exposure criteria under Chapter 62-777, FAC. Arsenic was detected at concentrations that exceeded the SCTL in the background subsurface soil sample (RNA-SB01). In addition, arsenic was also detected in subsurface soil samples RNA-SB05 (3.3 mg/kg), RNA-SB16 (5.9 mg/kg), RNA-SB19 (2.6 mg/kg), RNA-SB24 (4.1 mg/kg), RNA-SB25 (4.2 mg/kg), RNA-SB26 (4.2 mg/kg), RNA-SB28 (3.5 mg/kg), RNA-SB29 (2.9 mg/kg), RNA-SB30 (3.4 mg/kg), RNA-SB33 (4.0 mg/kg), RNA-SB34 (4.1 mg/kg), RNA-SB35 (4.0 mg/kg), RNA-SB73 (4.7 mg/kg), RNA-SB74 (3.7 mg/kg). These samples were collected from AOCs-1, 2 & 4.

Table 12 provides a summary of the RCRA 8 Metals detected in subsurface soil samples along with a comparison against the Florida SCTLs for Leachability to Groundwater, and Residential and Industrial Direct Exposure criteria set forth in Chapter 62-777, FAC for each COC detected. Laboratory analytical data sheets are provided in Appendix B.

***5.3.4 Dioxin and Furan Congeners.*** Fourteen dioxin and furan congeners were detected in one or more of the subsurface soil samples collected from AOC-2 near the former incinerator building. These congeners are listed in Table 14.

None of the individual dioxin/furan congeners were detected in the subsurface soil samples collected from AOC 2 at concentrations that exceeded the background screening concentrations.

Six subsurface soil samples including the background location had a calculated dioxin Total TEQ at concentrations that exceeded the SCTL as set forth in Chapter 62-777, FAC including RNA-SB01 (0.0008327 mg/kg), RNA-SB29 (0.0003509 mg/kg), RNA-SB30 (0.0004088 mg/kg), RNA-SB33 (0.0004097), RNA-SB34 (0.0004270 mg/kg) and RNA-SB35 (0.0004672).

Table 14 provides a summary of the dioxins and furans detected in subsurface soil samples along with a comparison against the Florida SCTLs for Residential and Industrial Direct Exposure criteria set forth in

Chapter 62-777, FAC for each COC detected. Laboratory analytical data sheets are provided in Appendix B. Dioxin Conversion Tables are provided in Appendix E.

## 5.4 Groundwater Assessment

Eleven groundwater samples (including one duplicate sample) were collected from 10 newly installed temporary micro-wells (TMW01 through TMW08, TMW16 and TMW17). Micro-well TMW-01 served as the background groundwater location.

Table 5 presents monitoring well completion information (including total depth and screened interval) and depth-to-groundwater measurements. Table 6 presents the final field parameter measurements recorded for the groundwater samples. Tables 15 and 16 include a summary of the laboratory analytical results for groundwater samples along with a comparison to Florida MCLs/GCTLs and Federal MCLs.

## 5.5 Groundwater Analytical Results

The background groundwater sample (RNA-GW01 at station RNA01) was collected from monitoring well TMW01which was located in a wooded area at the farthest east point of the MetroZoo property approximately 3,500 feet southeast of Hangar #1 (Figure 3). This location was part of the Richmond NAS. This sample was used to determine background screening concentrations for target analytes for comparison purposes. A groundwater matrix spike/matrix spike duplicate was also collected from groundwater sample RNA-GW01.

VOC target analytes were not detected at concentrations above their MDLs in the background sample. SVOC target analytes were not detected at concentrations above their MDLs in the background sample. Barium (9.8 µg/l) was the only inorganic analyte detected in the background groundwater sample, however, this concentration did not exceed the State GCTL or Federal MCL. None of the dioxin/furan congeners were detected at concentrations above their MDLs in the background sample. The background groundwater sample is considered to be representative of the targeted analytes.

The groundwater sample analytical results were compared with State and Federal MCLs for drinking water supplies and State groundwater standards in Chapter 62-550 FAC and GCTLs under Chapter 62-777, FAC. The Federal MCLs are only applicable to drinking water supplies, and the standards in Chapter 62-550 only apply to specific groundwater classifications.

Laboratory qualifiers for groundwater samples are as follows: U – the analyte was not detected at or above the reporting limit; J – identification of analyte is acceptable; reported value is an estimate; UJ – the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.

***5.5.1 Volatile Organic Compounds.*** VOCs were not detected above their respective MDLs in any of the groundwater samples collected from the site. Organic analytical results for groundwater samples are detailed in Table 15. Analytical reports are included in Appendix B.

***5.5.2 Semi-Volatile Organic Compounds.*** Four SVOCs were detected above their respective MDLs including carbazole, fluoranthene, n-nitroso-diphenylamine and phenanthrene. Only one of the 11 groundwater samples contained one or more of these compounds at concentrations above the MDLs.

The groundwater sample (RNA-GW05) contained Carbazole (6.6 µg/l) at a concentration that exceeded its background screening concentrations and the Florida GCTL per Chapter 62-777, FAC. This sample was collected from AOC 1 near Building 1 at the northeast corner of Hangar #1 (Figure 4B). Organic analytical results for groundwater samples are detailed in Table 15. Analytical reports are included in Appendix B.

***5.5.3 Inorganics.*** Groundwater samples were analyzed for the RCRA 8 metals. Only barium and lead were detected at concentrations that exceeded their respective MDLs, each in one groundwater sample collected from the site (Table 14).

Barium and lead were detected at elevated concentrations relative to their background screening concentration, each in one groundwater sample collected from AOC 1 (RNA-GW05) and AOC 4 (RNA-GW15), but did not exceed their respective GCTLs (Figures 4A & 6).

RCRA 8 metals were not detected in groundwater samples at concentrations that exceeded their respective State GCTLs or Federal MCLs.

Table 14 presents a summary of the laboratory analytical results for the RCRA 8 metals detected in the samples and a comparison against background screening concentrations and Florida MCLs and GCTLs and Federal MCLs or guidance concentrations.

***5.5.4 Dioxin and Furan Congeners.*** Dioxin/furans were not detected above their respective MDLs in any of the groundwater samples collected from the site. Analytical reports are included in Appendix B.

## 5.6 Groundwater Flow Direction

The depth to groundwater was measured at AOC 1 on January 27, 2011. The groundwater flow direction was established at AOC 1. Depth to water at the Hangar #1 AOC ranged between 10.07 to 10.75 feet below top of casing. It should be noted that the top of PVC casings were close to the land surface elevation. Groundwater at AOC 1 was determined to flow to the northeast with a northwesterly trend near the eastern end of AOC-1 (Figure 4B). Flow direction at AOCs 2, 3 and 4 was not determined due to a lack of data points.

## 5.7 Quality Analysis/Quality Control Results

The laboratory data package was evaluated by the USEPA Region IV Science and Environmental Support Division. The complete laboratory results and data review comments are presented on a CD in PDF format in Appendix B.

Based on the review, it was indicated that the metals data packages met acceptable contractual and technical performance with qualifications. The blank samples contained apparent low-levels of some of the analytes and detection limits were adjusted to as high as five times to discount possible false positives.

The data review of the volatile and semi-volatile organic analysis indicates that the technical and contractual analysis and extraction holding time limits were met. The laboratory scored within warning limits for all spiked analytes in the performance evaluation samples (PES).

Several samples for organics and inorganics had “J” qualifiers applied due to low volatile internal standard area counts, low or high DMC recoveries, low semi-volatile extractable internal standard area counts, low matrix spike/matrix spike duplicate (MS/MSD) recovery, poor precision based on MS/MSD relative percent difference, and erratic initial or continuing calibration. Several analytes were qualified due to other various factors. These qualifiers are detailed in the analytical reports included in Appendix B.

Several analytes for both soil and groundwater samples observed poor response and were therefore “R” qualified and were considered rejected.

A Stage 4 validation consisting of electronic and manual review was performed on the organic and inorganic samples submitted.

## 6.0 PATHWAY EVALUATION SUMMARY

### 6.1 Soil Exposure

Fifty-three soil borings were advanced at four different AOCs and a total of 96 soil samples were collected from these AOCs.

Six VOCs were detected in one or more of the surface soil samples collected from the site. Four VOCs were detected in one or more surface soil samples at concentrations that exceeded their respective background screening concentrations including acetone, chloroform, methyl ethyl ketone and TCE. TCE exceeded its Leachability to Groundwater criteria under Chapter 62-777, FAC, in three surface soil samples.

Five VOCs were detected in one or more of the subsurface soil samples collected from the site. The VOC target analytes detected in the subsurface soil samples included acetone, chloroform, methyl butyl ketone, methyl ethyl ketone, and TCE. All five of the reported VOCs were detected in one or more subsurface soil sample at a concentration that exceeded their respective background screening concentrations. TCE exceeded its Leachability to Groundwater criteria under Chapter 62-777, FAC., in one surface soil sample.

Twenty-five SVOCs were detected in one or more surface soil samples collected from the Richmond NAS site. Twenty-two SVOCs were detected in one or more subsurface soil sample at a concentration that exceeded their respective background screening concentrations.

Five of the detected target analytes exceeded their respective Leachability to Groundwater or Residential or Industrial Direct Exposure criteria under Chapter 62-777, FAC including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole and dibenzo(a,h)anthracene.

B(a)P TEQs exceeded the Residential Direct Exposure criteria under Chapter 62-777, FAC in 28 surface soil samples including two duplicate samples and exceeded the Industrial Direct Exposure criteria in nine samples.

Nine SVOCs were detected in one or more subsurface soil samples collected from the Richmond NAS site. Two SVOCs were detected in one or more subsurface soil sample at a concentration that exceeded their respective background screening concentration including fluoranthene and B(a)P TEQs. None of the detected target analytes exceeded their respective Leachability to Groundwater or Residential or Industrial Direct Exposure criteria under Chapter 62-777, FAC. B(a)P TEQs exceeded the Residential Direct Exposure criteria under Chapter 62-777, FAC in three subsurface soil samples.

Each of the RCRA 8 metals were detected in one or more surface soil samples collected during the SI at a concentration above their respective MDLs. Seven of the RCRA 8 metals were detected in one or more surface soil samples at a concentration that exceeded their respective background screening concentrations. Six of the detected RCRA 8 metals exceeded their respective Leachability to Groundwater or Residential or Industrial Direct Exposure criteria under Chapter 62-777, FAC including arsenic, barium, cadmium, chromium, lead and silver. Arsenic was detected at concentrations that exceeded the SCTL in both background surface soil samples (RNA-SF01 and RNA-SF02).

Nineteen different surface soil samples contained one or more RCRA 8 metals at a concentration above their background screening concentrations and 41 surface soil samples contained one or more RCRA 8 metals at a concentration above their SCTL.

Each of the RCRA 8 metals were detected in one or more subsurface soil samples collected during the SI at a concentration above their respective MDLs. Only chromium was detected in two samples at concentrations that exceeded its respective background screening concentration. Arsenic was found to exceed its Residential Direct Exposure criteria under Chapter 62-777, FAC. Arsenic was detected at concentrations that exceeded the SCTL in the background subsurface soil sample (RNA-SB01) and fourteen other locations collected from AOCs-1, 2 & 4.

Twenty-seven dioxin and furan congeners were detected in one or more of the surface soil samples collected from AOC-2 near the former incinerator building. Seven surface soil samples collected from AOC 2 contained one or more congeners that exceeded their respective background screening concentration. Three of these samples had a calculated dioxin Total TEQ that exceeded the background screening concentration.

Sixteen of the dioxin/furan congeners were detected in the eight surface soil samples collected from AOC 2 and in the two background samples at concentrations that exceeded the SCTL. Ten surface soil samples contained dioxin Total TEQs at concentrations that exceeded the SCTL as set forth in Chapter 62-777, FAC. A number of the samples, including RAD-SF34 and RNA-SF35, had concentrations that exceeded the Industrial Direct Exposure criteria under Chapter 62-777, FAC.

Fourteen dioxin and furan congeners were detected in one or more of the subsurface soil samples collected from AOC-2 near the former incinerator building. None of the individual dioxin/furan congeners were detected in the subsurface soil samples at concentrations that exceeded the background screening concentration. Six subsurface soil samples including the background location had a calculated dioxin Total TEQ at concentrations that exceeded the SCTL as set forth in Chapter 62-777, FAC.

Currently, most of these AOCs are occupied by some type of area that is restricted to the general public and are limited to low transient population. There are no residences on the site but there are commercial businesses present as well as the Coast Guard Base and Miami-FCI. AOC 1 (Hangar #1) is the area that is most open to the public as it is now the location of the Gold Coast Railroad Museum. Areas of this investigation are open to the public and there is a moderate amount of visitors to the museum including after school programs for school children.

The Read2Suceed afterschool program, which has about a dozen Kindergarten through 5$^{th}$ grade children, exists within 200 feet of areas of observed contamination on the Gold Coast Railroad Museum. This after school program, which runs weekdays during the school year, concentrates on improving academic performance and improved Florida Comprehensive Assessment Test (FCAT) scores. However, the students work area is primarily restricted to a rail car and a few adjacent picnic tables. The students have limited access to the areas of contamination [127].

AOCs 4 and 5 are located on Miami-Dade Parks and Recreation property. Access to both of these areas is restricted to the public with only zoo personnel having access to these areas. However, elevated levels of lead (200J & 310J mg/kg) were detected in two surface soil samples collected from Bunker # 3 within 200 feet of the Indian Rhinoceros and Asian Elephant Paddocks. These levels exceeded their respective background screening concentration. Both these species are federally designated endangered spices under 50 CFR 17.11 [27, 57] (Figure 6). Access to AOC 2 is restricted as it is located on the Miami-FCI property and is located on a part of the property which appears to receive little if any foot traffic. Although, the concentrations of dioxin/furan congeners at this location are high and these contaminants are considered carcinogenetic, an exposure pathway does not exist because no buildings or areas of activity inmate or guard activity are located within 200 feet.

The analytical results suggest that there may be a low risk for a direct exposure scenario at AOC 1 because the surface and subsurface soil samples contain COCs at concentrations that exceed Residential Direct Exposure criteria or Leachability to Groundwater criteria under Chapter 62-777, FAC. Arsenic, benzo(a)pyrene, lead and TCE would be the primary COCs. However, drinking water is not obtained from onsite so no targets exist.

Arsenic contamination was widespread and detected at each AOC. While concentrations were high and most exceeded the Residential Direct Exposure levels and some exceed the Commercial/Industrial Direct Exposure Levels, it is possible that arsenic is naturally occurring in the area and may warrant additional offsite background sampling activities to determine this before any decisions are made regarding the arsenic contamination detected during this SI.

Based on the above information, the soil migration pathway is a pathway of concern at this site.

## 6.2 Groundwater Migration

Eleven groundwater samples (including one duplicate sample) were collected from 10 newly installed temporary micro-wells (TMW01 through TMW08, TMW16 and TMW17). Micro-well TMW-01 served as the background groundwater location.

VOCs were not detected above their respective MDLs in the groundwater samples collected from the site.

Four SVOCs were detected above their respective MDLs including carbazole, fluoranthene, n-nitroso-diphenylamine and phenanthrene. Only one of the 11 groundwater samples contained one or more of these compounds at concentrations above the MDLs.

The groundwater sample (RNA-GW05) contained Carbazole (6.6 µg/l) at a concentration that exceeded its background screening concentrations and the Florida GCTL per Chapter 62-770, FAC. This sample was collected from AOC 1 near Building 1 at the northeast corner of Hangar #1.

Groundwater samples were analyzed for the RCRA 8 metals. Only barium and lead were detected at concentrations that exceeded their respective MDLs. Barium and lead were detected at elevated concentrations relative to their background screening concentration, each in one groundwater sample collected from AOC 1, but did not exceed their respective GCTLs.

RCRA 8 metals were not detected in groundwater samples at concentrations that exceeded their respective State GCTLs or Federal MCLs.

Dioxin/furans were not detected above their respective MDLs in groundwater samples collected at the site.

The majority of the population within a 4-mile radius of the site relies on water provided by the Miami-Dade Water and Sewer Department. Six non-community well systems have been identified within 4-miles of the site. These wells are open to upper portions of the Biscayne aquifer. These well systems collectively serve 264 people. The nearest well located at the Coral Reef Driver License office, reportedly serves 100 people and is located approximately 1 mile northeast of the former Richmond NAS. Six private drinking water wells, also open to upper portions of the Biscayne aquifer, were identified within 4 miles of the former Richmond NAS. The nearest private well was identified 1.8 miles southwest of the former Richmond NAS.

Depth to groundwater in 10 monitoring wells measured at the site ranged from between 10.07 to 10.75 feet below top of casing elevations in the AOC 1 area.

Based on the location of monitoring wells where the water level measurements were made on January 27, 2011, the groundwater flow direction at AOC 1 was to the northeast with a northwesterly trend near the eastern end of AOC-1.

Based on the limited presence of contaminants in groundwater above the GCTLs or MCLs and the significant distance to potable water wells, the groundwater migration pathway is not a pathway of concern.

## 6.3 Surface Water Pathway

The surface water migration route was not evaluated at the site. Surface water or sediment samples were not collected during the SI. However, based on the results of surface soil sampling, the potential exists for contaminated overland runoff from the AOCs to migrate into the surface water pathway. Further investigation of the ditch system located at the former NAS would appear to be warranted.

## 6.4 Air Migration

The air migration route was not evaluated at the site. Air samples were not collected during the SI.

## 7.0 CONCLUSIONS

The former Richmond NAS site is currently occupied by many different entities, the largest of which is owned by Miami-Dade Parks and Recreation which operate the Miami Metro Zoo and Gold Coast Railroad Museum on this property. Many areas are open to the public to visit. While this investigation only focused on certain areas of the former base that had potential to be affected by past base operations, there are still many areas that were occupied by the Richmond NAS that were not investigated. However, this investigation focused on currently known areas of concern except AOC 3 which was inaccessible. Some of the current development has occurred over areas where previous airfield activities were conducted and potentially impacted the environment. Exposure to the public to the detected COCs in the soils is limited due to the localized nature of the contaminants and the limited access to these areas. However, trespasser and commercial/industrial exposure risks may still exist, particularly at the former hangar #1 AOC and the former incinerator building AOC 2. Also, two endangered species are located in close proximity to a bunker in which elevated lead levels were found. However, it is important to note that these levels did not exceed State SCTL criteria.

Groundwater samples did not contain any VOCs, SVOC, or metals at concentrations of concern with the exception of carbazole. Carbazole was found in one groundwater sample collected from AOC 1 at a concentration above the GCTL. Based on the limited presence of contaminants in groundwater above the GCTLs or MCLs and the significant distance to potable water wells, the groundwater migration pathway is not a pathway of concern.

Based on the results of a draft HRS evaluation, this site would be eligible for further CERCLA Superfund action. This would be primarily via the soil exposure pathway. However, under CERCLA, the DERP-FUDS program was also established and the USACE was delegated the authority to execute and manage the FUDS program. As such, the USACE is responsible for determining the eligibility of properties and projects under the FUDS program. As a result, at this time, no further CERCLA Action under Superfund will be forthcoming for this site. Therefore, information from this report will be provided to USACE, as needed, to be evaluated according to the USACE FUDS policy. If additional projects are authorized under the FUDS program they will be ranked and rated for future response in accordance with the FUDS Statewide Management Action Plan for Florida.

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## FIGURES


| Figure | Title |
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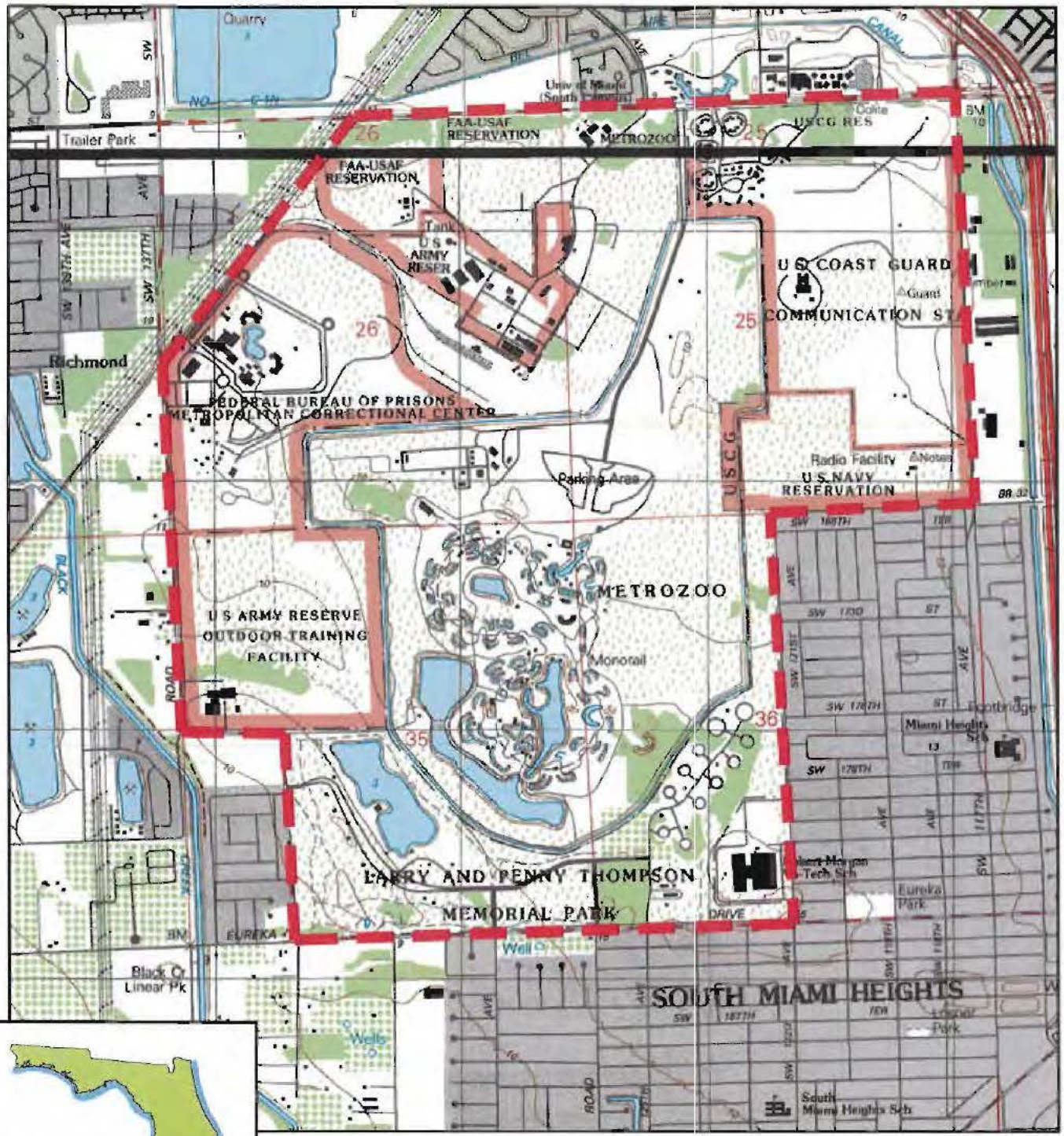
| 1 | Site Location Map |
| 2 | Site Vicinity Map |
| 3 | Site Map with Sample Analytical Results for the Background Locations |
| 4A | Soil Sample Analytical Results Map Results – AOC 1 Hangar #1 |
| 4B | Groundwater Analytical Results and Elevation – AOC 1 Hangar #1 |
| 5 | Soil and Groundwater Analytical Results – AOC 2 Incinerator Building |
| 6 | Soil and Groundwater Analytical Results for Organic and Inorganic Compounds – AOC 4 Artillery and High Explosive Bunkers and Gun Range |
| 7 | Soil and Groundwater Analytical Results for Organic and Inorganic Compounds – AOC 5 Hangar #3 |



**LEGEND**

Boundary of Site Investigation

SOURCE:
USGS Quadrangle - GOULDS, 1994 and
SOUTH MIAMI NW, 1988
Maps and data Copyright 2003 Maptech

0 1,000 2,000
SCALE: 1 INCH = 2,000 FEET

## SITE LOCATION MAP

| NO. | DATE | REVISIONS |
|---|---|---|
| 0 | May-11 | Initial Submittal |

| DESIGNED | DRAWN | CHECKED | DATE |
|---|---|---|---|
| RW | VC | | |

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SITE INSPECTION REPORT
PERRINE
MIAMI-DADE COUNTY, FLORIDA

**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

FIGURE: 1

Aerial:
Florida Department of Transportation
Surveying and Mapping Office
aerial dated April 2009.

**LEGEND**

Boundary of Site Investigation

0 1,000 2,000
SCALE: 1 INCH = 2,000 FEET

## SITE VICINITY MAP

| NO. | DATE | REVISIONS |
|---|---|---|
| 0 | May-11 | Initial Submittal |

| DESIGNED | DRAWN | CHECKED | DATE |
|---|---|---|---|
| RW | VC | | |

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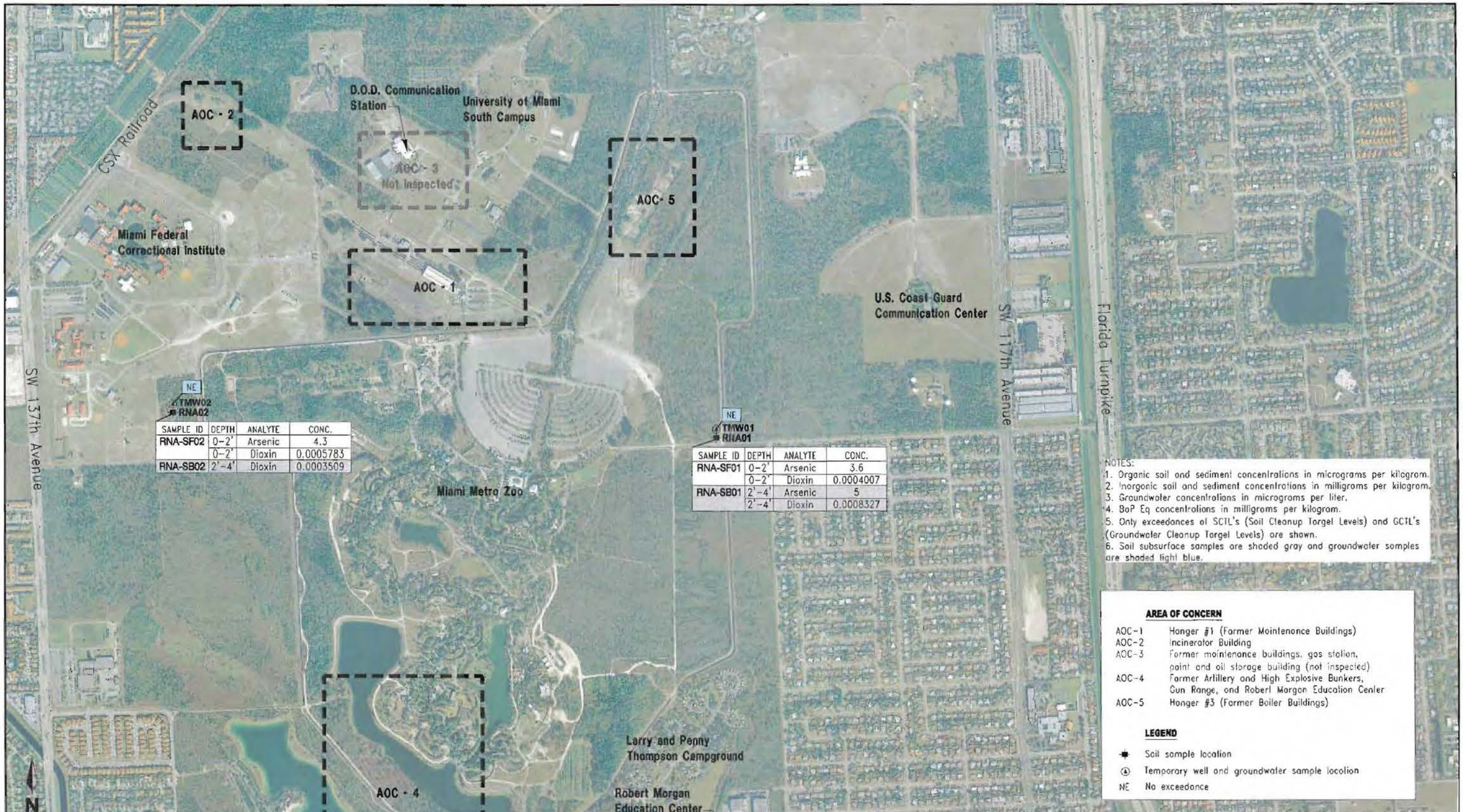
FIGURE:
2




| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF02 | 0-2' | Arsenic | 4.3 |
| | 0-2' | Dioxin | 0.0005783 |
| RNA-SB02 | 2'-4' | Dioxin | 0.0003509 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF01 | 0-2' | Arsenic | 3.6 |
| | 0-2' | Dioxin | 0.0004007 |
| RNA-SB01 | 2'-4' | Arsenic | 5 |
| | 2'-4' | Dioxin | 0.0008327 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF76 | 0-0.5' | Arsenic | 2.8 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF77 | 0-0.5' | Arsenic | 3.4 |

NOTES:
1. Organic soil and sediment concentrations in micrograms per kilogram.
2. Inorganic soil and sediment concentrations in milligrams per kilogram.
3. Groundwater concentrations in micrograms per liter.
4. BaP Eq concentrations in milligrams per kilogram.
5. Only exceedances of SCTL's (Soil Cleanup Target Levels) and GCTL's (Groundwater Cleanup Target Levels) are shown.
6. Soil subsurface samples are shaded gray and groundwater samples are shaded light blue.

**AREA OF CONCERN**

| | |
|---|---|
| AOC-1 | Hanger #1 (Former Maintenance Buildings) |
| AOC-2 | Incinerator Building |
| AOC-3 | Former maintenance buildings, gas station, paint and oil storage building (not inspected) |
| AOC-4 | Former Artillery and High Explosive Bunkers, Gun Range, and Robert Morgan Education Center |
| AOC-5 | Hanger #3 (Former Boiler Buildings) |

**LEGEND**

- Soil sample location
- Temporary well and groundwater sample location
- NE No exceedance

## SITE MAP WITH ANALYTICAL RESULTS FOR BACKGROUND LOCATIONS

| NO. | DATE | REVISIONS |
|---|---|---|
| 0 | May-11 | Initial Submittal |

| DESIGNED | DRAWN | CHECKED | DATE |
|---|---|---|---|
| RW | VC | | |

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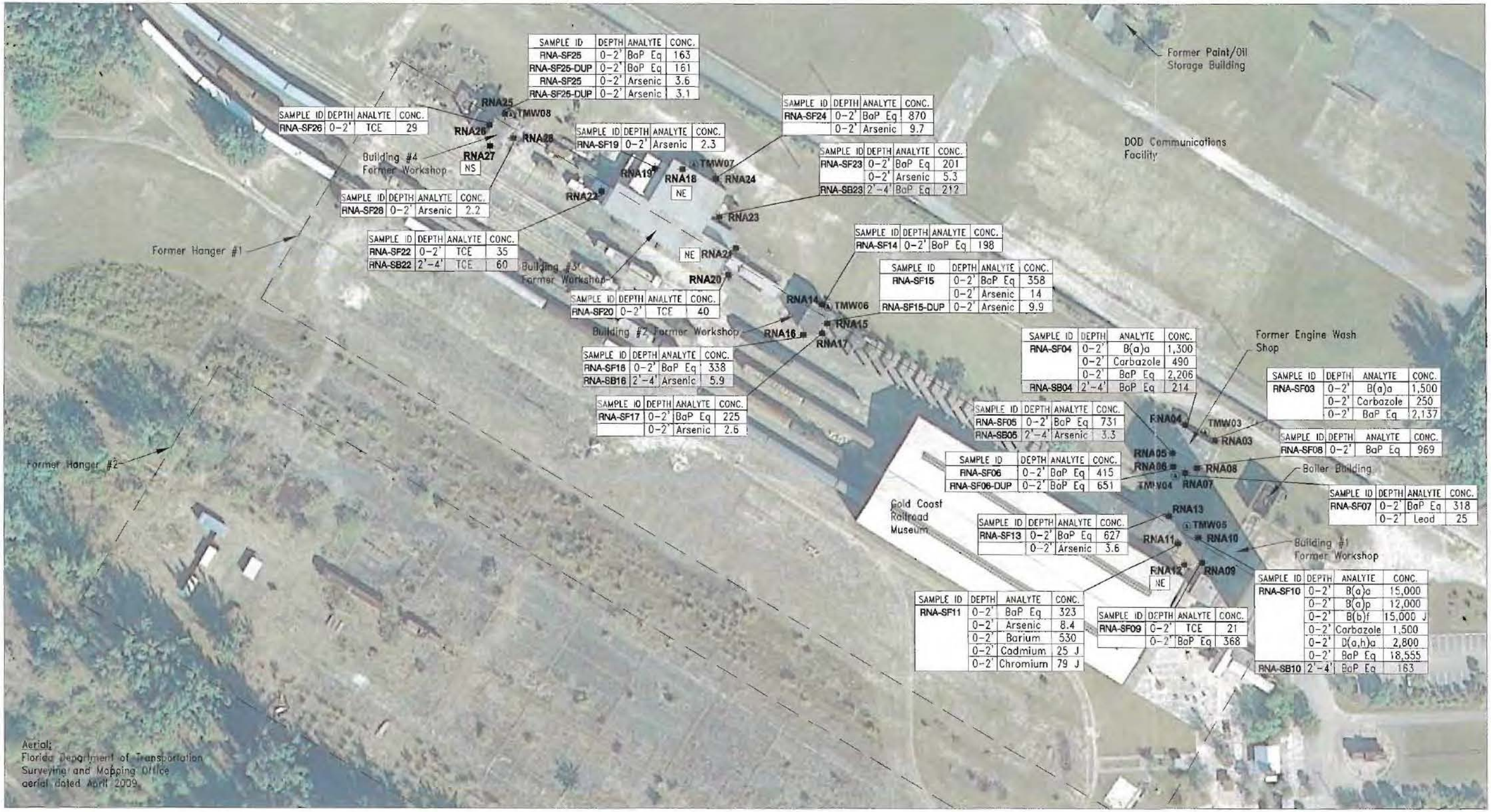
FIGURE: 3




| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF25 | 0-2' | BaP Eq | 163 |
| RNA-SF25-DUP | 0-2' | BaP Eq | 161 |
| RNA-SF25 | 0-2' | Arsenic | 3.6 |
| RNA-SF25-DUP | 0-2' | Arsenic | 3.1 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF26 | 0-2' | TCE | 29 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF19 | 0-2' | Arsenic | 2.3 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF28 | 0-2' | Arsenic | 2.2 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF22 | 0-2' | TCE | 35 |
| RNA-SB22 | 2'-4' | TCE | 60 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF20 | 0-2' | TCE | 40 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF16 | 0-2' | BaP Eq | 338 |
| RNA-SB16 | 2'-4' | Arsenic | 5.9 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF17 | 0-2' | BaP Eq | 225 |
| | 0-2' | Arsenic | 2.6 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF24 | 0-2' | BaP Eq | 870 |
| | 0-2' | Arsenic | 9.7 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF23 | 0-2' | BaP Eq | 201 |
| | 0-2' | Arsenic | 5.3 |
| RNA-SB23 | 2'-4' | BaP Eq | 212 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF14 | 0-2' | BaP Eq | 198 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF15 | 0-2' | BaP Eq | 358 |
| | 0-2' | Arsenic | 14 |
| RNA-SF15-DUP | 0-2' | Arsenic | 9.9 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF04 | 0-2' | B(a)a | 1,300 |
| | 0-2' | Carbazole | 490 |
| | 0-2' | BaP Eq | 2,206 |
| RNA-SB04 | 2'-4' | BaP Eq | 214 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF03 | 0-2' | B(a)a | 1,500 |
| | 0-2' | Carbazole | 250 |
| | 0-2' | BaP Eq | 2,137 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF05 | 0-2' | BaP Eq | 731 |
| RNA-SB05 | 2'-4' | Arsenic | 3.3 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF08 | 0-2' | BaP Eq | 969 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF06 | 0-2' | BaP Eq | 415 |
| RNA-SF06-DUP | 0-2' | BaP Eq | 651 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF07 | 0-2' | BaP Eq | 318 |
| | 0-2' | Lead | 25 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF13 | 0-2' | BaP Eq | 627 |
| | 0-2' | Arsenic | 3.6 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF10 | 0-2' | B(a)a | 15,000 |
| | 0-2' | B(a)p | 12,000 |
| | 0-2' | B(b)f | 15,000 J |
| | 0-2' | Carbazole | 1,500 |
| | 0-2' | D(a,h)a | 2,800 |
| | 0-2' | BaP Eq | 18,555 |
| RNA-SB10 | 2'-4' | BaP Eq | 163 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF11 | 0-2' | BaP Eq | 323 |
| | 0-2' | Arsenic | 8.4 |
| | 0-2' | Barium | 530 |
| | 0-2' | Cadmium | 25 J |
| | 0-2' | Chromium | 79 J |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF09 | 0-2' | TCE | 21 |
| | 0-2' | BaP Eq | 368 |

**LEGEND**

- Soil sample location
- Temporary well and groundwater sample location

B(a)a Benzo(a)anthracene
B(a)p Benzo(a)pyrene
BaP Eq B(a)P Equivalents
B(b)f Benzo(b)fluoranthene
D(a,h)a Dibenzo(a,h)anthracene

NE No exceedance
NS Not sampled
J Estimated value reported between the method detection limit and the reporting limit

0 50 100
SCALE: 1 INCH = 100 FEET

NOTES:
1. Organic soil and sediment concentrations in micrograms per kilogram.
2. Inorganic soil and sediment concentrations in milligrams per kilogram.
3. BaP Eq concentrations in milligrams per kilogram.
4. Only exceedances of SCTL's (Soil Cleanup Target Levels) are shown.
5. Soil subsurface samples are shaded gray and groundwater samples are shaded light blue.

N

**SOIL SAMPLE ANALYTICAL RESULTS FOR ORGANIC AND INORGANIC COMPOUNDS**
**AREA OF CONCERN - 1 (HANGER #1 (FORMER MAINTANCE BUILDINGS)**

| NO. | DATE | REVISIONS |
|---|---|---|
| 0 | May-11 | Initial Submittal |

| DESIGNED | DRAWN | CHECKED | DATE |
|---|---|---|---|
| RW | VC | | |

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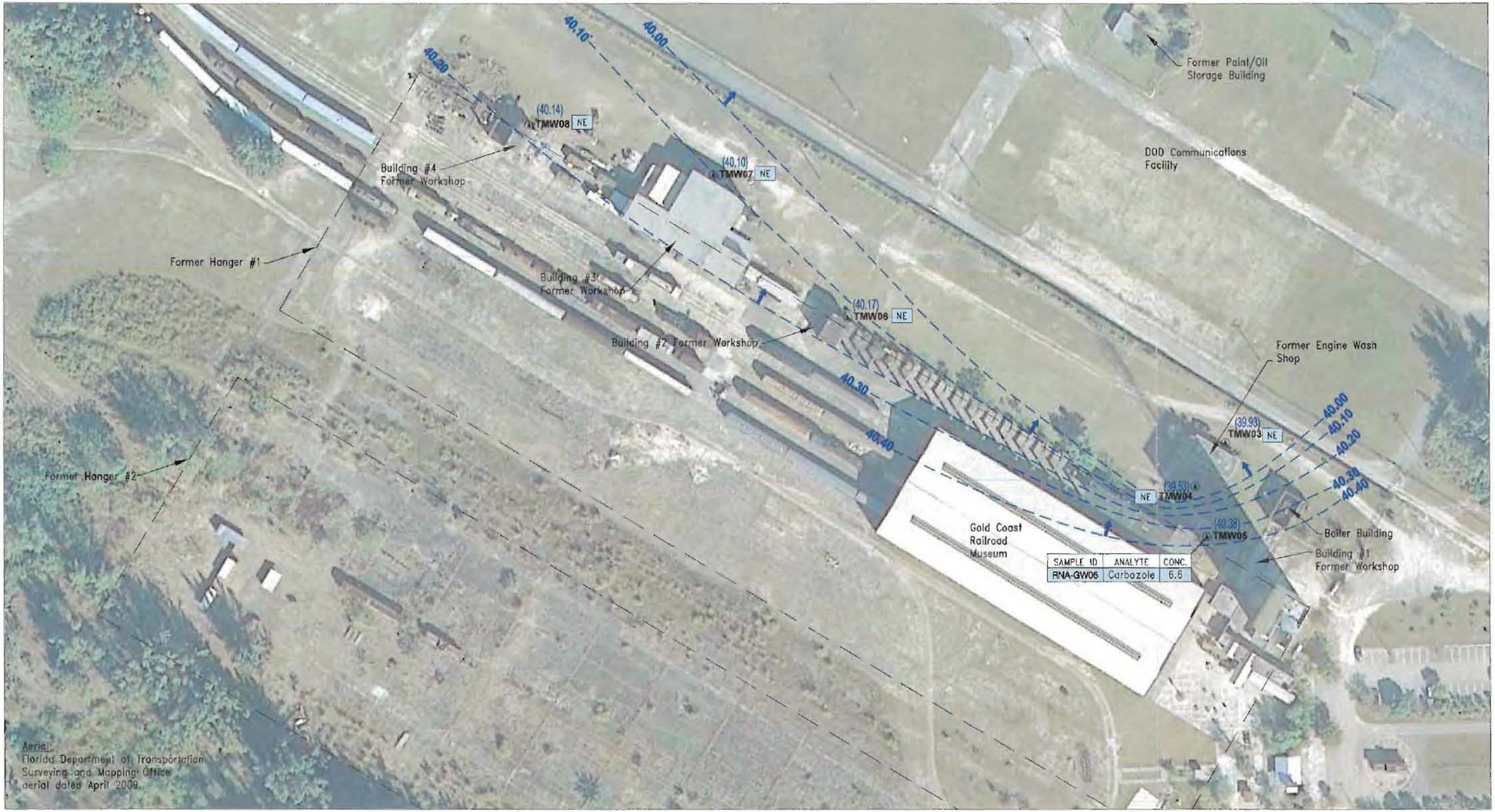
FIGURE: 4A




| SAMPLE ID | ANALYTE | CONC. |
|---|---|---|
| RNA-GW05 | Carbozole | 6.6 |

**LEGEND**

- Temporary well and groundwater sample location
- NE No exceedance
- (40.17) Groundwater elevation
- 40.0 Groundwater elevation contour
- Groundwater flow direction

0 50 100
SCALE: 1 INCH = 100 FEET

NOTES:
1. Groundwater concentrations in micrograms per liter.
2. Only exceedances of GCTL's (Groundwater Cleanup Target Levels) are shown.
3. Groundwater samples are shaded light blue.

N

**GROUNDWATER SAMPLE ANALYTICAL RESULTS FOR ORGANIC AND INORGANIC COMPOUNDS AND ELEVATION FOR AREA OF CONCERN - 1 [HANGER #1 (FORMER MAINTANCE BUILDINGS)]**

| NO. | DATE | REVISIONS |
|---|---|---|
| 0 | May-11 | Initial Submittal |

| DESIGNED | DRAWN | CHECKED | DATE |
|---|---|---|---|
| RW | VC | | |

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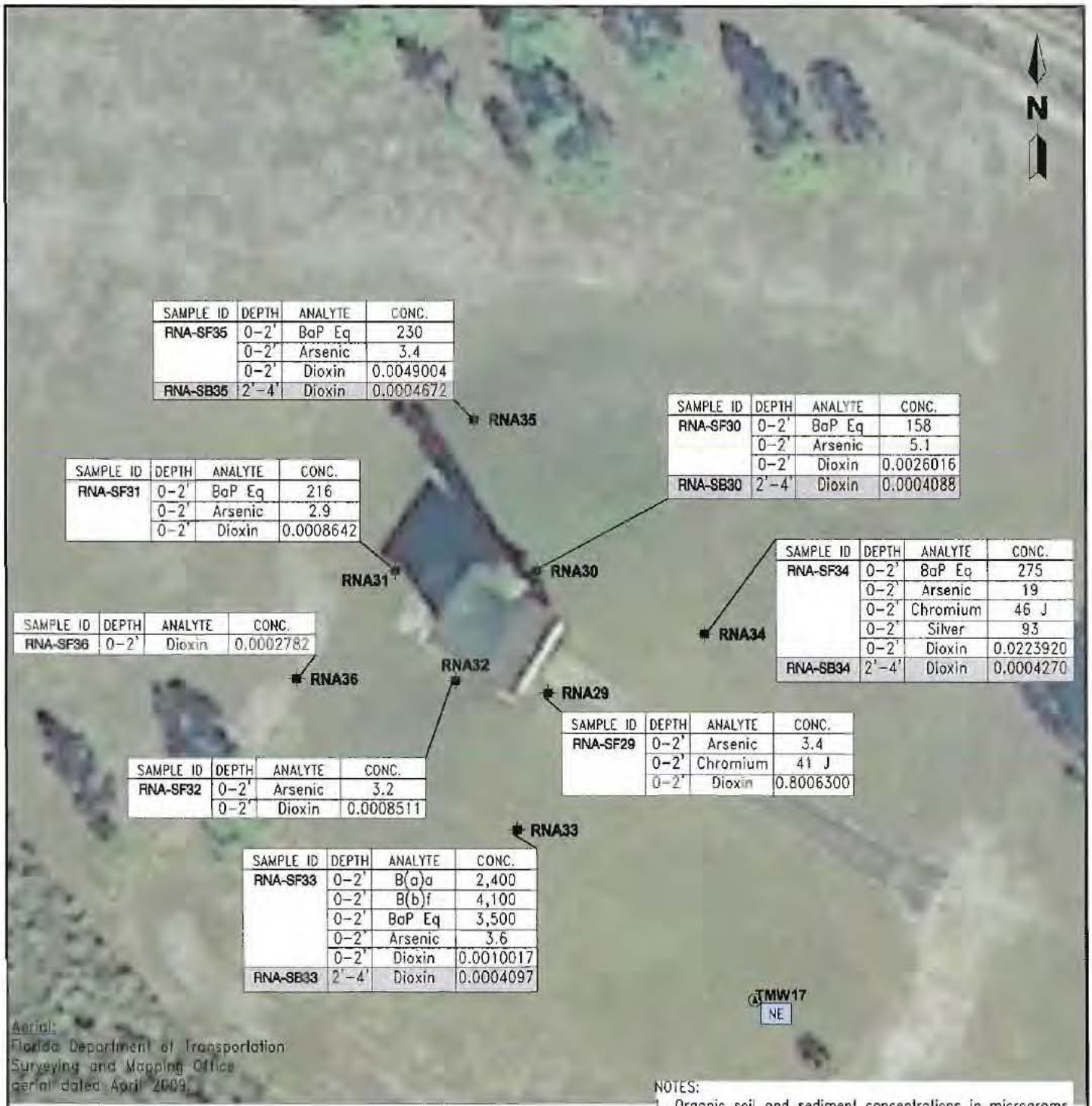
FIGURE: 4B




| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF35 | 0-2' | BaP Eq | 230 |
| | 0-2' | Arsenic | 3.4 |
| | 0-2' | Dioxin | 0.0049004 |
| RNA-SB35 | 2'-4' | Dioxin | 0.0004672 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF30 | 0-2' | BaP Eq | 158 |
| | 0-2' | Arsenic | 5.1 |
| | 0-2' | Dioxin | 0.0026016 |
| RNA-SB30 | 2'-4' | Dioxin | 0.0004088 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF31 | 0-2' | BaP Eq | 216 |
| | 0-2' | Arsenic | 2.9 |
| | 0-2' | Dioxin | 0.0008642 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF34 | 0-2' | BaP Eq | 275 |
| | 0-2' | Arsenic | 19 |
| | 0-2' | Chromium | 46 J |
| | 0-2' | Silver | 93 |
| | 0-2' | Dioxin | 0.0223920 |
| RNA-SB34 | 2'-4' | Dioxin | 0.0004270 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF36 | 0-2' | Dioxin | 0.0002782 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF29 | 0-2' | Arsenic | 3.4 |
| | 0-2' | Chromium | 41 J |
| | 0-2' | Dioxin | 0.8006300 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF32 | 0-2' | Arsenic | 3.2 |
| | 0-2' | Dioxin | 0.0008511 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF33 | 0-2' | B(a)a | 2,400 |
| | 0-2' | B(b)f | 4,100 |
| | 0-2' | BaP Eq | 3,500 |
| | 0-2' | Arsenic | 3.6 |
| | 0-2' | Dioxin | 0.0010017 |
| RNA-SB33 | 2'-4' | Dioxin | 0.0004097 |

Aerial:
Florida Department of Transportation
Surveying and Mapping Office
aerial dated April 2009.

**LEGEND**

- Soil sample location
- Temporary well and groundwater sample location

B(a)a Benza(a)anthracene
BaP Eq Benza(a)pyrene
B(b)f Benza(b)fluoranthene

J Estimated value reported between the method detection limit and the reporting limit

NE No exceedance

0 20 40
SCALE: 1 INCH = 40 FEET

NOTES:
1. Organic soil and sediment concentrations in micrograms per kilogram.
2. Inorganic soil and sediment concentrations in milligrams per kilogram.
3. Groundwater concentrations in micrograms per liter.
4. BaP Eq concentrations in milligrams per kilogram.
5. Only exceedances of SCTL's (Soil Cleanup Target Levels) and GCTL's (Groundwater Cleanup Target Levels) are shown.
6. Soil subsurface samples are shaded gray and groundwater samples are shaded light blue.

## SOIL AND GROUNDWATER SAMPLE ANALYITCAL RESULTS FOR OGRANIC AND INORGANIC COMPOUNDS FOR AREA OF CONCERN - 2 [INCINERATOR BUILDING]

| NO. | DATE | REVISIONS |
|---|---|---|
| 0 | May-11 | Initial Submittal |

| DESIGNED | DRAWN | CHECKED | DATE |
|---|---|---|---|
| RW | VC | | |

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FIGURE: 5

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF68 | 0-0.5' | Arsenic | 7.8 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF66 | 0-0.5' | Arsenic | 3.3 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF67 | 0-0.5' | Arsenic | 6.2 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF65 | 0-0.5' | Arsenic | 3.4 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF62 | 0-0.5' | Arsenic | 4.9 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF63 | 0-0.5' | Arsenic | 4.6 |
| RNA-SF63-DUP | 0-0.5' | Arsenic | 4.4 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF61 | 0-0.5' | Arsenic | 3.8 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF64 | 0-0.5' | Arsenic | 3.3 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF60 | 0-0.5' | Arsenic | 5.4 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF59 | 0-0.5' | Arsenic | 5.1 |
| RNA-SF59-DUP | 0-0.5' | Arsenic | 6.7 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF73 | 0-0.5' | Arsenic | 2.8 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF74 | 0-0.5' | Arsenic | 4.5 |

**LEGEND**

- Soil sample location
- Temporary well and groundwater sample location
- NE No exceedance

NOTES:
1. Organic soil and sediment concentrations in micrograms per kilogram.
2. Inorganic soil and sediment concentrations in milligrams per kilogram.
3. Groundwater concentrations in micrograms per liter.
4. BaP Eq concentrations in milligrams per kilogram.
5. Only exceedances of SCTL's (Soil Cleanup Target Levels) and GCTL's (Groundwater Cleanup Target Levels) are shown.
6. Groundwater samples are shaded light blue.

0 100 200
SCALE: 1 INCH = 200 FEET

Aerial:
Florida Department of Transportation Surveying and Mapping Office aerial dated April 2009.

N

**SOIL AND GROUNDWATER ANALTICAL RESULTS FOR ORGANIC AND INORGANIC COMPOUNTS AREA OF CONCERN - 4 [FORMER ARTILLERY AND HIGH EXPLOSIVE BUNKERS AND GUN RANGE]**

| NO. | DATE | REVISIONS |
|---|---|---|
| 0 | May-11 | Initial Submittal |

| DESIGNED | DRAWN | CHECKED | DATE |
|---|---|---|---|
| RW | VC | | |

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PLOTTED: July 6, 2011 - 11:39 AM BY: Crisler, Vanessa

**RICHMOND NAVAL AIR STATION**
SITE INSPECTION REPORT
MIAMI
DADE COUNTY, FLORIDA

**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

FIGURE: 6

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF69 | 0-2' | BaP Eq | 157 Dup |
| | 0-2' | Arsenic | 3 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF70 | 0-2' | Arsenic | 4.1 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF72 | 0-2' | B(a)a | 2,100 |
| | 0-2' | Carbazole | 300 |
| | 0-2' | BaP Eq | 2,320 |

| SAMPLE ID | DEPTH | ANALYTE | CONC. |
|---|---|---|---|
| RNA-SF71 | 0-2' | B(a)a | 3,100 |
| | 0-2' | B(b)f | 5,000 |
| | 0-2' | BaP Eq | 5,129 |
| | 0-2' | Arsenic | 4.1 |

**LEGEND**

- Soil sample location
- Temporary well and groundwater sample location

B(a)a Benzo(a)anthracene
BaP Eq B(a)P Equivalents
B(b)f Benzo(b)fluoranthene
NE No exceedance
Dup Duplicate sample

NOTES:
1. Organic soil and sediment concentrations in micrograms per kilogram.
2. Inorganic soil and sediment concentrations in milligrams per kilogram.
3. Groundwater concentrations in micrograms per liter.
4. BaP Eq concentrations in milligrams per kilogram.
5. Only exceedances of SCTL's (Soil Cleanup Target Levels) and GCTL's (Groundwater Cleanup Target Levels) are shown.
6. Groundwater samples are shaded light blue.

Aerial:
Florida Department of Transportation Surveying and Mapping Office aerial dated April 2009.

0 75 150
SCALE: 1 INCH = 150 FEET

N

**SOIL AND GROUNDWATER ANALYTICAL RESULTS WITH FOR ORGANIC AND INORGANIC COMPOUND FOR AREA OF CONCERN - 5 [FORMER HANGER #3 (BOILER BUILDINGS)]**

| NO. | DATE | REVISIONS |
|---|---|---|
| 0 | May-11 | Initial Submittal |

| DESIGNED | DRAWN | CHECKED | DATE |
|---|---|---|---|
| RW | VC | | |

P:\CAD\GERCLA\Richmond Naval Air Station\SIR\Fig- 7.dwg

MACTEC
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Tallahassee, Florida
850-656-1293
PLOTTED: July 8, 2011 - 11:52 AM, BY: Sutter, Vanessa

**RICHMOND NAVAL AIR STATION**
SITE INSPECTION REPORT
PERRINE
MIAMI-DADE COUNTY, FLORIDA

**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

FIGURE:
7

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**Table 1**
**Chronology of Historical Previous Events and Assessment Activities**

Site Inspection Workplan
USN Richmond NAS
Perrine, Miami-Dade County, Florida

| Date | Activity |
|---|---|
| Early 1900's | Richmond Lumber Co. built at turn of century [48]. |
| April 1942 | Preliminary construction of Richmond NAS [47]. |
| July 13,1942 | Official authorization to begin construction of Richmond NAS [47]. |
| July 21, 1942 | Approximately 2,100 acres acquired by Navy by eminent domain for Richmond NAS |
| September 15, 1942 | Richmond NAS commissioned [47,48,49,55]. |
| October 14, 1942 | Blimp Patrol Squadron ZP-21 arrives [48,49,55]. |
| December 8, 1942 | HTA operations commence at Richmond NAS with landing of PBR [55]. |
| June 9, 1943 | First Airship occupies Hangar # 1. Hangars # 2 & 3 completed shortly thereafter [47,52]. |
| May 8, 1945 | Germany surrenders, Victory in Europe day [117]. |
| September 2, 1945 | Japan surrenders, Victory over Japan day [117]. |
| September 15, 1945 | Hangars, aircraft and other infrastructure destroyed by massive Hurricane and fire [47,49,52,55]. |
| November 1945 | Richmond NAS LTA base ceased most operations [47,55]. |
| February 1946 | Richmond NAS decommissioned [47]. |
| October 1946 | 1,571 acres deeded to U of M "South Campus" for Tropical Food Research Laboratory [47,55,71]. |
| 1957 | Miami Railroad Historical Society started. Predecessor to Gold Coast Railroad Museum. |
| September 1960 | 284.16 acres transferred to U.S. Coast Guard [71]. |
| 1961 | U of M Tropical Food Research Laboratory ceases operations [47,55]. |
| 1962-1968s | Central Intelligence Agency occupies base to monitor Cuban activities [52,53]. |
| 1970 | U of M programs ordered off base except toxicology department of Medical school [53]. |
| December 11, 1970 | Miami-Dade County applies for 600 acres of the former Richmond NAS for a new Zoo [57]. |
| 1970-75 | County deeded 1,000 acres for zoo and public access. Building 25 used by the Marine Reserves [53]. |
| April 9, 1973 | 205.41 acres transferred to Department of Justice for construction of a Correctional Institution [63,68]. |
| March 1975 | 1.58 acres transferred to the Army for the Richmond Army Reserve Center [71]. |
| Fall 1975 | Construction of Miami Metro Zoo begins [57] |
| 1976 | U.S. Department of Justice Federal Correctional Institute of Miami built. Originally established as Federal Youth Offender facility [47]. |
| December 1979 | 61.78 acres in fee & 11.28 acres transferred to Department of Justice for the Bureau of Prisons [71]. |
| December 1981 | Miami-Dade County Metro Zoo Grand Opening of First Major Exhibit Section [57]. |
| May 4, 1984 | Miami Dade Co Parks & Recreation submits an Environmental Restoration Fund Application to USACE for Railroad Museum Site Cleanup [59] |
| May 19,1984 | Gold Coast Railroad Museum established with transfer of approximately 50 acres to Metropolitan Miami-Dade County [59,61,63,64,65,66] |
| June 4, 1984 | USACE and Miami-Dade Co. Parks & Recreation staff perform walkover of former Richmond NAS. Rubble from destruction of Hangars and trash found near former Hangar# 1. A storage area on Hangar# 2 foundation used by Prison to store Malathion (95%) and Abate located. Area reportedly cleaned up by EPA. No odors noted [62]. |
| February 12, 1988 | USN Richmond NAS site, specifically the lab waste NORM radioactive disposal area, placed onto EPA CERCLIS database. |
| April 16, 1988 | Original CERCLA Preliminary Assessment completed for Richmond NAS site 2 . |
| July 1988 | Results of radiological survey of U of M / Perrine Primate center lab disposal area indicate the presence of radionuclide contamination in and around trenches [75]. |
| 1991 | Fire burns two warehouses and threatens Gold Coast Railroad Museum [53]. |
| See notes at end of table. | |

**Table 1 (Continued)**
**Chronology of Historical Previous Events and Assessment Activities**

Site Inspection Workplan
USN Richmond NAS
Perrine, Miami-Dade County, Florida

| Date | Activity |
|---|---|
| August 1992 | Hurricane Andrew causes major damage to old, termite infested, wooden NAS buildings, Gold Coast Rail Road Museum and Zoo [53]. |
| November 5, 1992 | Site visit by USACE, prompted by requests from landowners/property managers. Several abandoned storage tanks located. No evidence of ordnance/explosive waste, unsafe structures/debris or additional hazardous/toxic waste noted [71]. |
| December 29, 1992 | National Institute of Health Perrine petitions USACE for removal of building asbestos and UST [79] |
| 1994 | GSA begins clearing the majority of old wooden buildings. Building 25 left in disrepair. The Perrine Primate Institute builds concrete structure for permanent residence [53]. |
| June 1994 | RUST conducts site investigation of UST & AST remediation. Sampling of soil, tank contents, and exteriors of tanks, piping, and equipment for lead and/or asbestos conducted. One UST (2,300 gallon capacity) & two ASTs (12,000 gallons each) found in Area 1. Stained soil found around concrete transformer pad. Area 3 consists of six 50,000 gallon, concrete USTs set in earthen mounds, a fill station & air release pit. Area 1 UST had mixture of fuel & water. ASTs had between 50 to 90 gallons of gasoline. Area 3 six USTs mixed with fuel and water. USTs 2, 3, 4 & 6 sampled. RUST report recommends removal/closure for tanks in these areas. Asbestos coating of pipes observed [70]. |
| July 10, 1995 | USACE Finding of Fact Report determines that 1,763.13 acres of former Richmond NAS elig ble for DERP as a FUDS [71]. |
| January 16, 1997 | EPA archives Richmond NAS site with a NFRAP |
| January 1997 | Smith BCM Engineers completes Site Investigation Report for AST and USTs. BCM/Smith samples tank contents; field headspace and lab analysis of soil samples and collection of tank and pipe coatings & liners for asbestos, PCB and lead analysis. Area 1 boring soil B-2 had petroleum odor. Headspace readings soil samples from B-2 (34 & 55 PPM), TPHs (23,200 & 25,600 PPM). Low levels of VOCs & PAHs detected. Lead (46.6 & 52.2 PPM) detected in soil samples. No PCBs, or asbestos detected in Area 1. Area 3 soil borings in UST area. No detection on soil headspace. No VOCs or PAHs detected in UST soils. Two soil samples from pipelines (P-19 &/or P-24) had elevated levels of benzo(a)anthracene (16.5 & 19.1 mg/kg), benzo(a)pyrene (9.5 & 15 mg/kg), benzo(b)fluoranthene (18.1 & 19.4 mg/kg) and indeno (1,2,3-cd) pyrene (7.07 mg/kg). Elevated levels of BTEX detected in UST tanks 3,4,5,6. All USTs contained water & oily scum. Asbestos (50% chrysotile) in pipeline coatings [72]. |
| August 14, 1997 | MDERM cites DoD and FAA for violation of non-registered 12,000 gallon tanks [115] |
| July 19, 1999 | Richmond NAS Fuel Storage Tank Remediation Report Issued by USACE [73] |
| June 2001 | USACE releases report with results of Geophysical Survey to Locate Trenches and Buried Drums in U of M/Perrine Primate center Lab disposal area. A number of anomalies possibly associated with buried drums noted [75, 77]. |
| August 27, 2001 | FDOH presents FDEP with results of Perrine Primate Lab scintillation disposal area 8/7/2001 wa kover. Results of Geophysical Survey to Locate Trenches and Buried Drums in same area included. A number of GPR anomalies possibly associated with buried drums noted [75]. |
| September 5, 2001 | GSA issues Notice of Surplus Determination for U.S. Army Reserve Outdoor Training Facility. Order advises parties of availability of property for public purposes [76]. |
| October 2001 | USACE submits Draft Work plan and HASP for Environmental Evaluation & Remedial Action for U of M/Perrine Primate center Lab disposal area [77]. |
| December 14, 2001 | DERM provides comments on Tank Closure report in Area 1 on FAA property. Additional confirmatory sampling required [80]. |
| January 16, 2002 | FDEP provides comments on Work plan for Environmental Evaluation & Remedial Action [83]. |
| March 28, 2002 | STEP delivers Final Work Plan & HASP for Environmental Evaluation & Remedial Action for U of M/Perrine Primate center Lab disposal area [85]. |
| July 1, 2002 | STEP delivers trench (RT) and stockpile (RS) soil sample results from U of M/Perrine Primate center Lab disposal area removal to FDEP. Elevated levels of arsenic (> 2.1 mg/kg) detected in several trench samples [87]. |
| October 15, 2002 | FDEP Storage Tank Facility Compliance Inspection conducted at USAF-FEO portion of former Richmond NAS. No Violation found [88] |
| January 2003 | Two 12,000 gal. AST removed from Area 1. Monitor well MW# Z installed in center of old tank farm area. No BTEX, MTBE, or PAHs detected in GW sample [89]. |

*See notes at end of table.*

**Table 1 (Continued)**
**Chronology of Historical Previous Events and Assessment Activities**

Site Inspection Workplan
USN Richmond NAS
Perrine, Miami-Dade County, Florida

| Date | Activity |
|---|---|
| February 27, 2003 | FDEP receives STEP final draft Completion Report for Environmental Evaluation & Remedial Action for U of M/Perrine Primate center Lab disposal area [90]. FDEP recommends additional geophysical testing of GPR anomalies. FDEP notes elevated arsenic levels in soils [91]. |
| May 19, 2003 | FDEP receives STEP final Completion Report for Environmental Evaluation & Remedial Action for U of M/Perrine Primate center Lab disposal area [92]. A source removal, managed and overseen by the Nuclear Regulatory Commission, was undertaken and completed in 2003. FDEP notes elevated VOCs & vanadium above State SCTLs for GW leachability. Arsenic (2.4 to 3.7 mg/kg) detected in confirmation soil samples RTS04W, 11W & 01M [92]. |
| July 17, 2003 | DERM and USACE meeting Re: Tank Closure Assessment report in Area 1. Additional confirmatory soil sampling of sidewalls discussed [93]. |
| August 11, 2003 | DERM receives additional confirmatory soil sample results. Screening OVA results of soils below 10 PPM. No BTEX, MTBE or PAHs detected in soil samples. Low levels of TPHs detected in soils. Low levels of toluene and xylenes found in GW samples. Detections don't exceed State guidelines [94]. |
| November 24, 2003 | FDEP Storage Tank Facility Compliance Inspection conducted at USAF-FEO portion of former Richmond NAS. No Violations found [95]. |
| December 10, 2003 | FDEP issues SRCO for FAA Former Richmond NAS [96]. |
| July 2005 | USACE issues Check Copy Finding of Suitability to Transfer Select Properties Report at former Richmond NAS [97]. |
| August 4, 2005 | The FDEP Southeast District forwards e-mail regarding additional concerns at former Richmond NAS. This includes the former Hangar and shop areas. FDEP notes numerous shops including a machine shop, plating shop, paint shop, battery shop & maintenance shop that have not undergone environmental assessment. FDEP noted the September 1945 hurricane and fire [98]. FDEP provides comments to USACE on Check Copy and Stakeholder Reports [99,100,101]. |
| November 10, 2005 | FDEP Storage Tank Facility Compliance Inspection conducted at USAF-FEO portion of former Richmond NAS. No Violations found [102]. |
| May 16, 2006 | USACE forwards draft FOST report for U.S. Army Martinez Reserve Center parcel to FDEP. USACE planning transfer of 0.3012 acre parcel to Miami-Dade Co [103]. |
| August 9, 2007 | FDEP Storage Tank Facility Annual Site Inspection conducted at USAF-FEO portion of former Richmond NAS. No Violations found [104]. |
| January 15, 2008 | Environ, contractor for U of M, submits NORM Radionuclide background Study Work plan for U of M South campus portion of former Richmond NAS [105]. |
| July 9, 2008 | Environ, contractor for U of M, submits NORM Radionuclide background Study Report for U of M South campus portion of former Richmond NAS. Study included Research Building, NIH and Primate cage areas. Eleven radionuclides were evaluated. Gross alpha & gross beta levels similar to background levels. Gamma activity mostly within normal range (approximately 5,000 cpm). Slightly higher area (11,000 cpm) noted. Radionuclide levels on South Campus not elevated in comparison to background levels in area [106]. |
| September 4, 2008 | FDEP completes review of Environ NORM background study. FDEP concurs with conclusion [107]. |
| October 28, 2008 | FDEP Storage Tank Facility Annual Site Inspection conducted at USAF-FEO portion of former Richmond NAS. No Violations found [108]. |
| September 8, 2009 | FDEP Storage Tank Facility Annual Site Inspection conducted at USAF-FEO portion of former Richmond NAS. No Violations found [110]. |
| November 3, 2009 | DERM issues Field Notice Violation to Miami FCI for operating without a Grease Discharge Operating permit [111]. |
| December 11, 2009 & January 11, 2010 | FDEP Southeast District forwards to FDEP PTS candidate sites for CERCLA Site Screening in the Southeast District including Richmond NAS. Concerns for former Blimp Hangar area, shop area and arsenic in scintillation vial disposal area noted in e-mail [112,113]. |
| January 13, 2010 | USACE indicates to FDEP PTS that the UST Tank Farm (6-50,000 gal. each) and piping, located on Miami FCI and GCRRM property being evaluated under DERP-FUDS [113]. |

*See notes at end of table.*

## Table 1 (Continued)
## Chronology of Historical Previous Events and Assessment Activities

Site Inspection Workplan
USN Richmond NAS
Perrine, Miami-Dade County, Florida

| Date | Activity |
|---|---|
| February 11, 2010 | USACE and FDEP meeting in Tallahassee. Discuss Richmond NAS site and share information [114,115]. |
| February 18, 2010 | FDEP PTS conducts windshield survey of portions of former Richmond NAS site. Visit Richmond NAS museum at GCRRM and tour remaining hangar structures [116]. |
| May 2010 | Based on potential contamination concerns at the Hangar # 1 and scintillation disposal area, FDEP Petitions EPA to retrieve Richmond NAS out of CERCLIS archive. |
| August 16, 2010 | FDEP PTS completes final PA. Notes possible contamination issues with Hangar # 1& 2 areas as well as remaining arsenic in scintillation disposal area. Recommends further CERCLA Superfund action. |
| November 2, 2010 | FDEP, MACTEC, DERM, USACE and property representatives conduct walkover of former Richmond NAS [123] |
| January 24-27, 2011 | FDEP and MACTEC conduct CERCLA Site Inspection field work. |

Notes:

Area 1-FAA and USAF Reservation
Area 3-Northwest of Gold Coast RR Museum on Miami FCI property
AST-Above ground storage tank
BTEX-Benzene, toluene, ethylbenzene & xylenes
CERCLA-Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS-Comprehensive Environmental Response, Compensation, and Liability Information System
cpm-counts per minute
DERM-Miami-Dade Environmental Resources Management
DoD-Department of Defense
DERP-Defense Environmental Restoration Program
FAA-Federal Aviation Authority
FCI-Federal Correctional Institution
FDEP-Florida Department of Environmental Protection
FDOH-Florida Department of Health
FOST-Finding of Suitability to Transfer
FUDS-Formerly Used Defense Site
GCRRM-Gold Coast Railroad Museum
GPR-Ground Penetrating Radar
GSA-U.S. General Services Administration
GW-Groundwater
HASP-Health & Safety Plan
HTA-Heavier than Air
LTA-Lighter than Air
mg/kg-milligrams per kilograms
MCL-maximum contaminant concentration
MTBE-Methyl-tert-butyl ether
NFRAP-No Further Remedial Action Planned
N/A-not applicable
NORM-Naturally occurring radioactive materials
OVA-Organic Vapor Analyzer
PA-Preliminary Assessment
PAHs-Polynuclear aromatic hydrocarbons
PBR-Patrol Bomber Reconnaissance
PPM-Parts per Million
PTS-Program and Technical Support Section
RAP-Remedial Action Plan
RUST-RUST Environment & Infrastructure
SCTLs-Soil Cleanup Target Levels (Florida Statute 62-777)
SI-Site Inspection
SRA-Site Reassessment report
SRCO-Site Rehabilitation Completion Order
SRCR-Site Rehabilitation Completion Report
TPH-Total petroleum hydrocarbons
U of M-University of Miami
USACE-US Army Corp of Engineers
UST-Underground storage tanks
VOCs-Volatile Organic Compounds

**Table 2**
**Estimated Number of Potable Wells and Population Served**
**AOC Florida Biscayne Aquifer**

Site Inspection Workplan
USN Richmond NAS
Perrine, Miami-Dade County, Florida

| Well Type | 0- 1/4 mile | 1/4-1/2 mile | 1/2-1 mile | 1-2 miles | 2-3 miles | 3-4 miles |
|---|---|---|---|---|---|---|
| Municipal[1] | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Community/ Noncomm[2] | 0/0 | 0/0 | 0/0 | 1/100 | 1/35 | 4/129 |
| Private | 0/0 | 0/0 | 0/0 | 1/3 | 1/3 | 4/11 |
| Totals | 0/0 | 0/0 | 0/0 | 2/103 | 2/38 | 8/140 |

Estimated Total Population served within 4 miles =281

Key:
# / # = Number of wells/Total population served
NE=Not Evaluated
AOC=Aquifer of Concern

Footnotes:
[1] The average persons per household in Miami-Dade County (2000 U.S. Census) is 2.84 [39].
The public well information was provided by FDEP's PWS/GIS-OTTIS Potable well search database [28].

**Table 3**
**Population Density Within 4 Miles of the Richmond NAS Site**

Site Inspection Workplan
USN Richmond NAS
Perrine, Miami-Dade County, Florida

| Distance Range (miles) | Population |
|---|---|
| 0-0.25 | 1 |
| 0.25-0.5 mile | 117 |
| 0.5-1 mile | 7,207 |
| 1-2 miles | 41,176 |
| 2-3 miles | 70,587 |
| 3-4 miles | 115,161 |
| Total Population within 4-mile radius | |

Reference: [31]

## Table 4
## Summary of Environmental Samples

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Station Name | Station Location | Matrix | Location | Rationale/Analysis |
|---|---|---|---|---|
| **Background Locations for Soil and Groundwater Samples** | | | | |
| **RNA01** | **RNA-SF01** | Surface Soil | Background surface soil sample located approximately 3,500 feet southeast of Hangar #1 AOC, on Miami-Dade Parks & Recreation property. Includes MS / MSD samples. | Background location to provide representative chemical concentrations for surface soil in the site area – VOCs, SVOCs, RCRA 8 Metals, Dioxins |
| **RNA01** | **RNA-SB01** | Subsurface Soil | Background subsurface soil sample located approximately 3,500 feet southeast of Hangar #1 AOC, on Miami-Dade Parks & Recreation property. Includes MS / MSD samples. | Background location to provide representative chemical concentrations for subsurface soil in the site area – VOCs, SVOCs, RCRA 8 Metals, Dioxins |
| **RNA02** | **RNA-SF02** | Surface Soil | Background surface soil sample located approximately 3,200 feet southwest of Hangar #1 AOC, on FCI property. Includes MS/ MSD samples. | Background location to provide representative chemical concentrations for surface soil in the site area – VOCs, SVOCs, RCRA 8 Metals, Dioxins |
| **RNA01** | **RNA-GW01** | Groundwater | Background groundwater sample for surficial aquifer from temporary micro-well (**TMW01**) located approximately 3,500 feet southeast of Hangar #1 AOC, Miami-Dade Parks & Recreation property. Includes MS / MSD samples. | Background location to provide representative chemical concentrations for groundwater in the site area – VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| **RNA02** | **RNA-GW02** | Groundwater | Background groundwater sample for surficial aquifer from temporary micro-well (**TMW02**) located approximately 3,500 feet SW of Hangar #1 on FCI property. Includes MS/ MSD samples | Background location to provide representative chemical concentrations for groundwater in the site area – VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| **AOC 1 – Hangar #1 Maintenance Building Samples** | | | | |
| **RNA03** | **RNA-SF03** | Surface Soil | Surface soil sample collected from soil boring **RNA03** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA03** | **RNA-SB03** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA03** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA04** | **RNA-SF04** | Surface Soil | Surface soil sample collected from soil boring **RNA04** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA04** | **RNA-SB04** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA04** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA05** | **RNA-SF05** | Surface Soil | Surface soil sample collected from soil boring **RNA05** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA05** | **RNA-SB05** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA05** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA06** | **RNA-SF06** | Surface Soil | Surface soil sample collected from soil boring **RNA06** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA06** | **RNA-SB06** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA06** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |

*See notes at end of table.*

**Table 4 (Continued)**
**Summary of Environmental Samples**

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Station Name | Station Location | Matrix | Location | Rationale/Analysis |
|---|---|---|---|---|
| **RNA07** | **RNA-SF07** | Surface Soil | Surface soil sample collected from soil boring **RNA07** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA07** | **RNA-SB07** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA07** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA08** | **RNA-SF08** | Surface Soil | Surface soil sample collected from soil boring **RNA08** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA08** | **RNA-SB08** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA08** located at engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA09** | **RNA-SF09** | Surface Soil | Surface soil sample collected from soil boring **RNA09** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA09** | **RNA-SB09** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA09** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA10** | **RNA-SF10** | Surface Soil | Surface soil sample collected from soil boring **RNA10** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA10** | **RNA-SB10** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA10** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA11** | **RNA-SF11** | Surface Soil | Surface soil sample collected from soil boring **RNA11** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA12** | **RNA-SF12** | Surface Soil | Surface soil sample collected from soil boring **RNA12** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA12** | **RNA-SB12** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA12** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA13** | **RNA-SF13** | Surface Soil | Surface soil sample collected from soil boring **RNA13** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA13** | **RNA-SB13** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA13** located near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA14** | **RNA-SF14** | Surface Soil | Surface soil sample collected from soil boring **RNA14** located near central Building #2 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA15** | **RNA-SF15** | Surface Soil | Surface soil sample collected from soil boring **RNA15** located near central Building #2 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA16** | **RNA-SF16** | Surface Soil | Surface soil sample collected from soil boring **RNA16** located near central Building #2 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA16** | **RNA-SB16** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA16** located near central Building #2 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA17** | **RNA-SF17** | Surface Soil | Surface soil sample collected from soil boring **RNA17** located near central Building #2 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA18** | **RNA-SB18** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA18** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |

*See notes at end of table.*

**Table 4 (Continued)**
**Summary of Environmental Samples**

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Station Name | Station Location | Matrix | Location | Rationale/Analysis |
|---|---|---|---|---|
| **RNA18** | **RNA-SB18** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA18** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA19** | **RNA-SF19** | Surface Soil | Surface soil sample collected from soil boring **RNA19** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA19** | **RNA-SB19** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA19** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA20** | **RNA-SF20** | Surface Soil | Surface soil sample collected from soil boring **RNA20** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA20** | **RNA-SB20** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA20** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA21** | **RNA-SF21** | Surface Soil | Surface soil sample collected from soil boring **RNA21** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA21** | **RNA-SB21** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA21** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA22** | **RNA-SF22** | Surface Soil | Surface soil sample collected from soil boring **RNA22** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA22** | **RNA-SB22** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA22** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA23** | **RNA-SF23** | Surface Soil | Surface soil sample collected from soil boring **RNA23** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA23** | **RNA-SB23** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA23** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA24** | **RNA-SF24** | Surface Soil | Surface soil sample collected from soil boring **RNA24** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA24** | **RNA-SB24** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA24** located near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA25** | **RNA-SF25** | Surface Soil | Surface soil sample collected from soil boring **RNA25** located near western maintenance Building #4 at Hangar #1 | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA25** | **RNA-SB25** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA25** located near western Building #4 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA26** | **RNA-SF26** | Surface Soil | Surface soil sample collected from soil boring **RNA26** located near western Building #4 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA26** | **RNA-SB26** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA26** located near western Building #4 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA28** | **RNA-SF28** | Surface Soil | Surface soil sample collected from soil boring **RNA28** located near western Building #4 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **RNA28** | **RNA-SB28** | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA28** located near western Building #4 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |

*See notes at end of table.*

## Table 4 (Continued)
## Summary of Environmental Samples

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Station Name | Station Location | Matrix | Location | Rationale/Analysis |
|---|---|---|---|---|
| RNA03 | RNA-GW03 | Groundwater Sample | Groundwater sample collected from temporary micro-well **TMW03** near engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| RNA07 | RNA-GW04 | Groundwater Sample | Groundwater sample collected from temporary micro-well **TMW04** near engine wash building at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| RNA10 | RNA-GW05 | Groundwater Sample | Groundwater sample collected from temporary micro-well **TMW05** near eastern Building #1 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| RNA14 | RNA-GW06 | Groundwater Sample | Groundwater sample collected from temporary micro-well **TMW06** near central Building #2 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| RNA18 | RNA-GW07 | Groundwater Sample | Groundwater sample collected from temporary micro-well **TMW07** near central Building #3 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| RNA25 | RNA-GW08 | Groundwater Sample | Groundwater sample collected from temporary micro-well **TMW08** near western Building #4 at Hangar #1. | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **AOC 2 – Incinerator Building** | | | | |
| RNA29 | RNA-SF29 | Surface Soil | Surface soil sample collected from soil boring **RNA29** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA29 | RNA-SB29 | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA29** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA30 | RNA-SF30 | Surface Soil | Surface soil sample collected from soil boring **RNA30** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA30 | RNA-SB30 | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA30** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA31 | RNA-SF31 | Subsurface Soil | Surface soil sample collected from soil boring **RNA31** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA32 | RNA-SF32 | Surface Soil | Surface soil sample collected from soil boring **RNA32** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA33 | RNA-SF33 | Surface Soil | Surface soil sample collected from soil boring **RNA33** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA34 | RNA-SF34 | Surface Soil | Surface soil sample collected from soil boring **RNA34** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA34 | RNA-SB34 | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA34** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA35 | RNA-SF35 | Surface Soil | Surface soil sample collected from soil boring **RNA35** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA35 | RNA-SB35 | Subsurface Soil | Subsurface soil sample collected from soil boring **RNA35** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| RNA36 | RNA-SF36 | Surface Soil | Surface soil sample collected from soil boring **RNA36** located around the incinerator building | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |

*See notes at end of table.*

## Table 4 (Continued)
## Summary of Environmental Samples

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Station Name | Station Location | Matrix | Location | Rationale/Analysis |
|---|---|---|---|---|
| RNA75 | RNA-GW17 | Groundwater Sample | Groundwater sample collected from temp micro-well **TMW17** located at incinerator | Potential source area. VOCs, SVOCs, RCRA 8 Metals, Dioxins and furans |
| **AOC 3 – Former Maintenance Buildings, Gas Station & Paint / Oil Storage Building** | | | | |
| Samples that were scoped to be collected from AOC 3 were not collected during this investigation due to site access issues. This is a secure DoD Communications installation. | | | | |
| **AOC 4 – Former Artillery & High Explosives Bunkers and Gun Range** | | | | |
| RNA59 | RNA-SF59 | Surface Soil | Surface soil sample collected from soil boring **RNA59** located at Bunker #3 | Potential source area. RCRA 8 Metals |
| RNA60 | RNA-SF60 | Surface Soil | Surface soil sample collected from soil boring **RNA60** located at Bunker #3 | Potential source area. RCRA 8 Metals |
| RNA61 | RNA-SF61 | Surface Soil | Surface soil sample collected from soil boring **RNA61** located at Bunker #5 | Potential source area. RCRA 8 Metals |
| RNA62 | RNA-SF62 | Surface Soil | Surface soil sample collected from soil boring **RNA62** located at Bunker #5 | Potential source area. RCRA 8 Metals |
| RNA63 | RNA-SF63 | Surface Soil | Surface soil sample collected from soil boring **RNA63** located at Bunker #1 | Potential source area. RCRA 8 Metals |
| RNA64 | RNA-SF64 | Surface Soil | Surface soil sample collected from soil boring **RNA64** located at Bunker #1 | Potential source area. RCRA 8 Metals |
| RNA65 | RNA-SF65 | Surface Soil | Surface soil sample collected from soil boring **RNA65** located at Bunker #4 | Potential source area. RCRA 8 Metals |
| RNA66 | RNA-SF66 | Surface Soil | Surface soil sample collected from soil boring **RNA66** located at Bunker #4 | Potential source area. RCRA 8 Metals |
| RNA67 | RNA-SF67 | Surface Soil | Surface soil sample collected from soil boring **RNA67** located at Bunker #2 | Potential source area. RCRA 8 Metals |
| RNA68 | RNA-SF68 | Surface Soil | Surface soil sample collected from soil boring **RNA68** located at Bunker #2 | Potential source area. RCRA 8 Metals |
| RNA73 | RNA-SF73 | Surface Soil | Surface soil sample collected from soil boring **RNA73** located at Gun Range at L&P Thompson Park | Potential source area. RCRA 8 Metals |
| RNA73 | RNA-SB73 | Subsurface Soil | Surface soil sample collected from soil boring **RNA73** located at Gun Range at L&P Thompson Park | Potential source area. RCRA 8 Metals |
| RNA74 | RNA-SF74 | Surface Soil | Surface soil sample collected from soil boring **RNA74** located at Gun Range at L&P Thompson Park | Potential source area. RCRA 8 Metals |
| RNA74 | RNA-SB74 | Subsurface Soil | Surface soil sample collected from soil boring **RNA74** located at Gun Range at L&P Thompson Park | Potential source area. RCRA 8 Metals |
| RNA76 | RNA-SF76 | Surface Soil | Surface soil sample collected from soil boring **RNA76** located near Robert Morgan | Potential source area. RCRA 8 Metals |
| RNA77 | RNA-SB77 | Surface Soil | Surface soil sample collected from soil boring **RNA77** located near Robert Morgan | Potential source area. RCRA 8 Metals |
| RNA64 | RNA-GW15 | Groundwater Sample | Groundwater sample collected from temp micro-well **TMW15** at Bunker #1 | Potential source area. RCRA 8 Metals |
| **AOC 5 - Former Hangar #3 Boiler Buildings** | | | | |
| RNA69 | RNA-SF69 | Surface Soil | Surface soil sample collected from soil boring **RNA69** located at north boiler building at Hangar #3 | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| RNA70 | RNA-SF70 | Surface Soil | Surface soil sample collected from soil boring **RNA70** located at north boiler building at Hangar #3 | Potential source area. VOCs, SVOCs, RCRA 8 Metals |

*See notes at end of table.*

## Table 4 (Continued)
## Summary of Environmental Samples

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Station Name | Station Location | Matrix | Location | Rationale/Analysis |
|---|---|---|---|---|
| RNA71 | RNA-SF71 | Surface Soil | Surface soil sample collected from soil boring **RNA71** located at south boiler building #8 at Hangar #3 | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| RNA72 | RNA-SF72 | Surface Soil | Surface soil sample collected from soil boring **RNA72** located at south boiler building #8 at Hangar #3 | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| RNA70 | RNA-GW16 | Groundwater Sample | Groundwater sample collected from temporary micro-well **TMW16** located at north boiler building at Hangar #3 | Potential source area. VOCs, SVOCs, RCRA 8 Metals |
| **Quality Assurance / Quality Control Samples** | | | | |
| RNA06 | RNA-SF06-Dup | Surface Soil | Duplicate soil sample of **RNA-SF06** from boring at **RNA06** at AOC 1. | Surface Soil Sample Duplicate VOCs, SVOCs, RCRA 8 Metals |
| RNA06 | RNA-SB06-Dup | Subsurface Soil | Duplicate soil sample of **RNA-SB06** from boring at **RNA06** at AOC 1. | Subsurface Soil Sample Duplicate VOCs, SVOCs, RCRA 8 Metals |
| RNA15 | RNA-SF15-Dup | Surface Soil | Duplicate soil sample of **RNA-SF15** from boring at **RNA15** at AOC 1. | Surface Soil Sample Duplicate VOCs, SVOCs, RCRA 8 Metals |
| RNA25 | RNA-SF25-Dup | Surface Soil | Duplicate soil sample of **RNA-SF25** from boring at **RNA25** at AOC 1. | Surface Soil Sample Duplicate VOCs, SVOCs, RCRA 8 Metals |
| RNA25 | RNA-SB25-Dup | Subsurface Soil | Duplicate soil sample of **RNA-SB25** from boring at **RNA25** at AOC 1. | Subsurface Soil Sample Duplicate VOCs, SVOCs, RCRA 8 Metals |
| RNA59 | RNA-SB59-Dup | Surface Soil | Duplicate soil sample of **RNA-SB59** from boring at **RNA59** at AOC 5. | Surface Soil Sample Duplicate RCRA 8 Metals |
| RNA63 | RNA-SF63-Dup | Surface Soil | Duplicate soil sample of **RNA-SF63** from boring at **RNA63** at AOC 4. | Surface Soil Sample Duplicate RCRA 8 Metals |
| RNA69 | RNA-SF69-Dup | Surface Soil | Duplicate soil sample of **RNA-SF69** from boring at **RNA69** at AOC 5. | Surface Soil Sample Duplicate VOCs, SVOCs, RCRA 8 Metals |
| RNA03 | RNA-GW03-Dup | Groundwater Sample | Duplicate groundwater sample of **RNA-GW03** from temporary micro-well **TMW03** at AOC 1. | Groundwater Sample Duplicate VOCs, SVOCs, RCRA 8 Metals |
| RNA64 | RNA-GW15-Dup | Groundwater Sample | Duplicate groundwater sample of **RNA-GW15** from temporary micro-well **TMW14** at former AOC 4. | Groundwater Sample Duplicate RCRA 8 Metals |
| #R4DART# | RNA-EB01 | Water | NA | Soil Sampling Equipment Rinse Blank |
| #R4DART# | RNA-EB02 | Water | NA | Groundwater Sampling Equipment Rinse Blank |
| #R4DART# | RNA-TS01 | Soil | NA | Soil Sample Trip Blank |
| #R4DART# | RNA-TS02 | Soil | NA | Soil Sample Trip Blank |
| #R4DART# | RNA-TS03 | Soil | NA | Soil Sample Trip Blank |
| #R4DART# | RNA-TW01 | Water | NA | Groundwater Sample Trip Blank |
| #R4DART# | RNA-TW02 | Water | NA | Groundwater Sample Trip Blank |
| #R4DART# | RNA-GW18 | Water | NA | Blind Metals Blank |

*See notes at end of table.*

## Table 4 (Continued)
## Summary of Environmental Samples

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Station Name | Station Location | Matrix | Location | Rationale/Analysis |
|---|---|---|---|---|

**Notes:** AOC 3 (grayed out area) was not sampled during the initial phase of investigation. May be sampled at a later date.

Sample ID designations

- RNA – Richmond Naval Air Station Site Designation
- SF – Surface soil sample
- SB – Subsurface soil sample
- GW – Groundwater sample
- TS – Trip Blank Soil
- TW – Trip Blank Water
- EB – Equipment Blank

The environmental samples were analyzed for the VOC and SVOC analytes (soil and groundwater samples) and RCRA 8 soil samples as listed in the USEPA CLP TCL by Mitkem Corporation Laboratory. The groundwater samples that were analyzed for the RCRA 8 metals were performed by EPA Region 4 ASB Lab. The soil and groundwater samples that were analyzed for dioxins/furans were performed by SGS-North America. The environmental samples were analyzed in accordance with USEPA CLP protocol. Identification of TICs was also included for the analyses.

## Table 5
## Monitoring Well Completion Summary and Depths to Groundwater
## January 26, 2011

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Monitoring Well Sample ID | Total Depth (feet bls) | Screen Interval (feet bls) | Top of Casing Elevation | Depth To Groundwater (feet btoc) | Groundwater Elevation |
|---|---|---|---|---|---|
| **Background Monitoring Wells** | | | | | |
| **TMW-1** | 12 | 2 – 12 | NM | 6.17 | NM |
| **TMW-2** | 11 | 1 - 11 | NM | 5.61 | NM |
| **AOC 1** | | | | | |
| **TMW-3** | 29 | 19 – 29 | 50.00 | 10.07 | 39.93 |
| **TMW-4** | 13.5 | 3.5 – 13.5 | 50.12 | 10.59 | 39.53 |
| **TMW-5** | 13.5 | 3.5 – 13.5 | 50.55 | 10.17 | 40.38 |
| **TMW-6** | 14 | 4 – 14 | 50.92 | 10.75 | 40.17 |
| **TMW-7** | 14 | 4 – 14 | 50.69 | 10.59 | 40.10 |
| **TMW-8** | 14 | 4 – 14 | 50.63 | 10.49 | 40.14 |
| **AOC 4** | | | | | |
| **TMW-15** | 18.5 | 8.5 – 18.5 | NM | 9.62 | NM |
| **AOC 5** | | | | | |
| **TMW-16** | 13 | 3 – 13 | NM | 9.85 | NM |
| **AOC 2** | | | | | |
| **TMW-17** | 12.5 | 2.5 – 12.5 – | NM | 7.38 | NM |

Notes: Elevations are surveyed relative to an arbitrary elevation.
bls = below land surface.
btoc = below top of casing.

Reference: [123]

## Table 6
## Final Field Parameter Measurements
## January 27, 2011

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Sample ID | Monitoring Well | pH (standard units) | Specific Conductance (μmhos/cm) | Temperature (degrees Celsius) | Turbidity (NTU) | Dissolved Oxygen (mg/l) | ORP (milliVolts) |
|---|---|---|---|---|---|---|---|
| **RNA-GW01** | **TMW-1** | 7.51 | 418 | 25.24 | 8.24 | 4.36 | 74.2 |
| **RNA-GW02** | **TMW-2** | 7.94 | 524 | 24.51 | 0.69 | 4.02 | -13.2 |
| **RNA-GW03** | **TMW-3** | 8.33 | 488 | 25.33 | 9.09 | 0.40 | -70.0 |
| **RNA-GW04** | **TMW-4** | 7.96 | 433 | 24.39 | 2.56 | 4.89 | -14.5 |
| **RNA-GW05** | **TMW-5** | 9.43 | 269 | 23.90 | 7.60 | 3.58 | -80.7 |
| **RNA-GW06** | **TMW-6** | 8.33 | 306 | 23.98 | 5.11 | 6.15 | 24.1 |
| **RNA-GW07** | **TMW-7** | 8.12 | 325 | 23.51 | 3.99 | 6.20 | 37.3 |
| **RNA-GW08** | **TMW-8** | 7.73 | 360 | 23.92 | 4.25 | 4.60 | 53 |
| **RNA-GW15** | **TMW-15** | 7.54 | 699 | 23.83 | 6.15 | 3.95 | 4.3 |
| **RNA-GW16** | **TMW-16** | 7.45 | 649 | 24.37 | 9.5 | 3.97 | 7.6 |
| **RNA-GW16** | **TMW-17** | 7.42 | 380 | 23.99 | 9.3 | 4.3 | -6.9 |

Notes: Reported parameters are the final readings recorded after all of the parameters had stabilized within their respective criteria.
μmhos/cm = micromhos per centimeter.
NTU = nephelometric turbidity units.
mg/l = milligrams per liter.

Reference: [123]

## Table 7
## Summary of Analytical Results for Surface Soil Samples for Volatile Organic Compounds

Site Inspection Report
Richmond Naval Air Station Site
Perrine, Miami-Dade County, Florida

| | Background | | AOC 1 | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF01* | RNA-SF02* | RNA-SF03 | RNA-SF04 | RNA-SF05 | RNA-SF06 | | | |
| Analyte↓ Station ID → | RNA01 | RNA02 | RNA03 | RNA04 | RNA05 | RNA06 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Acetone | 10 U | 11 U | 13 U | 12 U | 11 U | 11 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 5.1 U | 5.3 U | 6.3 U | 6.1 U | 5.7 U | 5.5 U | 400 | 400 | 600 |
| Methyl Butyl Ketone | 10 UJ | 11 UJ | 13 UJ | 12 UJ | 11 UJ | 11 UJ | 1,400 | 24,000 | 130,000 |
| Methyl Ethyl Ketone | 10 U | 11 U | 13 U | 12 U | 11 U | 11 U | 17,000 | 16,000,000 | 110,000,000 |
| Methylene Chloride | 5.1 U | 5.3 U | 6.3 U | 6.1 U | 5.7 U | 5.5 U | 20 | 17,000 | 26,000 |
| Trichloroethene (TCE) | 5.1 U | 5.3 U | 6.3 U | 6.1 U | 5.7 U | 5.5 U | 30 | 6,400 | 9,300 |

| | AOC 1 | | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF07 | RNA-SF08 | RNA-SF09 | RNA-SF10 | RNA-SF11 | RNA-SF12 | | | |
| Analyte↓ Station ID → | RNA07 | RNA08 | RNA09 | RNA10 | RNA11 | RNA12 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Acetone | 12 U | 10 U | 11 U | 11 U | 13 U | 9.4 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 5.9 U | 5.2 U | 47 J | 5.5 U | 6.6 U | 4.7 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 12 UJ | 10 UJ | 11 UJ | 11 UJ | 13 UJ | 9.4 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 12 U | 10 U | 11 U | 11 U | 13 U | 9.4 U | 1,400 | 24,000 | 130,000 |
| Methylene Chloride | 5.9 U | 5.2 U | 5.3 U | 5.5 U | 6.6 U | 4.7 U | 17,000 | 16,000,000 | 110,000,000 |
| Trichloroethene (TCE) | 5.9 U | 5.2 U | 21 | 5.5 U | 6.6 U | 4.7 U | 20 | 17,000 | 26,000 |

| | AOC 1 | | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF13 | RNA-SF14 | RNA-SF15 | RNA-SF16 | RNA-SF17 | RNA-SF18 | | | |
| Analyte↓ Station ID → | RNA13 | RNA14 | RNA15 | RNA16 | RNA17 | RNA18 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 8" | 0 to 2 | 0 to 8" | 0 to 2 | | | |
| Acetone | 11 U | 10 U | 12 U | 10 U | 15 U | 10 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 5.3 U | 5.2 U | 6.0 U | 31 J | 7.5 U | 5.2 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 11 UJ | 10 UJ | 12 UJ | 10 UJ | 15 UJ | 10 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 11 U | 10 U | 12 U | 10 U | 15 U | 10 U | 1,400 | 24,000 | 130,000 |
| Methylene Chloride | 5.3 U | 5.2 U | 6.0 U | 5.0 U | 7.5 U | 5.2 U | 17,000 | 16,000,000 | 110,000,000 |
| Trichloroethene (TCE) | 5.3 U | 5.2 U | 6.0 U | 5.0 U | 7.5 U | 5.2 U | 20 | 17,000 | 26,000 |

*See notes at end of table.*

## Table 7 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Volatile Organic Compounds

Site Inspection Report
Richmond Naval Air Station Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF19 | RNA-SF20 | RNA-SF21 | RNA-SF22 | RNA-SF23 | RNA-SF24 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA19 | RNA20 | RNA21 | RNA22 | RNA23 | RNA24 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Acetone | 12 U | 38 | 11 U | 53 | 12 U | 14 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 5.9 U | 49 J | 5.3 U | 45 J | 6.0 U | 6.9 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 12 UJ | 48 J | 11 UJ | 60 J | 12 UJ | 14 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 12 U | 11 U | 11 U | 60 J | 12 U | 14 U | 1,400 | 24,000 | 130,000 |
| Methylene Chloride | 5.9 U | 5.7 U | 5.3 U | 5.0 U | 6.0 U | 6.9 U | 17,000 | 16,000,000 | 110,000,000 |
| Trichloroethene (TCE) | 5.9 U | 40 | 5.3 U | 35 | 6.0 U | 6.9 U | 20 | 17,000 | 26,000 |

| | AOC 1 | | | AOC 2 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF25 | RNA-SF26 | RNA-SF28 | RNA-SF29 | RNA-SF30 | RNA-SF31 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA25 | RNA26 | RNA28 | RNA29 | RNA30 | RNA31 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Acetone | 11 U | 10 U | 32 | 11 U | 10 U | 11 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 5.4 U | 47 J | 14 | 5.4 U | 5.0 U | 5.6 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 11 UJ | 10 UJ | 11 UJ | 11 UJ | 10 UJ | 11 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 11 U | 10 U | 11 U | 11 U | 10 U | 11 U | 1,400 | 24,000 | 130,000 |
| Methylene Chloride | 5.4 U | 5.2 U | 5.7 U | 5.4 U | 5.0 U | 5.6 U | 17,000 | 16,000,000 | 110,000,000 |
| Trichloroethene (TCE) | 5.4 U | 29 | 5.7 U | 5.4 U | 5.0 U | 5.6 U | 20 | 17,000 | 26,000 |

| | AOC 2 | | | | | AOC 5 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF32 | RNA-SF33 | RNA-SF34 | RNA-SF35 | RNA-SF36 | RNA-SF69 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA32 | RNA33 | RNA34 | RNA35 | RNA36 | RNA69 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Acetone | 12 U | 41 | 11 U | 10 U | 10 U | 14 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 5.8 U | 6.5 U | 5.4 U | 5.1 U | 5.2 U | 7.0 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 12 UJ | 13 UJ | 11 UJ | 10 UJ | 10 UJ | 14 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 12 U | 13 U | 11 U | 10 U | 10 U | 14 U | 1,400 | 24,000 | 130,000 |
| Methylene Chloride | 5.8 U | 6.5 U | 5.4 U | 5.1 U | 5.2 U | 7.0 U | 17,000 | 16,000,000 | 110,000,000 |
| Trichloroethene (TCE) | 5.8 U | 6.5 U | 5.4 U | 5.1 U | 5.2 U | 9.9 | 20 | 17,000 | 26,000 |

*See notes at end of table.*

## Table 7 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Volatile Organic Compounds

Site Inspection Report
Richmond Naval Air Station Site
Perrine, Miami-Dade County, Florida

| | AOC 5 | | | AOC 1 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID ➔ | RNA-SF70 | RNA-SF71 | RNA-SF72 | RNA-SF06-DUP | RNA-SF15-DUP | RNA-SF25-DUP | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte🡻 Station ID ➔ | RNA70 | RNA71 | RNA72 | RNA06 | RNA15 | RNA25 | | | |
| Sample Depth (Ft bls) ➔ | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Acetone | 12 U | 15 U | 12 U | 9.7 U | 16 U | 11 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 6.2 U | 7.4 U | 6.0 U | 4.8 U | 8.1 U | 5.6 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 12 UJ | 15 UJ | 12 UJ | 9.7 UJ | 16 UJ | 11 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 12 U | 15 U | 12 U | 9.7 U | 16 U | 11 U | 1,400 | 24,000 | 130,000 |
| Methylene Chloride | 6.2 U | 7.4 U | 8.1 J | 4.8 U | 8.1 U | 5.6 U | 17,000 | 16,000,000 | 110,000,000 |
| Trichloroethene (TCE) | 6.2 U | 3.2 J | 6.0 U | 4.8 U | 8.1 U | 5.6 U | 20 | 17,000 | 26,000 |

| | AOC 5 | QA/QC | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID ➔ | RNA-SF69-DUP | RNA-TS01 | RNA-TS02 | RNA-TS03 | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte🡻 Station ID ➔ | RNA69 | #R4DART# | #R4DART# | #R4DART# | | | | | |
| Sample Depth (Ft bls) ➔ | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | | | |
| Acetone | 9.4 U | 11 U | 12 U | 12 U | | | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 4.7 U | 5.4 U | 5.8 U | 5.9 U | | | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 9.4 U | 11 UJ | 12 UJ | 12 UJ | | | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 9.4 U | 11 U | 12 U | 12 U | | | 1,400 | 24,000 | 130,000 |
| Methylene Chloride | 4.7 U | 5.4 U | 5.8 U | 5.9 U | | | 17,000 | 16,000,000 | 110,000,000 |
| Trichloroethene (TCE) | 4.7 U | 5.4 U | 5.8 U | 5.9 U | | | 20 | 17,000 | 26,000 |

* = Background sample for surface soil samples.
[1] = SCTL - Soil Cleanup Target Levels for Chapter 62-777 Florida Administrative Code.

Notes: Concentrations reported in micrograms per kilogram.
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.
**Bold Red** = Concentration exceeded Florida Soil Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample if not detected (see text for discussion).

## Table 8
## Summary of Analytical Results for Subsurface Soil Samples for Volatile Organic Compounds

Site Inspection Report
Richmond Naval Air Station Site
Miami, Dade County, Florida

| | Background | AOC 1 | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB01* | RNA-SB03 | RNA-SB04 | RNA-SB05 | RNA-SB06 | RNA-SB07 | | | |
| Analyte↓ Station ID → | RNA01 | RNA03 | RNA04 | RNA05 | RNA06 | RNA07 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetone | 11 U | 12 U | 12 U | 11 U | 12 U | 9.2 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 5.3 U | 5.9 U | 6.0 U | 5.3 U | 5.9 U | 4.6 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 11 UJ | 12 UJ | 12 UJ | 11 UJ | 12 UJ | 9.2 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 11 U | 12 U | 12 U | 11 U | 12 U | 9.2 U | 1,400 | 24,000 | 130,000 |
| Trichloroethene (TCE) | 5.3 U | 5.9 U | 6.0 U | 5.3 U | 5.9 U | 4.6 U | 20 | 17,000 | 26,000 |

| | AOC 1 | | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB08 | RNA-SB09 | RNA-SB10 | RNA-SB12 | RNA-SB13 | RNA-SB16 | | | |
| Analyte↓ Station ID → | RNA08 | RNA09 | RNA10 | RNA12 | RNA13 | RNA16 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetone | 10 U | 10 U | 10 U | 8.7 U | 11 U | 11 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 5.2 U | 5.1 U | 5.2 U | 4.4 U | 5.4 U | 5.3 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 10 UJ | 10 UJ | 10 UJ | 8.7 UJ | 11 UJ | 11 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 10 U | 10 U | 10 U | 8.7 U | 11 U | 11 U | 1,400 | 24,000 | 130,000 |
| Trichloroethene (TCE) | 5.2 U | 5.1 U | 5.2 U | 4.4 U | 5.4 U | 5.3 U | 20 | 17,000 | 26,000 |

| | AOC 1 | | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB18 | RNA-SB19 | RNA-SB20 | RNA-SB21 | RNA-SB22 | RNA-SB23 | | | |
| Analyte↓ Station ID → | RNA18 | RNA19 | RNA20 | RNA21 | RNA22 | RNA23 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetone | 13 U | 12 U | 15 U | 11 U | 150 | 15 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 6.6 U | 6.2 U | 7.6 U | 5.7 U | 72 J | 7.5 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 13 UJ | 12 UJ | 15 UJ | 11 UJ | 110 J | 15 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 13 U | 12 U | 15 U | 11 U | 130 J | 15 U | 1,400 | 24,000 | 130,000 |
| Trichloroethene (TCE) | 6.6 U | 6.2 U | 7.6 U | 5.7 U | 60 | 7.5 U | 20 | 17,000 | 26,000 |

*See notes at end of table.*

## Table 8 (Continued)
## Summary of Analytical Results for Subsurface Soil Samples for Volatile Organic Compounds

Site Inspection Report
Richmond Naval Air Station Site
Miami, Dade County, Florida

| | AOC 1 | AOC 2 | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB24 | RNA-SB25 | RNA-SB26 | RNA-SB28 | RNA-SB29 | RNA-SB30 | | | |
| Analyte↓ Station ID → | RNA24 | RNA25 | RNA26 | RNA28 | RNA29 | RNA30 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetone | 14 U | 13 U | 15 U | 78 | 12 U | 9.6 U | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 7.2 U | 6.6 U | 18 | 8.2 U | 6.2 U | 4.8 U | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 14 UJ | 13 UJ | 15 UJ | 16 UJ | 12 UJ | 9.6 UJ | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 14 U | 13 U | 15 U | 31 | 12 U | 9.6 U | 1,400 | 24,000 | 130,000 |
| Trichloroethene (TCE) | 7.2 U | 6.6 U | 7.5 U | 8.2 U | 6.2 U | 4.8 U | 20 | 17,000 | 26,000 |

| | AOC 2 | | | AOC 1 | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB33 | RNA-SB34 | RNA-SB35 | RNA-SB06-Dup | RNA-SB25-Dup | | | | |
| Analyte↓ Station ID → | RNA33 | RNA34 | RNA35 | RNA06 | RNA225 | | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | | |
| Acetone | 33 | 11 U | 9.3 U | 9.9 U | 11 U | | 25,000 | 11,000,000 | 68,000,000 |
| Chloroform | 4.7 U | 5.6 U | 4.6 U | 4.9 U | 5.6 U | | 25,000 | 11,000,000 | 68,000,000 |
| Methyl Butyl Ketone | 9.4 UJ | 11 UJ | 9.3 UJ | 9.9 UJ | 11 UJ | | 400 | 400 | 600 |
| Methyl Ethyl Ketone | 9.4 U | 11 U | 9.3 U | 9.9 U | 11 U | | 1,400 | 24,000 | 130,000 |
| Trichloroethene (TCE) | 4.7 U | 5.6 U | 4.6 U | 4.9 U | 5.6 U | | 20 | 17,000 | 26,000 |

* = Background sample for subsurface soil samples.
[1] = SCTL - Soil Cleanup Target Levels for Chapter 62-777 Florida Administrative Code.

Notes: Concentrations reported in micrograms per kilogram.
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.
**Bold Red** = Concentration exceeded Florida Soil Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample if not detected (see text for discussion).

## Table 9
## Summary of Analytical Results for Surface Soil Samples for Semi-Volatile Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | Background | | AOC 1 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID ➔ | RNA-SF01* | RNA-SF02 | RNA-SF03 | RNA-SF04 | RNA-SF05 | RNA-SF06 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte🡻 Station ID ➔ | RNA01 | RNA02 | RNA03 | RNA04 | RNA05 | RNA06 | | | |
| Sample Depth (Ft bls) ➔ | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| 1,1-Biphenyl | 190 U | 200 U | 200 U | 39 J | 180 U | 190 U | 200 | 3,000,000 | 34,000,000 |
| 2-Methylnaphthalene | 190 U | 200 U | 200 U | 150 J | 180 U | 190 U | 8,500 | 210,000 | 2,100,000 |
| Acenaphthene | 190 U | 200 U | 150 J | 300 | 59 J | 40 J | 2,100 | 2,400,000 | 20,000,000 |
| Acenaphthylene | 190 U | 200 U | 200 U | 43 J | 41 J | 190 U | 27,000 | 1,800,000 | 20,000,000 |
| Acetophenone | 190 U | 200 U | 200 U | 200 U | 180 U | 190 U | 3,900 | 3,900,000 | 32,000,000 |
| Anthracene | 190 U | 200 U | 300 | 350 | 130 J | 67 J | 2,500,000 | 21,000,000 | 300,000,000 |
| Benzaldehyde | 190 UJ | 200 UJ | 200 U | 200 U | 180 U | 190 U | 4,800 | 3,300,000 | 24,000,000 |
| Benzo(a)anthracene | 190 U | 200 U | 1500 | 1300 | 570 | 320 | 800 | ** | ** |
| Benzo(a)pyrene | 190 U | 200 U | 1300 | 1400 | 450 | 270 | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 190 U | 200 U | 1700 | 1800 | 800 | 380 | 2,400 | ** | ** |
| Benzo(g,h,i)perylene | 190 U | 200 U | 1400 | 1300 | 460 | 220 | 32,000,000 | 2,500,000 | 52,000,000 |
| Benzo(k)fluoranthene | 190 U | 200 U | 1500 | 1400 | 400 | 250 | 24,000 | ** | ** |
| Benzyl Butyl Phthalate | 190 U | 200 U | 200 U | 200 U | 180 U | 190 U | NS | NS | NS |
| Bis(2-ethylhexyl)phthalate | 190 U | 200 U | 200 U | 200 U | 180 U | 190 U | 3,600,000 | 72,000 | 390,000 |
| Carbazole | 190 U | 200 U | 250 | 490 | 96 J | 47 J | 200 | 49,000 | 240,000 |
| Chrysene | 190 U | 200 U | 1500 | 1700 | 560 | 390 | 77,000 | ** | ** |
| Dibenzo(a,h)anthracene | 190 U | 200 U | 380 | 360 | 100 J | 53 J | 700 | ** | ** |
| Dibenzofuran | 190 U | 200 U | 78 J | 240 | 180 U | 190 U | 15,000 | 320,000 | 6,300,000 |
| Fluoranthene | 190 U | 200 U | 2100 | 2400 | 890 | 610 | 1,200,000 | 3,200,000 | 59,000,000 |
| Fluorene | 190 U | 200 U | 90 J | 160 J | 38 J | 190 U | 160,000 | 2,600,000 | 33,000,000 |
| Indeno(1,2,3-cd)pyrene | 190 U | 200 U | 1200 | 1200 | 390 | 190 | 6,600 | ** | ** |
| Naphthalene | 190 U | 200 U | 53 J | 550 | 180 U | 190 U | 1,200 | 55,000 | 300,000 |
| Phenanthrene | 190 U | 200 U | 1400 | 2100 | 550 | 340 | 250,000 | 2,200,000 | 36,000,000 |
| Phenol | 190 U | 200 U | 200 UJ | 200 UJ | 180 UJ | 190 UJ | 50 | 500,000 | 220,000,000 |
| Pyrene | 190 U | 200 U | 2300 | 2600 | 900 | 550 | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | NE | 2,137 | 2,206 | 731 | 415 | NS | 100 | 700 |

*See notes at end of table.*

## Table 9 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Semi-Volatile Organic Compounds

Site Inspec ion Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF07 | RNA-SF08 | RNA-SF09 | RNA-SF10 | RNA-SF11 | RNA-SF12 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA07 | RNA08 | RNA09 | RNA10 | RNA11 | RNA12 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| 1,1-Biphenyl | 190 U | 180 U | 200 U | 190 U | 210 U | 190 U | 200 | 3,000,000 | 34,000,000 |
| 2-Methylnaphthalene | 190 U | 180 U | 200 U | 190 U | 210 U | 190 U | 8,500 | 210,000 | 2,100,000 |
| Acenaphthene | 190 U | 180 U | 200 U | 650 | 210 U | 190 U | 2,100 | 2,400,000 | 20,000,000 |
| Acenaphthylene | 190 U | 180 U | 200 U | 190 U | 210 U | 190 U | 27,000 | 1,800,000 | 20,000,000 |
| Acetophenone | 190 U | 180 U | 200 U | 250 | 210 U | 190 U | 3,900 | 3,900,000 | 32,000,000 |
| Anthracene | 39 J | 69 J | 200 U | 2100 | 210 U | 190 U | 2,500,000 | 21,000,000 | 300,000,000 |
| Benzaldehyde | 190 U | 180 U | 200 U | 190 U | 180 J | 190 U | 4,800 | 3,300,000 | 24,000,000 |
| Benzo(a)anthracene | 220 | 300 | 270 | 15,000 | 170 J | 190 UJ | 800 | ** | ** |
| Benzo(a)pyrene | 170 J | 280 | 200 | 12,000 | 160 J | 190 U | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 210 | 440 | 290 | 15,000 J | 250 | 190 U | 2,400 | ** | ** |
| Benzo(g,h,i)perylene | 140 J | 240 | 110 J | 5500 | 180 J | 190 U | 32,000,000 | 2,500,000 | 52,000,000 |
| Benzo(k)fluoranthene | 200 | 300 | 150 J | 14,000 | 150 J | 190 U | 24,000 | ** | ** |
| Benzyl Butyl Phthalate | 190 U | 180 U | 200 U | 190 U | 210 U | 190 U | NS | NS | NS |
| Bis(2-ethylhexyl)phthalate | 190 U | 180 U | 200 U | 190 U | 210 U | 190 U | 3,600,000 | 72,000 | 390,000 |
| Carbazole | 190 U | 52 J | 200 U | 1500 | 210 U | 190 U | 200 | 49,000 | 240,000 |
| Chrysene | 200 | 390 | 270 | 15,000 | 200 J | 190 UJ | 77,000 | ** | ** |
| D benzo(a,h)anthracene | 190 U | 59 J | 200 U | 2800 | 210 U | 190 U | 700 | ** | ** |
| D benzofuran | 190 U | 180 U | 200 U | 62 J | 210 U | 190 U | 15,000 | 320,000 | 6,300,000 |
| Fluoranthene | 370 | 570 | 350 | 22,000 | 270 | 190 UJ | 1,200,000 | 3,200,000 | 59,000,000 |
| Fluorene | 190 U | 180 U | 200 U | 260 | 210 U | 190 U | 160,000 | 2,600,000 | 33,000,000 |
| Indeno(1,2,3-cd)pyrene | 130 J | 220 | 100 J | 6000 | 140 J | 190 U | 6,600 | ** | ** |
| Naphthalene | 190 U | 180 U | 200 U | 53 J | 210 U | 190 U | 1,200 | 55,000 | 300,000 |
| Phenanthrene | 220 | 330 | 110 J | 6600 | 110 J | 190 U | 250,000 | 2,200,000 | 36,000,000 |
| Phenol | 190 UJ | 180 UJ | 200 UJ | 61 J | 210 UJ | 190 U | 50 | 500,000 | 220,000,000 |
| Pyrene | 340 | 530 | 350 | 19,000 | 270 J | 190 UJ | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | 318 | 969 | 368 | 18,555 | 323 | NE | NS | 100 | 700 |

*See notes at end of table.*

## Table 9 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Semi-Volatile Organic Compounds

Site Inspec ion Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF13 | RNA-SF14 | RNA-SF15 | RNA-SF16 | RNA-SF17 | RNA-SF18 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA13 | RNA14 | RNA15 | RNA16 | RNA17 | RNA18 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 0.8" | 0 to 2 | 0 to 0.8" | 0 to 2 | | | |
| 1,1-Biphenyl | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 200 | 3,000,000 | 34,000,000 |
| 2-Methylnaphthalene | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 8,500 | 210,000 | 2,100,000 |
| Acenaphthene | 52 J | 190 U | 220 U | 180 U | 260 U | 190 U | 2,100 | 2,400,000 | 20,000,000 |
| Acenaphthylene | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 27,000 | 1,800,000 | 20,000,000 |
| Acetophenone | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 3,900 | 3,900,000 | 32,000,000 |
| Anthracene | 80 J | 190 U | 220 U | 180 U | 260 U | 190 U | 2,500,000 | 21,000,000 | 300,000,000 |
| Benzaldehyde | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 4,800 | 3,300,000 | 24,000,000 |
| Benzo(a)anthracene | 500 | 74 J | 120 J | 180 U | 260 U | 190 U | 800 | ** | ** |
| Benzo(a)pyrene | 420 | 78 J | 100 J | 180 U | 55 J | 190 U | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 600 | 120 J | 140 J | 180 U | 260 U | 190 U | 2,400 | ** | ** |
| Benzo(g,h,i)perylene | 240 | 58 J | 54 J | 180 U | 260 U | 190 U | 32,000,000 | 2,500,000 | 52,000,000 |
| Benzo(k)fluoranthene | 430 | 190 U | 220 U | 180 U | 260 U | 190 U | 24,000 | ** | ** |
| Benzyl Butyl Phthalate | 520 | 190 U | 220 U | 180 U | 260 U | 190 U | NS | NS | NS |
| Bis(2-ethylhexyl)phthalate | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 3,600,000 | 72,000 | 390,000 |
| Carbazole | 65 J | 190 U | 220 U | 180 U | 260 U | 190 U | 200 | 49,000 | 240,000 |
| Chrysene | 510 | 70 J | 110 J | 180 U | 260 U | 190 U | 77,000 | ** | ** |
| D benzo(a,h)anthracene | 72 J | 190 U | 220 U | 180 U | 260 U | 190 U | 700 | ** | ** |
| D benzofuran | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 15,000 | 320,000 | 6,300,000 |
| Fluoranthene | 920 | 140 J | 260 | 180 U | 120 J | 190 U | 1,200,000 | 3,200,000 | 59,000,000 |
| Fluorene | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 160,000 | 2,600,000 | 33,000,000 |
| Indeno(1,2,3-cd)pyrene | 200 | 50 J | 220 U | 180 U | 260 U | 190 U | 6,600 | ** | ** |
| Naphthalene | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 1,200 | 55,000 | 300,000 |
| Phenanthrene | 390 | 53 J | 140 J | 180 U | 63 J | 190 U | 250,000 | 2,200,000 | 36,000,000 |
| Phenol | 190 U | 190 U | 220 U | 180 U | 260 U | 190 U | 50 | 500,000 | 220,000,000 |
| Pyrene | 880 | 110 J | 190 J | 180 U | 98 J | 190 U | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | 627 | 198 | 358 | NE | 225 | NE | NS | 100 | 700 |

*See notes at end of table.*

## Table 9 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Semi-Volatile Organic Compounds

Site Inspec ion Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF19 | RNA-SF20 | RNA-SF21 | RNA-SF22 | RNA-SF23 | RNA-SF24 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA19 | RNA20 | RNA21 | RNA22 | RNA23 | RNA24 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| 1,1-Biphenyl | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 200 | 3,000,000 | 34,000,000 |
| 2-Methylnaphthalene | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 8,500 | 210,000 | 2,100,000 |
| Acenaphthene | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 2,100 | 2,400,000 | 20,000,000 |
| Acenaphthylene | 190 U | 190 U | 180 U | 190 U | 230 U | 230 | 27,000 | 1,800,000 | 20,000,000 |
| Acetophenone | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 3,900 | 3,900,000 | 32,000,000 |
| Anthracene | 190 U | 190 U | 180 U | 190 U | 230 U | 140 J | 2,500,000 | 21,000,000 | 300,000,000 |
| Benzaldehyde | 190 U | 190 U | 180 U | 190 U | 230 U | 210 UJ | 4,800 | 3,300,000 | 24,000,000 |
| Benzo(a)anthracene | 190 U | 190 U | 180 U | 190 U | 64 J | 530 | 800 | ** | ** |
| Benzo(a)pyrene | 190 U | 190 U | 180 U | 190 U | 62 J | 540 | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 190 U | 190 U | 180 U | 190 U | 110 J | 1100 | 2,400 | ** | ** |
| Benzo(g,h,i)perylene | 190 U | 190 U | 180 U | 190 U | 91 J | 450 | 32,000,000 | 2,500,000 | 52,000,000 |
| Benzo(k)fluoranthene | 190 U | 190 U | 180 U | 190 U | 75 J | 480 | 24,000 | ** | ** |
| Benzyl Butyl Phthalate | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | NS | NS | NS |
| Bis(2-ethylhexyl)phthalate | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 3,600,000 | 72,000 | 390,000 |
| Carbazole | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 200 | 49,000 | 240,000 |
| Chrysene | 190 U | 190 U | 180 U | 190 U | 87 J | 760 | 77,000 | ** | ** |
| D benzo(a,h)anthracene | 190 U | 190 U | 180 U | 190 U | 230 U | 120 J | 700 | ** | ** |
| D benzofuran | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 15,000 | 320,000 | 6,300,000 |
| Fluoranthene | 190 U | 190 U | 180 U | 190 U | 92 J | 790 | 1,200,000 | 3,200,000 | 59,000,000 |
| Fluorene | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 160,000 | 2,600,000 | 33,000,000 |
| Indeno(1,2,3-cd)pyrene | 190 U | 190 U | 180 U | 190 U | 55 J | 410 | 6,600 | ** | ** |
| Naphthalene | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 1,200 | 55,000 | 300,000 |
| Phenanthrene | 190 U | 190 U | 180 U | 190 U | 230 U | 74 J | 250,000 | 2,200,000 | 36,000,000 |
| Phenol | 190 U | 190 U | 180 U | 190 U | 230 U | 210 U | 50 | 500,000 | 220,000,000 |
| Pyrene | 190 U | 190 U | 180 U | 190 U | 110 J | 1200 | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | NE | NE | NE | 201 | 870 | NS | 100 | 700 |

*See notes at end of table.*

## Table 9 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Semi-Volatile Organic Compounds

Site Inspec ion Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | AOC 2 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID ➔ | RNA-SF25 | RNA-SF26 | RNA-SF28 | RNA-SF29 | RNA-SF30 | RNA-SF31 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID ➔ | RNA25 | RNA26 | RNA28 | RNA29 | RNA30 | RNA31 | | | |
| Sample Depth (Ft bls) ➔ | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| 1,1-Biphenyl | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 200 | 3,000,000 | 34,000,000 |
| 2-Methylnaphthalene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 8,500 | 210,000 | 2,100,000 |
| Acenaphthene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 2,100 | 2,400,000 | 20,000,000 |
| Acenaphthylene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 27,000 | 1,800,000 | 20,000,000 |
| Acetophenone | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 3,900 | 3,900,000 | 32,000,000 |
| Anthracene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 2,500,000 | 21,000,000 | 300,000,000 |
| Benzaldehyde | 190 U | 190 U | 190 U | 180 UJ | 190 U | 190 U | 4,800 | 3,300,000 | 24,000,000 |
| Benzo(a)anthracene | 40 J | 190 U | 190 U | 180 U | 44 J | 140 J | 800 | ** | ** |
| Benzo(a)pyrene | 47 J | 190 U | 190 U | 180 U | 41 J | 86 J | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 73 J | 190 U | 190 U | 180 U | 70 J | 150 J | 2,400 | ** | ** |
| Benzo(g,h,i)perylene | 190 U | 190 U | 190 U | 180 U | 190 U | 58 J | 32,000,000 | 2,500,000 | 52,000,000 |
| Benzo(k)fluoranthene | 45 J | 190 U | 190 U | 180 U | 190 U | 64 J | 24,000 | ** | ** |
| Benzyl Butyl Phthalate | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | NS | NS | NS |
| Bis(2-ethylhexyl)phthalate | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 3,600,000 | 72,000 | 390,000 |
| Carbazole | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 200 | 49,000 | 240,000 |
| Chrysene | 63 J | 190 U | 190 U | 180 U | 49 J | 140 J | 77,000 | ** | ** |
| D benzo(a,h)anthracene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 700 | ** | ** |
| D benzofuran | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 15,000 | 320,000 | 6,300,000 |
| Fluoranthene | 81 J | 190 U | 190 U | 180 U | 67 J | 240 | 1,200,000 | 3,200,000 | 59,000,000 |
| Fluorene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 160,000 | 2,600,000 | 33,000,000 |
| Indeno(1,2,3-cd)pyrene | 190 U | 190 U | 190 U | 180 U | 190 U | 52 J | 6,600 | ** | ** |
| Naphthalene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 1,200 | 55,000 | 300,000 |
| Phenanthrene | 190 U | 190 U | 190 U | 180 U | 190 U | 68 J | 250,000 | 2,200,000 | 36,000,000 |
| Phenol | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 50 | 500,000 | 220,000,000 |
| Pyrene | 76 J | 190 U | 190 U | 180 U | 73 J | 230 | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | 163 | NE | NE | NE | 158 | 216 | NS | 100 | 700 |

*See notes at end of table.*

## Table 9 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Semi-Volatile Organic Compounds

Site Inspec ion Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 2 | | | | | AOC 5 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF32 | RNA-SF33 | RNA-SF34 | RNA-SF35 | RNA-SF36 | RNA-SF69 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA32 | RNA33 | RNA34 | RNA35 | RNA36 | RNA69 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| 1,1-Biphenyl | 190 U | 190 U | 190 U | 190 U | 180 U | 210 U | 200 | 3,000,000 | 34,000,000 |
| 2-Methylnaphthalene | 190 U | 190 U | 190 U | 190 U | 180 U | 210 U | 8,500 | 210,000 | 2,100,000 |
| Acenaphthene | 190 U | 190 U | 190 U | 190 U | 180 U | 210 U | 2,100 | 2,400,000 | 20,000,000 |
| Acenaphthylene | 190 U | 940 | 48 J | 190 U | 180 U | 210 U | 27,000 | 1,800,000 | 20,000,000 |
| Acetophenone | 190 U | 53 J | 190 U | 190 U | 180 U | 210 U | 3,900 | 3,900,000 | 32,000,000 |
| Anthracene | 190 U | 590 | 190 U | 190 U | 180 U | 210 U | 2,500,000 | 21,000,000 | 300,000,000 |
| Benzaldehyde | 190 UJ | 190 UJ | 190 UJ | 190 UJ | 180 UJ | 210 UJ | 4,800 | 3,300,000 | 24,000,000 |
| Benzo(a)anthracene | 190 U | 2400 | 160 J | 150 J | 180 U | 210 U | 800 | ** | ** |
| Benzo(a)pyrene | 190 U | 2200 | 130 J | 100 J | 180 U | 210 U | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 45 J | 4100 | 240 | 140 J | 180 U | 210 U | 2,400 | ** | ** |
| Benzo(g,h,i)perylene | 190 U | 1800 | 93 J | 64 J | 180 U | 210 U | 32,000,000 | 2,500,000 | 52,000,000 |
| Benzo(k)fluoranthene | 190 U | 1800 | 140 J | 80 J | 180 U | 210 U | 24,000 | ** | ** |
| Benzyl Butyl Phthalate | 190 U | 190 U | 190 U | 340 | 180 U | 210 U | NS | NS | NS |
| Bis(2-ethylhexyl)phthalate | 190 U | 1200 | 11,000 | 190 U | 180 U | 210 U | 3,600,000 | 72,000 | 390,000 |
| Carbazole | 190 U | 110 J | 190 U | 190 U | 180 U | 210 U | 200 | 49,000 | 240,000 |
| Chrysene | 190 U | 2200 | 140 J | 150 J | 180 U | 210 U | 77,000 | ** | ** |
| D benzo(a,h)anthracene | 190 U | 470 | 190 U | 190 U | 180 U | 210 U | 700 | ** | ** |
| D benzofuran | 190 U | 190 U | 190 U | 190 U | 180 U | 210 U | 15,000 | 320,000 | 6,300,000 |
| Fluoranthene | 190 U | 2000 | 170 J | 150 J | 180 U | 210 U | 1,200,000 | 3,200,000 | 59,000,000 |
| Fluorene | 190 U | 190 U | 190 U | 190 U | 180 U | 210 U | 160,000 | 2,600,000 | 33,000,000 |
| Indeno(1,2,3-cd)pyrene | 190 U | 1600 | 86 J | 50 J | 180 U | 210 U | 6,600 | ** | ** |
| Naphthalene | 190 U | 190 U | 190 U | 190 U | 180 U | 210 U | 1,200 | 55,000 | 300,000 |
| Phenanthrene | 190 U | 150 J | 190 U | 110 J | 180 U | 210 U | 250,000 | 2,200,000 | 36,000,000 |
| Phenol | 190 U | 190 U | 190 U | 190 U | 180 U | 210 U | 50 | 500,000 | 220,000,000 |
| Pyrene | 39 J | 2700 J | 220 J | 250 J | 180 U | 210 U | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | 3,500 | 275 | 230 | NE | NE | NS | 100 | 700 |

*See notes at end of table.*

## Table 9 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Semi-Volatile Organic Compounds

Site Inspec ion Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 5 | | | AOC 1 | | | AOC 5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF70 | RNA-SF71 | RNA-SF72 | RNA-SF06-DUP | RNA-SF15-DUP | RNA-SF25-DUP | RNA-SF69-DUP | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA70 | RNA71 | RNA72 | RNA06 | RNA15 | RNA25 | RNA69 | | | |
| Sample Depth (Ft bls) → | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| 1,1-Biphenyl | 190 U | 220 U | 200 U | 190 U | 250 U | 190 U | 180 U | 200 | 3,000,000 | 34,000,000 |
| 2-Methylnaphthalene | 190 U | 220 U | 200 U | 190 U | 250 U | 190 U | 180 U | 8,500 | 210,000 | 2,100,000 |
| Acenaphthene | 190 U | 220 U | 140 J | 80 J | 250 U | 190 U | 180 U | 2,100 | 2,400,000 | 20,000,000 |
| Acenaphthylene | 190 U | 220 U | 200 U | 190 U | 250 U | 190 U | 180 U | 27,000 | 1,800,000 | 20,000,000 |
| Acetophenone | 190 U | 220 U | 200 U | 190 U | 250 U | 190 U | 180 U | 3,900 | 3,900,000 | 32,000,000 |
| Anthracene | 190 U | 86 J | 530 | 130 J | 250 U | 190 U | 180 U | 2,500,000 | 21,000,000 | 300,000,000 |
| Benzaldehyde | 190 UJ | 220 UJ | 200 U | 190 U | 250 U | 190 U | 180 UJ | 4,800 | 3,300,000 | 24,000,000 |
| Benzo(a)anthracene | 190 U | 3100 | 2100 | 600 | 170 J | 190 U | 180 U | 800 | ** | ** |
| Benzo(a)pyrene | 190 U | 3400 | 1500 | 420 | 160 J | 40 J | 43 J | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 190 U | 5000 | 2100 | 540 | 260 J | 65 J | 53 J | 2,400 | ** | ** |
| Benzo(g,h,i)perylene | 190 U | 2200 | 890 | 320 | 91 J | 190 U | 180 U | 32,000,000 | 2,500,000 | 52,000,000 |
| Benzo(k)fluoranthene | 190 U | 2600 | 1400 | 440 | 120 J | 37 J | 180 U | 24,000 | ** | ** |
| Benzyl Butyl Phthalate | 190 U | 220 U | 200 U | 190 U | 250 U | 190 U | 180 U | NS | NS | NS |
| Bis(2-ethylhexyl)phthalate | 190 U | 220 U | 200 U | 190 U | 250 U | 190 U | 180 U | 3,600,000 | 72,000 | 390,000 |
| Carbazole | 190 U | 220 U | 300 | 91 J | 250 U | 190 U | 180 U | 200 | 49,000 | 240,000 |
| Chrysene | 190 U | 2800 | 2000 | 500 | 200 J | 55 J | 37 J | 77,000 | ** | ** |
| D benzo(a,h)anthracene | 190 U | 670 | 300 | 82 J | 250 U | 190 U | 180 U | 700 | ** | ** |
| D benzofuran | 190 U | 220 U | 55 J | 190 U | 250 U | 190 U | 180 U | 15,000 | 320,000 | 6,300,000 |
| Fluoranthene | 190 U | 2900 | 2700 | 910 | 360 J | 74 J | 180 U | 1,200,000 | 3,200,000 | 59,000,000 |
| Fluorene | 190 U | 220 U | 130 J | 50 J | 250 U | 190 U | 180 U | 160,000 | 2,600,000 | 33,000,000 |
| Indeno(1,2,3-cd)pyrene | 190 U | 2200 | 840 | 300 | 86 J | 190 U | 180 U | 6,600 | ** | ** |
| Naphthalene | 190 U | 220 U | 200 U | 190 U | 250 U | 190 U | 180 U | 1,200 | 55,000 | 300,000 |
| Phenanthrene | 190 U | 220 U | 1400 | 610 | 150 J | 190 U | 180 U | 250,000 | 2,200,000 | 36,000,000 |
| Phenol | 190 U | 220 U | 200 U | 190 UJ | 250 U | 190 U | 180 U | 50 | 500,000 | 220,000,000 |
| Pyrene | 190 U | 5600 | 2400 J | 910 | 300 J | 66 J | 180 U | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | 5,129 | 2,320 | 651 | 330 | 161 | 157 | NS | 100 | 700 |

*See notes at end of table.*

## Table 9 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Semi-Volatile Organic Compounds

Site Inspec ion Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

* = Background sample for surface soil samples.
1 = SCTL - Soil Cleanup Target Levels for Chapter 62-777 Florida Administrative Code.

Notes: Concentrations reported in micrograms per kilogram.
* = Background sample for surface soil samples. However, since both soil backgrounds are similar in concentrations, only RNA-SF01 will be used for comparison.
** = Site specific concentrations for carcinogenic polycyclic aromatic hydrocarbons have been converted to Benzo(a)pyrene (BaP) equivalents. See attached spreadsheets at end of Tables section
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.
NS = No standard.
**Bold Red** = Concentration exceeded Florida Soil Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample if not detected (see text for discussion).

## Table 10
## Summary of Analytical Results for Subsurface Soil Samples for Semi-Volatile Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | Background | AOC 1 | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB01* | RNA-SB03 | RNA-SB04 | RNA-SB05 | RNA-SB06 | RNA-SB07 | | | |
| Analyte↓ Station ID → | RNA01 | RNA03 | RNA04 | RNA05 | RNA06 | RNA07 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetophenone | 77 J | 190 U | 190 U | 180 U | 190 U | 190 U | 3,900 | 3,900,000 | 32,000,000 |
| Benzo(a)anthracene | 190 U | 190 J | 190 U | 180 U | 190 U | 190 U | 800 | ** | ** |
| Benzo(a)pyrene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 190 U | 43 J | 190 U | 180 U | 190 U | 190 U | 2,400 | ** | ** |
| Benzo(k)fluoranthene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 24,000 | ** | ** |
| Chrysene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 77,000 | ** | ** |
| Fluoranthene | 190 U | 46 J | 190 U | 180 U | 190 U | 190 U | 1,200,000 | 3,200,000 | 59,000,000 |
| Phenanthrene | 190 U | 190 U | 190 U | 180 U | 190 U | 190 U | 250,000 | 2,200,000 | 36,000,000 |
| Pyrene | 190 U | 39 J | 190 U | 180 U | 190 U | 190 U | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | NE | NE | NE | NE | NE | NS | 100 | 700 |

*See notes at end of table.*

## Table 10 (Continued)
## Summary of Analytical Results for Subsurface Soil Samples for Semi-Volatile Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB08 | RNA-SB09 | RNA-SB10 | RNA-SB12 | RNA-SB13 | RNA-SB16 | | | |
| Analyte↓ Station ID → | RNA08 | RNA09 | RNA10 | RNA12 | RNA13 | RNA16 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetophenone | 180 U | 190 U | 190 U | 190 U | 190 U | 200 U | 3,900 | 3,900,000 | 32,000,000 |
| Benzo(a)anthracene | 180 U | 190 U | 64 J | 190 U | 190 U | 200 U | 800 | ** | ** |
| Benzo(a)pyrene | 180 U | 190 U | 46 J | 190 U | 190 U | 200 U | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 180 U | 190 U | 53 J | 190 U | 190 U | 200 U | 2,400 | ** | ** |
| Benzo(k)fluoranthene | 180 U | 190 U | 53 J | 190 U | 190 U | 200 U | 24,000 | ** | ** |
| Chrysene | 180 U | 190 U | 60 J | 190 U | 190 U | 200 U | 77,000 | ** | ** |
| Fluoranthene | 180 U | 190 U | 80 J | 190 U | 190 U | 200 U | 1,200,000 | 3,200,000 | 59,000,000 |
| Phenanthrene | 180 U | 190 U | 190 U | 190 U | 190 U | 200 U | 250,000 | 2,200,000 | 36,000,000 |
| Pyrene | 180 U | 190 U | 84 J | 190 U | 190 U | 200 U | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | NE | 163 | NE | NE | NE | NS | 100 | 700 |

*See notes at end of table.*

## Table 10 (Continued)
## Summary of Analytical Results for Subsurface Soil Samples for Semi-Volatile Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB18 | RNA-SB19 | RNA-SB20 | RNA-SB21 | RNA-SB22 | RNA-SB23 | RNA-SB24 | | | |
| Analyte↓ Station ID → | RNA18 | RNA19 | RNA20 | RNA21 | RNA22 | RNA23 | RNA24 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetophenone | 190 U | 190 U | 200 U | 190 U | 190 U | 220 U | 190 U | 3,900 | 3,900,000 | 32,000,000 |
| Benzo(a)anthracene | 190 U | 190 U | 200 U | 190 U | 190 U | 120 J | 190 U | 800 | ** | ** |
| Benzo(a)pyrene | 190 U | 190 U | 200 U | 190 U | 190 U | 65 J | 190 U | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 190 U | 190 U | 200 U | 190 U | 190 U | 130 J | 190 U | 2,400 | ** | ** |
| Benzo(k)fluoranthene | 190 U | 190 U | 200 U | 190 U | 190 U | 59 J | 190 U | 24,000 | ** | ** |
| Chrysene | 190 U | 190 U | 200 U | 190 U | 190 U | 100 J | 190 U | 77,000 | ** | ** |
| Fluoranthene | 190 U | 190 U | 200 U | 190 U | 190 U | 250 | 190 U | 1,200,000 | 3,200,000 | 59,000,000 |
| Phenanthrene | 190 U | 190 U | 200 U | 190 U | 190 U | 120 J | 190 U | 250,000 | 2,200,000 | 36,000,000 |
| Pyrene | 190 U | 190 U | 200 U | 190 U | 190 U | 210 J | 190 U | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | NE | NE | NE | NE | 212 | NE | NS | 100 | 700 |

*See notes at end of table.*

## Table 10 (Continued)
## Summary of Analytical Results for Subsurface Soil Samples for Semi-Volatile Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | AOC 2 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB25 | RNA-SB26 | RNA-SB28 | RNA-SB29 | RNA-SB30 | RNA-SB33 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte↓ Station ID → | RNA25 | RNA26 | RNA28 | RNA29 | RNA30 | RNA33 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetophenone | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 3,900 | 3,900,000 | 32,000,000 |
| Benzo(a)anthracene | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 800 | ** | ** |
| Benzo(a)pyrene | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 2,400 | ** | ** |
| Benzo(k)fluoranthene | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 24,000 | ** | ** |
| Chrysene | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 77,000 | ** | ** |
| Fluoranthene | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 1,200,000 | 3,200,000 | 59,000,000 |
| Phenanthrene | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 250,000 | 2,200,000 | 36,000,000 |
| Pyrene | 190 U | 190 U | 220 U | 190 U | 190 U | 190 U | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | NE | NE | NE | NE | NE | NS | 100 | 700 |

*See notes at end of table.*

## Table 10 (Continued)
## Summary of Analytical Results for Subsurface Soil Samples for Semi-Volatile Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 2 | | AOC 1 | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB34 | RNA-SB35 | RNA-SB06-DUP | RNA-SB25-Dup | | | |
| Analyte↓ Station ID → | RNA34 | RNA30 | RNA06 | RNA25 | | | |
| Sample Depth (Ft bls) → | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Acetophenone | 190 U | 190 U | 190 U | 190 U | 3,900 | 3,900,000 | 32,000,000 |
| Benzo(a)anthracene | 190 U | 190 U | 190 U | 190 U | 800 | ** | ** |
| Benzo(a)pyrene | 190 U | 190 U | 190 U | 190 U | 8,000 | 100 | 700 |
| Benzo(b)fluoranthene | 190 U | 190 U | 190 U | 190 U | 2,400 | ** | ** |
| Benzo(k)fluoranthene | 190 U | 190 U | 190 U | 190 U | 24,000 | ** | ** |
| Chrysene | 190 U | 190 U | 190 U | 190 U | 77,000 | ** | ** |
| Fluoranthene | 190 U | 190 U | 190 U | 190 U | 1,200,000 | 3,200,000 | 59,000,000 |
| Phenanthrene | 190 U | 190 U | 190 U | 190 U | 250,000 | 2,200,000 | 36,000,000 |
| Pyrene | 190 U | 190 U | 190 U | 190 U | 880,000 | 2,400,000 | 45,000,000 |
| BaP Equivalents | NE | NE | NE | NE | NS | 100 | 700 |

* = Background sample for subsurface soil samples.
[1] = SCTL - Soil Cleanup Target Levels for Chapter 62-777 Florida Administrative Code.

Notes: Concentrations reported in micrograms per kilogram.
* = Background sample for subsurface soil samples.
** = Site specific concentrations for carcinogenic polycyclic aromatic hydrocarbons have been converted to Benzo(a)pyrene (BaP) equivalents. See attached spreadsheets at end of Tables section
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.
NS = No standard.
**Bold Red** = Concentration exceeded Florida Soil Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample if not detected (see text for discussion).

## Table 11
## Summary of Analytical Results for Surface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | Background | | AOC 1 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF01* | RNA-SF02* | RNA-SF03 | RNA-SF04 | RNA-SF05 | RNA-SF06 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID → | RNA01 | RNA02 | RNA03 | RNA04 | RNA05 | RNA06 | | | |
| Sample Depth (ft bls) | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Arsenic | 3.6 | 4.3 | 1.1 U | 1.1 U | 1 U | 0.95 U | *** | 2.1 | 12 |
| Barium | 3.3 J | 2.3 J | 5.5 J | 1.8 J | 3.3 J | 2.2 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.53 UR | 0.5 UR | 0.021 J | 0.53 UR | 0.21 J | 0.063 J | 7.5 | 82 | 1,700 |
| Chromium | 22 J | 7 J | 11 J | 8.2 J | 13 J | 7 J | 38 | 210 | 470 |
| Lead | 6.3 | 3.7 | 6.7 | 2.9 | 14 | 8.4 | *** | 400 | 1,400 |
| Mercury | 0.046 J | 0.025 J | 0.026 J | 0.24 J | 0.051 J | 0.06 J | 2.1 | 3 | 17 |
| Selenium | 3.7 U | 3.5 U | 3.9 U | 3.7 U | 3.6 U | 3.3 U | 5.2 | 440 | 11,000 |
| Silver | 1.1 U | 1 U | 1.1 U | 1.1 U | 1 U | 0.95 U | 17 | 410 | 8,200 |

| | AOC 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF07 | RNA-SF08 | RNA-SF09 | RNA-SF10 | RNA-SF11 | RNA-SF12 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID → | RNA07 | RNA08 | RNA09 | RNA10 | RNA11 | RNA12 | | | |
| Sample Depth (ft bls) | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Arsenic | 1.7 U | 1 U | 1 U | 1.1 U | 8.4 | 1.2 | *** | 2.1 | 12 |
| Barium | 12 J | 6.4 J | 1.3 J | 7 J | 530 | 3 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.29 J | 0.031 J | 0.52 UR | 2 J | 25 J | 0.4 UR | 7.5 | 82 | 1,700 |
| Chromium | 14 J | 10 J | 13 J | 11 J | 79 J | 11 J | 38 | 210 | 470 |
| Lead | 25 | 9.8 | 2.7 | 700 | 430 | 3.3 J | *** | 400 | 1,400 |
| Mercury | 0.044 J | 1.1 | 0.024 J | 0.014 J | 0.35 | 0.018 J | 2.1 | 3 | 17 |
| Selenium | 3.6 U | 3.6 U | 3.7 U | 3.7 U | 1 J | 2.8 U | 5.2 | 440 | 11,000 |
| Silver | 1 U | 1 U | 1 U | 1.1 U | 0.079 J | 0.8 U | 17 | 410 | 8,200 |

*See notes at end of table.*

## Table 11 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF13 | RNA-SF14 | RNA-SF15 | RNA-SF16 | RNA-SF17 | RNA-SF18 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID → | RNA13 | RNA14 | RNA15 | RNA16 | RNA17 | RNA18 | | | |
| Sample Depth (ft bls) | 0 to 2 | 0 to 2 | 0 to 8" | 0 to 2 | 0 to 8" | 0 to 2 | | | |
| Arsenic | 3.6 | 2 | 14 | 1.4 | 2.6 | 1.7 | *** | 2.1 | 12 |
| Barium | 13 J | 9.9 J | 40 | 3.5 J | 9 J | 8.2 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.82 J | 0.27 J | 0.69 J | 0.48 UR | 0.39 J | 0.12 J | 7.5 | 82 | 1,700 |
| Chromium | 14 J | 15 J | 33 J | 8.1 J | 9.4 J | 12 J | 38 | 210 | 470 |
| Lead | 64 J | 25 J | 140 J | 2.8 J | 14 J | 15 J | *** | 400 | 1,400 |
| Mercury | 0.17 | 0.025 J | 0.04 J | 0.014 J | 0.018 J | 0.026 J | 2.1 | 3 | 17 |
| Selenium | 3.9 U | 3.6 U | 3.9 U | 3.3 U | 3 U | 3.2 U | 5.2 | 440 | 11,000 |
| Silver | 1.1 U | 1 U | 1.1 U | 0.96 U | 0.87 U | 0.91 U | 17 | 410 | 8,200 |

| | AOC 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF19 | RNA-SF20 | RNA-SF21 | RNA-SF22 | RNA-SF23 | RNA-SF24 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID → | RNA19 | RNA20 | RNA21 | RNA22 | RNA23 | RNA24 | | | |
| Sample Depth (ft bls) | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Arsenic | 2.3 | 1.1 | 1.9 | 1.6 | 5.3 | 9.7 | *** | 2.1 | 12 |
| Barium | 4.1 J | 6.6 J | 6.3 J | 3.1 J | 12 J | 6.1 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.017 J | 0.46 UR | 0.37 J | 0.027 J | 0.22 J | 0.23 J | 7.5 | 82 | 1,700 |
| Chromium | 12 J | 6.7 J | 11 J | 8.6 J | 28 J | 11 J | 38 | 210 | 470 |
| Lead | 8.2 J | 3.9 J | 140 J | 2.8 J | 31 | 30 | *** | 400 | 1,400 |
| Mercury | 0.023 J | 0.017 J | 0.023 J | 0.029 J | 0.032 J | 0.047 J | 2.1 | 3 | 17 |
| Selenium | 3.7 U | 3.2 U | 3.2 U | 2.9 U | 1.3 J | 3.7 U | 5.2 | 440 | 11,000 |
| Silver | 1.1 U | 0.91 U | 0.93 U | 0.82 U | 1.2 U | 1 U | 17 | 410 | 8,200 |

*See notes at end of table.*

## Table 11 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | AOC 2 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF25 | RNA-SF26 | RNA-SF28 | RNA-SF29 | RNA-SF30 | RNA-SF31 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID → | RNA25 | RNA26 | RNA28 | RNA29 | RNA30 | RNA31 | | | |
| Sample Depth (ft bls) | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Arsenic | 3.6 | 3.6 | 2.2 | 3.4 | 5.1 | 2.9 | *** | 2.1 | 12 |
| Barium | 6 J | 4.2 J | 6 J | 18 | 10 J | 4.6 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.13 J | 0.47 UR | 0.049 J | 0.066 J | 0.24 J | 0.037 J | 7.5 | 82 | 1,700 |
| Chromium | 15 J | 24 J | 8.2 J | 41 J | 18 J | 10 J | 38 | 210 | 470 |
| Lead | 38 | 5.1 | 4.5 | 31 | 33 | 15 | *** | 400 | 1,400 |
| Mercury | 0.027 J | 0.025 J | 0.015 J | 0.094 J | 0.043 J | 0.026 J | 2.1 | 3 | 17 |
| Selenium | 2.9 U | 3.3 U | 0.7 J | 2.5 U | 0.51 J | 2.7 U | 5.2 | 440 | 11,000 |
| Silver | 0.84 U | 0.94 U | 1 U | 0.72 U | 1 U | 0.76 U | 17 | 410 | 8,200 |

| | AOC 2 | | | | | AOC 4 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF32 | RNA-SF33 | RNA-SF34 | RNA-SF35 | RNA-SF36 | RNA-SF59 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID → | RNA32 | RNA33 | RNA34 | RNA35 | RNA36 | RNA59 | | | |
| Sample Depth (ft bls) | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 0.3 | | | |
| Arsenic | 3.2 | 3.6 | 19 | 3.4 | 1.3 U | 5.1 | *** | 2.1 | 12 |
| Barium | 5.2 J | 3.7 J | 70 | 5.1 J | 1.1 J | 20 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.065 J | 0.03 J | 1.8 J | 0.44 UR | 0.45 UR | 1.5 J | 7.5 | 82 | 1,700 |
| Chromium | 14 J | 8.8 J | 46 J | 27 J | 9.1 J | 15 J | 38 | 210 | 470 |
| Lead | 18 | 11 J | 210 J | 10 J | 2.2 UJ | 310 J | *** | 400 | 1,400 |
| Mercury | 0.073 J | 0.052 J | 0.034 J | 0.037 J | 0.0092 J | 0.057 J | 2.1 | 3 | 17 |
| Selenium | 2.7 U | 3.9 U | 3.7 U | 0.8 J | 1.6 J | 3.7 U | 5.2 | 440 | 11,000 |
| Silver | 0.76 U | 0.41 J | 93 | 0.14 J | 0.9 U | 0.57 J | 17 | 410 | 8,200 |

*See notes at end of table.*

## Table 11 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 4 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF60 | RNA-SF61 | RNA-SF62 | RNA-SF63 | RNA-SF64 | RNA-SF65 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID → | RNA60 | RNA61 | RNA62 | RNA63 | RNA64 | RNA65 | | | |
| Sample Depth (ft bls) | 0 to 0.3 | 0 to 0.3 | 0 to 0.3 | 0 to 0.3 | 0 to 0.3 | 0 to 0.3 | | | |
| Arsenic | 5.4 | 3.8 | 4.9 | 4.6 | 3.3 | 3.4 | *** | 2.1 | 12 |
| Barium | 98 | 5.4 J | 5.4 J | 6.8 J | 2.4 J | 4.2 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.77 J | 2 J | 0.11 J | 0.55 UR | 0.56 UR | 0.019 J | 7.5 | 82 | 1,700 |
| Chromium | 21 J | 12 J | 6.4 J | 15 J | 6 J | 7.6 J | 38 | 210 | 470 |
| Lead | 200 J | 18 J | 14 J | 6.6 J | 3.3 J | 9.6 J | *** | 400 | 1,400 |
| Mercury | 0.21 | 0.0087 J | 0.038 J | 0.0099 J | 0.015 J | 0.019 J | 2.1 | 3 | 17 |
| Selenium | 1.6 J | 3.8 U | 4.2 U | 3.9 U | 3.9 U | 4 U | 5.2 | 440 | 11,000 |
| Silver | 2.1 | 0.36 J | 0.43 J | 0.32 J | 0.42 J | 0.46 J | 17 | 410 | 8,200 |

| | AOC 4 | | | AOC 5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF66 | RNA-SF67 | RNA-SF68 | RNA-SF69 | RNA-SF70 | RNA-SF71 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID → | RNA66 | RNA67 | RNA68 | RNA69 | RNA70 | RNA71 | | | |
| Sample Depth (ft bls) | 0 to 0.3 | 0 to 0.3 | 0 to 0.3 | 0 to 2 | 0 to 2 | 0 to 2 | | | |
| Arsenic | 3.3 | 6.2 | 7.8 | 3 | 4.1 | 4.1 | *** | 2.1 | 12 |
| Barium | 5.1 J | 4.2 J | 6.4 J | 3.6 J | 4.5 J | 8.9 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.6 UR | 0.57 J | 0.87 J | 0.42 UR | 0.017 J | 0.47 UR | 7.5 | 82 | 1,700 |
| Chromium | 10 J | 4.7 J | 9.3 J | 8.2 J | 20 J | 13 J | 38 | 210 | 470 |
| Lead | 12 J | 18 J | 39 J | 4.5 | 14 | 9.8 | *** | 400 | 1,400 |
| Mercury | 0.028 J | 0.018 J | 0.07 J | 0.016 J | 0.026 J | 0.033 J | 2.1 | 3 | 17 |
| Selenium | 0.87 J | 3 U | 0.69 J | 3 U | 3.7 U | 3.3 U | 5.2 | 440 | 11,000 |
| Silver | 0.43 J | 0.15 J | 0.3 J | 0.31 J | 0.37 J | 0.31 J | 17 | 410 | 8,200 |

*See notes at end of table.*

## Table 11 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 5 | AOC 4 | | | | AOC 1 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SF72 | RNA-SF73 | RNA-SF74 | RNA-SF76 | RNA-SF77 | RNA-SF06-DUP | | | |
| Analyte ↓Station ID → | RNA72 | RNA73 | RNA74 | RNA76 | RNA77 | RNA06 | | | |
| Sample Depth (ft bls) | 0 to 2 | 0 to 0.3 | 0 to 0.3 | 0 to 0.3 | 0 to 0.3 | 0 to 2 | | | |
| Arsenic | 1.5 U | 2.8 | 4.5 | 2.8 | 3.4 | 2.6 U | *** | 2.1 | 12 |
| Barium | 8.2 J | 37 | 13 J | 4.5 J | 4.6 J | 5.4 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.42 UR | 0.2 J | 0.091 J | 0.6 UR | 0.5 UR | 0.36 J | 7.5 | 82 | 1,700 |
| Chromium | 29 J | 8.1 J | 12 J | 7.7 J | 17 J | 11 J | 38 | 210 | 470 |
| Lead | 66 | 71 J | 26 | 9.2 | 12 | 24 | *** | 400 | 1,400 |
| Mercury | 0.013 J | 0.1 J | 0.052 J | 0.028 J | 0.042 J | 0.057 J | 2.1 | 3 | 17 |
| Selenium | 1.1 J | 3.3 U | 3.9 U | 4.2 U | 0.63 J | 3.4 U | 5.2 | 440 | 11,000 |
| Silver | 0.85 U | 0.44 J | 0.55 J | 0.42 J | 0.35 J | 0.97 U | 17 | 410 | 8,200 |

*See notes at end of table.*

## Table 11 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | AOC 4 | | AOC 5 | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID →** | **RNA-SF15-DUP** | **RNA-SF25-Dup** | **RNA-SF59-Dup** | **RNA-SF63-Dup** | **RNA-SF69-Dup** | **SCTL[1] Leachability Values** | **SCTL[1] Residential Values** | **SCTL[1] Industrial Values** |
| **Analyte ↓Station ID →** | **RNA15** | **RNA25** | **RNA59** | **RNA63** | **RNA69** | | | |
| **Sample Depth (ft bls)** | **0 to 2** | **0 to 2** | **0 to 0.3** | **0 to 0.3** | **0 to 2** | | | |
| Arsenic | **9.9** | **3.1** | **6.7** | **4.4** | 2.3 U | *** | 2.1 | 12 |
| Barium | 64 | 6.5 J | 28 | 5.9 J | 3.2 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.86 J | 0.069 J | 2.2 J | 0.42 UR | 0.52 UR | 7.5 | 82 | 1,700 |
| Chromium | 29 J | 13 J | 21 J | 12 J | 11 J | 38 | 210 | 470 |
| Lead | 66 J | 14 | 320 | 94 J | 5 | *** | 400 | 1,400 |
| Mercury | 0.041 J | 0.027 J | 0.043 J | 0.013 J | 0.018 J | 2.1 | 3 | 17 |
| Selenium | 3.9 U | 3.2 U | 4 U | 3 U | 1.2 J | 5.2 | 440 | 11,000 |
| Silver | 1.1 U | 0.91 U | 1.5 | 0.16 J | 0.27 J | 17 | 410 | 8,200 |

* = Background sample for surface soil samples.
[1] = SCTL - Soil Cleanup Target Levels for Chapter 62-777 Florida Administrative Code.

Notes: Concentrations reported in milligrams per kilogram.
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
R = The presence or absence of the analyte cannot be determined from the data due to sever quality control problems. The data are rejected and considered unusable.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.
*** = Leachability values can be determined using the SPLP Test to calculate site-specific SCTLs or may be determined using the TCLP in the event oily wastes are present.
**Bold Red** = Concentration exceeded Florida Soil Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample if not detected (see text for discussion).

## Table 12
## Summary of Analytical Results for Subsurface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | Background | AOC 1 | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB01* | RNA-SB03 | RNA-SB04 | RNA-SB05 | RNA-SB06 | RNA-SB07 | | | |
| Analyte ↓ Station ID → | RNA01 | RNA03 | RNA04 | RNA05 | RNA06 | RNA07 | | | |
| Sample Depth (ft bls) | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Arsenic | 5 | 1 U | 1.1 U | 3.3 | 1 U | 1U | *** | 2.1 | 12 |
| Barium | 2.8 J | 20 U | 0.6 J | 11 J | 20 U | 20 U | 1,600 | 120 | 130,000 |
| Cadmium | 0.57 U | 0.51 UR | 0.56 UR | 0.045 J | 0.51 UR | 0.51 UR | 7.5 | 82 | 1,700 |
| Chromium | 4.2 J | 7.1 J | 12 J | 55 J | 4.8 J | 3.3 J | 38 | 210 | 470 |
| Lead | 3.6 | 0.29 J | 0.54 J | 7 | 1 U | 1 U | *** | 400 | 1,400 |
| Mercury | 0.0073 J | 0.011 J | 0.022 J | 0.02 J | 0.0083 J | 0.008 J | 2.1 | 3 | 17 |
| Selenium | 4 U | 3.6 UR | 3.9 U | 1 J | 3.6 U | 3.5 U | 5.2 | 440 | 11,000 |
| Silver | 1.1 U | 1 U | 1.1 U | 1 U | 1 U | 1 U | 17 | 410 | 8,200 |

| | AOC 1 | | | | | | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-SB08 | RNA-SB09 | RNA-SB10 | RNA-SB12 | RNA-SB13 | RNA-SB16 | | | |
| Analyte ↓ Station ID → | RNA08 | RNA09 | RNA10 | RNA12 | RNA13 | RNA16 | | | |
| Sample Depth (ft bls) | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Arsenic | 0.99 U | 1 U | 0.87 U | 1.2 U | 1.9 | 5.9 | *** | 2.1 | 12 |
| Barium | 6.2 J | 20 U | 0.34 J | 3.5 J | 4.7 J | 8.2 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.49 UR | 0.51 UR | 0.43 UR | 0.42 UR | 0.56 UR | 0.52 UR | 7.5 | 82 | 1,700 |
| Chromium | 4.1 J | 1.7 J | 4 J | 37 J | 15 J | 18 J | 38 | 210 | 470 |
| Lead | 0.99 U | 1 U | 1.7 | 4.1 | 4.2 J | 4 J | *** | 400 | 1,400 |
| Mercury | 0.0095 J | 0.005 J | 0.0062 J | 0.022 J | 0.019 J | 0.018 J | 2.1 | 3 | 17 |
| Selenium | 3.5 U | 3.6 U | 3 U | 2.9 U | 3.9 U | 3.7 U | 5.2 | 440 | 11,000 |
| Silver | 0.99 U | 1 U | 0.87 U | 0.83 U | 1.1 U | 1 U | 17 | 410 | 8,200 |

*See notes at end of table.*

## Table 12 (Continued)
## Summary of Analytical Results for Subsurface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID ➔ | RNA-SB18 | RNA-SB19 | RNA-SB20 | RNA-SB21 | RNA-SB22 | RNA-SB23 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID ➔ | RNA18 | RNA19 | RNA20 | RNA21 | RNA22 | RNA23 | | | |
| Sample Depth (ft bls) | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Arsenic | 1.2 | 2.6 | 1.1 | 1.4 | 1.5 | 1.3 | *** | 2.1 | 12 |
| Barium | 2.5 J | 5.7 J | 3.7 J | 2.2 J | 4.9 J | 6.3 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.53 UR | 0.49 UR | 0.45 UR | 0.46 UR | 0.026 J | 0.5 UR | 7.5 | 82 | 1,700 |
| Chromium | 5.9 J | 49 J | 9.1 J | 3.7 J | 8.9 J | 9.6 J | 38 | 210 | 470 |
| Lead | 2.8 J | 8.3 J | 2.7 J | 2.8 J | 2.8 J | 3.3 J | *** | 400 | 1,400 |
| Mercury | 0.014 J | 0.028 J | 0.015 J | 0.0077 J | 0.012 J | 0.024 J | 2.1 | 3 | 17 |
| Selenium | 3.7 U | 3.4 U | 3.2 U | 3.2 U | 3.3 U | 3.5 U | 5.2 | 440 | 11,000 |
| Silver | 1.1 U | 0.98 U | 0.91 U | 0.92 U | 0.95 U | 1 U | 17 | 410 | 8,200 |

| | AOC 1 | | | | AOC 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample ID ➔ | RNA-SB24 | RNA-SB25 | RNA-SB26 | RNA-SB28 | RNA-SB29 | RNA-SB30 | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ↓ Station ID ➔ | RNA24 | RNA25 | RNA26 | RNA28 | RNA29 | RNA30 | | | |
| Sample Depth (ft bls) | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Arsenic | 4.1 | 4.2 | 4.2 | 3.5 | 2.9 | 3.4 | *** | 2.1 | 12 |
| Barium | 5.2 J | 3.1 J | 3.2 J | 2.5 J | 3.6 J | 4.2 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.5 UR | 0.44 UR | 0.51 UR | 0.57 UR | 0.49 UR | 0.033 J | 7.5 | 82 | 1,700 |
| Chromium | 13 J | 5.1 J | 5.2 J | 5.7 J | 16 J | 16 J | 38 | 210 | 470 |
| Lead | 4 | 3.1 U | 3.6 | 3.3 U | 4.3 | 7.8 | *** | 400 | 1,400 |
| Mercury | 0.062 J | 0.012 J | 0.014 J | 0.018 J | 0.025 J | 0.048 J | 2.1 | 3 | 17 |
| Selenium | 3.5 U | 3.1 U | 3.6 U | 4 U | 0.86 J | 0.7 J | 5.2 | 440 | 11,000 |
| Silver | 0.99 U | 0.89 U | 1 U | 1.1 U | 0.99 U | 1.1 U | 17 | 410 | 8,200 |

*See notes at end of table.*

## Table 12 (Continued)
## Summary of Analytical Results for Subsurface Soil Samples for Inorganic Analytes

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 2 | | | AOC 4 | | AOC 1 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID ➔ | RNA-SB33 | RNA-SB34 | RNA-SB35 | RNA-SB73 | RNA-SB74 | RNA-SB06-DUP | RNA-SB25-Dup | SCTL[1] Leachability Values | SCTL[1] Residential Values | SCTL[1] Industrial Values |
| Analyte ⬇ Station ID ➔ | RNA33 | RNA34 | RNA35 | RNA73 | RNA74 | RNA06 | RNA25 | | | |
| Sample Depth (ft bls) | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | 2 to 4 | | | |
| Arsenic | **4** | **4.1** | **4** | **4.7** | **3.7 J** | 1.1 U | **4** | *** | 2.1 | 12 |
| Barium | 3 J | 4.1 J | 5.8 J | 7 J | 4.2 J | 22 U | 2.9 J | 1,600 | 120 | 130,000 |
| Cadmium | 0.5 UR | 0.46 UR | 0.48 UR | 0.47 UR | 0.54 UR | 0.56 UR | 0.58 UR | 7.5 | 82 | 1,700 |
| Chromium | 9 J | 15 J | 31 J | 32 J | 1.8 J | 0.72 J | 4.4 J | 38 | 210 | 470 |
| Lead | 3.6 J | 5 J | 7.3 J | 10 J | 2.9 | 1.1 U | 3.4 U | *** | 400 | 1,400 |
| Mercury | 0.028 J | 0.045 J | 0.022 J | 0.045 J | 0.11 U | 0.009 J | 0.0089 J | 2.1 | 3 | 17 |
| Selenium | 3.5 U | 3.2 U | 3.4 U | 0.93 J | 3.8 U | 3.9 U | 4 U | 5.2 | 440 | 11,000 |
| Silver | 0.28 J | 0.39 J | 0.26 J | 0.12 J | 0.42 J | 1.1 U | 1.2 U | 17 | 410 | 8,200 |

* = Background sample for subsurface soil samples.
[1] = SCTL - Soil Cleanup Target Levels for Chapter 62-777 Florida Administrative Code.

Notes: Concentrations reported in milligrams per kilogram.
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
R = The presence or absence of the analyte cannot be determined from the data due to sever quality control problems. The data are rejected and considered unusable.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.
*** = Leachability values can be determined using the SPLP Test to calculate site-specific SCTLs or may be determined using the TCLP in the event oily wastes are present.
**Bold Red** = Concentration exceeded Florida Soil Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample if not detected (see text for discussion.

## Table 13
## Summary of Analytical Results for Surface Soil Samples for Dioxins

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | | | Background | | AOC 2 | | |
|---|---|---|---|---|---|---|---|
| | | Sample ID ➔ | RNA-SF01* | RNA-SF02 | RNA-SF29 | RNA-SF30 | RNA-SF31 |
| | | Station ID ➔ | RNA01 | RNA02 | RNA29 | RNA30 | RNA31 |
| Analyte🡻 | | Sample Depth (Ft bls) ➔ | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 |
| 1,2,3,4,6,7,8-Heptachlorodibenzodioxin | | | 2.7 J | 0.30 U | 13 J | 77 J | 16 J |
| 1,2,3,4,6,7,8-Heptachlorodibenzofuran | | | 0.11 U | 0.20 U | 7.9 | 30 | 7.9 |
| 1,2,3,4,7,8,9-Heptachlorodibenzofuran | | | 0.36 U | 0.32 U | 0.15 U | 0.78 U | 1.8 U |
| 1,2,3,4,7,8-Hexachlorodibenzodioxin | | | 0.27 U | 0.31 U | 0.19 U | 1.2 J | 0.42 U |
| 1,2,3,4,7,8-Hexachlorodibenzofuran | | | 0.18 U | 0.13 U | 0.27 U | 1.2 U | 0.29 U |
| 1,2,3,6,7,8-Hexachlorodibenzodioxin | | | 0.27 U | 0.32 U | 0.75 J | 2.5 J | 0.44 U |
| 1,2,3,6,7,8-Hexachlorodibenzofuran | | | 0.18 U | 0.13 U | 0.33 U | 1.3 U | 0.28 U |
| 1,2,3,7,8,9-Hexachlorodibenzodioxin | | | 0.28 U | 0.33 U | 0.45 J | 2.2 J | 0.45 U |
| 1,2,3,7,8,9-Hexachlorodibenzofuran | | | 0.27 U | 0.18 U | 0.15 U | 0.66 U | 0.47 U |
| 1,2,3,7,8-Pentachlorodibenzodioxin | | | 0.23 U | 0.20 U | 0.17 U | 0.31 U | 0.36 U |
| 1,2,3,7,8-Pentachlorodibenzofuran | | | 0.12 U | 0.15 U | 0.12 J | 0.42 U | 0.13 U |
| 2,3,4,6,7,8-Hexachlorodibenzofuran | | | 0.20 U | 0.13 U | 0.53 J | 2.1 J | 0.57 U |
| 2,3,4,7,8-Pentachlorodibenzofuran | | | 0.14 U | 0.14 U | 0.44 J | 1.1 J | 0.13 U |
| 2,3,7,8-Tetrachlorodibenzodioxin | | | 0.21U | 0.19U | 0.091U | 0.30U | 0.32U |
| 2,3,7,8-Tetrachlorodibenzofuran | | | 0.25 U | 0.48 U | 0.35 U | 0.50 U | 0.46 U |
| Heptachlorod benzodioxin (Total) | | | 8.6 J | 1.8 UJ | 29 J | 170 J | 42 J |
| Heptachlorod benzofuran (Total) | | | 0.36 UJ | 0.32 UJ | 15 J | 89 J | 24 J |
| Hexachlorodibenzodioxin (Total) | | | 0.28 UJ | 0.33 UJ | 6.4 J | 24 J | 7.2 J |
| Hexachlorodibenzofuran (Total) | | | 0.27 UJ | 0.18 UJ | 5.8 J | 28 J | 5.6 J |
| Octachlorodibenzodioxin | | | 18 J | 4.6 J | 72 J | 610 J | 120 J |
| Octachlorodibenzofuran | | | 0.56 U | 0.45 U | 6.8 J | 45 U | 10 U |
| Pentachlorodibenzodioxin (Total) | | | 0.23 UJ | 0.20 UJ | 3.3 J | 5.9 J | 1.1 J |
| Pentachlorodibenzofuran (Total) | | | 0.14 UJ | 0.15 UJ | 4.8 J | 9.3 J | 1.2 J |
| TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98) | | | 0.97 J | 1.1 J | 1.4 J | 3.5 J | 1.6 J |
| TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98) | | | 0.76 J | 0.71 J | 0.84 J | 2.8 J | 1.3 J |
| TEQ (Mammalian Toxic. Eq Value, WHO TEQ-2005) | | | 0.71 J | 0.65 J | 0.93 J | 3.4 J | 1.4 J |
| Tetrachlorodibenzodioxin (Total) | | | 0.21 U | 0.19 U | 0.31 J | 2.4 J | 0.32 UJ |
| Tetrachlorodibenzofuran (Total) | | | 0.48 UJ | 1.6 J | 2.4 J | 2.8 J | 2.6 J |
| Total Dioxin Equivalents | | | 0.3063000 | 0.3899600 | 0.5267000 | 1.8260000 | 0.6475000 |
| Total Furan Equivalents | | | 0.0943780 | 0.1883523 | 0.2739300 | 0.7755500 | 0.8642000 |
| SCTL [1] - Total TEQs = Dioxins + Furans | Residential | 7.0e-06 | **0.0004007** | **0.0005783** | **0.0008006** | **0.0026016** | **0.0008642** |
| | Industrial | 3.0e-05 | | | | | |

*See notes at end of table.*

## Table 13 (Continued)
## Summary of Analytical Results for Surface Soil Samples for Dioxins

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | | | AOC 2 | | | | |
|---|---|---|---|---|---|---|---|
| | | Sample ID ➔ | RNA-SF32 | RNA-SF33 | RNA-SF34 | RNA-SF35 | RNA-SF36 |
| | | Station ID ➔ | RNA32 | RNA33 | RNA34 | RNA35 | RNA36 |
| Analyte🡻 | | Sample Depth (Ft bls) ➔ | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 |
| 1,2,3,4,6,7,8-Heptachlorodibenzodioxin | | | 16 J | 140 J | 140 J | 52 J | 0.17 U |
| 1,2,3,4,6,7,8-Heptachlorodibenzofuran | | | 5.9 U | 8.5 | 37 | 25 | 0.075 U |
| 1,2,3,4,7,8,9-Heptachlorodibenzofuran | | | 0.59 U | 0.62 U | 2.4 J | 0.56 U | 0.25 U |
| 1,2,3,4,7,8-Hexachlorodibenzodioxin | | | 0.54 U | 0.64 U | 3.1 J | 0.90 J | 0.18 U |
| 1,2,3,4,7,8-Hexachlorodibenzofuran | | | 0.32 U | 0.28 U | 7.2 | 0.53 J | 0.14 U |
| 1,2,3,6,7,8-Hexachlorodibenzodioxin | | | 0.53 U | 1.9 J | 9.2 | 1.5 J | 0.18 U |
| 1,2,3,6,7,8-Hexachlorodibenzofuran | | | 0.32 U | 0.29 U | 7.2 | 0.71 U | 0.13 U |
| 1,2,3,7,8,9-Hexachlorodibenzodioxin | | | 0.56 U | 0.69 U | 7.9 | 1.7 J | 0.19 U |
| 1,2,3,7,8,9-Hexachlorodibenzofuran | | | 0.49 U | 0.42 U | 1.7 J | 0.34 U | 0.19 U |
| 1,2,3,7,8-Pentachlorod benzodioxin | | | 0.38 U | 0.39 U | 3.7 J | 0.44 J | 0.17 U |
| 1,2,3,7,8-Pentachlorod benzofuran | | | 0.30 U | 0.19 U | 5.5 U | 0.13 U | 0.12 U |
| 2,3,4,6,7,8-Hexachlorodibenzofuran | | | 0.58 J | 0.35 U | 8.7 | 1.2 J | 0.15 U |
| 2,3,4,7,8-Pentachlorod benzofuran | | | 0.14 U | 0.12 U | 8.9 | 0.31 U | 0.11 U |
| 2,3,7,8-Tetrachlorodibenzodioxin | | | 0.37U | 0.28U | 0.67U | 0.20U | 0.21U |
| 2,3,7,8-Tetrachlorod benzofuran | | | 0.45 U | 0.34 U | 7.4 | 0.45 U | 0.18 U |
| Heptachlorodibenzodioxin (Total) | | | 37 J | 910 J | 390 J | 120 J | 0.23 UJ |
| Heptachlorodibenzofuran (Total) | | | 13 J | 43 J | 72 J | 80 J | 0.25 UJ |
| Hexachlorod benzodioxin (Total) | | | 6.1 J | 60 J | 120 J | 14 J | 0.19 UJ |
| Hexachlorod benzofuran (Total) | | | 5.5 J | 5.9 J | 75 J | 21 J | 0.19 UJ |
| Octachlorodibenzodioxin | | | 98 J | 850 J | 780 J | 400 J | 2.1 J |
| Octachlorodibenzofuran | | | 7.3 J | 38 | 25 | 61 | 0.34 U |
| Pentachlorod benzodioxin (Total) | | | 0.38 UJ | 0.64 J | 81 J | 1.1 J | 0.17 UJ |
| Pentachlorod benzofuran (Total) | | | 2.2 J | 0.67 J | 86 J | 3.8 J | 0.12 UJ |
| TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98) | | | 1.7 J | 1.7 J | 25 J | 2.3 J | 0.78 J |
| TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98) | | | 1.4 J | 1.6 J | 14 J | 1.9 J | 0.61 J |
| TEQ (Mammalian Toxic. Eq Value, WHO TEQ-2005) | | | 1.4 J | 3.0 J | 14 J | 2.4 J | 0.56 J |
| Tetrachlorodibenzodioxin (Total) | | | 2.5 J | 0.28 UJ | 57 J | 1.6 J | 0.21 UJ |
| Tetrachlorodibenzofuran (Total) | | | 1.5 J | 0.97 J | 100 J | 1.6 J | 0.23 J |
| Total Dioxin Equivalents | | | 0.6624000 | 0.7915000 | 14.5980000 | 1.5550000 | 0.2035600 |
| Total Furan Equivalents | | | 0.1886800 | 0.2101500 | 7.7940000 | 3.3454000 | 0.0746420 |
| SCTL [1] - Total TEQs = Dioxins + Furans | Residential | 7.0e-06 | **0.0008511** | **0.0010017** | **0.0223920** | **0.0049004** | **0.0002782** |
| | Industrial | 3.0e-05 | | | | | |

[1] = SCTL - Soil Cleanup Target Levels for Chapter 62-777, Florida Administrative Code. Site specific concentrations for carcinogenic dioxins have been converted to Total Dioxin and Total Furan equivalents. See attached spreadsheets at end of Tables section

**Notes:** Concentrations reported in nanograms per kilogram (ng/kg).
Dioxin/furan TEQ SCTLs & calculated TEQ values presented in milligrams per kilogram.
* = Background sample for surface soil samples.
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.
**Bold Red** = Concentration exceeded Florida Soil Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample (see text for description).

## Table 14
## Summary of Analytical Results for Subsurface Soil Samples for Dioxins

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | | Background | | AOC 2 | | | |
|---|---|---|---|---|---|---|---|
| | Sample ID ➔ | RNA-SB01* | RNA-SB29 | RNA-SB30 | RNA-SB33 | RNA-SB34 | RNA-SB35 |
| | Station ID ➔ | RNA01 | RNA02 | RNA30 | RNA33 | RNA34 | RNA35 |
| Analyte🡻 | Sample Depth (Ft bls) ➔ | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 | 0 to 2 |
| 1,2,3,4,6,7,8-Heptachlorodibenzodioxin | | 1.0 U | 0.69 J | 3.3 J | 0.18 U | 0.23 U | 0.27 U |
| 1,2,3,4,6,7,8-Heptachlorodibenzofuran | | 0.54 U | 0.31 J | 1.1 U | 0.14 U | 0.15 U | 0.31 U |
| 1,2,3,4,7,8,9-Heptachlorodibenzofuran | | 0.94 U | 0.14 U | 0.30 U | 0.21 U | 0.42 U | 0.43 U |
| 1,2,3,4,7,8-Hexachlorodibenzodioxin | | 0.53 U | 0.13 U | 0.36 U | 0.33 U | 0.29 U | 0.30 U |
| 1,2,3,4,7,8-Hexachlorodibenzofuran | | 0.41 U | 0.082 U | 0.17 U | 0.13 U | 0.24 U | 0.21 U |
| 1,2,3,6,7,8-Hexachlorodibenzodioxin | | 0.56 U | 0.13 U | 0.35 U | 0.34 U | 0.29 U | 0.32 U |
| 1,2,3,6,7,8-Hexachlorodibenzofuran | | 0.37 U | 0.084 U | 0.17 U | 0.13 U | 0.23 U | 0.21 U |
| 1,2,3,7,8,9-Hexachlorodibenzodioxin | | 0.57 U | 0.13 U | 0.37 U | 0.35 U | 0.30 U | 0.33 U |
| 1,2,3,7,8,9-Hexachlorodibenzofuran | | 0.60 U | 0.10 U | 0.24 U | 0.18 U | 0.34 U | 0.32 U |
| 1,2,3,7,8-Pentachlorodibenzodioxin | | 0.50 U | 0.11 U | 0.17 U | 0.23 U | 0.24 U | 0.26 U |
| 1,2,3,7,8-Pentachlorodibenzofuran | | 0.29 U | 0.065 U | 0.19 U | 0.11 U | 0.20 U | 0.17 U |
| 2,3,4,6,7,8-Hexachlorodibenzofuran | | 0.42 U | 0.086 U | 0.17 U | 0.14 U | 0.24 U | 0.22 U |
| 2,3,4,7,8-Pentachlorodibenzofuran | | 0.30 U | 0.029 U | 0.19 U | 0.11 U | 0.19 U | 0.18 U |
| 2,3,7,8-Tetrachlorodibenzodioxin | | 0.47U | 0.12U | 0.17U | 0.19U | 0.34U | 0.32U |
| 2,3,7,8-Tetrachlorodibenzofuran | | 0.58 U | 0.39 U | 0.23 U | 0.23 U | 0.28 U | 0.35 U |
| Heptachlorod benzodioxin (Total) | | 1.0 UJ | 1.5 J | 7.7 J | 0.96 J | 0.31 UJ | 0.36 UJ |
| Heptachlorod benzofuran (Total) | | 0.94 UJ | 0.31 UJ | 2.5 J | 0.21 UJ | 0.42 UJ | 0.43 UJ |
| Hexachlorodibenzodioxin (Total) | | 0.57 UJ | 0.13 UJ | 1.2 J | 0.35 UJ | 0.30 UJ | 0.33 UJ |
| Hexachlorodibenzofuran (Total) | | 0.60 UJ | 0.10 UJ | 2.2 J | 0.18 UJ | 0.34 UJ | 0.32 UJ |
| Octachlorodibenzodioxin | | 4.6 J | 3.7 J | 21 J | 2.8 J | 1.9 J | 3.1 J |
| Octachlorodibenzofuran | | 1.5 U | 0.14 U | 1.4 J | 0.37 U | 0.53 U | 0.80 U |
| Pentachlorodibenzodioxin (Total) | | 0.50 UJ | 0.11 UJ | 0.17 UJ | 0.23 UJ | 0.24 UJ | 0.26 UJ |
| Pentachlorodibenzofuran (Total) | | 0.30 UJ | 0.090 J | 1.3 J | 0.11 UJ | 0.20 UJ | 0.18 UJ |
| TEQ (Avian Toxic. Equiv. Value, WHO TEQ-98) | | 2.2 J | 0.72 J | 0.93 J | 0.88 J | 1.2 J | 1.3 J |
| TEQ (Fish Toxic. Equiv. Value, WHO TEQ-98) | | 1.6 J | 0.37 J | 0.74 J | 0.72 J | 0.96 J | 0.97 J |
| TEQ (Mammalian Toxic. Eq. Value,WHO TEQ-2005) | | 1.5 J | 0.37 J | 0.67 J | 0.64 J | 0.87 J | 0.89 J |
| Tetrachlorodibenzodioxin (Total) | | 0.47 UJ | 0.12 UJ | 0.95 J | 0.19 UJ | 0.34 UJ | 0.32 UJ |
| Tetrachlorodibenzofuran (Total) | | 0.58 UJ | 1.3 J | 1.6 J | 1.1 J | 0.79 J | 0.85 J |
| Total Dioxin Equivalents | | 0.6239600 | 0.2767700 | 0.2473500 | 0.3051595 | 0.3371800 | 0.3541600 |
| Total Furan Equivalents | | 0.2087250 | 0.0741120 | 0.1614400 | 0.1218765 | 0.0725185 | 0.1129900 |
| SCTL [1] - Total TEQs = Dioxins + Furans | Residential<br>Industrial | 7.0e-06<br>3.0e-05 | **0.0008327** | **0.0003509** | **0.0004088** | **0.0004097** | **0.0004270** | **0.0004672** |

[1] = SCTL - Soil Cleanup Target Levels for Chapter 62-777, Florida Administrative Code. Site specific concentrations for carcinogenic dioxins have been converted to Total Dioxin and Total Furan equivalents. See attached spreadsheets at end of Tables section

Notes: Concentrations reported in nanograms per kilogram (ng/kg).
Dioxin/furan TEQ SCTLs & calculated TEQ values presented in milligrams per kilogram. * = Background sample for subsurface soil samples.
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample.
**Bold Red** = Concentration exceeded Florida Soil Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample (see text for description).

## Table 15
## Summary of Fixed Base Analytical Results for Groundwater Samples for Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | | | Florida GCTL[2] or Guidance Concentration | Federal MCL or Guidance Concentration |
|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-GW01* | RNA-GW02 | RNA-GW03 | RNA-GW04 | RNA-GW05 | | |
| Monitoring Well ID → | TMW01 | TMW02 | TMW03 | TMW04 | TMW05 | | |
| Analyte ↓ Station ID → | RNA01 | RNA02 | RNA03 | RNA07 | RNA10 | | |
| Carbazole | 5 U | 5 U | 5 U | 5 U | 6.6 | 1.8[2] | NS |
| Fluoranthene | 5 U | 5 U | 5 U | 5 U | 1.1 J | 280[2] | NS |
| n-Nitroso-diphenylamine | 5 U | 5 U | 5 U | 5 U | 2.4 J | 7.1[2] | NS |
| Phenanthrene | 5 U | 5 U | 5 U | 5 U | 1.7 J | 210[2] | NS |

*See notes at end of table.*

## Table 15 (Continued)
## Summary of Fixed Base Analytical Results for Groundwater Samples for Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | AOC 5 | AOC 2 | Florida GCTL[2] or Guidance Concentration | Federal MCL or Guidance Concentration |
|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-GW06 | RNA-GW07 | RNA-GW08 | RNA-GW16 | RNA-GW17 | | |
| Monitoring Well ID → | TMW06 | TMW07 | TMW08 | TMW16 | TMW17 | | |
| Analyte ↓ Station ID → | RNA14 | RNA18 | RNA25 | RNA70 | RNA75 | | |
| Carbazole | 5 U | 5 U | 5 U | 5 U | 5 U | 1.8[2] | NS |
| Fluoranthene | 5 U | 5 U | 5 U | 5 U | 5 U | 280[2] | NS |
| n-Nitroso-diphenylamine | 5 U | 5 U | 5 U | 5 U | 5 U | 7.1[2] | NS |
| Phenanthrene | 5 U | 5 U | 5 U | 5 U | 5 U | 210[2] | NS |

*See notes at end of table.*

## Table 15 (Continued)
## Summary of Fixed Base Analytical Results for Groundwater Samples for Organic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | QA/QC | | | Florida GCTL[2] or Guidance Concentration | Federal MCL or Guidance Concentration |
|---|---|---|---|---|---|---|
| Sample ID ➔ | RNA-GW03-DUP | RNA-EB01 | RNA-EB02 | | | |
| Monitoring Well ID ➔ | TMW03 | NA | NA | | | |
| Analyte ↓ Station ID ➔ | RNA03 | #R4DART# | #R4DART# | | | |
| Carbazole | 5 U | 5 U | 5 U | | 1.8[2] | NS |
| Fluoranthene | 5 U | 5 U | 5 U | | 280[2] | NS |
| n-Nitroso-diphenylamine | 5 U | 5 U | 5 U | | 7.1[2] | NS |
| Phenanthrene | 5 U | 5 U | 5 U | | 210[2] | NS |

[1] = Secondary Drinking Water Standard
[2] = State of Florida Groundwater Cleanup Target Level (GCTL)

Notes: Concentrations reported in micrograms per liter (µg/l).
* = Background sample for groundwater samples.
U = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
**Bold Red** = Concentration exceeded Florida Groundwater Cleanup Target Levels.
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample.

## Table 16
## Summary of Fixed Base Analytical Results for Groundwater Samples for Inorganic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | Background | | AOC 1 | | | Florida GCTL or Guidance Concentration | Federal MCL or Guidance Concentration |
|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-GW01* | RNA-GW02 | RNA-GW03 | RNA-GW04 | RNA-GW05 | | |
| Monitoring Well ID → | TMW01 | TMW02 | TMW03 | TMW04 | TMW05 | | |
| Analyte ↓ Station ID → | RNA01 | RNA02 | RNA03 | RNA07 | RNA10 | | |
| Arsenic | 1 UJ | 1 UJ | 1 UJ | 1 UJ | 1 UJ | 10[2] | 10[2] |
| Barium | 9.8 | 16 | 12 | 13 | 12 | 2000[2] | 2000[2] |
| Cadmium | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5[2] | 5[2] |
| Chromium | 5 U | 5 U | 5 U | 5 U | 5 U | 100[2] | 100[2] |
| Lead | 1 U | 1 U | 1 U | 1 U | 6.6 | 15[2] | 15[2] |
| Mercury | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 2[2] | 2[2] |
| Selenium | 2 U | 2 U | 2 U | 2 U | 2 U | 50[2] | 50[2] |
| Silver | 5 U | 5 U | 5 U | 5 U | 5 U | 100[2] | NS |

*See notes at end of table.*

## Table 16 (Continued)
## Summary of Fixed Base Analytical Results for Groundwater Samples for Inorganic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 1 | | | AOC 4 | AOC 5 | Florida GCTL or Guidance Concentration | Federal MCL or Guidance Concentration |
|---|---|---|---|---|---|---|---|
| Sample ID → | RNA-GW06 | RNA-GW07 | RNA-GW08 | RNA-GW15 | RNA-GW16 | | |
| Monitoring Well ID → | TMW06 | TMW07 | TMW08 | TMW15 | TMW16 | | |
| Analyte ↓ Station ID → | RNA14 | RNA18 | RNA25 | RNA64 | RNA70 | | |
| Arsenic | 1 UJ | 1 UJ | 1 UJ | 1 UJ | 1 UJ | 10[2] | 10[2] |
| Barium | 10 | 14 | 19 | 30 | 17 | 2000[2] | 2000[2] |
| Cadmium | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5[2] | 5[2] |
| Chromium | 5 U | 5 U | 5 U | 5 U | 5 U | 100[2] | 100[2] |
| Lead | 1 U | 1 U | 1 U | 1 U | 1 U | 15[2] | 15[2] |
| Mercury | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 2[2] | 2[2] |
| Selenium | 2 U | 2 U | 2 U | 2 U | 2 U | 50[2] | 50[2] |
| Silver | 5 U | 5 U | 5 U | 5 U | 5 U | 100[2] | NS |

*See notes at end of table.*

## Table 16 (Continued)
## Summary of Fixed Base Analytical Results for Groundwater Samples for Inorganic Compounds

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| | AOC 2 | AOC 1 | AOC 3 | QA/QC | | Florida GCTL or Guidance Concentration | Federal MCL or Guidance Concentration |
|---|---|---|---|---|---|---|---|
| **Sample ID ➔** | **RNA-GW17** | **RNA-GW03-DUP** | **RNA-GW15-DUP** | **RNA-EB01** | **RNA-EB02** | | |
| **Monitoring Well ID ➔** | **TMW17** | **TMW03** | **TMW15** | **NA** | **NA** | | |
| **Analyte ↓ Station ID ➔** | **RNA75** | **RNA03** | **RNA64** | **#R4DART#** | **#R4DART#** | | |
| Arsenic | 1 UJ | 1 UJ | 1 UJ | 1 UJ | 1 UJ | 10[2] | 10[2] |
| Barium | 11 | 12 | 28 | 5 U | 5 U | 2000[2] | 2000[2] |
| Cadmium | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 5[2] | 5[2] |
| Chromium | 5 U | 5 U | 5 U | 5 U | 5 U | 100[2] | 100[2] |
| Lead | 1 U | 1 U | 1 U | 1 U | 1 U | 15[2] | 15[2] |
| Mercury | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 2[2] | 2[2] |
| Selenium | 2 U | 2 U | 2 U | 2 U | 2 U | 50[2] | 50[2] |
| Silver | 5 U | 5 U | 5 U | 5 U | 5 U | 100[2] | NS |

[1] = Background Screening Concentration is 3X background level or the minimum detection level in background sample if not detected (see text for discussion).
[2] = Primary Drinking Water Standard
[3] = Secondary Drinking Water Standard

Notes: All concentrations reported in micrograms per liter (µg/l).
* = Background sample for groundwater samples.
U = The analyte was not detected at or above the reporting limit.
UJ = the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample
NS = No standard.
**Bold** = Concentration meets or exceeds Florida and/or Federal MCL
Shade = Concentration exceeded Background Screening Concentration by 3X or greater or above the minimum detection level of the background sample.

## Table 17
## Sample Location Coordinates

Site Inspection Report
USN Richmond NAS Site
Perrine, Miami-Dade County, Florida

| Sample ID | Latitude | Longitude |
|---|---|---|
| RNA01 | 25.61237 | -80.3915 |
| RNA02 | 25.61779 | -80.4045 |
| RNA03 | 25.61749 | -80.4001 |
| RNA04 | 25.61752 | -80.4002 |
| RNA05 | 25.61748 | -80.4003 |
| RNA06 | 25.61743 | -80.4003 |
| RNA07 | 25.61739 | -80.4002 |
| RNA08 | 25.61736 | -80.4002 |
| RNA09 | 25.61712 | -80.4001 |
| RNA10 | 25.61720 | -80.4001 |
| RNA11 | 25.61727 | -80.4003 |
| RNA12 | 25.61716 | -80.4003 |
| RNA13 | 25.61726 | -80.4003 |
| RNA14 | 25.61790 | -80.4014 |
| RNA15 | 25.61781 | -80.4013 |
| RNA16 | 25.61786 | -80.4015 |
| RNA17 | 25.61780 | -80.4014 |
| RNA18 | 25.61829 | -80.4018 |
| RNA19 | 25.61826 | -80.4019 |
| RNA20 | 25.61799 | -80.4017 |
| RNA21 | 25.61805 | -80.4016 |
| RNA22 | 25.61822 | -80.4021 |
| RNA23 | 25.61816 | -80.4017 |
| RNA25 | 25.61843 | -80.4023 |
| RNA26 | 25.61841 | -80.4024 |
| RNA28 | 25.61836 | -80.4024 |
| RNA29 | 25.62203 | -80.4081 |
| RNA30 | 25.62209 | -80.408 |
| RNA31 | 25.62207 | -80.4082 |
| RNA32 | 25.62202 | -80.4081 |
| RNA33 | 25.62184 | -80.4081 |
| RNA34 | 25.62219 | -80.4078 |
| RNA35 | 25.62225 | -80.4081 |
| RNA36 | 25.62203 | -80.4083 |
| RNA33 | 25.62183 | -80.4081 |
| RNA59 | 25.60307 | -80.3999 |
| RNA60 | 25.60314 | -80.3999 |
| RNA61 | 25.60370 | -80.4015 |
| RNA62 | 25.60368 | -80.4014 |
| RNA63 | 25.60304 | -80.403 |
| RNA64 | 25.60304 | -80.403 |
| RNA65 | 25.60464 | -80.4028 |
| RNA66 | 25.60461 | -80.4028 |
| RNA67 | 25.60472 | -80.4041 |
| RNA68 | 25.60473 | -80.4041 |
| RNA69 | 25.62025 | -80.3929 |
| RNA70 | 25.62016 | -80.3928 |
| RNA71 | 25.61860 | -80.3941 |
| RNA72 | 25.61861 | -80.3939 |
| RNA73 | 25.60035 | -80.4035 |
| RNA74 | 25.59903 | -80.4019 |
| RNA75 | 25.62183 | -80.4079 |
| RNA76 | 25.59863 | -80.3923 |
| RNA77 | 25.59862 | -80.3922 |

Notes: Longitude and latitude obtained from a GPS unit equipped with wide area augmentation system
Coordinates are listed in decibel degrees