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REPORT ON ENVIRONMENTAL DUE DILIGENCE INVESTIGATION OF FLIGHT LINE FACILITIES NAS CECIL FIELD FL

1/1/1998

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REPORT ON

ENVIRONMENTAL DUE DILIGENCE INVESTIGATION
FLIGHT LINE FACILITIES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, DUVAL COUNTY, FLORIDA

Submitted to:

Northrop Grumman Corporation
5000 U.S. 1 North
St. Augustine, Florida 32085

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August 1998 973-3778

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August 7, 1998 973-3778

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Attn: Mr. Richard Doria, P.E.
Manager, Environmental Engineering

RE: ENVIRONMENTAL DUE DILIGENCE INVESTIGATION
FLIGHT LINE FACILITIES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, DUVAL COUNTY, FLORIDA

Dear Rick:

Golder Associates Inc. is pleased to present the attached Environmental Due Diligence Report documenting environmental concerns associated with the Flight Line Facilities at Naval Air Station Cecil Field. The environmental due diligence investigation was conducted by Golder Associates as part of a broader due diligence evaluation being performed by NGC in conjunction with evaluation of leasing options of certain facilities at NAS Cecil Field by NGC.

Please feel free to contact us with questions or comments concerning this correspondence or the attached report. Golder Associates appreciates the opportunity to provide professional services to Northrop Grumman Corporation.

Very truly yours,

GOLDER ASSOCIATES INC.

Mark J. Jordana, P.G.
Senior Project Manager/Associate

Attachment

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1.0 SUMMARY

Northrop Grumman Corporation (NGC) retained Golder Associates Inc. to perform a focused environmental due diligence investigation at selected areas of Naval Air Station (NAS) Cecil Field located in Jacksonville, Duval County, Florida. NGC is currently evaluating the feasibility of establishing operations at NAS Cecil Field, which is transitioning to civilian use under the Base Realignment and Closure (BRAC) Program administered by the U.S. Navy. Reportedly, the U.S. Navy will turn over administration of the facility to the City of Jacksonville upon closure of U.S. Navy activities at the base.

NAS Cecil Field includes two main areas: the main base area (comprising 9,516 acres) and the Yellow Water Weapons Area (comprising 8,091 acres). The sites that are presently being considered by NGC are located within the main base area. This report addresses investigative activities performed by Golder Associates at Buildings No. 815 and No. 1845, and the respective parking areas for these buildings, collectively referred to as the "Flight Line Facilities." Specifically, existing environmental documentation and records for the Flight Line Facilities were reviewed, and Golder Associates conducted an inspection of this area of the base. Based on the review of existing documents and the site inspection, Golder Associates developed and implemented a scope of work designed to characterize baseline soil, sediment, surface-water, and groundwater conditions in the vicinity of the Flight Line Facilities.

A Statement of Work for the baseline characterization investigation was prepared by Golder Associates and submitted to NGC in a June 4, 1998 correspondence. Information that was used to develop the Statement of Work included a preliminary review of the base-wide Environmental Baseline Survey (EBS) report prepared by ABB Environmental Services, Inc. (ABB) during November 1994, selected BRAC and Navy Installation Restoration (IR) Program environmental reports, and site inspections conducted by Golder Associates' personnel during November 1997 and May 1998.

The baseline characterization investigation conducted for the Flight Line Facilities included installation and sampling of 47 shallow soil borings from selected locations across the Flight Line Facilities. Soil samples collected from the 47 shallow borings were screened in the field for the

presence of volatile organic compounds (VOCs) and/or submitted to Savannah Laboratories & Environmental Services, Inc. (Savannah Labs) for chemical analysis. Additionally, two surface-water and two sediment samples were collected from a stormwater retention pond located west of Building No. 1845. The soil, surface-water and sediment samples were analyzed by Savannah Labs for a broad list of parameters which included VOCs, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals.

A total of 10 existing monitoring wells installed by a U.S. Navy contractor were located in the Flight Line Facilities area. Additionally, 39 new monitoring wells were installed by Golder Associates in three vertical intervals of the surficial aquifer at 27 locations in the Flight Line Facilities area. Groundwater samples were collected from a total of 49 monitoring wells screened in the shallow, intermediate, and deeper intervals of the surficial aquifer for laboratory analyses. The groundwater samples were submitted to Savannah Labs for analysis for VOCs, SVOCs, and metals. The monitoring wells were surveyed and groundwater elevation measurements were recorded in each well to characterize groundwater flow conditions at the Flight Line Facilities.

A geologic cross-section for the Flight Line Facilities was developed prior to the field investigation using soil boring logs from selected BRAC and IR investigative reports from adjacent and nearby facilities. In general, the site is underlain by approximately 90 to 100 feet of sand with varying amounts of silt and clay, which comprise the surficial aquifer above the Hawthorn Group. A relatively thin, discontinuous low permeability unit was reported in the area west of Building No. 1845 at a depth of approximately 35 to 40 feet. Below the surficial sand unit, interfingering clay and limestone were reported at a depth of approximately 90 to 100 feet below ground surface (bgs). A sand and limestone unit, which is apparently equivalent to the rock aquifer present throughout Duval County, was reported at a depth of approximately 100 to 130 feet bgs. Reportedly, at an approximate depth of 130 feet bgs, the surficial aquifer is underlain by marl with phosphatic material representing the top of the Hawthorn Group, which is a low permeability confining unit at the base of the surficial aquifer. Boring logs from the current investigation confirm the lithologic conditions determined from the existing data to a depth of approximately 50 feet, which was the total depth of the deepest wells installed during the current investigation. Groundwater flow in the upper, intermediate, and deeper zones of the surficial

aquifer was determined to be generally toward the south to southeast, based on measurements recorded during the focused due diligence investigation.

Previous investigations performed by the U.S. Navy's Southern Division environmental contractor indicated that documented environmental impacts exist at several areas in the vicinity of the Flight Line Facilities. Specifically, environmental testing conducted at the Jet Engine Test Cell Site, the IR Site No. 16, Areas of Interest (AOI) 28 and 29, and the Building No. 815 wash rack area indicated that impacts to soil and groundwater have occurred in each of these areas.

The Jet Engine Test Cell Site includes Buildings No. 334, No. 339, and No. 811. This area has been identified as Petroleum Contamination Site C and is currently undergoing assessment and remediation activities under the BRAC program. Investigative findings reported in the Remedial Action Plan (RAP) (ABB, 1996) indicate that soil contamination, phase-separated petroleum hydrocarbons (free product), and dissolved petroleum constituents in groundwater have been identified at the Site. According to the RAP, no petroleum constituents have migrated eastward beyond the fence that separates the Jet Engine Test Cell Site from Building No. 1845. Soil and groundwater samples collected during the current investigation from locations east of the fence appear to support the previous findings that the groundwater plume has not migrated east of the fence toward Building No. 1845. However, a groundwater sample collected from an existing monitoring well south of Building No. 334, contained an elevated concentration of naphthalene, which may indicate that the plume from the Jet Engine Test Cell Site has migrated south and may extend beneath the Building No. 1845 parking area. Alternatively, the detection of naphthalene in this well may represent a previously undetected release which is unrelated to the known plume in the Jet Engine Test Cell Site area.

IR Site No. 16 is a former solvent seepage pit located on the north side of Building No. 313 west of Building No. 815. A Remedial Investigation (RI) was completed for IR Site No. 16 during 1995. The report indicates a groundwater contaminant plume associated with release of chlorinated solvents from jet engine maintenance activities into the former seepage pit may extend beneath Building No. 815. Specific contaminants of concern include trichloroethene (TCE). Groundwater samples collected during the current investigation from monitoring wells installed at

the southwest corner of Building No. 815 indicate the TCE plume appears to underlie the southern portion of Building No. 815.

AOI No. 28, the North Temporary Hazardous Waste Collection Point, is located west of Building No. 815. Hazardous wastes related to aircraft maintenance activities were reportedly collected and stored here. Two surface soil samples and one groundwater sample were collected, and a Sampling and Analysis Report (SAR) was issued by ABB during June 1996. The SAR reported that surface soil samples exceeded Florida Department of Environmental Protection (FDEP) soil cleanup levels for Archlor-1242 in one sample, and lead, magnesium, selenium, vanadium, and zinc exceeded cleanup levels in the second sample. Concentrations of certain metals in excess of Florida Primary and Secondary Drinking Water Standards maximum contaminant levels (MCLs) were reported in the groundwater sample collected from AOI No. 28. Reportedly, the U.S. Navy intends to undertake a removal action to remove contaminated surface soil from the site. Analyses of a groundwater sample collected during the current investigation from the existing monitoring well confirms that elevated concentrations of certain metals in groundwater persist at concentrations exceeding MCLs.

AOI No. 29, the Building No. 313 Temporary Hazardous Waste Collection Point, is located west of Building No. 815. Potentially contaminated runoff from hazardous waste storage buildings may have impacted surface soils in the area. Two surficial soil samples were collected and evaluated by ABB during 1998; however, a report of the findings has not been issued to date. Preliminary analytical data provided by ABB indicates detections of pesticides, total petroleum hydrocarbons, and metals in soil.

Stormwater drains associated with an aircraft wash rack on the north side of Building No. 815 were identified as potential sources of groundwater contamination during the due diligence investigation. Two monitoring wells were installed and sampled by ABB during 1998; however, a report of the findings has not been issued to date. Preliminary analytical data provided by ABB indicate that naphthalene, aluminum, iron, and manganese were detected at concentrations in excess of MCLs in groundwater in the wash rack area. The monitoring wells were resampled as part of the current investigation, and the analytical results indicate that groundwater contamination by naphthalene persists in the wash rack area.

Soil with concentrations of beryllium above FDEP Soil Cleanup Goals was reported at a location on the south side of Building No. 1845 where mop water was reportedly discharged directly to the ground surface.

During 1998, ABB conducted a preliminary investigation of groundwater conditions underlying the concrete apron between the hangars and the flight line runways. Results of the investigation have not been released in a report; however, initial review of analytical data indicates that low concentrations of certain VOCs were detected in groundwater in several locations along the flight line.

Additional areas with potential environmental impacts not previously identified by the U.S. Navy, but identified during the current baseline characterization investigation performed by Golder Associates, include the following:

- Soil impacts by VOCs south of Building No. 1845;
- Polychlorinated biphenyls (PCBs) in soil adjacent to a transformer west of Building No. 815;
- Butylbenzylphthalate in soil near the fence west of the northwest corner of Building No. 815;
- Naphthalene in soil underlying the concrete slab inside Building No. 815;
- Vinyl chloride in groundwater near the northeast corner of Building No. 815; and
- Surface-water and sediment impacts in the stormwater retention pond southwest of Building No. 1845.

Soil Impacts by VOCs South of Building No. 1845

Elevated headspace concentrations of VOCs were reported in one soil sample (SB-15) located adjacent to a former hazardous waste storage area south of Building No. 1845. The elevated concentrations of VOCs were confirmed by laboratory testing. This location is adjacent to the aircraft wash rack area with previously documented soil and groundwater impacts by naphthalene and metals. However, the VOCs reported at the SB-15 location included chlorinated solvent compounds, which were not previously reported in the wash rack area. Consequently, the

presence of chlorinated solvent compounds may indicate that a previously unidentified release of hazardous substances occurred in this area.

PCBs in Soil Adjacent to a Transformer West of Building No. 815

Concentrations of Archlor-1260, a PCB compound, was reported in surficial soil adjacent to a transformer located west of Building No. 815. The concentration of Archlor-1260 was reported above the Florida Residential Soil Cleanup Goal for this compound.

Butylbenzylphthalate in Soil Near the Fence West of the Northwest Corner of Building No. 815

Butylbenzylphthalate was reported in one soil sample located adjacent to the fence near the Building No. 815 parking area at a concentration exceeding the Florida Residential Soil Cleanup Goal for this compound.

Soil Impacts Beneath Building No. 815

Soil underlying the south end of Building No. 815 had reported elevated naphthalene concentrations. Specifically, naphthalene was reported in soil in a soil boring which was located adjacent to a crack in the concrete slab for the building, indicating releases from the building to soil may have occurred at locations where the integrity of the slab has been compromised.

Vinyl Chloride in Groundwater Near the Northeast Corner of Building No. 815

Vinyl chloride was reported in a groundwater sample from one well located near the northeast corner of Building No. 815 at a concentration exceeding the MCL of 1 microgram per liter (μg/l).

Surface-Water and Sediment Impacts in the Stormwater Retention Pond

Elevated concentrations of TCE, bis (2-ethylhexyl) phthalate, and certain metals were reported in sediment and/or surface-water samples collected from the stormwater retention pond located southwest of Building No. 1845. Certain process wastewater has reportedly been discharged to this pond historically, and environmental impacts may have occurred in the pond.

Results of the hydrogeological characterization of the Flight Line Facilities area indicate groundwater flow is sluggish in the upper surficial aquifer, moving on the order of a few feet

per year. A relatively strong downward gradient was observed from the upper surficial aquifer to lower intervals of the surficial aquifer. Consequently, contaminant transport may have a distinct downward flow component. This determination is supported by the fact that TCE was not reported in several shallow wells located within the IR Site No. 16 TCE plume while TCE was reported in deeper wells in this area. At the North Fuel Farm area, located approximately 1,500 feet north of the Flight Line Facilities area, petroleum hydrocarbon contamination has reportedly migrated downward to the base of the surficial aquifer at a depth in excess of 100 feet bgs. Given this documented downward flow, and the sluggish lateral flow in the upper surficial aquifer, groundwater impacts within the Flight Line Facilities area may not extend over broad areas laterally, but may extend to significant depths within the surficial aquifer. Consequently, the vertical extent of groundwater impacts remains undefined in several of the areas where elevated concentrations of regulated substances were identified in groundwater.

2.0 INTRODUCTION

2.1 Overview

NGC retained Golder Associates to perform a focused environmental due diligence investigation in the Flight Line Facilities area of NAS Cecil Field located in Jacksonville, Duval County, Florida. The investigation was performed as a component of a broader due diligence assessment being performed by NGC associated with evaluation of the feasibility of leasing certain areas of the base, which is slated for closure. The purpose of the environmental due diligence evaluation was to review and summarize pre-existing information regarding the environmental status of the areas of the properties that are under consideration by NGC and use the information obtained during the records review to develop an environmental testing program to characterize baseline conditions in the vicinity of the Flight Line Facilities area. The investigation was conducted during the period from May through July 1998. A final Statement of Work which defined the scope of the baseline characterization investigation was submitted by Golder Associates to NGC on June 4, 1998. The field investigation was conducted during June 1998, and data evaluation and reporting was conducted during July 1998.

2.2 Purpose and Scope

The purpose of the focused environmental due diligence investigation was to characterize baseline environmental conditions in the general vicinity of the Flight Line Facilities. The evaluation of the Flight Line Facilities was conducted in two phases. The first phase included a preliminary review of available information and a walkover inspection of the site. The second phase consisted of a field program which included soil, groundwater, surface-water, and sediment sample collection and analysis. The results of the first phase of work are reported in Section 3.0 of this report and were used to develop the Scope of Work conducted for the second phase of the investigation. A description of the second phase of the investigation is provided in Section 4.0, and the investigative findings of the second phase of the investigation are described in Section 5.0 of this report. Section 6.0 of this report presents the conclusions regarding the baseline environmental conditions in the Flight Line Facilities area developed during the investigation.

During the first phase of the evaluation, existing information was reviewed to evaluate the current level of understanding of environmental conditions in the vicinity of the Flight Line Facilities and to develop a Statement of Work for the field investigation in this area. Information that was used to develop the Statement of Work included interviews with base personnel knowledgeable about the site, a preliminary review of the base-wide Environmental Baseline Survey (EBS) Report prepared by ABB during November 1994, a review of Sampling and Analysis Outlines (SAOs) and SARs prepared by ABB during 1995 through 1998, and site inspections conducted by Golder Associates' personnel at Buildings No. 1845 and No. 815 during November 1997 and May 1998. Records of interviews conducted during development of the Statement of Work are included in Appendix A.

Following issuance of the Statement of Work by Golder Associates, the U.S. Navy issued the Feasibility Study of Suitability for Lease (FOSL) for several hangars at the base (U.S. Navy, 1998). This report, which included the buildings associated with the Flight Line Facilities, was reviewed in association with issuance of this due diligence report. The existing environmental data and reports available for the Flight Line Facilities from the U.S. Navy are summarized in Section 3.2 of this report.

2.3 Special Terms and Conditions and Standard of Care

The environmental due diligence evaluation was performed in general accordance with the final Statement of Work developed for the Flight Line Facilities presented in our June 4, 1998 correspondence to NGC. Certain changes from the original scope of work were authorized by NGC based on information obtained from preliminary field data to better characterize baseline environmental conditions in the Flight Line Facilities area.

Golder Associates' professional services were performed, findings obtained, and report prepared in accordance with standard professional principles and practices in the fields of environmental science and site assessment. This representation is in lieu of all other representations, either expressed or implied. Our services were performed in accordance with the terms and conditions of the Master Service Agreement between NGC and Golder Associates.

2.4 Limitations and Exceptions of Assessment

Findings presented in this correspondence are based on select, publicly available information, information provided by representatives of the U.S. Navy and/or the City of Jacksonville and site conditions observed at the time of the site inspections and field investigations conducted during the period from May to July 1998. During the focused due diligence investigation, Golder Associates relied on publicly available information provided by representatives of the U.S. Navy. Golder Associates cannot accept responsibility for any deficiencies, mis-statements, or inaccuracies contained in this report which have resulted from omission, misrepresentations, or fraudulent information contained within the materials provided by representatives of the U.S. Navy or materials which are publicly available documents. This report has been prepared for the sole use by NGC. Golder Associates is not responsible for independent conclusions, opinions, or recommendations made by others or otherwise based on the findings presented in this report.

2.5 Limiting Conditions and Methodology Used

During performance of the information review, Golder Associates was provided copies of applicable BRAC and IR environmental reports. Certain information may exist for the Flight Line Facilities which is not publicly accessible and was not provided by the U.S. Navy and, therefore, has not been reviewed by Golder Associates during performance of the current investigation.

During development and implementation of the scope for the field investigation, the goal of the investigation was to characterize baseline environmental conditions at selected areas near the Flight Line Facilities. A limited soil and groundwater investigation was conducted. Soil sample collection was restricted to near the ground surface (generally from 0 to 6 feet bgs); consequently, the investigation was not designed to characterize soil chemistry through an extensive vertical section of the soil column. In addition, given the large area encompassed by the Flight Line Facilities, soil samples were collected at relatively broad spacing throughout the study area.

Groundwater samples were collected from permanent monitoring wells installed in three vertical intervals of the surficial aquifer; specifically, the water table interval (i.e., screened approximately 5-15 feet bgs), an intermediate section of the surficial aquifer (i.e., screened approximately 33-38 feet bgs), and a deeper section of the surficial aquifer (i.e., screened approximately 45-50 feet bgs). No groundwater samples were collected from depths below 50 feet during the current investigation. Groundwater sample locations were selected to provide representative groundwater quality data in areas of concern identified in the vicinity of the Flight Line Facilities. Monitoring well placement was generally limited to areas with records of past handling or storage of hazardous substances or wastes which could serve as source areas for environmental contamination if a release of these substances occurred. The groundwater monitoring network was not designed to delineate the lateral and vertical extent of groundwater impacts at the property, if groundwater concerns were identified at the site.

There is no assurance that the soil and groundwater monitoring program conducted for the baseline environmental characterization has identified the location of all source areas for soil or groundwater impacts which may exist at the Flight Line Facilities. Additionally, the site inspections did not include evaluation of the potential for asbestos-containing materials to be present in structures located on the inspected properties. No evaluations of the potential for radon, integrity of concrete floor and floor drain systems, lead-based paint, or lead in drinking water were performed. No wetland surveys were conducted, and no ecological resources evaluations were performed.

3.0 BACKGROUND INFORMATION

3.1 NAS Cecil Field Main Base Area - Overview

3.1.1 General Site Conditions

The Flight Line Facilities area includes Buildings No. 1845, No. 815, and associated parking areas located on the main base of NAS Cecil Field. The main base is located in the western portion of Duval County, Florida as shown on Figure 1. The center of the Flight Line Facilities area is located at approximately 30°14'0" north latitude and 81°52'54" west longitude. Site plans showing features observed during the investigation for Building No. 1845, Building No. 815, and the parking areas are shown on Figures 2 through 4, respectively.

The NAS Cecil Field main base area consists of a number of buildings, roadways, flight lines, paved areas, and green space. The area has little topographic relief, with a typical elevation of approximately 75 feet above mean sea level (MSL). A spill diversion pond located on the east side of the north/south runway retains stormwater runoff from the northeastern side of the base, including the north/south runway and high-speed hot fueling stations.

3.1.2 Regional Geologic and Hydrogeologic Setting

The main base is located within the western portion of Duval County. The regional geologic units in this area, in descending sequence, consist of undifferentiated sediments deposited since the mid-Miocene, the Miocene age Hawthorn Group, and Eocene limestone units. These sedimentary units dip eastward at approximately 4 to 8 feet per mile.

The undifferentiated sediments above the Hawthorn Group are Holocene, Pleistocene, Pliocene, and upper Miocene in age. The Holocene and Pleistocene sediments consist of fine to medium-grained unconsolidated quartz sands with varying amounts of silt and clay. These units were deposited on marine terraces and beach ridges. The Pliocene and upper Miocene sediments consist of sand, shell, calcareous clay, and soft friable limestone and were deposited in a shallow marine environment. The undifferentiated post-Hawthorn sediments vary in thickness from less than 10 feet along the coast to over 100 feet in western Duval County.

Unconformably underlying the surficial sediments is the Hawthorn Group of early to middle Miocene age. These sediments consist of sandy clay and clayey sand with layers of phosphatic sands, limestone, and dolomite. The phosphatic sands are a distinguishing characteristic that is not seen in the overlying post-Hawthorn sediments. The Hawthorn Group is subdivided into four formations: the Statenville Formation, the Coosawhatchee Formation, the Marks Head Formation, and the Penney Farms Formation. Eocene limestone units unconformably underlie the Hawthorn Group.

The regional hydrogeologic system in northeast Florida is generally described in terms of a three-unit system. The three units are: the surficial aquifer system, the upper confining unit, and the Floridan aquifer system.

The surficial aquifer is comprised of two hydrogeologic zones: the upper surficial aquifer and the rock aquifer. These hydrogeologic zones correspond to the geologic post-Hawthorn sediments. The upper surficial aquifer consists of fine- to medium-grained sands and is principally recharged directly from precipitation. Discharge from the upper surficial aquifer is from evapotranspiration, downward leakage, pumping, and seepage into surface-water bodies. The rock aquifer is the principal water-bearing zone of the surficial aquifer system in Duval County and consists of a permeable limestone that grades into a medium to coarse sand and shell deposit. The rock aquifer is located at the base of the post-Hawthorn sediments. The rock aquifer may be locally discontinuous or absent in western Duval County.

The potentiometric surface for the surficial aquifer system is generally less than 5 to 10 feet bgs. Regional groundwater flow in the surficial aquifer is towards major discharge areas such as the St. Johns River and the Atlantic Ocean. However, local groundwater flow patterns are greatly influenced by local topography and nearby local surface-water features.

The Hawthorn Group acts as the upper confining unit to the Floridan aquifer system. The clayey sand and sandy clay act as an aquitard which inhibits the flow of groundwater from the surficial aquifer system to the Floridan aquifer system.

The Floridan aquifer system is the major source of potable water in northeast Florida. The geologic units that comprise the Floridan aquifer are the Ocala Group, the Avon Park Limestone, the Lake City Limestone, and the Oldsmar Limestone. These four units consist mainly of massive limestone and dolomite with secondary dissolution porosity. The Floridan aquifer system is approximately 300 to 330 feet below MSL (approximately 400 feet bgs) and is estimated to be between 1,000 to 1,800 feet thick in western Duval County. Recharge of the Floridan aquifer occurs in several counties located west of Duval County. The upper confining unit in these areas is usually thin or absent and allows downward recharge from the surficial aquifer.

3.2 Flight Line Facilities

3.2.1 General Description of the Area

The Flight Line Facilities consist of Buildings No. 1845 and No. 815 and adjacent paved parking areas located west of each building. The flight line runs north to south immediately east of Buildings No. 1845 and No. 815. A concrete apron extends from the Flight Line to the buildings. There are also support structures around the perimeter of the buildings with additional parking areas to the west. Individual structures and associated areas of the Flight Line Facilities are discussed below.

Building No. 1845

Building No. 1845 is located west of the flight line in a secured area north of Building No. 815 and east of Building No. 339 (Jet Engine Test Cell 4) at the location shown on Figure 2. Flammable materials storage lockers, hazardous waste satellite accumulation areas, and hazardous materials storage areas are located on the concrete pavement surrounding the building. Building No. 1845 was constructed in 1985 to be used for aircraft maintenance and administrative offices. Reportedly, the building is used by visiting squadrons, but was inactive during the Golder Associates site inspections conducted in November 1997 and May 1998.

The structure is a two-story concrete block building with a concrete slab floor and corrugated steel roof. Steel doors form the eastern wall of the building, which allows aircraft to access the

building from the north-south flight line. The building includes two floors of administrative offices located along the western side of the building and an aircraft service area on the eastern side of the building. A series of trench drains are located in the building, which reportedly drain to two oil/water separators, located immediately west of the building. Effluent from the oil/water separator may be discharged to the base-wide wastewater sewer system; however, this was not confirmed during review of information made available for the site. Reportedly, the oil/water separator effluent can be manually shifted to discharge to the stormwater retention pond located near the southwest corner of the building. According to the FOSL, the switching mechanism to shift the flow of effluent from the oil/water separators between the wastewater sewer system and the stormwater retention pond is not currently operable. The FOSL did not indicate in which position the switch is currently set.

The retention pond located on the west side of Building No. 1845 collects surface-water runoff from the surrounding area and discharges water to a culvert located on the south side of the pond.

Building No. 815

Building No. 815 is located west of the flight line in a secured area south of Building No. 1845 and north of Building No. 825 (Aircraft Hangar) at the location shown on Figure 3. Building No. 815 is surrounded by pavement except for a grassy area on the west side of the building. Flammable materials storage lockers, hazardous waste satellite accumulation areas, and hazardous materials storage areas are located on the concrete pavement surrounding the building. Building No. 815 was constructed in 1970 to be used for aircraft maintenance and administrative offices. The building is currently occupied and was active during the Golder Associates site inspection conducted during May 1998.

The structure is a two-story concrete block building with a concrete slab floor and corrugated steel roof. Steel doors form the eastern wall of the building, which allows aircraft to access the building from the north-south flight line. The building includes two floors of administrative offices located along the western side of the building, and an aircraft service area on the eastern side of the building. A series of trench drains are located around the outside perimeter of the building, which reportedly discharge to the storm sewer system.

An aircraft wash rack area and catch basins are located on the north side of Building No. 815. No information regarding the wash rack area was provided in the EBS. Preliminary data provided by ABB from groundwater samples collected near the catch basins indicate that naphthalene, aluminum, iron, and manganese were detected at concentrations exceeding MCLs. During the due diligence investigation, drums containing aircraft cleaning solution were observed stored on wooden pallets near the wash rack. Stained pavement, presumably from cleaning solution spillage was observed on the pavement adjacent to the drums. Photographs recording aircraft cleaner storage practices are included in Appendix A-1.

Parking Areas

The parking areas associated with Buildings No. 815 and No. 1845 are located west of Buildings No. 815 and No. 1845, respectively, at the locations shown on Figure 4. The parking area is located south of Building No. 334 (Jet Engine Test Cell 3) and north of Building No. 313 (Jet Engine Maintenance Building). The Building No. 815 parking area was constructed in 1970. The Building No. 1845 parking area was constructed in 1985.

3.2.2 Summary of the Environmental Baseline Survey Report

The EBS Report was prepared by ABB during November 1994 in preparation for base closure under the BRAC process. The EBS provides a determination of the potential for environmental impacts at each building or structure and identifies areas where additional assessment activities may be warranted. For areas where additional assessment was recommended, SAOs were prepared and implemented, and SARs were produced. Data collected during the EBS process (including results of the SARs) were used by the Navy to determine if the property is suitable for release and transfer. Findings of the suitability determination are presented in the FOSL (U.S. Navy, 1998).

The FOSL was prepared by Southern Division, Naval Facilities Engineering Command (South Div) for Buildings No. 1845 and No. 815 using information presented in the EBS, SAOs, and SARs. A summary of information used to develop the FOSL for Buildings No. 1845 and No. 815 is presented below.

Building No. 1845

Building No. 1845 was reportedly constructed during 1985 and is used for aircraft maintenance. Hazardous materials are used in the building, and activities conducted in the building result in generation of hazardous wastes. A spill of 25 to 30 gallons of JP-5 jet fuel into a storm drain was reported in 1990. No additional information regarding this spill was provided in the EBS report.

There are two pad-mounted transformers; one each located north and south of the building. According to the EBS, one transformer contains non-dielectric fluid, but the EBS did not specify which transformer. No other information about the transformers was provided.

Reportedly, sanitary waste and other wastewater are discharged to the base wastewater sewer system. The EBS report did not indicate whether or not there are septic systems associated with the building. A spill containment system (i.e., trench drain system) is located inside the building and is designed to collect releases inside the building. Stormwater flows into various storm drains around the building and eventually drains into Yellow Water Creek. Two oil/water separators are located on the west side of building, which reportedly were pumped out routinely when the building was operational. Oil stains were observed on the floor during the EBS site inspection. The EBS report did not indicate whether or not there are underground storage tanks (USTs) associated with the building.

The EBS report indicated that a hazardous waste satellite accumulation area was located on the south and west sides of the building. Wastes were reportedly stored in these areas until they were transported to Building No. 600 (Hazardous Waste Storage Facility). The EBS report indicated there is no record of any release associated with the storage or removal of wastes from this location.

An airplane wash rack is located immediately south of Building No. 1845. Aircraft cleaning solvents are stored on the pavement in the wash rack area.

Building No. 815

Building No. 815 was reportedly constructed during 1970 and is used for administrative offices and aircraft maintenance. Hazardous materials are used in the building, and activities conducted in the building result in generation of hazardous wastes. Two spills of 25 to 30 gallons of JP-5 jet fuel onto the pavement were reported at the building. No additional information regarding these spills was provided in the EBS report.

There is one transformer located on the west side of the building. No information regarding the transformer is provided in the EBS report.

Reportedly, sanitary waste and other wastewater are discharged to the base wastewater sewer system. The EBS report did not indicate whether or not there are septic systems associated with the building. Stormwater flows into various storm drains around the building and eventually discharges into Yellow Water Creek. A spill containment system (i.e., trench drain system) is located inside the building and is designed for collection of releases inside the building. Oil stains were observed on the floor of the maintenance section during the EBS site inspection. The EBS report did not indicate whether or not there are USTs associated with the building.

The EBS report indicated that hazardous waste satellite accumulation areas are located on the east side of the building adjacent to four line shacks and in a small building located west of Building No. 815. Wastes are reportedly stored in these areas until they are transported to Building No. 600 (Hazardous Waste Storage Facility). The EBS report indicated that there is no record of any release associated with the storage or removal of wastes from this location.

Parking Areas

The parking areas associated with Buildings No. 1845 and No. 815 are not considered buildings or facilities; and, therefore, were not included as part of the EBS investigation.

BRAC Program Areas of Interest

Three AOI sites have been identified in the vicinity of Building No. 313/Site No. 16. AOI No. 28, located approximately 400 feet southwest of Building No. 1845 and 100 feet west of Building No. 815, was a hazardous waste temporary collection point. AOI No. 29, located approximately 750 feet south-southwest of Building No. 1845 and 50 feet west of Building No. 815, was also a hazardous waste temporary collection point. AOI No. 30, located approximately 100 feet southwest of Building No. 815, was the Building No. 313 Floor Wash Disposal Area. Each of these areas is discussed in greater detail in Section 3.2.6.

3.2.3 Personnel Interviews

As part of the environmental due diligence investigation, interviews were conducted with certain base personnel familiar with current and former hazardous material and hazardous waste generation, handling, storage, and disposal practices, and petroleum spills and/or releases associated with buildings in or around the Flight Line Facilities.

Golder Associates conducted an interview with Mr. David J. Kruzicki, Environmental Director and Mr. John Dingwall, Environmental Coordinator for NAS Cecil Field. Questions asked of Mr. Kruzicki and Mr. Dingwall and their responses to those questions are presented in Appendix A.

3.2.4 Summary of the Golder Associates Site Inspections

Golder Associates conducted site inspections of the Flight Line Facilities during November 1997 and May 1998. Results of the site inspections are as follows:

Building No. 1845

During the site inspection, oil staining was observed on the hangar floor, as reported in the EBS. The floor appeared to be unpainted poured concrete, and several small cracks were observed near the floor drains. The building has a trench drain system located throughout the building, which reportedly discharges to two oil/water separators located west of the building at

the approximate locations shown on Figure 2. A site drawing was provided from the NAS Cecil Field Stormwater Pollution Prevention Plan (SWPPP) Illicit Discharge Report (Ogden, November, 1996) which indicated the trench drain system and oil/water separators have an electrically operated valve that switches the discharge from the sanitary sewer to the storm sewer system west of the building. The FOSL indicated the valve is not operable, but did not indicate where effluent from the building would currently flow. Given that the building is inactive, no observation of flow from the building was recorded during the site inspection. No detailed inspection of the trench drain system, oil/water separator, or associated piping was conducted during the site inspection. A trench drain inspection was conducted as a separate component of the environmental due diligence investigation by Ivey, Harris & Walls, Inc. (IHW). The Trench Drain Inspection Report was submitted to NGC by IHW during July 1998.

A stormwater retention pond is located southwest of the building. A utility vault located near the northeast corner of the pond appears to be the point at which effluent from the oil/water separators would discharge to the pond when active.

South of the building there is a hazardous waste storage locker, a line shack (LS-2), two 1,500-gallon above ground storage tanks (ASTs) which store aqueous film-forming foam (AFFF), a pad-mounted transformer, and an area where 55-gallon drums of solvent emulsion cleaner are stored associated with an airplane wash rack. There are two storm drains and two sumps located in the vicinity of the wash rack to collect runoff from plane cleaning operations.

A 400-gallon oil/water separator associated with Building No. 334 (Jet Engine Test Cell 3) is located immediately west of the fence on the west side of Building No. 1845. ABB has conducted sampling in the vicinity of this oil/water separator, which is discussed in Section 3.2.6. Documented groundwater contamination exists at Building No. 339 (Jet Engine Test Cell 4) which is located approximately 200 feet west (i.e., upgradient) of Building No. 1845. Monitoring wells are located adjacent to the fence which separates these two buildings. Previous testing in this area performed by ABB is discussed in Section 3.2.6.

A hazardous materials storage shed and a hazardous waste storage area are located near the northwest corner of Building No. 1845. A pad-mounted transformer is located immediately

north of the northwest corner of the building at the location shown on Figure 2. Two 1,500-gallon ASTs which store AFFF are located on the north side of the building. A line shack (LS-1) is located near the northeast corner of the building. A mechanical building is located at the north end of the building.

Several utility structures were observed around the perimeter of the building, including storm drains, telephone manholes, water and fire hydrant systems, sanitary sewer manholes, and overhead electrical lines.

Building No. 815

During the site inspection, oil staining was observed on the hangar floor, as reported in the EBS. The floor appeared to be unpainted poured concrete, and several small cracks were observed near the hangar bay doors. The building has a trench drain system located along the exterior perimeter the building, which reportedly discharges to an oil/water separator. The location of the oil/water separator was confirmed during the site inspection. The NAS Cecil Field SWPPP Illicit Discharge Report (Ogden, November, 1996) indicates the results of a dye test confirmed that effluent from the trench drain system is discharged to the sanitary sewer. No detailed inspection of the trench drain system, oil/water separator, or associated piping was conducted during the site inspection. A trench drain inspection was conducted as a separate component of the environmental due diligence investigation by IHW. The Trench Drain Inspection Report was submitted to NGC by IHW during July 1998.

A utility vault is located near the northeast corner of the building. Aircraft fuel storage tanks are stored along the north and southwest sides of the building. An airplane wash rack is located on the north side of Building No. 815. Storm drains and sumps are located in the vicinity of the wash rack to collect runoff from aircraft cleaning operations. A pad-mounted transformer was observed on the west side of Building No. 815. Several utility structures were observed around the perimeter of the building, including storm drains, telephone manholes, water and fire hydrant systems, sanitary sewer manholes, and overhead electrical lines. Building No. 814, an electrical generating equipment building, is located at the north end of the building.

East of the building adjacent to the runway, there are four line shacks (309LN, 566LN, 303LN, and 837LN), and associated hazardous waste storage areas, flammable storage lockers, and spill response lockers. Staining was noted on the concrete apron southeast of Building No. 309LN. Building No. 871 (Hazardous Materials Storage) is located immediately west of Building No. 815. Two additional hazardous waste storage buildings were observed in the grassy area northwest of Building No. 871, and two hazardous waste storage buildings were observed on the pavement northwest of Building No. 853 (Hazardous/Flammable Materials Warehouse). An area of stressed vegetation measuring approximately 5 feet by 10 feet was observed north of the hazardous waste storage buildings near Building No. 871.

Documented groundwater contamination exists at IR Site No. 16 near Building No. 313, which is located approximately 300 feet west (i.e., upgradient) of Building No. 815. Monitoring wells are located adjacent to the fence which separates Building No. 313 and Building No. 815. Previous testing in this area performed by ABB is discussed in Section 3.2.6.

Parking Areas

The Jet Engine Test Cell Site (Buildings No. 339, No. 334, and No. 811) is located adjacent to the north side of the Building No. 1845 parking area. Documented soil and groundwater contamination exists in this area due to petroleum products leaking from USTs that supplied fuel to the test cell. A 400-gallon oil/water separator associated with the facility is located immediately north of the northeast corner of the Building No. 1845 parking area. Existing monitoring wells CEF-334-19 (FL-ABB-2) and an unidentified monitoring well were observed along the northern boundary of the parking area. Existing monitoring well CEF-811-15S (FL-ABB-1) was observed on the east side of the Building No. 1845 parking area. Based on the reported groundwater flow direction toward the east to southeast, the groundwater plume at the Jet Engine Test Cell, as well as groundwater impacts associated with the oil/water separator, if any, may be located upgradient of the northern portion of the parking area.

3.2.5 Summary of Aerial Photograph Review

Aerial photographs were reviewed for the following years: 1968, 1977, 1988, 1993, and 1995. A summary of observations made during review of the photographs is presented below.

1968

In the 1968 photograph, the Flight Line Facilities area was a cleared patch of land with dimensions of approximately 600 feet by 1200 feet, with very little vegetation and some small trees. To the north of the future hangar locations, several buildings, including Buildings No. 75, No. 104, No. 360, No. 365, and No. 366, can be observed in the photograph along Loop Road. Building No. 362 exists to the northwest of the future Flight Line Facilities area. To the west of Building No. 330, Building No. 185 exists along with a road which formed a rectangular block with 10th Street and 'A' Avenue. To the west of the future Buildings No. 1845 and No. 815 area is an undeveloped area with disturbed vegetation and cleared land. Buildings No. 825 and No. 313 exist to the south.

1977

Building No. 815 was constructed in 1970. In the 1977 photograph, Building No. 815 appears occupied and the associated parking area appears active. To the south of the Flight Line Facilities area, Building No. 825 is visible. A group of buildings to the northwest associated with the Jet Engine Test Cell, including Buildings No. 328, No. 334, No. 339, and No. 811, can be observed in the photograph. In 1977, the future location of Building No. 1845 and the associated parking area was still a cleared area of land with little vegetation. Small trees were observed on the northern end of the future Building No. 1845 location.

1988

In the 1988 photograph, Building No. 1845 is visible, as the building was constructed in 1985, along with the associated parking area on the west side of the hangar. The area to the east of Building No. 1845 still appeared as cleared land with little vegetation.

1993

In the 1993 aerial photograph, the tarmac has been extended to the Building No. 1845 area where cleared land was observed on the 1988 photograph. Buildings No. 818 and No. 885 were complete in the 1993 photograph.

1995

No changes to the Flight Line Facilities area were observed in the 1995 aerial photograph. Buildings No. 1845 and No. 815 and the associated parking areas appear active.

3.2.6 Facilities Within 1,000-Feet with Potential Environmental Concerns

Based on information presented in the EBS report, the following buildings were identified which stored hazardous materials or hazardous wastes or petroleum products within 1,000 feet of Buildings No. 1845 and No. 815 and the associated parking areas.

Building No.	Building Identification (year built)	Recognized Environmental Condition
185	Aviation Ordnance Nitrogen Facility (1983)	Hazardous materials storage
293	High-Speed Refueling Facility (1955)	UST (2)
303LN	Line Shack (1956)	Hazardous waste storage
305LN	Line Shack (1956)	Hazardous waste storage
309LN	Line Shack (1957)	Hazardous waste storage
313	Jet Engine Maintenance Bldg. (1960)	Hazardous waste storage
323	Battery Locker (1991)	AST (2)
324	Engine Maintenance Shack (1989)	Hazardous materials storage
329	Parachute Loft (1957)	Hazardous materials storage
330	Liquid Oxygen Farm (LOX) (1957)	Hazardous materials; AST (5)
334	Jet Engine Test Cell (1959)	Hazardous materials storage
339	Jet Engine Test Cell (1959)	Hazardous materials; UST; AST (2)
361	Water Treatment Plant #2 (1957)	Hazardous materials storage
566LN	Line Shack (1963)	Hazardous materials storage
811	Jet Engine Test Cell (1975)	Hazardous materials storage
814	400 HZ Generating Building (1970)	Hazardous materials; UST
816	Motor Generating Building (1970)	UST
817	Motor Generator Building (1971)	UST
818	Aircraft Acoustical Enclosure (1989)	Hazardous materials storage
824	Avionics Shop (1957)	Hazardous waste storage
825	Hanger (1966)	Hazardous materials and waste
826	Administrative Office (1965)	Hazardous materials storage
837LN	Line Shack	Hazardous waste storage
841	Flammable Storage Locker (1993)	Hazardous materials storage
846	Ground Support Equip. Storage Facility (1974)	Hazardous materials storage
852	Flammable Materials Warehouse (1988)	Hazardous materials storage
853	Haz/Flammable Materials Warehouse(1988)	Hazardous materials storage
871	Haz/Flammable Storehouse (1980)	Hazardous materials and waste
885	Flammable Storage Locker (1987)	Hazardous materials storage
927	BEQ (1969)	PCBs
1845	Maintenance Hangar (1985)	Hazardous materials and waste
1847	Fire Pump House (1985)	Hazardous materials; AST (3)
AOI No. 28	North Temporary Collection Point	Hazardous waste storage
AOI No. 29	Building No. 313 Temporary Collection Point	Hazardous waste storage
AOI No. 30	Building No. 313 Floor Wash Disposal Area	Unauthorized solvents disposal

Buildings within 1,000 feet which represent the most significant potential for releases of regulated substances and/or have the greatest potential to affect soil, surface-water, or groundwater conditions in the vicinity of the Flight Line Facilities are briefly discussed below.

Building No. 818

Building No. 818 is the Aircraft Acoustical Enclosure Building, which is located approximately 100 feet north of Building No. 1845. Three jet engine test cells, Building No. 334 (Test Cell 3), Building No. 339 (Test Cell 4), and Building No. 811 (Test Cell 5), are situated west of Building No. 818. Building No. 818 differs from the other three test cells in that the other test cell facilities evaluate jet engines after they are removed from the aircraft and placed on a rack; in Building No. 818, the entire aircraft is placed in the building and evaluated. Reportedly, Building No. 818 stores hazardous materials inside the facility, including jet fuel and various oils. The EBS report indicated this building had cracks in the foundation, and releases to the floor of the building have the potential to migrate into the underlying soil and groundwater. Based on reported groundwater flow information, Building No. 818 may be upgradient from the Flight Line Facilities area.

Jet Engine Test Cell Site

Buildings No. 334, No. 339, and No. 811 comprise the Jet Engine Test Cell Site. These buildings have been present since at least 1959 and have stored hazardous materials and fuels. This area has been identified as Petroleum Contamination Site C and is currently undergoing assessment and remediation activities as part of the BRAC programs. Documents prepared during the study and assessment of the Jet Engine Test Cell Site include:

Date	Document
March 1994	Contamination Assessment Report (CAR)
November 1994	CAR Addendum
August 1995	Alternate Procedures Request (APR) for vapor enhanced free-product extraction system
November 1996	Remedial Action Plan (RAP)

Building No. 334 (Test Cell 3) is located approximately 200 feet west of Building No. 1845 and approximately 500 feet northwest of Building No. 815. According to the EBS, wastewater, waste oil, and waste fuel from test cell operations inside Building No. 334 are discharged to an

oil/water separator and holding tank located southeast of Building No. 334. Reportedly, the oil/water separator is pumped out every six months and the waste is disposed through the Public Works Department.

Building No. 339 (Test Cell 4) is located west of the taxiway near Jet Road and 9th Street approximately 200 feet west of Building No. 1845 and 500 feet northwest of Building No. 815. A fenced AST and UST storage yard is located between Building No. 339 and Building No. 811, west of Building No. 818. These tanks are associated with Building No. 339. According to the EBS, environmental concerns at this facility include potential discharges of petroleum products from two leaking USTs and one AST. According to the NAS Cecil Field Tank Inventory List and the EBS, two USTs (339TC1 and 339TC2) are 20,000-gallon jet fuel storage tanks. The AST (339TC3) is a 5,000-gallon aviation fuel tank. The EBS reported that the USTs are scheduled for closure during 1998. ABB reports for the Jet Engine Test Cell Site indicate the AST was removed during June 1996.

The EBS report indicates that wastewater, waste oil, and waste fuel from test cell operations inside Building No. 339 are discharged to the oil/water separator and holding tank located southeast of Building No. 334. The EBS report also indicated that directly outside the building wastewater, waste oil and waste fuel from equipment and parts washing operations may potentially be draining into the sanitary sewer system.

Building No. 811 (Test Cell 5) is located west of the taxiway near Jet Road and 9th Street, approximately 200 feet west of Building No. 1845, and 500 feet northwest of Building No. 815. The EBS report indicates wastewater, waste oil, and waste fuel from test cell operations inside Building No. 811 are discharged to the oil/water separator and holding tank located southeast of Building No. 334. Additional reported environmental concerns at this facility include potential discharges of petroleum products from the fuel tank yard located between Buildings No. 339 and No. 811. Based on reported groundwater flow information, the Jet Engine Test Cell Site may be upgradient from the Flight Line Facilities area.

Environmental assessments and sampling activities conducted by ABB during 1990 through 1996 indicate that groundwater is contaminated in the Jet Engine Test Cell Site. The RAP

issued by ABB was based on data collected from June 1994 to September 1996. Soil borings and monitoring wells were installed across the site during several phases of assessment activities. Three monitoring wells were installed immediately adjacent to the fence located west of Building No. 1845. Investigative findings reported in the RAP indicate that soil contamination, free product, and dissolved petroleum constituents in groundwater have been identified at the Jet Engine Test Cell Site. Contaminants detected in groundwater samples include benzene, toluene, ethylbenzene, xylenes, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. Reportedly, the vertical extent of groundwater contamination does not exceed 40 feet bgs. Groundwater flow is reportedly eastward; consequently, the groundwater plume is upgradient from the Flight Line Facilities. According to the RAP, no petroleum constituents have migrated eastward beyond the fence that separates the Jet Engine Test Cells from Building No. 1845. Implementation of the RAP, including free-product removal and contaminated soil removal was initiated during 1997 and is currently ongoing. According to the RAP, direct excavation and treatment of contaminated soil and free-product to a depth of 8 feet bgs will effectively remove nearly 90 percent of the source of groundwater contamination in the vicinity of the site and reduce the potential for free-product to migrate offsite.

Building No. 313 and IR Site No. 16

Building No. 313 is the Jet Engine Maintenance Building located approximately 800 feet southwest of Building No. 1845 and 300 feet west of the southern portion of Building No. 815. This facility has a FDEP Hazardous Waste Storage Permit (No. H016-211406). The permit for Building No. 313 was issued to close a hazardous waste storage tank north of the building. The tank was part of the Avionics Intermediate Maintenance Department (AIMD) Seepage Pit, which has been designated IR Site No. 16 under the ongoing CERCLA cleanup program at NAS Cecil Field. This seepage pit was used for the disposal of wastewater and spent solvents from the aircraft engine maintenance shop and the Non-Destructive Inspection (NDI) laboratory.

An RI was completed for IR Site No. 16 by ABB during July 1995. According to the RI, during the period from 1959 to 1980 grease, solvents, paint wastes, and blasting grit generated during machine and parts cleaning processes were pumped into the Building No. 313 holding tank, which acted as a surge tank for the seepage pit. Use of the seepage pit was discontinued

in 1980. According to the RI, the holding tank and seepage pit were excavated during March 1994. Soil contaminated with TCE was excavated and disposed of at a hazardous waste landfill. The RI indicates that the discharge to the former seepage pit was below the water table such that contaminants were released directly to groundwater, creating a mound that spread the contaminants radially in the soil and groundwater. The groundwater plume of TCE has been documented moving southeast from IR Site No. 16 toward the south end of Building No. 815.

Area of Interest 28

AOI No. 28, the North Temporary Collection Point, is located west of Building No. 815 at the location shown on Figure 3. It is an open, grassy area with dimensions of approximately 15 feet by 30 feet (450 square feet) adjacent to two unnumbered hazardous waste storage buildings. Hazardous wastes, believed to have been related to aircraft maintenance activities from Building No. 815, were reportedly collected and stored in this area. An undocumented spill was reported to ABB and the BRAC Cleanup Team in 1994. One monitoring well was installed and sampled, and two surface soil samples were collected in the AOI No. 28 area, as recommended in the SAO. A SAR for this site was issued by ABB in June 1996. The SAR reported concentrations of Archlor-1242 in the soil in excess of established FDEP Residential Soil Cleanup Target Levels in one soil sample. Concentrations of selected metals in excess of FDEP Soil Cleanup Target Levels were also reported in one soil sample. Concentrations of lead, manganese, selenium and vanadium in excess of Florida MCLs were reported in the groundwater sample collected from one monitoring well in AOI No. 28. According to the FOSL, the Navy intends to undertake a removal action to ensure that contaminated surface soil is removed from the site.

Area of Interest 29

AOI No. 29, the Building No. 313 Temporary Collection Point, is located west of Building No. 815 at the location shown on Figure 3. It is a grassy area with dimensions of approximately 10 feet by 20 feet (200 square feet) that potentially has been affected by contaminated runoff from the adjacent hazardous material storage buildings. Two surficial soil samples were collected in the AOI No. 29 area as recommended in the SAO. A SAR has not been issued for this site. Preliminary analytical data reported by ABB indicate detections of pesticides, total petroleum

hydrocarbons, and metals; however, Golder Associates has not reviewed the data in a publicly accessible report to compare the data to applicable regulatory standards.

Area of Interest 30

AOI No. 30, the Building No. 313 Floor Wash Disposal Area, is located east of Building No. 313 and southwest of Building No. 815 at the location shown on Figure 3. It is in a grassy area along the security fence with dimensions of approximately 10 feet by 15 feet (150 square feet). Reportedly, solvent-contaminated wastewater from Building No. 313 was dumped in the area. In response to the reports of unauthorized disposal, the upper 4 to 6 inches of soil along the western side of the fence was removed. No soil samples were collected during or following the soil removal. AOI No. 30 is located within the IR Site No. 16 groundwater contamination plume, and three monitoring wells and one soil boring associated with the IR Site No. 16 groundwater investigation are located within 30 feet of AOI No. 30. The SAO recommended no soil or groundwater sampling as the analytical files from the IR Site No. 16 investigation are available to reference data pertinent to AOI No. 30.

Building No. 871

Building No. 871 is a hazardous materials storage building located east of Building No. 815 parking area. Reportedly, hazardous and flammable materials including solvents, coolants, paints, and oils have been stored here since its construction in 1980. One monitoring well was installed by ABB at the southeast corner of the building, as recommended in the SAO. A SAR for this site has not been issued. Preliminary data provided by ABB indicate positive detections of metals in the groundwater sample collected from the monitoring well; however, Golder Associates has not reviewed the data in a publicly accessible report to compare the data to applicable regulatory standards.

Flight Line

ABB provided analytical data for six groundwater samples collected using direct-push technology (DPT) methods from two vertical intervals of the surficial aquifer at locations along the east side of Building No. 815. No permanent or temporary monitoring wells were installed. Preliminary analytical data provided by ABB indicate detections of VOCs and

SVOCs in the groundwater samples. A report of the analytical findings has not been issued; therefore, Golder Associates has not reviewed the data in a publicly accessible report to compare the data to applicable regulatory standards.

3.3 Areas With Reported Environmental Impacts in the Flight Line Facilities Area From the Records Review

During a review of the available IR and BRAC documents and reports, areas with reported environmental impacts in the vicinity of the Flight Line Facilities area included the Jet Engine Test Cell Site; IR Site No. 16; the Building No. 815 Wash Rack; and AOIs No. 28, No. 29, and No. 30.

4.0 FIELD INVESTIGATIVE PROCEDURES

4.1 Overview

Following completion of the record review and site inspection, a field investigation program was developed and implemented in the Flight Line Facilities area. In general, the field investigation included a focused environmental sampling program conducted in the areas of concern identified within the immediate vicinity of the Flight Line Facilities. The field investigation included installation of permanent monitoring wells using conventional drilling procedures, collection of soil and sediment samples, and collection of groundwater and surface-water samples. All field sampling procedures were performed in general accordance with the Golder Associates FDEP-approved comprehensive quality assurance plan (CompQAP No. 910019G). A summary of the field investigation is described below.

- Soil samples were collected at 27 shallow monitoring well locations and 20 additional locations to characterize soil conditions and evaluate the potential for releases of hazardous substances from probable source areas identified at the sample location. Soil samples were collected in 2-foot vertical intervals from 0 to 6 feet bgs and screened with an organic vapor analyzer (OVA) to measure headspace concentrations of VOCs in the samples. One soil sample was collected from each soil boring and submitted to the laboratory to be analyzed for parameters of concern identified for each sampling location. In general, soil samples were analyzed for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, and Appendix IX metals plus aluminum by EPA Methods 6010/7470. Additional analyses were performed at selected locations where site-specific parameters of concern were identified. Specifically, samples were collected and analyzed for PCBs in the vicinity of electrical transformers.

- Given that soil samples were collected using EnCore™ samplers and extracted in the laboratory using recently adopted EPA Method 5035, in accordance with the June 1997 Update III of SW-846, approximately 10 percent of soil sample locations were resampled and split samples were submitted to two laboratories for VOC analyses by EPA Method 8260 to validate soil analytical data obtained during the current investigation.

- Prior to monitoring well installation, Golder Associates identified planned drilling locations for utility clearances from base personnel. A decontamination and investigative derived waste (IDW) staging area was located in a secure area near the northwest corner of Building No. 1845.

- At each monitoring well location, one shallow monitoring well was installed to approximately 15 feet bgs. In the Flight Line Facilities area, a total of 27 shallow monitoring wells were installed. Additionally, six intermediate monitoring wells were

installed to approximately 38 feet bgs, and six deeper monitoring wells were installed to approximately 50 feet bgs. All monitoring wells consisted of 2.0-inch diameter PVC screen and riser. The shallow wells were constructed using a 10-foot screened interval which intersected the water table. The intermediate and deeper wells were constructed using a 5-foot screened interval. All monitoring wells were developed by pumping to reduce suspended sediments in the discharge water, and all wells were purged prior to sampling. Wells were developed by pumping a minimum of 50 gallons, or until in-situ water quality standards had stabilized and discharge water appeared free of sediments. All wells were allowed to equilibrate for a minimum of 48 hours after development prior to sampling.

- Groundwater samples were collected from the 39 new monitoring wells and analyzed for the parameters of concern identified for each sampling location. Additionally, groundwater samples were collected and analyzed from 10 existing monitoring wells located in the vicinity of the Flight Line Facilities. Groundwater samples were analyzed for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, and Appendix IX metals plus aluminum by EPA Methods 6010/7470. Monitoring wells were purged until in-situ groundwater measurements indicated either turbidity values were below 10 NTUs, or until turbidity values were stabilized in three successive measurements taken with at least one well volume purged between measurements.

- Approximately 10 percent of the monitoring wells were resampled, and split samples were submitted to two laboratories for VOC analyses by EPA Method 8260 to validate groundwater analytical data obtained during the current investigation.

- Golder Associates retained a licensed surveying firm to determine the locations and elevations of all new soil borings and monitoring wells installed during the field investigation. Groundwater elevations were measured to an accuracy of 0.01 foot; and groundwater flow directions were determined for the shallow, intermediate, and deeper zones of the surficial aquifer evaluated during the investigation based on water-level elevation measurements.

- Soil and water generated as IDW were containerized in 55-gallon drums and staged at a secure location on the northwest side of Building No. 1845.

Soil and sediment sampling locations are shown on Figure 5. A summary of the soil and sediment sampling program is presented in Table 1. Groundwater and surface-water sampling locations are shown on Figure 6. A summary of the groundwater and surface-water sampling program is presented in Table 2. Soil boring records, well installation logs, soil screening records, soil and sediment sample collection records, and certain equipment calibration records associated with the soil sampling program are included in Appendix B. Well development records, groundwater and surface-water sample collection records, and certain equipment calibration records associated with the groundwater sampling program are included in Appendix C. The laboratory contractor, Savannah Labs, located in Savannah, Georgia, performed laboratory analyses in accordance with

their FDEP-approved CompQAP (No. 890142G). During the resampling effort, split samples were submitted to Columbia Analytical Services, Inc. (Columbia), who performed laboratory analyses in accordance with their FDEP-approved CompQAP (No. 930298G).

4.2 Field Soil OVA Screening Procedures

Soil samples FL-SB-1 through FL-SB-47 were collected and screened in the field for VOCs in soil headspace using a HNU PI-101 OVA equipped with a photoionization detector (PID). The field screening technique used, herein referred to as the headspace method, was performed in general accordance with the procedures described in Chapter 62-770.200(8) of the Florida Administrative Code (F.A.C.). At each soil boring location, soil samples were collected at 2-foot vertical intervals from the ground surface to the water table, at approximately 6 feet bgs, using a clean stainless steel hand auger. The interval with the highest headspace VOC concentration was resampled from an adjacent soil boring location and submitted for laboratory analyses. At soil sample locations where headspace results were below the OVA detection limit of 1.0 part per million (ppm), the soil sample for laboratory analysis was collected from 0 to 2 feet bgs. The OVA measurement for each sample was recorded onto field forms. The OVA was calibrated in the field according to the manufacturer's specifications using a 91 ppm isobutylene gas standard. VOC concentrations in soil headspace from OVA measurements are presented in Table 3. Copies of OVA calibration records and OVA field measurement data records are presented in Appendix B.

4.3 Soil Sampling Program

Soil samples were collected at 47 locations (FL-SB-1 through FL-SB-47) in the Flight Line Facilities area. The rationale for each soil sample location was presented in the Statement of Work dated June 4, 1998. Based on the results of the field soil headspace method testing, one 2-foot vertical interval was selected to be sampled for laboratory analysis. The soil samples were collected from newly installed soil borings located immediately adjacent to the original boring where the headspace method testing was performed.

FDEP adopted EPA's Update III to SW-846 methods beginning June 13, 1997, resulting in substantial changes in soil sample collection procedures for analysis of VOCs. The EPA developed Method 5035 to attempt to minimize open-air handling of soil samples. As a result, Golder Associates used EnCore™ samplers to collect the soil samples to be analyzed for VOCs in accordance with procedures identified in Update III of SW-846. The procedure for sampling soil using the EnCore™ sampling device is designed to minimally disturb soil to prevent volatilization. Soil borings were advanced to the target sampling depth using a stainless steel hand auger. The EnCore™ sampler was connected to the extrusion tool and placed in direct contact with soil within the auger bucket. The sampling device was rotated and pushed into the soil until the coring body was completely full (approximately 5 grams of soil). The sampler was removed from the soil, and excess soil was wiped from the coring body exterior. The coring body was capped, and the plunger was locked in place. The sampler was detached from the extrusion tool, labeled and placed in a sealed container. Two EnCore™ samples were collected at each sample location for VOC analysis.

Following completion of soil sampling for VOC analyses, grab soil samples were collected in a 125-milliliter amber glass container for moisture testing. Grab soil samples were also collected and placed in 250-milliliter clear glass containers for SVOC analyses, and 250-milliliter plastic containers for Appendix IX metals plus aluminum analyses. All sample containers were provided by the laboratory. The samples were properly identified on a label attached to the outside of each container and placed into a cooler packed with ice for sample preservation. The samples were transported via overnight or same-day courier to Savannah Labs under appropriate chain-of custody procedures.

Sampling equipment which had the potential to contact soil samples was decontaminated prior to each use in accordance with the Golder Associates CompQAP. The decontamination process included scrubbing the sampling equipment with a brush and tap water to remove soil attached to the equipment. The equipment was subsequently scrubbed using a brush and a tap water/Liquinox mixture, rinsed with deionized (DI) water, and rinsed with isopropyl alcohol. The equipment was allowed to air dry, if practical; otherwise a final DI water rinse was performed prior to use.

4.4 Sediment Sampling Program

Sediment samples FL-SD-1 and FL-SD-2 were collected near outfall structures in the stormwater retention pond located southwest of Building No. 1845 at the locations shown on Figure 5. The samples were collected using the EnCore™ sampling device and a stainless steel auger. Sediment samples were obtained from the upper 1-foot of material in the pond using the hand auger to obtain the sediment. The sample was then collected in the EnCore™ sampling device. The samples were packaged on ice and shipped to Savannah Labs for analysis for VOCs, SVOCs, and Appendix IX metals plus aluminum. Field equipment was decontaminated in accordance with the Golder Associates CompQAP procedures prior to sample collection. The sediment sampling program summary information is presented in Table 1.

4.5 Monitoring Well Installation

A total of 39 monitoring wells were installed during the current investigation using two different drilling methods. Shallow monitoring wells were installed using the hollow stem auger drilling method. The intermediate and deeper monitoring wells were installed using the mud rotary drilling method. Each drilling location was cleared for buried utilities by base personnel prior to drilling activities. To further minimize the potential for risk of damage to utility structures, a manually-installed boring was advanced to an approximate depth of 6 feet bgs using a hand auger or post hole shovel. Soil samples were collected using standard penetration tests (SPTs) in accordance with ASTM Method D-1586 using split-spoon samplers during drilling activities to characterize soil conditions at each drilling location.

Shallow monitoring wells were installed to a depth of approximately 15 feet and were constructed of 2-inch diameter, Schedule 40 PVC with threaded joints and a 10-foot length of 0.010-inch mill slotted screen. The filter pack was constructed using 20/30 grade silica sand to a depth of 1 to 2 feet above the top of the screened interval, followed by a 1-foot thick 30/65 grade fine sand seal. Grout was placed in the remaining annular space to just below ground surface. The wells were then completed below grade with locking well caps and steel protective meter boxes set into concrete 2-foot by 2-foot anti-percolation pads.

A clay unit was reported at a depth of approximately 30 to 35 feet bgs near the Jet Engine Test Cell (west of Building No. 1845) in well boring logs from earlier ABB reports. One ABB report showed a distinct reduction of headspace readings reported below the clay associated with the petroleum hydrocarbon plume at the Jet Engine Test Cell Site; therefore, it appears the clay may serve as an effective confining unit in this area. As a result, well clusters were installed at six monitoring well locations where an intermediate (approximately 38 feet bgs) and deeper monitoring well (approximately 50 feet bgs) were constructed adjacent to the shallow monitoring well. Mud rotary drilling procedures were used for installation of intermediate and deep wells. Soil samples from the deep soil borings were collected at 5-foot vertical intervals with SPT split-spoon samplers to a depth of 50 feet bgs to characterize the lithology of the surficial aquifer and identify the approximate depth of the clay unit, if present. Soil samples from the intermediate soil borings were collected continuously after the boring was advanced to a depth of approximately 28 feet bgs to locate the top of the clay unit.

Intermediate monitoring wells were installed to a depth of approximately 38 feet, and deeper monitoring wells were installed to a depth of approximately 50 feet. Both intermediate and deeper monitoring wells were constructed of 2-inch diameter, Schedule 40 PVC with threaded joints and a 5-foot length of 0.010-inch mill slotted screen. The filter pack was constructed using 20/30 grade silica sand to a depth of 1 to 2 feet above the top of the screened interval, followed by a 1-foot thick bentonite seal. Grout was placed in the remaining annular space to just below ground surface. The wells were then completed below grade with locking well caps and steel protective meter boxes set into concrete 2-foot by 2-foot anti-percolation pads.

The soil cuttings and drilling mud produced during drilling activities were containerized in labeled 55-gallon drums and temporarily staged on the northwest side of Building No. 1845. The contents of the IDW drums and label numbers were recorded on a drum tracking log. A copy of the IDW drum tracking log is presented in Appendix D.

All drilling equipment associated with monitoring well installation was decontaminated prior to each use. The decontamination process included a thorough pressure washing of all appropriate drilling equipment at the decontamination area. Following completion of decontamination activities, the drilling equipment was wrapped in plastic. The decontamination wastewater was

collected from the decontamination area in labeled 55-gallon drums and temporarily stored in the IDW staging area.

Thirty-nine permanent monitoring wells were installed at the Flight Line Facility during May and June 1998 as part of the environmental due diligence investigation.

4.6 Monitoring Well Development

All newly installed monitoring wells were developed by pumping to reduce suspended sediments in the discharge water. Well development was performed to establish good hydraulic connection between the monitoring well and the lithologic formation into which the well was installed. The shallow monitoring wells were developed immediately after completion and the intermediate and deep monitoring wells were developed a minimum of 24 hours after completion. Each well was developed by pumping a minimum of 50 gallons, or until field water quality standards were stabilized and the discharge water appeared free of sediments. All wells were allowed to equilibrate for at least 48 hours after development before groundwater sampling was conducted. The water discharged from well development activities was containerized in labeled 55-gallon drums and temporarily staged on the northwestern side of Building No. 1845.

4.7 Groundwater Sampling Program

A total of 49 monitoring wells, including 39 newly installed wells and 10 existing wells, were sampled at the Flight Line Facilities during June 1998. Prior to purging each monitoring well, the depth to water was measured to determine the volume of water to be evacuated from each well. Following determination of the appropriate purge volume, dedicated polyethylene tubing was installed in the monitoring well to the screened interval, and a peristaltic pump was connected to the discharge end of the tubing. The monitoring well was purged under low flow conditions until a minimum of three well volumes had been removed, in-situ water quality parameters stabilized, and turbidity values were below 10 NTUs, or until turbidity values were stabilized in three successive measurements taken with at least one well volume purged between measurements. During purging activities, the polyethylene intake tubing was raised and maintained near the top of the water column. In-situ water quality parameters were monitored during well purging

activities including specific conductance, pH, temperature and turbidity. Field instruments were calibrated according to the manufacturer's instructions. The purge water produced during groundwater sampling activities (IDW) was containerized in labeled 55-gallon drums and temporarily staged on the northwestern side of Building No. 1845.

Groundwater samples were collected directly from the effluent tubing under low flow conditions for samples to be analyzed for SVOCs and metals analyses. Following collection of samples for SVOCs and metals analyses, the pump was turned off and the tubing was carefully removed from the monitoring well. Groundwater samples for VOC analyses were subsequently collected using a decontaminated stainless steel bailer. One additional well volume was purged with the bailer prior to collection of the sample for VOC analyses in accordance with the Golder Associates CompQAP. Following sample collection, the groundwater samples were placed in a cooler packed with ice for sample preservation. The samples were delivered to Savannah Labs under appropriate chain-of-custody procedures within 24 hours of sample collection. Groundwater sampling program summary information is presented in Table 2. Groundwater sample collection and field instrument calibration records are presented in Appendix C.

4.8 Surface-water Sampling Program

Surface-water samples FL-SW-1 and FL-SW-2 were collected from the stormwater retention pond located southwest of Building No. 1845 at the locations shown on Figure 6. Surface-water samples were collected directly into the sample containers without supplemental sampling equipment. The samples were packaged on ice and shipped to Savannah for analysis of VOCs by EPA Method 8260, SVOCs by EPA Method 8270, and Appendix IX metals plus aluminum by EPA Methods 6010/7471. The surface-water sampling program summary information is presented in Table 2.

4.9 Resampling Program

To confirm the presence of VOCs in soil samples collected using the EnCore™ sampling method, approximately 10 percent of soil samples were recollected for confirmatory VOC analysis. Specifically, samples were recollected adjacent to SB-8, SB-9, SB-15, SB-22, SB-31, and SB-34.

Additionally, groundwater samples were recollected from SMW-9, SMW-15, SMW-22, and SMW-25 for confirmatory VOC analysis. Laboratory analytical results are presented in Appendix E.

4.10 QA/QC Program

In accordance with the Golder Associates CompQAP, duplicate samples were collected for 10 percent of the samples, equipment blanks on 5 percent of samples for each type of sampling equipment, and one trip blank per cooler shipped which contained samples for VOCs analyses. Duplicate samples and equipment blanks collected during the soils and sediments sampling programs are presented in Table 1. Duplicate samples and equipment blanks collected during the groundwater and surface-water sampling programs are presented in Table 2.

Field equipment was decontaminated in the field prior to sampling in accordance with the CompQAP which includes a wash with laboratory-grade detergent, a DI water rinse, isopropanol rinse and a final DI water rinse. Equipment was allowed to air dry and was wrapped in aluminum foil prior to sampling to minimize the risk of cross-contamination.

4.11 Water Table Elevation Measurements

The positions of the monitoring wells were surveyed by Holland & Bassett Surveyors, Inc. of Jacksonville, Florida, a licensed surveyor in the State of Florida. The horizontal locations were surveyed to an accuracy of 1.0 foot and were tied into the State Planar Coordinate system. The vertical locations (ground surface and top of casing elevations) were surveyed to an accuracy of 0.01 feet referenced to MSL.

Water-level measurements were recorded from the monitoring wells following well completion and prior to the groundwater sampling event. Additionally, a complete circuit of water-level measurements was made on June 22, 1998. Water-level measurements were recorded to an accuracy of 0.01 feet and groundwater elevations were calculated to an accuracy of 0.01 feet referenced to MSL. Table 4 presents the water-level measurements made and corresponding groundwater elevations recorded from each temporary monitoring well.

5.0 INVESTIGATIVE FINDINGS

5.1 Site Geology in the Flight Line Facilities Area

A generalized geologic cross-section for the area located west of the north-south flight line is shown on Figure 7. The cross-section was developed using soil boring logs from several ABB reports for the North Fuel Farm, Jet Engine Test Cell Site, IR Program Site No. 16, and the Day Tank area. In general, the site is underlain by approximately 90 to 100 feet of sand with varying amounts of silt and clay. In the vicinity of the Jet Engine Test Cell (west of Building No. 1845), a clay unit was reported at a depth of approximately 30 to 35 feet bgs. Golder Associates encountered this clay unit during our investigation in the monitoring well cluster MW-1 at 38 feet bgs, in the monitoring well cluster MW-2 at 39 feet bgs, in the monitoring well cluster MW-12 at 38 feet bgs, in the monitoring well cluster MW-18 at 32 feet bgs, and in the monitoring well cluster MW-23 at 34 feet bgs. No clay unit was encountered during the installation of monitoring well cluster MW-3 located on the east side of Building No. 1845. The thickness of the clay unit ranged from 0.5 to 2 feet. It appears from review of the boring logs used to develop the generalized cross section and the boring logs from the newly installed monitoring wells that this thin clay unit is laterally discontinuous and localized, as indicated by the absence of this unit at the MW-3 location. This clay unit may serve as a localized confining unit to restrict movement of contaminants, if present, from migrating vertically through the surficial aquifer.

Below the surficial sand unit, interfingering clay and limestone was reported at a depth of approximately 90 to 100 feet bgs. A sand and limestone unit, which is apparently equivalent to the rock aquifer reported throughout Duval County, was reported at a depth of approximately 100 feet bgs. Marl associated with the Hawthorn Group was encountered at a depth of approximately 130 feet bgs. The lithology reported in the ABB reports is generally consistent with the sediments encountered in the deep boring Golder Associates installed near Building No. 900 during November 1997.

5.2 Hydrogeologic Characteristics of the Surficial Aquifer System

5.2.1 Groundwater Flow in the Surficial Aquifer

A total of six monitoring well clusters and 21 individual monitoring wells were installed in the Flight Line Facilities area during the baseline characterization investigation. At each well cluster, one shallow well was installed to a depth of approximately 15 feet bgs in the upper surficial aquifer, one intermediate well was installed to a depth of approximately 38 feet bgs, and one deep well was installed to a depth of approximately 50 feet bgs. At the individual monitoring well locations, the wells were installed to a depth of approximately 15 feet bgs. Each well was surveyed to determine the horizontal coordinates to an accuracy of 1.0 foot and the elevation to an accuracy of 0.01 foot relative to MSL. Groundwater elevations were measured in each well on June 22, 1998. Groundwater elevation data are presented in Table 4. A potentiometric map for the water table interval of the upper surficial aquifer is shown on Figure 8. A potentiometric map for the intermediate zone of the upper surficial aquifer is shown on Figure 9. A potentiometric map of the deeper zone of the upper surficial aquifer is shown on Figure 10. The potentiometric maps indicate the direction of groundwater flow underlying the Flight Line Facilities was toward the southeast in all three monitored intervals during June 1998.

5.2.2 Horizontal Hydraulic Gradient

Horizontal hydraulic gradients were calculated from water-level elevations in monitoring wells measured on June 22, 1998. The horizontal gradient in the upper surficial aquifer was calculated at 2.3×10^{-3}. The horizontal gradient in the intermediate zone of the surficial aquifer was calculated at 2.4×10^{-3}. The horizontal gradient in the deeper zone of the surficial aquifer was calculated at 2.0×10^{-3}. A copy of the horizontal hydraulic gradient calculations is included in Appendix F.

5.2.3 Vertical Hydraulic Gradient

Vertical hydraulic gradients were calculated from water-level elevations measured in monitoring well clusters MW-3, MW-23, and MW-18 measured on June 22, 1998. The

average vertical gradient between the shallow and intermediate zones of the surficial aquifer was downward under a gradient of approximately 8.0 x 10^{-3}. The average vertical gradient between the intermediate and deeper zones of the surficial aquifer was downward under a gradient of approximately 8.0 x 10^{-3}. Vertical hydraulic gradient calculations are presented in Appendix F.

5.2.4 Groundwater Flow Rate Estimate

Groundwater flow rates were calculated for the surficial aquifer using data collected during the current investigation and data reported by ABB in the Site No. 16 RI report. The calculations were performed using the formula:

$$V = Ki/n_e$$

Where

v = average linear velocity

K = hydraulic conductivity

i = hydraulic gradient

n_e = effective porosity

The calculated average linear velocity for the upper surficial aquifer beneath the Flight Line Facilities is estimated to be approximately 7 feet per year, based on a hydraulic conductivity of 2.5 feet/day (ABB, 1995), a hydraulic gradient of 2.3 x 10^{-3}, and an estimated effective porosity of 30 percent.

The calculated average linear velocity for the intermediate zone of the surficial aquifer is estimated to be approximately 50 feet per year, based on a hydraulic conductivity of 17 feet/day (ABB, 1995), a hydraulic gradient of 2.0 x 10^{-3}, and an estimated effective porosity of 30 percent.

The calculated average linear velocity for the deeper zone of the surficial aquifer is estimated to be approximately 55 feet per year, based on a hydraulic conductivity of 22 feet/day (ABB,

1995), a hydraulic gradient of 2.0 x 10^{-3}, and an estimated effective porosity of 30 percent. Groundwater flow rate calculations are presented in Appendix F.

5.3 Soil Analytical Results

A total of 47 soil borings were installed during the environmental baseline characterization to evaluate soil conditions in the Flight Line Facilities area. Three soil borings (FL-SB-25, FL-SB-26 and FL-SB-35) were installed to determine if PCBs were released in the vicinity of electrical transformers. The remaining 44 soil borings were installed to determine if releases of other regulated substances have occurred at potential source areas identified at the site. Soil samples were screened in the field with an OVA using the headspace method to determine if VOCs were present. At each soil boring location, soil samples were collected at 2-foot vertical intervals from the ground surface to the water table at approximately 6 feet bgs. A total of 10 soil screening locations were identified with headspace concentrations of VOCs exceeding the instrument detection limit of 1 ppm. A summary of soil OVA screening, data is presented on Table 3. Specific locations with VOC headspace concentrations exceeding 1 ppm are listed below.

- SB-2 (Building No. 815 wash rack area) – VOCs were reported at a concentration of 4 ppm in the 0 to 2 feet bgs interval and 1 ppm in the 2 to 4 feet bgs interval. This location was adjacent to the drums of aircraft cleaner stored in the wash rack area.

- SB-15 (south end of Building No. 1845) – VOCs were reported at a concentration of 70 ppm in the 4 to 6 feet bgs interval. This location corresponds to an area where hazardous wastes were temporarily stored and may be adjacent to an area where mop water was discharged.

- SB-21 (east side of Building No. 815) – VOCs were reported at a concentration of 3 ppm in the 2 to 4 feet bgs interval and 1 ppm in the 4 to 6 feet bgs interval. This location was east of hazardous waste storage areas.

- SB-22 (inside Building No. 815) – VOCs were reported in all three samples screened with the OVA, with the highest concentration of 160 ppm reported in the 0 to 2 feet bgs interval. This location was adjacent to a crack in the concrete slab inside the hangar.

- SB-30 (aircraft wash rack area) – VOCs were reported in all three samples screened with the OVA, with the highest concentration of 40 ppm reported in the 0 to 2 feet bgs interval. This location was adjacent to the northern sump in the wash rack area.

- SB-32 (aircraft wash rack area) -- VOCs were reported in all three samples screened with the OVA, with the highest concentration of 115 ppm reported in the 0 to 2 feet bgs interval. This location was adjacent to the southern sump in the wash rack area.

- SB-34 (west of Building No. 815) – VOCs were reported at a concentration of 200 ppm in the 0 to 2 feet bgs interval and 50 ppm in the 2 to 4 feet bgs interval. This location corresponds to an area where hazardous wastes were temporarily stored.

- SB-37 (east side of Building No. 815) – VOCs were reported in all three samples screened with the OVA, with the highest concentration of 3 ppm reported in both the 2 to 4 and 4 to 6 feet bgs intervals. This location corresponds to an area where hazardous wastes were temporarily stored.

- SB-43 (Jet Engine Test Cell Site) -- VOCs were reported at a concentration of 20 ppm in the 0 to 2 feet bgs interval and 12 ppm in the 2 to 4 feet bgs interval. This location was adjacent to an oil/water separator in the Jet Engine Test Cell Site.

- SB-46 (west side of Building No. 815 parking area) – VOCs were reported at a concentration of 2 ppm in the 0 to 2 feet bgs interval. This location was east of the Building No. 815 parking area.

The sample interval at each soil boring location with the highest headspace VOC concentration was resampled and submitted to the laboratory for analysis of VOCs, SVOCs, and Appendix IX metals plus aluminum. At the soil boring locations where the three intervals had a headspace VOC concentration of less than 1 ppm, a soil sample was typically collected from the 0 to 2 foot depth interval to evaluate whether a surface release had occurred in that area. Some exceptions to these criteria were made in the field based on site-specific conditions. Specifically, the soil sample interval selected for laboratory analysis in the borings placed near the two oil/water separators located on the west side of Building No. 1845 was 5 to 5.5 feet bgs, given that this sampling depth would better indicate if a release occurred from the oil/water separator system. Soil analytical results for the Flight Line Facilities area are summarized in Table 5 and shown on Figure 11.

Results of the baseline soil characterization indicate detection of several VOCs; however, no VOCs were reported at concentrations exceeding applicable Florida Soil Cleanup Goals. Tetrachloroethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA), TCE, ethylbenzene, toluene, and xylenes were reported at relatively low concentrations is certain soil samples collected in the Flight Line Facilities area. The highest concentrations of VOCs in soil were reported at soil boring SB-15, which was located south of Building No. 1845 in an area where hazardous wastes

were reportedly stored. Although no VOCs exceeded Florida Soil Cleanup Goals at SB-15, certain VOCs, including PCE and TCE, were reported at substantially elevated concentrations which indicates a release of hazardous substances may have occurred in this area. At SB-15, PCE was reported at a concentration of 2,300 μg/kg and TCE was reported at a concentration of 650 μg/kg. PCE and TCE naturally break down into certain daughter compounds, including 1,1-dichloethene (1,1-DCE), which has a Soil Cleanup Goal of 10 μg/kg. Consequently, PCE and TCE, while not exceeding Soil Cleanup Goals, could degrade to other compounds at concentrations which exceed the new compound's respective Soil Cleanup Goal.

Other VOCs reported in soil included acetone, carbon disulfide, methylene chloride, 1,2-dichloropropane; however, it is uncertain whether the reported concentrations of these parameters are representative of site conditions or whether they represent laboratory artifacts.

Butylbenzylphthalate was reported in soil boring SB-44 at a concentration of 580 μg/kg, which exceeds the Florida Soil Cleanup Goal of 220 μg/kg. This location is near the fence west of the northwest corner of Building No. 815. Butylbenzylphthalate was not reported in any other soil samples.

Naphthalene and 2-methylnaphthalene were reported in soil at SB-22, which was located inside of Building No. 815. Elevated VOC concentrations were reported in soil headspace at this location. Cracks were observed in the concrete slab of the building in the area of this soil sample. Apparently, petroleum constituents may have been released to soil from inside the building in this location.

Naphthalene was also reported in soil at SB-30, which was located adjacent to a sump in the aircraft wash rack area between Buildings No. 1845 and No. 815. Naphthalene has previously been reported in the wash rack area by ABB.

Three soil samples were tested for PCBs during the current investigation. At one location, three PCB compounds were reported in soil. Specifically, Archlor-1248, Archlor-1254, and Archlor-1260 were identified in the soil sample from soil boring SB-35, which was located adjacent to a pad-mounted transformer immediately west of Building No. 815. The concentration of Archlor-

1260 was reported at 620 μg/kg, which exceeds the Florida Residential Soil Cleanup Goal of 600 μg/kg for Archlor-1260.

Several metals were reported in the soil samples collected in the Flight Line Facilities area. However, no metals were reported at concentrations which exceeded Florida Soil Cleanup Goals.

5.4 Sediment Analytical Results

Sediment analytical results for the two samples collected from the stormwater retention pond located west of the Flight Line Facilities area are summarized in Table 6 and shown on Figure 12. VOCs reported in sediment samples included carbon disulfide and methylene chloride; however, it is uncertain whether the reported concentrations of these parameters are representative of site conditions or whether they represent laboratory artifacts. Bis (2-ethylhexyl) phthalate was reported at a concentration of 14,000 μg/kg in sediment sample SD-2. Several metals were reported in the sediment samples collected from the stormwater retention pond. The metals concentrations reported in sediment sample SD-2 were in general one to two orders of magnitude above the concentrations reported in sediment sample SD-1, and appear to be substantially elevated above background concentrations of metals in pond sediments.

5.5 Surface-water Analytical Results

Surface-water analytical results for the two samples collected from the stormwater retention pond located west of the Flight Line Facilities area are summarized in Table 7 and shown on Figure 12. VOCs reported in surface-water samples included acetone and carbon disulfide; however, it is uncertain whether the reported concentrations of these parameters are representative of site conditions or whether they represent laboratory artifacts. If these results are representative of site conditions, carbon disulfide was reported at a concentration of 170 μg/l in surface-water sample SW-2, which exceeds the Florida Class III Surface-water Quality Standard for carbon disulfide of 105 μg/l. TCE was reported in surface-water sample SW-1 at a concentration of 16 μg/l. Barium and zinc were the only metals reported in surface-water. TCE, barium, and zinc were reported at concentrations below Surface-water Quality Standards.

5.6 Groundwater Analytical Results

Groundwater analytical results for the Flight Line Facilities area are summarized in Table 8 and shown on Figure 13. Results of the baseline groundwater characterization in the Flight Line Facilities area indicate certain VOCs were reported in groundwater, including ethylbenzene, TCE, vinyl chloride, and xylenes. Vinyl chloride was reported at a concentration of 1.8 μg/l in monitoring well FL-MW-14 located near the northeast corner of Building No. 815, which exceeds the Florida MCL of 1.0 μg/l for vinyl chloride. TCE was reported at a concentration of 37 μg/l in FL-MW-18I (intermediate zone), which exceeds the MCL of 3.0 μg/l for TCE. Monitoring well FL-MW-18I is downgradient from IR Site No. 16, and appears to be located within the TCE groundwater plume which has been documented extending downgradient from the IR Site No. 16 source area. No other VOCs were reported in groundwater at concentrations above MCLs during the current investigation.

Other VOCs reported in groundwater included acetone, bromodichloromethane, carbon disulfide, chloroform, 2-hexanone, and 4-methyl-2-pentanone; however, it is uncertain whether the reported concentrations of these parameters are representative of site conditions or whether they represent laboratory artifacts.

Naphthalene and 2-methylnaphthalene were reported in groundwater in three existing wells during the current investigation. Specifically, naphthalene and 2-methylnaphthalene were reported in samples from monitoring wells ABB-2 and ABB-9, and naphthalene was reported in the sample from ABB-10. Concentrations of naphthalene were reported above the Florida MCL of 20 μg/l for naphthalene in all three samples. ABB-2 is located adjacent to the northern extent of the parking area for Building No. 1845, which is near the southern end of the Jet Engine Test Cell Site. Although a groundwater plume with petroleum hydrocarbons has been reported at the Jet Engine Test Cell Site by ABB, the plume had not previously been delineated as far south as the location of ABB-2. Naphthalene was reported at a concentration of 38 μg/l in ABB-2, which may indicate the leading edge of the plume from the Jet Engine Test Cell Site has reached this location, or it may indicate an unrelated release of petroleum hydrocarbons has occurred in this area. Monitoring wells ABB-9 and ABB-10 are located in the aircraft wash rack facility area between Buildings No. 1845 and No. 815. Naphthalene has previously been reported in groundwater in the wash rack area by ABB. The maximum concentration of naphthalene reported in the wash

rack area during the current investigation was at ABB-9 at a concentration of 340 μg/l, which is more than an order of magnitude above the MCL of 20 μg/l.

Several metals were reported in groundwater during the current investigation. At monitoring well ABB-5, chromium was reported at a concentration of 0.14 mg/l, which exceeds the MCL of 0.1 mg/l, and lead was reported at a concentration of 0.094 mg/l, which exceeds the MCL of 0.015 mg/l. However, monitoring well ABB-5 was damaged, resulting in a limited purging effort prior to sampling, and the groundwater sample was turbid. This may have caused elevated metals results from suspended sediments in the sample. Aluminum was reported above the secondary MCL of 0.2 mg/l in all but three groundwater samples; however, background concentrations of aluminum appear to be above the MCL. No other metals were reported at concentrations above MCLs.

6.0 CONCLUSIONS

NGC retained Golder Associates to perform a focused environmental due diligence investigation at selected areas of NAS Cecil Field located in Jacksonville, Duval County, Florida during the period of May through August 1998. This report addresses investigative activities performed by Golder Associates at Buildings No. 815, No. 1845, and the respective parking areas for these buildings, which are located within the main base area, and have been collectively referred to as the Flight Line Facilities throughout this report.

During the investigation, Golder Associates reviewed existing environmental documentation and records for the Flight Line Facilities area, and we conducted an inspection of this area of the base. Based on the review of existing documents and the site inspection, Golder Associates developed and implemented a scope of work designed to characterize baseline soil, sediment, surface water, and groundwater conditions in the vicinity of the Flight Line Facilities.

A Statement of Work for the baseline characterization investigation was prepared by Golder Associates and submitted to NGC in a June 4, 1998 correspondence. Information that was used to develop the Statement of Work included a preliminary review of the base-wide EBS report (ABB, 1994), selected BRAC and IR Program environmental reports, and site inspections conducted by Golder Associates' personnel during November 1997 and May 1998.

The baseline characterization investigation conducted by Golder Associates at the Flight Line Facilities included installation and sampling of 47 shallow soil borings. Soil samples collected from the 47 shallow borings were screened in the field for the presence of VOCs and/or submitted to Savannah Labs for chemical analysis. Additionally, two surface-water and two sediment samples were collected from a stormwater retention pond located west of Building No. 1845. The soil, surface-water and sediment samples were analyzed by Savannah Labs for a broad list of parameters which included VOCs, SVOCs, and metals. In addition, certain soil samples collected from borings located adjacent to electrical transformers were analyzed for PCBs.

A total of 10 existing monitoring wells previously installed by a U.S. Navy contractor were located in the Flight Line Facilities area. Additionally, 39 new monitoring wells were installed by

Golder Associates in three vertical intervals of the surficial aquifer at 27 locations in the Flight Line Facilities area. Groundwater samples were collected for laboratory analyses from a total of 49 monitoring wells screened in the shallow (15 feet bgs), intermediate (35 feet bgs), and deeper (50 feet bgs) intervals of the surficial aquifer. The groundwater samples were submitted to Savannah Labs for analysis for VOCs, SVOCs, and metals. The monitoring wells were surveyed, and groundwater elevation measurements were recorded in each well to characterize groundwater flow conditions at the Flight Line Facilities.

Publicly-available reports prepared by ABB and previous subsurface investigation performed by Golder Associates for NGC at NAS Cecil Field were used to characterize the geologic and hydrologic setting of the Flight Line Facilities area. The site is underlain by approximately 90 to 100 feet of sand with varying amounts of silt and clay which comprise the surficial aquifer. A relatively thin, discontinuous low permeability unit occurs locally within this sand unit at a depth of approximately 35 to 40 feet in the general vicinity of Building No. 1845. The maximum depth of drilling during the current investigation was 50 feet bgs. Reportedly, interfingering clay and limestone underlie the surficial sand unit at a depth of approximately 90 to 100 feet bgs. A sand and limestone unit, apparently equivalent to the rock aquifer which underlies much of Duval County, was reported at a depth of approximately 100 to 130 feet bgs. Reportedly, at an approximate depth of 130 feet bgs, the surficial aquifer is underlain by marl with phosphatic material representing the top of the Hawthorn Group, which is a low permeability confining unit at the base of the surficial aquifer. Groundwater flow direction in the upper, intermediate, and deeper zones of the surficial aquifer monitored during the current investigation was toward the south to southeast, with a distinct downward flow gradient between each of these units.

Previous investigations performed at NAS Cecil Field by U.S. Navy contractors identified several areas in the vicinity of the Flight Line Facilities with documented environmental impacts. These areas were identified in the FOSL and are shown on Figure 14. A summary of areas identified by the U.S. Navy with environmental impacts in the vicinity of the Flight Line Facilities is presented below.

- Jet Engine Test Cell Site – This facility includes Buildings No. 334, No. 339, and No. 811, which are located west of Building No. 1845. This area has a free product and contaminated groundwater plume from a leaking UST, and is currently undergoing assessment and remediation activities under the BRAC program. Reportedly, the

contaminated plume of groundwater extends to near the fence which separates the Jet Engine Test Cell facility from Building No. 1845.

- IR Site No. 16 – This site is a former solvent seepage pit located on the north side of Building No. 313, which is west of Building No. 815. A groundwater contaminant plume associated with the release of chlorinated solvents from jet engine maintenance activities into the former seepage pit extends beneath the southern end of Building No. 815. Specific contaminants of concern include TCE.

- AOI No. 28 -- The North Temporary Hazardous Waste Collection Point, which is located west of Building No. 815, was designated as AOI No. 28. Hazardous wastes related to aircraft maintenance activities were reportedly collected and stored here. The SAR reported that concentrations of Arochlor-1242, lead, magnesium, selenium, vanadium, and zinc in surface soil samples exceeded FDEP Soil Cleanup Goals. In addition, concentrations of certain metals were reported in groundwater in excess of Florida MCLs.

- AOI No. 29 -- The Building No. 313 Temporary Hazardous Waste Collection Point, which is located west of Building No. 815, was designated as AOI No. 29. Potentially contaminated runoff from hazardous waste storage buildings may have impacted surface soils in the area. Preliminary analytical data reported by ABB indicate detection of pesticides, total petroleum hydrocarbons, and metals in soil.

- Aircraft Wash Rack Area – The aircraft wash rack on the north side of Building No. 815 has been identified by the U.S. Navy as an area with groundwater contamination. Preliminary analytical data provided by ABB indicate that naphthalene, aluminum, iron, and manganese were detected at concentrations in excess of Florida MCLs in groundwater in the wash rack area.

- South Side of Building No. 1845 – Soil with concentrations of beryllium above FDEP Soil Cleanup Goals was reported at a location on the south side of Building No. 1845.

- Flight Line Area – A preliminary investigation of the flight line east of Buildings No. 815 and No. 1845 conducted by ABB in 1998 indicate that low concentrations of certain VOCs were reported in groundwater at several sampling locations.

During the current investigation by Golder Associates, environmental impacts were confirmed in several of the impacted areas previously identified by the U.S. Navy. Specifically, findings of the current investigation confirmed impacts at the locations listed below.

- Jet Engine Test Cell Site – Naphthalene was reported at a concentration which exceeds the MCL for naphthalene in the groundwater sample collected from monitoring well ABB-2, which is located south of Building No. 334. Elevated concentrations of naphthalene were not previously reported for this location, indicating that either the Jet Engine Test Cell plume has migrated to this location or an unrelated release of petroleum constituents has occurred in this area. The presence of groundwater MCL violations at

this location indicates that groundwater impacts may extend under the northern end of the Building No. 1845 parking area.

- IR Site No. 16 – Golder Associates identified elevated concentrations of TCE above the MCL in the groundwater sample collected from intermediate monitoring well IMW-18, which is located at the southwestern corner of Building No. 815. This detection of TCE indicates that the groundwater contaminant plume associated with release of chlorinated solvents from jet engine maintenance activities into the former seepage pit extends beneath the southern end of Building No. 815.

- AOI No. 28 – Elevated concentrations of certain metals above MCLs were reported during the current investigation in a groundwater sample collected from monitoring well ABB-5, which is located in AOI No. 28.

- Aircraft Wash Rack Area – Elevated concentrations of naphthalene were confirmed in soil and groundwater in the vicinity of the aircraft wash rack located on the north side of Building No. 815.

Additional areas with potential environmental impacts not previously identified by the U.S. Navy, but identified during the current baseline characterization investigation by Golder Associates, are shown on Figure 14 and are summarized below.

- Soil Impacts by VOCs South of Building No. 1845 -- Elevated headspace concentrations of VOCs were reported in one soil sample (SB-15) located adjacent to a former hazardous waste storage area south of Building No. 1845. The elevated concentrations of VOCs were confirmed by laboratory testing. This location is adjacent to the aircraft wash rack area with previously documented soil and groundwater impacts by naphthalene and metals. However, the VOCs reported at the SB-15 location included chlorinated solvent compounds, which were not previously reported in the wash rack area. Consequently, the presence of chlorinated solvent compounds may indicate that a previously unidentified release of hazardous substances occurred in this area.

- PCBs in Soil Adjacent to a Transformer West of Building No. 815 -- Concentrations of Arochlor-1260, a PCB compound, was reported in surficial soil adjacent to a transformer located west of Building No. 815. The concentration of Arochlor-1260 was reported above the FDEP Soil Cleanup Goal for this compound.

- Butylbenzylphthalate in Soil Near the Fence West of the Northwest Corner of Building No. 815 -- Butylbenzylphthalate was reported in one soil sample located adjacent to the fence near the Building No. 815 parking area at a concentration exceeding the FDEP Soil Cleanup Goal for this compound.

- Soil Impacts Beneath Building No. 815 -- Soil underlying the south end of Building No. 815 had reported elevated naphthalene concentrations. Specifically, naphthalene was reported in soil in a soil boring which was located adjacent to a crack in the concrete slab

for the building, indicating that releases from the building to soil may have occurred at locations where the integrity of the slab has been compromised.

- Vinyl Chloride in Groundwater Near the Northeast Corner of Building No. 815 -- Vinyl chloride was reported in one well located near the northeast corner of Building No. 815 at a concentration above the MCL.

- Surface Water and Sediment Impacts in the Stormwater Retention Pond -- Elevated concentrations of TCE, bis (2-ethylhexyl) phthalate, and certain metals were reported in sediment and/or surface-water samples collected from the stormwater retention pond located southwest of Building No. 1845. Certain process wastewater had reportedly been discharged to this pond historically, and environmental impacts may have occurred in the pond from the release(s) of regulated substances.

Results of the hydrogeological characterization of the Flight Line Facilities area indicate that groundwater flow is sluggish in the upper surficial aquifer, moving on the order of a few feet per year. A relatively strong downward gradient was observed from the upper surficial aquifer to lower intervals of the surficial aquifer. Consequently, contaminant transport may have a distinct downward flow component. This determination is supported by the fact that TCE was not reported in several shallow wells located within the IR Site No. 16 TCE plume while TCE was reported in deeper wells in this area. At the North Fuel Farm area, located approximately 1,500 feet north of the Flight Line Facilities area, petroleum hydrocarbon contamination has reportedly migrated downward to the base of the surficial aquifer at a depth in excess of 100 feet bgs. Given this documented downward flow of contaminants at certain areas near the Flight Line Facilities, and the sluggish lateral flow in the upper surficial aquifer, groundwater impacts within the Flight Line Facilities area may not extend over broad areas laterally, but may extend to significant depths within the surficial aquifer. Consequently, the vertical extent of groundwater impacts remains undefined in several of the areas where elevated concentrations of regulated substances were identified in groundwater.

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BIBLIOGRAPHY

ABB Environmental Services, Inc. June 1994. Environmental Baseline Survey, Areas of Interest Index 1.0 – 10.0. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. November 1994. Base Realignment and Closure Environmental Baseline Survey Report. Naval Air Station Cecil Field. Jacksonville, Florida.

ABB Environmental Services, Inc. November 1994. Contamination Assessment Report, Jet Engine Test Cell. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. January 1995. Sampling and Analysis Outline. Area of Interest 28. Base Realignment and Closure. Zone C, Administration and Light Industrial Area Group II. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. January 1995. Sampling and Analysis Outline. Building 1845. Base Realignment and Closure. Zone D, Industrial and Flightline Area Group II. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. February 1995. Sampling and Analysis Outline. Area of Interest 29. Base Realignment and Closure. Zone D, Industrial and Flightline Area Group III. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. February 1995. Sampling and Analysis Outline. Area of Interest 30. Base Realignment and Closure. Zone D, Industrial and Flightline Area Group III. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. February 1995. Sampling and Analysis Outline. Building 814. Base Realignment and Closure. Zone D, Industrial and Flightline Area Group III. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. February 1995. Sampling and Analysis Outline. Building 815. Base Realignment and Closure. Zone D, Industrial and Flightline Area Group III. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. February 1995. Sampling and Analysis Outline. Building 825LN. Base Realignment and Closure. Zone D, Industrial and Flightline Area Group III. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. July 1995. Remedial Investigation, Operable Limit 7, Volume I. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. July 1995. Remedial Investigation, Site No. 16. Naval Air Station Cecil Field, Jacksonville, Florida.

BIBLIOGRAPHY

(Cont'd)

ABB Environmental Services, Inc. August 1995. Feasibility Study, Operable Unit 7. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. April 1996. Contamination Assessment Report Addendum, North Fuel Farm. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. June 1996. Sampling and Analysis Report. Area of Interest 28. Base Realignment and Closure. Zone C, Administration and Light Industrial Area Group II. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. June 1996. Sampling and Analysis Outline. Building 313. Base Realignment and Closure. Zone D, Flightline Industrial Area Group VIII. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. June 1996. Sampling and Analysis Outline. Building 825. Base Realignment and Closure. Zone D, Flightline Industrial Area Group VIII. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. June 1996. Sampling and Analysis Report. Building 1845. Base Realignment and Closure. Zone D, Industrial and Flightline Area Group II. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. November 1996. Remedial Action Plan, Jet Engine Test Cell. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. January 1997. Remedial Action Plan, North Fuel Farm Site. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. January 1997. Sampling and Analysis Outline. Building 241. Base Realignment and Closure. Zone D, Flightline Industrial Area Group VIII. Naval Air Station Cecil Field, Jacksonville, Florida.

ABB Environmental Services, Inc. December 1997. Record of Decision, Site 7, Operable Unit 3. Naval Air Station Cecil Field, Jacksonville, Florida.

Duval County, Florida. April 1968. Aerial Photograph, Jacksonville, Florida. Panel No. 41.

Duval County, Florida. February 1977. Aerial Photograph, Jacksonville, Florida. Panel No. 41.

Duval County, Florida. January 1988. Aerial Photograph, Jacksonville, Florida. Panel No. 41.

BIBLIOGRAPHY

(Cont'd)

Duval County, Florida. January 1993. Aerial Photograph, Jacksonville, Florida. Panel No. 41.

Duval County, Florida. December 1995. Aerial Photograph, Jacksonville, Florida. Panel No. 41.

Fairchild, Roy W. 1972. The Shallow Aquifer System in Duval County, Florida, Report of Investigations No. 59. State of Florida Department of Natural Resources, Bureau of Geology.

Golder Associates Inc. June 4, 1998. Proposed Statement of Work and Cost Estimate, Focused Environmental Due Diligence Investigation, Flight Line Facilities. Jacksonville, Florida

Golder Associates Inc. January 6, 1998. Environmental Due Diligence Assessment Northrop Grumman Corporation. Cecil Field Project Yellow Water Weapons Compound Area. Jacksonville, Florida.

Golder Associates Inc. January 12, 1998. Environmental Due Diligence Assessment Northrop Grumman Corporation. Cecil Field Project Building No. 68. Jacksonville, Florida.

Golder Associates Inc. January 12, 1998. Environmental Due Diligence Assessment Northrop Grumman Corporation. Cecil Field Project Building No. 900. Jacksonville, Florida.

Ivey, Harris & Walls, Inc. July 29, 1998. Trench Drain Inspection Report, Building 815 and Building 1845, NAS Cecil Field, Jacksonville, Florida.

Leve, Gilbert W. 1966. Groundwater in Duval and Nassau Counties, Florida, Report of Investigations No. 43. State of Florida State Board of Conservation, Division of Geology, Florida Geological Survey.

Northrop Grumman Corporation. October 8, 1997. Environmental Summary Report - Cecil Field Inspection. Memorandum.

Ogden Environmental and Energy Services Company. November 1996. Illicit Discharge Report. Naval Air Station Cecil Field, Jacksonville, Florida.

Southern Division Naval Facilities Engineering Command. 1998. Environmental Baseline Survey for Lease, Hangars 13, 14, 67, 815, 860, and 1845 and Associated Buildings. NAS Cecil Field, Jacksonville, Florida.

United States Geological Survey. 1993. Fiftone Quadrangle, Florida. 7.5 Minute Topographic Series.

United States Geological Survey. 1993. Jacksonville Heights Quadrangle, Florida. 7.5 Minute Topographic Series.

TABLE 1

SOIL AND SEDIMENT SAMPLING PROGRAM SUMMARY
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT
JACKSONVILLE, FLORIDA

Sample ID	Key Dates			Analytical Parameters				QA / QC	
	Date Sampled	Date Shipped	Trip Blank	App IX VOCs	App IX SVOCs	Appendix IX Metals + Al	8080	Equipment Blank	Duplicate
BUILDING NO. 1845									
FL-SB-1	5/29/98	5/30/98	TB-1	✓	✓	✓	---	---	---
FL-SB-2	6/2/98	6/3/98	TB-2	✓	✓	✓	---	---	---
FL-SB-3	6/2/98	6/3/98	TB-2	✓	✓	✓	---	---	---
FL-SB-4	5/29/98	5/30/98	TB-1	✓	✓	✓	---	---	FL-DUP-1
FL-SB-5	6/4/98	6/4/98	TB-4	✓	✓	✓	---	---	---
FL-SB-6	6/3/98	6/3/98	TB-3	✓	✓	✓	---	---	---
FL-SB-7	6/4/98	6/4/98	TB-4	✓	✓	✓	---	---	---
FL-SB-8	5/29/98	5/30/98	TB-1	✓	✓	✓	---	---	---
FL-SB-9	6/4/98	6/4/98	TB-4	✓	✓	✓	---	---	---
FL-SB-10	5/29/98	5/30/98	TB-2	✓	✓	✓	---	---	---
FL-SB-11	6/8/98	6/9/98	TB-5	✓	✓	✓	---	---	---
FL-SB-13	6/2/98	6/3/98	TB-2	✓	✓	✓	---	---	---
FL-SB-15	5/29/98	5/30/98	TB-1	✓	✓	✓	---	FL-EQ-1	---
FL-SB-25	6/10/98	6/11/98	---	N/A	N/A	N/A	✓	---	---
FL-SB-26	6/10/98	6/11/98	---	N/A	N/A	N/A	✓	FL-EQ-PCB	---
FL-SB-27	6/4/98	6/4/98	TB-4	✓	✓	✓	---	---	---
FL-SB-28	6/4/98	6/4/98	TB-4	✓	✓	✓	---	---	---
FL-SB-29	6/4/98	6/4/98	TB-4	✓	✓	✓	---	---	FL-DUP-2
FL-SB-30	6/9/98	6/10/98	TB-6	✓	✓	✓	---	---	---
FL-SB-31	6/8/98	6/9/98	TB-5	✓	✓	✓	---	---	---
BUILDING NO. 815									
FL-SB-12	6/8/98	6/9/98	TB-5	✓	✓	✓	---	---	--
FL-SB-14	6/17/98	6/18/98	TB-10	✓	✓	✓	---	---	--
FL-SB-16	6/9/98	6/10/98	TB-6	✓	✓	✓	---	---	--
FL-SB-17	6/16/98	6/17/98	TB-9	✓	✓	✓	---	---	--
FL-SB-18	6/9/98	6/10/98	TB-6	✓	✓	✓	---	---	--
FL-SB-19	6/12/98	6/13/98	TB-8	✓	✓	✓	---	FL-EQ-2A	--
FL-SB-20	6/12/98	6/13/98	TB-8	✓	✓	✓	---	---	--
FL-SB-21	6/11/98	6/12/98	TB-7	✓	✓	✓	---	---	--
FL-SB-22	6/17/98	6/18/98	TB-10	✓	✓	✓	---	---	--
FL-SB-32	6/9/98	6/10/98	TB-6	✓	✓	✓	---	---	FL-DUP-3
FL-SB-33	6/17/98	6/18/98	TB-10	✓	✓	✓	---	---	--
FL-SB-34	6/9/98	6/10/98	TB-6	✓	✓	✓	---	---	--
FL-SB-35	6/11/98	6/12/98	---	N/A	N/A	N/A	✓	---	--
FL-SB-36	6/11/98	6/12/98	TB-7	✓	✓	✓	---	---	--
FL-SB-37	6/11/98	6/12/98	TB-7	✓	✓	✓	---	---	FL-DUP-4
FL-SB-38	6/11/98	6/12/98	TB-7	✓	✓	✓	---	---	--
FL-SB-39	6/17/98	6/18/98	TB-10	✓	✓	✓	---	---	--
FL-SB-40	6/17/98	6/18/98	TB-10	✓	✓	✓	---	---	--
FL-SB-41	6/17/98	6/18/98	TB-10	✓	✓	✓	---	---	--
FL-SB-42	6/17/98	6/18/98	TB-10	✓	✓	✓	---	---	--
FL-SB-47	6/17/98	6/18/98	TB-10	✓	✓	✓	---	---	--
FLIGHT LINE PARKING LOTS									
FL-SB-23	6/11/98	6/12/98	TB-7	✓	✓	✓	---	---	---
FL-SB-24	6/16/98	6/17/98	TB-9	✓	✓	✓	---	---	---
FL-SB-43	6/18/98	6/19/98	TB-11	✓	✓	✓	---	FL-EQ-3	FL-DUP-5
FL-SB-44	6/18/98	6/19/98	TB-11	✓	✓	✓	---	---	---
FL-SB-45	6/18/98	6/19/98	TB-11	✓	✓	✓	---	---	---
FL-SB-46	6/18/98	6/19/98	TB-11	✓	✓	✓	---	---	---
SEDIMENT SAMPLES									
FL-SD-1	6/18/98	6/19/98	TB-11	✓	✓	✓	---	FL-EQ-4	---
FL-SD-2	6/18/98	6/19/98	TB-11	✓	✓	✓	---	---	---
TOTAL				46	46	46	3	5	5

TABLE 2

GROUNDWATER AND SURFACE WATER SAMPLING PROGRAM SUMMARY
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT
JACKSONVILLE, FLORIDA

Sample ID	Key Dates						Analytical Parameters				QA / QC	
	Date Installed	Date Developed	Bottles Prepared	Date Sampled	Date Shipped	Trip Blank	App IX VOCs	App IX SVOCs	Appendix IX Metals + Al	Filter	Equipment Blank	Duplicate
BUILDING NO. 1845												
Shallow Wells												
FL-SMW-1	5/28/98	5/28/98	6/5/98	6/8/98	6/9/98	TB-1 (GW)	✓	✓	✓	---	EB-1 (GW)	---
FL-SMW-2	5/29/98	5/29/98	6/5/98	6/9/98	6/10/98	TB-2 (GW)	✓	✓	✓	---	---	DUP-1 (GW)
FL-SMW-3	6/2/98	6/2/98	6/5/98	6/9/98	6/10/98	TB-2 (GW)	✓	✓	✓	---	---	---
FL-SMW-4	5/29/98	5/29/98	6/5/98	6/9/98	6/10/98	TB-2 (GW)	✓	✓	✓	---	---	---
FL-SMW-5	6/4/98	6/4/98	6/5/98	6/9/98	6/10/98	TB-2 (GW)	✓	✓	✓	---	---	---
FL-SMW-6	6/3/98	6/3/98	6/5/98	6/9/98	6/10/98	TB-2 (GW)	✓	✓	✓	---	---	---
FL-SMW-7	5/27/98	5/27/98	6/5/98	6/9/98	6/10/98	TB-2 (GW)	✓	✓	✓	---	---	---
FL-SMW-8	5/27/98	5/27/98	6/5/98	6/10/98	6/11/98	TB-3 (GW)	✓	✓	✓	---	---	---
FL-SMW-9	6/4/98	6/4/98	6/5/98	6/10/98	6/11/98	TB-3 (GW)	✓	✓	✓	---	---	---
FL-SMW-10	5/28/98	5/28/98	6/5/98	6/10/98	6/11/98	TB-3 (GW)	✓	✓	✓	---	---	---
FL-SMW-11	6/8/98	6/8/98	6/5/98	6/11/98	6/12/98	TB-4 (GW)	✓	✓	✓	---	---	---
FL-SMW-13	6/2/98	6/2/98	6/5/98	6/11/98	6/12/98	TB-4 (GW)	✓	✓	✓	---	---	---
FL-SMW-15	5/27/98	5/27/98	6/5/98	6/11/98	6/12/98	TB-4 (GW)	✓	✓	✓	---	---	---
Intermediate Wells												
FL-IMW-1	5/28/98	5/29/98	6/15/98	6/16/98	6/17/98	TB-7 (GW)	✓	✓	✓	---	---	DUP-4 (GW)
FL-IMW-2	6/1/98	6/2/98	6/5/98	6/8/98	6/9/98	TB-1 (GW)	✓	✓	✓	---	EB-1 (GW)	
FL-IMW-3	6/3/98	6/5/98	6/5/98	6/10/98	6/11/98	TB-3 (GW)	✓	✓	✓	---	---	
Deep Wells												
FL-DMW-1	5/28/98	5/29/98	6/5/98	6/8/98	6/9/98	TB-1 (GW)	✓	✓	✓	---	EB-1 (GW)	---
FL-DMW-2	6/1/98	6/2/98	6/5/98	6/8/98	6/9/98	TB-1 (GW)	✓	✓	✓	---	EB-1 (GW)	---
FL-DMW-3	6/3/98	6/5/98	6/5/98	6/10/98	6/11/98	TB-3 (GW)	✓	✓	✓	---	---	---
Existing Wells												
FL-ABB-10	---	---	6/5/98	6/11/98	6/12/98	TB-4 (GW)	✓	✓	✓	---	---	---
BUILDING NO. 815												
Shallow Wells												
FL-SMW-12	6/5/98	6/5/98	6/15/98	6/15/98	6/16/98	TB-6 (GW)	✓	✓	✓	---	---	DUP-2 (GW)
FL-SMW-14	6/17/98	6/17/98	6/19/98	6/19/98	6/20/98	TB-10 (GW)	✓	✓	✓	---	---	---
FL-SMW-16	6/9/98	6/9/98	6/5/98	6/12/98	6/13/98	TB-5 (GW)	✓	✓	✓	---	EB-2 (GW)	---
FL-SMW-17	6/16/98	6/16/98	6/18/98	6/18/98	6/19/98	TB-9 (GW)	✓	✓	✓	---	EB-3 (GW)	---
FL-SMW-18	6/9/98	6/9/98	6/16/98	6/16/98	6/17/98	TB-7 (GW)	✓	✓	✓	---	---	---
FL-SMW-19	6/12/98	6/15/98	6/16/98	6/16/98	6/20/98	TB-10 (GW)	✓	✓	✓	---	---	---
FL-SMW-20	6/12/98	6/15/98	6/16/98	6/16/98	6/20/98	TB-10 (GW)	✓	✓	✓	---	---	---
FL-SMW-21	6/11/98	6/15/98	6/16/98	6/16/98	6/20/98	TB-10 (GW)	✓	✓	✓	---	---	---
FL-SMW-22	6/17/98	6/17/98	6/20/98	6/20/98	6/21/98	TB-11 (GW)	✓	✓	✓	---	---	---
FL-SMW-25	6/16/98	6/16/98	6/20/98	6/20/98	6/21/98	TB-11 (GW)	✓	✓	✓	---	---	---
FL-SMW-26	6/17/98	6/17/98	6/20/98	6/20/98	6/21/98	TB-11 (GW)	✓	✓	✓	---	---	---
FL-SMW-27	6/17/98	6/17/98	6/20/98	6/20/98	6/21/98	TB-11 (GW)	✓	✓	✓	---	---	---
Intermediate Wells												
FL-IMW-12	6/8/98	6/10/98	6/15/98	6/15/98	6/16/98	TB-6 (GW)	✓	✓	✓	---	---	---
FL-IMW-18	6/10/98	6/11/98	6/15/98	6/16/98	6/17/98	TB-7 (GW)	✓	✓	✓	---	---	DUP-3 (GW)
Deep Wells												
FL-DMW-12	6/4/98	6/5/98	6/15/98	6/15/98	6/16/98	TB-6 (GW)	✓	✓	✓	---	---	---
FL-DMW-18	6/9/98	6/10/98	6/15/98	6/16/98	6/17/98	TB-7 (GW)	✓	✓	✓	---	---	---
Existing Wells												
FL-ABB-5	---	---	6/5/98	6/12/98	6/13/98	TB-5 (GW)	✓	✓	✓	---	EB-2 (GW)	---
FL-ABB-6	---	---	6/5/98	6/12/98	6/13/98	TB-5 (GW)	✓	✓	✓	---	EB-2 (GW)	---
FL-ABB-7	---	---	6/5/98	6/12/98	6/13/98	TB-5 (GW)	✓	✓	✓	---	EB-2 (GW)	---
FL-ABB-8	---	---	6/5/98	6/12/98	6/13/98	TB-5 (GW)	✓	✓	✓	---	EB-2 (GW)	---
FL-ABB-9	---	---	6/5/98	6/11/98	6/12/98	TB-4 (GW)	✓	✓	✓	---	---	---
PARKING AREA												
Shallow Wells												
FL-SMW-23	6/16/98	6/16/98	6/18/98	6/18/98	6/18/98	TB-9 (GW)	✓	✓	✓	---	EB-3 (GW)	---
FL-SMW-24	6/16/98	6/16/98	6/19/98	6/19/98	6/19/98	TB-10 (GW)	✓	✓	✓	---	---	---
Intermediate Wells												
FL-IMW-23	6/11/98	6/12/98	6/18/98	6/18/98	6/18/98	TB-9 (GW)	✓	✓	✓	---	EB-3 (GW)	---
Deep Wells												
FL-DMW-23	6/10/98	6/12/98	6/18/98	6/18/98	6/18/98	TB-9 (GW)	✓	✓	✓	---	EB-3 (GW)	---
Existing Wells												
FL-ABB-1	---	---	6/17/98	6/17/98	6/18/98	TB-8 (GW)	✓	✓	✓	---	---	---
FL-ABB-2	---	---	6/17/98	6/17/98	6/18/98	TB-8 (GW)	✓	✓	✓	---	---	---
FL-ABB-3	---		6/17/98	6/17/98	6/18/98	TB-8 (GW)	✓	✓	✓			
FL-ABB-4	---	---	6/17/98	6/17/98	6/18/98	TB-8 (GW)	✓	✓	✓	---	---	---
Surface Water Samples												
FL-SW-1	---	---	---	6/18/98	6/18/98	TB-11	✓	✓	✓	---	---	---
FL-SW-2	---	---	---	6/24/98	6/25/98	B-1 (SED)	✓	✓	✓	---	---	---
TOTAL							51	51	51	---	3	4

TABLE 3

SUMMARY OF SOIL OVA SCREENING DATA
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT
JACKSONVILLE, FLORIDA

SOIL BORING ID	OVA RESULTS 0-2 FEET BGS	OVA RESULTS 2-4 FEET BGS	OVA RESULTS 4-6 FEET BGS	LABORATORY SAMPLE COLLECTION DATE	LABORATORY SAMPLE COLLECTION DEPTH (FEET BGS)	COMMENTS
FL-SB-1	< 1	< 1	< 1	5/29/98	0.5-1.0	Collected near surface of unpaved area.
FL-SB-2	4	1	< 1	6/2/98	1.0-1.5	Collected at the interval with the highest OVA reading.
FL-SB-3	< 1	< 1	< 1	6/2/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-4	< 1	< 1	NT	5/29/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-5	< 1	< 1	< 1	6/4/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-6	< 1	< 1	< 1	6/3/98	1.0-1.5	Collected beneath asphalt surface.
FL-SB-7	< 1	< 1	< 1	6/4/98	1.0-1.5	Collected beneath asphalt surface.
FL-SB-8	< 1	< 1	< 1	5/29/98	0.5-1.0	Collected near surface of an unpaved area near FL-SMW-8.
FL-SB-9	< 1	< 1	< 1	6/4/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-10	< 1	< 1	< 1	5/29/98	0.5-1.0	Collected near surface of unpaved area.
FL-SB-11	< 1	< 1	< 1	6/8/98	2.0-2.5	Collected near a cracked concrete area adjacent to a floor drain.
FL-SB-12	< 1	< 1	< 1	6/8/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-13	< 1	< 1	< 1	6/2/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-14	< 1	< 1	< 1	6/17/98	0.5-1.0	Collected beneath the concrete ramp.
FL-SB-15	< 1	< 1	70	5/29/98	4.0-4.5	Collected at the interval with the highest OVA reading.
FL-SB-16	< 1	< 1	< 1	6/9/98	0.5-1.0	Collected near surface of unpaved area.
FL-SB-17	< 1	< 1	< 1	6/16/98	0.5-1.0	Collected near surface of unpaved area.
FL-SB-18	< 1	< 1	< 1	6/9/98	1.0-1.5	Collected beneath asphalt surface.
FL-SB-19	< 1	< 1	< 1	6/12/98	1.5-2.0	Collected beneath the concrete ramp.
FL-SB-20	< 1	< 1	< 1	6/12/98	1.5-2.0	Collected beneath the concrete ramp.
FL-SB-21	< 1	3	1	6/11/98	2.0-3.0	Collected at the interval with the highest OVA reading.
FL-SB-22	160	140	45	6/17/98	1.0-1.5	Collected at the interval with the highest OVA reading.
FL-SB-23	< 1	< 1	< 1	6/11/98	0.5-1.0	Collected near surface of unpaved area.
FL-SB-24	< 1	< 1	< 1	6/16/98	1.0-1.5	Collected beneath asphalt surface.
FL-SB-25	NT	NT	NT	6/10/98	0.25-0.5	Surface sample collected for PCB testing.
FL-SB-26	NT	NT	NT	6/10/98	0.25-0.5	Surface sample collected for PCB testing.
FL-SB-27	< 1	< 1	< 1	6/4/98	0.5-1.0	Collected beneath asphalt surface.
FL-SB-28	< 1	< 1	< 1	6/4/98	5.0-5.5	Collected near depth of the oil/water separator.
FL-SB-29	< 1	< 1	< 1	6/4/98	5.0-5.5	Collected near depth of the oil/water separator.
FL-SB-30	40	36	22	6/9/98	1.5-2.0	Collected at the interval with the highest OVA reading.
FL-SB-31	< 1	< 1	< 1	6/8/98	0.5-1.0	Collected near surface of unpaved area by door to Building No. 1845.
FL-SB-32	115	40	24	6/9/98	1.0-1.5	Collected at the interval with the highest OVA reading.
FL-SB-33	< 1	< 1	< 1	6/17/98	1.0-1.5	Collected beneath asphalt surface.
FL-SB-34	200	50	5	6/9/98	0.25-1.0	Collected at the interval with the highest OVA reading.
FL-SB-35	NT	NT	NT	6/11/98	SURFACE	Surface sample collected for PCB testing.
FL-SB-36	< 1	< 1	< 1	6/11/98	0.5-1.0	Collected near surface of unpaved area.
FL-SB-37	2	3	3	6/11/98	2.0-3.0	Collected at the interval with the highest OVA reading.
FL-SB-38	< 1	< 1	< 1	6/11/98	1.0-2.0	Collected beneath the concrete ramp.
FL-SB-39	< 1	< 1	< 1	6/17/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-40	< 1	< 1	< 1	6/17/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-41	< 1	< 1	< 1	6/17/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-42	< 1	< 1	< 1	6/17/98	1.0-1.5	Collected beneath the concrete ramp.
FL-SB-43	20	12	4	6/18/98	1.0-1.5	Collected at the interval with the highest OVA reading.
FL-SB-44	< 1	< 1	< 1	6/18/98	1.0-1.5	Collected near surface of unpaved area.
FL-SB-45	< 1	< 1	< 1	6/18/98	1.0-1.5	Collected near surface of unpaved area.
FL-SB-46	2	< 1	< 1	6/18/98	1.0-1.5	Collected at the interval with the highest OVA reading.
FL-SB-47	< 1	< 1	< 1	6/17/98	1.0-1.5	Collected near surface of unpaved area near FL-SB-27.
FL-SD-1	NT	NT	NT	6/18/98	0-0.5	Collected on north side of detention pond.
FL-SD-2	NT	NT	NT	6/18/98	0-0.5	Collected on southeast side of detention pond.

Notes:
Soils were screened using a HNU OVA equipped with a photoionization detector.
Headspace measurements conducted in general accordance with procedures established in Chapter 62-770.200 F.A.C. for soil screening at petroleum contaminated sites.
NT = Not tested.
ppm = Parts per million.

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TABLE 4

SUMMARY OF MONITORING WELL CONSTRUCTION AND
GROUNDWATER ELEVATION DATA
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT
JACKSONVILLE, FLORIDA

Well ID	Installation Date	Total Depth (feet)	Screened Interval (feet)	Elevation of Top of Casing[1] (feet)	Depth to Water (feet btoc)	Groundwater Elevation (feet)	Measurement Sample Date	Volume Purged (gallons)	Turbidity After Purging (NTU)
SMW-1	5/28/98	15	4-14	78.09	7.61	70.48	6/8/98	6	2.00
IMW-1	5/28/98	38	32-37	78.10	7.69	70.41	6/16/98	25	8.70
DMW-1	5/28/98	50	43-48	78.14	7.93	70.21	6/8/98	24	0.59
SMW-2	5/29/98	15	4-14	76.77	6.69	70.08	6/9/98	5	8.88
IMW-2	6/1/98	39	33-38	76.72	7.12	69.60	6/8/98	24	14.50
DMW-2	6/1/98	50	43-48	76.74	7.15	69.59	6/8/98	24	2.20
SMW-3	6/2/98	14.5	4-14	76.43	6.40	70.03	6/9/98	20	7.81
IMW-3	6/3/98	39	33-38	76.40	6.49	69.91	6/10/98	36	9.94
DMW-3	6/3/98	51	45-50	76.47	6.57	69.90	6/10/98	66	9.62
SMW-4	5/29/98	15	4-14	77.69	7.47	70.22	6/9/98	22	2.67
SMW-5	6/4/98	15	4-14	77.10	7.42	69.68	6/9/98	16	8.10
SMW-6	6/3/98	15	4-14	77.89	7.50	70.39	6/9/98	20	7.50
SMW-7	5/27/98	15	4-14	78.12	7.81	70.31	6/9/98	23	8.37
SMW-8	5/27/98	14	3-13	77.35	6.88	70.47	6/10/98	13	5.35
SMW-9	6/4/98	15	4-14	77.33	6.98	70.35	6/10/98	21	5.56
SMW-10	5/28/98	15	4-14	76.94	6.32	70.62	6/10/98	11	5.29
SMW-11	6/8/98	14.5	4-14	77.53	7.54	69.99	6/11/98	9	5.96
SMW-12	6/5/98	15	4-14	76.06	6.63	69.43	6/15/98	6	5.45
IMW-12	6/8/98	38	32.5-37.5	76.01	6.65	69.36	6/15/98	25	6.50
DMW-12	6/4/98	51	45-50	76.04	6.70	69.34	6/15/98	32	6.81
SMW-13	6/2/98	15	4-14	76.42	6.74	69.68	6/11/98	17	9.17
SMW-14	6/17/98	14.5	4-14	75.99	6.93	69.06	6/19/98	19	9.35
SMW-15	5/27/98	14	3-13	76.61	6.75	69.86	6/11/98	30	8.50
SMW-16	6/9/98	15	4-14	75.65	5.99	69.66	6/12/98	12	7.89
SMW-17	6/16/98	14.5	4-14	76.23	7.73	68.50	6/18/98	9	1.38
SMW-18	6/9/98	15	4-14	75.97	7.83	68.14	6/16/98	36	9.70
IMW-18	6/10/98	31	26.5-30.5	75.71	7.62	68.09	6/16/98	26	11.37
DMW-18	6/9/98	50	38-43	75.42	7.37	68.05	6/16/98	62	97.40
SMW-19	6/12/98	14.5	4-14	74.97	7.25	67.72	6/19/98	6	4.68
SMW-20	6/12/98	14.5	4-14	74.98	6.98	68.00	6/19/98	15	3.98
SMW-21	6/11/98	15	4-14	75.35	7.07	68.28	6/19/98	12	7.31
SMW-22 [2]	6/17/98	14.5	4-14	76.37	8.38	67.99	6/22/98	20	7.03
SMW-23	6/16/98	14.5	4-14	77.37	7.35	70.02	6/18/98	12	3.71
IMW-23	6/11/98	33.5	28-33	77.55	7.55	70.00	6/18/98	5	3.32
DMW-23	6/10/98	48.5	43-48	77.55	7.87	69.68	6/18/98	18	0.86
SMW-24	6/16/98	14.5	4-14	78.17	7.75	70.42	6/19/98	16	8.30
SMW-25	6/16/98	14.5	4-14	76.01	6.79	69.22	6/22/98	5	4.26
SMW-26	6/17/98	14.5	4-14	76.24	6.42	69.82	6/22/98	8	3.69
SMW-27	6/17/98	14.5	4-14	76.74	6.38	70.36	6/22/98	16	8.36
ABB-1	---	12.5	2.5-12.5	NS	5.43		6/17/98	74	8.78
ABB-2	---	15	---	NS	7.19	---	6/17/98	40	47.80
ABB-3	---	16	4-14	NS	7.00		6/17/98	25	6.93
ABB-4	---	16	4-14	NS	7.32		6/17/98	32	10.58
ABB-5	---	15.5	4.5-14.5	NS	6.99	---	6/12/98	6[3]	1101
ABB-6	---	16	---	NS	7.01		6/12/98	47	232
ABB-7	---	17	7-17	NS	7.98	---	6/12/98	9.5	5.80
ABB-8	---	102	91-101	NS	7.17	---	6/12/98	50	9.80
ABB-9	---	14	---	NS	6.10		6/11/98	31	9.93
ABB-10	---	15	---	NS	5.90	---	6/11/98	52	41.50

Notes:
[1]Surveyed elevations are referenced to mean seal level (msl).
[2]Monitoring well casing was cut after water level measurement collected and prior to completion of the elevation survey
[3]Monitoring well purged dry twice prior to sampling.
NS = Not surveyed
Feet btoc = Feet below top of casing.
--- = No measurement recorded.

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TABLE 5
Page 1 of 4
SUMMARY OF DETECTED PARAMETERS IN SOIL
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT
JACKSONVILLE, FLORIDA

Parameter	Units	FDEP Soil Cleanup Target Levels[1]		SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	SB-10	SB-11	SB-12	SB-13
		Residential	Industrial													
Volatile Organic Compounds by EPA Method 8260																
Acetone	µg/kg	770,000	5,500,000	---	73	---	---	---	---	---	---	---	---	---	---	---
Carbon disulfide	µg/kg	200,000	730,000	---	---	---	---	---	---	---	---	---	---	---	---	---
Methylene chloride	µg/kg	16,000	23,000	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2-Dichloropropane	µg/kg	600	800	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	µg/kg	240,000	240,000	---	---	---	---	---	---	---	---	---	---	---	---	---
Tetrachloroethene	µg/kg	10,000	20,000	63	---	---	56	---	---	---	120	---	120	---	---	---
Toluene	µg/kg	300,000	520,000	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1,1-Trichloroethane	µg/kg	420,000	1,400,000	---	---	---	---	---	---	---	55	---	54	---	---	---
Trichloroethene	µg/kg	4,800	6,800	---	---	---	---	---	---	---	---	---	---	---	---	---
Xylenes	µg/kg	290,000	290,000	---	---	---	---	---	---	---	50	---	52	---	---	---
Semivolatile Organic Compounds by EPA Method 8270																
Butylbenzylphthalate	µg/kg	220	220	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Methylnaphthalene	µg/kg	1,500,000	15,000,000	---	---	---	---	---	---	---	---	---	---	---	---	---
Naphthalene	µg/kg	1,000,000	8,600,000	---	---	---	---	---	---	---	---	---	---	---	---	---
Polychlorinated Biphenyls by EPA Method 8082																
Arochlor-1248	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Arochlor-1254	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Arochlor-1260	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Appendix IX Metals by EPA Method 6010/7470																
Aluminum	mg/kg	72,000	1,000,000	8,000	1,600	6,600	2,200	230	1,300	8,700	1,900	2,100	1,200	4,300	4,500	2,000
Barium	mg/kg	105	87,000	6.6	2.5	3.4	1.9	---	2.9	6.7	1.9	4.5	1.3	9.8	6.3	5.7
Chromium	mg/kg	290	430	6.5	2.7	6.7	2.5	---	2.8	7.1	1.6	2.3	---	6.5	6.0	2.2
Cobalt	mg/kg	4,700	110,000	---	---	---	---	---	---	---	---	---	---	---	---	---
Copper	mg/kg	9	12,000	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/kg	500	920	4.6	2.7	4.3	1.4	0.53	2.1	4.3	1.5	1.9	1.1	3.0	3.0	2.7
Mercury	mg/kg	4	28	0.027	---	0.052	---	---	0.011	0.031	---	0.019	---	---	0.022	0.013
Nickel	mg/kg	30	28,000	4.4	---	---	---	---	---	4.2	---	---	---	---	---	---
Vanadium	mg/kg	11	7,700	5.5	2.0	3.6	2.1	---	2.9	5.4	1.3	1.9	---	5.6	7.0	1.9
Zinc	mg/kg	23,000	560,000	9.9	5.0	4.1	5.0	---	2.7	3.5	6.8	2.0	6.4	4.2	3.5	4.8

Notes:
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
--- = Not Detected
NS = Not Sampled
[1] Florida Department of Environmental Protection Soil Cleanup Target Levels,
Chapter 62-785 F.A.C., (April, 1998),
and/or Florida Department of Environmental Protection Soil Cleanup Target Levels -
Petroleum Contamination Site Cleanup Criteria, Chapter 62-770 F.A.C, (September, 1997)
Shaded areas indicate exceedence of established cleanup target levels for residential scenario.

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TABLE 5
Page 2 of 4
SUMMARY OF DETECTED PARAMETERS IN SOIL
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT
JACKSONVILLE, FLORIDA

Parameter	Units	FDEP Soil Cleanup Target Levels[1] Residential	Industrial	SB-14	SB-15	SB-16	SB-17	SB-18	SB-19	SB-20	SB-21	SB-22	SB-23	SB-24	SB-25	SB-26
Volatile Organic Compounds by EPA Method 8260																
Acetone	µg/kg	770,000	5,500,000	---	---	74	---	---	---	---	---	---	---	---	NS	NS
Carbon disulfide	µg/kg	200,000	730,000	---	---	---	---	---	---	---	---	---	---	---	NS	NS
Methylene chloride	µg/kg	16,000	23,000	---	310	---	---	---	---	---	---	---	---	---	NS	NS
1,2-Dichloropropane	µg/kg	600	800	---	590	---	---	---	---	---	---	---	---	---	NS	NS
Ethylbenzene	µg/kg	240,000	240,000	---	270	---	---	---	---	---	---	---	---	---	NS	NS
Tetrachloroethene	µg/kg	10,000	20,000	---	2,300	---	---	---	---	---	---	---	---	---	NS	NS
Toluene	µg/kg	300,000	520,000	---	280	---	---	---	---	---	---	---	---	---	NS	NS
1,1,1-Trichloroethane	µg/kg	420,000	1,400,000	---	1,400	---	---	---	---	---	---	---	---	---	NS	NS
Trichloroethene	µg/kg	4,800	6,800	---	650	---	---	---	---	---	---	---	---	---	NS	NS
Xylenes	µg/kg	290,000	290,000	---	1,100	---	---	---	---	---	---	---	---	---	NS	NS
Semivolatile Organic Compounds by EPA Method 8270																
Butylbenzylphthalate	µg/kg	220	220	---	---	---	---	---	---	---	---	---	---	---	NS	NS
2-Methylnaphthalene	µg/kg	1,500,000	15,000,000	---	---	---	---	---	---	---	---	3,400	---	---	NS	NS
Naphthalene	µg/kg	1,000,000	8,600,000	---	---	---	---	---	---	---	---	1,300	---	---	NS	NS
Polychlorinated Biphenyls by EPA Method 8082																
Arochlor-1248	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
Arochlor-1254	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
Arochlor-1260	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
Appendix IX Metals by EPA Method 6010/7470																
Aluminum	mg/kg	72,000	1,000,000	5,700	8,500	3,800	1,100	3,400	1,800	980	17,000	2,800	460	1,600	NS	NS
Barium	mg/kg	105	87,000	4.3	8.6	4.8	2.5	1.8	2.3	1.7	6.4	4.0	1.3	4.2	NS	NS
Chromium	mg/kg	290	430	5.5	12	4.0	1.6	2.5	1.6	1.5	8.4	3.1	---	2.4	NS	NS
Cobalt	mg/kg	4,700	110,000	---	---	---	---	---	---	---	2.3	---	---	---	NS	NS
Copper	mg/kg	9	12,000	---	---	---	---	---	---	---	---	---	---	---	NS	NS
Lead	mg/kg	500	920	4.4	11	5.7	4.7	2.1	0.97	0.99	7.0	2.9	1.3	4.7	NS	NS
Mercury	mg/kg	4	28	0.035	0.20	---	0.013	0.015	---	---	0.058	0.017	---	0.014	NS	NS
Nickel	mg/kg	30	28,000	---	---	---	---	---	---	---	12	---	---	---	NS	NS
Vanadium	mg/kg	11	7,700	3.2	2.9	3.0	1.4	1.2	1.1	1.1	10	2.4	---	2.0	NS	NS
Zinc	mg/kg	23,000	560,000	---	7.3	4.8	4.6	2.3	---	---	---	2.5	2.1	4.5	NS	NS

Notes:
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
--- = Not Detected
NS = Not Sampled
[1] Florida Department of Environmental Protection Soil Cleanup Target Levels, Chapter 62-785 F.A.C., (April, 1998), and/or Florida Department of Environmental Protection Soil Cleanup Target Levels - Petroleum Contamination Site Cleanup Criteria, Chapter 62-770 F.A.C, (September, 1997)
Shaded areas indicate exceedence of established cleanup target levels for residential scenario.

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TABLE 5
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SUMMARY OF DETECTED PARAMETERS IN SOIL
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT
JACKSONVILLE, FLORIDA

Parameter	Units	FDEP Soil Cleanup Target Levels[1] Residential	Industrial	SB-27	SB-28	SB-29	SB-30	SB-31	SB-32	SB-33	SB-34	SB-35	SB-36	SB-37	SB-38	SB-39
Volatile Organic Compounds by EPA Method 8260																
Acetone	µg/kg	770,000	5,500,000	---	---	---	3,200	200	660	---	77	NS	---	---	---	---
Carbon disulfide	µg/kg	200,000	730,000	---	---	---	---	---	---	---	59	NS	---	---	---	---
Methylene chloride	µg/kg	16,000	23,000	---	---	---	---	170	---	---	---	NS	---	---	---	---
1,2-Dichloropropane	µg/kg	600	800	---	---	---	---	---	---	---	---	NS	---	---	---	---
Ethylbenzene	µg/kg	240,000	240,000	---	---	---	---	---	---	---	---	NS	---	---	---	---
Tetrachloroethene	µg/kg	10,000	20,000	---	---	---	---	---	---	---	---	NS	---	---	---	---
Toluene	µg/kg	300,000	520,000	---	---	---	---	---	---	---	---	NS	---	---	---	---
1,1,1-Trichloroethane	µg/kg	420,000	1,400,000	---	---	---	---	---	---	---	---	NS	---	---	---	---
Trichloroethene	µg/kg	4,800	6,800	---	---	---	---	64	---	---	---	NS	---	---	---	---
Xylenes	µg/kg	290,000	290,000	---	---	---	---	---	---	---	---	NS	---	---	---	---
Semivolatile Organic Compounds by EPA Method 8270																
Butylbenzylphthalate	µg/kg	220	220	---	---	---	---	---	---	---	---	NS	---	---	---	---
2-Methylnaphthalene	µg/kg	1,500,000	15,000,000	---	---	---	---	---	---	---	---	NS	---	---	---	---
Naphthalene	µg/kg	1,000,000	8,600,000	---	---	---	660	---	---	---	---	NS	---	---	---	---
Polychlorinated Biphenyls by EPA Method 8082																
Arochlor-1248	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	180	NS	NS	NS	NS
Arochlor-1254	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	350	NS	NS	NS	NS
Arochlor-1260	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS	620	NS	NS	NS	NS
Appendix IX Metals by EPA Method 6010/7470																
Aluminum	mg/kg	72,000	1,000,000	10,000	11,000	14,000	12,000	2,500	7,400	7,500	2,900	NS	3,700	3,800	1,500	2,100
Barium	mg/kg	105	87,000	7.0	4.8	4.1	2.4	23	5.8	4.3	1.9	NS	2.2	2.9	1.2	1.8
Chromium	mg/kg	290	430	8.7	6.4	9.4	8.4	7.8	8.6	5.9	8.1	NS	4.0	2.5	1.3	2.0
Cobalt	mg/kg	4,700	110,000	---	---	---	---	---	---	---	---	NS	---	---	---	---
Copper	mg/kg	9	12,000	---	---	---	---	4.6	3.1	---	---	NS	---	---	---	---
Lead	mg/kg	500	920	7.0	13	6.6	6.4	3.3	14	3.4	1.9	NS	5.9	1.9	1.0	1.8
Mercury	mg/kg	4	28	0.069	---	---	0.072	0.013	---	---	---	NS	0.032	---	---	---
Nickel	mg/kg	30	28,000	---	8.9	---	---	---	---	---	---	NS	---	---	---	---
Vanadium	mg/kg	11	7,700	5.5	4.6	10	2.8	2.2	6.2	4.2	1.9	NS	2.7	1.6	1.1	1.5
Zinc	mg/kg	23,000	560,000	4.9	3.2	---	---	11	10	---	---	NS	4.9	---	---	---

Notes:
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
--- = Not Detected
NS = Not Sampled
[1] Florida Department of Environmental Protection Soil Cleanup Target Levels, Chapter 62-785 F.A.C., (April, 1998), and/or Florida Department of Environmental Protection Soil Cleanup Target Levels - Petroleum Contamination Site Cleanup Criteria, Chapter 62-770 F.A.C, (September, 1997)
Shaded areas indicate exceedence of established cleanup target levels for residential scenario.

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TABLE 5
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SUMMARY OF DETECTED PARAMETERS IN SOIL
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT
JACKSONVILLE, FLORIDA

Parameter	Units	FDEP Soil Cleanup Target Levels[1]		SB-40	SB-41	SB-42	SB-43	SB-44	SB-45	SB-46	SB-47
		Residential	Industrial								
Volatile Organic Compounds by EPA Method 8260											
Acetone	µg/kg	770,000	5,500,000	---	---	---	---	---	---	---	---
Carbon disulfide	µg/kg	200,000	730,000	---	---	---	---	---	---	---	---
Methylene chloride	µg/kg	16,000	23,000	---	---	---	---	---	---	---	---
1,2-Dichloropropane	µg/kg	600	800	---	---	---	---	---	---	---	---
Ethylbenzene	µg/kg	240,000	240,000	---	---	---	---	---	---	---	---
Tetrachloroethene	µg/kg	10,000	20,000	---	---	---	---	---	---	---	---
Toluene	µg/kg	300,000	520,000	---	---	---	---	---	---	---	---
1,1,1-Trichloroethane	µg/kg	420,000	1,400,000	---	---	---	---	---	---	---	---
Trichloroethene	µg/kg	4,800	6,800	---	---	---	---	---	---	---	---
Xylenes	µg/kg	290,000	290,000	---	---	---	---	---	---	---	---
Semivolatile Organic Compounds by EPA Method 8270											
Butylbenzylphthalate	µg/kg	220	220	---	---	---	---	580	---	---	---
2-Methylnaphthalene	µg/kg	1,500,000	15,000,000	---	---	---	---	---	---	---	---
Naphthalene	µg/kg	1,000,000	8,600,000	---	---	---	---	---	---	---	---
Polychlorinated Biphenyls by EPA Method 8082											
Arochlor-1248	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS
Arochlor-1254	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS
Arochlor-1260	µg/kg	600	2200	NS	NS	NS	NS	NS	NS	NS	NS
Appendix IX Metals by EPA Method 6010/7470											
Aluminum	mg/kg	72,000	1,000,000	740	7,300	7,400	9,100	3,500	4,400	4,100	2,400
Barium	mg/kg	105	87,000	1.0	17	4.4	6.0	4.8	3.7	1.4	3.0
Chromium	mg/kg	290	430	---	13	8.1	8.0	8.1	4.0	4.0	2.7
Cobalt	mg/kg	4,700	110,000	---	---	---	---	---	---	---	---
Copper	mg/kg	9	12,000	---	---	---	---	2.8	---	---	---
Lead	mg/kg	500	920	0.73	3.8	6.2	6.6	42	7.3	3.9	4.2
Mercury	mg/kg	4	28	---	0.016	0.073	0.033	0.011	0.018	---	---
Nickel	mg/kg	30	28,000	---	---	---	---	---	---	---	---
Vanadium	mg/kg	11	7,700	---	9.5	3.3	6.2	3.4	3.4	1.3	2.3
Zinc	mg/kg	23,000	560,000	---	6.0	---	2.9	25	5.1	---	3.2

Notes:
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
--- = Not Detected
NS = Not Sampled
[1] Florida Department of Environmental Protection Soil Cleanup Target Levels, Chapter 62-785 F.A.C., (April, 1998), and/or Florida Department of Environmental Protection Soil Cleanup Target Levels - Petroleum Contamination Site Cleanup Criteria, Chapter 62-770 F.A.C, (September, 1997)
Shaded areas indicate exceedence of established cleanup target levels for residential scenario.

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TABLE 6

SUMMARY OF DETECTED PARAMETERS IN SEDIMENT
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT

JACKSONVILLE, FLORIDA

PARAMETER	Units	SD-1	SD-2
Volatile Organic Compounds by EPA Method 8260			
Carbon disulfide	µg/kg	16	240
Methylene chloride	µg/kg	6.8	18
Semivolatile Organic Compounds by EPA Method 8270			
bis (2-Ethylhexyl) phthalate	µg/kg	---	14,000
Appendix IX Metals by EPA Method 6010/7470			
Aluminum	mg/kg	4,000	8,100
Barium	mg/kg	5.9	55
Cadmium	mg/kg	---	30
Chromium	mg/kg	3.9	73
Cobalt	mg/kg	---	2.9
Copper	mg/kg	---	110
Lead	mg/kg	3.1	240
Mercury	mg/kg	0.012	0.058
Nickel	mg/kg	---	25
Tin	mg/kg	---	14
Vanadium	mg/kg	3.7	13
Zinc	mg/kg	5.2	500

Notes:
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
--- = Not Detected

DISK: 973-3778\sed_det.xls

TABLE 7

SUMMARY OF DETECTED PARAMETERS IN SURFACE WATER
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT

JACKSONVILLE, FLORIDA

PARAMETER	UNITS	CLASS III SURFACE WATER QUALITY STANDARDS	SW-1	SW-2
Volatile Organic Compounds by EPA Method 8260				
Acetone	μg/l	1692	---	68
Carbon disulfide	μg/l	105	---	170
Trichloroethene	μg/l	≤ 80.7 annual average	16	---
Appendix IX Metals by EPA Method 6010/7470				
Barium	mg/l	not greater than 10% above background	0.019	0.074
Zinc	mg/l	≤ 1	---	0.058

Notes:
Surface Water Quality Standards, Chapter 62-302 F.A.C., 1996.
μg/l = micrograms per liter
mg/l = milligrams per liter
--- = Not Detected
Shaded areas indicate exceedence of established water quality standards

DISK: 973-3778\sw_det.xls

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SUMMARY OF DETECTED PARAMETERS IN GROUNDWATER
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT

JACKSONVILLE, FLORIDA

Parameter	Units	MCL	SMW-1	IMW-1	DMW-1	SMW-2	IMW-2	DMW-2	SMW-3	IMW-3	DMW-3	SMW-4	SMW-5	SMW-6	SMW-7
Volatile Organic Compounds by EPA Method 8260															
Acetone	µg/l	700	---	---	---	52	---	---	---	---	---	34	---	---	---
Bromodichloromethane	µg/l	1	---	---	---	---	---	---	---	---	1.0	---	---	---	---
Carbon disulfide	µg/l	700	---	1.2	---	2.2	---	13	---	---	---	---	---	---	---
Chloroform	µg/l	5.7	---	---	---	---	---	2.8	---	1.7	3.7	---	---	---	---
Ethylbenzene	µg/l	30	---	---	1.7	---	---	---	---	---	---	---	---	---	---
2-Hexanone	µg/l	280	---	---	---	---	---	---	---	---	---	---	---	---	---
4-Methyl-2-pentanone	µg/l	560	---	---	---	---	---	---	---	---	---	---	---	---	---
Trichloroethene	µg/l	3	---	---	---	---	---	---	---	---	---	---	---	---	---
Vinyl chloride	µg/l	1	---	---	---	---	---	---	---	---	---	---	---	---	---
Xylenes	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Semivolatile Organic Compounds by EPA Method 8270															
2-Methylnaphthalene	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Naphthalene	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Appendix IX Metals by EPA Method 6010/7470															
Aluminum	mg/l	0.2	0.25	0.56	---	0.56	0.74	---	0.55	0.91	0.79	0.39	0.27	0.76	1.0
Arsenic	mg/l	0.05	---	---	---	---	---	---	---	0.014	0.010	---	---	---	---
Barium	mg/l	2	0.024	0.025	0.043	---	0.040	0.033	0.025	0.022	0.015	0.017	0.014	---	---
Chromium	mg/l	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/l	0.015	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury	mg/l	0.002	---	---	---	---	---	---	---	---	---	---	---	---	---
Nickel	mg/l	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	mg/l	49	0.013	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	mg/l	5	---	---	---	---	---	---	---	---	---	---	---	---	---

Notes:
MCL = Primary and secondary Maximum Contaminant Levels, Florida Drinking Water Standards, Chapter 62-550 F.A.C., April 1998
µg/l = micrograms per liter
mg/l = milligrams per liter
--- = Not Detected
Shaded areas indicate exceedence of established MCLs.

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SUMMARY OF DETECTED PARAMETERS IN GROUNDWATER
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT

JACKSONVILLE, FLORIDA

Parameter	Units	MCL	SMW-8	SMW-9	SMW-10	SMW-11	SMW-12	IMW-12	DMW-12	SMW-13	SMW-14	SMW-15	SMW-16	SMW-17	SMW-18
Volatile Organic Compounds by EPA Method 8260															
Acetone	µg/l	700	---	---	---	---	---	---	---	---	---	---	---	---	---
Bromodichloromethane	µg/l	1	---	---	---	---	---	---	---	---	---	---	---	---	---
Carbon disulfide	µg/l	700	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloroform	µg/l	5.7	---	---	---	---	---	1.7	---	---	---	---	---	---	---
Ethylbenzene	µg/l	30	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Hexanone	µg/l	280	---	---	---	---	25	---	---	---	---	---	---	---	---
4-Methyl-2-pentanone	µg/l	560	---	---	---	---	---	---	---	---	---	---	---	---	---
Trichloroethene	µg/l	3	---	1.7	---	---	---	---	---	---	---	---	---	---	---
Vinyl chloride	µg/l	1	---	---	---	---	---	---	---	---	1.8	---	---	---	---
Xylenes	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Semivolatile Organic Compounds by EPA Method 8270															
2-Methylnaphthalene	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Naphthalene	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Appendix IX Metals by EPA Method 6010/7470															
Aluminum	mg/l	0.2	0.41	0.70	0.35	0.36	2.6	0.51	0.56	1.0	1.1	0.78	0.55	0.89	0.96
Arsenic	mg/l	0.05	---	---	---	---	---	---	---	---	---	---	---	---	---
Barium	mg/l	2	0.013	0.020	0.027	---	0.015	0.023	0.019	0.036	0.022	0.040	0.030	0.014	0.035
Chromium	mg/l	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/l	0.015	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury	mg/l	0.002	---	---	---	---	---	---	---	---	---	---	---	---	---
Nickel	mg/l	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	mg/l	49	---	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	mg/l	5	---	---	---	---	---	---	---	---	---	---	---	---	---

Notes:
MCL = Primary and secondary Maximum Contaminant Levels, Florida Drinking Water Standards, Chapter 62-550 F.A.C., April 1998
µg/l = micrograms per liter
mg/l = milligrams per liter
--- = Not Detected
Shaded areas indicate exceedence of established MCLs.

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SUMMARY OF DETECTED PARAMETERS IN GROUNDWATER
JUNE 1998

FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT

JACKSONVILLE, FLORIDA

Parameter	Units	MCL	IMW-18	DMW-18	SMW-19	SMW-20	SMW-21	SMW-22	SMW-23	IMW-23	DMW-23	SMW-24	SMW-25	SMW-26	SMW-27
Volatile Organic Compounds by EPA Method 8260															
Acetone	µg/l	700	---	---	---	---	---	---	---	---	---	---	---	---	---
Bromodichloromethane	µg/l	1	---	---	---	---	---	---	---	---	---	---	---	---	---
Carbon disulfide	µg/l	700	33	20	1.2	---	---	---	---	---	---	---	---	---	---
Chloroform	µg/l	5.7	---	---	9.8	1.4	---	---	---	---	---	---	---	---	---
Ethylbenzene	µg/l	30	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Hexanone	µg/l	280	---	---	---	---	---	---	---	---	---	---	---	---	---
4-Methyl-2-pentanone	µg/l	560	---	---	---	---	---	---	---	---	---	---	---	---	---
Trichloroethene	µg/l	3	37	---	---	---	---	---	---	---	---	---	---	---	---
Vinyl chloride	µg/l	1	---	---	---	---	---	---	---	---	---	---	---	---	---
Xylenes	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Semivolatile Organic Compounds by EPA Method 8270															
2-Methylnaphthalene	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Naphthalene	µg/l	20	---	---	---	---	---	---	---	---	---	---	---	---	---
Appendix IX Metals by EPA Method 6010/7470															
Aluminum	mg/l	0.2	0.78	6.9	0.29	0.40	0.63	0.61	0.82	0.24	---	1.1	0.81	0.48	0.33
Arsenic	mg/l	0.05	---	0.015	---	---	---	---	---	---	---	---	---	---	---
Barium	mg/l	2	0.035	0.027	---	---	---	---	0.026	0.042	0.041	---	0.019	0.024	---
Chromium	mg/l	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/l	0.015	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury	mg/l	0.002	---	---	---	---	---	---	---	---	---	---	---	---	---
Nickel	mg/l	0.1	---	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	mg/l	49	---	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	mg/l	5	---	---	---	---	---	---	---	---	---	---	0.050	---	0.056

Notes:
MCL = Primary and secondary Maximum Contaminant Levels, Florida Drinking Water Standards, Chapter 62-550 F.A.C., April 1998
µg/l = micrograms per liter
mg/l = milligrams per liter
--- = Not Detected
Shaded areas indicate exceedence of established MCLs.

DISK: 973-3778\gw_det.xls

TABLE 8
Page 4 of 4
SUMMARY OF DETECTED PARAMETERS IN GROUNDWATER
JUNE 1998

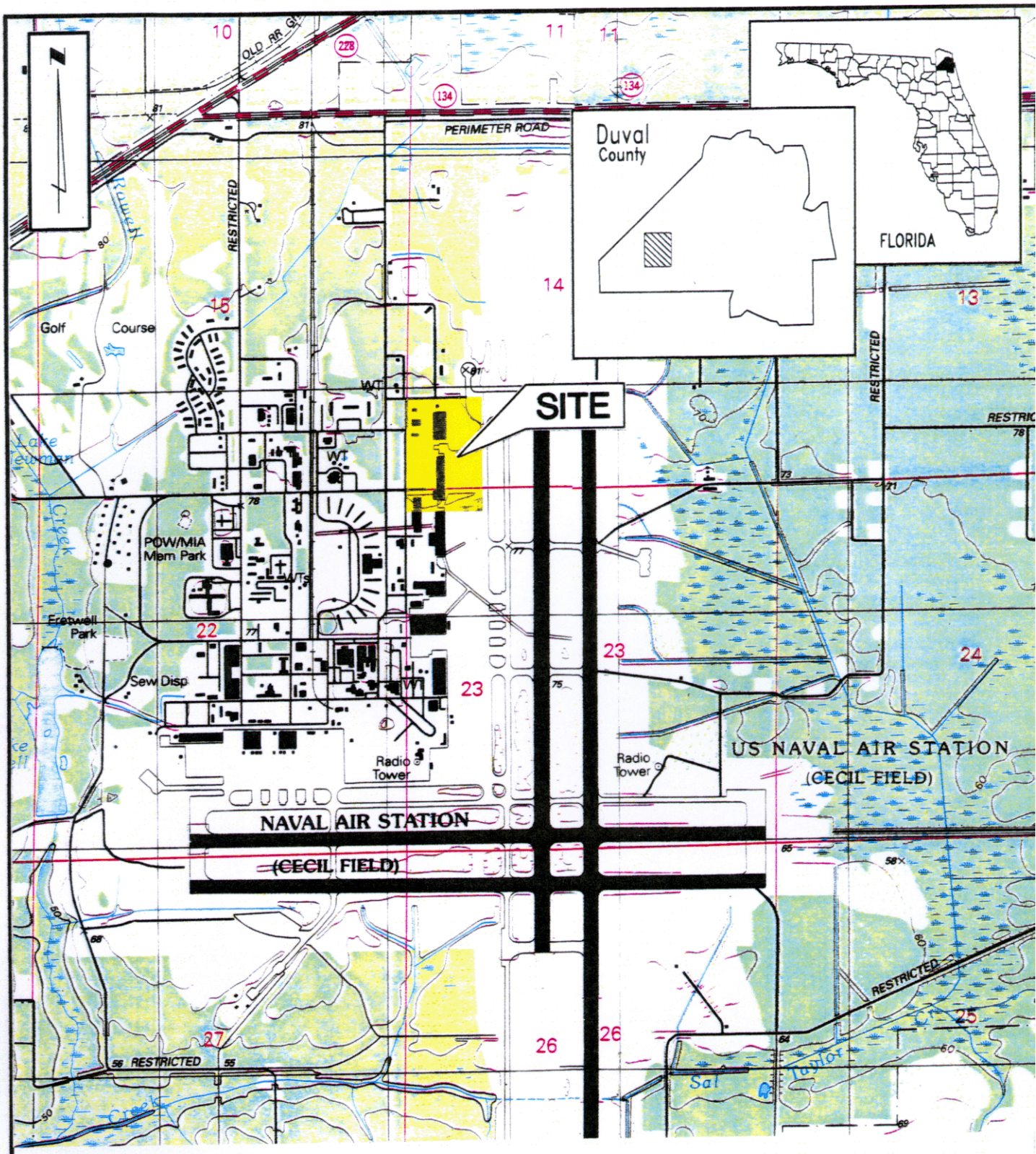
FLIGHT LINE FACILITIES
NORTHROP GRUMMAN CORPORATION NAS CECIL FIELD PROJECT

JACKSONVILLE, FLORIDA

Parameter	Units	MCL	ABB-1	ABB-2	ABB-3	ABB-4	ABB-5	ABB-6	ABB-7	ABB-8	ABB-9	ABB-10
Volatile Organic Compounds by EPA Method 8260												
Acetone	µg/l	700	25	---	38	---	---	---	---	---	620	---
Bromodichloromethane	µg/l	1	---	---	---	---	---	---	---	---	---	---
Carbon disulfide	µg/l	700	2.2	1.2	---	---	---	3.5	---	---	---	---
Chloroform	µg/l	5.7	---	---	---	---	---	---	1.0	---	---	---
Ethylbenzene	µg/l	30	---	20	---	---	---	---	---	---	---	---
2-Hexanone	µg/l	280	---	---	---	---	---	---	---	---	---	---
4-Methyl-2-pentanone	µg/l	560	---	---	---	---	---	---	---	---	250	---
Trichloroethene	µg/l	3	---	---	---	---	---	---	---	---	---	---
Vinyl chloride	µg/l	1	---	---	---	---	---	---	---	---	---	---
Xylenes	µg/l	20	---	9.0	---	---	---	---	---	---	---	---
Semivolatile Organic Compounds by EPA Method 8270												
2-Methylnaphthalene	µg/l	20	---	23	---	---	---	---	---	---	50	---
Naphthalene	µg/l	20	---	38	---	---	---	---	---	---	340	26
Appendix IX Metals by EPA Method 6010/7470												
Aluminum	mg/l	0.2	0.98	3.0	0.54	2.0	230	22	0.28	1.2	0.83	3.0
Arsenic	mg/l	0.05	---	---	---	---	0.010	---	---	---	---	---
Barium	mg/l	2	0.016	0.014	---	0.040	0.18	0.031	0.028	0.038	0.011	0.012
Chromium	mg/l	0.1	---	---	---	---	0.14	0.015	---	---	---	---
Lead	mg/l	0.015	---	---	---	---	0.094	0.0075	---	---	---	---
Mercury	mg/l	0.002	---	---	---	---	0.00025	---	---	---	---	---
Nickel	mg/l	0.1	---	---	---	---	0.049	---	---	---	---	---
Vanadium	mg/l	49	---	---	---	---	0.12	0.016	---	---	0.012	---
Zinc	mg/l	5	---	---	---	---	0.053	---	---	---	---	---

Notes:
MCL = Primary and secondary Maximum Contaminant Levels, Florida Drinking Water Standards, Chapter 62-550 F.A.C., April 1998
µg/l = micrograms per liter
mg/l = milligrams per liter
--- = Not Detected
Shaded areas indicate exceedence of established MCLs.

DISK: 973-3778\gw_det.xls



REFERENCE:
USGS TOPOGRAPHIC MAP, 7.5 MIN. SERIES, QUADRANGLE MAP: JACKSONVILLE HEIGHTS QUADRANGLE, DUVAL COUNTY, FLORIDA FIFTONE QUADRANGLE, DUVAL COUNTY, FLORIDA

SCALE IN FEET

0 2000 4000

JACKSONVILLE, FLORIDA

Golder Associates

TITLE

FLIGHT LINE FACILITIES
SITE LOCATION MAP

CLIENT/PROJECT

NGC/CECIL FIELD/FL

DRAWN	TRG	DATE	7/15/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG NO. 3778B2	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 1

04784101X

10th STREET

ASPHALT

CONCRETE

HAZARDOUS MATERIAL STORAGE

818

MECHANICAL ROOM

811

PUMP OUT

LS-1

JET ENGINE TEST CELL FACILITY (WITH A JET FUEL GROUNDWATER PLUME)

AIRCRAFT STORAGE AND TAXIWAY TO FLIGHT LINES

JET ROAD

339

HAZARDOUS MATERIAL STORAGE

885

UNDERGROUND VAULT

334

1845

400-GALLON OIL/WATER SEPARATOR

GRASS

GRASS

PARKING AREA

CONCRETE

328

323LS

PARKING AREA

UTILITY VAULT

STORMWATER OUTLET (TYP)

STORMWATER DRAINAGE FROM PARKING AREA

323

GRASS

LS-2

55-GALLON DRUMS OF SOLVENT EMULSION CLEANER (WITH SPILLAGE AND SURFACE STAINING)

HAZARDOUS WASTE STORAGE

AIRCRAFT WASH RACK

STORMWATER DRAINAGE FROM PARKING AREA

OUTFALL TO BASE STORM DRAIN SYSTEM

814

815

837LN

PARKING AREA

LEGEND

- STORM/FLOOR DRAIN
- SUMP
- TRANSFORMER
- UTILITY VAULTS WITH OIL/WATER SEPARATORS OR EQUALIZATION TANK
- 1500-GALLON ABOVEGROUND STORAGE TANKS WITH AQUEOUS FILM FORMING FOAM
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- BUILDING
- STORMWATER RETENTION POND

SCALE IN FEET

0 100 200

Golder Associates JACKSONVILLE, FLORIDA

CLIENT/PROJECT

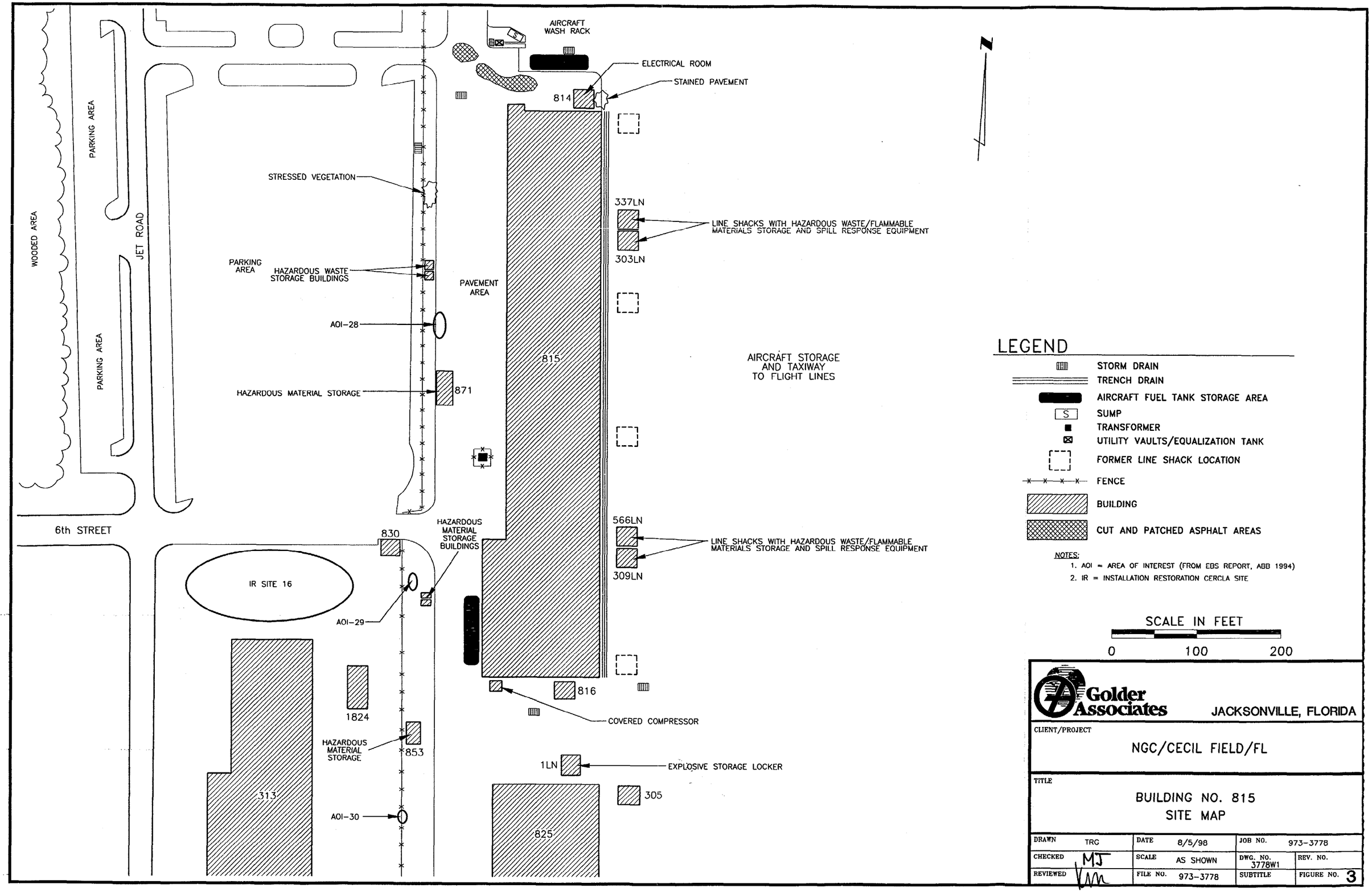
NGC/CECIL FIELD/FL

TITLE

BUILDING NO. 1845
SITE MAP

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778L1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 2

C4784LB22



Golder Associates JACKSONVILLE, FLORIDA

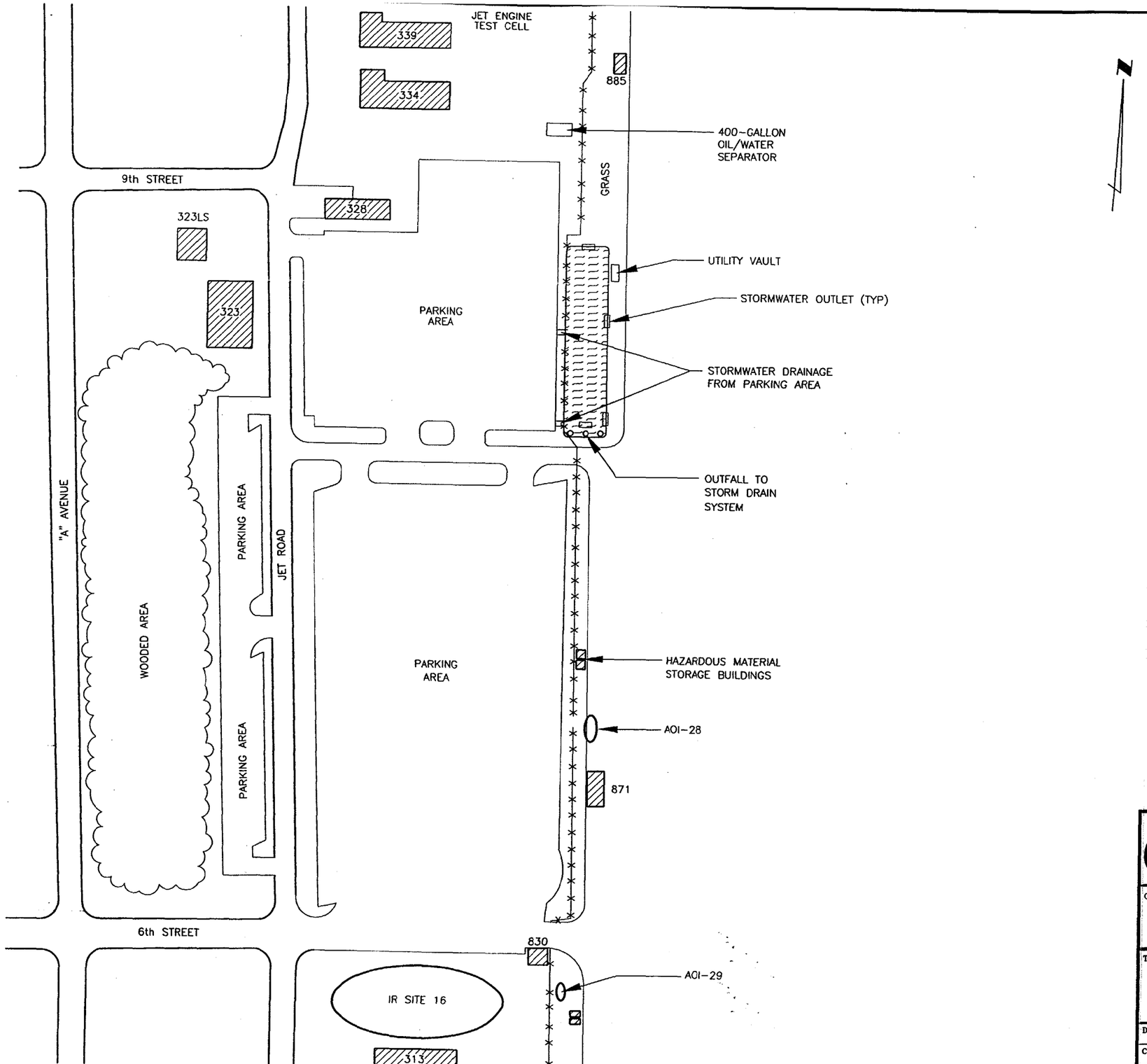
CLIENT/PROJECT

NGC/CECIL FIELD/FL

TITLE

BUILDING NO. 815
SITE MAP

DRAWN	TRC	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778W1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 3



LEGEND

- FENCE
- BUILDING
- STORMWATER RETENTION POND

NOTES:
1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE

SCALE IN FEET

0 120 240

Golder Associates

JACKSONVILLE, FLORIDA

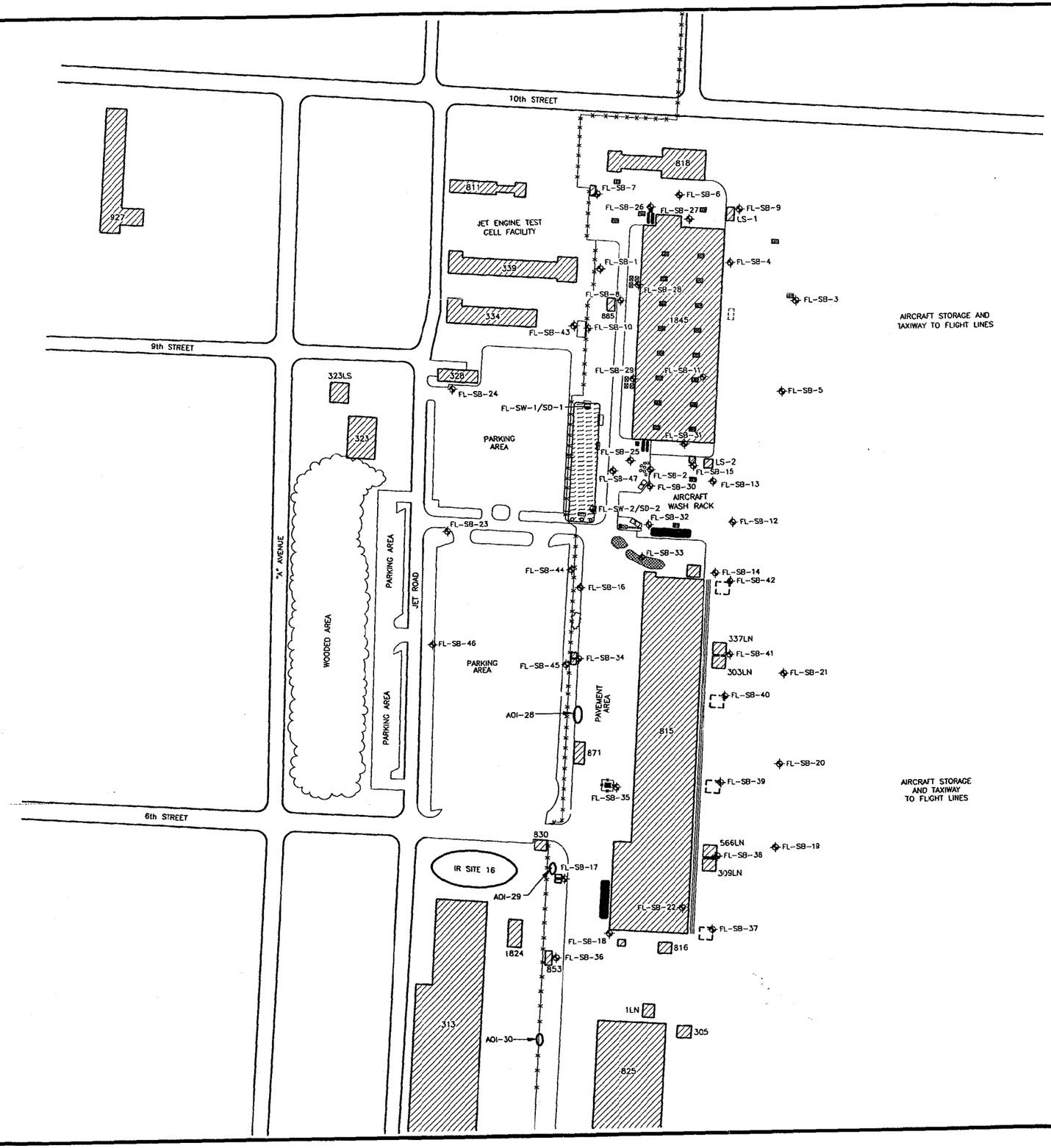
CLIENT/PROJECT

NGC/CECIL FIELD/FL

TITLE

PARKING AREA SITE MAP

DRAWN	TRG	DATE	7/30/98	JOB NO.	973-3778		
CHECKED	MJJ	SCALE	AS SHOWN	DWG. NO.	3778Y1	REV. NO.	
REVIEWED	KM	FILE NO.	973-3778	SUBTITLE		FIGURE NO.	4



LEGEND

- FL-SB-1 — SOIL BORING LOCATION
- FL-SW-1/SD-1 — SURFACE WATER AND SEDIMENT SAMPLING LOCATION
- TRENCH DRAIN
- STORM/FLOOR DRAIN
- SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- BUILDING
- STORMWATER RETENTION POND
- CUT AND PATCHED ASPHALT AREAS

NOTES:
1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE

SCALE IN FEET

0 200 400

Golder Associates — JACKSONVILLE, FLORIDA

CLIENT/PROJECT: NGC/CECIL FIELD/FL

TITLE: FLIGHT LINE FACILITIES SOIL BORING LOCATION MAP

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778D2	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 5

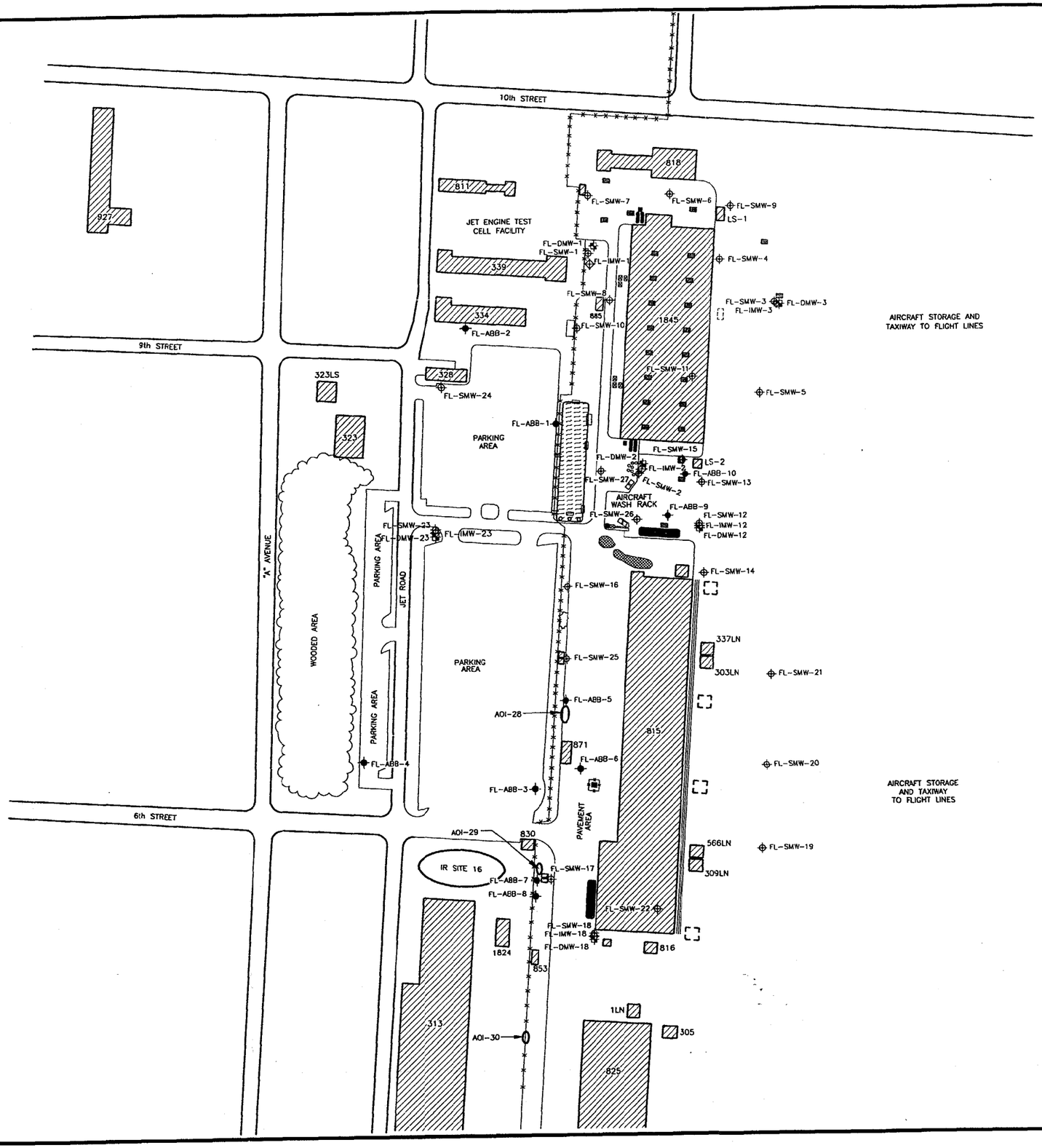


ABB MONITORING WELLS		
ABB WELL ID	EXISTING WELL ID	APPROXIMATE SCREEN INTERVAL (FT. BGS)
FL-ABB-1	CEF-811-15S	2.5-12.5
FL-ABB-2	CEF-334-19	UNAVAILABLE
FL-ABB-3	CEF-16-15S	4-14
FL-ABB-4	CEF-16-13S	4-14
FL-ABB-5	CEF-1028-01	4.5-14.5
FL-ABB-6	11G00101	UNAVAILABLE
FL-ABB-7	CEF-16-19S	7-17
FL-ABB-8	CEF-16-20D	91-101
FL-ABB-9	22G00101	UNAVAILABLE
FL-ABB-10	22G00201	UNAVAILABLE

LEGEND

- FL-ABB-1 — EXISTING MONITORING WELL INSTALLED BY ABB
- FL-SMW-1 — SHALLOW MONITORING WELL LOCATION
- FL-IMW-1 — INTERMEDIATE MONITORING WELL LOCATION
- FL-DMW-1 — DEEP MONITORING WELL LOCATION
- TRENCH DRAIN
- STORM/FLOOR DRAIN
- SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- BUILDING
- STORMWATER RETENTION POND
- CUT AND PATCHED ASPHALT AREAS

NOTES:
1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE

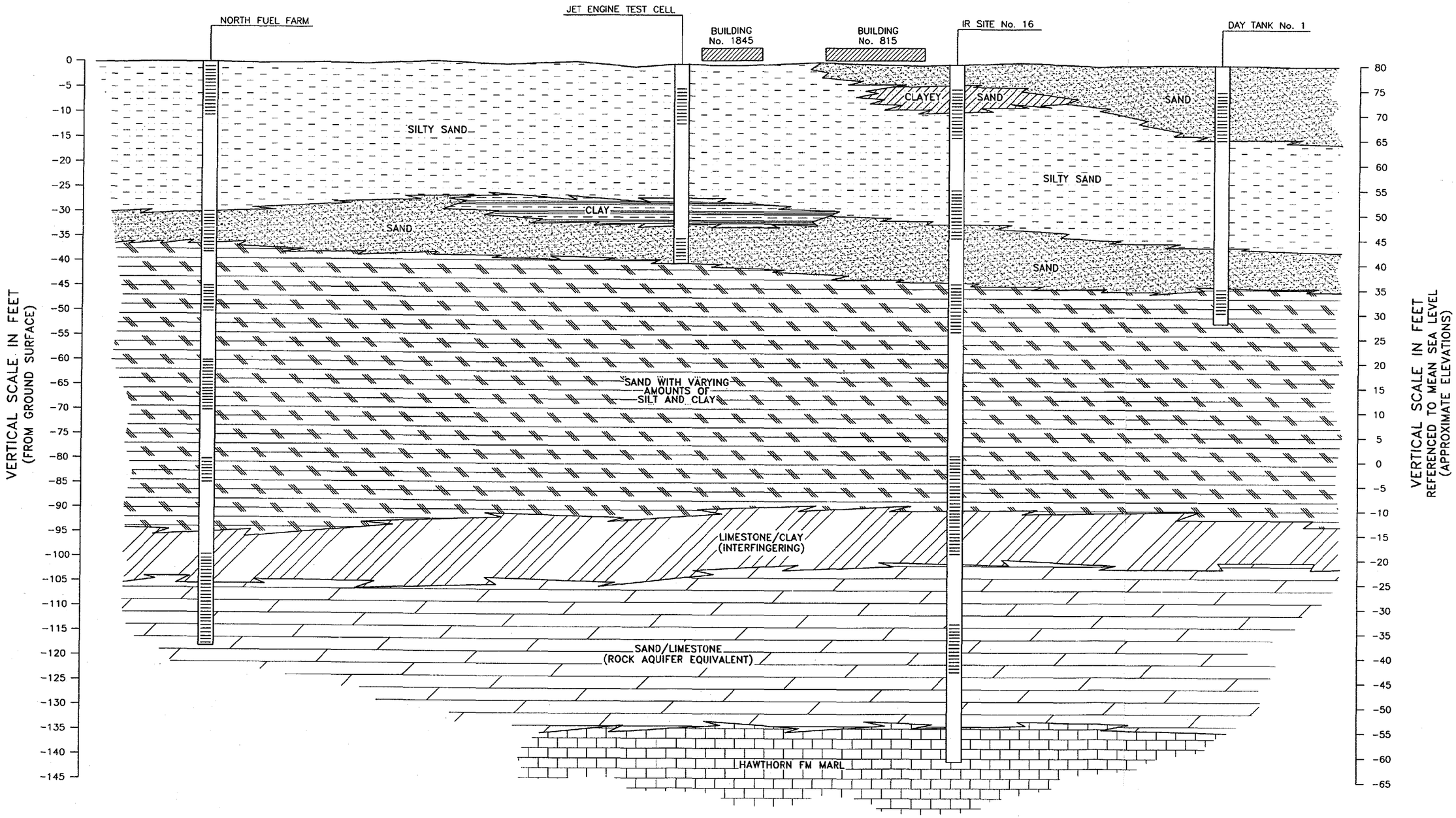
SCALE IN FEET
0 200 400

Golder Associates — JACKSONVILLE, FLORIDA

CLIENT/PROJECT
NGC/CECIL FIELD/FL

TITLE
FLIGHT LINE FACILITIES
MONITORING WELL LOCATION MAP

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778C2	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 6



LEGEND

SCREENED INTERVALS (FROM ABB INVESTIGATIONS)

NOTE: STRATIGRAPHY INFERRED FROM ABB LITHOLOGIC BORING LOGS.

HORIZONTAL SCALE IN FEET

0 400 800

Golder Associates

JACKSONVILLE, FLORIDA

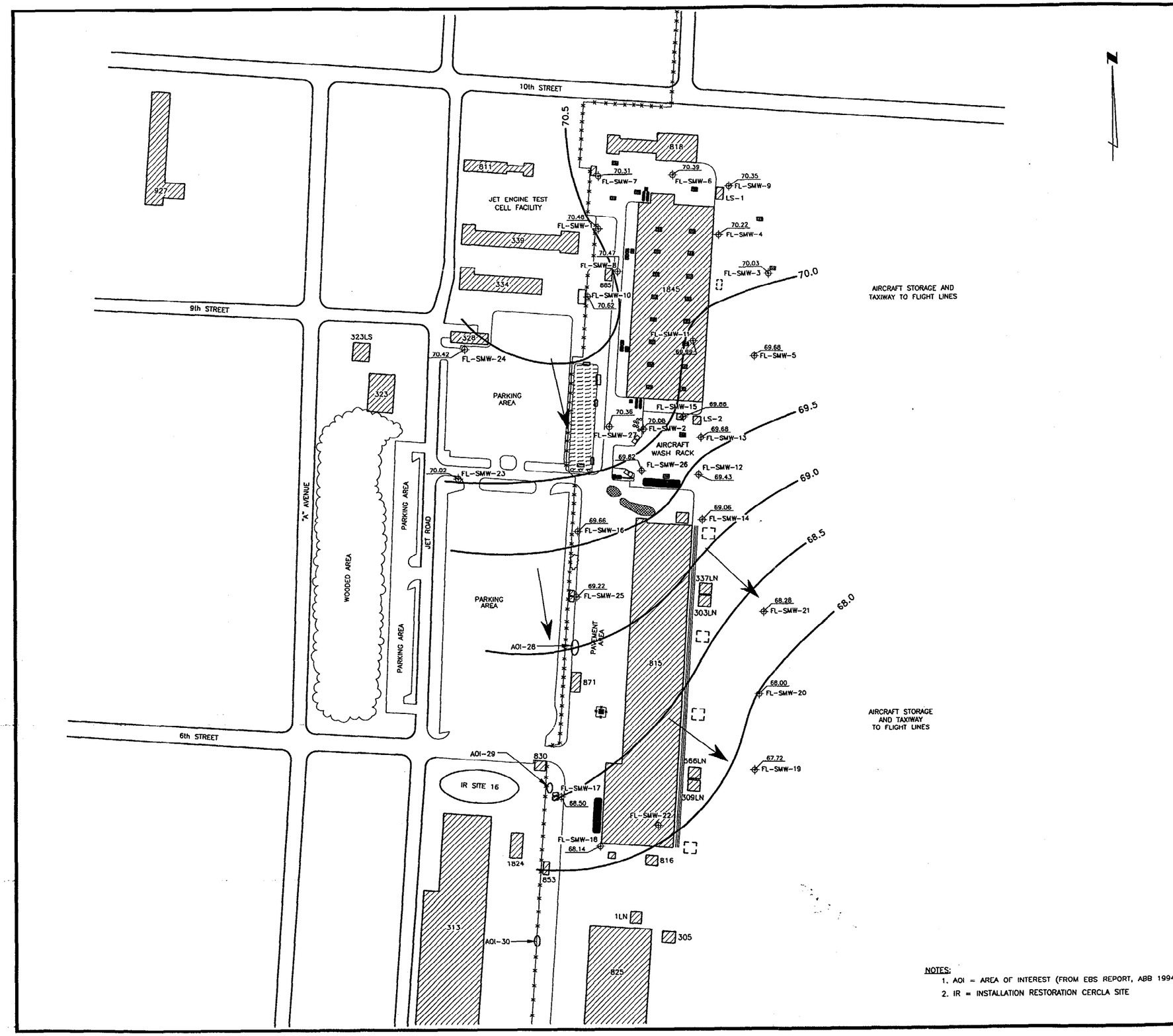
CLIENT/PROJECT

NGC/CECIL FIELD/FL

TITLE

GENERALIZED GEOLOGICAL CROSS-SECTION
ADJACENT TO THE NORTH-SOUTH FLIGHT LINE

DRAWN	TRG	DATE	7/29/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 377871	REV. NO.
REVIEWED	VM	FILE NO.	973-3778	SUBTITLE	FIGURE NO. 7



MONITORING WELL	GROUNDWATER ELEVATION (JUNE 1998)
FL-SMW-1	70.48
FL-SMW-2	70.08
FL-SMW-3	70.03
FL-SMW-4	70.22
FL-SMW-5	69.68
FL-SMW-6	70.39
FL-SMW-7	70.31
FL-SMW-8	70.47
FL-SMW-9	70.35
FL-SMW-10	70.62
FL-SMW-11	69.99
FL-SMW-12	69.43
FL-SMW-13	69.68
FL-SMW-14	69.06
FL-SMW-15	69.86
FL-SMW-16	69.66
FL-SMW-17	68.50
FL-SMW-18	68.14
FL-SMW-19	67.72
FL-SMW-20	68.00
FL-SMW-21	68.28
FL-SMW-22	NM
FL-SMW-23	70.02
FL-SMW-24	70.42
FL-SMW-25	69.22
FL-SMW-26	70.42
FL-SMW-27	70.36

(NM = NOT MEASURED)

LEGEND

- FL-SMW-1 — SHALLOW MONITORING WELL LOCATION
- 70.48 — GROUNDWATER ELEVATION
- 70.0 — GROUNDWATER CONTOUR LINE
- GROUNDWATER FLOW DIRECTION
- TRENCH DRAIN
- STORM/FLOOR DRAIN
- S — SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- BUILDING
- STORMWATER RETENTION POND
- CUT AND PATCHED ASPHALT AREAS

SCALE IN FEET

0 200 400

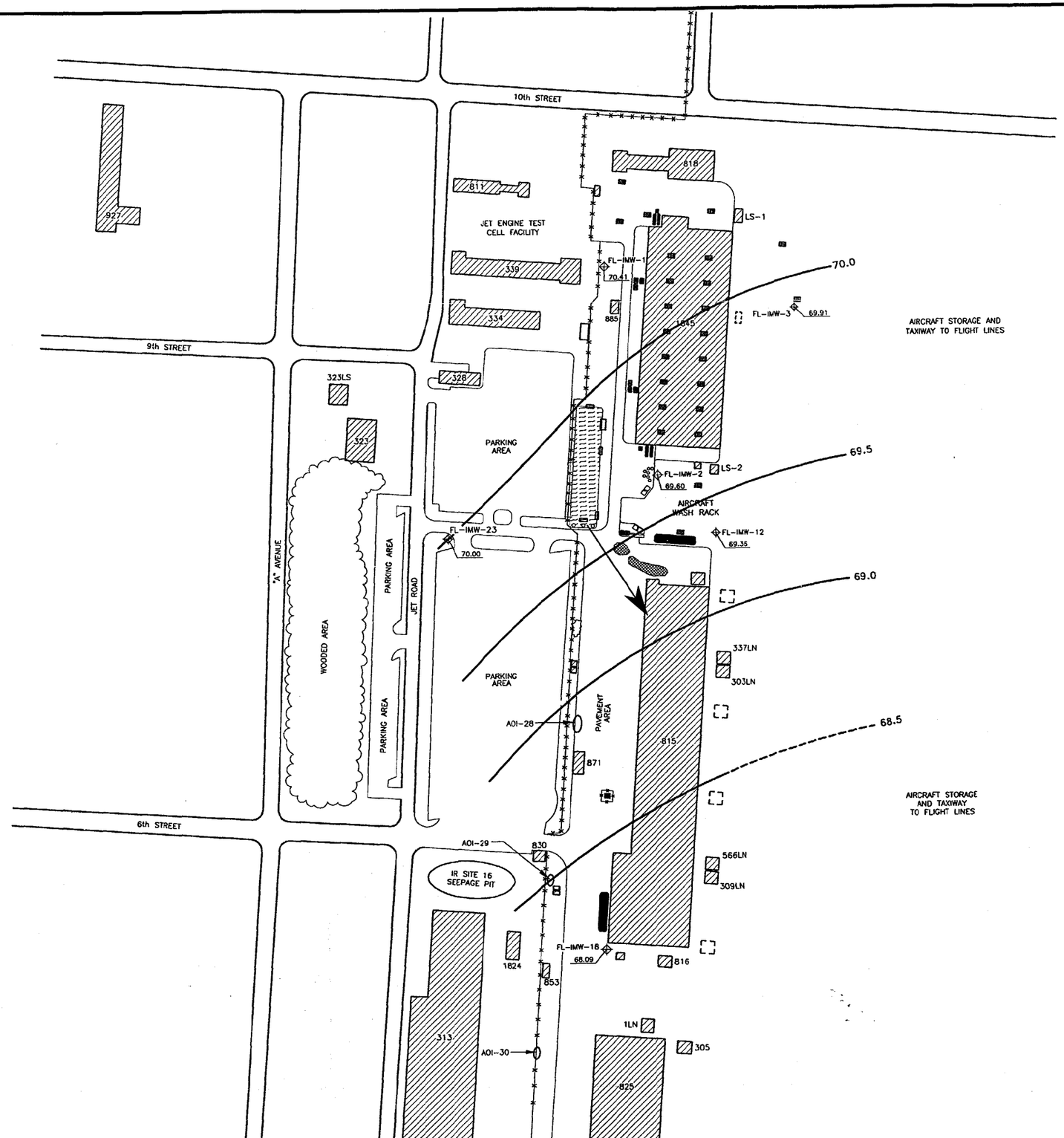
NOTES:
1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE

Golder Associates — JACKSONVILLE, FLORIDA

CLIENT/PROJECT: NGC/CECIL FIELD/FL

TITLE: FLIGHT LINE FACILITIES POTENTIOMETRIC MAP OF THE UPPER SURFICIAL AQUIFER – SHALLOW ZONE JUNE 1998

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778V2	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 8



MONITORING WELL	GROUNDWATER ELEVATION (JUNE 1998)
FL-IMW-1	78.41
FL-IMW-2	69.60
FL-IMW-3	69.91
FL-IMW-12	69.36
FL-IMW-18	68.09
FL-IMW-23	70.00

LEGEND

- FL-IMW-1 — INTERMEDIATE MONITORING WELL LOCATION
- 70.41 — GROUNDWATER ELEVATION
- 69.0 — GROUNDWATER CONTOUR LINE
- 69.0 — ESTIMATED GROUNDWATER CONTOUR LINE
- GROUNDWATER FLOW DIRECTION
- STORM/FLOOR DRAIN
- S — SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION AREA
- AIRCRAFT FUEL TANK STORAGE
- FENCE
- BUILDING
- STORMWATER RETENTION POND
- CUT AND PATCHED ASPHALT AREAS

NOTES:
1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE

SCALE IN FEET

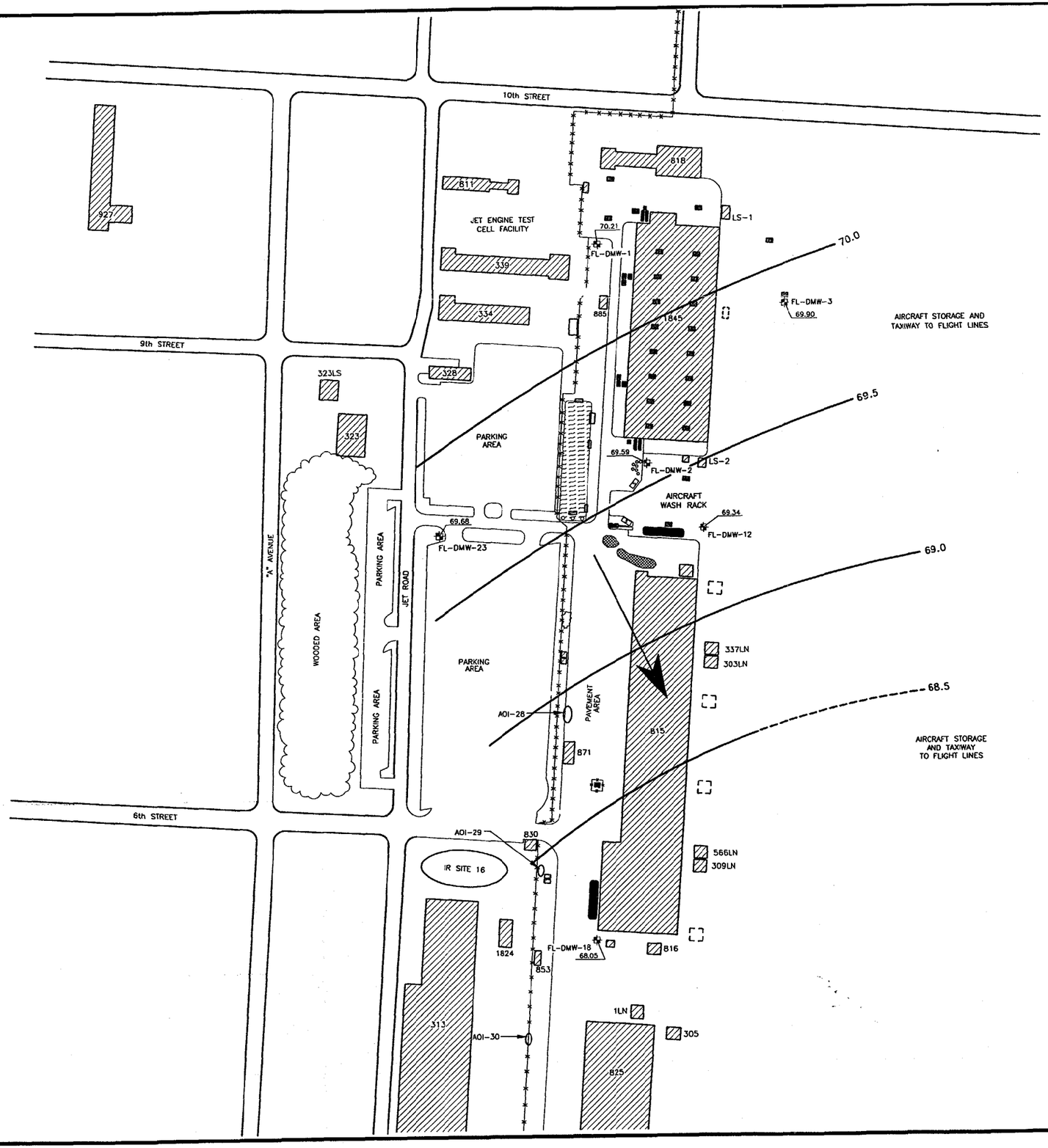
0 200 400

Golder Associates — JACKSONVILLE, FLORIDA

CLIENT/PROJECT: NGC/CECIL FIELD/FL

TITLE: FLIGHT LINE FACILITIES POTENTIOMETRIC MAP OF THE UPPER SURFICIAL AQUIFER – INTERMEDIATE ZONE JUNE 1998

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778W2	REV. NO.
REVIEWED	VMM	FILE NO.	973-3778	SUBTITLE	FIGURE NO. 9



MONITORING WELL	GROUNDWATER ELEVATION (JUNE 1998)
FL-DMW-1	70.21
FL-DMW-2	69.59
FL-DMW-3	69.90
FL-DMW-12	69.34
FL-DMW-18	68.05
FL-DMW-23	69.68

LEGEND

- FL-DMW-1 — DEEP MONITORING WELL LOCATION
- 70.21 — GROUNDWATER ELEVATION
- 69.0 — GROUNDWATER CONTOUR LINE
- 69.0 — ESTIMATED GROUNDWATER CONTOUR LINE
- GROUNDWATER FLOW DIRECTION
- STORM/FLOOR DRAIN
- S — SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- BUILDING
- STORMWATER RETENTION POND
- CUT AND PATCHED ASPHALT AREAS

NOTES:
1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE

SCALE IN FEET

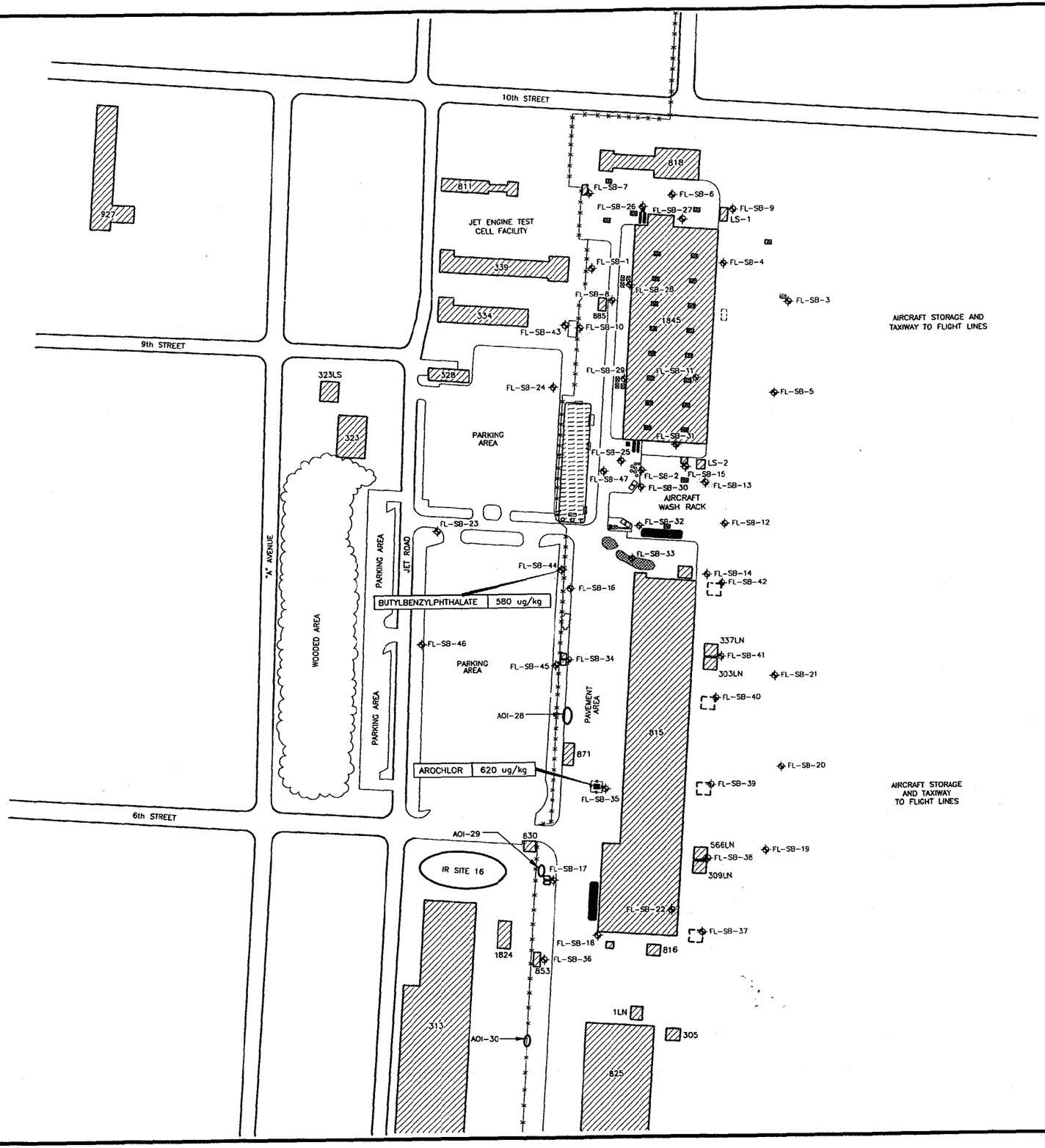
0 200 400

Golder Associates — JACKSONVILLE, FLORIDA

CLIENT/PROJECT: NGC/CECIL FIELD/FL

TITLE: FLIGHT LINE FACILITIES POTENTIOMETRIC MAP OF THE UPPER SURFICIAL AQUIFER – DEEPER ZONE JUNE 1998

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778X2	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 10



LEGEND

- FL-SB-1 — SOIL BORING LOCATION
- FL-SD-1 — SEDIMENT SAMPLING LOCATION
- STORM/FLOOR DRAIN
- S — SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- BUILDING
- STORMWATER RETENTION POND
- CUT AND PATCHED ASPHALT AREAS

NOTES:
1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE
3. ug/kg = MICROGRAMS PER KILOGRAM

SCALE IN FEET

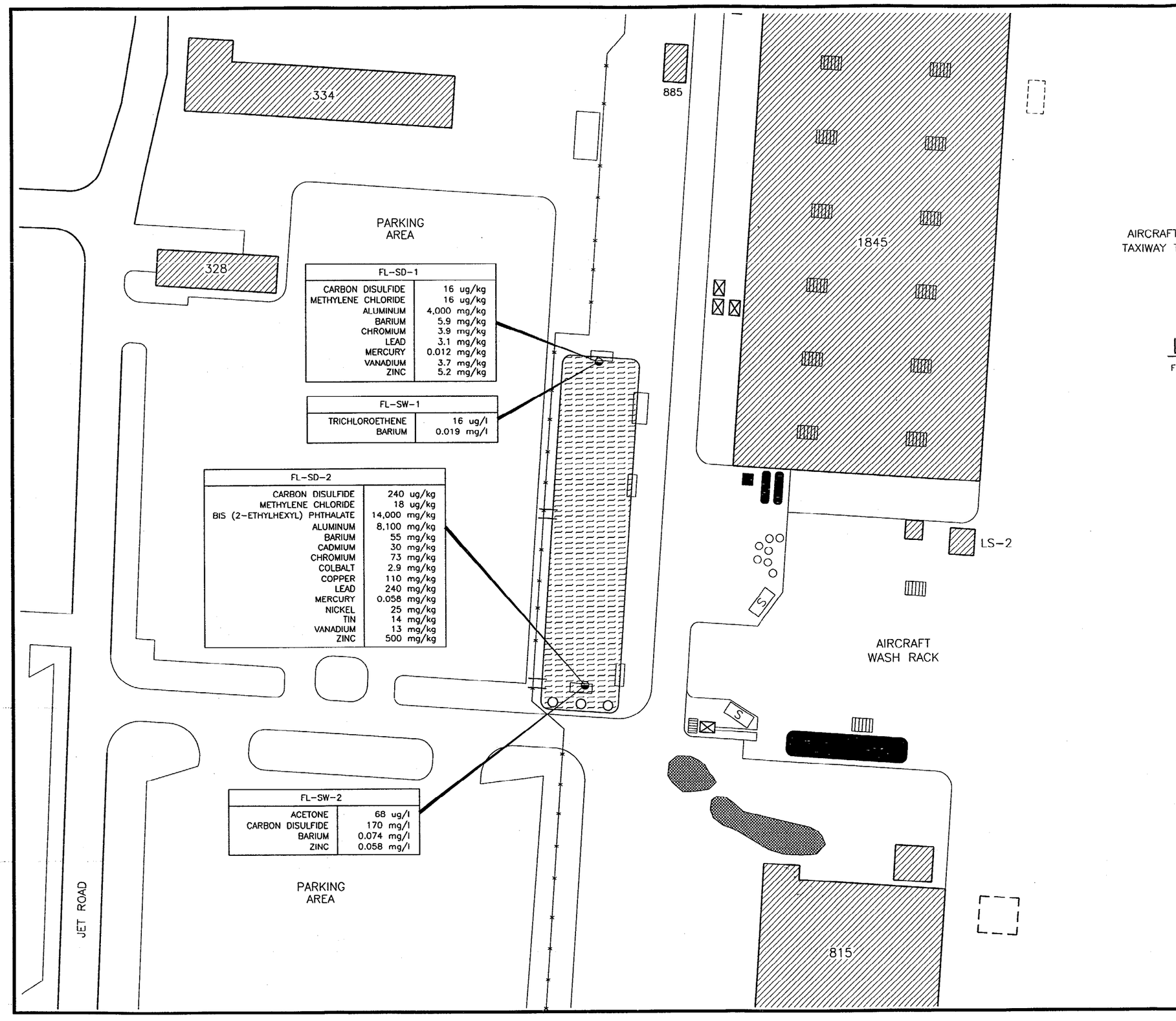
0 200 400

Golder Associates — JACKSONVILLE, FLORIDA

CLIENT/PROJECT: NGC/CECIL FIELD/FL

TITLE: FLIGHT LINE FACILITIES
DETECTED PARAMETERS IN SOIL ABOVE THE FDEP SOIL CLEANUP LEVELS

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778Y2	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 11



LEGEND

- FL-SD-1 — SURFACE WATER AND SEDIMENT SAMPLING LOCATION
- STORM/FLOOR DRAIN
- SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- BUILDING
- STORMWATER RETENTION POND
- CUT AND PATCHED ASPHALT AREAS

NOTES:
1. ug/Kg = MICROGRAMS PER KILOGRAM
2. mg/Kg = MILLIGRAMS PER KILOGRAM

SCALE IN FEET

0 60 120

Golder Associates JACKSONVILLE, FLORIDA

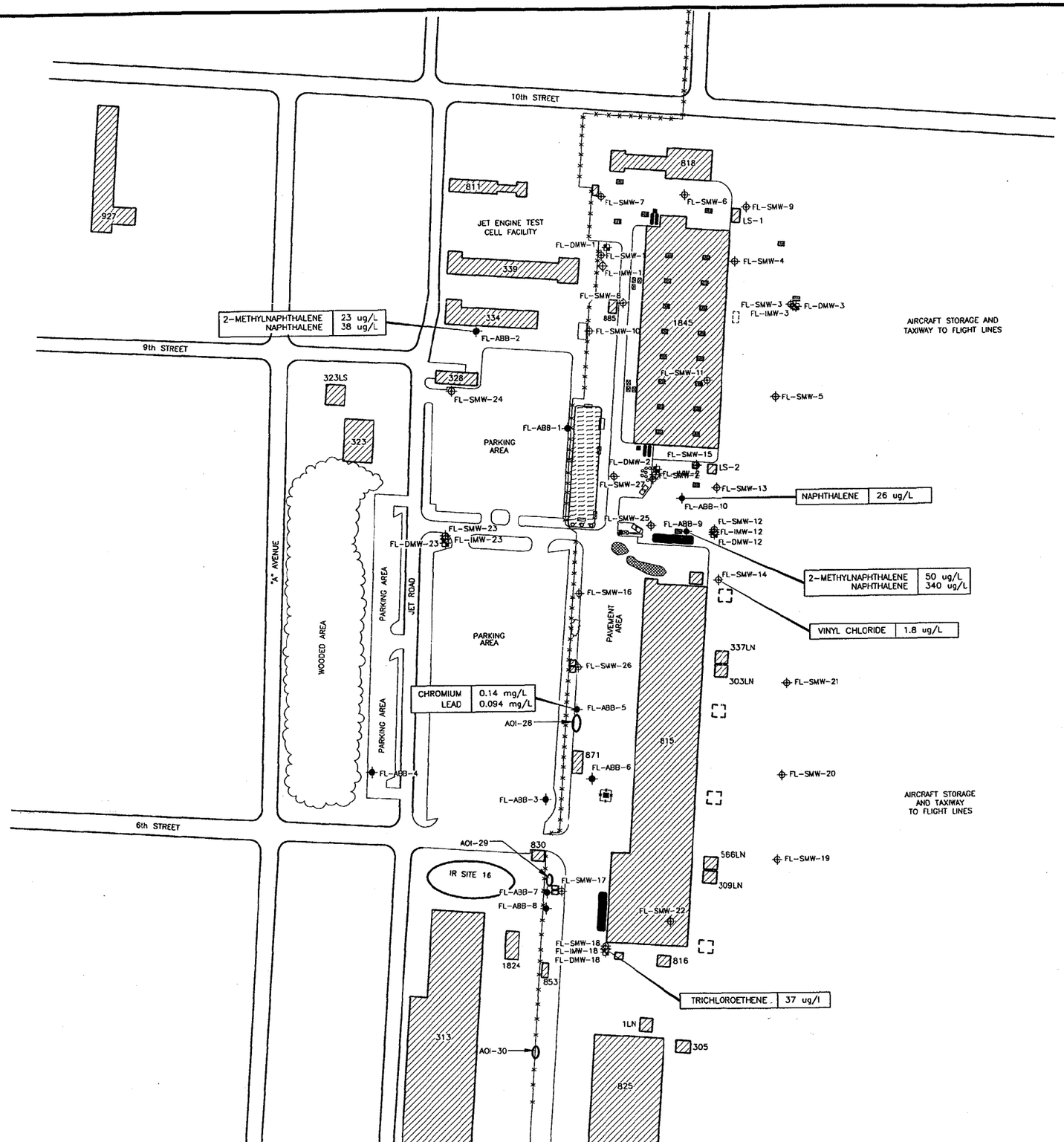
CLIENT/PROJECT

NGC/CECIL FIELD/FL

TITLE

FLIGHT LINE FACILITIES
DETECTED PARAMETERS IN
SEDIMENT AND SURFACE WATER

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJT	SCALE	AS SHOWN	DWG. NO. 377BA3	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 12



LEGEND

- FL-ABB-1 — EXISTING MONITORING WELL PROPOSED RESAMPLING LOCATION
- FL-SMW-1 — SHALLOW MONITORING WELL LOCATION
- FL-IMW-1 — INTERMEDIATE MONITORING WELL LOCATION
- FL-DMW-1 — DEEP MONITORING WELL LOCATION
- STORM/FLOOR DRAIN
- S — SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- BUILDING
- STORMWATER RETENTION POND
- CUT AND PATCHED ASPHALT AREAS

NOTES:

1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE
3. ug/L = MICROGRAMS PER LITER
4. mg/L = MILLIGRAMS PER LITER
5. MCL = MAXIMUM CONTAMINANT LEVEL
6. ALUMINUM WAS RECORDED ABOVE THE SECONDARY MCL IN MOST WELLS. THE PRESENCE OF ALUMINUM APPEARS TO BE ASSOCIATED WITH BACKGROUND CONDITIONS; CONSEQUENTLY, ALUMINUM RESULTS ARE NOT SHOWN ON THIS FIGURE.

SCALE IN FEET

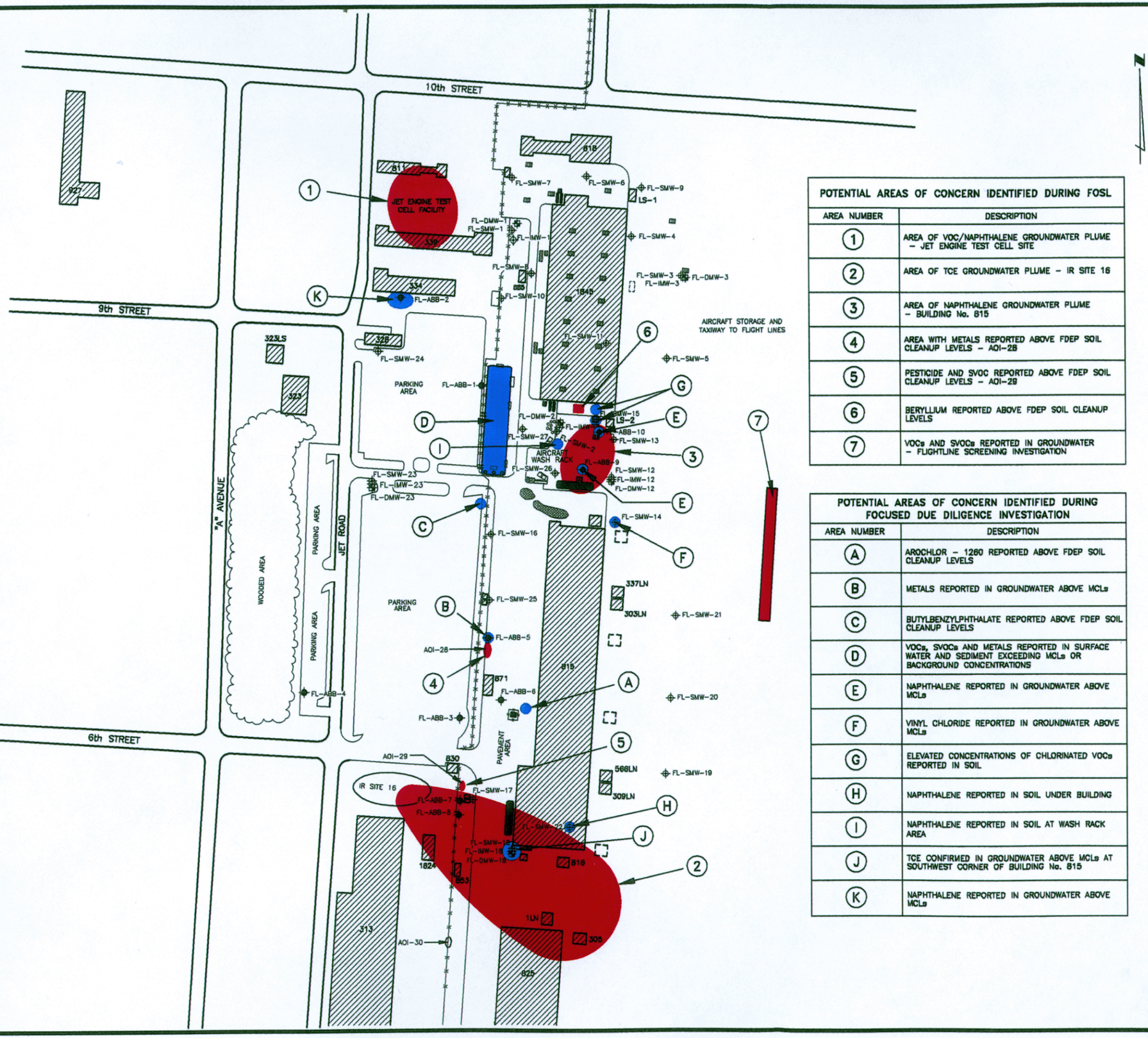
0 200 400

Golder Associates — JACKSONVILLE, FLORIDA

CLIENT/PROJECT: NGC/CECIL FIELD/FL

TITLE: FLIGHT LINE FACILITIES DETECTED PARAMETERS IN GROUNDWATER ABOVE MCLs

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 377822	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 13



POTENTIAL AREAS OF CONCERN IDENTIFIED DURING FOSL	
AREA NUMBER	DESCRIPTION
1	AREA OF VOC/NAPHTHALENE GROUNDWATER PLUME – JET ENGINE TEST CELL SITE
2	AREA OF TCE GROUNDWATER PLUME – IR SITE 16
3	AREA OF NAPHTHALENE GROUNDWATER PLUME – BUILDING No. 815
4	AREA WITH METALS REPORTED ABOVE FDEP SOIL CLEANUP LEVELS – AOI-28
5	PESTICIDE AND SVOC REPORTED ABOVE FDEP SOIL CLEANUP LEVELS – AOI-29
6	BERYLLIUM REPORTED ABOVE FDEP SOIL CLEANUP LEVELS
7	VOCs AND SVOCs REPORTED IN GROUNDWATER – FLIGHTLINE SCREENING INVESTIGATION

POTENTIAL AREAS OF CONCERN IDENTIFIED DURING FOCUSED DUE DILIGENCE INVESTIGATION	
AREA NUMBER	DESCRIPTION
A	AROCHLOR – 1260 REPORTED ABOVE FDEP SOIL CLEANUP LEVELS
B	METALS REPORTED IN GROUNDWATER ABOVE MCLs
C	BUTYLBENZYLPHTHALATE REPORTED ABOVE FDEP SOIL CLEANUP LEVELS
D	VOCs, SVOCs AND METALS REPORTED IN SURFACE WATER AND SEDIMENT EXCEEDING MCLs OR BACKGROUND CONCENTRATIONS
E	NAPHTHALENE REPORTED IN GROUNDWATER ABOVE MCLs
F	VINYL CHLORIDE REPORTED IN GROUNDWATER ABOVE MCLs
G	ELEVATED CONCENTRATIONS OF CHLORINATED VOCs REPORTED IN SOIL
H	NAPHTHALENE REPORTED IN SOIL UNDER BUILDING
I	NAPHTHALENE REPORTED IN SOIL AT WASH RACK AREA
J	TCE CONFIRMED IN GROUNDWATER ABOVE MCLs AT SOUTHWEST CORNER OF BUILDING No. 815
K	NAPHTHALENE REPORTED IN GROUNDWATER ABOVE MCLs

LEGEND

- FL-ABB-1 — EXISTING MONITORING WELL PROPOSED RESAMPLING LOCATION
- FL-SMW-1 — SHALLOW MONITORING WELL LOCATION
- FL-IMW-1 — INTERMEDIATE MONITORING WELL LOCATION
- FL-DMW-1 — DEEP MONITORING WELL LOCATION
- STORM/FLOOR DRAIN
- S — SUMP
- TRANSFORMER
- UTILITY VAULTS WITH AN OIL/WATER SEPARATOR
- FORMER LINE SHACK LOCATION
- AIRCRAFT FUEL TANK STORAGE AREA
- FENCE
- POTENTIAL AREAS OF CONCERN IDENTIFIED IN THE FOSL
- POTENTIAL AREAS OF CONCERN IDENTIFIED DURING THE GOLDER ASSOCIATES 1998 FOCUSED DUE DILIGENCE INVESTIGATION
- BUILDING
- CUT AND PATCHED ASPHALT AREAS

NOTES:
1. AOI = AREA OF INTEREST (FROM EBS REPORT, ABB 1994)
2. IR = INSTALLATION RESTORATION CERCLA SITE
3. VOC = VOLATILE ORGANIC COMPOUND
4. TCE = TRICHLOROETHENE
5. SVOC = SEMIVOLATILE ORGANIC COMPOUND
6. MCLs = MAXIMUM CONTAMINANT LEVELS
7. FOSL = FINDING OF SUITABILITY TO LEASE

SCALE IN FEET
0 200 400

Golder Associates — JACKSONVILLE, FLORIDA

CLIENT/PROJECT
NGC/CECIL FIELD/FL

TITLE
FLIGHT LINE FACILITIES
POTENTIAL AREAS OF CONCERN

DRAWN	TRG	DATE	8/5/98	JOB NO.	973-3778
CHECKED	MJ	SCALE	AS SHOWN	DWG. NO. 3778D3	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 14

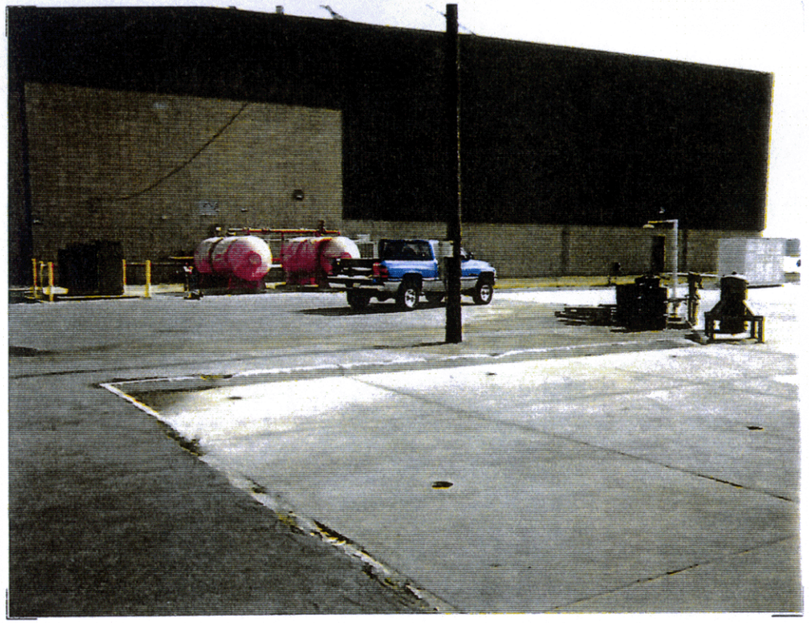
04784103Y

APPENDIX A

Site Inspection and Personnel Interviews

APPENDIX A-1

Photographic Log



PHOTOGRAPH NO. 1

PHOTOGRAPH NO. 2

PHOTOGRAPH NO. 3

PHOTOGRAPH NO. 4

Golder Associates JACKSONVILLE, FLORIDA	TITLE PHOTOGRAPHIC LOG			
CLIENT/PROJECT NGC/CECIL FIELD/FL	DRAWN TRG	DATE 7/30/98	JOB NO. 973-3778	
	CHECKED KM	SCALE N.T.S.	DWG. NO. 3778E3	REV. NO.
	REVIEWED MJJ	FILE NO. 973-3778	SUBTITLE	FIGURE NO. A1

APPENDIX A-1

PHOTOGRAPHIC LOG
FLIGHT LINE FACILITIES
NAS CECIL FIELD

JACKSONVILLE, FLORIDA

SHEET NUMBER	PHOTOGRAPH NO.	DESCRIPTION
A-1	1	View of the washrack area on the north side of Building No. 815 facing Building No. 1845.
	2	Similar view of the washrack area on the north side of Building No. 815 facing Building No. 1845.
	3	View of the aircraft cleaning solvent drum storage area adjacent to monitoring wells SMW-2, IMW-2, and DMW-2.
	4	View of the aircraft cleaning solvent drum storage area adjacent to the monitoring well cluster.

DISK: 973-3778\phot_log.xls

APPENDIX A-2

Interview Records

DUE DILIGENCE ASSESSMENT OF THE FLIGHT LINE FACILITIES AREA AT THE NAVAL AIR STATION CECIL FIELD
PROJECT NO. 973-3778
INTERVIEW WITH MR. DAVID KRUZICKI AND MR. JOHN DINGWALL
JUNE 24, 1998

Introduction

Ralph F. Mongillo, Jr. of Golder Associates Inc. interviewed Mr. David Kruzicki, Environmental Director and Mr. John Dingwall, Environmental Coordinator of the Environmental Department for the Naval Air Station (NAS) at Cecil Field on June 24, 1998. Questions asked during the interview are presented below in italics; the responses follow each question (as documented by Mr. Mongillo during the interview). The reference of the "Flight Line Facilities area" refers to the area associated with Buildings No. 1845, No. 815 and the associated parking areas located west of the respective buildings.

1. ***What type of activities are completed in Building No. 1845 and Building No. 815?***

   Both buildings are used as aircraft maintenance hangars and administrative offices for the fighter squadrons. Building No. 815 is currently occupied. Building No. 1845 was vacant at the time of the investigation. Building No. 1845 is periodically used by fighter squadrons from other base or countries visiting NAS Cecil Field.

2. ***Describe any major demolition that occurred at the Flight Line Facilities area.***

   None to their knowledge.

3. ***Provide facility utilities and suppliers to the Flight Line Facilities area.***

   Electric – Jacksonville Electric Authority
   Gas – Peoples Gas
   Potable Water – Base has five public use wells
   Sanitary Sewer – Building No. 15
   Storm Sewer – Primarily directed towards Sal Taylor Creek located east of the runway.

4. ***Where is the central potable water system located on the base? What are the depths of the wells? What are the daily pumping rates?***

   There are five public use wells on the base at various locations. The closest well to the Flight Line Facilities area is located near the North Fuel Farm. The total depth of the wells range from approximately 750 to 1,300 feet below ground surface (bgs).

Mr. Dingwall believes that the water system is permitted to pump approximately 1 million gallons of water a day but was uncertain about that number.

There is an unsubstantiated rumor that Jacksonville Electric Authority is considering abandoning the five existing public use wells and installing a new well system for potable water in the foreseeable future.

5. ***Is the Flight Line Facilities area located within the 25-year or 100-year floodplain?***

No.

6. ***Has the Flight Line Facilities area ever been flooded?***

No, not since Mr. Dingwall's employment at Cecil Field in 1986.

7. ***What types of wastes and raw materials were stored, treated or disposed at the Flight Line Facilities area?***

Halengonated and non-halengonated solvents, paints and oils are regularly stored in small storage lockers. Small quantities of acids, lubricants, cleaners, inks, adhesives, glues and batteries are stored as needed.

8. ***What is the typical process to handle raw materials and associated wastes, both hazardous and non-hazardous, at the Flight Line Facilities area?***

The non-halengonated and halengonated solvents and paints are kept in hazardous material storage lockers located just outside each hangar. Each fighter squadron is responsible for storing their hazardous materials/wastes. When needed inside the hangar, a small amount of the material is placed inside a bucket and carried to the hangar and used as needed. At the end of the day, any excess material and/or waste generated is transported to the hazardous waste storage locker and poured into the appropriate container. Hazardous waste is picked up every 80 days for disposal at the facility. Non-hazardous waste oil is containerized at several locations around the hangars. This waste oil is recycled when enough volume is collected. This process has been in place at the Flight Line Facilities area since Mr. Dingwall's tenure in 1986.

In 1983, hazardous and non-hazardous wastes were temporarily stored in drums resting on pallets near the same locations as the storage lockers are situated today. The drums were then transported to Installation Restoration Operable Units No. 3, No. 5 or No. 17 and dumped into seepage pits. None of the wastes generated from the Flight Line Facilities area was dumped into the adjacent former seepage pit, Installation Restoration Site No. 16, according to Mr. Dingwall.

9. ***Has the Flight Line Facilities area every been inspected by any Federal, State or Local Environmental Authority?***

The Florida Department of Environmental Protection (FDEP) performs yearly inspections of the hazardous waste storage lockers. There have been no compliance violations according to Mr. Dingwall.

10. ***There are two small documented spills of jet fuel on the paved portion of the Building No. 815. Do you have any additional information concerning these spills?***

Mr. Dingwall did not have any additional information concerning the spills.

11. ***There is one documented spill of 25-30 gallons of jet fuel into a storm drain near Building No. 1845 in 1990. Do you have any additional information concerning this spill?***

Mr. Dingwall did not have any additional information concerning this spill.

12. ***The base inventory list indicates the presence of an underground storage tank (UST) adjacent to Building No. 816. The UST was not observed during a walk-through site reconnaissance. Are you aware of the location of this UST?***

Mr. Dingwall is not sure if this UST exists.

13. ***What is the status on the environmental assessment and remedial effort completed at the former UST area associated with the jet engine test cell adjacent to Buildings No. 811 and No. 339?***

ABB completed fieldwork at this site within the last six months. Mr. Dingwall has not received the results of their investigation. There is still "free-phase petroleum products" in some of the source wells.

The Navy has scheduled a detachment out of Virginia to mobilize to the site on August 17, 1998 to excavate contaminated soil and complete other remedial tasks.

14. ***Describe any known or suspected major environmental problems associated with the Flight Line Facilities area.***

There may be a problem with the oil/water separator located near Building No. 328. The oil/water separator is located close to the western property boundary such that any kind of release could possibly impact the Flight Line Facilities area. It is also likely that contaminants from Installation Restoration Site No. 16 and the jet engine test cell may have adversely impacted the Flight Line Facilities area.

15. ***Describe any previous, current or planned remediation activities on the Flight Line Facilities area.***

There are no remedial activities associated with the Flight Line Facilities area.

16. ***To your knowledge, are there any reported spills and/or releases in the vicinity of the container storage areas at the Flight Line Facilities area?***

Area of Interest No. 30 has documented a suspected dumping of cleaning solvents on the ground southwest of Building No. 815. No other spills or releases were noted.

17. ***Does the Flight Line Facilities area have a spill prevention control and countermeasures (SPCC) plan?***

There is a SPCC plan and Emergency Response Plan effective basewide, not just for the individual buildings.

18. ***List all aboveground storage tanks (ASTs) and contents currently at the Flight Line Facilities area. Include any ASTs that have been removed from the subject site in the past.***

Two ASTs are situated at the north and south end of Building No. 1845 containing aqueous fire fighting foam (AFFF).

19. ***Describe any reported spills or releases associated with the ASTs at the Flight Line Facilities area.***

No releases or spills have occurred to Mr. Dingwall's knowledge.

20. ***Have any wastes been disposed on-site in a lagoon or impoundment or disposal area at the Flight Line Facilities area?***

No wastes have been disposed on-site to Mr. Dingwall's knowledge.

21. ***Has any material ever been disposed or stored beneath the surface of the Flight Line Facilities area?***

No, not to Mr. Dingwall's knowledge.

22. ***Describe past and current sludge disposal practices in the Flight Line Facilities area.***

Building No. 1845 has floor drains. Mr. Dingwall has no knowledge how the floor drains were cleaned as part of general maintenance and how the sludge was disposed. Each squadron cleaned out the floor drains in their own work area. Mr. Dingwall assumes the sludge was placed in the dumpster.

23. ***Describe any active or inactive land disposal sites located within one half mile of the Flight Line Facilities area.***

No land disposal sites are located within one half mile of the subject site.

24. ***Describe the floor drain system and oil/water separator system associated with the Flight Line Facilities area.***

There are 16 floor drains inside Building No. 1845 within the maintenance bay area. There is a trench drain aligned parallel with the large doors on the east side of the building that are interconnected with the floor drains. Under normal conditions, the drains are supposed to discharge through one of the two oil/water separators then to the sanitary sewer system. When the AFFF alarm system is activated, the floor drains are electronically disconnected from the sanitary sewer and discharged to the storm sewer (retention pond). However, the drain system was dye tested and found to discharge to the retention pond not the sanitary sewer system during normal operation. It appears that there is a problem with the electrically operated valve located near the oil/water separator. The problem with drainage system has not been identified and corrected to date.

There are two drains located in the wash rack area south of Building No. 1845. There is a manual switch that can redirect the flow from the two surface drains either towards a 500-gallon equalization tank or to the sanitary or storm sewer system. Ideally, when jets are being washed the switch should be positioned so the wastewater is directed towards the equalization tank.

25. ***How is runoff from the roofs discharged?***

To Mr. Dingwall's knowledge, water is discharged to the storm sewer system.

26. ***List all USTs, past or present, and their respective contents at the Flight Line Facilities area.***

No USTs are present at the Flight Line Facilities area except for the two oil/water separators located on the west side of Building No. 1845 and equalization tank located southwest of the wash rack area.

27. ***List all wastewater streams at the Flight Line Facilities area.***

Condensate from air conditioning units may be discharged to the stormwater system, but Mr. Dingwall is unsure of any other waste water streams.

28. ***Are there any septic tanks on the Flight Line Facilities area?***

Not to Mr. Dingwall's knowledge. The site is connected to a basewide sanitary sewer system.

29. ***List stormwater discharges and permits for the Flight Line Facilities area.***

There is an NPDES permit for NAS Cecil Field which includes the Flight Line Facilities area. Stormwater that flows into storm drains located in the Flight Line Facilities area is either discharged to the detention pond located at the

southwest corner of Building No. 1845 or to Sal Taylor Creek located on the east side of the runway.

30. ***Describe pesticide use, handling or storage at the Flight Line Facilities area.***

To Mr. Dingwall's knowledge, pesticides were not used.

31. ***Describe any unique activities involving toxic materials or substances at the Flight Line Facilities area.***

The aircraft have counterweights containing low level uranium that are replaced periodically. When the counterweights are replaced, environmental personnel place the spent counterweight into a cardboard box and transport it to the Yellow Water Area to be stored in a metal drum. A detachment from Virginia disposes of the drum when necessary.

32. ***Several large sections of asphalt patch work has been observed northwest of Building No. 815. What is the reason for the repair of the asphalt surface?***

Mr. Dingwall does not know.

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APPENDIX A-3

Description of Trench Drain Systems and Wash Rack Area

APPENDIX A-3

Description of Trench Drain Systems and Wash Rack Area

Sixteen floor drains are located within the hanger maintenance bay area of Building No. 1845. A trench drain system traverses the east end of the building along the hanger bay doors and is interconnected with the floor drain system. Ogden Environmental and Energy Services Company (Ogden) performed a dye test on the floor drain system in 1996 and determined the system discharges into the retention pond located at the southwest corner of Building No. 1845. The drains are reportedly controlled by an electrical valve which switches the discharge between the sanitary and storm sewer system. Under normal conditions, the drains reportedly discharge into one of two oil/water separators located on the west side of the building, with non-oily waste being discharged to the sanitary sewer. When the aqueous fire fighting foam (AFFF) alarm system is activated, the floor drains should automatically be disconnected from the sanitary sewer and discharge to the storm sewer (detention pond). Since the dye was detected in the storm sewer during the dye test, it is apparent that the drainage system is not working as designed.

Golder Associates contacted Ms. Lorraine Seidel of the Environmental Department at NAS Cecil Field on July 8, 1998 concerning the current status of the floor drain system in Building No. 1845. A contractor has looked into repairing the floor drain system, but was unable to correct the situation believed to be an electrical problem in the control box, according to Ms. Seidel. The U.S. Navy has not corrected the problem to date so the system currently does not operate as designed.

There are no floor drains in Building No. 815. A series of trench drains transverse the east end of the building along the hanger bay doors. The drains were die tested by Ogden and determined to discharge into the storm sewer system. The trench drains are located outside of the hanger and their purpose is to prevent rainwater runoff from entering the hanger.

The wash rack located between Buildings No. 1845 and No. 815 has a catch basin which receives water from two surface drains. Reportedly, the catch basin has a manually operated valve that switches the discharge from directly to the storm sewer to a 500-gallon equalization tank when the area is being used for washing jets by U.S. Navy personnel. A dye study performed in the wash

rack area by Ogden during September 1996 indicated that the flow discharged into the storm sewer (retention pond) when the valve was open or closed. According to Ms. Seidel, when the catch basin is periodically cleaned out the valve system will work as designed and discharge water will flow to the equalization tank prior to discharging the sanitary sewer system. A follow up dye test conducted during November 1996 by Ogden confirmed that the dye was discharged to the equalization tank prior to being discharged to the sanitary sewer system. Reportedly, the manual valve must be positioned properly every time the area is being used to wash jets, and regular maintenance needs to be schedule to clean out the catch basin so that wastewater containing cleaning solvents can be discharged to the appropriate waste collection system. The results of the 1996 dye test suggest that discharges to the retention pond occurred while Navy personnel were washing airplanes in the past.

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APPENDIX B

Field Documentation – Soil Sampling Program

APPENDIX B-1

Soil Boring Records

Golder Associates
Field Boring Log

DEPTH HOLE 50'	JOB NO. 973-3778.203	PROJECT N&C / CF / FL 1845	BORING NO. DMW-1
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD MUD ROTARY	SHEET 1 OF 2
DEPTH ROCK CORE	WEATHER CLOY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80's	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 48'	HRS. PROD. 38 MIN	WT. SAMPLER HAMMER 140 lb DROP 48"	STARTED 700 (TIME) / 5/28/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT (INCHES)	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	POST HOLE FIRST 4 FEET							BROWN TO DARK BROWN FINE SAND w/ LI SILT
2							2	
								LI CLAY
4							4	LIGHT BR F SD, LOOSE(L) (SP)
		10	1		8,5,5,8	18/24		
6							6	
8							8	
10		19	2		7,9,10,12	17/24	10	LIGHT (GRAYISH) BR F SD, CP (SP)
12							12	
14							14	
		8	3		4,4,4,8	16/24		LIGHT GRAY F SD, LOOSE (SP) TRACE SILT
16							16	
18							18	
20		25	4		11,12,13,15	10/24	20	LIGHT GRAY F SD, CP (SP)
22							22	
24							24	
		58	5		20,28,30,22	9/24		LIGHT GRAY ~~MEDIUM~~ FINE SD, VDN (SP)
26							26	
28							28	
30		68	6		27,34,34,30	10/24	30	MED. GRAY F SD, VDN (SP)
32							32	
34							34	
		27	7		13,12,15,22	18/24		MED GRAY F SD, CP (SP) - 2" SEAM, GRAYISH GREEN WITH SOME SILT
36							36	
38							38	
	DRILLER NOTED CHANGE IN LITHOLOGY AT 39'							CLAY CUTTINGS IN THE WASH BETWEEN 36-39'
40		24	8		12,12,10,9	20/24	40	MED. GRAY F SA, CP (SP) WITH LITTLE SILT
42							42	
44							44	

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Golder Associates

Field Boring Log

DEPTH HOLE 50'	JOB NO. 973-3778.203	PROJECT N&C/CF/FL 1845	BORING NO. BMW-1
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD MUD ROTARY	SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER CLDY.	DRILLING COMPANY HVSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80's	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 48'	HRS. PROD. 38 MIN.	WT. SAMPLER HAMMER 160 lb. DROP 48"	STARTED 700 (TIME) 15/28/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		60		9		25,30,30,50	16/24		MED GRAY F SD, VDN(SD)
									2" SEAM OF GRAY CLAY
46								46	
48								48	
									MED GRAY SIY SD, L
50		10		10		6,5,5,8	17/24	50	

Golder Associates

Field Boring Log

DEPTH HOLE 50'	JOB NO. 973-3778.203	PROJECT NGC/CF JFL 1845				BORING NO. DMW-2	
DEPTH SOIL DRILL 50'	GA INSP. BMW	DRILLING METHOD MUD ROTARY				SHEET 1 OF 2	
DEPTH ROCK CORE —	WEATHER P.C	DRILLING COMPANY HUSS DRILLING				SURFACE ELEV. —	
NO. DIST. SA. — UD. SA. —	TEMP. 80'S	DRILL RIG # 2879 BK-66	DRILLER TONY			DATUM —	
DEPTH WL. —	HRS. PROD. 30 MIN.	WT. SAMPLER HAMMER 160 lb	DROP 48"			STARTED 1045 (TIME) 16/1/98 (DATE)	
TIME WL. —	HRS. DELAYED —	WT. CASING HAMMER —	DROP —			COMPLETED 1245 (TIME) 16/1/98 (DATE)	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	1" OF ASPHALT POSTHOLE TO 4 FEET.								
2	6" OF LIMEROCK							2	LIGHT BR F SD (SP)
4		12		1		3,6,6,8	18/24	4	LIGHT BR CLY SD (4-5'), CP (SP)
6								6	LIGHT BR F SD (5-6"), CP (SP)
8								8	
10		10		2		6,6,4,4	14/24	10	(9-10') LIGHT BR F SD (9-11'), LS (SP)
12								12	
14		7		3		5,3,4,4	17/24	14	(14-16') LIGHT BR F SD → LIGHT GRAY F SD, LS (SP)
16								16	
18								18	
20		32		4		6,14,18,18	10/24	20	(19-21') LIGHT GRAY F SD, DN (SP)
22								22	
24		43		5		13,13,30,40	10/24	24	(24-26') LIGHT GRAY → TAN F SD, DN (SP)
26								26	
28								28	(29-31') TAN → GRAY F SD, VDN (SP)
30		70		6		16,40,30,50	6/24	30	
32								32	
34		83		7		20,28,55	16/24	34	(34-36') GRAY F SD, VDN (SP)
36								36	
38	CLAY CUTTINGS BETWEEN 36'-39' IN DRILLING MUD (NONE IN SPOON)							38	(39-41')
40		72		8		19,22,50	12/24	40	GRAY F SD, VDN (SP)
42								42	
44								44	

Golder Associates

Field Boring Log

DEPTH HOLE 50'	JOB NO. 923-3778.203	PROJECT NGL/CE/EC 1845	BORING NO. DMW-2
DEPTH SOIL DRILL 50'	GA INSP. BMW	DRILLING METHOD MUD ROTARY	SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER PARTLY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 90's	DRILL RIG 1879 DRILLER TONY	DATUM
DEPTH WL. 48'	HRS. PROD. 30 MIN.	WT. SAMPLER HAMMER 160 lb DROP 48"	STARTED 1045 (TIME) / 6/1/88 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		85	9		19,35,50	12/24		GRAY F SD, VDN
46							46	(2" SEAM OF GRAY CLAY)
48							48	
50		90	10		20,50,40,50		50	GRAY F SD, VDN
52							52	

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Field Boring Log

RW 6/2/98

DEPTH HOLE 48'	JOB NO. 973.3778.203	PROJECT NGC/CF/FL 1845				BORING NO. DMW-3	
DEPTH SOIL DRILL 50'	GA INSP. BMW	DRILLING METHOD MUD ROTARY				SHEET 1 OF 2	
DEPTH ROCK CORE	WEATHER HAZY	DRILLING COMPANY HUSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 80'S	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL. 50'	HRS. PROD. 60 min	WT. SAMPLER HAMMER 160 lb.		DROP 48"		STARTED 730 (TIME) / 6/3/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" - 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	10½" OF CONCRETE POST HOLE TO 4 FEET								
2								2	DARK BR F SD
4		18		1		6,10,8,10	16/24	4	DARK BR F SD, LI SI, CP
6								6	
8								8	
10		15		2		7,7,8,8	16/24	10	BR F SD, LI SI, CP
12								12	
14		19		3		9,9,10,14	15/24	14	BR F SD, CP
16								16	
18								18	
20		26		4		7,9,17,20	10/24	20	FIRST 4" BR F SD, CP LAST 6" TAN F SD, CP
22								22	
24		36		5		8,14,22,26	9/24	24	TAN F SD, DN
26								26	
28								28	
30		58		6		18,22,36,55	14/24	30	GRAY F SD, VDN
32								32	
34								34	
36		59		7		16,22,37,50	8/24	36	GRAY F SD, VDN
38								38	
40		74		8		20,[illegible]31,50	12/24	40	GRAYISH TAN F SD, VDN
42								42	
44								44	

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Field Boring Log

DEPTH HOLE 50'	JOB NO. 973-3778.203	PROJECT NGC/CF/FL 1845				BORING NO. DMW-3	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD MUD ROTARY				SHEET 2 OF 2	
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY UVSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 90	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL. 50'	HRS. PROD. 60 MIN	WT. SAMPLER HAMMER 160 lb		DROP 48"		STARTED 730 (TIME) 16/3/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" - 12 - 30%
"LITTLE" - 5 - 12% "AND" - 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		76		9		13,26,SD			GRAYISH TAN F SD, VDN
46								46	
48								48	
50		84		10		20,37,47,50		50	GRAY F SD, VDN
52								52	

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Field Boring Log

DEPTH HOLE 14'	JOB NO. 973-3778.203	PROJECT NBC/CF/FL 1845	BORING NO. SMW-2
DEPTH SOIL DRILL 16'	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80'S	DRILL RIG 2879 / DRILLER TONY	DATUM
DEPTH WL. 14 MIN	HRS. PROD.	WT. SAMPLER HAMMER 160 lb / DROP	STARTED 1000 (TIME) 5/29/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER / DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	8" OF CONCRETE								
1	SAMPLE TAKEN @ 1-1.5'							1	
									BR F SD
2								2	TAN F SD
3								3	RUSTY BR F SD
4								4	
5		5		1		5,2,3,7	22/24	5	BR F SD, LS 4-6'
6								6	
7								7	
8								8	
9								9	BR F SD, CP (9-10')
10		14		2		5,7,7,10	22/24	10	TAN F SD, CP (10-11')
11								11	
12								12	
13								13	
14								14	
15		25		3		7,11,14,16		15	TAN→BR F SD, CP

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Field Boring Log

DEPTH HOLE 15'	JOB NO. 973-3778.213	PROJECT NBC/MC/FL 1845	BORING NO. SMW-5
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. ___ UD. SA. ___	TEMP. 80's	DRILL RIG 2879	DRILLER TONY	DATUM
DEPTH WL. 14	HRS. PROD. 30 MIN.	WT. SAMPLER HAMMER 160 lb	DROP 48"	STARTED 745 (TIME) 6/4/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" - 12 - 30%
"LITTLE" - 5 - 12% "AND" - 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	14" OF CONCRETE								
1								1	
									LIGHT TAN F SD
2								2	BR TO DARK BR SLIGHTLY SI SD
3								3	
4								4	
5								5	
6								6	
7								7	
8								8	
9								9	
									DARK BR SD, LI SI, CP
10		15		1		28,6,9,10	15/24	10	BR F SD, CP
11								11	
12								12	
13								13	
14								14	
15		23		2		4,7,10,27	24/24	15	BR F SD, CP

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Field Boring Log

DEPTH HOLE 50'	JOB NO. 973-3778.203	PROJECT NGC / CF / FL 1845	BORING NO. DMW-1
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD MUD ROTARY	SHEET 1 OF 2
DEPTH ROCK CORE	WEATHER CLOY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80'S	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 48	HRS. PROD. 38 MIN	WT. SAMPLER HAMMER 140 lb DROP 48"	STARTED 700 / 5/28/98 (TIME / DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT (INCHES)	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	POST HOLE FIRST 4 FEET								BROWN TO DARK BROWN FINE SAND w/ Li SILT
2								2	
									Li CLAY
4								4	
		10		1		8,5,5,8	18/24		LIGHT BR F SD, LOOSE(L) (SP)
6								6	
8								8	
10		19		2		7,9,10,12	17/24	10	LIGHT (GRAYISH) BR F SD, CP (SP)
12								12	
14								14	
		8		3		4,4,4,8	16/24		LIGHT GRAY F SD, LOOSE (SP)
16								16	TRACE SILT
18								18	
20		25		4		11,12,13,15	10/24	20	LIGHT GRAY F SD, CP (SP)
22								22	
24								24	
		58		5		20,28,30,22	9/24		LIGHT GRAY ~~MEDIUM~~ FINE SD, VDN (SP)
26								26	
28								28	
30		68		6		27,34,34,30	10/24	30	MED. GRAY F SD, VDN (SP)
32								32	
34								34	
		27		7		13,12,15,22	18/24		MED GRAY F SD, CP (SP)
36								36	- 2" SEAM, GRAYISH GREEN WITH SOME SILT
38								38	
	DRILLER NOTED CHANGE IN LITHOLOGY AT 39'								CLAY CUTTINGS IN THE WASH BETWEEN 36-39'
40		24		8		12,12,10,9	20/24	40	MED. GRAY F SD, CP (SP)
									WITH LITTLE SILT
42								42	
44								44	

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Field Boring Log

DEPTH HOLE 15	JOB NO. 973-3728-263	PROJECT NEC/CE/KL 18YS	BORING NO. SMW-6
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. UPPER 90'S	DRILL RIG 287-9 DRILLER TONY	DATUM
DEPTH WL. 14 TO SCREEN	HRS. PROD. 34 MIN.	WT. SAMPLER HAMMER 160 lb. DROP 48"	STARTED 1500 TIME 10/3/98 DATE
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" - 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	3" ASPHALT								
1	6" LIMEROCK							1	
2								2	BR F SD
3								3	CLY BR F SD
4								4	
5								5	4-6 DARK BR F SD
6								6	
7								7	
8								8	
9								9	(9-10') LIGHT GRAY SD → BR F SD, LS
10		8		1		3,3,5,5	23/24	10	(10-11') BR F SD, LS
11								11	
12								12	
13								13	
14								14	(14-16')
15		16		2		5,6,10,14	24/24	15	BR F SD, CP

Golder Associates

Field Boring Log

DEPTH HOLE 14'	JOB NO. 973-3778.203	PROJECT NBL/CF/FL 1845	BORING NO. SMW-7
DEPTH SOIL DRILL 15'	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE ___	WEATHER CLDY.	DRILLING COMPANY HUSS DRILLING CO.	SURFACE ELEV. ___
NO. DIST. SA. ___ UD. SA. ___	TEMP. 80's	DRILL RIG 2879 / DRILLER TONY	DATUM ___
DEPTH WL. ___	HRS. PROD. 1/2	WT. SAMPLER HAMMER 160 lb / DROP 48"	STARTED 1100 (TIME) 5/27/98 (DATE)
TIME WL. ___	HRS. DELAYED —	WT. CASING HAMMER ___ / DROP ___	COMPLETED 1240 (TIME) 5/27/98 (DATE)

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	1" ASPHALT ~6" LIMEROCK							
1							1	BROWN MEDIUM SD MIXED W/LIMEROCK
2							2	
3							3	BR MEDIUM SAND
4							4	
5					2,2,3,2		5	BR MEDIUM SAND VERY LOOSE DENSITY, VERY SOFT
6	WATER TABLE						6	
7							7	
8							8	
9							9	
10					2,4,2,2		10	F. LIGHT BR SLY SAND VERY LOOSE DENSITY, SOFT
11							11	
12							12	
13							13	
14					8,9,9,11		14	F LIGHT BR SIY SAND LOOSE DENSITY, SOFT
15							15	

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Field Boring Log

DEPTH HOLE 13'	JOB NO. 973-3778.203	PROJECT NGC/CF/FL 1845	BORING NO. SMW-8
DEPTH SOIL DRILL 15'	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER 80's CLDY.	DRILLING COMPANY HVSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80's	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL.	HRS. PROD. 1/2	WT. SAMPLER HAMMER 160lb DROP 48"	STARTED 1300 (TIME) 5/27/98 (DATE)
TIME WL.	HRS. DELAYED —	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	1.0" ASPHALT							
	6" LIMEROCK							BR SD MIXED W/LIMEROCK
1	POST HOLE TO 4'						1	
								VERY F LIGHT BR SD, SOFT
2							2	
3							3	CLY SD, LIGHT BR
4							4	VERY F LIGHT BR SAND
5	WATER TABLE				3,5,9,9		5	CLY SD, LIGHT BR
								VERY F GRAY SAND
6							6	
7							7	
8							8	
9							9	
								LIGHT BR CLY SD
10					6,5,4,5		10	& GRAY
								LIGHT GRAY F SD
11							11	
12							12	
							13	
								LIGHT GRAY F SD
					3,3,3,6		14	
							15	

Golder Associates
Field Boring Log

DEPTH HOLE 15	JOB NO. 973-3778203	PROJECT NGC/CF/FL 1845	BORING NO. SMW-9
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD HOLLOW STEM	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HVSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80S	DRILL RIG 2879 / DRILLER TONY	DATUM
DEPTH WL. 14	HRS. PROD. 80 MIN.	WT. SAMPLER HAMMER 160/6. / DROP 48"	STARTED 1040 (TIME) 6/4/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER / DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" - 12 - 30%
"LITTLE" - 5 - 12% "AND" - 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	12.5" DIA CONCRETE								
1								1	DARK BR F SD
2								2	BR F SD, TR CL TO 3.5'
3								3	
4								4	(4-6') BR F SD
5								5	
6								6	
7								7	
8								8	
9								9	BR→DARK BR F SD, LI SI, DN
10		46		1		49,33,13,15	24/24	10	BR F SD, DN (10-11')
11								11	
12								12	
13								13	
14								14	BR F SD, CP
15		16		2		5,7,9,18	24/24	15	DARK BR F SD, CP (LAST 8")

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Field Boring Log

DEPTH HOLE 14'	JOB NO. 873-3778.203	PROJECT NEC (CF) FL	BORING NO. SMW-10
DEPTH SOIL DRILL 15'	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER P. CLDY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80S	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL.	HRS. PROD. 25 MIN.	WT. SAMPLER HAMMER 160 lb. DROP	STARTED 1500 (TIME) 5/28/88 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	POST HOLE FIRST 4'								
1								1	BR SAND, FINE
2								2	LIGHT BR F SD
3								3	GRAY CLY SD → ORANGE
4								4	
5		16		1		5,8,8,8	20/24	5	4-5' CLY ORANGE SD, CP LIGHT GRAY F SD, CP
6								6	
7								7	
8								8	
9								9	
10		10		2		11,5,5,5	18/24	10	9-10' ORANGE F SD, SOME CLAY, LS 10-11' LIGHT GRAY F SD, LS
11								11	
12								12	
13								13	
14								14	
15		6		3		3,3,3,3	19/24	15	14-15' LIGHT GRAY F, SD, LS

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Field Boring Log

DEPTH HOLE 15	JOB NO. 923-3778.283	PROJECT NBC/CF/FL 1845				BORING NO. SMW-11	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER				SHEET 1 OF 1	
DEPTH ROCK CORE	WEATHER P. CLOUDY	DRILLING COMPANY NVSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 80's	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL. 14	HRS. PROD. 37 min.	WT. SAMPLER HAMMER 160 lb.		DROP 48"		STARTED 1500 (TIME) 6/8/78 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE		
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED		
C	COARSE	MOT	MOTTLED	SD	SAND		
CA	CASING	NP	NON-PLASTIC	SI	SILT		
CL	CLAY	OG	ORANGE	SIY	SILTY		
CLY	CLAYEY	ORG	ORGANIC	SM	SOME		
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE		
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL		
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER		
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW		
LI	LITTLE	RX	ROCK				

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	INSIDE HANGER #1845								
1	10" OF CONCRETE 2" OF GRAVEL							1	
2								2	LIGHT GRAYISH BROWN F SD.
3								3	DARK BROWN F SD, LI SI
4								4	
5								5	BR F SD
6								6	
7								7	
8								8	LIGHT GRAY F SD (8-9'), CP
9		11		1		35,6,5,6	20/24	9	BR F SD, TR SI, CP
10				3				10	
11								11	
12								12	
13								13	
14								14	BR F SD, LS
15		8		2		2,3,5,8	24/24	15	GRAYISH TAN F SD, LS

Golder Associates

Field Boring Log

DEPTH HOLE 51	JOB NO. 973-3778.403	PROJECT N&C/CF/FL ~~1845~~ 815				BORING NO. DMW-12	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD MUD ROTARY				SHEET 1 OF 2	
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HUSS				SURFACE ELEV. G.S.	
NO. DIST. SA. UD. SA.	TEMP. 90's	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL.	HRS. PROD. 49 min.	WT. SAMPLER HAMMER 160 lb.		DROP 48"		STARTED 1330 / 6/4/98 (TIME / DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	10" OF CONCRETE								
2								2	BR F SD
4		32		1		14,14,18,14	14/24	4	BR F SD, LI CL
6								6	BR F SD, TR CL, DN
8								8	
10		95		2		28,40,55	14/24	10	DARK BR F SD, LI SI, VDN
12								12	
14		14		3		6,6,8,10	17/24	14	BR F SD, CP
16								16	
18								18	
20		34		4		9,12,22,30	11/24	20	MIXED GRAY & TAN F SD, CP
22								22	
24		26		5		6,10,16,20	11/24	24	LIGHT GRAY F SD, CP
26								26	
28								28	
30	88 blows/8" →	88		6		16,38,50	10/24	30	GRAYISH TAN F SD, VDN
32								32	
34		80		7		17,40,40,40	10/24	34	GRAY F SD, VDN
36								36	
38								38	A SMALL AMOUNT OF CLAY @ THE TOP OF SPOON
40		76		8		18,32,44,34	12/24	40	GRAY F SD, VDN
42								42	
44								44	

Golder Associates

Field Boring Log

DEPTH HOLE 57	JOB NO. 973-3778.403	PROJECT NGC/CF/IEL ~~DUS~~ 815	BORING NO. DMW-12
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD MUD ROTARY	SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 90's	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL.	HRS. PROD. 49 min.	WT. SAMPLER HAMMER 160 lb DROP 48"	STARTED 1330 (TIME) / 6/4/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
46		66		9		24,30,36,50	12/24	46	GRAY F SD, VDN
48								48	
50		100		10		23,50,50	8/24	50	GRAY F SD, VDN

Golder Associates

Field Boring Log

DEPTH HOLE 14' OVERL	JOB NO. 973-3778.203	PROJECT NOC/CF/FL 1848				BORING NO. SMW-13	
DEPTH SOIL DRILL 15	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER				SHEET 1 OF 1	
DEPTH ROCK CORE	WEATHER 90's	DRILLING COMPANY NUSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. SUNNY	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL.	HRS. PROD. 24 MIN	WT. SAMPLER HAMMER 160 lb.		DROP 48"		STARTED 1100 (TIME) / 6/2/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" - 12 - 30%
"LITTLE" - 5 - 12% "AND" - 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-60	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	12" CONCRETE								
1								1	
2								2	BR F SD
3								3	BR F SD, SOME CL
4								4	DARK BR F SD
5		1		RW				5	BR F SD, LI CL
6								6	
7								7	
8								8	
9								9	BR F SD, SM CL (9/10'), CP
10		14		1		20,7,7,7	20/24	10	BR → GRAY F SD (10-11'), CP
11								11	
12								12	
13								13	
14								14	
15		28		2		10,14,12,14	24/24	15	BR F SD, CP (very uniform)

Golder Associates

Field Boring Log

DEPTH HOLE 15	JOB NO. 973-3778.403	PROJECT NGC/CF/PL 815				BORING NO. SMW-~~2~~814 (RMW)	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER				SHEET 1 OF 1	
DEPTH ROCK CORE	WEATHER P. CLOUDY	DRILLING COMPANY HUSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 90's	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL. 14.5	HRS. PROD. 13 MIN.	WT. SAMPLER HAMMER 160 lb		DROP 48"		STARTED 1230 (TIME) 6/17/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	8" CONCRETE								
1								1	
									1-2' BR F SD
2								2	
									(2-6') REDDISH BR F SD
3								3	
4								4	
5								5	
6								6	
7								7	
8								8	
9		17		1		6,7,10,13	22/24	9	BR F SD, CP
10								10	
11								11	
12								12	
13								13	
14		14		2		4,6,8,12	24/24	14	BR TO TAN F SD, CP
15								15	

Golder Associates

Field Boring Log

DEPTH HOLE 13'	JOB NO. 973-3778.203	PROJECT NGC/CF/FL 1845	BORING NO. SMW-15
DEPTH SOIL DRILL 15'	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE ___	WEATHER CLDY.	DRILLING COMPANY HUSS	SURFACE ELEV. ___
NO. DIST. SA. ___ UD. SA. ___	TEMP. 80'S	DRILL RIG 2879 DRILLER TONY	DATUM ___
DEPTH WL. ___	HRS. PROD. 30 MIN.	WT. SAMPLER HAMMER 160lb DROP 48"	STARTED 1430 (TIME) / 5/27/98 (DATE)
TIME WL. ___	HRS. DELAYED ___	WT. CASING HAMMER ___ DROP ___	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
1	1' OF CONCRETE 4" LIMEROCK						1	
2							2	BR & LIGHT BR MEDIUM GRAINED SDS
3							3	
4							4	DARK BR CP SD
5	WATER TABLE				6,6,13,13		5	BR CP SD
6							6	
7							7	
8							8	
9							9	DARK BR SD (SLIGHTLY CLAYEY)
10					5,3,8,9		10	
11							11	10.5' LIGHT BR. F. SD.
12							12	
13							13	
					3,5,8,10		14	LIGHT BR. F. SD
							15	

Golder Associates

Field Boring Log

DEPTH HOLE 15'	JOB NO. 973/3778.403	PROJECT NEC/CK/PC 815	BORING NO. SB-W-16
DEPTH SOIL DRILL	GA INSP. RMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER CLEAR	DRILLING COMPANY NVSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 70's	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 14'	HRS. PROD. 33 MIN.	WT. SAMPLER HAMMER 160 lb. DROP 48"	STARTED 730 (TIME) / 6/9/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	THROUGH GRASS								
1								1	(0-2') GRAY TO DARK GRAY F SD
2								2	
3								3	(2-4') TAN TO RUSTY F SD, MIXED RUSTY-ORANGE SD HAS SOME SILT & CLAY
4								4	
5								5	(4-6') TAN TO RUSTY F SD, MIXED
6								6	
7								7	
8								8	FIRST 8" MIXED GRAY & RUSTY SD RUSTY SD HAS SOME CL
9		6		1		17,3,3,3	24/24	9	LIGHT GRAY F SD, LS
10								10	
11								11	
12								12	
13								13	
14		10		2		5,5,5,10	24/24	14	(13-15') LIGHT GRAY F SD, LS
15								15	

Golder Associates

Field Boring Log

DEPTH HOLE 15	JOB NO. 973-3778.403	PROJECT NGC/CF/FC 815				BORING NO. SMW-17	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER				SHEET 1 OF 1	
DEPTH ROCK CORE	WEATHER P. CLOUDY	DRILLING COMPANY HUSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 70'S	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL. 14	HRS. PROD. 30 MIN.	WT. SAMPLER HAMMER 160 lb.		DROP 48"		STARTED 1350 (TIME) 10/16/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	IN GRASS								
1								1	(1-2') LOOSE, BR F SD
2								2	
3								3	(3-4') TAN & GRAY F SD
4								4	
5								5	(4-6') MIXED GRAY AND OR CLY SD
6								6	
7								7	
8								8	(8-8.5') LIGHT GRAY & BR F SD, MIXED, VLS
9		4		1		6,2,2,2	24/24	9	(8.5'-10') SLIGHTLY REDDISH BR F SD, VLS
10								10	
11								11	
12								12	
13								13	(13-14') BR F SD, LS
14		6		2		4,3,3,5	24/24)	14	(14-15') BR TO GRAY F SD, LS
15								15	

Golder Associates

Field Boring Log

DEPTH HOLE 51	JOB NO. 973-3778.403	PROJECT NGC/CP/PL 815	BORING NO. DMW-18
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD MUD ROTARY	SHEET 1 OF 2
DEPTH ROCK CORE	WEATHER CLEAR	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80's	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 48.5	HRS. PROD. 72 min.	WT. SAMPLER HAMMER 160 lb DROP 48"	STARTED 1040 (TIME) 6/9/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
2	1" ASPHALT 3" LIMEROCK							2	DARK BR F SD
4								4	TAN-BR F SD
6		13		1		5,5,8,10	20/24	6	DARK BR F SD, LI SI, CP
8								8	
10		10		2		7,6,4,5	14/24	10	BR F SD, TR SI, LS
12								12	
14								14	TAN F SD, CP
16		11		3		5,5,6,8	8/24	16	
18								18	
20		4		4		2,2,2,4	22/24	20	GRAY F SD, VLS (WITH A 2" BAND OF BR F SD @ 21.5')
22								22	
24		11		5		5,5,6,6	24/24	24	GREENISH GRAY F SD, LS
26								26	
28								28	
30		18		6		6,8,10,14	15/24	30	GREENISH GRAY F SD CP WITH A LITTLE CLAY AT 31 ft.
32								32	
34		52		7		13,22,30,28	12/24	34	CLAY IN THE CUTTINGS ON TOP @ ~34' GRAY F SD, VDN
36								36	
38								38	
40		59		8		13,25,34,35	12/24	40	GRAY F SD, VDN WITH A LENSE OF CLAY 1/2 THROUGH CORE
42								42	
44								44	

Golder Associates

Field Boring Log

DEPTH HOLE 50	JOB NO. 973-3778.403	PROJECT NBC/CF/FL 85	BORING NO. DMW-18
DEPTH SOIL DRILL	GA INSP. BAW	DRILLING METHOD MUD ROTARY	SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER CLEAR	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80's	DRILL RIG 2879 / DRILLER TONY	DATUM
DEPTH WL. 48.5	HRS. PROD. 72 min.	WT. SAMPLER HAMMER 160 lb / DROP 48"	STARTED TIME 16/9/98 DATE
TIME WL.	HRS. DELAYED	WT. CASING HAMMER / DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
46	90 blows/11" →	90		9		26,40,50 5"	12/24	46	GRAY F SD, VDN
48								48	
50		79		10		19,29,50,54	12/24	50	TAN → GRAY F SD, VDN

Golder Associates

Field Boring Log

DEPTH HOLE 15'	JOB NO. 923-3778.403	PROJECT NBC/CF IFL 815				BORING NO. SMW-19	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER				SHEET 1 OF 1	
DEPTH ROCK CORE	WEATHER P. CLOUDY	DRILLING COMPANY NUSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 90	DRILL RIG 7879		DRILLER TONY		DATUM	
DEPTH WL. 14'	HRS. PROD. 27 min.	WT. SAMPLER HAMMER 160 lb		DROP 48"		STARTED 1200 (TIME) 6/12/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	11" OF CONCRETE POST HOLE TO 4'								
1								1	BR F SD
2								2	
3								3	(2-4') TAN → BR F SD
4								4	
5								5	(4-6') REDDISH BR F SD
6								6	
7								7	
8								8	TOP 8" REDDISH BR F SD, VLS
9		4		1		3,2,2,3	24/24	9	(9-10") - BR F SD, VLS
10								10	
11								11	
12								12	
13								13	(13-14') BR F SD, VLS
14		4		2		6,2,2,3	24/24	14	(14-15') GRAY F SD, VLS
15								15	

Golder Associates

Field Boring Log

DEPTH HOLE 15	JOB NO. 973-3778.463	PROJECT NGC / CF / FL				BORING NO. SMW-20	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER				SHEET 1 OF 1	
DEPTH ROCK CORE	WEATHER P: CLOUDY	DRILLING COMPANY HUSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 80'S	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL. 14	HRS. PROD. 25 MIN.	WT. SAMPLER HAMMER 160 lb.		DROP 48"		STARTED 9:45 (TIME) / 6/12/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	11" OF CONCRETE								
1								1	
									BR F SD
2								2	(2.5') OG BR CLY SD
3								3	(4.0')
4								4	(4-6') REDDISH GRAY F SD, TR SI
5								5	
6								6	
7								7	
8	PUNCH THROUGH FLOWED UP AUGER WITH SLOW (47 BLOWS)	6		1		47,4,2,2)	23/24	8	(8-9') OG CLY SD, LS
9								9	9-10) GRAY F SD, LS
10								10	
11								11	
12								12	
13								13	
14		4		2		4,2,2,2	24/24	14	(13-15') GRAY F SD, VLS
15								15	

Golder Associates

Field Boring Log

DEPTH HOLE 15	JOB NO. 973-3778-403	PROJECT NGC/CR/FL 815				BORING NO. SMW-21	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER				SHEET 1 OF 1	
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY NUSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 90	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL. 14	HRS. PROD. 33 MIN.	WT. SAMPLER HAMMER		DROP		STARTED 1420 (TIME) 6/11/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	10.5" OF CONCRETE								
1								1	
									BR F SD
2								2	(2.5-4.5') OG CLY SD
3								3	
4								4	
5								5	(4.5-6') ORANGE CLY SD TO BR F SD
6								6	
7								7	
8								8	
9				KAW				9	
10		10		1		16,46,10	18/24	10	(9-10') OG CLY SD
11								11	(10-11') GRAYISH BR F SD, LS
12								12	
13								13	
14		21		2		4,7,14,18	12/24	14	(13-15') GRAYISH BR F SD, CP
15								15	

Golder Associates
Field Boring Log

DEPTH HOLE 15	JOB NO. 973-3778.403	PROJECT NGC/CF/FL 815				BORING NO. SMW-22	
DEPTH SOIL DRILL —	GA INSP. BMN	DRILLING METHOD HOLLOW STEM AUGER				SHEET 1 OF 1	
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS				SURFACE ELEV.	
NO. DIST. SA. — UD. SA. —	TEMP. 90'S	DRILL RIG 2879		DRILLER TONY		DATUM	
DEPTH WL. 14.5	HRS. PROD. 37 MIN.	WT. SAMPLER HAMMER 140 lb		DROP 48"		STARTED 1434, 6/17/98 (TIME, DATE)	
TIME WL. —	HRS. DELAYED —	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	10" OF CONCRETE POST HOLE 4' HAND AUGER TO 6'								
1								1	(1-2') BR F SD
2								2	
3								3	(2-4.5') TAN F SD
4								4	(4.5-6') REDDISH GRAY F SD, LI CL
5								5	
6								6	
7								7	
8		6		1		5,3,3,4	20/24	8	(8-8.5') MIXED BR AND TAN F SD, LS
9								9	(8.5-9.5') BR F SD, LS
10								10	(9.5-10') GRAYISH BR F SD, LS
11								11	
12								12	
13								13	
14		18		2		6,8,10,10	19/24	14	(13-15') BR F SD
15								15	

Golder Associates

Field Boring Log

DEPTH HOLE 50	JOB NO. 973-3778.603	PROJECT NEC/CP/FL P. LOT	BORING NO. BMW-23
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD MUD ROTARY	SHEET 1 OF 2
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HVSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 90'S	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 48.5	HRS. PROD. 36 MIN	WT. SAMPLER HAMMER 160 lb. DROP 48"	STARTED 1300 (TIME) 6/10/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	THROUGH GRASS POST HOLE TO 4'								
									DARK BRAYSD
2								2	
									BR → TAN F SD, LI CL
4								4	
		20		1		6,8,12,11	20/24		GRAY F SD, LI SI, CP
6								6	
8								8	
10		6		2		2,3,3,4	23/24	10	GRAYISH PINK F SD, LS
12								12	
14								14	
		8		3		4,4,4,5	14/24		GRAYISH BR F SD, LS
16								16	
18								18	
20		36		4		10,17,19,25	14/24	20	MIXED BR & LIGHT GRAY F SD, DN
22								22	
24								24	
		26		5		8,10,16,24	11/24		MIXED BR & LIGHT BR F SD, BP
26								26	
28								28	
30		58		6		15,28,30,50	12/24	30	LIGHT OG F SD, VDN
32								32	
34								34	
		10		7		11,7,3,4	10/24		GRAY F SD, LS
36								36	(BOTTOM 2" GRAY CLAY)
38								38	
									TOP 4" GRAY CLAY
40		12		8		6,6,6,4	18/24	40	REST TO 41" GRAY CLY SD, CP
42								42	
44								44	

Golder Associates

Field Boring Log

DEPTH HOLE 50	JOB NO. 973-3278.005	PROJECT NKC/CP/EL ~~SHF~~ P.LOT				BORING NO. DMW-23	
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD MUD ROTARY				SHEET 2 OF 2	
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY NVSS				SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 90's	DRILL RIG 2829		DRILLER TONY		DATUM	
DEPTH WL. 48.5	HRS. PROD. 30 MIN.	WT. SAMPLER HAMMER 140 lb		DROP 48"		STARTED 1300 (TIME) 6/10/98 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP		COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE		
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED		
C	COARSE	MOT	MOTTLED	SD	SAND		
CA	CASING	NP	NON-PLASTIC	SI	SILT		
CL	CLAY	OG	ORANGE	SIY	SILTY		
CLY	CLAYEY	ORG	ORGANIC	SM	SOME		
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE		
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL		
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER		
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW		
LI	LITTLE	RX	ROCK				

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		68		9		16,31,34,30	12/24		TOP OF SPOON HAD BRN F SD
46								46	THIN A 3" SEAM RED CLAY
									BOTTOM OF SPOON → CLEAN VERY LIGHT
48								48	GRAY SD., VDN
50		37		10		11,13,24,19	14/24	50	CLEAN VERY LIGHT GRAY SD, DN

Golder Associates

Field Boring Log

DEPTH HOLE 75	JOB NO. 973-3778.603	PROJECT NEC/CE/PC P.LOT	BORING NO. SMW-24
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HVSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 90	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 14	HRS. PROD. 63 MIN.	WT. SAMPLER HAMMER 160 lb DROP 48"	STARTED 1030 (TIME) 6/16/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	2" OF ASPHALT								
1	6" OF LIMEROCK							1	
	POST HOLE TO 4'								DARK BR F. SD
2	HAND AUGER TO 6'							2	
3								3	(2-4') LIGHT GRAY F SD
4								4	
5								5	(4-6') MIXED OG AND GRAY F SD WITH LI CL
6								6	
7								7	
8								8	(8-8.5') DARK BR F SD, CP
9		24		1		12,16,6,6	24/24	9	(8.5-9.5') MIXED GRAY AND OG SD, LI CL, CP
10								10	(9.5-10') VERY LIGHT GRAY F SD, CP
11								11	
12								12	
13								13	
14		4		2		2,2,2,3	24/24	14	(13-14.5') LIGHT REDDISH GRAY F SD, VLS
15								15	(14.5-15') BR F SD, VLS

Golder Associates

Field Boring Log

DEPTH HOLE 15	JOB NO. 973-2778.403	PROJECT NOC/CF/FL 815	BORING NO. SMW-25
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER P. CLOUDY	DRILLING COMPANY JUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 90'S	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 17.5	HRS. PROD. 30 MIN.	WT. SAMPLER HAMMER 160 lb. DROP 48"	STARTED 1555 (TIME) 11/16/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	2" ASPHALT 4" LIMEROCK								
1								1	(1-2') DARK BR F SD
2								2	(2-3') BR F SD
3								3	(3-4') MIXED GRAY AND OG CLY SD
4								4	
5		11		1		10,5,6,6	24/24	5	(4-6') MIXED GRAY AND OG CLY SD, CP
6								6	
7								7	
8								8	
9		3		2		3,2,1,1	24/24	9	(8-10') LIGHT GRAY F SD, VLS
10								10	
11								11	
12								12	
13								13	
14		7		3		3,4,3,3		14	(13-15') LIGHT GRAY F SD, LS
15								15	

Golder Associates
Field Boring Log

DEPTH HOLE 15	JOB NO. 9733778.403	PROJECT NEC ICF 1A 815	BORING NO. SMW-26
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER HAZY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 80's	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 14	HRS. PROD. 22 MIN.	WT. SAMPLER HAMMER 140 lb. DROP 48"	STARTED 750 TIME 10/17/88 DATE
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE		
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED		
C	COARSE	MOT	MOTTLED	SD	SAND		
CA	CASING	NP	NON-PLASTIC	SI	SILT		
CL	CLAY	OG	ORANGE	SIY	SILTY		
CLY	CLAYEY	ORG	ORGANIC	SM	SOME		
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE		
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL		
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER		
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW		
LI	LITTLE	RX	ROCK				

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	THROUGH GRASS ADJACENT TO WASH RACK.								
1								1	(0-2') GRAY TO BR F SD
2								2	
3								3	(2-6') GRAY F SD
4								4	
5								5	
6								6	
7								7	
8								8	(8-9') GRAY F SD, LS
9		5		1		4,3,2,2	24/24	9	(9-10') LIGHT GRAY F SD, LS
10								10	
11								11	
12								12	
13								13	
14		12		2		6,6,6,6		14	(13-15') LIGHT GRAY F SD, LS
15								15	

Golder Associates
Field Boring Log

DEPTH HOLE 15	JOB NO. 973-3778.403	PROJECT NGC/OE/FC 815	BORING NO. SMW-27
DEPTH SOIL DRILL	GA INSP. BMW	DRILLING METHOD HOLLOW STEM AUGER	SHEET 1 OF 1
DEPTH ROCK CORE	WEATHER CLOUDY	DRILLING COMPANY HUSS	SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP. 90	DRILL RIG 2879 DRILLER TONY	DATUM
DEPTH WL. 14.5	HRS. PROD. 36 MIN.	WT. SAMPLER HAMMER 140 lb DROP 48"	STARTED 1020 (TIME) 10/13/98 (DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER DROP	COMPLETED

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" – 0 - 5% "SOME" 12 - 30%
"LITTLE" – 5 - 12% "AND" 30-50%

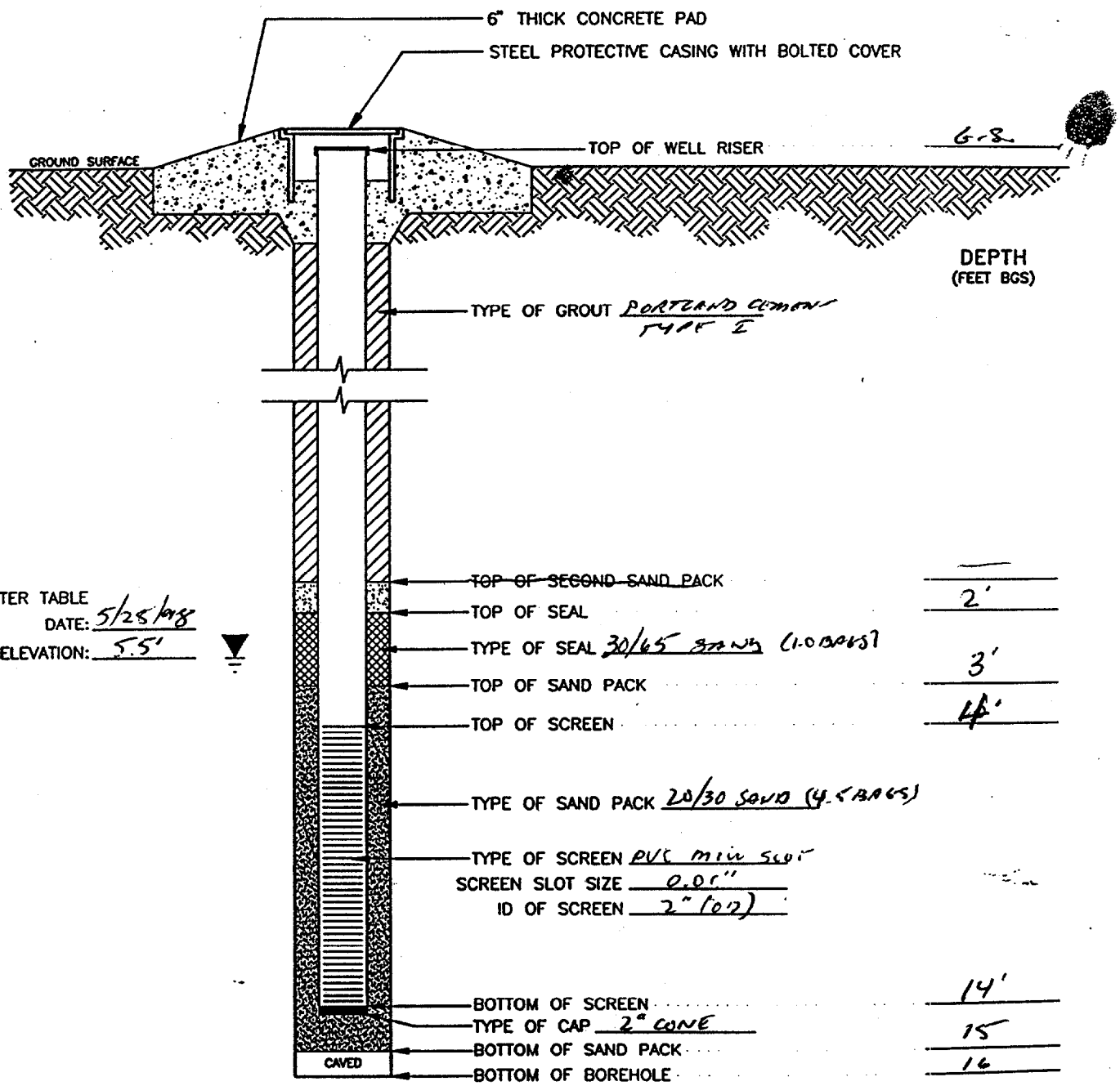
RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
	IN GRASS								
	POST HOLE 4'								(0-1') GRAY F SD
1								1	
									(1-3') LIGHT GRAY F SD
2								2	
3								3	
4								4	(3-6') MIXED GRAY & OG CLY SD
5								5	
6								6	
7								7	
8								8	(8-9') GRAY F SD, WITH LI OG CL, VLS
9		4		1		4,2,2,2	24/24	9	(9-10') OG → TAN F SD, VLS
10								10	
11								11	
12								12	
13								13	(TOP 4") – TAN F SD, LS
14		5		2		2,2,3,4	24/24	14	(TO 15') – GRAY F SD, LS
15								15	

APPENDIX B-2

Monitoring Well Installation Logs

PROJECT NAME: NGL/CF/FL 1845	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-1
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2	DATE INSTALLED: 5/28/98
DRILLING COMPANY: HVSS	WELL MATERIAL: SCD. 40 PVC	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP. RIG
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA

Golder Associates

TITLE

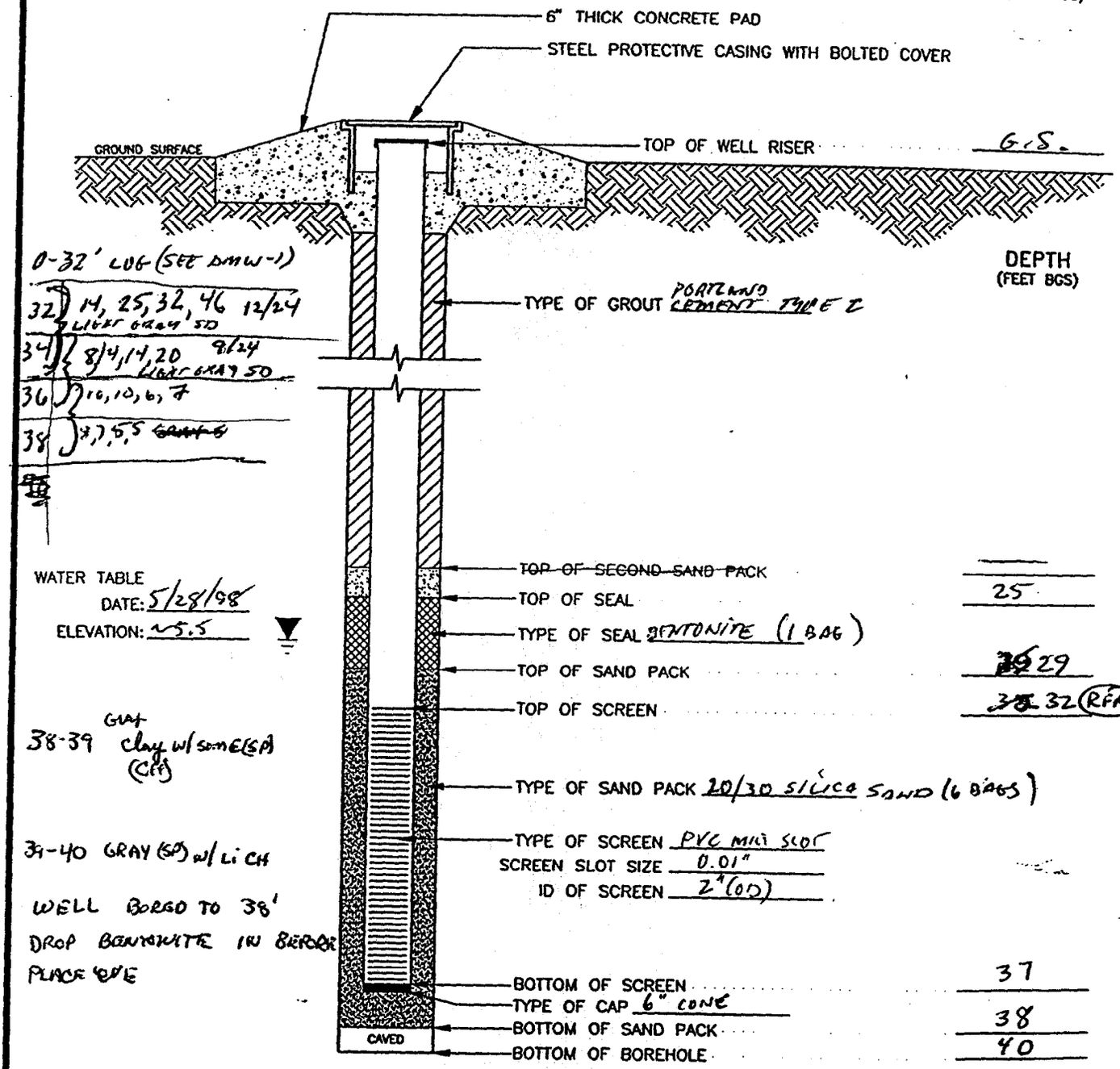
MONITORING WELL INSTALLATION DATA RECORD

CLIENT/PROJECT

NGSA/CECIL FIELD/FL

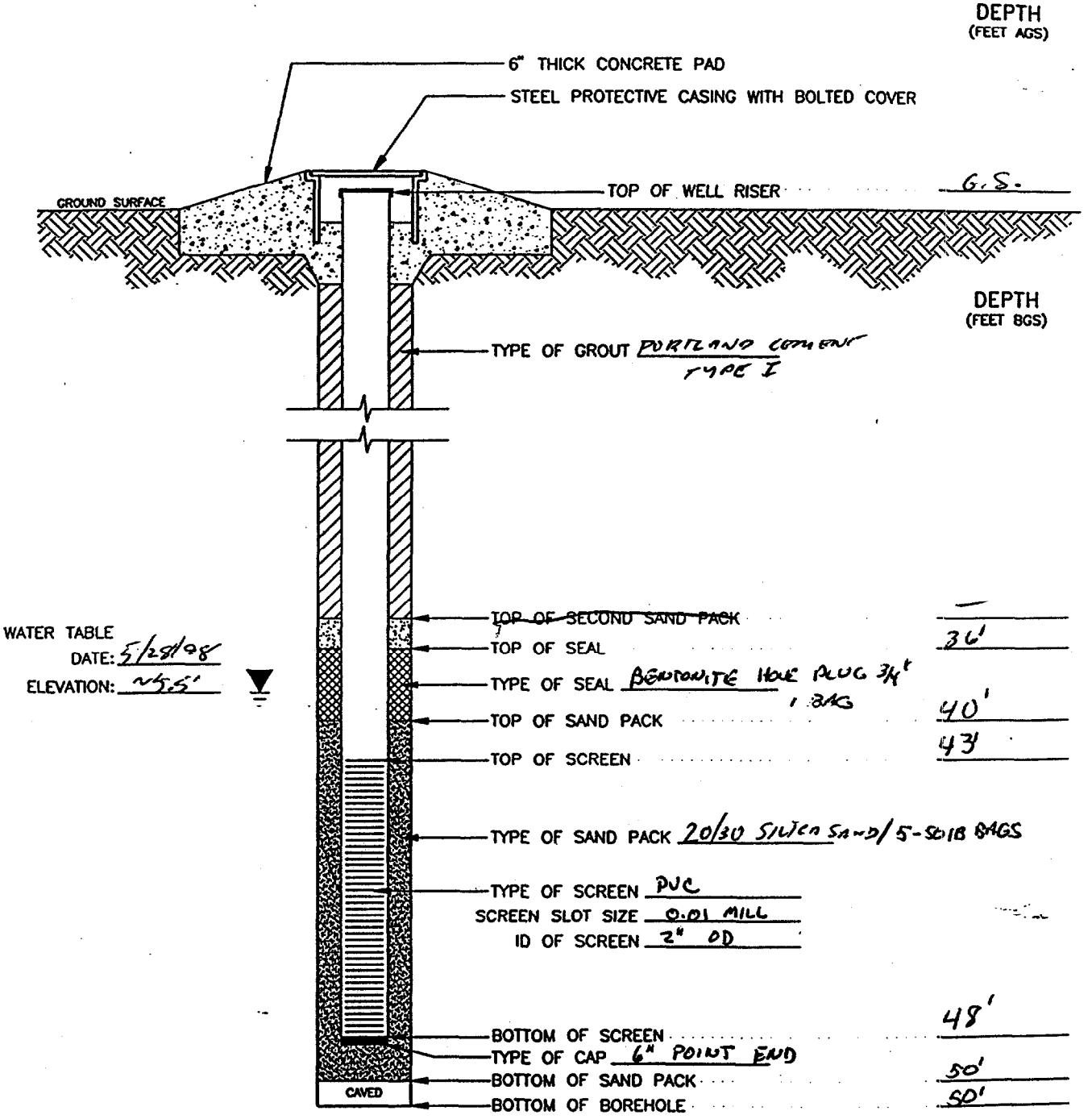
DRAWN	TRG	DATE	5/11/98	JOB NO.	973-3778
CHECKED	RFM	SCALE	NOT TO SCALE	DWG NO. 3778P1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 1845	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: IMW-1
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 5/28/98
DRILLING COMPANY: HUSS	WELL MATERIAL: PVC SCD. 40	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW, RM	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP. (RIG)
	GROUND SURFACE ELEVATION:	



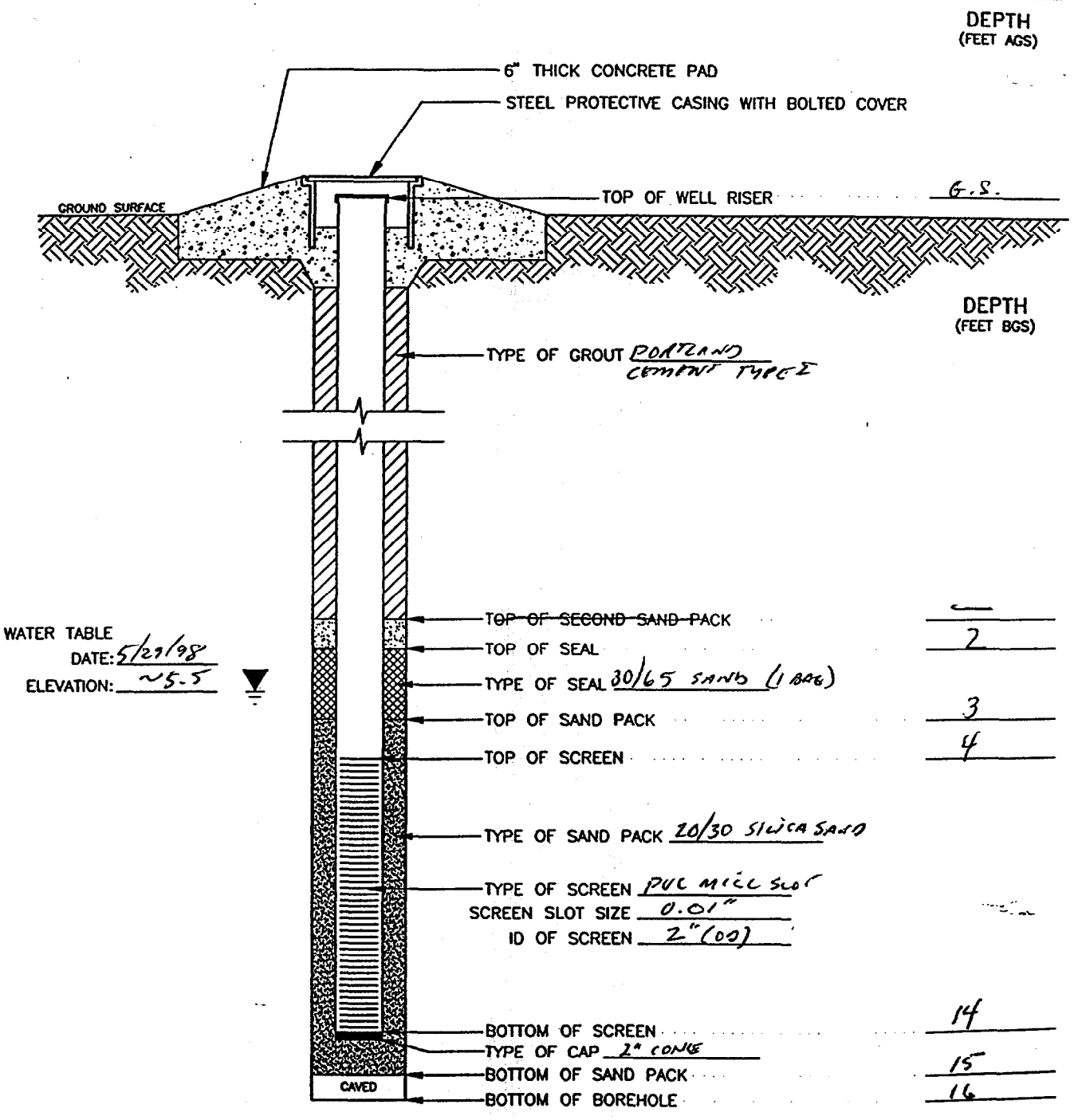
Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: BXGC/CF/FL 1845	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: DMW-1
PROJECT No: 973-3778, 203	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 5/28/98
DRILLING COMPANY: HOSS	WELL MATERIAL: PVC	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BOB / RALPH	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP (RIG)
	GROUND SURFACE ELEVATION:	



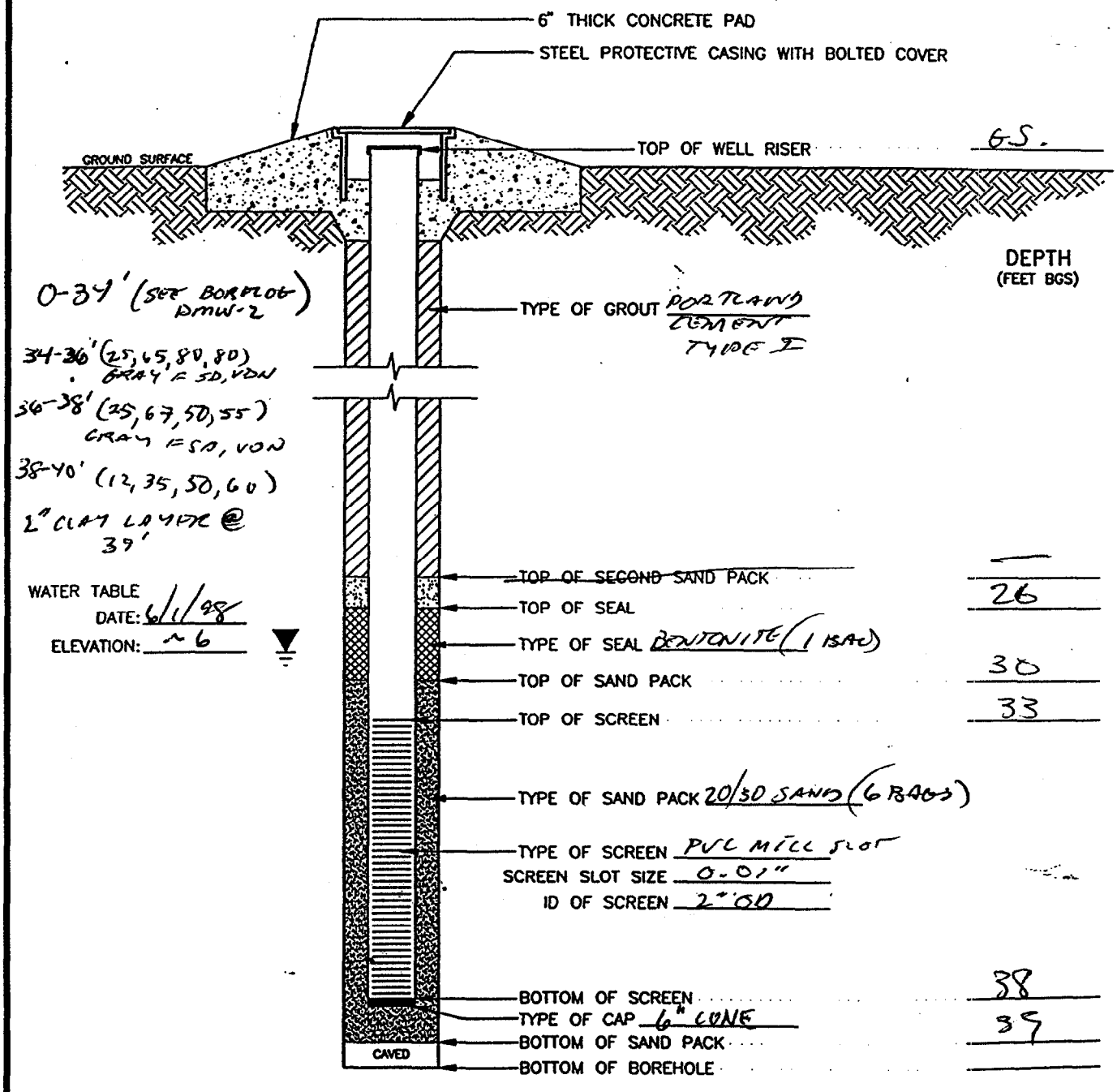
JACKSONVILLE, FLORIDA — Golder Associates	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO.: 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO.: 3778P1	REV. NO.
	REVIEWED	FILE NO.: 973-3778	SUBTITLE	FIGURE NO.: 1

PROJECT NAME: NGC/CF/FL 1845	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-2
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 5/29/98
DRILLING COMPANY: HUSS	WELL MATERIAL: SCD 40 PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP. (A16)
	GROUND SURFACE ELEVATION:	



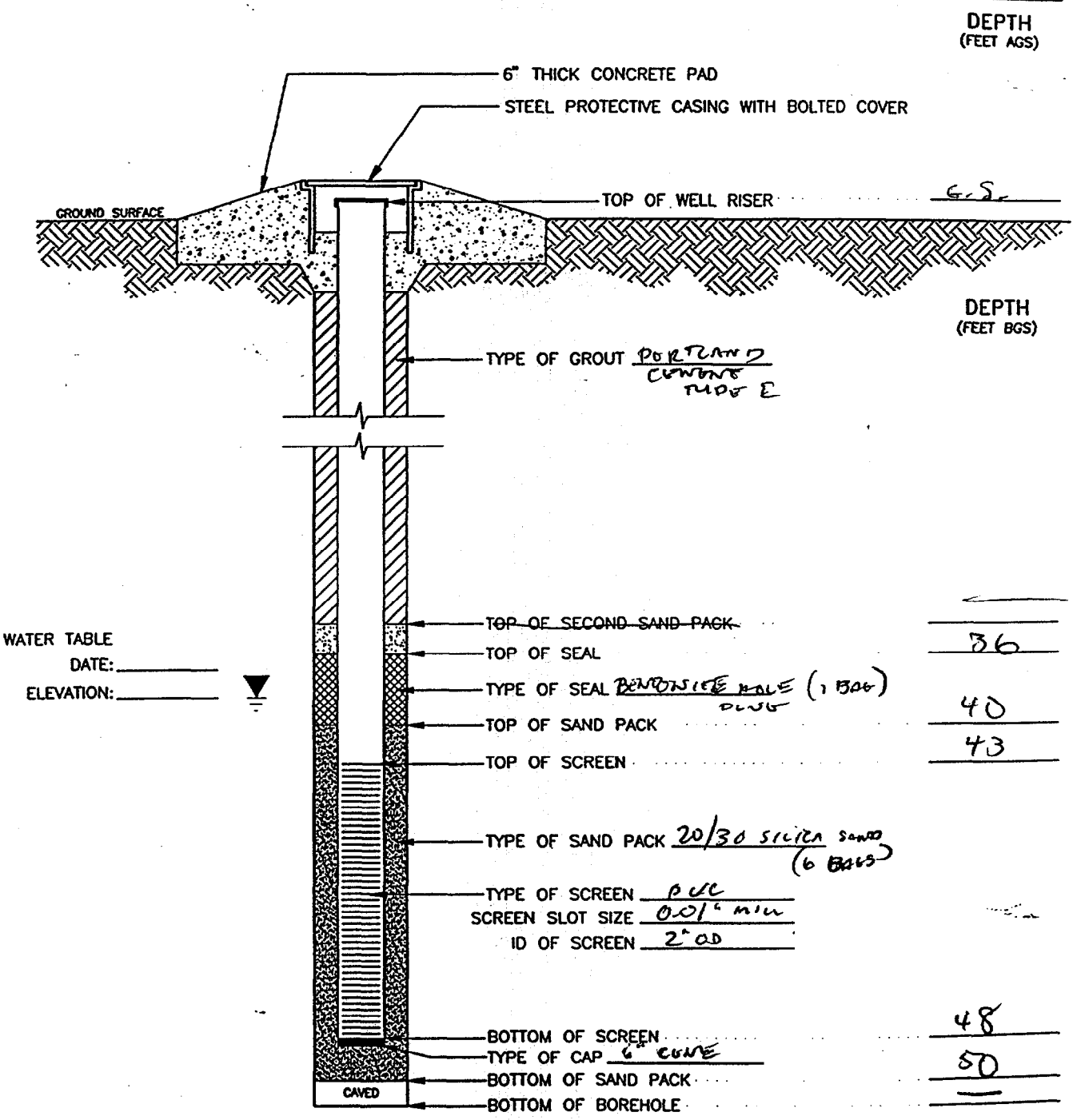
Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RCM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NSC/CF/FL 1845	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: TMW-2
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/1/98
DRILLING COMPANY: HUSS	WELL MATERIAL: PVC SCH 40	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: CENTRIFUGAL PUMP
	GROUND SURFACE ELEVATION:	



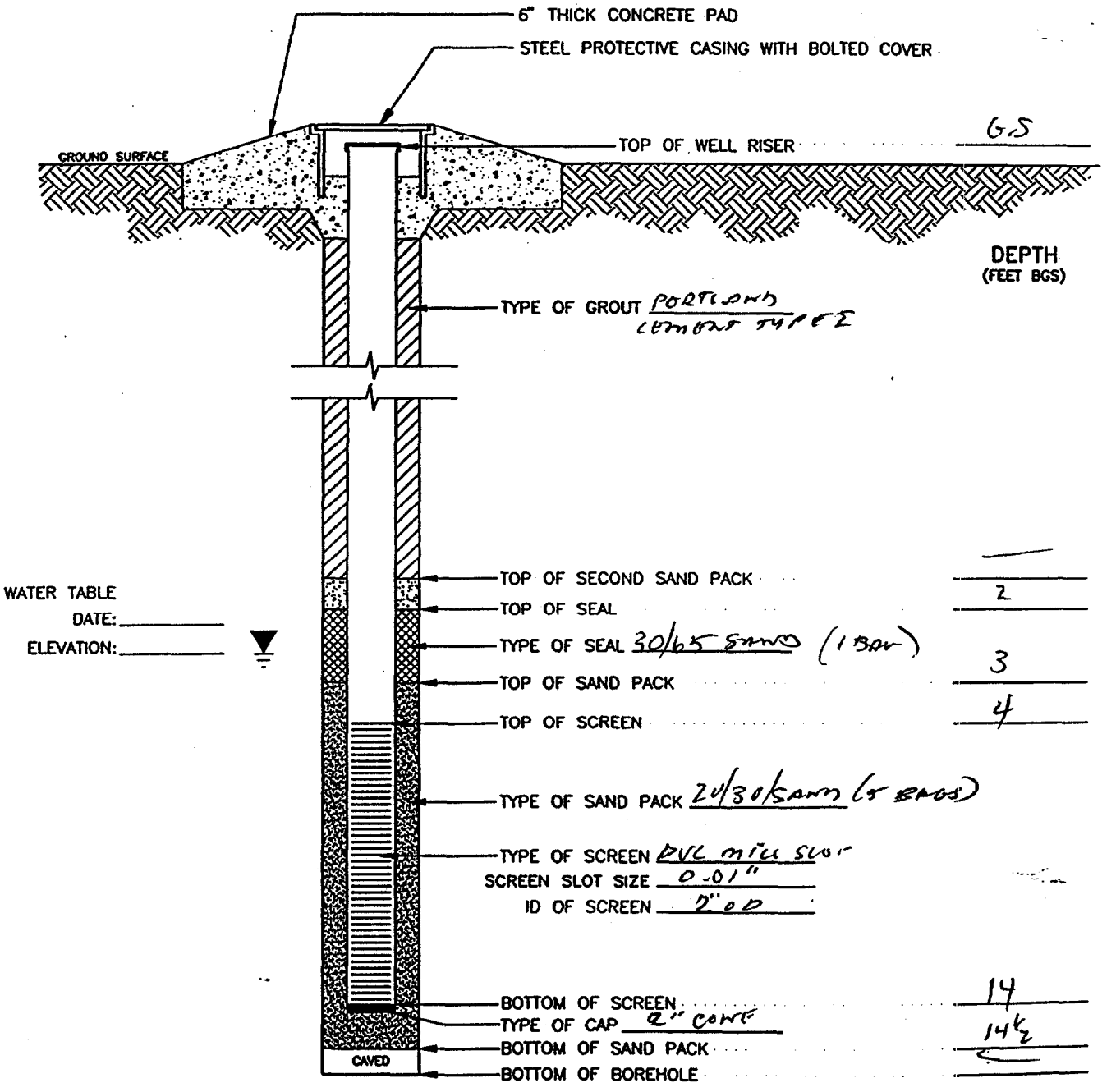
JACKSONVILLE, FLORIDA Golder Associates	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO.: 973-3778	
	CHECKED: RSM	SCALE: NOT TO SCALE	DWG NO.: 3778P1	REV. NO.
	REVIEWED	FILE NO.: 973-3778	SUBTITLE	FIGURE NO.: 1

PROJECT NAME: NGC/CF/FC 1845	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: DMW-2
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/1/88
DRILLING COMPANY: NUSS	WELL MATERIAL: SCD. 40 PVC	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: R.G PUMP
	GROUND SURFACE ELEVATION:	



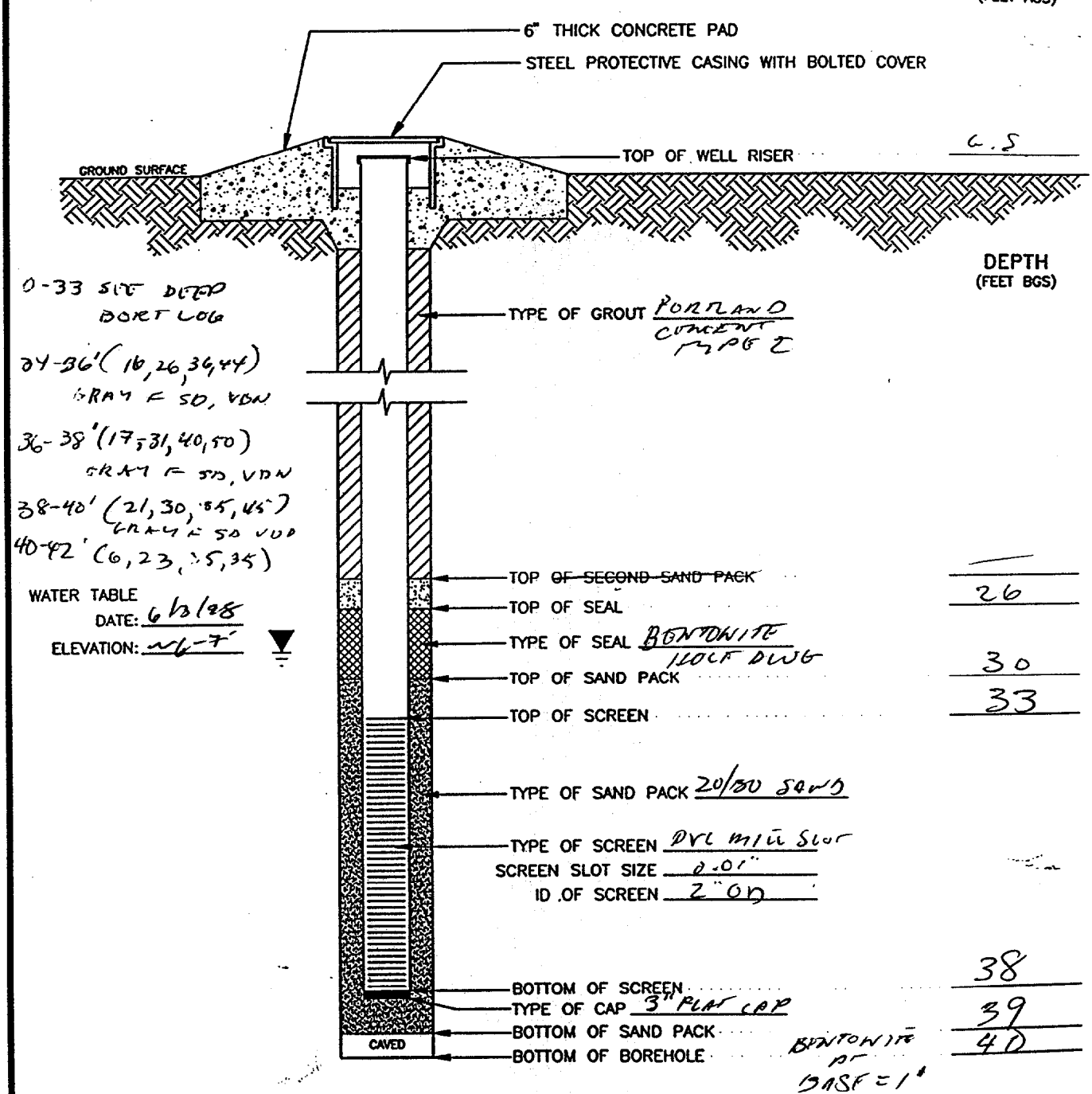
JACKSONVILLE, FLORIDA Golder Associates	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RFM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FC 1845	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-3
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/2/98
DRILLING COMPANY: K USS	WELL MATERIAL: PVC SCD. 40	DRILLING METHOD: HOLLOW STEM AUG
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: E-PUMP (RIK)
	GROUND SURFACE ELEVATION:	



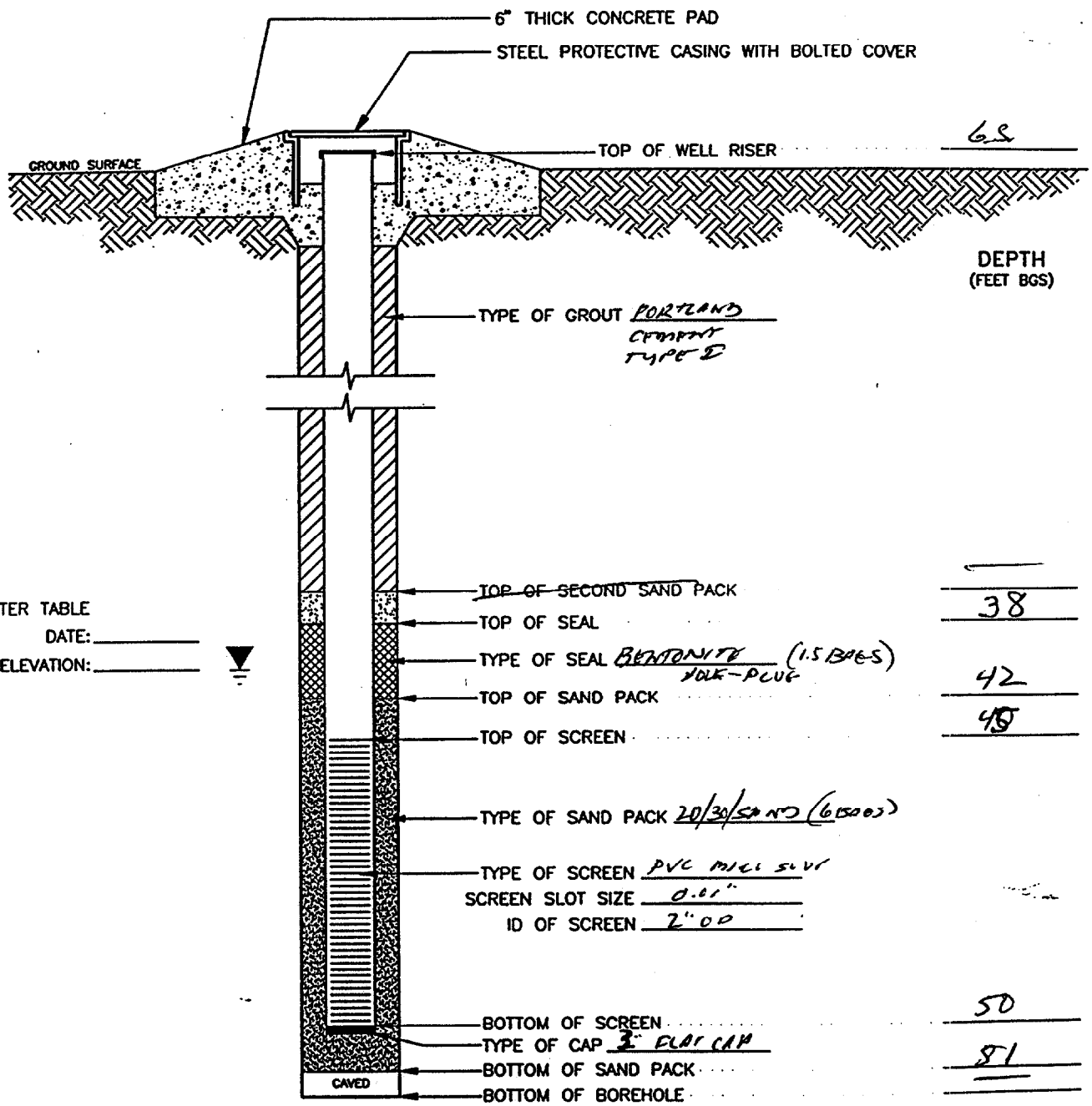
Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RFW	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 5845	BORING DIAMETER: 6"	WELL No./PIEZOMETER No.: IMW-3
PROJECT No.: 973-3778.200	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/3/98 @ 1115
DRILLING COMPANY: PDSS	WELL MATERIAL: PVC (SCD. 40)	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: R.G PUMP
	GROUND SURFACE ELEVATION:	



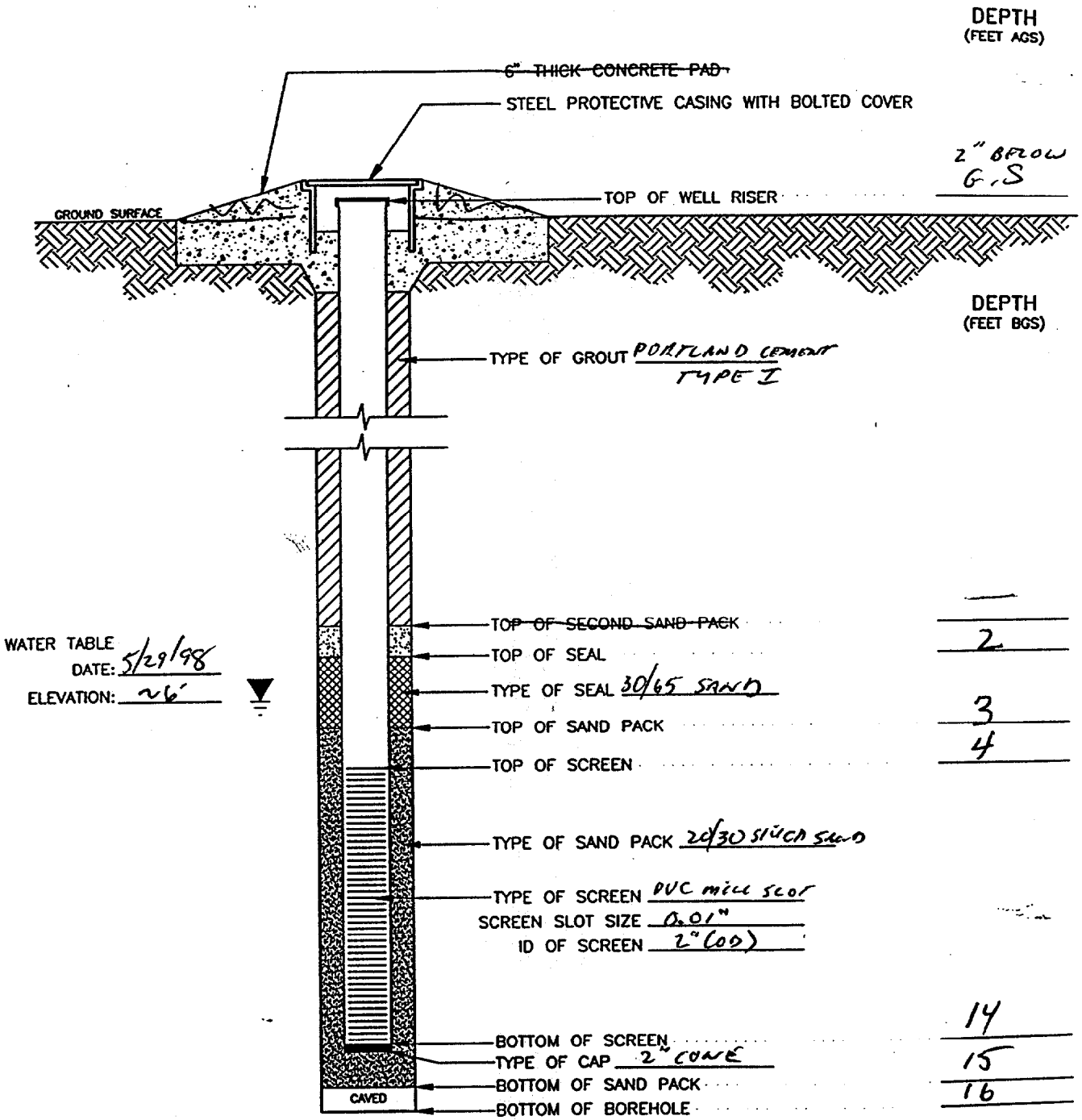
JACKSONVILLE, FLORIDA — Golder Associates	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO.: 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO.: 3778P1	REV. NO.
	REVIEWED	FILE NO.: 973-3778	SUBTITLE	FIGURE NO.: 1

PROJECT NAME: NGC/CEFL 1845	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: DMW-3
PROJECT No: 973-3778.003	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/3/98
DRILLING COMPANY: USS	WELL MATERIAL: PVC SCD. 40	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP (RIB)
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA Golder Associates	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RCM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CE/FL	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-4
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 5/29/98
DRILLING COMPANY: HUSS	WELL MATERIAL: SCD 40 PVC	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP R/B
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA

Golder Associates

TITLE

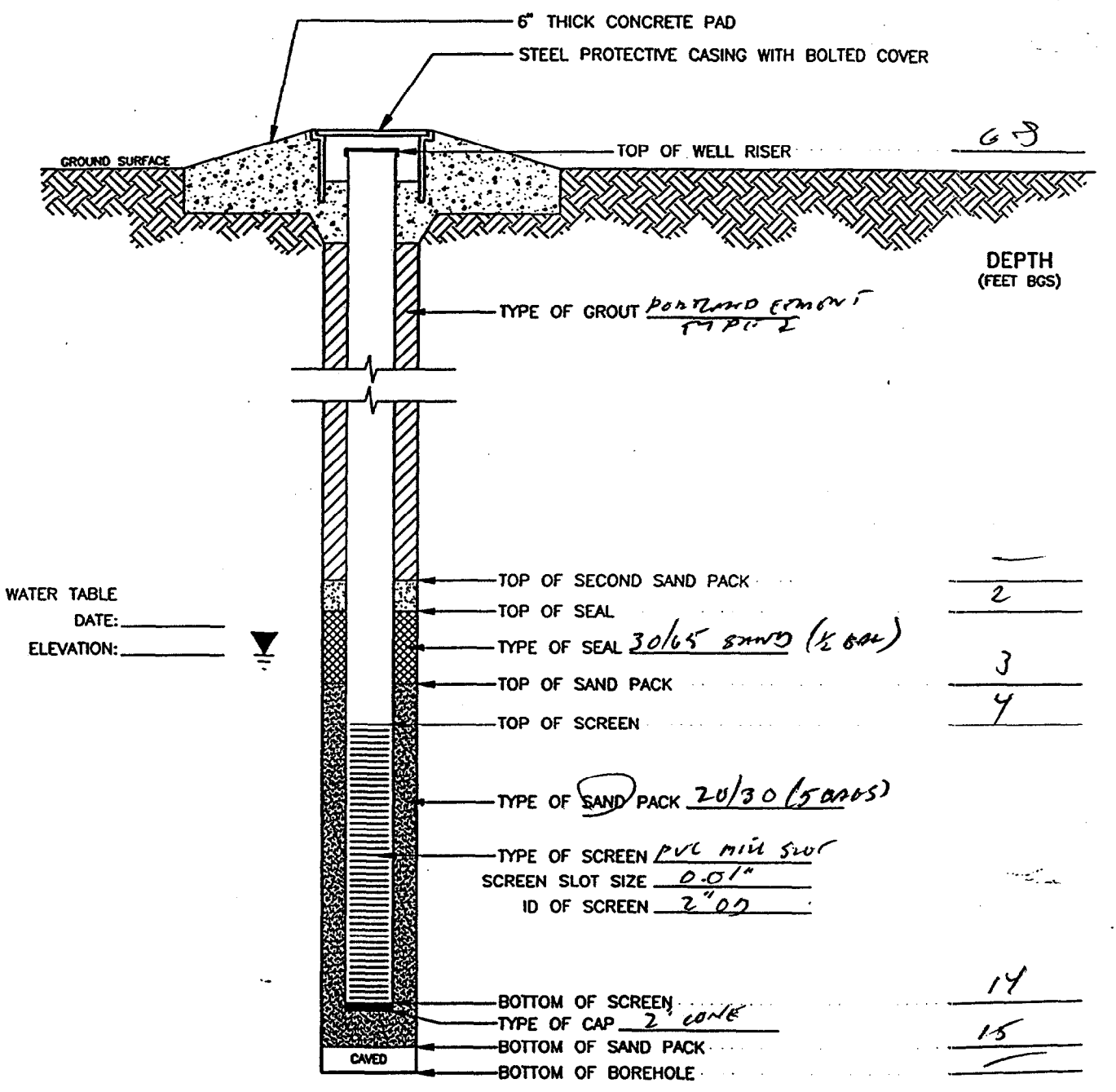
MONITORING WELL INSTALLATION DATA RECORD

CLIENT/PROJECT

NGSA/CECIL FIELD/FL

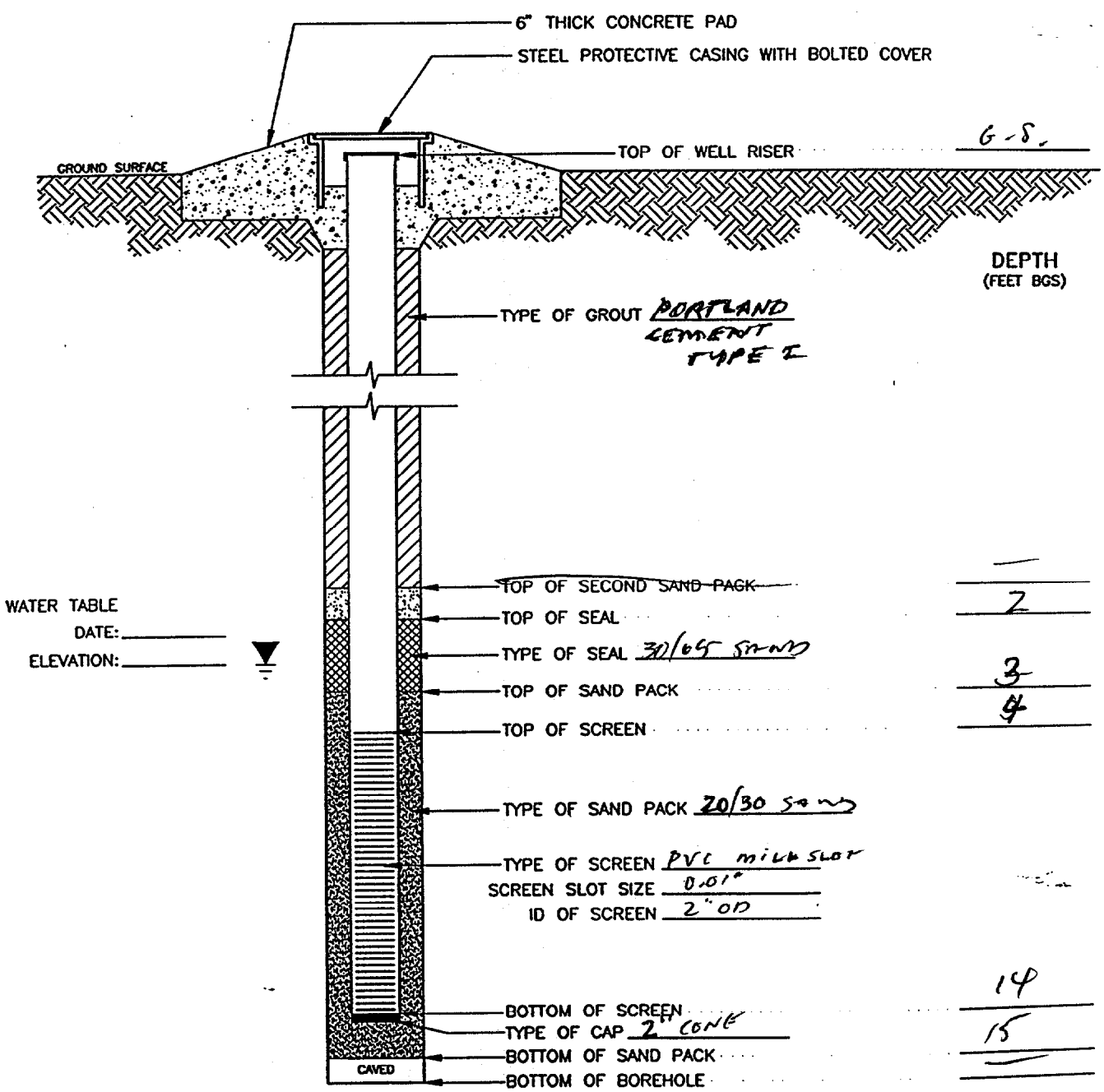
DRAWN	TRG	DATE	5/11/98	JOB NO.	973-3778
CHECKED	RFM	SCALE	NOT TO SCALE	DWG NO. 3778P1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CEC/FL 1945	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: DMW-5
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/4/98
DRILLING COMPANY: HUSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP (RIG)
	GROUND SURFACE ELEVATION:	



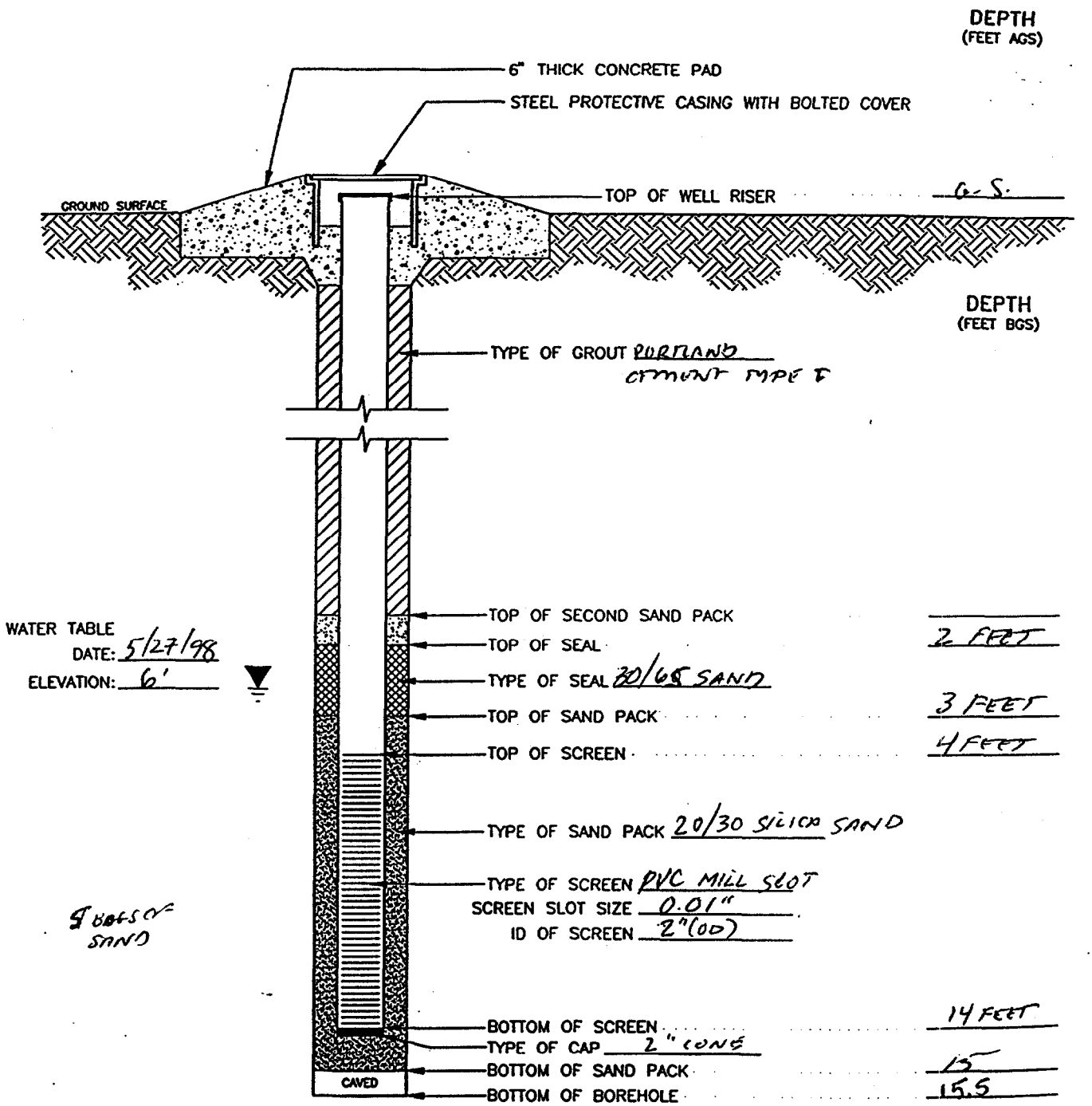
Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED:	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGSA/CF/FL 1845	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-6
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/3/98
DRILLING COMPANY: HVSS	WELL MATERIAL: PVC (SCD 40)	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: & PUMP (RIG)
	GROUND SURFACE ELEVATION:	



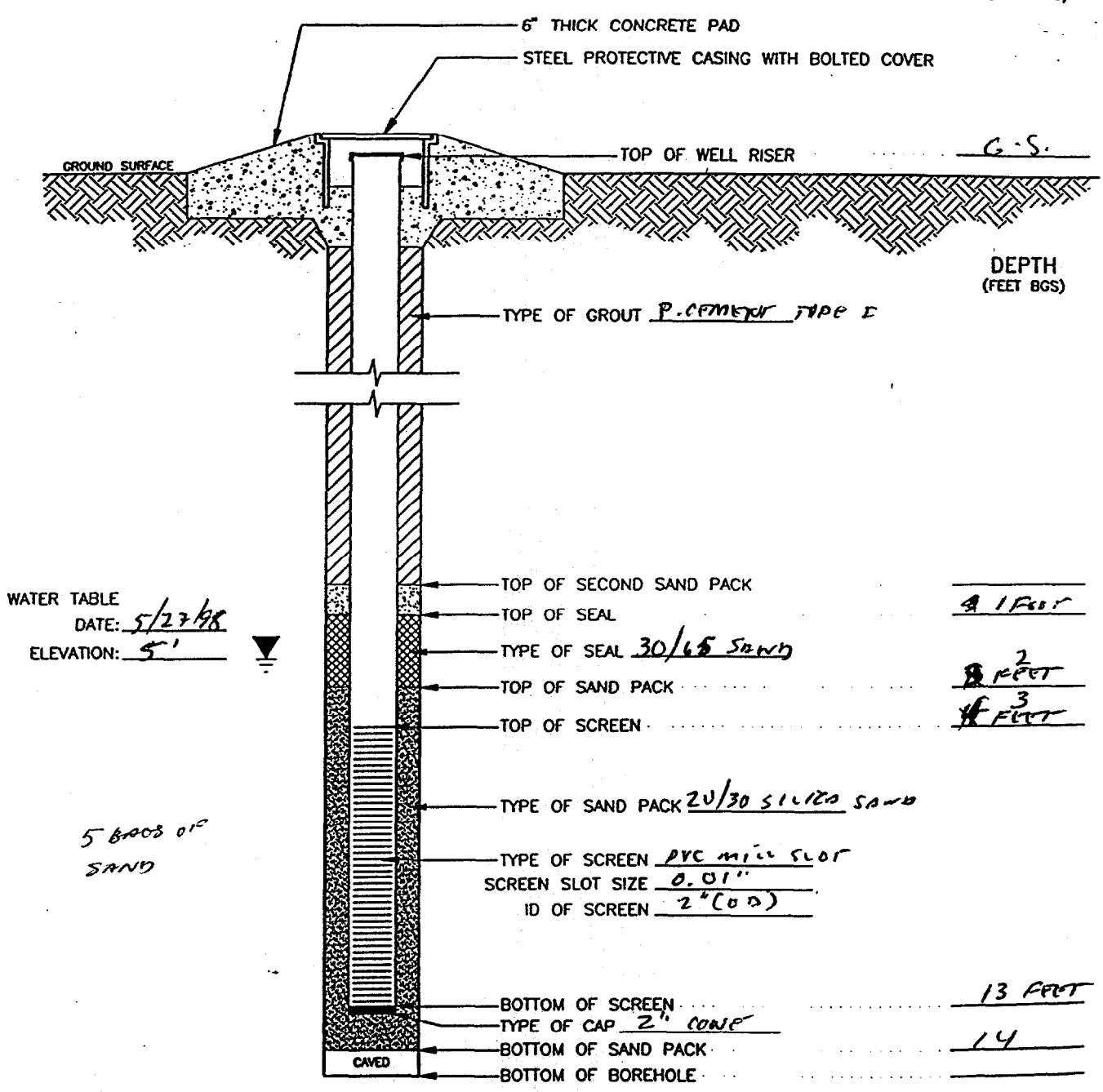
JACKSONVILLE, FLORIDA Golder Associates	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED KFM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 1848	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-7
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 5/27/98
DRILLING COMPANY: HVSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: RIT PUMP
	GROUND SURFACE ELEVATION:	



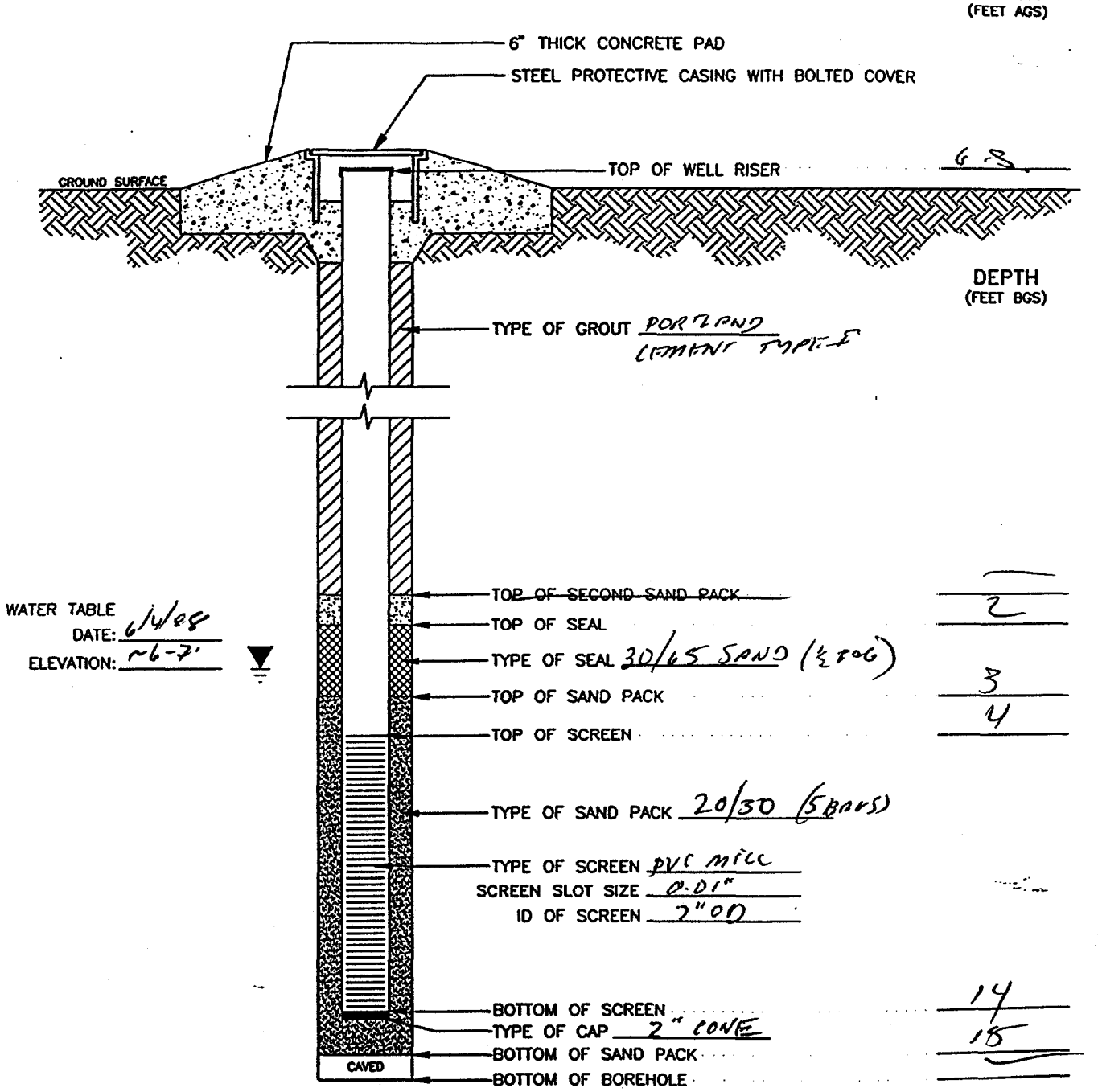
JACKSONVILLE, FLORIDA Golder Associates	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RFM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NFC/CR/FL 1845	BORING DIAMETER: 8	WELL No/PIEZOMETER No.: SMW-8
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2	DATE INSTALLED: 5/27/98
DRILLING COMPANY: NVSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP
	GROUND SURFACE ELEVATION:	



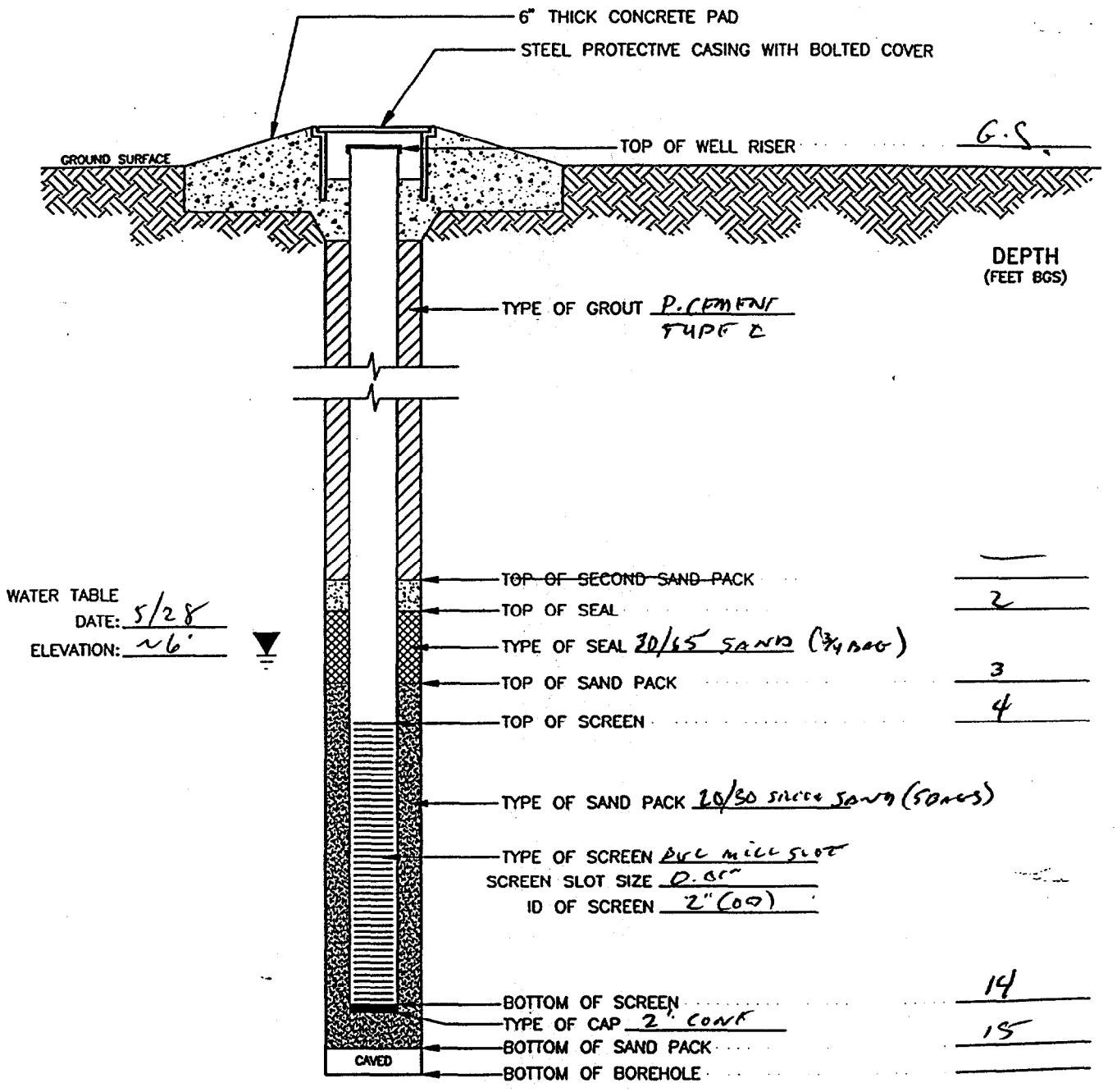
Golder Associates JACKSONVILLE, FLORIDA	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RFM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: N&C/CF/FL 1845	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-9
PROJECT No: 973-3778-203	WELL INSIDE DIAMETER: 2" ID	DATE INSTALLED: 6/4/98
DRILLING COMPANY: USSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP (RW)
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA Golder Associates	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RFM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-10
PROJECT No: 973-3728.203	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 5/28/98
DRILLING COMPANY: HUSS	WELL MATERIAL: SCH 40 PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP RIG
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA

Golder Associates

TITLE

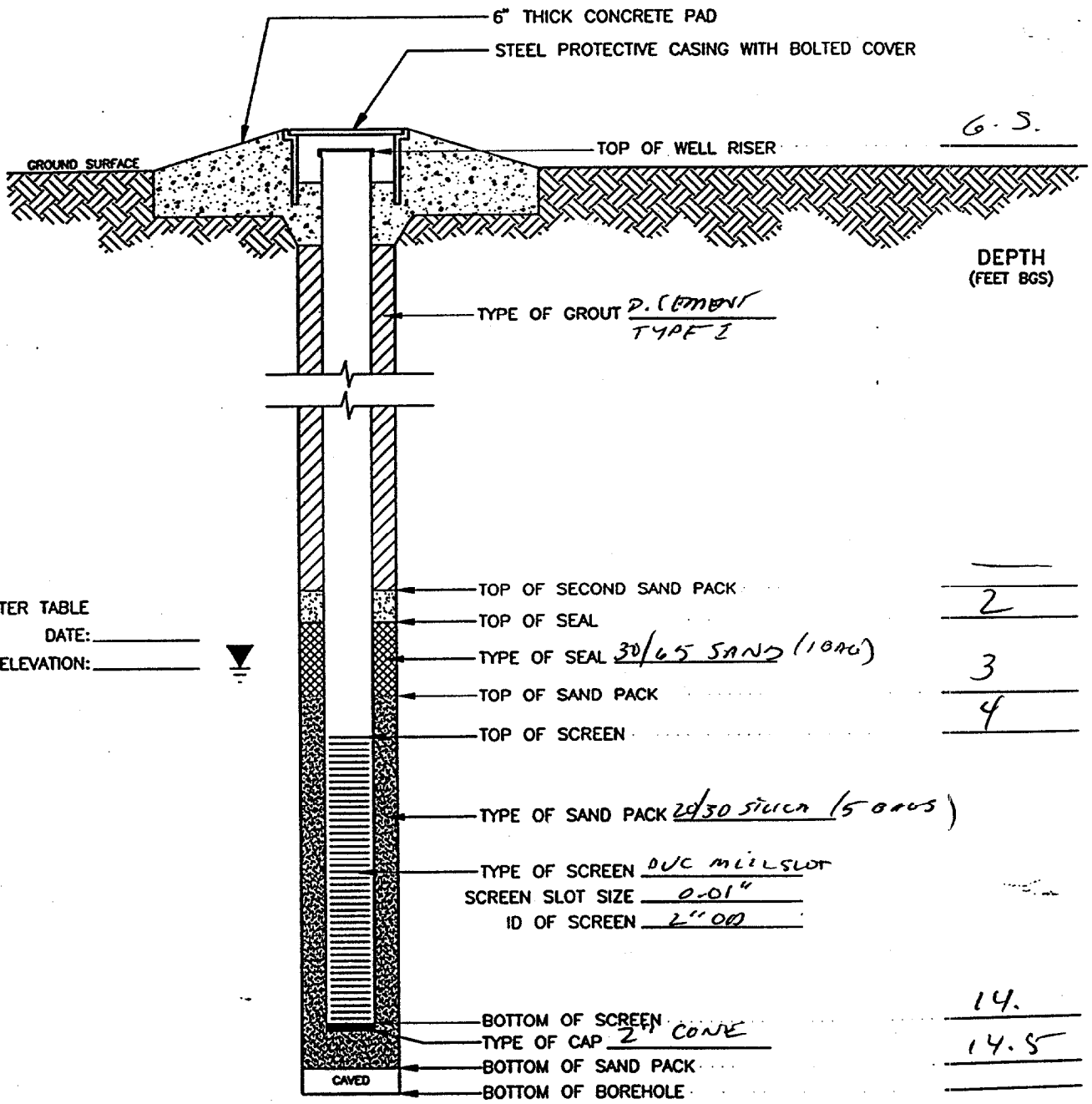
MONITORING WELL INSTALLATION DATA RECORD

CLIENT/PROJECT

NGSA/CECIL FIELD/FL

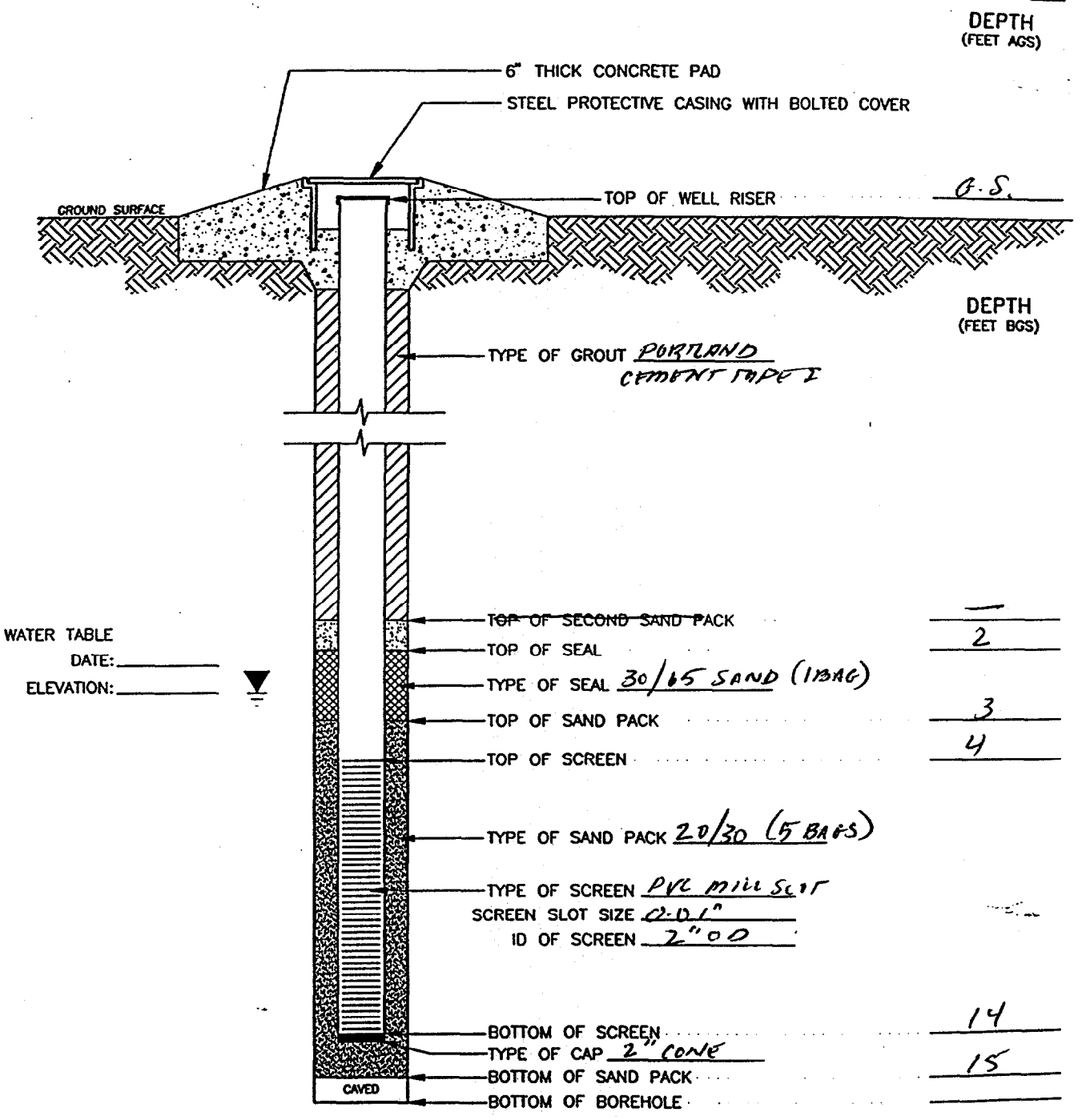
DRAWN	TRG	DATE	5/11/98	JOB NO.	973-3778
CHECKED	REM	SCALE	NOT TO SCALE	DWG NO. 3778P1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CEFL 1845	BORING DIAMETER: 8"	WELL No./PIEZOMETER No.: FC-SMW-11
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/8/98
DRILLING COMPANY: HVSS	WELL MATERIAL: PVC SCD. 40	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP (RIG)
	GROUND SURFACE ELEVATION:	



Golder Associates JACKSONVILLE, FLORIDA	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RFM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-12
PROJECT No: 973-3778-403	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/5/98
DRILLING COMPANY: HVSS	WELL MATERIAL: PVC SCD 40	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP (R/B)
	GROUND SURFACE ELEVATION:	



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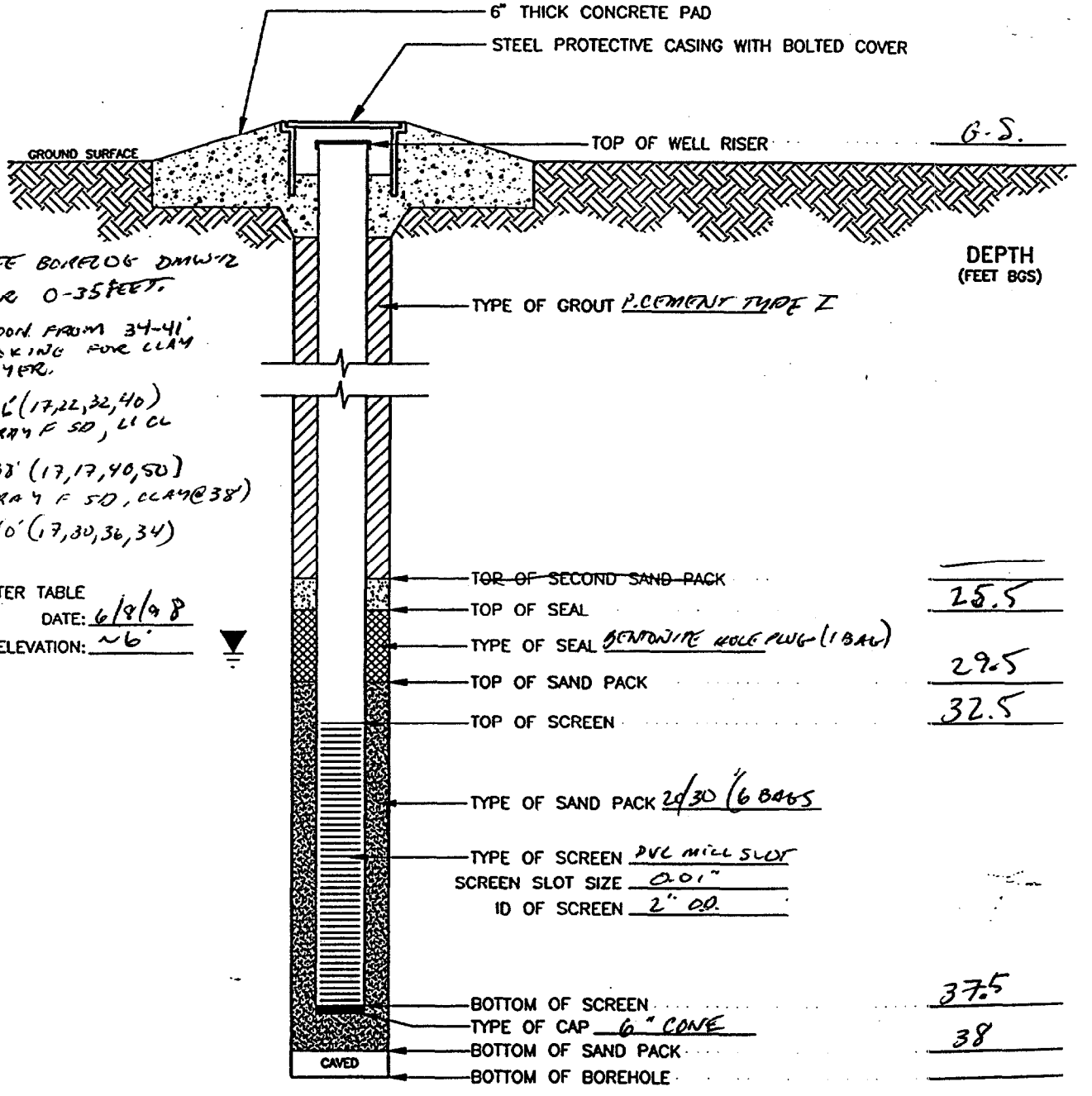
TITLE: MONITORING WELL INSTALLATION DATA RECORD

CLIENT/PROJECT: NGSA/CECIL FIELD/FL

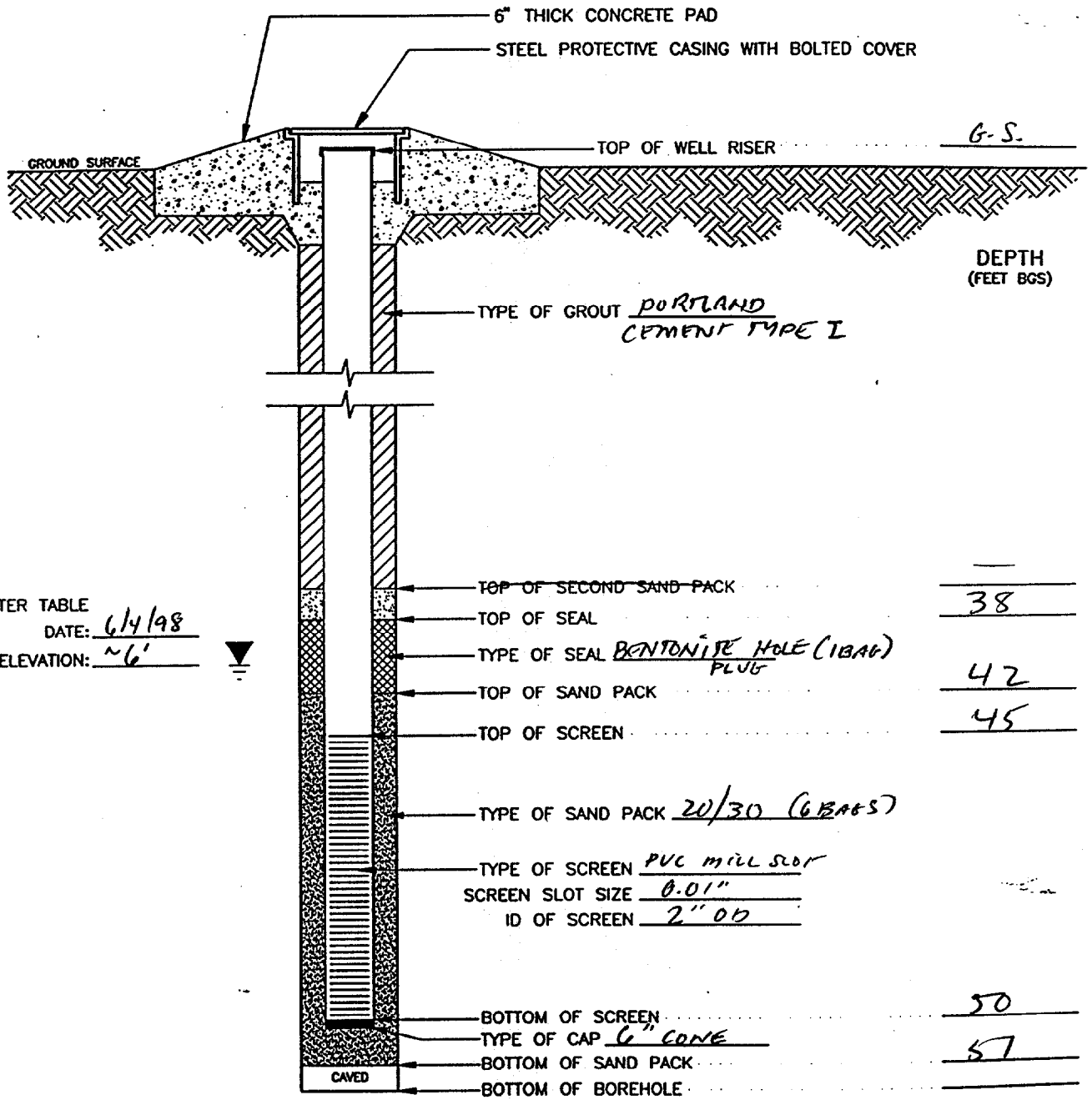
DRAWN	TRG	DATE	5/11/98	JOB NO.	973-3778
CHECKED	REM	SCALE	NOT TO SCALE	DWG NO. 3778P1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 6"	WELL No./PIEZOMETER No.: FMW-12
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2" OD.	DATE INSTALLED: 6/8/98
DRILLING COMPANY: HUSS	WELL MATERIAL: PVC SCD. 40	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: C. PUMP (R16)
	GROUND SURFACE ELEVATION:	



Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: DMW-12
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/4/98
DRILLING COMPANY: NVSS	WELL MATERIAL: PVC SCD 40	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP (R16)
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA

Golder Associates

TITLE

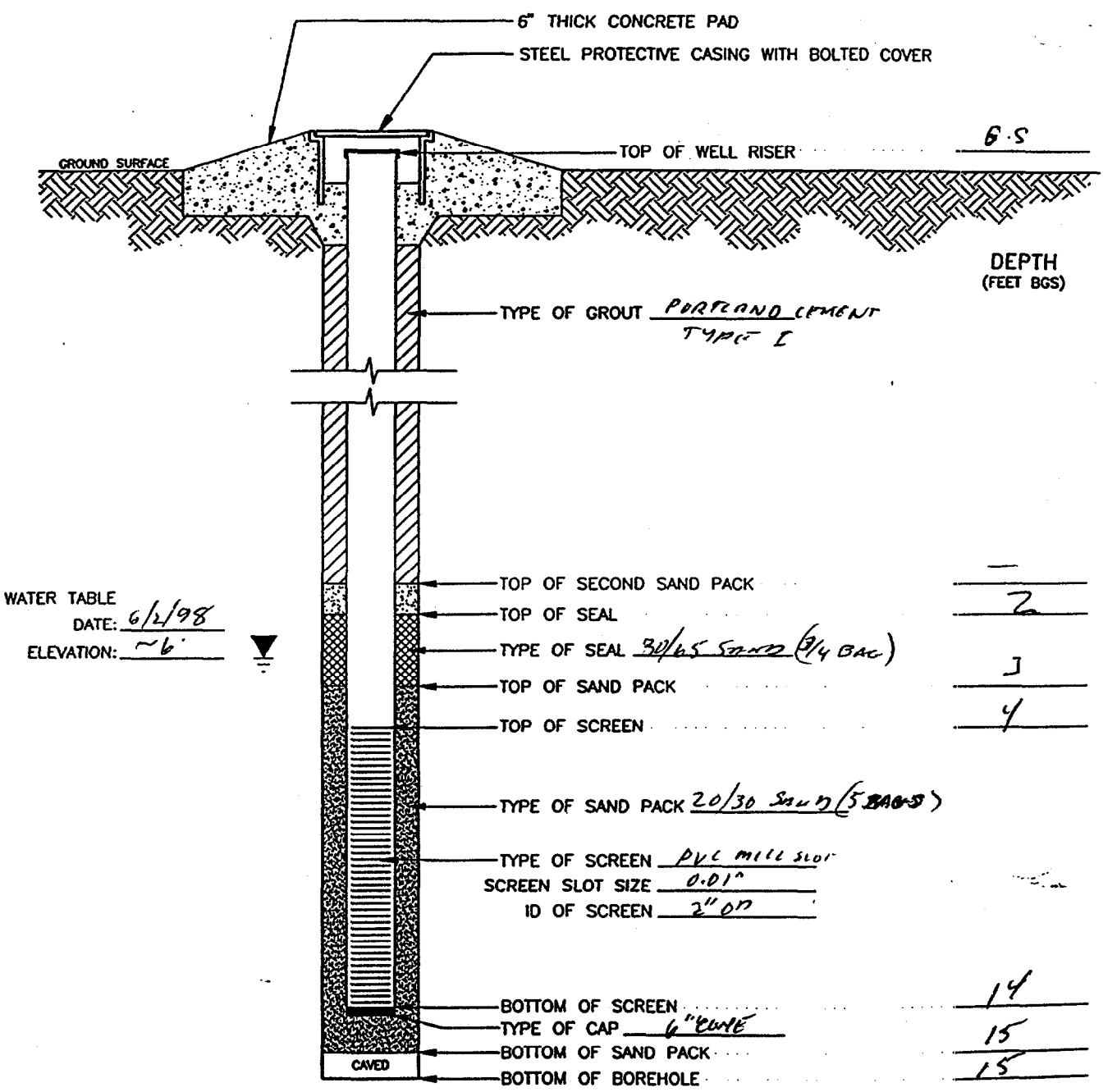
MONITORING WELL INSTALLATION DATA RECORD

CLIENT/PROJECT

NGSA/CECIL FIELD/FL

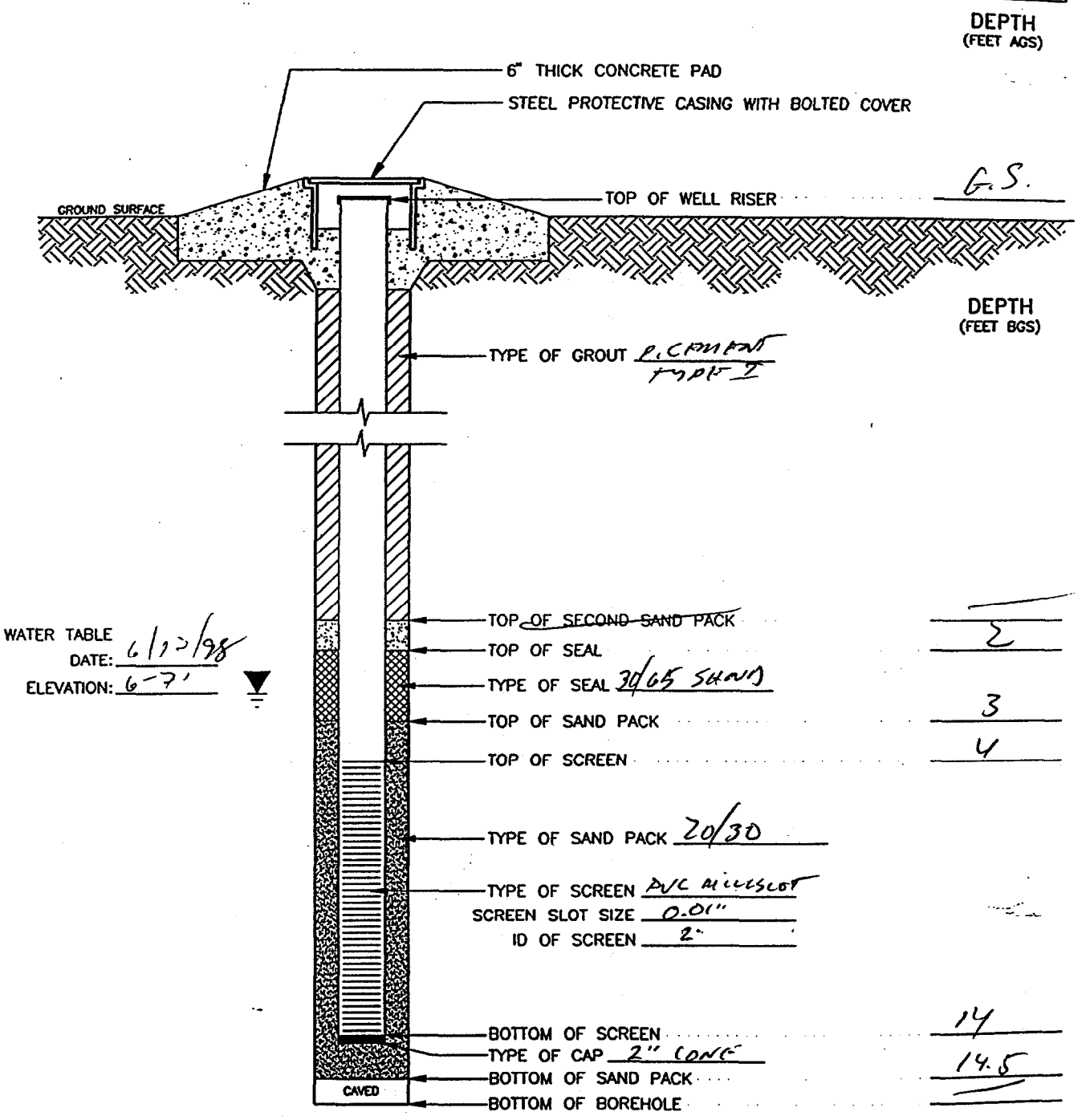
DRAWN	TRG	DATE	5/11/98	JOB NO.	973-3778
CHECKED	REW	SCALE	NOT TO SCALE	DWG NO. 3778P1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 1845	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-13
PROJECT No: 973.3778.203	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/2/98
DRILLING COMPANY: HVSS	WELL MATERIAL: PVC SCH 40	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: —	DEVELOPMENT METHOD: C. PUMP (R16)
	GROUND SURFACE ELEVATION:	



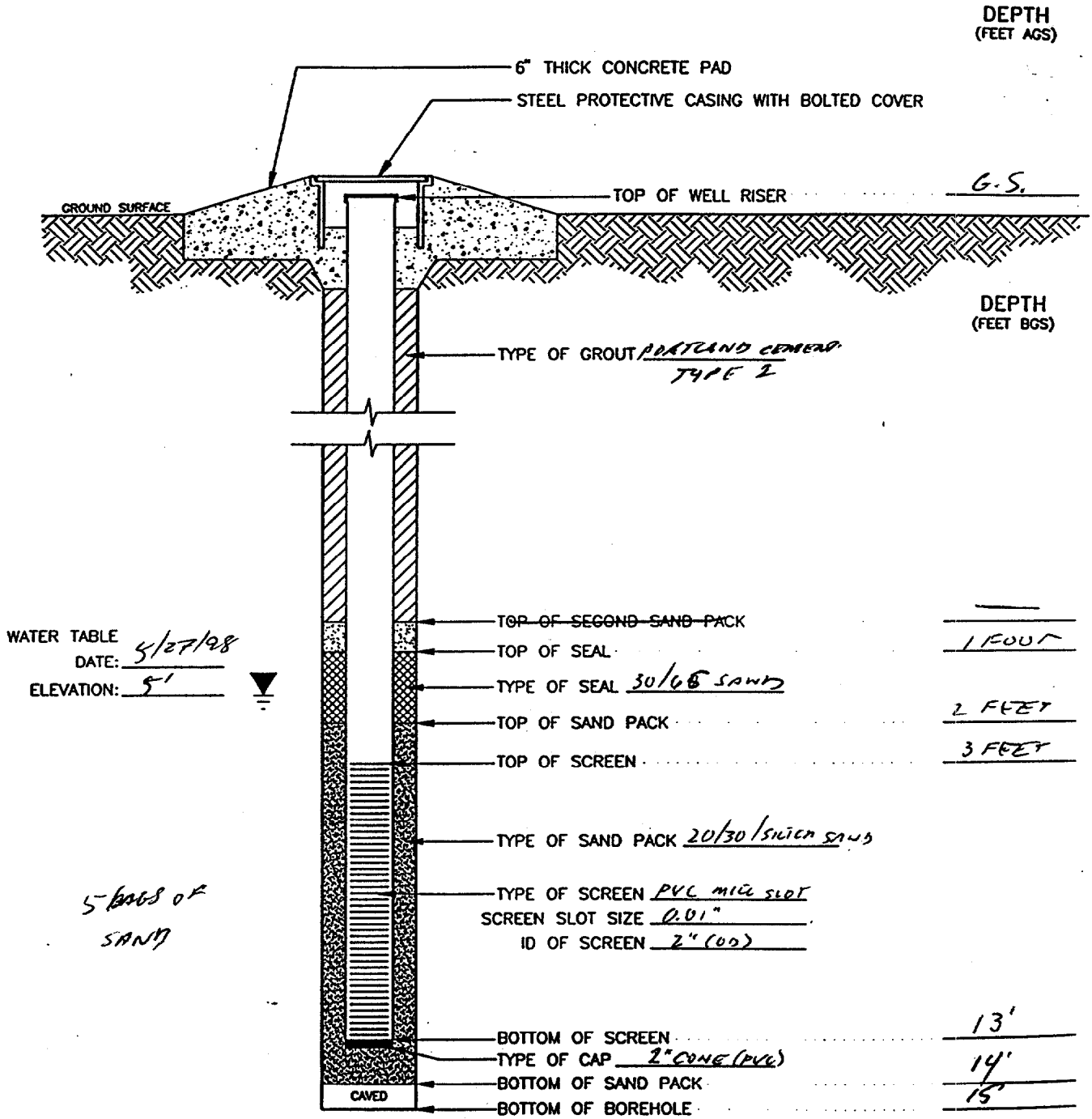
Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CIFL 815	BORING DIAMETER: 8 1/4"	WELL No/PIEZOMETER No.: SMW-28LH (RFM)
PROJECT No: 973-3778.400	WELL INSIDE DIAMETER: 2	DATE INSTALLED: 6/17/98
DRILLING COMPANY: HVSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: GPM (RIG)
	GROUND SURFACE ELEVATION:	



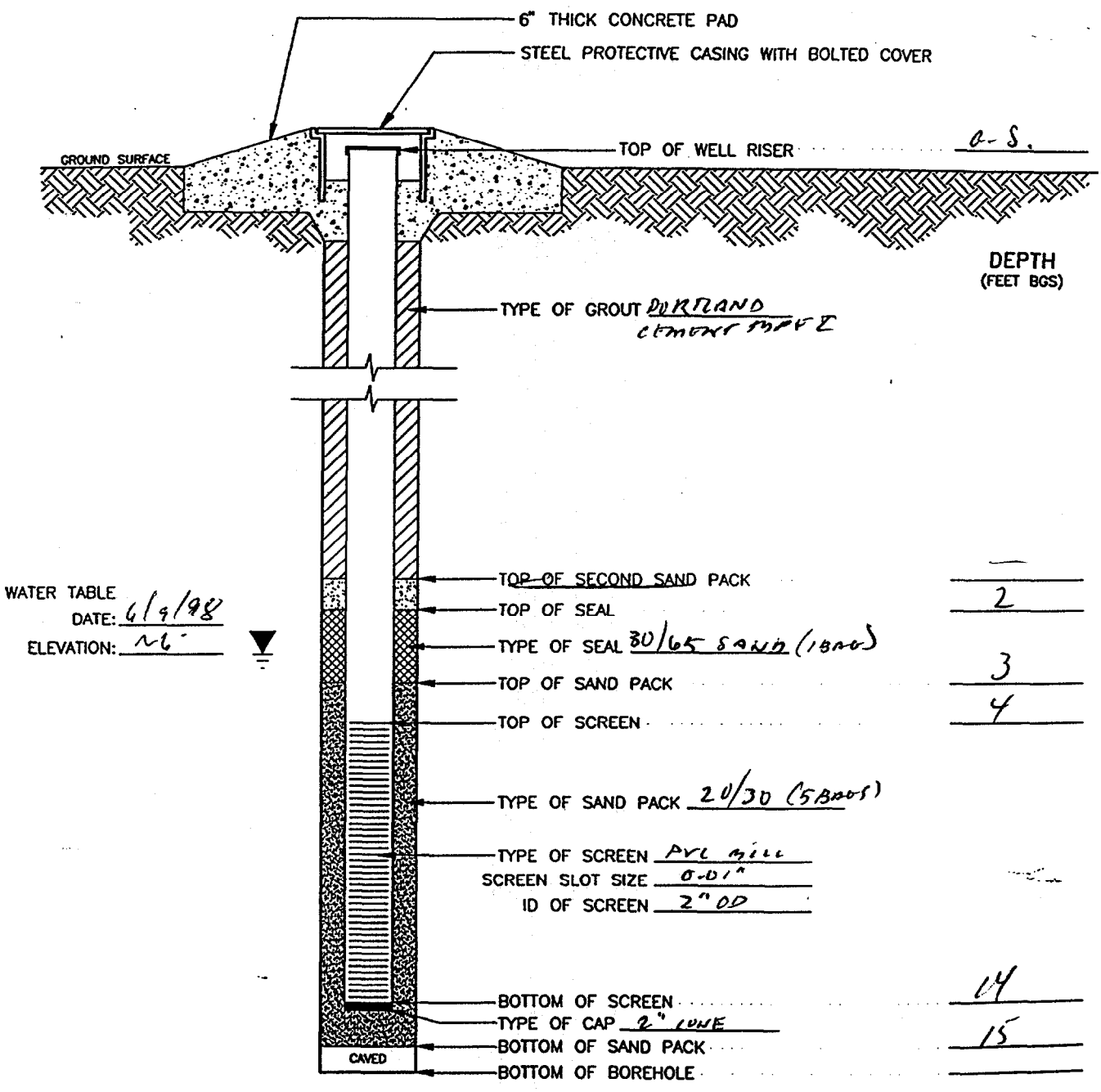
JACKSONVILLE, FLORIDA Golder Associates	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED (RFM)	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 1845	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-15
PROJECT No: 973-3778.203	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 5/27/98
DRILLING COMPANY: HUSS	WELL MATERIAL: PVC SCH 40	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: C. PUMP (RIG)
	GROUND SURFACE ELEVATION:	



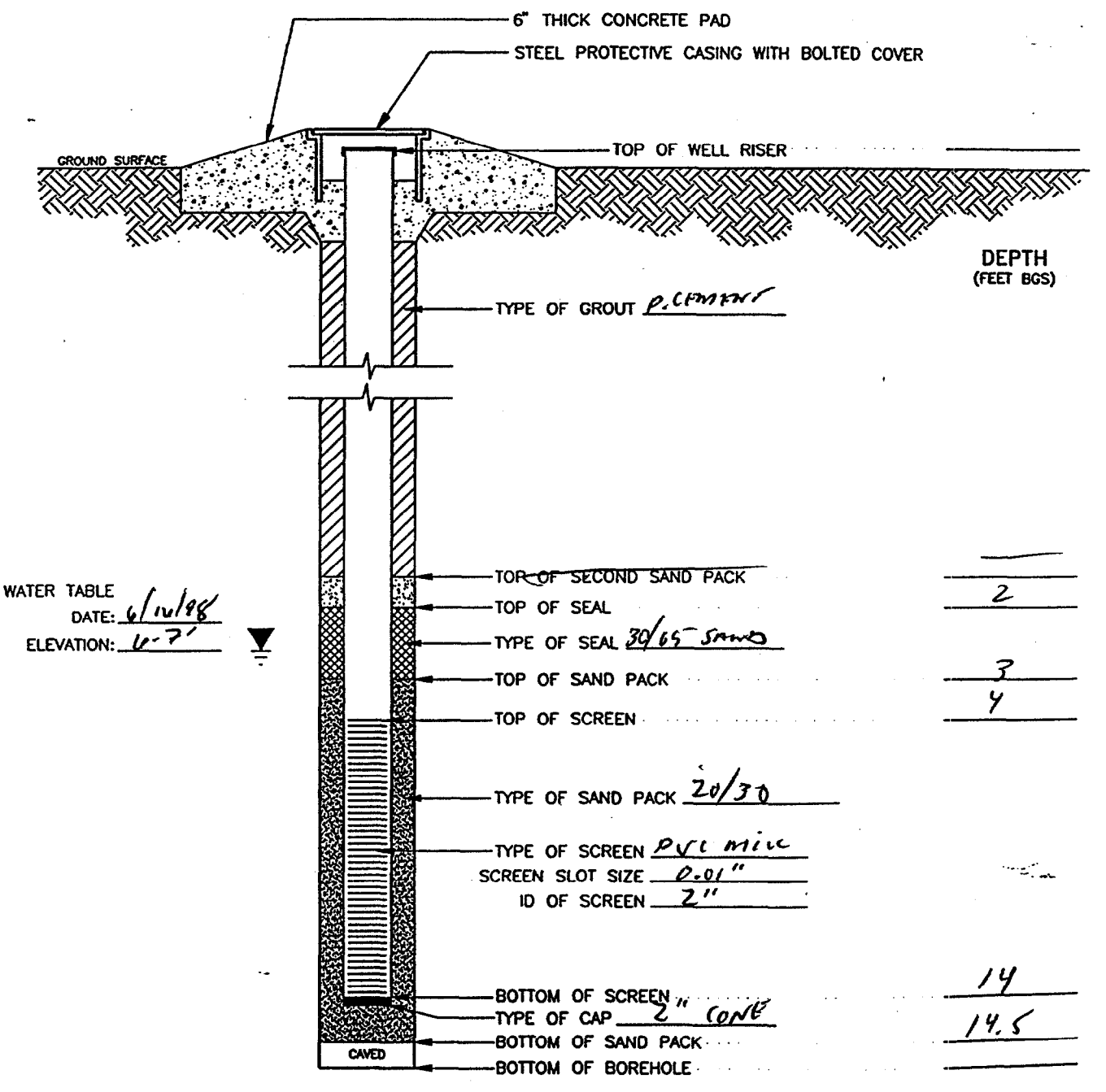
JACKSONVILLE, FLORIDA Golder Associates	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RCM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CECIL FL SIS	BORING DIAMETER: 8 1/4"	WELL No/PIEZOMETER No.: SMW-16
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/9/98
DRILLING COMPANY: USS	WELL MATERIAL: PVC SCD 40	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: C. PUMP (ALL)
	GROUND SURFACE ELEVATION:	



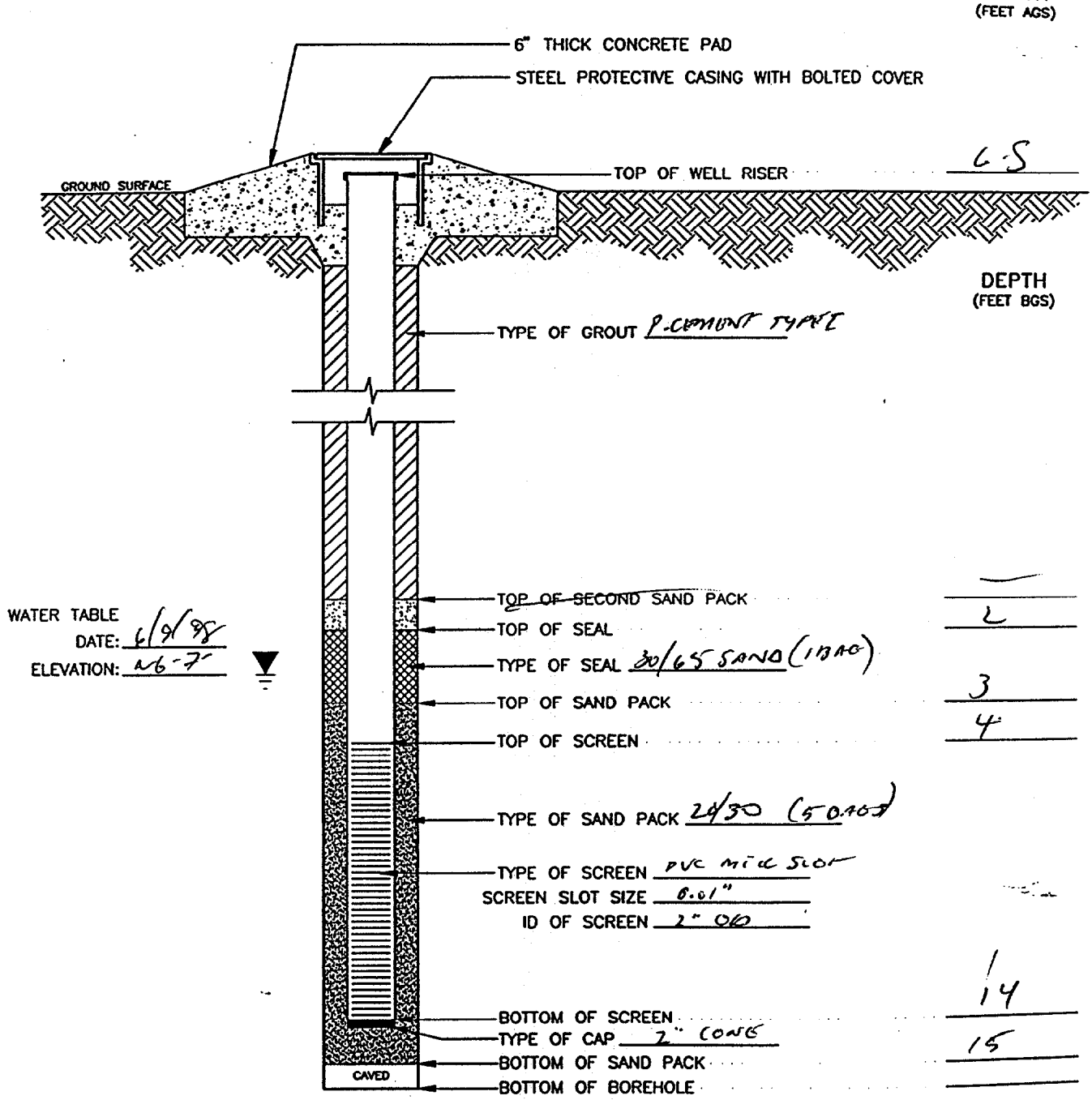
Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RCM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FC 815	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: SMW-17
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/16/98
DRILLING COMPANY: HCSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: 2" PUMP (RLG)
	GROUND SURFACE ELEVATION:	



Golder Associates JACKSONVILLE, FLORIDA	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RGM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: SMW-18
PROJECT No: 973-3378.400	WELL INSIDE DIAMETER: 2" O.D.	DATE INSTALLED: 6/8/98
DRILLING COMPANY: HUSS	WELL MATERIAL: PVC SCH 40	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: 6.5	DEVELOPMENT METHOD: C.P. PUMP (RIK)
	GROUND SURFACE ELEVATION:	



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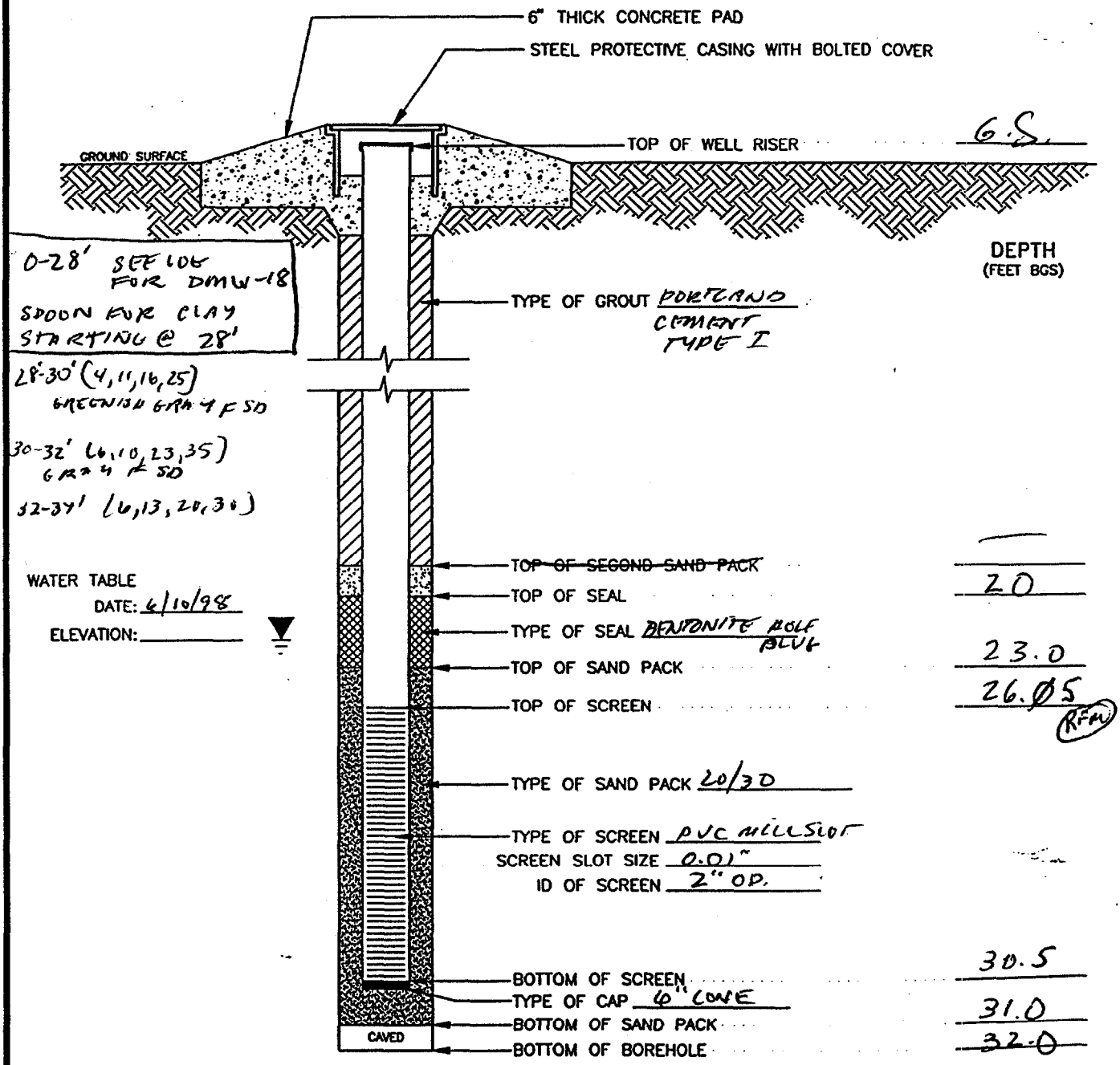
TITLE: MONITORING WELL INSTALLATION DATA RECORD

CLIENT/PROJECT: NGSA/CECIL FIELD/FL

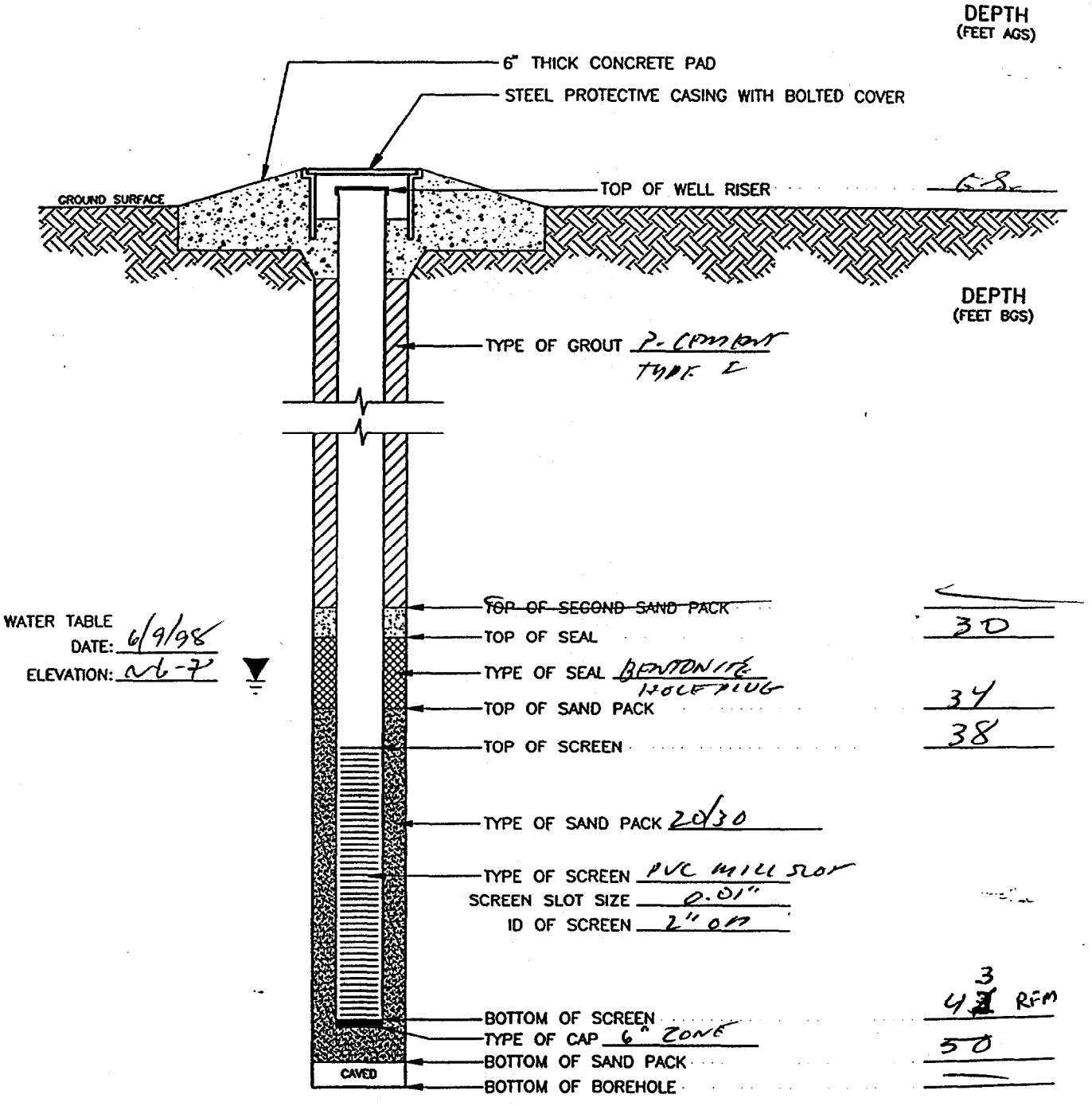
DRAWN	TRG	DATE	5/11/98	JOB NO.	973-3778
CHECKED	RFA	SCALE	NOT TO SCALE	DWG NO.	3778P1
REVIEWED		FILE NO.	973-3778	SUBTITLE	
				REV. NO.	
				FIGURE NO.	1

PROJECT NAME: NEC/CP/FL 815	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: DMW-18
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/10/98
DRILLING COMPANY: HJSS	WELL MATERIAL: PVC SCH40	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: RIG PUMP
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA — Golder Associates	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: DMW-18
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/9/98
DRILLING COMPANY: HVSS	WELL MATERIAL: PVC	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMN	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: Rig Pump
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA

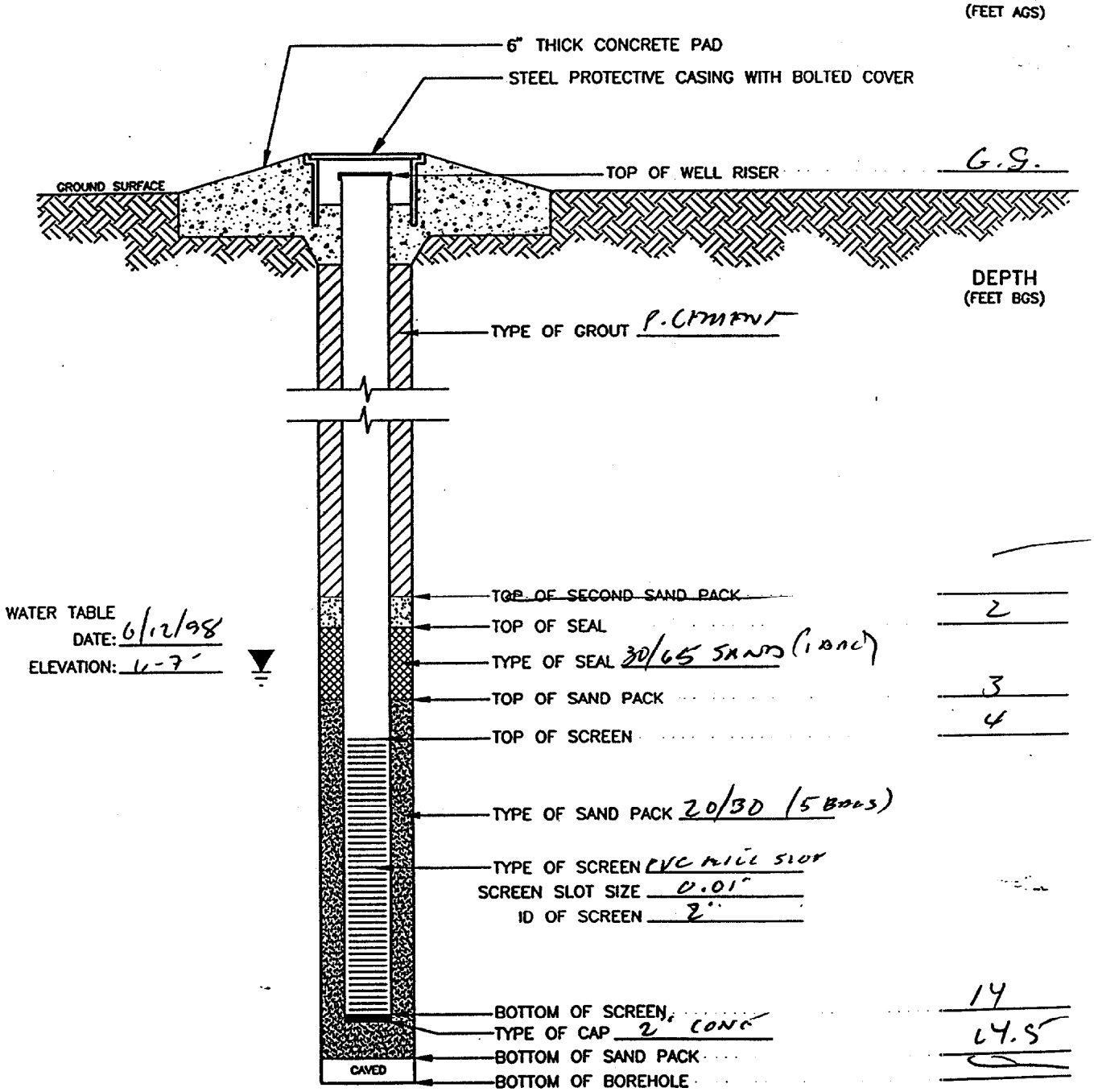
Golder Associates

TITLE

MONITORING WELL INSTALLATION DATA RECORD

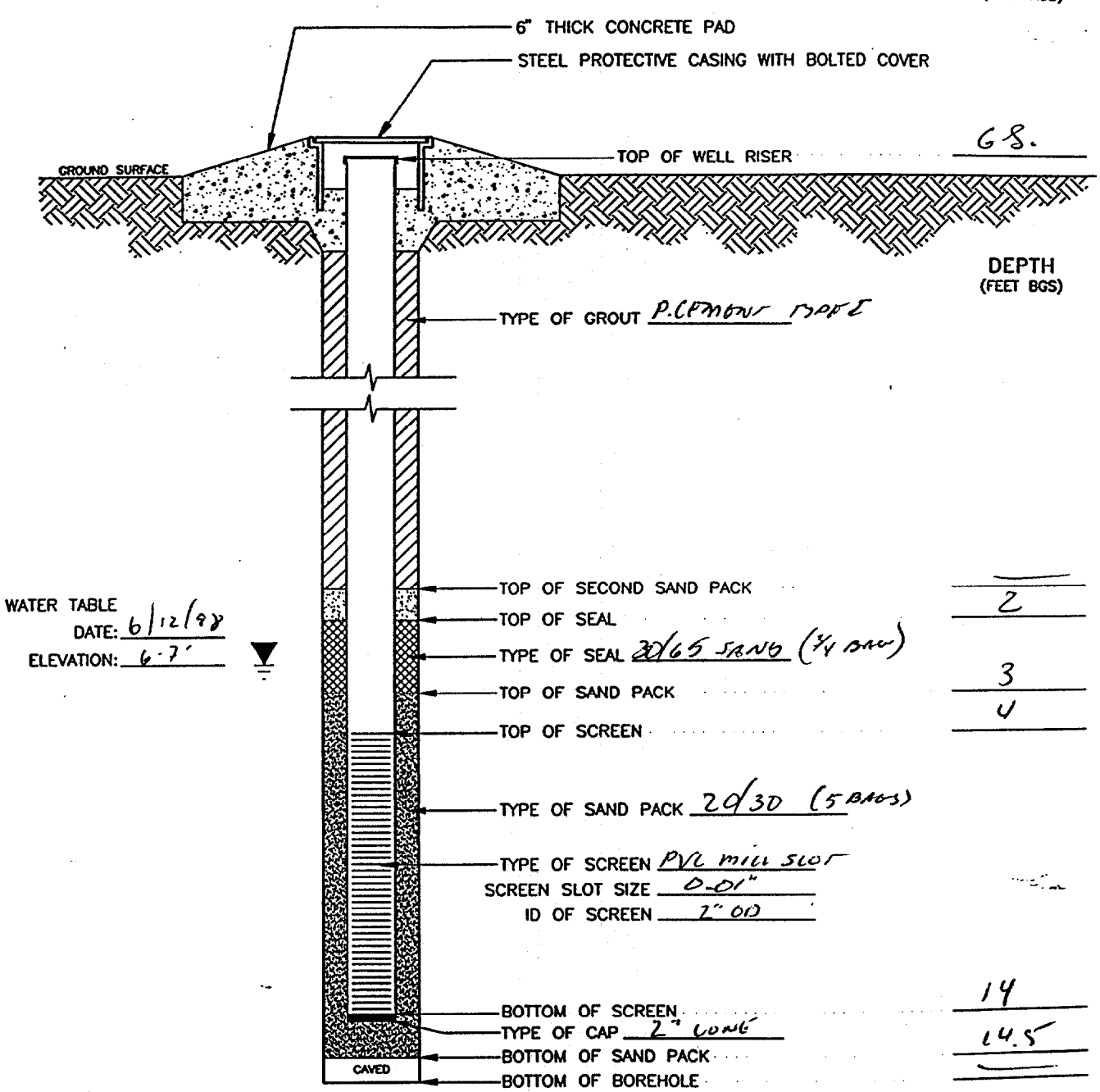
CLIENT/PROJECT	DRAWN	DATE	JOB NO.	
NGSA/CECIL FIELD/FL	TRG	5/11/98	973-3778	
	CHECKED RFM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 8½"	WELL No/PIEZOMETER No.: FL-SMW-19
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/12/98
DRILLING COMPANY: KVSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: Rig Pump
	GROUND SURFACE ELEVATION:	



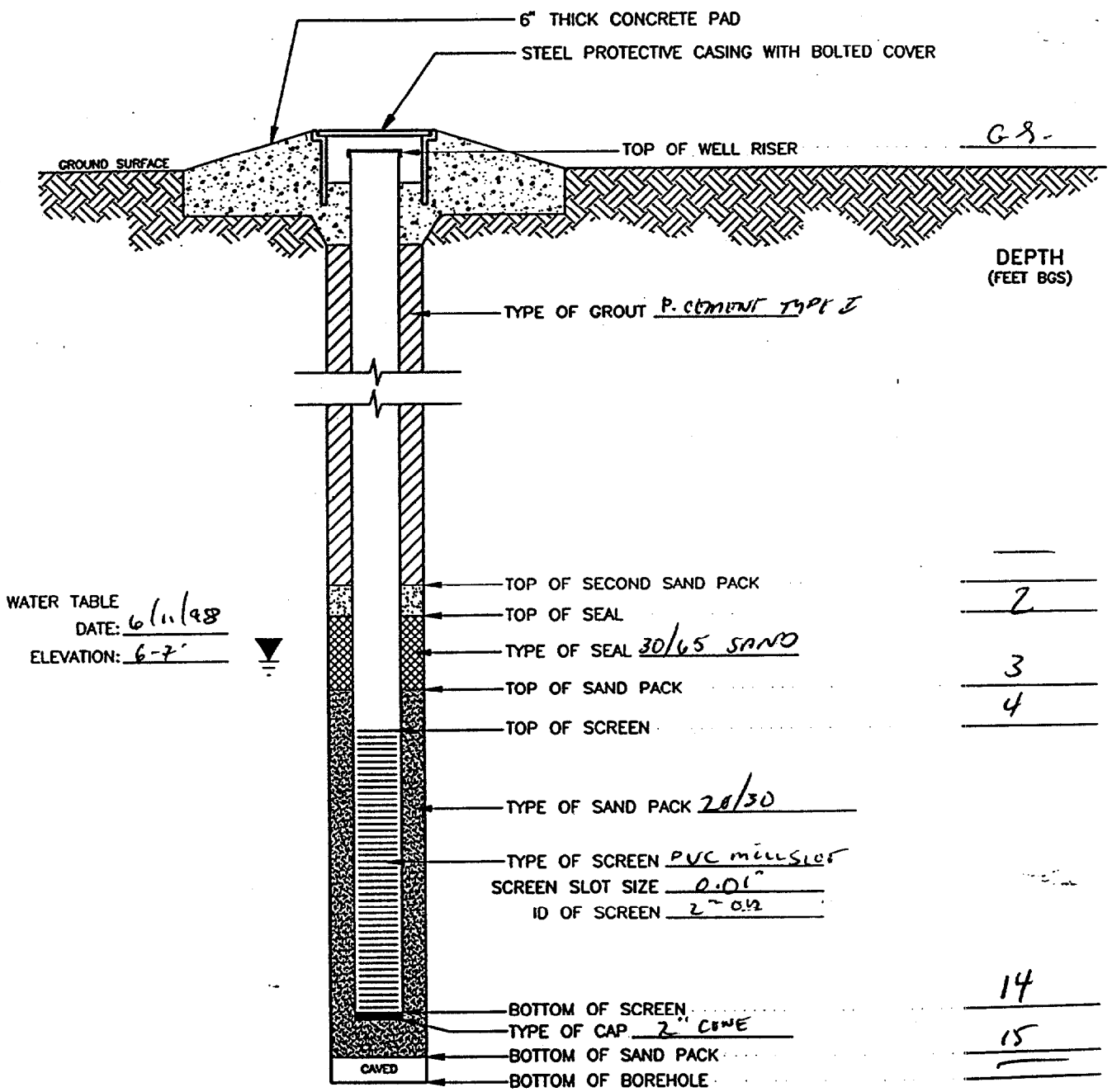
JACKSONVILLE, FLORIDA Golder Associates	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RCM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: FL-SMW-20
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/12/98
DRILLING COMPANY: HUSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: 6.5.	DEVELOPMENT METHOD: Rig Pump
	GROUND SURFACE ELEVATION:	



Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: KPM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 8"	WELL No/PIEZOMETER No.: SMW-21
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/11/98
DRILLING COMPANY: HUSS	WELL MATERIAL: PVC SCD 40	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: 6.5	DEVELOPMENT METHOD: Rig Pump
	GROUND SURFACE ELEVATION:	



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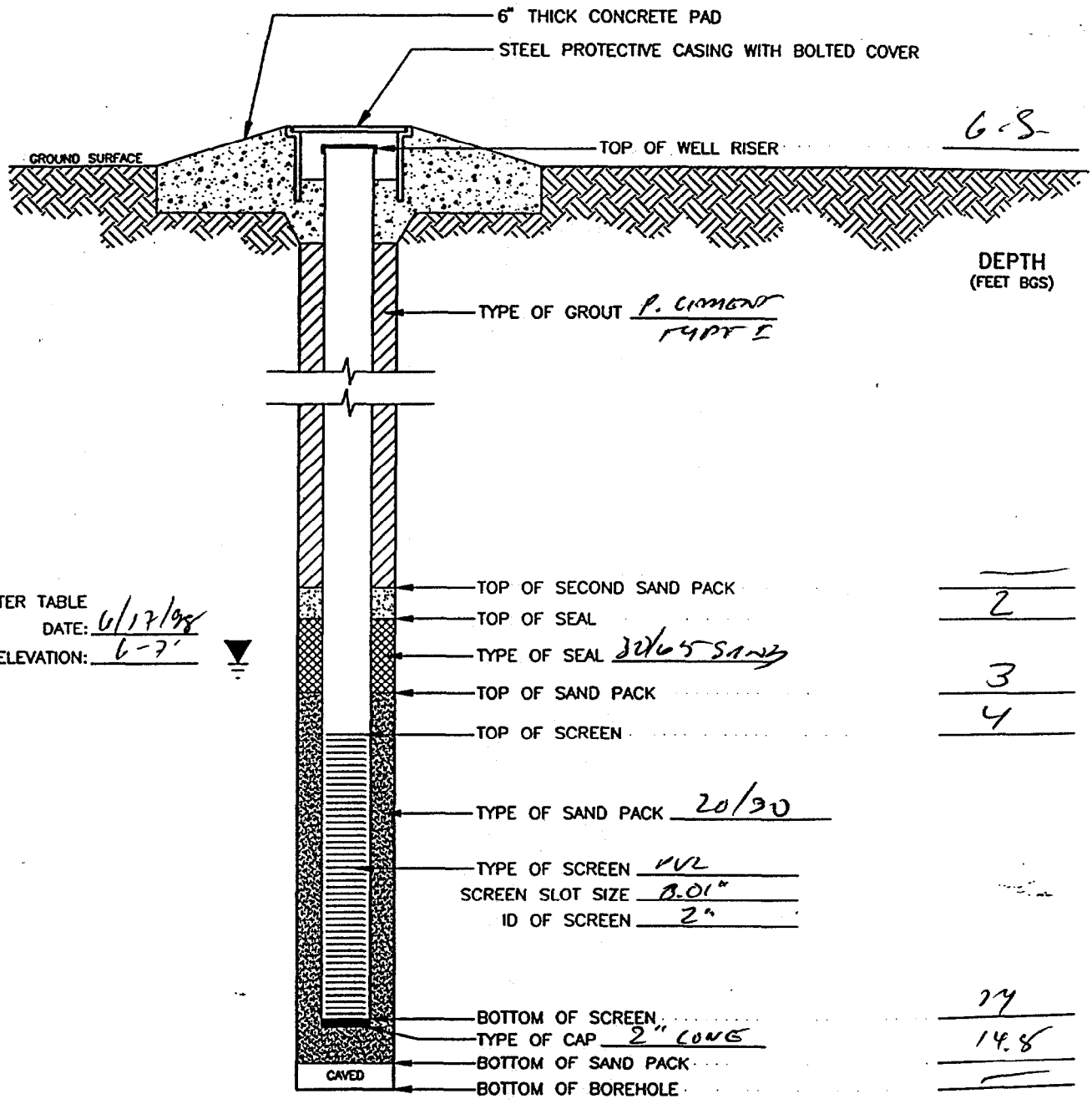
TITLE: MONITORING WELL INSTALLATION DATA RECORD

CLIENT/PROJECT: NGSA/CECIL FIELD/FL

DRAWN	TRG	DATE	5/11/98	JOB NO.	973-3778
CHECKED	RFM	SCALE	NOT TO SCALE	DWG NO. 3778P1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: SMW-2922
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/17/98
DRILLING COMPANY: IWSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: B MW	TOP OF WELL ELEVATION:	DEVELOPMENT METHOD: CENTRIFUGAL PUMP (REC)
	GROUND SURFACE ELEVATION:	



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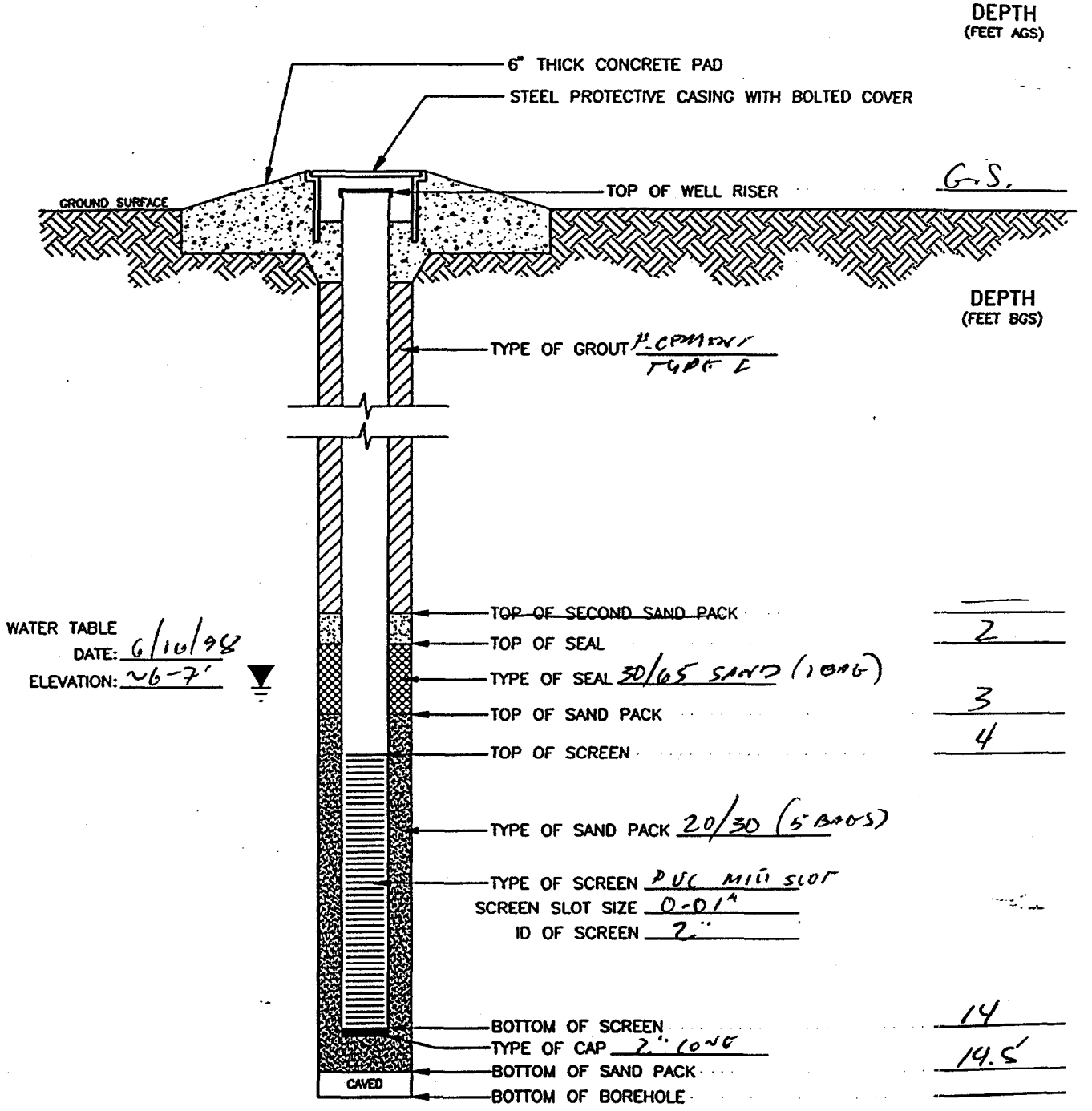
TITLE

MONITORING WELL INSTALLATION DATA RECORD

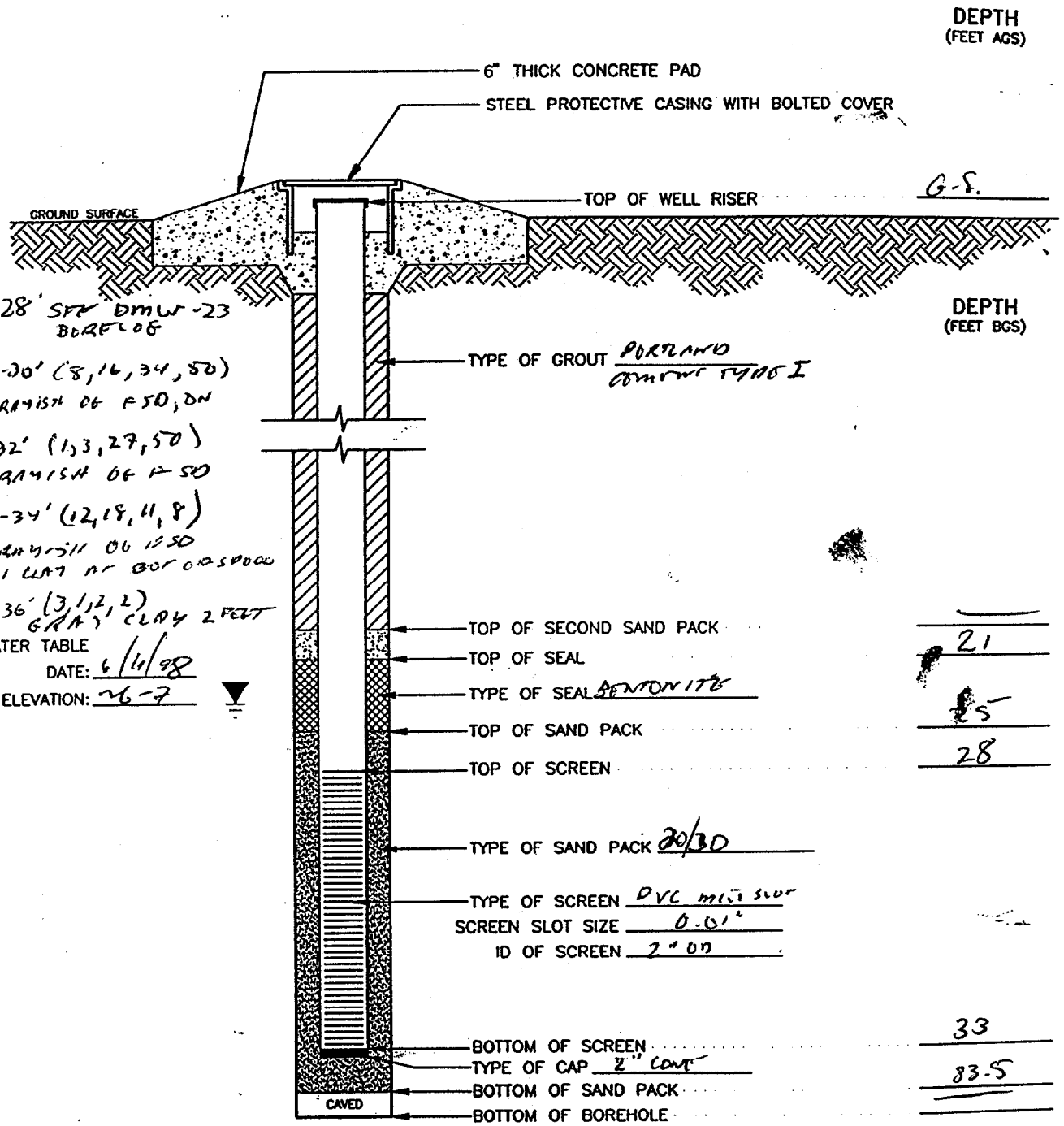
CLIENT/PROJECT	DRAWN	DATE	JOB NO.
NGSA/CECIL FIELD/FL	TRG	5/11/98	973-3778
	CHECKED RCM	SCALE NOT TO SCALE	DWG NO. 3778P1 / REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE / FIGURE NO. 1

PROJECT NAME: NGC/CF/FL P.COT	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: SMW-23
PROJECT No: 973-3778.603	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/16/98
DRILLING COMPANY: IUSS	WELL MATERIAL: PVC SCH 40	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: C.PUMP (RIG)
	GROUND SURFACE ELEVATION:	



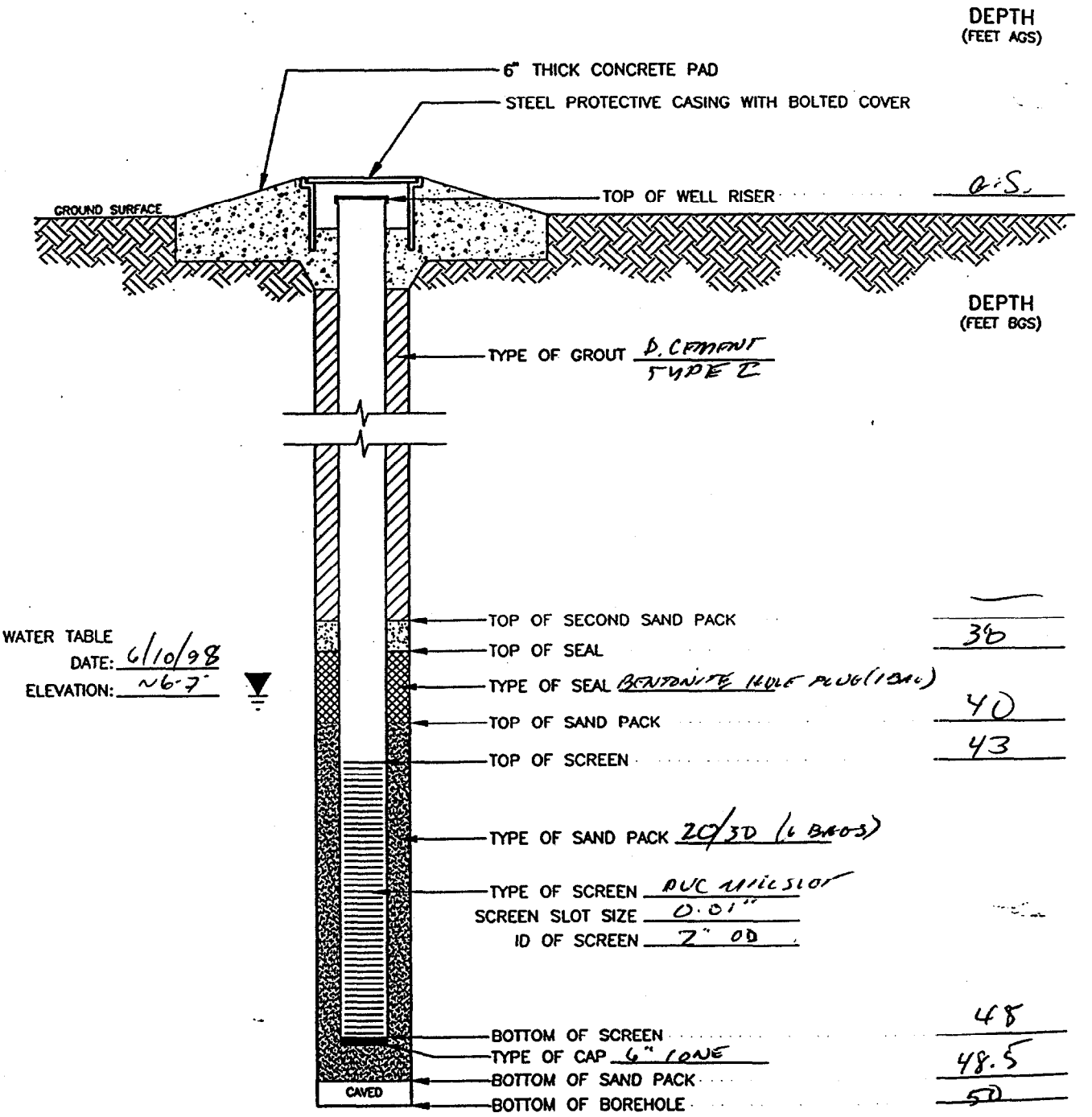
Golder Associates JACKSONVILLE, FLORIDA	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RFM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL P.LOT	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: MW-23
PROJECT No: 973-3778.603	WELL INSIDE DIAMETER: 2" O.D.	DATE INSTALLED: 6/11/98
DRILLING COMPANY: NVSS	WELL MATERIAL: PVC	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: JSMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: RIG PUMP
	GROUND SURFACE ELEVATION:	



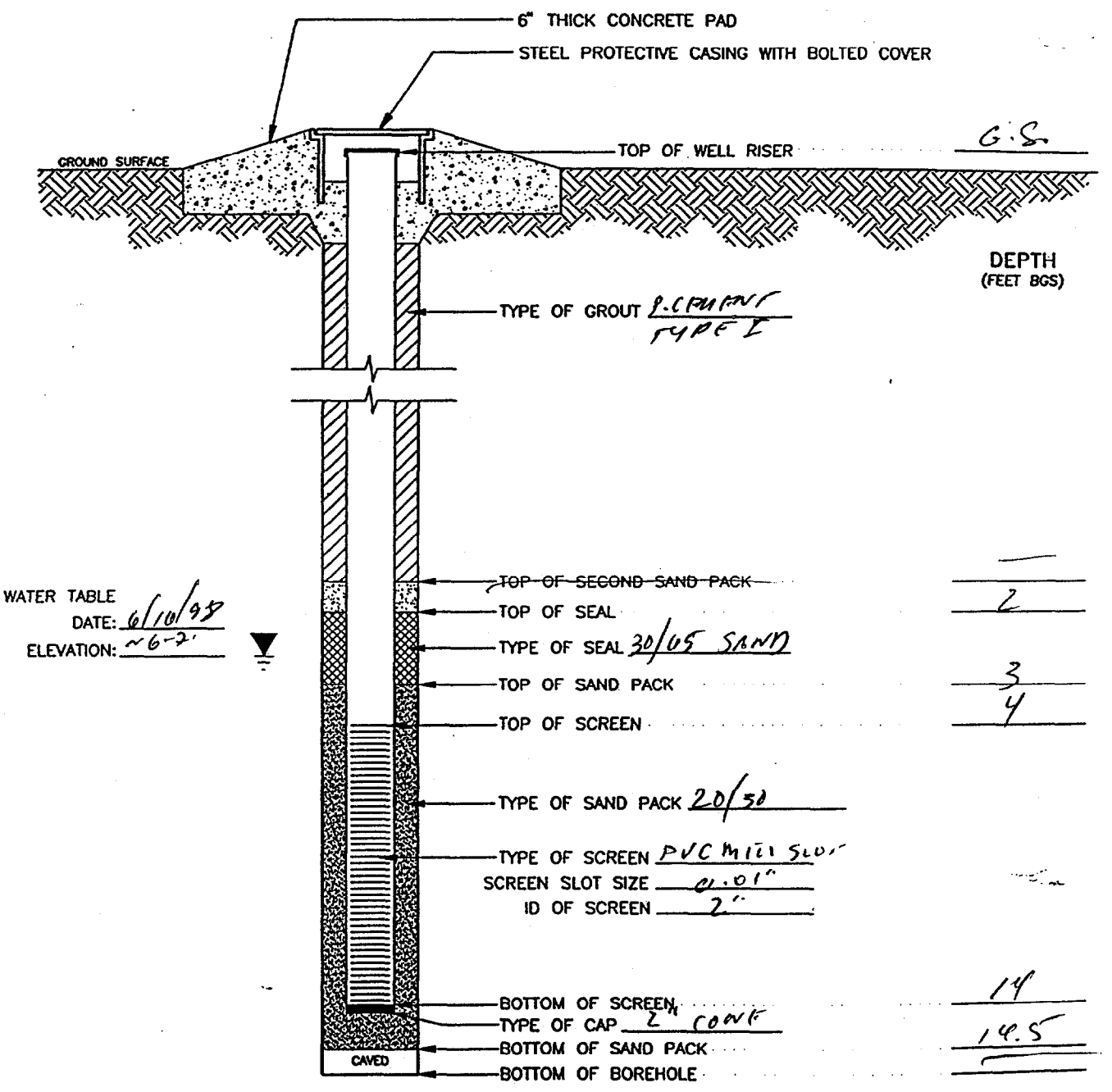
JACKSONVILLE, FLORIDA — Golder Associates	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: Rem	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/PL P.LOT	BORING DIAMETER: 6"	WELL No/PIEZOMETER No.: DMW-23
PROJECT No: 973-3778.603	WELL INSIDE DIAMETER: 2" OD	DATE INSTALLED: 6/10/98
DRILLING COMPANY: RDSJ	WELL MATERIAL: PVC SCD. 40	DRILLING METHOD: MUD ROTARY
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: C. PUMP (KIT)
	GROUND SURFACE ELEVATION:	



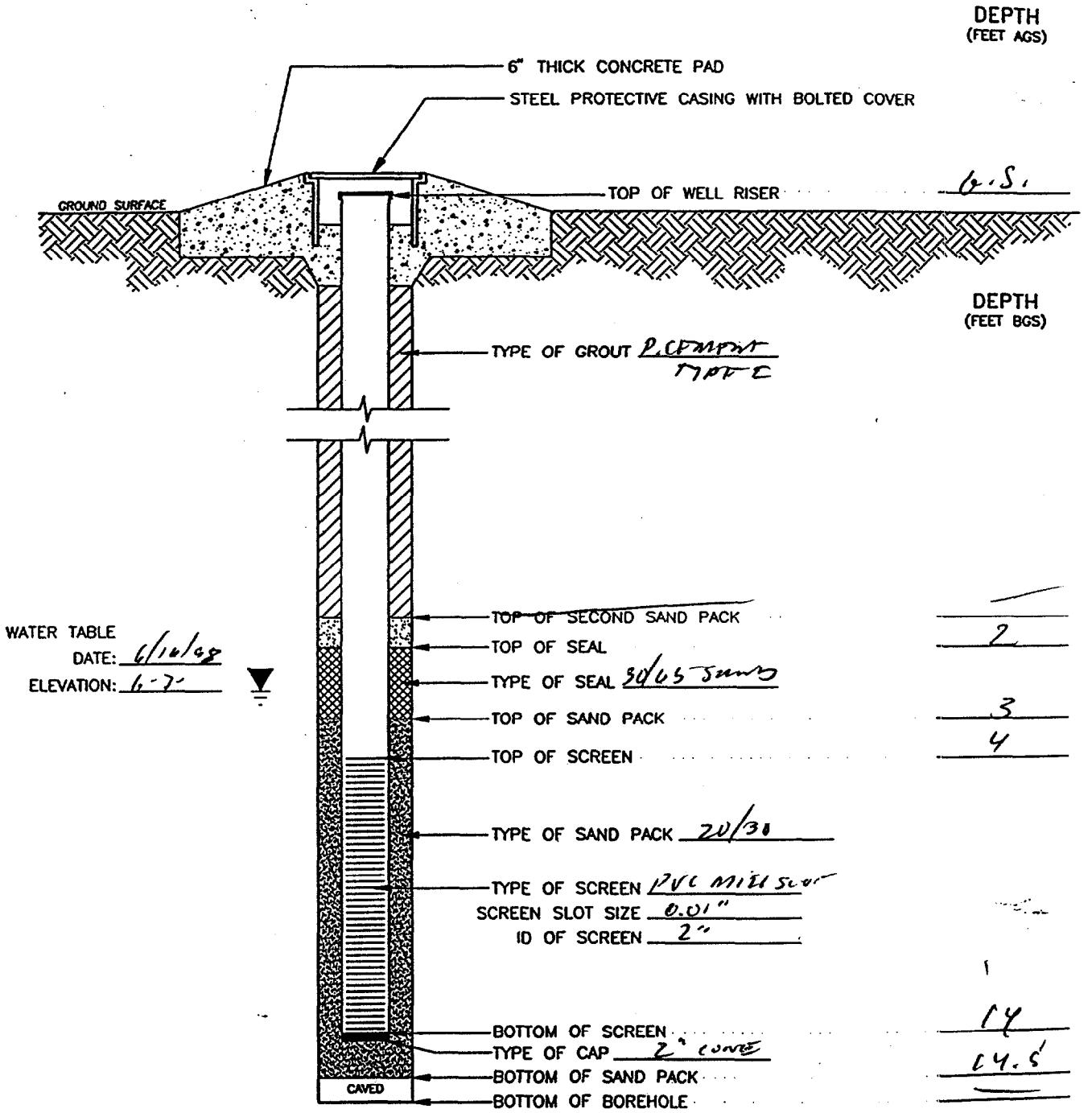
Golder Associates JACKSONVILLE, FLORIDA	TITLE MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT NGSA/CECIL FIELD/FL	DRAWN TRG	DATE 5/11/98	JOB NO. 973-3778	
	CHECKED RGM	SCALE NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/CF/FL PILOT	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: SMW-24
PROJECT No: 973-3778.603	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/10/98
DRILLING COMPANY: RUSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: GPUMP (PIG)
	GROUND SURFACE ELEVATION:	



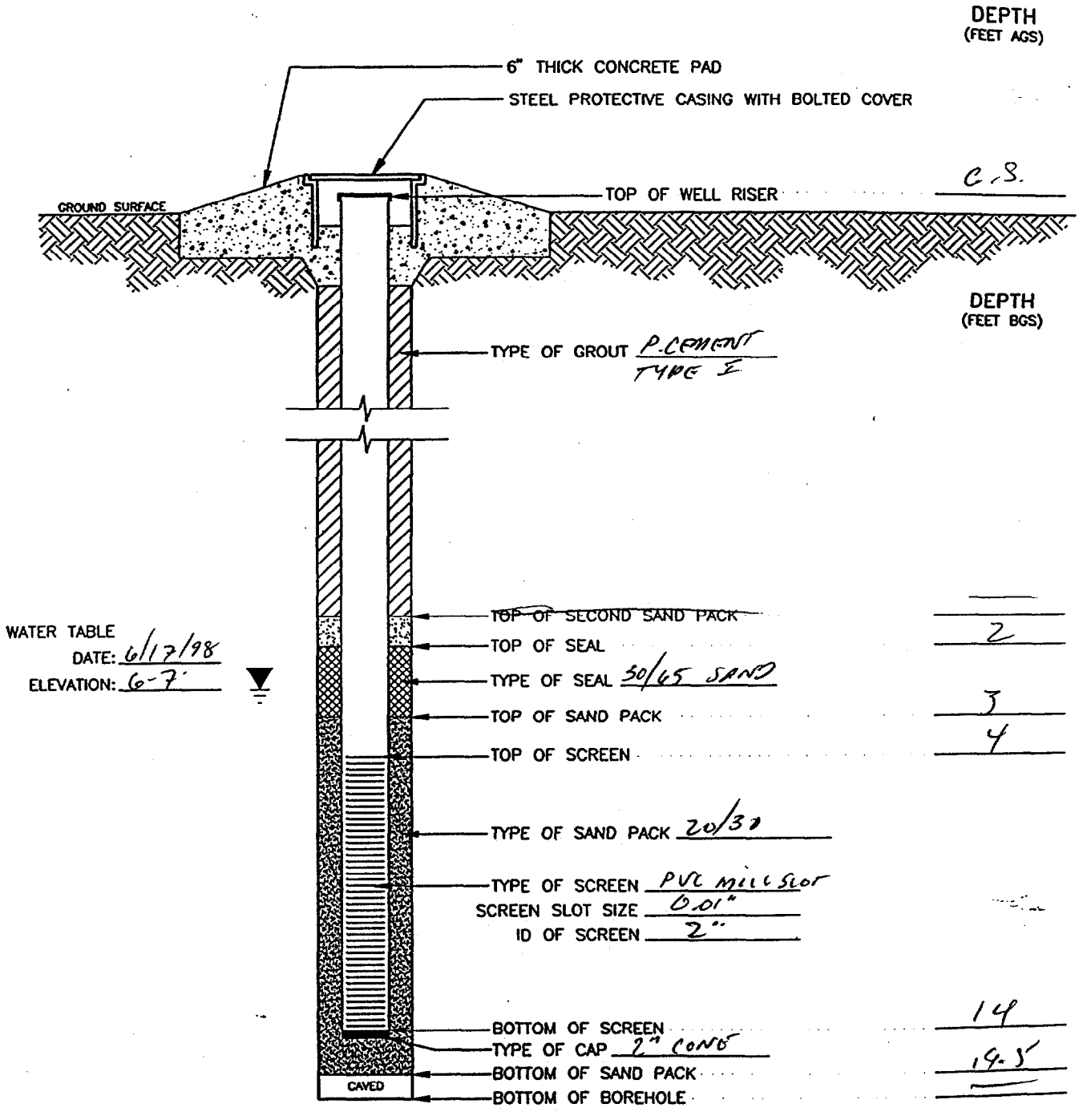
Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NKC/CF/KL 815	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: SMW-25
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/10/98
DRILLING COMPANY: KVSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: C. PUMP (RIG)
	GROUND SURFACE ELEVATION:	



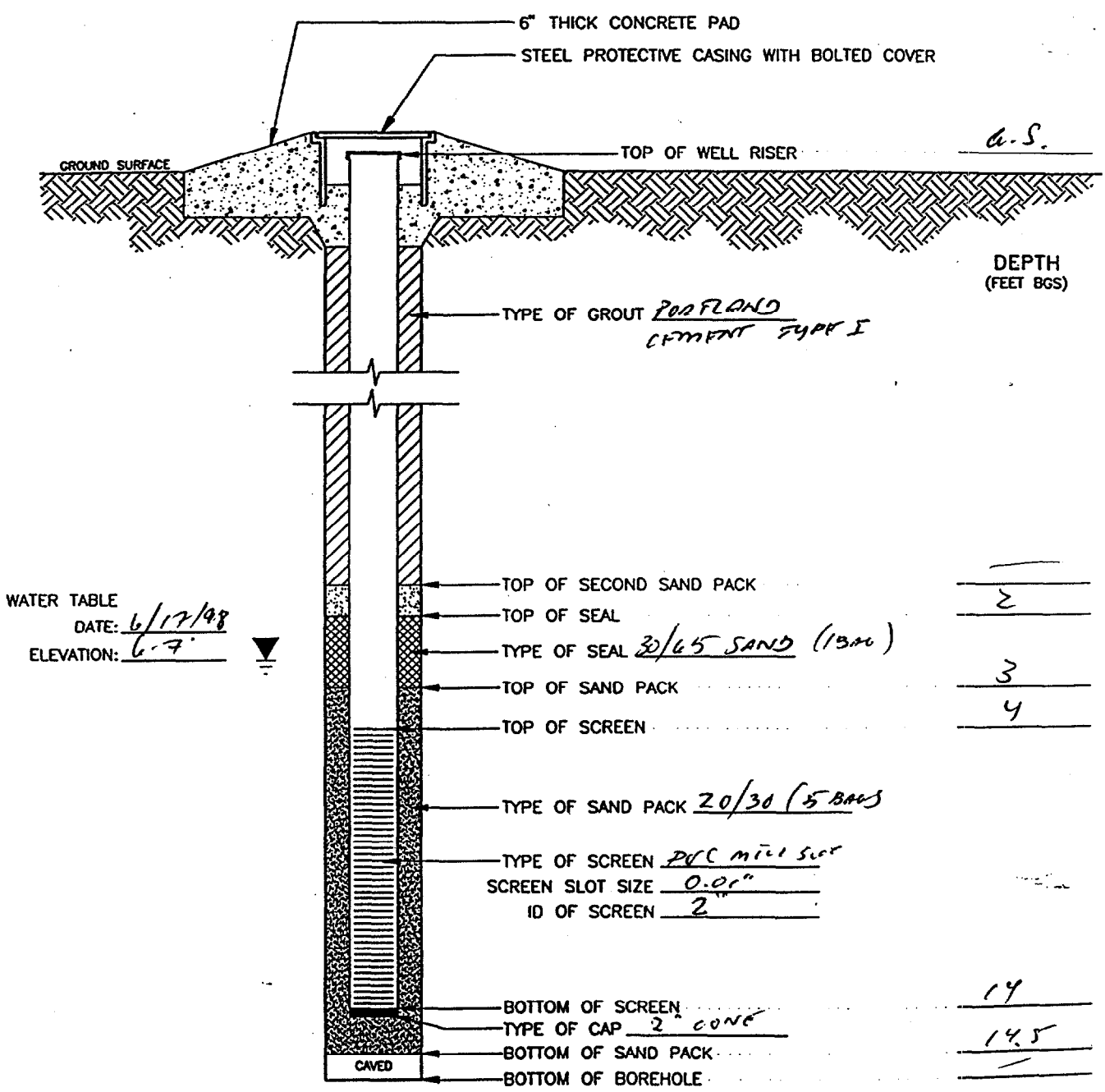
Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO. 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO. 3778P1	REV. NO.
	REVIEWED	FILE NO. 973-3778	SUBTITLE	FIGURE NO. 1

PROJECT NAME: NGC/Cecil FL 815	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: SMW-26
PROJECT No: 973-3778.2/03	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/17/98
DRILLING COMPANY: NVES	WELL MATERIAL: PVC	DRILLING METHOD: Hollow Stem Auger
FIELD SCIENTIST: Brown	TOP OF WELL ELEVATION: C.S.	DEVELOPMENT METHOD: Pump (Rig)
	GROUND SURFACE ELEVATION:	



Golder Associates JACKSONVILLE, FLORIDA	TITLE: MONITORING WELL INSTALLATION DATA RECORD			
CLIENT/PROJECT: NGSA/CECIL FIELD/FL	DRAWN: TRG	DATE: 5/11/98	JOB NO.: 973-3778	
	CHECKED: RFM	SCALE: NOT TO SCALE	DWG NO.: 3778P1	REV. NO.
	REVIEWED	FILE NO.: 973-3778	SUBTITLE	FIGURE NO.: 1

PROJECT NAME: NGC/CF/FL 815	BORING DIAMETER: 8¼"	WELL No/PIEZOMETER No.: SMW-27
PROJECT No: 973-3778.403	WELL INSIDE DIAMETER: 2"	DATE INSTALLED: 6/17/98
DRILLING COMPANY: IHSS	WELL MATERIAL: PVC	DRILLING METHOD: HOLLOW STEM AUGER
FIELD SCIENTIST: BMW	TOP OF WELL ELEVATION: G.S.	DEVELOPMENT METHOD: C. PUMP (RIG)
	GROUND SURFACE ELEVATION:	



JACKSONVILLE, FLORIDA

Golder Associates

TITLE: MONITORING WELL INSTALLATION DATA RECORD

CLIENT/PROJECT: NGSA/CECIL FIELD/FL

DRAWN	TRG	DATE	5/11/98	JOB NO.	973-3778
CHECKED	RFM	SCALE	NOT TO SCALE	DWG NO. 3778P1	REV. NO.
REVIEWED		FILE NO.	973-3778	SUBTITLE	FIGURE NO. 1

APPENDIX B-3

Soil Screening Records

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RPM
Sampling Location: SB-1
BLDG 1845

Screening Date: 5/29/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU
Detector: PID
Calibration Gas: ISOBUTYLENE 91 ppm

Calibration Date: 5/29/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	
2-4	<1	
4-6	<1	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW/RM
Sampling Location: IMW-1
BLDG-1845

Screening Date: 5/28/98
Sampling Method: SPLIT SPOON
Type of Sampling Equipment: H-NU

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU
Detector: PHOTO-IONIZER
Calibration Gas: PL 101 150BUT. 91

Calibration Date: 5/28/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
~~0-2~~		
~~2-4~~		
~~4-6~~		
32-34'	0.4	
34-36'	0.5	
36-38'	0.8	
39'	0.2	
40'	0.2	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: DMW-2 (1845)

Screening Date: 6/1/98
Sampling Method: HAND AUGER
Type of Sampling Equipment: H-NU HEADSPACE

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUT. 91 ppm

Calibration Date: 6/1/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	4.0	
2-4	1.0	
4-6	0.0	

Field Team Leader: Robert Wogich

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RKM
Sampling Location: SB-3

Screening Date: 6/2/98
Sampling Method: HAND AUGER
Type of Sampling Equipment: HEADSPACE

SAMPLE SCREENING LOCATION SKETCH:

10½" OF CONCRETE

INSTRUMENT RECORD

OVA Model: N-NU PL101
Detector: PID
Calibration Gas: ISOBUT. 91 PPM

Calibration Date: 6/2/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
1-2 ~~0-2~~	<1	
2-4	<1	
4-6	<1	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RCM
Sampling Location: SB-4
BLDG 1845

Screening Date: 5/29/98
Sampling Method: BRHB
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUTYLENE 91 ppm

Calibration Date: 5/29/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	
2-4	<1	
~~6~~		

Field Team Leader: Robert Wapek

SOIL SCREENING FORM

Project Name:	NGC/Cecil Field	Screening Date:	6/4/98
Project Number:	973-3778	Sampling Method:	HAND AUGER
Sampled by:	RFM	Type of Sampling Equipment:	HEADSPACE
Sampling Location:	SMW-5		

SAMPLE SCREENING LOCATION SKETCH:

14" OF CONCRETE

INSTRUMENT RECORD

OVA Model:	H-NU PI101	Calibration Date:	6/4/98
Detector:	PID	Calibration Sheet No.:	
Calibration Gas:	ISOBUT. 91 PPM		

DEPTH INTERVAL	READING	DESCRIPTION
1-2 0-2	<1	
2-4	<1	
4-6	<1	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: SMW-6

Screening Date: 6/3/98
Sampling Method: HAND AUGER
Type of Sampling Equipment: HEADSPACE

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PI 101
Detector: PID
Calibration Gas: ISOBUT. 91 ppm

Calibration Date: 6/3/98
Calibration Sheet No.:

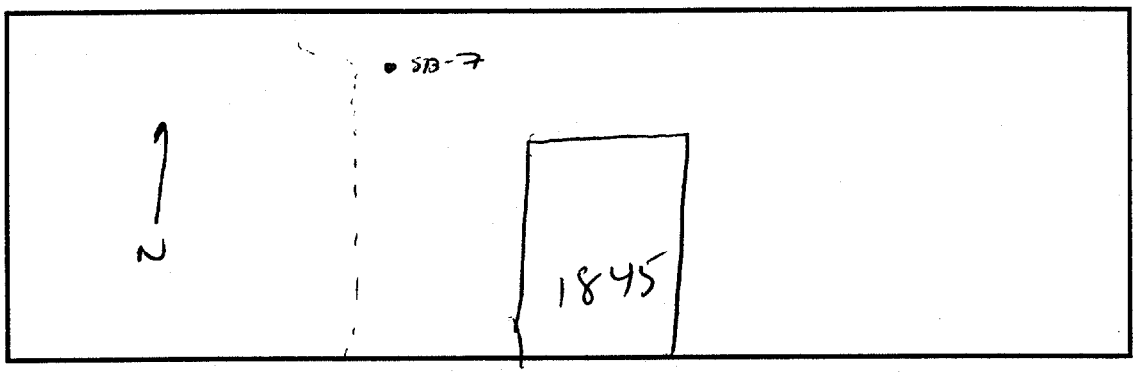
DEPTH INTERVAL	READING	DESCRIPTION
~~1-2~~ 1-2	<1	
2-4	<1	
4-6	<1	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name:	NGC/Cecil Field	Screening Date:	5/29/98
Project Number:	973-3778	Sampling Method:	GRAB
Sampled by:	RPM	Type of Sampling Equipment:	HAND
Sampling Location:	SB-7		NUGER

SAMPLE SCREENING LOCATION SKETCH:



INSTRUMENT RECORD

OVA Model:	N-NV	Calibration Date:	5/29/98
Detector:	PID	Calibration Sheet No.:	
Calibration Gas:	ISOBUT 91. ppm		

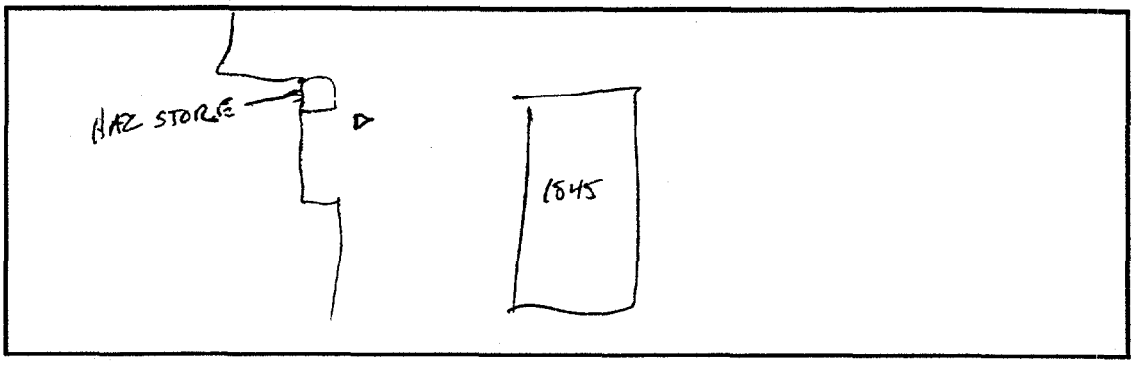
DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	
2-4	<1	HIT CAUTION TAPE FOR
4-6	——	PIPE @ 4 FEET

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name:	NGC/Cecil Field	Screening Date:	6/4/98
Project Number:	973-3778	Sampling Method:	GRAB
Sampled by:	RFM	Type of Sampling Equipment:	HA
Sampling Location:	FL-SB-7		

SAMPLE SCREENING LOCATION SKETCH:



INSTRUMENT RECORD

OVA Model:	HNU	Calibration Date:	6/4/98
Detector:	PID	Calibration Sheet No.:	
Calibration Gas:	21 PPM		

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR-GRBR (SP) 2" ASPHALT 6" LR
2-4	<1	" "
4-6	<1	BR (SP)

Field Team Leader: Robert Wojnik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFm
Sampling Location: SB-8
B206 184S

Screening Date: 5/29/98
Sampling Method: GRAB, HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL101
Detector: PID
Calibration Gas: 100 BUTYLENE 91ppm

Calibration Date: 5/29/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	
2-4	<1	
4-6	<1	

Field Team Leader: Robert Wogek

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SMW-9

Screening Date: 6/4/98
Sampling Method: HAND AUGER
Type of Sampling Equipment: HEADSPACE

SAMPLE SCREENING LOCATION SKETCH:

12½" OF CONCRETE

INSTRUMENT RECORD

OVA Model: H-NU PC 101
Detector: PID
Calibration Gas: 1500US. 91ppm

Calibration Date: 6/4/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
1-2 ~~0-2~~	<1	
2-4	<1	
4-6	<1	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: KPM
Sampling Location: SB-10
BLDG 1845

Screening Date: 5/29/98
Sampling Method: GRAB, HEADSPACE
Type of Sampling Equipment: HAND
RUBBER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: HNU PL 101
Detector: PID
Calibration Gas: ISOBUTYLENE 91ppm

Calibration Date: 5/29/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	
2-4	<1	
4-6	<1	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM/BMW
Sampling Location: INSIDE HANGER 1845
SB-11

Screening Date: 6/8/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUT. 91 PPM

Calibration Date: 6/8/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
~~0-2~~ 1-2	<1	LIGHT BRNISH BR F SD
2-4	<1	DARK BR F SD, LI SI
4-6	<1	BR F SD

Field Team Leader: Robert Wozniak

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM / BMW
Sampling Location: N SIDE OF BLDG 815
SB-12

Screening Date: 6/8/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PC 101
Detector: PID
Calibration Gas: ISOBUTYLENE

Calibration Date: 6/8/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR F SD
2-4	<1	DARK BR F SD, LI SI
4-6	<1	" , LI SI

Field Team Leader: B. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SMW-13

Screening Date: 6/2/98
Sampling Method: HAND AUGER
Type of Sampling Equipment: JARS H-NU HEADSPACE

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PI101
Detector: PID
Calibration Gas: 250 BUT. 91 ppm

Calibration Date: 6/2/98
Calibration Sheet No.:

12" OF CONCRETE

DEPTH INTERVAL	READING	DESCRIPTION
0-2	0.0	
2-4	0.0	
4-6	0.0	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM/BMW
Sampling Location: FL-BLDG 815 SB-14

Screening Date: 6/17/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUTYLENE 91. ppm

Calibration Date: 6/17/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR F SD
2-4	<1	2-6' REDDISH BR F SD
4-6	<1	

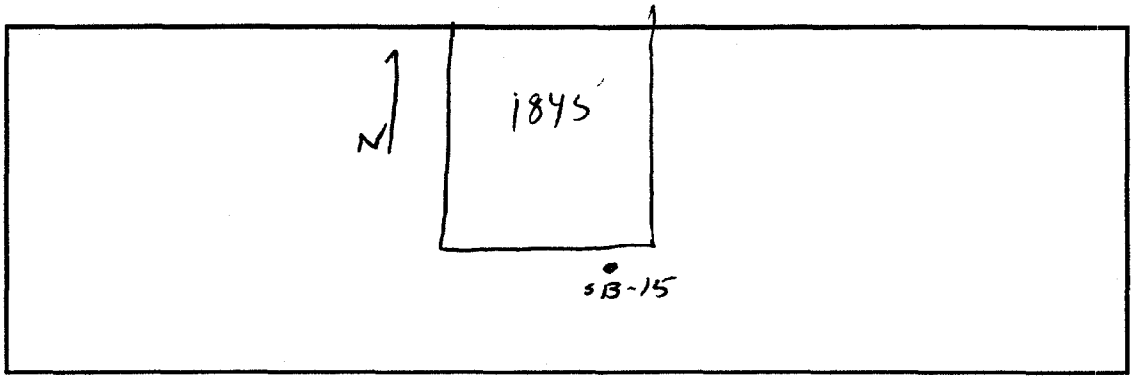
Field Team Leader: R. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RPM
Sampling Location: SB-15
BLDG 1845

Screening Date: 5/29/98
Sampling Method: GRAB, HEADSPACE
Type of Sampling Equipment: HAND
AUGER

SAMPLE SCREENING LOCATION SKETCH:



INSTRUMENT RECORD

OVA Model: H-NU
Detector: PID
Calibration Gas: ISOBUTYLENE 91ppm

Calibration Date: 5/29/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	< 1	
2-4	< 1	
4-6	70ppm	

Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM / BMW
Sampling Location: FL-SB-16
WEST OF BLDG 815

Screening Date: 6/9/98
Sampling Method: GRAB, HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUT. 91 PPM

Calibration Date: 6/9/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	L BR → DARK GRAY SP
2-4	<1	TAN → OG SP
4-6	<1	TAN → OG SP

Field Team Leader: R. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: DMW/RFM
Sampling Location: FC-SB-17

Screening Date: 6/16/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PC 101
Detector: PID
Calibration Gas: ISOBUTYLENE 9 1.

Calibration Date: 6/16/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR F SD, VLS
2-4	<1	LIGHT GRAY F SD
4-6	<1	MIXED OG & GRAY FLY SD

Field Team Leader: R. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BRM/BMW
Sampling Location: CECIL FIELD
BLDG 815

Screening Date: 6/9/98
Sampling Method: GRAB, HEADSPACE
Type of Sampling Equipment: HAND AUGER

SB-18

SAMPLE SCREENING LOCATION SKETCH:

1" ASPHALT
2" LIMEROCK

INSTRUMENT RECORD

OVA Model: H-NU DL101
Detector: PID
Calibration Gas: ISOBUT, 91 ppm

Calibration Date: 6/9/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR F SD
2-4	<1	"
4-6	<1	"

Field Team Leader: B. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: 815 FLINT SD-19

Screening Date: 6/12/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PG101
Detector: PID
Calibration Gas: ISO BUT. 91 PPM

Calibration Date: 6/12/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	0.0 <1	BR F SD
2-4	<1	THIN BR F SD
4-6	<1	REDDISH BR F SD
	BLOWS	
8-10	3,2,2,3	24/24 TOP 8" REDDISH BR F SD, BOT BR F SD
13-15	6,2,2,3	24/24 TOP 12" BR F SD BOT 12" GRAY F SD
		TO 15'

Field Team Leader: B. Wright

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: 815
FLIGH LINE SB-20

Screening Date: 6/12/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER
JARS

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: LAMP-P.ID
Calibration Gas: ISOBUT 91 PPM

Calibration Date: 6/12/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
1-2 ~~0-2~~	<1	BR F SD
2-4	<1	OG CLY SD
4-6	<1	REDDISH GRAY F SD, TR SI

Field Team Leader: R. Wright

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FLIGHT LINE BLDG. 815 SB-21

Screening Date: 6/11/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUTYLENE 91ppm

Calibration Date: 6/11/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR F SD
2-4	3	2.5-4.5' OG CLY SD
4-6	1	4.5-6' OG CLY SD → BR F SD.

Field Team Leader: R. Wapk

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: INSIDE BLD HANGAR SB-22

Screening Date: 6/17/98
Sampling Method: HANDSPADE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: 150 BUT. 91 PPM

Calibration Date: 6/17/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
~~0-2~~ ~10" CONCRETE 1-2	160 PPM	BR F SD
2-4	140 PPM	TAN F SD
4-6	45 PPM	REDDISH GRAY F SD, LI CL

Field Team Leader: R. Wagle

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: P. LOT SB-23

Screening Date: 6/11/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PC101
Detector: PID
Calibration Gas: ISOBUT. 91 PPM

Calibration Date: 6/11/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1 ppm	BR (SD)
2-4	<1	(2-4.5') WH (SP)
4-6	<1	(4.5-5.0)' BR (SP-SC)
		(5.0-6.0)' BR (SP)

Field Team Leader: B. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: CECIL FIELD
PLOT 815
FL-SB-24

Screening Date: 6/16/98
Sampling Method: HANDSCALE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU
Detector: PID
Calibration Gas: ISOBUT. 91.PPM

Calibration Date: 6/16/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	< 1	DARK BR F SD
2-4	< 1	LIGHT GRAY F SD
4-6	< 1	MIXED BG & BR F SD W/LI CL

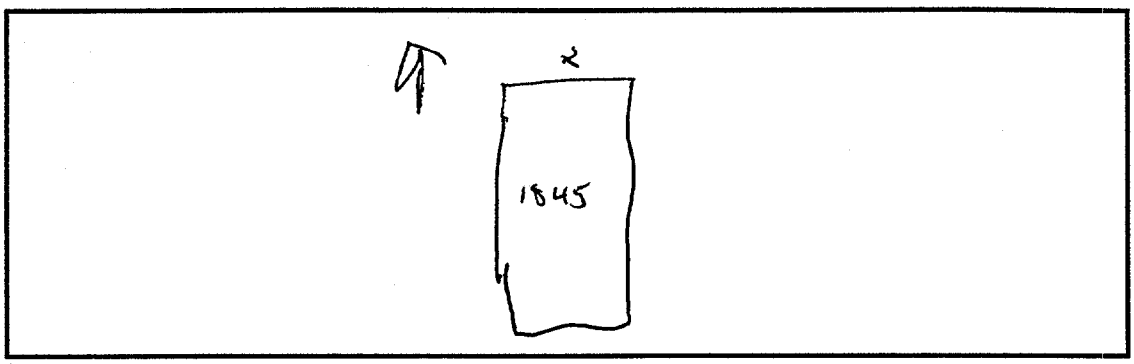
Field Team Leader: B. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FL SB-27

Screening Date: 6/6/94
Sampling Method: GRAB
Type of Sampling Equipment: HA

SAMPLE SCREENING LOCATION SKETCH:



INSTRUMENT RECORD

OVA Model: HNU PID
Detector: PID
Calibration Gas: 91 ppm

Calibration Date: 6/4/94
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	DK BA - BR (SP-SM) 2" ASPHALT 2" LR
2-4	<1	BR (SP-SM) @ 3'
4-6	<1	BR (SP-SM) light cementation

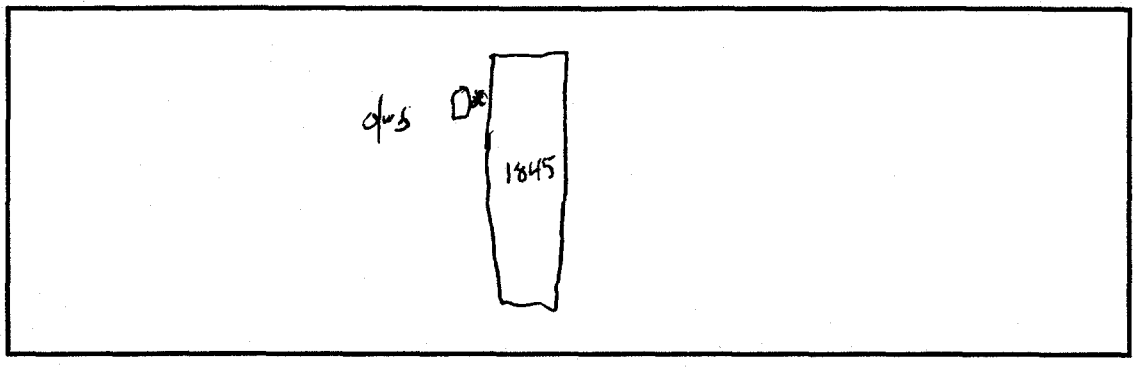
Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: R Fay
Sampling Location: FL - SB - 28

Screening Date: 6/4/98
Sampling Method: GRAB
Type of Sampling Equipment: HA

SAMPLE SCREENING LOCATION SKETCH:



INSTRUMENT RECORD

OVA Model: HNU - PID
Detector: PID
Calibration Gas: 91 ppm

Calibration Date: 6/4/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BROWN SP-SM
2-4	<1	BROWN (SP)
4-6	<1	LT BR SP

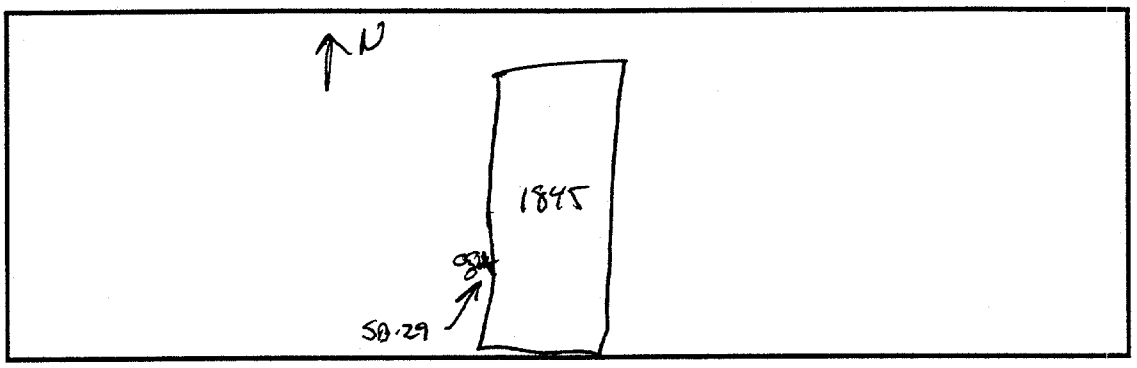
Field Team Leader: Robert Whitfield

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FC-SB-29

Screening Date: 6/4/94
Sampling Method: ~~HA~~ GRAB
Type of Sampling Equipment: HA

SAMPLE SCREENING LOCATION SKETCH:



INSTRUMENT RECORD

OVA Model: HNU
Detector: PID
Calibration Gas: 91 ppm

Calibration Date: 6/4/94
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	lt Gray brown SP
2-4	<1	" "
4-6	<1	" " @ 5' Brown SC Mottling

Field Team Leader: RFM

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FL-SB-30

Screening Date: 6/9/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

12" OF CONCRETE

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUT. 91 PPM

Calibration Date: 6/9/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	40 ppm	BR F SD
2-4	36 ppm	BR F SD
4-6	22 ppm	BR → GRAY BR F SD

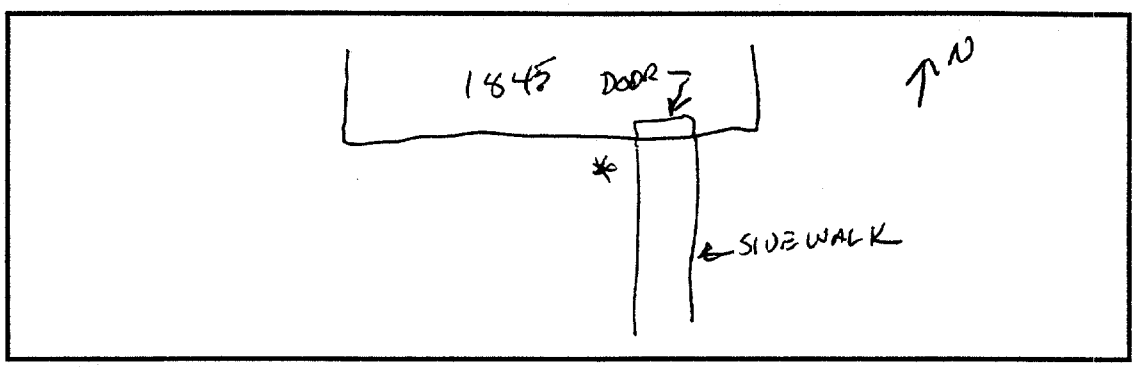
Field Team Leader: R. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: CECIL FIELD F2-SB-31

Screening Date: 6/8/98
Sampling Method: GRAB
Type of Sampling Equipment: HA

SAMPLE SCREENING LOCATION SKETCH:



INSTRUMENT RECORD

OVA Model: NNO
Detector: PID
Calibration Gas: 91 ppm

Calibration Date: 6/8/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	GRAY (SP)
2-4	<1	DK BROWN - BROWN (SP-SM) 3-5' BLS
4-6	<1	BROWN (SM) @ 5'

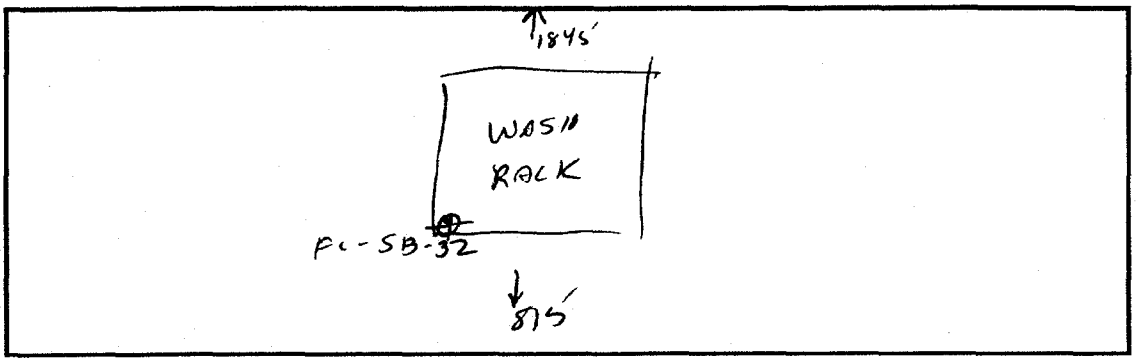
Field Team Leader: Robert Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FC-SB-32

Screening Date: 6/9/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:



INSTRUMENT RECORD

OVA Model: H-NU PI-101
Detector: PID
Calibration Gas: ISOBUTYLENE 91 ppm

Calibration Date: 6/9/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	115 ppm	0-1' BR SP
2-4	40 ppm	1-6' GRAY BR SP
4-6	24 ppm	

Field Team Leader: R. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: FL-SB-33

Screening Date: 6/16/98
Sampling Method: HAND SPADE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUT. 91 PPM

Calibration Date: 6/16/98
Calibration Sheet No.:

2" OF ASPHALT

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR F SD
2-4	<1	TAN F SD
4-6	<1	OG → BR CLY SD

Field Team Leader: B. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FL-SB-34
WEST DR 8/5

Screening Date: 6/9/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: TD-NU PC 101
Detector: PID
Calibration Gas: ISOBUTYLENE 91ppm

Calibration Date: 6/9/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	200 ppm	BR F SD
2-4	50 ppm	LIGHT BR GRAYISH F SD, LI CL
4-6	5 ppm	LIGHT GRAY F SD

Field Team Leader: R. Wojnb

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SW POND OVF BLDG 815
FL-SB-36

Screening Date: 6/11/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PC 101
Detector: PID
Calibration Gas: ISOBUTYLENE 91ppm

Calibration Date: 6/11/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR SD
2-4	<1	2-3' BR SP, 3-4' LT BR SP
4-6	<1	DK BR - BR SP-SM

Field Team Leader: D. Wright

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SB-37

Screening Date: 6/11/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND
RUBBER

SAMPLE SCREENING LOCATION SKETCH:

SE CORNER OF BLDG. 815

CONCRETE 12" THICK

INSTRUMENT RECORD

OVA Model: 93-NU PC 101
Detector: PID
Calibration Gas: ISOBUTYLENE 91 ppm

Calibration Date: 6/11/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
~~0-2~~ 1-2	2 ppm	1-4' DK BR SD
2-4	3 "	"
4-6	3 "	BR SP

Field Team Leader: B. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FL-SB-38

Screening Date: 6/11/98
Sampling Method: HAND SPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

SE SIDE OF BLDG 815.

CONCRETE 12" THICK

INSTRUMENT RECORD

OVA Model: H-NU PI101
Detector: PIP
Calibration Gas: ISOBUTYLENE 91 ppm

Calibration Date: 6/11/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR SP
2-4	<1	GR BR SP
4-6	<1	4-4.5' LT BR SP, 4.5-6' LT GB SP-SC

Field Team Leader: B. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW/KM
Sampling Location: 815 FL-SB-39

Screening Date: 6/15/98
Sampling Method: headspace
Type of Sampling Equipment: hand augers

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: HNu PI 101
Detector: PID
Calibration Gas: Isobutylene

Calibration Date: 6/15/98
Calibration Sheet No.:

12" Concrete

DEPTH INTERVAL	READING	DESCRIPTION
1 0-2		dk. brown fine sand
2-4		gray fine sand w/ Orange sandy clay
4-6		same as above.

Field Team Leader: [signature]

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW/KM
Sampling Location: 815 FL-SB-40

Screening Date: 6/15/98
Sampling Method: headspace
Type of Sampling Equipment: hand auger

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: HNu PI 101
Detector: PID
Calibration Gas: Isobutylene

Calibration Date: 6/15/98
Calibration Sheet No.:

~~Lot#~~ 12" Concrete

DEPTH INTERVAL	READING	DESCRIPTION
1 ~~0~~-2	<1	lt. brown/buff fine Sand
2-4	<1	Gray/brown fine Sand w/ Clay
4-6	<1	Clayey fine sand, brown to rust

Field Team Leader: KMurray

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: Bmw/ICM
Sampling Location: 815 FL-SB-41

Screening Date: 6/15/98
Sampling Method: headspace
Type of Sampling Equipment: hand auger

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: HNU PI 101
Detector: PID
Calibration Gas: Isobutylene

Calibration Date: 6/15/98
Calibration Sheet No.:

12" Concrete

DEPTH INTERVAL	READING	DESCRIPTION
1-2	<1	tan-brown fine sand, damp
2-4	<1	brown fine sand, damp
4-6	<1	brown-rust fine sand, damp

Field Team Leader: [signature]

FN: g:\common\murray\forms\soilscrn.xls

Golder Associates

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW/KM
Sampling Location: 815 FL-SB-42

Screening Date: 6/15/98
Sampling Method: hand auger
Type of Sampling Equipment: headspace

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: HNU PI 101
Detector: PID
Calibration Gas: Isobutylene 91.0 ppm

Calibration Date: 6/15/98
Calibration Sheet No.:

12" Concrete

DEPTH INTERVAL	READING	DESCRIPTION
1-2 ~~0-2~~	(0) <1	brown/gray f. Sand
2-4	<1	brown f. Sand, damp
4-6	<1	brown f. Sand w/ some Clay, damp.

Field Team Leader: KMurray

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SB-43 PLOT

Screening Date: 6/18/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL101
Detector: PID
Calibration Gas: ISOBUT. 91 ppm

Calibration Date: 6/18/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	20 ppm	0-3' GR BR (SP)
2-4	12 ppm	3-4' BR (SP-SM)
4-6	4 ppm	4-6' GR BR / BR SP

Field Team Leader: R. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SB-44 P.L.OF

Screening Date: 6/18/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PL 101
Detector: PID
Calibration Gas: ISOBUT. 91 ppm

Calibration Date: 6/18/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	GR BR / GRY SP
2-4	<1	GR BR / OG BR SC
4-6	<1	GR BR / OG BR SP-SC

Field Team Leader: R. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SB-45 P-LOT

Screening Date: 6/18/98
Sampling Method: HEADSPACE
Type of Sampling Equipment: HAND NUBBR

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: HNU PI101
Detector: PID
Calibration Gas: ISOBUT. 91 ppm

Calibration Date: 6/18/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	GR BR (SP)
2-4	<1	BR (SP)
4-6	<1	GR/BR (SP)

Field Team Leader: R. Wojcik

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BFM
Sampling Location: SB-46
P. LOT

Screening Date: 6/18/98
Sampling Method: GEOPROBE
Type of Sampling Equipment: HAND
AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: H-NU PG 101
Detector: PID
Calibration Gas: 150 BUT. 91 PPM

Calibration Date: 6/18/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	2	GR BR (SP) (0-1.5')
2-4	<1	RD BR (SP-SM) (1.5-2.0')
4-6	<1	GRB (SP) (2-3')
		BR - LT BR (SP) (3-4')
		GR (SC) (4-6')

Field Team Leader: R. Wyrick

SOIL SCREENING FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RKM
Sampling Location: FL-SB-47 @ SMW-27 LOCATION

Screening Date: 6/17/98
Sampling Method: HAND SPACE
Type of Sampling Equipment: HAND AUGER

SAMPLE SCREENING LOCATION SKETCH:

INSTRUMENT RECORD

OVA Model: OVA-PID
Detector: PID
Calibration Gas: 91 ppm

Calibration Date: 6/17/98
Calibration Sheet No.:

DEPTH INTERVAL	READING	DESCRIPTION
0-2	<1	BR/GR (SP) SOME ROCKS TO 1FT
2-4	<1	BR GR (SP) @ 1-3 FT BLS
4-6	<1	Tan / LT BR (SC) @ 3-4 " "
		Tan / LT BR (SP-SC) @ 4-5 " "
		BROWN (SP) 5-6 " "

Field Team Leader: R. Wogel

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 4/3/98 Sheet 1 of 1

Job Name NGC/OF/FL 1845 Job Number 973.3778-203

Location CAPE FIRD BLDG. 1845

Time In 700 Time Out _____ Weather HAZY Temp 80'S Wind D. _____ V _____

Instrument Type H·NU PC 101 Serial No. _____

Calibration Gas ISOBUTYLENE Instrument Reading _____ Span/Gain/RF Setting 91.0ppm

and Concentration • If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
730	CALIB.		91.0	SPAN GAS
730	DMW-3		0.0	
750	DMW-3		0.0	
810	DMW-3		0.0	
815	DMW-3		0.0	
834	DMW-3		0.0	
900	DMW-3		0.0	
920	DMW-3		0.0	
930	SPAN		86.0	SPAN GAS
950	—		91.0	RF-CALIB. WIND-NW-10mph
1115	EMW-3		0.0	
1140	EMW-3		0.0	
1155	EMW-3		0.0	
1220	EMW-3		0.0	
1246	EMW-3		0.0	
1250	SPAN		89.0	SPAN GAS
1500	SMW-6		0.0	
1519	SMW-6		0.0	
1530	SMW-6		0.0	
1545	SMW-6		0.0	
1548	SPAN		89.0	SPAN GAS

Recommendations

ROBERT WISZIK
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 6/4/98 Sheet 1 of 1

Job Name NGC/CF/FL 1845 Job Number 973-3778.203

Location CECIL FIELD BLDG. 1845

Time In 730 Time Out _____ Weather CLEAR Temp. 80°C Wind D. — V C

Instrument Type H-NU PC 101 Serial No. _____

Calibration Gas and Concentration ISOBUTYLENE Instrument Reading 91 ppm Span/Gain/RF Setting 91.0

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
738	SMW-5		91.0	SPAN GAS
755	SMW-5		0.0	
815	SMW-5		0.0	
828	SMW-5		0.0	
1020	SMW-5		0.0	
1100	—		91.0	RECALIB-SPAN
1340	DMW-12		0.0	
1359	DMW-12		0.0	
1430	DMW-12		0.0	
1450	DMW-12		0.0	
1615	DMW-12		0.0	
1530	DMW-12		0.0	
1535	—		91.0	SPAN GAS

Recommendations

ROBERT WOJCIK
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 6/5/98 Sheet 1 of 1

Job Name NGC / CF / FC 1845 Job Number 923-3378.203

Location CECIL FIELD BLDG. 1845

Time In 730 Time Out _____ Weather SUNNY Temp. 80's Wind D. — V —

Instrument Type H-NU PL 101 Serial No. _____

Calibration Gas and Concentration ISOBUTYLENE Instrument Reading _____ Span/Gain/RF Setting 91.0 ppm

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 351, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
759	CALIB		91.0	SPAN GAS
800	SMW-12		0.0	
815	SMW-12		0.0	
830	SMW-12		0.0	
850	SMW-12		0.0	
910	SMW-12		0.0	
930	SMW-12		0.0	
940	CALIB		91.0	SPAN

Recommendations

ROBERT WATTIE
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 6/8/98 Sheet 1 of 1

Job Name NGC/CF/FL 815 Job Number 973-3778.403

Location CECIL FIELD BLDG. 815

Time In 1050 Time Out _____ Weather P. CLOUDY Temp. 80'S Wind D. E V 5

Instrument Type H-NU PL 101 Serial No. 201198 (MSR)

Calibration Gas ISOBUTYLENE Instrument Reading _____ Span/Gain/RF Setting 91.0ppm and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
1054	CALIB	—	91.0	SPAN GAS
1230	IMW-12		0.0	
1245	IMW-12		0.0	
1255	IMW-12		0.0	
1430	CALIB		91.0	RECALIB.

Recommendations

R. WATTIZ
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 6/9/98 Sheet 1 of 1

Job Name NGC/CF/FL 815 Job Number 973-3778.403

Location CEDAR FORD, FL

Time In 730 Time Out _____ Weather CLEAR Temp. 80 Wind D. E V 5

Instrument Type H-NU PL 101 Serial No. 201198

Calibration Gas and Concentration 1500 BUTYLENE Instrument Reading _____ Span/Gain/RF Setting 91.0

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
735	SMW-16		0.0	
750	SMW-16		0.0	
800	SMW-16		0.0	
815	SMW-16		0.0	
920	SMW-18		0.0	
940	SMW-18		0.0	
955	SMW-18		0.0	
1050	DMW-18		0.0	
1120	DMW-18		0.0	
1143	DMW-18		0.0	
1202	DMW-18		0.0	
1215	DMW-18		0.0	
1237	DMW-18		0.0	
~~1600~~	~~S~~			

Recommendations

K. WOJCIK
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 4/10/98 Sheet 1 of 1

Job Name NGC/CF/FC 815 Job Number 973-3778.403

Location CERIL FIRD

Time In 730 Time Out _____ Weather HAZY Temp. 70S Wind D. E V 5-10

Instrument Type SENSIDYNE MODEL 800 Serial No. 01757 (GOLDER)

Calibration Gas and Concentration — Instrument Reading _____ Span/Gain/RF Setting _____

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
758	IMW-18	V.C.	0.0	4 STROKES
802	IMW-18	BENZENE	0.0	3 STROKES
1315	CALIB	H-NU	91.0	SPAN GAS
1330	DMW-23		0.0	
1350	DMW-23		0.0	
1410	DMW-23		0.0	
1428	DMW-23		0.0	
1447	DMW-23		0.0	
1500	DMW-23	V.C.	0.0	4 STROKES
1500	DMW-23	BENZENE	0.0	3

Recommendations

R. WOJCIK
Printed Name

Robert Wojcik
Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 6/12 Sheet 1 of 1

Job Name NGC / OF / FEL 815 Job Number

Location CERIC FIELD 815

Time In 945 Time Out Weather P. CLOUD Temp. 80S Wind D. N V 5

Instrument Type H-NU PI 101 Serial No. 201188

Calibration Gas ISOBUTYLENE Instrument Reading 91.0 Span/Gain/RF Setting 91.0 ppm and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
945	CALIB		91.0 ppm	SPAN GAS
950	SMW-20		0.0	
959	SMW-20		0.0	
1010	SMW-20		0.0	
1023	SMW-20		0.0	
1032	SMW-20	BZ	0.0	3 STROKES } SENSIDYNE
1038	SMW-20	VC	0.0	4 STROKES } GOLDER# 01757
1200	SMW-19		0.0	WIND OUT OF SW 5-10 mph
1215	SMW-19		0.0	
1230	SMW-19		0.0	
1250	SMW-19		0.0	
1310	SMW-19		0.0	

Recommendations

R. WOZIE
Printed Name

Robert Wozie
Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 6/16/98 Sheet 1 of 1

Job Name NGC/CF/AL PLOT & 815 Job Number 973-3778.403

Location CITIZ FIELD

Time In 730 Time Out _____ Weather P.CLOUDY Temp. 50'S Wind D. S V ↑20

Instrument Type H-NV #201198 (MSR) Serial No. _____

Calibration Gas 150 BUTYLENE Instrument Reading 0.0 Span/Gain/RF Setting 91.0 ppm

and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr. *	Reading	Procedure/Observations/Comments
820	SMW-23		0.0	
842	SMW-23		0.0	
858	SMW-23		0.0	
909	SMW-23		0.0	
928	SMW-23		0.0	
1020	SMW-24		0.0	
1043	SMW-24		0.0	
1059	SMW-24		0.0	
1108	SMW-24		0.0	
1119	SMW-24		0.0	
1400	SMW-19		0.0	
1421	SMW-17		0.0	
1438	SMW-17		0.0	
1458	SMW-17		0.0	
1600	SMW-25		0.0	
1615	SMW-25		0.0	
1633	SMW-25		0.0	
1651	SMW-25		0.0	
1708	SMW-25		0.0	

Recommendations

R. WARIC
Printed Name

Robert A Wagoite
Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 6/17/98 Sheet 1 of 1

Job Name NGC/CF/KL 815 Job Number 973-3378.403

Location CFRIL FIELD 815

Time In 750 Time Out _____ Weather Hot Temp. 80's Wind D. C V —

Instrument Type H-NU PC 101 # 208198 (MSR) Serial No. _____

Calibration Gas ISOBUTYLENE 91 ppm Instrument Reading _____ Span/Gain/RF Setting 91.0 ppm

and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
756	SMW-26	CALIB	91.0	PPM / SPAN GAS
758	SMW-26		0.0	
817	SMW-26		0.0	
828	SMW-26		0.0	
851	SMW-26		0.0	
1020	SMW-27		0.0	
1041	SMW-27		0.0	
1058	SMW-27		0.0	
1112	SMW-27		0.0	
1230	SMW-28		0.0	
1245	SMW-28		0.0	
1302	SMW-28		0.0	
1425	SMW-29	BZ	0.0	
1429	SMW-29	1,1 DI	0.0	
1435	SMW-29	VC	0.0	
1445	SMW-29	H-NU	0.0	
1459	SMW-29	H-NU	0.0	

Recommendations

RALPH F. MONGILLO JR.
Printed Name

Ralph F. Mongillo Jr.
Signature

APPENDIX B-4

Soil and Sediment Sample Collection Records

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SMW-1 (1845)

Sample ID: SB-1
Date: 5/23/98 (RFM)
Sampling Method: ~~HAND AUGER~~ GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL- SB-1	1507	0.5-1'	BR SD

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125 mL	1	✓		
8270 SVOCs	GLASS 250 mL	1	✓		
6010/7470 Metals	PLASTIC 250 mL	1	✓	✓ (RFM)	
8260 ENCORE	PLASTIC ~~40 ml~~ 5 gm	2	✓		
	RFM				

Chain of Custody #: 116997
Shuttle ID: —
Trip Blank ID: FL-TB-1
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Morgille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: —

Sample ID: EQ-1
Date: 5/29/88
Sampling Method: DI OVER SAMPLING EQUIP.
Type of Sampling Equipment: HANDAUGER, BOWL

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-EQ-1	1610	—	—

RFM

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8270/~~8010~~ ~~8260 VOCs~~	1L AMBER GLASS	2	✓		
8260 ~~8270 SVOCs~~	40mL VOLE GLASS	3	✓		
Hg ~~6010/7470 Metals~~	250mL PLASTIC	1	✓		
METALS	500mL PLASTIC	1	✓		

Chain of Custody #: 116992
Shuttle ID: —
Trip Blank ID: FL-TB-1
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Morgan Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SMW-2

Sample ID: SB-2
Date: 6/2/98
Sampling Method: ~~HAND AUGER~~ GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

ASPHALT 3"
LIMEROCK 7"

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-2	1310	1 - 1.5'	BR SD

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125 mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓	~~AA~~ RFM	
8260 Encore	" ~~TEFLON~~ ~~40 mL~~ 5 gm	2	✓		
	REM				

Chain of Custody #: 116987
Shuttle ID: —
Trip Blank ID: FL-TB-2
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: [illegible]

FN: g:\common\murray\forms\soilsamp.xls

Golder Associates

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SMW-3

Sample ID: SB-3
Date: 6/2/98 (RFM)
Sampling Method: ~~HAND AUGER~~ GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

10½" OF CONCRETE

Sample ID	Time Collected	Sample Depth Interva	Soil Description
SB-3	1400	1-1½	LIGHT BR → BR F SD

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125 ml	1	✓		
8270 SVOCs	"	250 "	1	✓		
6010/7470 Metals	PLASTIC	250 "	1	✓		
8260 ENCORE	"	5 gm ~~40~~ (RFM)	2	✓		

Chain of Custody #: 116987
Shuttle ID: —
Trip Blank ID: FL-TB-2
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Robert F. Morgello Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: EAST SIDE OF 1845

Sample ID: SB-4
Date: 5/29/98
Sampling Method: ~~HAND AUGER~~ Grab (RFM)
Type of Sampling Equipment: ~~HANDSPADE~~ Handauger

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FC-SB-4	1013	(1-1.5')	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓	(RFM)	
8260 ENCORE	" 5gm	2	✓		
	(RFM)				

Chain of Custody #: 116992
Shuttle ID: —
Trip Blank ID: FC-TB-1
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

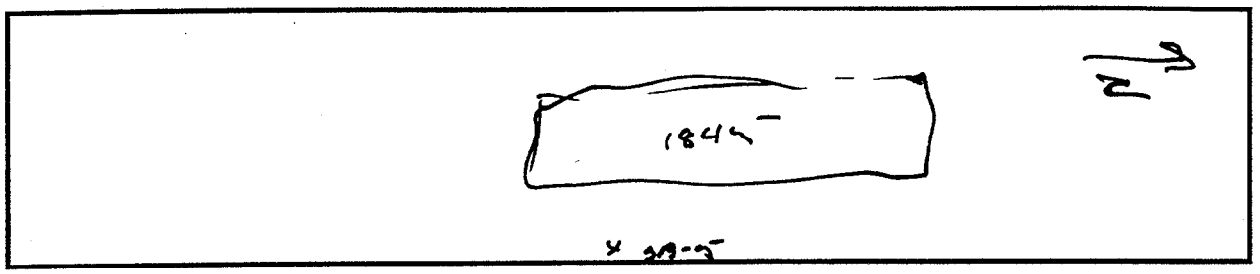
Field Team Leader: Ralph F. Murphy Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: CECIL FIELD EAST RAMP

Sample ID: SB-5
Date: 6/4/98
Sampling Method: ~~HA~~ GRAB (RFM)
Type of Sampling Equipment: ENCORE / HA

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-5	4:05	1.0-1.5	GRAY SAND
		~~1.0~~	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	2-ENCOR/5gm 125 mL AM	2/1	✓		
8270 SVOCs	250 mL GLASS	1	✓		
6010/7470 Metals	250 mL PL	1	✓		

Chain of Custody #: 117224
Shuttle ID: —
Trip Blank ID: TB-4
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Moncrief Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: BMW-6

Sample ID: SB-6
Date: 6/10/98
Sampling Method: ~~HAND AUGER~~ GRAB
Type of Sampling Equipment: ENCORE/HAND AUGER (RFM)

SAMPLE COLLECTION LOCATION SKETCH:

3" ASPHALT
6" LIMEROCK

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-6	1445	1-1.5'	

Analysis	Container Type and Size		Quantity	Per Sample	Per Composite	Comments
8260 VOCs	GLASS	125ml	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	PLASTIC	250	1	✓	—	
8260 Enlow	"	~~40~~ 5gm	2	✓		
		(RFM)				

Chain of Custody #: 116988
Shuttle ID: —
Trip Blank ID: FL-TB-3
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph T. Morrill Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FL-SB-7

Sample ID: FL-SB-7
Date: 6/4/98
Sampling Method: GRAB
Type of Sampling Equipment: HA

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-7	17:45	1.0 - 1.5	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	5 gm 2 ENCOR + 1 25 ml AM	2/1	✓		
8270 SVOCs	250 GLASS	1	✓		
6010/7470 Metals	250 PLASTIC	1	✓		

Chain of Custody #: 117224
Shuttle ID: —
Trip Blank ID: FL-TB4
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F Mongille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: WEST OF 1845

Sample ID: SB-8
Date: 5/29/98
Sampling Method: ~~HAND AUGER~~ GRAB (RFM)
Type of Sampling Equipment: ~~HEMOSPOON~~ HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL- SB-8	1536	0-1	

Analysis	Container Type and Size	Quantity	Per Sample	Per Composite	Comments
8260 VOCs	GLASS 125 mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓	RFM	
8260 ENCORE	" ~~40~~ 5gm	2	✓		
	RFM				

Chain of Custody #: 116997
Shuttle ID: —
Trip Blank ID: FL-TB-1
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: [signature]

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: ~~SAW-9~~ CECIL FIELD

Sample ID: SB-9
Date: 6/4/98
Sampling Method: GRAB/ENCORE
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

12.5" CONCRETE

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-9	10:40	1-1.5'	DARK BR F SA

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs ENCORE	125 mL GLASS	1	✓		
8270 SVOCs	250 mL "	1	—		
6010/7470 Metals	250 mL PLASTIC	1	—		
8260 ENCORE	5gm Tome "	2	—		
	(REAR)				

Chain of Custody #: 117224
Shuttle ID: —
Trip Blank ID: ~~24~~ FL-TB-4
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Murphy Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: WEST OF 1845

Sample ID: SB-10
Date: 5/29/98
Sampling Method: ~~[illegible]~~ GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-10	1549	0.5-1	

Analysis	Container Type and Size	Quantity	Per Sample	Per Composite	Comments
8260 VOCs	GLASS 125	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓	RM	
8260 Encore	" ~~[illegible]~~ 5gm	2	✓	RFM	
	RFM				

Chain of Custody #: 116997
Shuttle ID: —
Trip Blank ID: FL-TB-1
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Morrill Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM/BMW
Sampling Location: INSIDE BMS

Sample ID: FL-SB-11
Date: 6/8/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-11	1500	2-2.5'	BR F SD

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓		
8260 EnCore	" ~~250~~ 5gm	2	—		
	(RFM)				

Chain of Custody #: 116989
Shuttle ID: —
Trip Blank ID: FL-TB-5
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph E. Mongillo Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM/BMW
Sampling Location: IMW-12
N SIDE OF BLDG 815

Sample ID: SB-12
Date: 6/8/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

1-1.5' SAMPLE TAKEN
10.5" OF CONCRETE

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-12	1135	1-1.5'	BR F SD

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125	1	✓		
8270 SVOCs	"	250	1			
6010/7470 Metals	PLASTIC	250	1	✓		
8260 ENCORE	"	Synth	2	✓		
		RFM				

Chain of Custody #: 116989
Shuttle ID: —
Trip Blank ID: FL-TB-5
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Moniell Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SMW-B

Sample ID: SB-13
Date: 6/2/98
Sampling Method: ~~Hand Auger~~ R Monkello
Type of Sampling Equipment: ~~Hand~~ AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
SB-13 FL	1055	1-2	BR F SD

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓	~~N~~ RFM	
8260 ENCORE	" ~~125~~ 5gm	2	✓		
	RFM				

Chain of Custody #: 116987
Shuttle ID: —
Trip Blank ID: FL-TB-2
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: [signature]

FN: g:\common\murray\forms\soilsamp.xls

Golder Associates

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: FL BLDG 815
FL-SB-14

Sample ID: FL-SB-14
Date: 6/12/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-14	1225	0.5-1.0'	BR F SD

Analysis	Container Type and Size	Quantity	Per Sample	Per Composite	Comments
8260 VOCs	GLASS 125	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	" 250	1	✓		
8260 Bulker	PLASTIC ~~40~~ 5gm	2	✓		

Chain of Custody #: 117211
Shuttle ID: —
Trip Blank ID: FL-TB-10
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph E. Mongille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SE CORNER OF 1845

Sample ID: SB-15
Date: 5/29/98
Sampling Method: ~~Hand Auger~~ GRAB
Type of Sampling Equipment: ~~Ralph F. Monyll Jr.~~ (RFM) HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

DUPLICATE

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL- SB-15	1655	(4-4.5')	
FL- DUP-1	1655	(4-4.5')	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125	2	✓		
8270 SVOCs	" 250	2	✓		
6010/7470 Metals	PLASTIC 250	2	✓	✓	
8260 TPH GRO	" 5gm	4	✓	(RFM)	
	(RFM)				

Chain of Custody #: 116957
Shuttle ID: —
Trip Blank ID: FL-TB-1
Lab Name: SAVANNAH
Air Bill #: ✓

REMARKS: DUPLICATE TAKEN

Field Team Leader: Ralph F. Monyll Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FL-SB-16 BLDG 815

Sample ID: FL-SB-16
Date: 6/9/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-16	825	0.5-1.0'	

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125 mL	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	PLASTIC	250	1	✓		
8260 ENCORE	"	~~40~~ 5gm	2	✓		
		RFM				

Chain of Custody #: 117225
Shuttle ID: —
Trip Blank ID: FL-TB-6
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Monzillo Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: BLDG 875

Sample ID: FL-SB-17
Date: 6/16/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-17	1345	0.5-1.0'	LOOSE BR F SD

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125	1	—		
8270 SVOCs	" 250	1	—		
6010/7470 Metals	PLASTIC 250	1	—		
8260 ENCORE	" 40 5gm	2	—		
	RFM				

Chain of Custody #: 117219
Shuttle ID: —
Trip Blank ID: FL-TB-9
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Charles F. Mongille Jr...

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: TOMW
Sampling Location: SW CORNER OF 815

Sample ID: FC-SB-18
Date: 6/9/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID #	Time Collected	Sample Depth Interva	Soil Description
FC-SB-18	1545	1-1.5'	BR F SD

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125 ml	1	✓		
8270 SVOCs	" 250 "	1	✓		
6010/7470 Metals	PLASTIC 250 "	1	✓		
8260 ENCORE	" ~~40~~ 5gm	2	✓		
	RFM				

Chain of Custody #: 117225
Shuttle ID: —
Trip Blank ID: FC-TB-6
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Robert F. Mongille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: SMW-19 FLIGHT LINE

Sample ID: FL-SB-19
Date: 6/12/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-19	1200	1.5-2'	TAN F SD

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	PLASTIC	250	1	✓		
8260 EN Cork	"	~~500~~ 5gm	2	✓		
		RGN				

Chain of Custody #: 117222
Shuttle ID: —
Trip Blank ID: FL-TB-8
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Mongillo Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: SMW-20 FLIGHT LINE

Sample ID: FL-SB-20
Date: 6/12/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND DIGGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-20	1018	1.5-2'	TAN F SD

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	PLASTIC	250	1	✓		
8260 ENCORE	"	~~5gm~~ 5gm	2	✓		
		REM				

Chain of Custody #: 117222
Shuttle ID: —
Trip Blank ID: FL-TB-8
Lab Name: SAVANNAH
Air Bill #: —

REMARKS: ALSO HAD AN EQUIP. BLANK FL-EQ-24 ON C.O.C.# 117222

Field Team Leader: Ralph F. Mongille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: FLIGHT LINE OF BLDG 815

Sample ID: FL-SB-21
Date: 6/11/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-21	1518	2-3'	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓		
8260 ENCORE	" ~~40~~ 5gm	2	✓		
	RFM				

Chain of Custody #: 117223
Shuttle ID: —
Trip Blank ID: FL-TB-7
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Mongille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW
Sampling Location: INSIDE 815 CECIL FIELD

Sample ID: FL-SB-22
Date: 6/17/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
6/17/98	1410	1-1.5'	BR F SD.

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	" 250	1	✓		
8260 EnCore	" 40 Sgm	2	✓		
	RFM				

Chain of Custody #: 117211
Shuttle ID: —
Trip Blank ID: FL-TB-10
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Moriglio Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: P. LOT

Sample ID: FC-SB-23
Date: 6/11/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID #	Time Collected	Sample Depth Interval	Soil Description
FC-SB-23	1715	0.5-1.0'	

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125mL	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	PLASTIC	250	1	✓		
8260 ENCORE	"	~~40~~ 5gm	2	✓		
		REM				

Chain of Custody #: 117223
Shuttle ID: —
Trip Blank ID: FC-TB-7
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Morgello Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: DMW
Sampling Location: FL-SB-24
815 P. LOT

Sample ID: FL-SB-24
Date: 6/16/98
Sampling Method: GR AB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-24	1035	1-1.5'	DARK BR F SD

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125	1	—		
8270 SVOCs	"	250	1	—		
6010/7470 Metals	PLASTIC	250	1	—		
8260 ENCORE	"	SyringE	2			
		RPM				

Chain of Custody #: 117219
Shuttle ID: —
Trip Blank ID: FL-TB-9
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Mongillo Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/ CECIL FIELD
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SW CORNER OF BUILDING 1845

Sample ID: FL-SB-25
Date: 6/10/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-25	15:50	0.25-0.5	BR SP

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8080	CLEAR GLASS 250ML	1	✓		

Chain of Custody #: 117226
Shuttle ID: —
Trip Blank ID: —
Lab Name: SAVANNAH LABS
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Murray Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC / CECIL FIELD
Project Number: 973-3778
Sampled by: RRM
Sampling Location: NW SIDE OF BUILDING 1845

Sample ID: FL-SB-26
Date: 6/10/99
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-26	15:40	0.25-0.50	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8080	CL GLASS 125ML	1	✓		

Chain of Custody #: 117226
Shuttle ID: —
Trip Blank ID: —
Lab Name: SAVANNAH LABS
Air Bill #: —

REMARKS: EQUIPMENT BLANK FL-EQ-PCB WAS COLLECTED @ 15:35

Field Team Leader: [illegible]

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: QF

Sample ID: FL-SB-27
Date: 6-4-98
Sampling Method: GRAB
Type of Sampling Equipment: Hand Auger

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-27	17:35	0.5-1.0	BR (SP-SM)

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	2/40mL ENCORE / 1-125mL GLASS	2/1	✓		
8270 SVOCs	250 mL GLASS	1	✓		
6010/7470 Metals	250 mL PLASTIC	1	✓		

Chain of Custody #: 117224
Shuttle ID: —
Trip Blank ID: FL-TB-4
Lab Name: SPUNDOPNAK
Air Bill #: —

REMARKS:

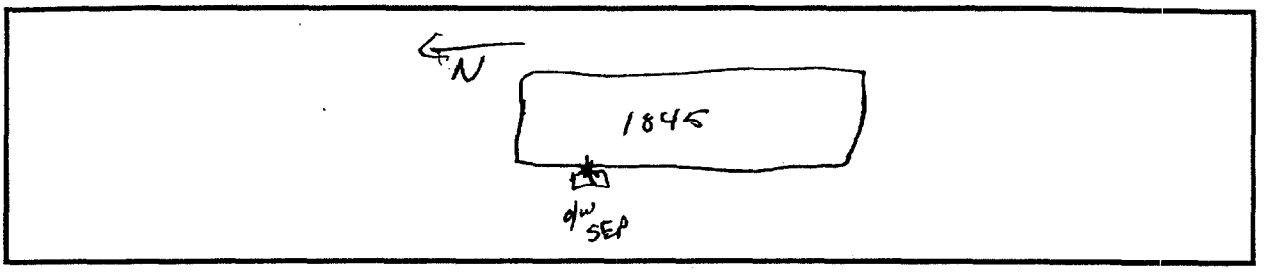
Field Team Leader: [illegible]

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: ~~FL-SB-28~~ CECIL FIELD

Sample ID: FL-SB-28
Date: 6/4/98
Sampling Method: ~~HA~~ GRAB
Type of Sampling Equipment: HA

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-28	12:25	5'-5.5'	Lite Brown SP

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comment
8260 VOCs	5gm 125 mL AMBER 2 ENCORE SAMPLES	2/1	✓		
8270 SVOCs	250 mL GLASS	1	✓		
6010/7470 Metals	250 mL PLASTIC	1	✓		

Chain of Custody #: 117224
Shuttle ID: —
Trip Blank ID: ~~FL-TB-4~~ FL-TB-4
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

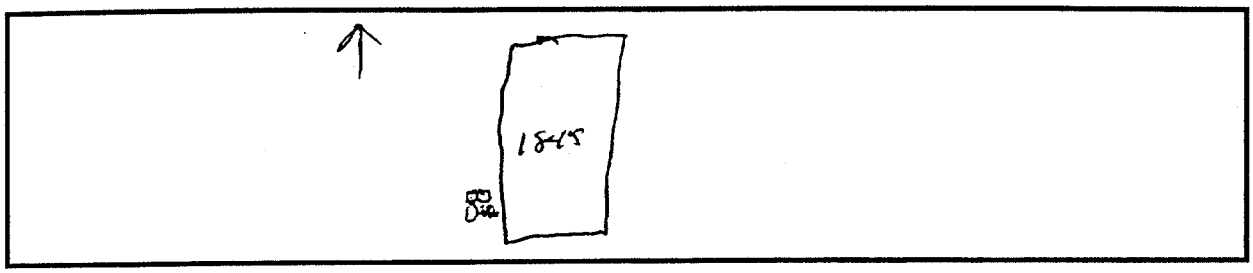
Field Team Leader: Ralph F. Mongille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RCM / BMW
Sampling Location: FL-SB-29

Sample ID: FL-SB-29
Date: 6/4/98
Sampling Method: GRAB
Type of Sampling Equipment: HA

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-29	14:20	5-5.5	Brown/Tan clayey sand
"		"	
"		"	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	125 ml AMBER GLASS ENCORE SAMPLER (Sys)	2/1	✓		
8270 SVOCs	250 ml GLASS	1	✓		
6010/7470 Metals	250 ml PLASTIC	1	✓		

Chain of Custody #: 117224
Shuttle ID:
Trip Blank ID: FL-TB4
Lab Name: SAVANNAH LABS
Air Bill #:

REMARKS: SAMPLED DU-2 @ this location

Field Team Leader: Ralph F. Mizell Jr.

FN: g:\common\murray\forms\soilsamp.xls

Golder Associates

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: S/S F.LINE

Sample ID: FL-SB-30
Date: 6/9/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-30	1245	1.5-2.0'	BR F SD.

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	PLASTIC	250	1	✓		
8260 EN/CORE	"	5gm	2	✓		
		RFM				

Chain of Custody #: 117225
Shuttle ID: —
Trip Blank ID: FL-TB-6
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

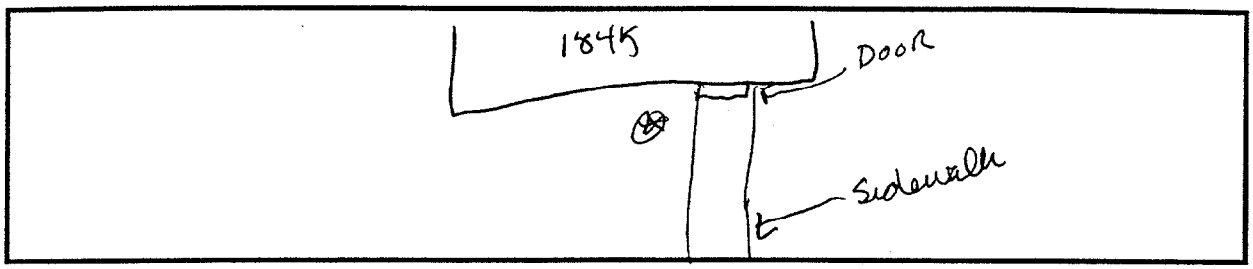
Field Team Leader: Ralph F. Morgille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: CECIL FIELD

Sample ID: FL-SB-31
Date: 6/8/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-31	16:20	0.5-1.0	GRAY/GRAYBROWN (SP)

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	5gm 2 ENCORE/125 ML AMB	2/1	✓		
8270 SVOCs	250 ML GLASS	1	✓		
6010/7470 Metals	250 ML PLASTIC	1	✓		

Chain of Custody #: 116989
Shuttle ID:
Trip Blank ID: FL-TB-5
Lab Name: SAVANNAH
Air Bill #:

REMARKS:

Field Team Leader: Ralph F. Mongillo Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: WASH RACK AREA

Sample ID: FL-SB-32
Date: 6/9/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-32	1440	1-1.5'	BR SP

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125mL	1	✓		
8270 SVOCs	"	250 "	1	✓		
6010/7470 Metals	PLASTIC	250 "	1	✓		
8260 ENCORE	"	5gm	2	✓		
		RFM				

Chain of Custody #: 117225
Shuttle ID: —
Trip Blank ID: FL-TB-6
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Mongille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: NW CORNER OF 815

Sample ID: SB-33
Date: 6/17/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-33	1705	1-1.5'	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125 mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓		
8260 ENCORE	" 5gm	2	✓		
	RFM				

Chain of Custody #: 117211
Shuttle ID: —
Trip Blank ID: FL-TB-10
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Mongille Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: REM
Sampling Location: WEST SIDE OF 815

Sample ID: FL-SB-34
Date: 6/9/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-34	1550	0.25-1'	

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125 mL	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	PLASTIC	250	1	✓		
8260 ENCORE	"	~~40~~ 5gm	2	✓		
		REM				

Chain of Custody #: 117225
Shuttle ID: —
Trip Blank ID: FL-TB-6
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

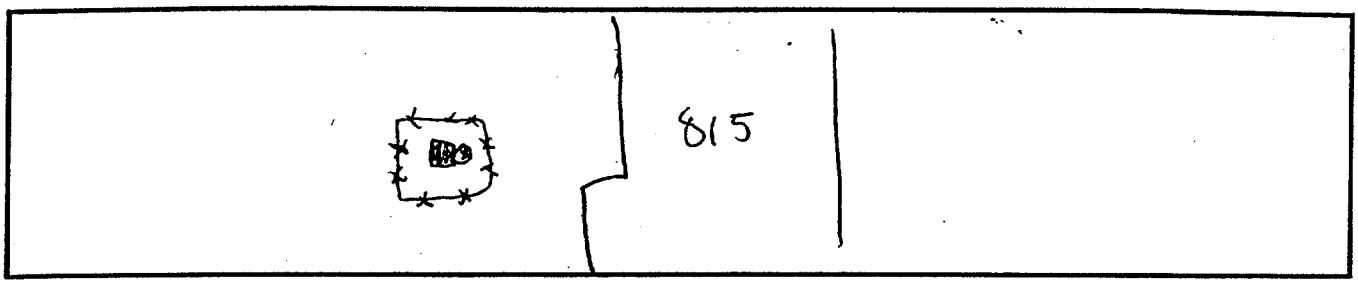
Field Team Leader: Ralph F. Moniglio Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/CECIL FIELD
Project Number: 973-3778
Sampled by: RFM
Sampling Location: INSIDE FENCED TRANS AREA NEAR 815

Sample ID: FL-SB-35
Date: 6/11/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-35	9:20	SURFACE	DK BR-BR (SP) W/ GRAVEL
			VISIBLE STAINING ON CONCRETE
			NEAR SAMPLE LOCATION

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8080	GLASS 125ML	1	✓		

Chain of Custody #: RFM ~~117223~~ 117223
Shuttle ID: —
Trip Blank ID: FL-TB-7
Lab Name:
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Morrill Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SW CORNER OF BLDG 815

Sample ID: FL-SB-36
Date: 6/11/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-36	1655	0.5-1.0'	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓		
8260 ENCORE	" 5gm	2	✓		
	RFM				

Chain of Custody #: 117223
Shuttle ID: —
Trip Blank ID: FL-TB-7
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Robert F. Monzibello Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SE CORNER OF 815

Sample ID: FL-SB-37
Date: 6/11/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-37	1600	2-3'	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓		
8260 ENCORE	" 40 5gm	2	✓		

Chain of Custody #: 117223
Shuttle ID: —
Trip Blank ID: FL-TB-7
Lab Name: SAVANNAH
Air Bill #: —

REMARKS: COLLECTED DUPLICATE @ SB-37 - FL-DUP-4 ON C.O.C. 117223

Field Team Leader: Ralph F. Moriglio Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: @ 815 BETWEEN LDN 566 & 309

Sample ID: FL-SB-38
Date: 6/11/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-38	1620	1-2'	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125 mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓		
8260 ENCORE	" ~~40~~ 5gm	2	✓		
	(RFM)				

Chain of Custody #: 117223
Shuttle ID: —
Trip Blank ID: FL-TB-7
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Monzillo Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: F. LINE BLDG. 815

Sample ID: SB-39
Date: 6/17/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-39	1400	1-1.5'	

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125mL	1			
8270 SVOCs	"	250	1			
6010/7470 Metals	PLASTIC	250	1			
8260 ENCORE	"	~~40~~ 5gm	2			
		RFM				

Chain of Custody #: 117211
Shuttle ID: —
Trip Blank ID: FL-TB-10
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Murgillo Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: F. LINE BLDG. 815

Sample ID: SB-40
Date: 6/17/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-40	1325	1-1.5'	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓		
8260 ENCORE	" ~~10~~ 5gm	2	✓		
	RFM				

Chain of Custody #: 117211
Shuttle ID: —
Trip Blank ID: FL-TB-10
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Morgillo Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: F. LINE
BLDG 815

Sample ID: SB-41
Date: 6/17/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-41	1300	1-1.5'	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	PLASTIC 250	1	✓		
8260 ENCORE	" ~~40~~ 5gm	2	✓		
	RFM				

Chain of Custody #: 117211
Shuttle ID: —
Trip Blank ID: FL-TB-10
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Murray Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: F.LINE 815

Sample ID: SB-42
Date: 6/17/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-42	1215	1-1.5'	

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125 mL	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	PLASTIC	250	1	✓		
8260 ENCORE	"	40 5gm	2	✓		
		(Rem)				

Chain of Custody #: 117211
Shuttle ID: —
Trip Blank ID: FL-TB-10
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Merrill Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: P. LOT

Sample ID: SB-43
Date: 6/18/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interva	Soil Description
FL-SB-43	1333	1-1.5'	GR BR SP

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125 mL	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	"	250	1	✓		
8261 ENCORE	PLASTIC	40 Sgm	2	✓		
		RFM				

Chain of Custody #: 117220
Shuttle ID: —
Trip Blank ID: FL-TB-11
Lab Name: SAVANNAH
Air Bill #: —

REMARKS: COLLECTED DUPLICATE @ FL-SB-43, FL-DUP-5, ALSO FL-EQ-3.

Field Team Leader: Ralph E. Wright Jr.

FN: g:\common\murray\forms\soilsamp.xls

Golder Associates

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: P. LOT

Sample ID: SB-44
Date: 6/18/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FC-SB-44	1455	1-1.5'	

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125 mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	" 250	1	✓		
8260 ENCORE	PLASTIC ~~40~~ 5gm	2	✓		
	(RFM)				

Chain of Custody #: 117220
Shuttle ID: —
Trip Blank ID: FC-TB-11
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Murphy Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: P. LOT

Sample ID: SB-45
Date: 6/18/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FL-SB-45	1435	1-1.5'	GR BR SP

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS 125mL	1	✓		
8270 SVOCs	" 250	1	✓		
6010/7470 Metals	" 250	1	✓		
8260 Enlore	PLASTIC 40 5gm	2	✓		
	RFM				

Chain of Custody #: 177220
Shuttle ID: —
Trip Blank ID: PC-TB-11
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Marigall Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: RFM
Sampling Location: P. LOT

Sample ID: SB-46
Date: 6/18/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
FC-SB-46	1400	1-1.5'	GR BR SP

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125 ML	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	"	250	1	✓		
8260 ENCORE	PLASTIC	~~40~~ 5gm	2	✓		

Chain of Custody #: 117220
Shuttle ID: —
Trip Blank ID: FC-TB-11
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

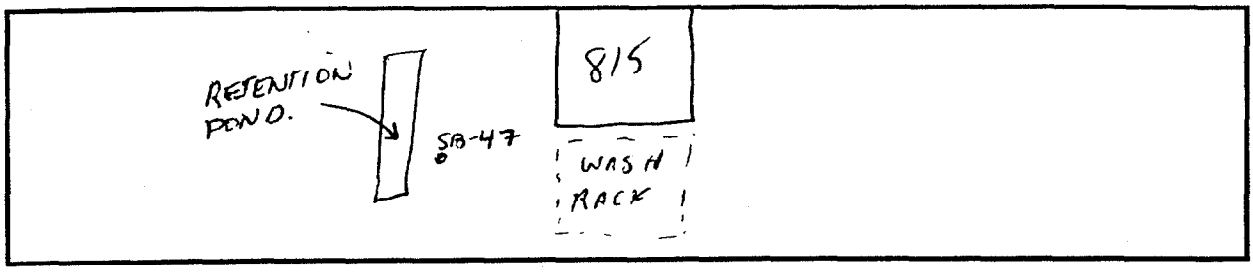
Field Team Leader: Ralph F. Murphy Jr.

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: BMW/RFM
Sampling Location: WEST OF WASH-RACK NEAR POND

Sample ID: FC-SB-47
Date: 6/17/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interva	Soil Description
FC-SB-47	1000	1-1.5'	

Analysis	Container Type and Size		Quantity	Per Sample?	Per Composite?	Comments
8260 VOCs	GLASS	125mL	1	✓		
8270 SVOCs	"	250	1	✓		
6010/7470 Metals	"	250	1	✓		
8260 ENCORE	PLASTIC	40.5gm	2	✓		
		RFM				

Chain of Custody #: 117211
Shuttle ID: —
Trip Blank ID: FC-TB-10
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

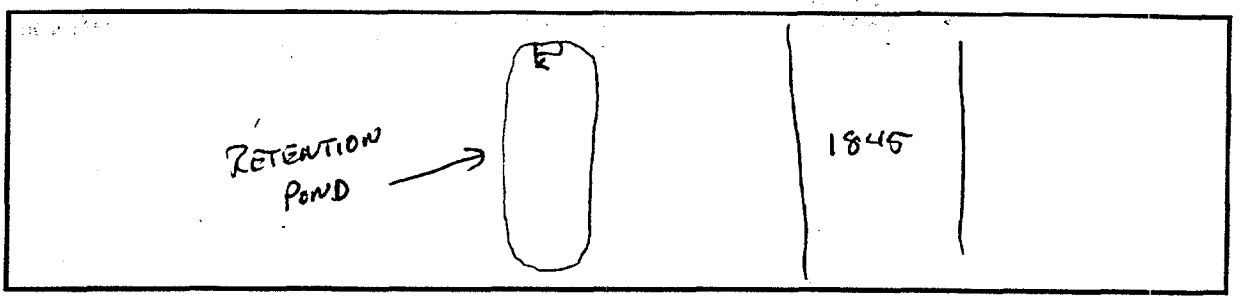
Field Team Leader: Ralph F. Monzillo Jr.

SURFACE WATER/SEDIMENT SAMPLE COLLECTION FORM

Project Name: NOC/CF/FL
Project Number: 973-3778
Sampled by: RFM
Sampling Location: NORTH OUTFALL OF RETENTION POND (1845)

Surface Water Sample ID: —
Sediment Sample ID: FL-SD-1
Date: 6/18/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interval	Description
FL-SD-1	16:05	0-0.5'	DK BR/BR SP w/ ABUND ORGAN

Analysis	Container, Type and Size	Quantity	Surface Water?	Sediment?	Comments
8260 VOCS	AMB GLASS 125ML	1		✓	
8270 SVOCS	CL GLASS 250ML	1		✓	
METALS	PLASTIC 250ML	1		✓	
8260 EWCOC	" " 5gm	2		✓	

Chain of Custody #: 117221
Shuttle ID: —
Trip Blank ID: FL-TB-11 ~~(SED/SURF)~~ (SOIL)
Lab Name: SAVANNAH
Air Bill #: —

REMARKS: FL-FQ-4 (SED/SURF) collected @ 15:33

RFM

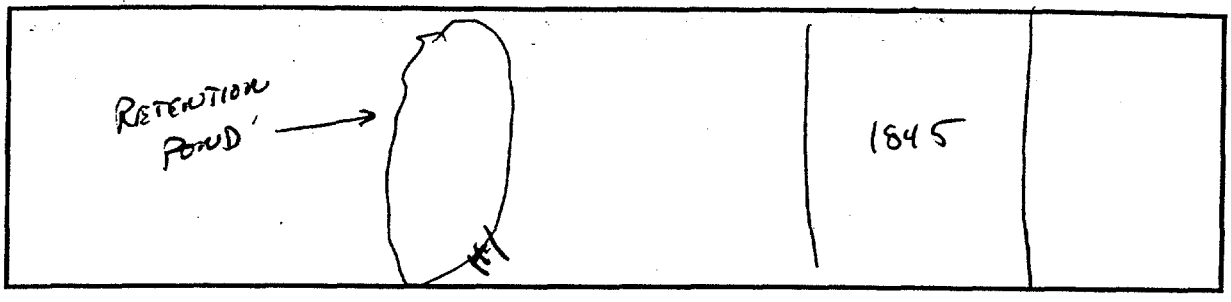
Field Team Leader: [signature]

SURFACE WATER/SEDIMENT SAMPLE COLLECTION FORM

Project Name: NGC / CF / FL
Project Number: 973-3778
Sampled by: RFM
Sampling Location: SE ~~[illegible]~~ OUTFALL OF RETENTION POND (1845)

Surface Water Sample ID: ——
Sediment Sample ID: FL-SD-2
Date: 6/18/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interval	Description
FL-SD-2	16:45	0-0.5	DK BR / BR (SB) w/ ABUND ORGAN

Analysis	Container Type and Size	Quantity	Surface Water?	Sediment?	Comments
8260 VOCS	AMB GLASS 125 mL	1		✓	
8270 SVOCS	CL GLASS 250 mL	1		✓	
METALS	PLASTIC 250 mL	1		✓	
8260 GROCLE	PLASTIC ENCORE 5 gm	2		✓	

Chain of Custody #: 117221
Shuttle ID: ——
Trip Blank ID: FL-TB-11 ~~(SED/SOIL)~~ SOIL (PAN)
Lab Name: SAVANNAH LAB
Air Bill #: ——

REMARKS:

Field Team Leader: [signature]

FN: g:\common\murray\forms\sw_samp.xls

Golder Associates

APPENDIX B-5

Soil Sample Collection Records – Confirmation Sampling Event

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Numb: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SB-8R
Date: 7/21/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-8R	1015	0.5-1.0'	BR F SA (SP)

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite	Comments
8260 VOCs	2 EnCore samplers + 4 oz glass jar for dry wt.				
	Samples will be split between 2 laboratories				

of Custody #:
Shuttle ID:
rip Blank ID:
Lab Name:
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

FN: g:\common\murray\forms\soilsamp.xls

Golder Associates

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Numb: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SB-15R
Date: 7/21/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-15R	1100	4-4.5'	BR F SD (3M)

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite	Comments
8260 VOCs	2 EnCore samplers + 4 oz glass jar for dry wt.				
8260 +	SODIUM BISULFATE				
	Samples will be split between 2 laboratories				

of Custody #:
Shuttle ID:
rip Blank ID:
Lab Name:
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Numb: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SB-31R
Date: 7/21/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-31R	1115	0.5 - 1.0'	LT BR F SD (SP)

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite	Comments
8260 VOCs	2 EnCore samplers + 4 oz glass jar for dry wt.				
	Samples will be split between 2 laboratories				

of Custody #:
Shuttle ID:
rip Blank ID:
Lab Name:
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

FN: g:\common\murray\forms\soilsamp.xls

Golder Associates

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Numb: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SB-34R
Date: 7/21/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-34R	1130	0.25 - 1.0'	LT BR F SD (SP)

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite	Comments
8260 VOCs	2 EnCore samplers + 4 oz glass jar for dry wt.				
	Samples will be split between 2 laboratories				

of Custody #:
Shuttle ID:
rip Blank ID:
Lab Name:
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Numb: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SB-9R
Date: 7/21/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-9R	1245	1-1.5'	GRAYISH BR F SD

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite	Comments
8260 VOCs	2 EnCore samplers + 4 oz glass jar for dry wt.				
	Samples will be split between 2 laboratories				

of Custody #:
Shuttle ID:
rip Blank ID:
Lab Name:
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

FN: g:\common\murray\forms\soilsamp.xls

Golder Associates

SOIL SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Numb: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SB-22R
Date: 7/21/98
Sampling Method: GRAB
Type of Sampling Equipment: HAND AUGER

SAMPLE COLLECTION LOCATION SKETCH:

Sample ID	Time Collected	Sample Depth Interval	Soil Description
SB-22R	1330	1-1.5'	BR FSD

Analysis	Container Type and Size	Quantity	Per Sample?	Per Composite	Comments
8260 VOCs	2 EnCore samplers + 4 oz glass jar for dry wt.				
	Samples will be split between 2 laboratories				

of Custody #:
Shuttle ID:
rip Blank ID:
Lab Name:
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

FN: g:\common\murray\forms\soilsamp.xls

Golder Associates

APPENDIX B-6

Equipment Calibration Records

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Instrument (Name/Model No./Serial No.): H-NV PC 101 #201198 MSR

Manufacturer H-NV

MSR ~~Golder~~ ID No. #201198

Calibration Date	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
5/29/98	0.0	ISOBUT 91.0 ppm	TO 91.0 ppm	0.0	Bmw	@1228

FN: g:\common\murray\forms\fldcalrd.doc

Ralph F. Mongille Jr.

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Instrument (Name/Model No./Serial No.): H-NU / PL-101 / 201198 (MSR)

Manufacturer H-NU

Golder ID No. — ~~[illegible]~~ MILCO SAFETY RENTAL

Calibration Date	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
6/1/98	SPAN GAS 91.0	ISOBUTYLENE/91 ppm	—	0.0	BMW	H-NU CALIB @ 91 ppm
6/2/98	SPAN GAS 91.0	" "	—	0.0	BMW	"
6/3/98	SPAN GAS 91.0	" "	—	0.0	BMW	"
6/3/98	SPAN GAS 91.0	" "	RE-CALIB.	0.0	BMW	"
6/4/98	"	" "	INITIAL CALIB	0.0	BMW	"
6/4/98	"	" "	1120 AM RE-CALIB	0.0	BMW	"
6/5/98	"	" "	INITIAL CALIB	0.0	BMW	"

FN: g:\common\murray\forms\fldcalrd.doc

Randolph F. Morzillo Jr.

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/CCF/FC 815

Project Number: 973-3778.403

Date: 6/8/98

Instrument (Name/Model No./Serial No.): H-NU PC 101

Calibration Standard Manufacturer: PINE ENVIRO.

Manufacturer H-NU

Lot Numbers:

Serial No. #201198 MSR (MILCO SAFETY RENTAL)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1054	0.0	ISOBUTYLENE 91.0 PPM	TO 91.0 PPM	BACK TO 0.0	BMW	
1430	0.0	"	"	"	"	

FN: g:\common\murray\forms\fldcalrd.doc

RALPH F. MONGILLO JR.

Name: R. WOJCIK

Signature: Ralph F. Mongillo Jr.

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NOC/CF/FC P15

Project Number: 973-3778.403

Date: 6/9/98

Instrument (Name/Model No./Serial No.):

Calibration Standard Manufacturer: PINE ENVIRO.

Manufacturer: H-NU PL 101

Lot Numbers:

Serial No. #201198 (MSR)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
715	0.0	ISOBUTYLENE 91.0 PPM	TO 91.0 TO CALIB	BACK TO 0.0	BMW	

FN: g:\common\murray\forms\fldcalrd.doc

RALPH F. MORGILLO JR

Name: R. WOTUK

Signature: Ralph F. Morgillo Jr.

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/CF/FL 815

Project Number: 923-3778.403

Date: 6/10/98

Instrument (Name/Model No./Serial No.):

Calibration Standard Manufacturer: PINE ENVIRO

Manufacturer H-NU PL 101

Lot Numbers:

Serial No. 201198 (MSA)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1315	0.0	ISOBUTYLENE 91.0 PPM	TO 91.0 TO CALIB	BACK TO 0.0	BKW	

FN: g:\common\murray\forms\fldcalrd.doc

Name: R. WOJCIK (RALPH F. MONGILLO JR)

Signature: Robert Wojcik (Ralph F. Mongillo Jr.)

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: N&C / CF / FC

Project Number: 973.3778.403

Date: 6/11/98

Instrument (Name/Model No./Serial No.): H-NU PL 101

Calibration Standard Manufacturer: PINE ENVIRO.

Manufacturer

Lot Numbers:

Serial No. # 201198 (MSR)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
900	0.0	ISOBUT. 91.0 ppm	TO 91.0	0.0	BMW	
1125	0.0	ISOBUT 91.0 ppm	TO 91.0	0.0	BMW	

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Name: ROBERT WATZIK

Signature: Robert M. Watzik

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NBC / OIL / FL

Project Number: 973-3778.403

Date: 6/12/98

Instrument (Name/Model No./Serial No.): HNU PI101

Calibration Standard Manufacturer: PINE ENVIRON.

Manufacturer

Lot Numbers:

Serial No. #201198 (MSR)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
945	0.0	ISOBUTYLENE 91.0 PPM	TO 91.0 PPM	0.0	BMW	

FN: g:\common\murray\forms\fldcalrd.doc

Name: R. Wojtke (RALPH F. MONGELLO JR)

Signature: Robert Wojtke (Ralph F. Mongello Jr.)

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC Cecil Field

Project Number: 973-3778

Date: 6/15/98

Instrument (Name/Model No./Serial No.): HNU PI 101

Calibration Standard Manufacturer: PINE ENVIRON.

Manufacturer

Lot Numbers:

Serial No. #201198 (MSR)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1249	0.0	Isobutylene 91.0 ppm	to 91.0	0.0	KM	

FN: g:\common\murray\forms\fldcalrd.doc

RALAH F. MONGILLO JR

Name: R. WOJCIK

Signature: Ralph F. Mongillo Jr.

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: WGC/OF/FL 515

Project Number: 923-3778.403

Date: 6/16/97

Instrument (Name/Model No./Serial No.): CO-NO

Calibration Standard Manufacturer: PINE ENVIRON.

Manufacturer PC 101

Lot Numbers: —

Serial No. #201188 (MSA)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
750	0.0	100 BVT. 91.0 PPM	TO 91.0	0.0	BMW	
1320	0.0	"	RECALIBRATE	0.0	BMW	

FN: g:\common\murray\forms\fldcalrd.doc

Name: RALPH F. MONGILLO JR F. WATTER

Signature: Ralph F. Mongillo Jr...

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/CF/FL 815

Project Number: 973-2228.403

Date: 6/17/98

Instrument (Name/Model No./Serial No.):

Calibration Standard Manufacturer: PINE ENVIRO.

Manufacturer H-NU 8c 101

Lot Numbers:

Serial No. 201198 (MSR)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
750	0.0	ISOBUTYLENE 91.0 PPM	TO 91.0	0.0	BMW	
1200	0.0	ISOBUTYLENE 91.0 PPM	RECALIB. TO 91.0	0.0	BMW	

FN: g:\common\murray\forms\fldcalrd.doc

Name: RALPH F. MORGILLO JR K. Watsik

Signature: Ralph F. Morgillo Jr. Robert Wojcik

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC / CF / PL

Project Number: 973-3778

Date: 6/18/98

Instrument (Name/Model No./Serial No.): H-NU PL 101

Calibration Standard Manufacturer: PINE ENVIRO

Manufacturer

Lot Numbers:

Serial No. #201198 (MSR)

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1144	0.0	1308UF. 91 ppm	TO 91.0	0.0	REM	

FN: g:\common\murray\forms\fldcalrd.doc

RALPH F. MONGELLO JR

Name: RALPH MONGELLO

Signature: Ralph F. Mongello Jr.

APPENDIX C

Field Documentation – Groundwater Sampling Program

APPENDIX C-1

Well Development Records

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: SMW-1
Project Number: 973-3778
Monitoring Well Installation Date: 5/28/98
Monitoring Well Developed By:
Monitoring Well Completion Date: 5/28/98

Development Start Date: 5/28/98
Development Start Time: 1425
Development Finish Date: 5/28/98
Development Finish Time: 1455

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: / ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: NM gal/ft
Column of Water in Well: NM feet
Volume of Water in Well: <2.5 gallons
Well Volumes to Remove: 10 +
Min. Volume to be Removed: 50 gallons
Method of Development: C.PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1435	1445	1455			
Volume Removed (gal.):	15	30	45			
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):	133	12.7	0.25			
:						

Average Pumping Rate: 1.5 gal/min
Total Volume Removed: 45 gallons

REMARKS: 45 GALLONS / 30 MIN.

Field Team Leader: B. Wright / Ralph F. Morgan Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: IMW-1
Project Number: 973-3778
Monitoring Well Installation Date: 5/28/98
Monitoring Well Developed By: HUSS
Monitoring Well Completion Date: 5/28/98

Development Start Date: 5/29/98
Development Start Time: 1237
Development Finish Date: 5/29/98
Development Finish Time: 1420

PRE DEVELOPMENT

Total Depth of Well: 37 ft TOC
Initial Depth to Water: 6.97 ft TOC
Column of Water in Well: 30.03 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 30.03 feet
Volume of Water in Well: 4.9 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6	
Time:	1250	1301	1317	1333	1340	1346	1420
Volume Removed (gal.):	15	25	40	60	70	80	120
pH:							
Specific Conductance (μmhos/cm):							
Temperature (Degrees C):							
Turbidity (ntu):	177.8	175.6	172.8	104.4	93.0	70.1	76.2
:							

Average Pumping Rate: 1.2 gal/min
Total Volume Removed: 120 gallons

REMARKS: 103 MINUTES / 120 GALLONS
STABILIZED @ ~70 NTU

Field Team Leader: R. Ulojik / Ralph F. Mangilli Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: DMW-1
Project Number: 973-3778
Monitoring Well Installation Date: 5/28/98
Monitoring Well Developed By: HUSS
Monitoring Well Completion Date: 5/28/98

Development Start Date: 5/29/98
Development Start Time: 1153
Development Finish Date: 5/29/98
Development Finish Time: 1231

PRE DEVELOPMENT

Total Depth of Well: 48 ft TOC
Initial Depth to Water: 6 ft TOC
Column of Water in Well: 42 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2" inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: 42 feet
Volume of Water in Well: 6.72 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes ~~No~~

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1202	1205	1212	1217	1222	1231
Volume Removed (gal.):	30	55	85	110	140	190
pH:	—	—				
Specific Conductance (μmhos/cm):	—	—				
Temperature (Degrees C):	—	—				
Turbidity (ntu):	172.0	172.0	176.4	133.6	87.0	0.28
:						

Average Pumping Rate: 5.0 gal/min
Total Volume Removed: 190 gallons

REMARKS: 190 GAL / 38 MIN.

Field Team Leader: R. Wojtek / Ralph F. Mangelli Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: MUSS

Monitoring Well ID: SMW-2
Monitoring Well Installation Date: 5/29/98
Monitoring Well Completion Date: 5/29/98

Development Start Date: 5/29/98
Development Finish Date: 5/29/98

Development Start Time: 715
Development Finish Time: 930

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: DRY ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: <2.3 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	920	925	930			
Volume Removed (gal.):	15	40	55			
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):	179.7	107.2	0.65			
:						

Average Pumping Rate: 3.6 gal/min
Total Volume Removed: 55 gallons

REMARKS: 55 GALLONS / 15 MIN

Field Team Leader: R. Wagner / Ralph F. Morrillo Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HUSS

Monitoring Well ID: DMW-2
Monitoring Well Installation Date: 6/1/98
Monitoring Well Completion Date: 6/1/98

Development Start Date: 6/2/98
Development Finish Date: 6/2/98

Development Start Time: 905
Development Finish Time: 934

PRE DEVELOPMENT

Total Depth of Well: 48 ft TOC
Initial Depth to Water: ≈7 ft TOC
Column of Water in Well: ≈41 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: ≈41 feet
Volume of Water in Well: 6.56 gallons
Well Volumes to Remove: >10
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes ~~NO~~

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	911	916	922	927	934	
Volume Removed (gal.):	45	80	150	205	260	
pH:	—					
Specific Conductance (μmhos/cm):	—					
Temperature (Degrees C):	—					
Turbidity (ntu):	298	112	70.4	35.3	3.9	
:						

Average Pumping Rate: 9 gal/min
Total Volume Removed: 260 gallons

REMARKS:

Field Team Leader: B. Wright / Ralph F. Moniglia Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: SMW-3
Project Number: 973-3778
Monitoring Well Installation Date: 6/2/98
Monitoring Well Developed By: 11 VSS
Monitoring Well Completion Date: 6/2/98

Development Start Date: 6/2/98
Development Start Time: 1430
Development Finish Date: 6/2/98
Development Finish Time: 1456

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: 4 ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: <2.3 gallons
Well Volumes to Remove: +10
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1436	1442	1447	1451	1456	
Volume Removed (gal.):	15	30	40	45	55	
pH:	–					
Specific Conductance (μmhos/cm):	–					
Temperature (Degrees C):	–					
Turbidity (ntu):	581.0	62.3	21.4	13.4	7.91	
:						

Average Pumping Rate: 2.1 gal/min
Total Volume Removed: 55 gallons

REMARKS: VERY TURBID & BROWN @ START OF DEVELOPMENT.

Field Team Leader: B. Wojcik / Ralph E. Monitto Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HUSS

Monitoring Well ID: IMW-3
Monitoring Well Installation Date: 6/4/98
Monitoring Well Completion Date: 6/4/98

Development Start Date: 6/5/98
Development Finish Date: 6/5/98

Development Start Time: 1205
Development Finish Time: 1255

PRE DEVELOPMENT

Total Depth of Well: 38' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: 6.38 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: ~6.38 feet
Volume of Water in Well: ~6.1 gallons
Well Volumes to Remove: 10 +
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6		
Time:	1212	1220	1225	1231	1237	1243	1249	1255
Volume Removed (gal.):	50	100	150	200	250	300	350	400
pH:	–							
Specific Conductance (μmhos/cm):	–							
Temperature (Degrees C):	–							
Turbidity (ntu):	122	43.2	28.8	22.8	19.2	16.8	14.0	10.5
:								

Average Pumping Rate: 8 gal/min
Total Volume Removed: 400 gallons

REMARKS:

Field Team Leader: B. Wagoil / Ralph F. Morrillo Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: DMW-3
Project Number: 973-3778
Monitoring Well Installation Date: 6/4/98
Monitoring Well Developed By: HVSS
Monitoring Well Completion Date: 6/4/98

Development Start Date: 6/5/98
Development Start Time: 1058
Development Finish Date: 6/5/98
Development Finish Time: 1158

PRE DEVELOPMENT

Total Depth of Well: 50' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <50 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <50 feet
Volume of Water in Well: 8.0 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes NO

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6		
Time:	1108	1116	1123	1132	1140	1146	1150	1158
Volume Removed (gal.):	50	100	150	200	250	280	300	350
pH:	—	—	—	—				
Specific Conductance (μmhos/cm):	—	—	—	—				
Temperature (Degrees C):	—	—	—	—				
Turbidity (ntu):	203	118	67.0	40.7	24.8	29.3	25.4	23.0
:								

Average Pumping Rate: 5.8 gal/min
Total Volume Removed: 350 gallons

REMARKS:

Field Team Leader: L. Wojcik / Ralph F. Morgillo Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HVSS

Monitoring Well ID: SMW-4
Monitoring Well Installation Date: 5/29/98
Monitoring Well Completion Date: 5/29/98

Development Start Date: 5/29/98
Development Finish Date: 5/29/98

Development Start Time: 1122
Development Finish Time: 1136

PRE DEVELOPMENT

Total Depth of Well: 14 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1126	1131	1136			
Volume Removed (gal.):	15	40	55			
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):	>200	58.6	8.2			
:						

Average Pumping Rate: 3.9 gal/min
Total Volume Removed: 55 gallons

REMARKS: 55 gal / 14 min

Field Team Leader: R. Wojcik / Ralph F. Mongillo Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: SMW-5
Project Number: 973-3778
Monitoring Well Installation Date: 6/4/98
Monitoring Well Developed By: NUSS
Monitoring Well Completion Date: 6/4/98

Development Start Date: 6/4/98
Development Start Time: 850
Development Finish Date: 6/4/98
Development Finish Time: 920

PRE DEVELOPMENT

Total Depth of Well: 14 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	855	900	904	910	915	920
Volume Removed (gal.):	15	40	60	80	95	110
pH:	—	—				
Specific Conductance (μmhos/cm):	—	—				
Temperature (Degrees C):	—	—				
Turbidity (ntu):	851	160.1	42.4	15.3	10.20	6.3
:						

Average Pumping Rate: 3.7 gal/min
Total Volume Removed: 110 gallons

REMARKS:

Field Team Leader: B. Wright / Ralph F. Murphy Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HUSS

Monitoring Well ID: SMW-6
Monitoring Well Installation Date: 6/3/98
Monitoring Well Completion Date: 6/3/98

Development Start Date: 6/3/98
Development Finish Date: 6/3/98

Development Start Time: 1553
Development Finish Time: 1627

PRE DEVELOPMENT

Total Depth of Well: 14' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1557	1602	1608	1611	1622	1627
Volume Removed (gal.):	15	30	45	55	80	95
pH:	—	—				
Specific Conductance (μmhos/cm):	—	—				
Temperature (Degrees C):	—	—				
Turbidity (ntu):	985	221	22.3	16.2	22.0	8.65
:						

Average Pumping Rate: 2.8 gal/min
Total Volume Removed: 95 gallons

REMARKS: STOPPED & RESTARTED AFTER 55 GALLONS

Field Team Leader: B. Wojcik / Ralph F. Morrisette Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NEC/CF/FL 1845
Project Number: 973-3778.203
Monitoring Well Developed By: NUSS

Monitoring Well ID: SMW-7
Monitoring Well Installation Date: 5/27/98
Monitoring Well Completion Date: 5/27/98

Development Start Date: 5/27/98
Development Finish Date: 5/27/98

Development Start Time: 1210
Development Finish Time: 12:40

PRE DEVELOPMENT

Total Depth of Well: 14.0 ft TOC
Initial Depth to Water: 6.0 ft TOC
Column of Water in Well: 8.0 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: .16 gal/ft
Column of Water in Well: 8 feet
Volume of Water in Well: 1.28 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:						
Volume Removed (gal.):						
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):						
:						

Average Pumping Rate: 1.375 gal/min
Total Volume Removed: 41.0 gallons

REMARKS: 3/4 55 GAL DRUM 30 MIN.
CLEAR, NO FINES AFTER DEVELOPMENT
NO ACCESS TO TURBITY METER.

Field Team Leader: R. Wojcik / Ralph F. Morgillo Jr.

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/CF/FL 845
Project Number: 973-3778.203
Monitoring Well Developed By: HUSS

Monitoring Well ID: SMW-8
Monitoring Well Installation Date: 5/27/98
Monitoring Well Completion Date: 5/27/98

Development Start Date: 5/27/98
Development Finish Date: 5/27/98

Development Start Time: 13:37
Development Finish Time: 14:01

PRE DEVELOPMENT

Total Depth of Well: 14 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 30-50 + gallons
Method of Development: C. DUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:						
Volume Removed (gal.):						
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):						
:						

Average Pumping Rate: 1.375 gal/min
Total Volume Removed: 41.0 gallons

REMARKS: 3/4 55 GAL DRUM / 30 MIN.
CLEAR, NO FINES AFTER DEVELOPMENT
NO ACCESS TO A TURBIDITY METER

Field Team Leader: B. Wojcik / Ralph F. Morrille Jr.

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: AVS5

Monitoring Well ID: SMW-9
Monitoring Well Installation Date: 6/4/98
Monitoring Well Completion Date: 6/4/98

Development Start Date: 6/4/98
Development Finish Date: 6/4/98

Development Start Time: 1128
Development Finish Time: 1248

PRE DEVELOPMENT

Total Depth of Well: 14 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6	
Time:	1139	1148	1200	1207	1216	1240	1248
Volume Removed (gal.):	15	30	40	50	65	75	100
pH:	—						
Specific Conductance (μmhos/cm):	—						
Temperature (Degrees C):	—						
Turbidity (ntu):	174.5	32.8	23.1	19.6	16.2	23.0	15.0
:							

Average Pumping Rate: 1.25 gal/min
Total Volume Removed: 100 gallons

REMARKS: PUMPED VERY SLOWLY

Field Team Leader: R. Wojcik / Ralph F. Murphy Jr...

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HUSS

Monitoring Well ID: SMW-10
Monitoring Well Installation Date: 5/28/98
Monitoring Well Completion Date: 5/28/98

Development Start Date: 5/28/98
Development Finish Date: 5/28/98

Development Start Time: 1600
Development Finish Time: 1625

PRE DEVELOPMENT

Total Depth of Well: 14' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14' feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (NO)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1605	1615	1625			
Volume Removed (gal.):	10	55	80			
pH:	–	–				
Specific Conductance (μmhos/cm):	–	–				
Temperature (Degrees C):	–	–				
Turbidity (ntu):	177.8	31.5	0.42			
:						

Average Pumping Rate: 4. gal/min
Total Volume Removed: 80 gallons

REMARKS: 80 GALLONS / 20 MIN

Field Team Leader: B. Wojcik / Ralph F. Morgillo Jr...

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: SMW-11
Project Number: 973-3778
Monitoring Well Installation Date: 6/8/98
Monitoring Well Developed By: RJSS
Monitoring Well Completion Date: 6/8/98

Development Start Date: 6/8/98
Development Start Time: 1611
Development Finish Date: 6/8/98
Development Finish Time: 1648

PRE DEVELOPMENT

Total Depth of Well: 14' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1619	1624	1633	1635	1644	1646
Volume Removed (gal.):	15	25	45	50	65	70
pH:	–					
Specific Conductance (μmhos/cm):	–					
Temperature (Degrees C):	–					
Turbidity (ntu):	58.0	32.3	31.7	17.0	11.35	8.70
:						

Average Pumping Rate: 1.9 gal/min
Total Volume Removed: 70 gallons

REMARKS:

Field Team Leader: B. Wöpcke / Ralph E. Mayille Jr...

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HVSS

Monitoring Well ID: SMW-12
Monitoring Well Installation Date: 6/5/98
Monitoring Well Completion Date: 6/5/98

Development Start Date: 6/5/98
Development Finish Date: 6/5/98

Development Start Time: 825
Development Finish Time: 927

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: ~6 ft TOC
Column of Water in Well: 8.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2" inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: 8.5 feet
Volume of Water in Well: 1.36 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	840	847	857	907	918	927
Volume Removed (gal.):	25	35	50	75	90	100
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):	69.4	39.1	25.4	20.1	18.5	18.6
:						

Average Pumping Rate: 1.6 gal/min
Total Volume Removed: 100 gallons

REMARKS: STRONG SULPHER ODOR.

Field Team Leader: K. Wagoner / Ralph F. Morgan Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: EMW-12
Project Number: 973-3778
Monitoring Well Installation Date: 6/8/98
Monitoring Well Developed By: HUSS
Monitoring Well Completion Date: 6/8/98

Development Start Date: 6/10/98
Development Start Time: 11 46
Development Finish Date: 6/10/98
Development Finish Time: 12 41

PRE DEVELOPMENT

Total Depth of Well: 38 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <38 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <38 feet
Volume of Water in Well: 6.10 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C.Pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6	
Time:	1201	1212	1218	1224	1230	1237	1241
Volume Removed (gal.):	100	200	250	300	350	425	450
pH:							
Specific Conductance (μmhos/cm):							
Temperature (Degrees C):							
Turbidity (ntu):	135	48.0	37.0	33.1	27.8	25.0	
:							

Average Pumping Rate: 8.2 gal/min
Total Volume Removed: 450 gallons

REMARKS:

Field Team Leader: R. Wojcik / Ralph F. Mongille Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HUSS

Monitoring Well ID: DMW-12
Monitoring Well Installation Date: 6/4/98
Monitoring Well Completion Date: 6/4/98

Development Start Date: 6/5/98
Development Finish Date: 6/5/98

Development Start Time: 938
Development Finish Time: 1027

PRE DEVELOPMENT

Total Depth of Well: 50 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <50 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2" OD inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <50 feet
Volume of Water in Well: 8.0 gallons
Well Volumes to Remove: 10 +
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP (RIG)
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	943	950	955	1001	1004	1009
Volume Removed (gal.):	70	90	150	200	250	300
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):	940	371	106	66	49.5	36.1
:						

Average Pumping Rate: 11.2 gal/min
Total Volume Removed: 550 gallons

REMARKS: TIME:	1013	1018	1022	1027	1031
NTU:	31.5	27.3	29.0	22.2	20.3
GAL:	350	400	450	500	550

Field Team Leader: R. Wojcik / Ralph F. Murphy Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: SMW-13
Project Number: 973-3778
Monitoring Well Installation Date: 6/2/98
Monitoring Well Developed By: HUSS
Monitoring Well Completion Date: 6/2/98

Development Start Date: 6/2/98
Development Start Time: 1150
Development Finish Date: 6/2/98
Development Finish Time: 1214

PRE DEVELOPMENT

Total Depth of Well: 14' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1156	1201	1208	1214		
Volume Removed (gal.):	15	25	35	~55		
pH:	—					
Specific Conductance (μmhos/cm):	—					
Temperature (Degrees C):	—					
Turbidity (ntu):	122.2	34.2	8.96	8.47		
:						

Average Pumping Rate: 2.3 gal/min
Total Volume Removed: 55 gallons

REMARKS: INITIAL DEVEL. WATER VERY TURBID & BROWN, MOSTLY FINES. <10 @ 35 GALLONS CONTINUED TO PURGE A FULL 55 GALLON DRUM

Field Team Leader: B. Wagirk / Ralph F. Mongillo Jr.

All wells will be allowed to equilibrate at least 24 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

6/17

Project Name: NGC/Cecil Field
Monitoring Well ID: BMW-~~28~~ 14 (BMW)
Project Number: 973-3778
Monitoring Well Installation Date: 6/17/98
Monitoring Well Developed By: MVSS
Monitoring Well Completion Date: 6/17/98

Development Start Date: 6/17/98
Development Finish Date: 6/17/98
Development Start Time: 1308
Development Finish Time: 1321

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1311	1316	1321			
Volume Removed (gal.):	20	30	55			
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):	61.6	16.3	7.8			
:						

Average Pumping Rate: 4.2 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: L. Wojcik / Robert F. Moughler Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC / CF / FC 1845
Project Number: 973-378.203
Monitoring Well Developed By: HUSS

Monitoring Well ID: SMW-15
Monitoring Well Installation Date: 5/27/98
Monitoring Well Completion Date: 5/27/98

Development Start Date: 5/27/98
Development Finish Date: 5/27/98

Development Start Time: 1527
Development Finish Time: 1557

PRE DEVELOPMENT

Total Depth of Well: 13 ft TOC
Initial Depth to Water: 5 ft TOC
Column of Water in Well: 8 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2" inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: 8 feet
Volume of Water in Well: 1.28 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:						
Volume Removed (gal.):						
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):						
:						

Average Pumping Rate: 1.0 gal/min
Total Volume Removed: 30 gallons

REMARKS: 30 GALLONS / 30 MIN
NO PID AVAIL. FOR MONITORING
NO TURBIDITY METER

Field Team Leader: B. Wojcik / Ralph F. Mongelli Jr...

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HVSS

Monitoring Well ID: SMW-46
Monitoring Well Installation Date: 6/9/98
Monitoring Well Completion Date: 6/9/98

Development Start Date: 6/9/98
Development Finish Date: 6/9/98

Development Start Time: 812
Development Finish Time: ~~825~~ 845

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: 14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	825	845				
Volume Removed (gal.):	20	50				
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):	5.44	5.01				
:						

Average Pumping Rate: 0.6 gal/min
Total Volume Removed: 50 gallons

REMARKS: TOTAL OF 50 GALLONS

Field Team Leader: B. Wojcik / Ralph F. Mingle Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: JVS

Monitoring Well ID: SMW-17
Monitoring Well Installation Date: 6/16/98
Monitoring Well Completion Date: 6/16/98

Development Start Date: 6/16/98
Development Finish Date: 6/16/98

Development Start Time: 1447
Development Finish Time: 1517

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: ~~14.5~~ NA ft TOC
Column of Water in Well: < 14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1458	1509	1517			
Volume Removed (gal.):	20	40	55			
pH:	–					
Specific Conductance (μmhos/cm):	–					
Temperature (Degrees C):	–					
Turbidity (ntu):	10.37	7.6	7.5			
:						

Average Pumping Rate: 1.8 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: B. Wright / Ralph C. Mingle Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HVSS

Monitoring Well ID: SMW-18
Monitoring Well Installation Date: 6/9/98
Monitoring Well Completion Date: 6/9/98

Development Start Date: 6/9/98
Development Finish Date: 6/9/98

Development Start Time: 954
Development Finish Time: 1039

PRE DEVELOPMENT

Total Depth of Well: 14' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1039					
Volume Removed (gal.):	50					
pH:						
Specific Conductance (μmhos/cm):						
Temperature (Degrees C):						
Turbidity (ntu):	5.95					
:						

Average Pumping Rate: 1.1 gal/min
Total Volume Removed: 50 gallons

REMARKS:

Field Team Leader: L. Wopat / Ralph F. Moriello Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: IMW-18
Project Number: 973-3778
Monitoring Well Installation Date: 6/10/98
Monitoring Well Developed By: HVSS
Monitoring Well Completion Date: 6/10/98

Development Start Date: 6/11/98
Development Start Time: 835
Development Finish Date: 6/11/98
Development Finish Time: 952

PRE DEVELOPMENT

Total Depth of Well: 30.5' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: < 30.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <30.5 feet
Volume of Water in Well: 4.88 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes / No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6			
Time:	845	851	856	905	910	914	924	931	~~937~~
Volume Removed (gal.):	50	75	100	150	175	200	250	300	325
pH:	—								
Specific Conductance (μmhos/cm):	—								
Temperature (Degrees C):	—								
Turbidity (ntu):	120	72.4	62.3	59.4	48.2	49.5	54.8	45.0	46.5
:									

Average Pumping Rate: 5.2 gal/min
Total Volume Removed: 400 gallons

REMARKS:
time: 942 952
Gallons: 350 400
NTU: 45.3 59.0

Field Team Leader: R. Wojcik / Ralph F. Morgillo Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: DMW-18
Project Number: 973-3778
Monitoring Well Installation Date: 6/9/98
Monitoring Well Developed By: HUSS
Monitoring Well Completion Date: 6/9/98

Development Start Date: 6/10/98
Development Start Time: 1022
Development Finish Date: 6/10/98
Development Finish Time: 1134

PRE DEVELOPMENT

Total Depth of Well: 48.5 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <48.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <48.5 feet
Volume of Water in Well: 7.76 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~1000~~ 80 gallons
Method of Development: G. PUMP
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6			
Time:	1040	1050	1100	1106	1110	1116	11:22	11:26	11
Volume Removed (gal.):	150	250	325	400	450	500	550	575	600
pH:	—								
Specific Conductance (μmhos/cm):	—								
Temperature (Degrees C):	—								
Turbidity (ntu):	450	140.	123	82.3	64.5	106.5	66.8	55.0	52.6
:									

Average Pumping Rate: 9 gal/min
Total Volume Removed: 650 gallons

REMARKS: 625 – 47.1
650 – 48.0

Field Team Leader: R. Wojcik / Ralph F. Mongillo Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By:

Monitoring Well ID: SMW 19
Monitoring Well Installation Date: 6/12/98
Monitoring Well Completion Date: 6/12/98

Development Start Date: 6/15/98
Development Finish Date: 6/15/98

Development Start Time: 1543
Development Finish Time: 1610

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2' inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1550	1559	1610			
Volume Removed (gal.):	20	35	55			
pH:	—					
Specific Conductance (μmhos/cm):	—					
Temperature (Degrees C):	—					
Turbidity (ntu):	86.2	35.6	8.5			
:						

Average Pumping Rate: 2 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: R. Wagner / Ralph F. Mongille Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: Hubb

Monitoring Well ID: SMW20
Monitoring Well Installation Date: 6/12/98
Monitoring Well Completion Date: 6/12/98

Development Start Date: 6/15/98
Development Finish Date: 6/15/98

Development Start Time: ~~1548~~ 1505
Development Finish Time: 1530

PRE DEVELOPMENT

Total Depth of Well: 15 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <15 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <15 feet
Volume of Water in Well: 2.40 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1512	1515	1530			
Volume Removed (gal.):	20	27	55			
pH:	—	—	—			
Specific Conductance (μmhos/cm):	—	—	—			
Temperature (Degrees C):	—	—	—			
Turbidity (ntu):	30.0	13.38	6.19			
:						

Average Pumping Rate: 2.2 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: R. Wojtek / Robert F. Mungitt Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HLSS

Monitoring Well ID: SMW-21
Monitoring Well Installation Date: 6/11/98
Monitoring Well Completion Date: 6/11/98

Development Start Date: 6/15/98
Development Finish Date: 6/15/98

Development Start Time: 1400
Development Finish Time: 1433

PRE DEVELOPMENT

Total Depth of Well: 15 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <15 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: ~~0.176~~ 0.163 gal/ft
Column of Water in Well: <15 feet
Volume of Water in Well: 2.44 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 25 gallons
Method of Development: Centrifugal Pump
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1426	1430	1433			
Volume Removed (gal.):	25	45	55			
pH:	—	—				
Specific Conductance (μmhos/cm):	—	—				
Temperature (Degrees C):	—	—				
Turbidity (ntu):	55.0	9.51	9.01			
:						

Average Pumping Rate: 1.7 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: R. Wojcik / Ralph E. Mangilli Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

RMW 6/17

Project Name: NGC/Cecil Field
Monitoring Well ID: SMW-~~29~~22
Project Number: 973-3778
Monitoring Well Installation Date: 6/17/98
Monitoring Well Developed By: RJSS
Monitoring Well Completion Date: 6/17/98

Development Start Date: 6/17/98
Development Start Time: 1515
Development Finish Date: 6/17/98
Development Finish Time: 1552

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1525	1538	1552			
Volume Removed (gal.):	15	30	55			
pH:	–					
Specific Conductance (µmhos/cm):	–					
Temperature (Degrees C):	–					
Turbidity (ntu):	20.4	6.9	4.54			
:						

Average Pumping Rate: 1.5 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: R. Wojcik / Ralph F. Monzillo Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HVSS

Monitoring Well ID: SMW-23
Monitoring Well Installation Date: 6/16/98
Monitoring Well Completion Date: 6/16/98

Development Start Date: 6/16/98
Development Finish Date: 6/16/98

Development Start Time: 930
Development Finish Time: 955

PRE DEVELOPMENT

Total Depth of Well: 14.5' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	939	947	955			
Volume Removed (gal.):	25	40	55			
pH:	—					
Specific Conductance (μmhos/cm):	—					
Temperature (Degrees C):	—					
Turbidity (ntu):	15.7	10.8	8.75			
:						

Average Pumping Rate: 2.2 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: R. Wofik / Ralph F. Monzillo Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: IMW-23
Project Number: 973-3778
Monitoring Well Installation Date: 6/11/98
Monitoring Well Developed By: HVSS
Monitoring Well Completion Date: 6/11/98

Development Start Date: 6/12/98
Development Start Time: 808
Development Finish Date: 6/12/98
Development Finish Time: 900

PRE DEVELOPMENT

Total Depth of Well: 33' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <33.0 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <33 feet
Volume of Water in Well: 5.28 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	820	829	839	849	900	
Volume Removed (gal.):	50	100	150	200	250	
pH:	—	—				
Specific Conductance (μmhos/cm):	—	—				
Temperature (Degrees C):	—	—				
Turbidity (ntu):	127.2	89.1	60.3	37.8	36.2	
:						

Average Pumping Rate: 4.8 gal/min
Total Volume Removed: 250 gallons

REMARKS:

Field Team Leader: R. Wojcik / Ralph E. Morgille Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: DMW-23
Project Number: 973-3778
Monitoring Well Installation Date: 6/10/98
Monitoring Well Developed By: HVSS
Monitoring Well Completion Date: 6/10/98

Development Start Date: 6/12/98
Development Start Time: 726
Development Finish Date: 6/12/98
Development Finish Time: 802

PRE DEVELOPMENT

Total Depth of Well: 48 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <48 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <48 feet
Volume of Water in Well: 7.68 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	736	744	7:53	802		
Volume Removed (gal.):	50	100	150	200		
pH:	—					
Specific Conductance (μmhos/cm):	—					
Temperature (Degrees C):	—					
Turbidity (ntu):	198	199	25.0	0.3		
:						

Average Pumping Rate: 5.6 gal/min
Total Volume Removed: 200 gallons

REMARKS:

Field Team Leader: R. Wojcik / Ralph F. Morrille Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: HVSS

Monitoring Well ID: SMW-24
Monitoring Well Installation Date: 6/10/98
Monitoring Well Completion Date: 6/10/98

Development Start Date: 6/10/98
Development Finish Date: 6/10/98

Development Start Time: 1123
Development Finish Time: 1226

PRE DEVELOPMENT

Total Depth of Well: 14.5' ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2" inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes No

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1143	1200	1226			
Volume Removed (gal.):	20	35	55			
pH:	—	—	—			
Specific Conductance (μmhos/cm):	—	—	—			
Temperature (Degrees C):	—	—	—			
Turbidity (ntu):	13.1	6.1	5.2			
:						

Average Pumping Rate: 0.9 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: B. Wojcik / Ralph C. Morgitt Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Monitoring Well ID: SMW-25
Project Number: 973-3778
Monitoring Well Installation Date: 6/16/98
Monitoring Well Developed By: RVS
Monitoring Well Completion Date: 6/16/98

Development Start Date: 6/16/98
Development Start Time: 1648
Development Finish Date: 6/16/98
Development Finish Time: 1718

PRE DEVELOPMENT

Total Depth of Well: 19 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14 feet
Volume of Water in Well: 2.24 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1700	1709	1718			
Volume Removed (gal.):	25	40	55			
pH:	—	—				
Specific Conductance (μmhos/cm):	—	—				
Temperature (Degrees C):	—	—				
Turbidity (ntu):	4.64	3.74	3.86			
:						

Average Pumping Rate: 1.8 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: R. Wagoth / Ralph F. Morgillo Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By: 11VSS

Monitoring Well ID: SMW-26
Monitoring Well Installation Date: 6/17/98
Monitoring Well Completion Date: 6/17/98

Development Start Date: 6/17/98
Development Finish Date: 6/17/98

Development Start Time: 848
Development Finish Time: 910

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 52 gallons
Method of Development: C. PUMP
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	853	859	906	910		
Volume Removed (gal.):	15	30	40	55		
pH:	—	—				
Specific Conductance (μmhos/cm):	—	—				
Temperature (Degrees C):	—	—				
Turbidity (ntu):	49.1	31.6	2.92	2.18		
:						

Average Pumping Rate: 2.5 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: R. Wojcik / Ralph F. Mangilli Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

MONITORING WELL DEVELOPMENT FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Monitoring Well Developed By:

Monitoring Well ID: SMW-27
Monitoring Well Installation Date: 6/17/98
Monitoring Well Completion Date: 6/17/98

Development Start Date: 6/17/98
Development Finish Date: 6/17/98

Development Start Time: 1112
Development Finish Time: 1148

PRE DEVELOPMENT

Total Depth of Well: 14.5 ft TOC
Initial Depth to Water: NM ft TOC
Column of Water in Well: <14.5 ft

DEVELOPMENT CALCULATIONS

Casing Inside Diameter: 2 inches
Casing Volume: 0.16 gal/ft
Column of Water in Well: <14.5 feet
Volume of Water in Well: 2.32 gallons
Well Volumes to Remove: 10+
Min. Volume to be Removed: ~~100~~ 50 gallons
Method of Development: C. Pump
Well Purged Dry?: Yes (No)

WELL DEVELOPMENT DATA

	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Volume 6
Time:	1120	1127	1136	1143	1148	
Volume Removed (gal.):	15	25	35	45	55	
pH:	—	—				
Specific Conductance (μmhos/cm):	—	—				
Temperature (Degrees C):	—	—				
Turbidity (ntu):	98.1	31.3	28.2	28.3	28.8	
:						

Average Pumping Rate: 1.5 gal/min
Total Volume Removed: 55 gallons

REMARKS:

Field Team Leader: R. Wagoke / Ralph F. Mangello Jr.

All wells will be allowed to equilibrate at least 2 hours prior to sampling!

APPENDIX C-2

Groundwater and Surface Water Sample Collection Records

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denoso w/r
Sampling Location: Cecil Field

Sample ID: FL-ABB-5
Date: 6/12/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: ~~FL-ABB-5~~ MD 1200

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15.5 ft TOC
Depth to Water: 6.99 ft TOC
Column of Water in Well: 8.51 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.51 feet
Volume of Water in Well: 1.39 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.2 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Cloudy - brown

WELL PURGE DATA

well allowed to recharge

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	945	950	955	959	1134	1200
Volume Removed (gal.):	2	4	4.5	5	6	
pH:	5.45	5.74	5.71			
Specific Conductance (μmhos/cm):	110.0	115.2	122.9			
Temperature (Degrees C):						
Turbidity (ntu):	194.7	190	260	306	738	1101
:						

noted on COC

Starting Purge Time: 943 / 1134
Ending Purge Time: 1136
Average Purge Rate: gal/min
Total Volume Purged: gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	2 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	No	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 5
Shuttle ID:
Trip Blank ID: MD 5
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: Purged dry - H_2O still cloudy.

Field Team Leader: Kelly Murray

Well Pumped dry 2 times.
Let well recharge and sample.

K. Murray

Note: Metals/SVOCs collected thru pump; VOCs filled by gravity from tubing per M. Jordan. Well was bailed & could not

FN: g:\common\murray\forms\sampfrm3.xls

Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: JC. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FC-ABB-6
Date: 6/12/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: ~~FC-ABB-6~~ 1115 MJ

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 16.0 ft TOC
Depth to Water: 7.01 ft TOC
Column of Water in Well: 8.99 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.99 feet
Volume of Water in Well: 1.46 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Cloudy brown

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1012	1015	1017	1020	1031	1039
Volume Removed (gal.):	1	2	5	7	12	16
pH:	5.68	5.82	5.83	–	–	–
Specific Conductance (μmhos/cm):	139.3	156.8	137.7	–	–	–
Temperature (Degrees C):						
Turbidity (ntu):	80.3	1215	1316	1047	1035	111
:						

9 10 11 12 13 14
1055 1100 1104 1109 1114 1115
36 40 43 44 45 47
43.3 15.88 184.3 561 549 232

7 8
1045 105
24 2
104 96

Starting Purge Time: 1011
Ending Purge Time: 1115
Average Purge Rate: 0.73 gal/min
Total Volume Purged: ~47 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 5
Shuttle ID:
Trip Blank ID: 5
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: ~~Noted on COC~~

Field Team Leader: Kelly Murray

Note: Teflon tubing had been left in well from a previous sampling effort

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

CEF-16-19S

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-ABB-7
Date: 6/12/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: ~~FL-ABB-7~~ MD 1252

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 17.07 ft TOC
Depth to Water: 7.98 ft TOC
Column of Water in Well: 9.09 ft

VOLUME OF WATER TO BE PURGED

Screened Interval → 7-BL
TOC elev 77.61 NGVD

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 9.09 feet
Volume of Water in Well: 1.48 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.45 gallons
Method of Purging: Peristaltic pump
Well Purged Dry? Yes / No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1239	1243	1246	1248	1250	1251
Volume Removed (gal.):	2	4	6	8	9	9.5
pH:	4.65	4.69	4.67	4.61		
Specific Conductance (μmhos/cm):	64.5	66.1	64.0	64.6		
Temperature (Degrees C):						
Turbidity (ntu):	750	28.3	45.8	5.79	5.73	5.80
:						

Starting Purge Time: 1237
Ending Purge Time: 1252
Average Purge Rate: 0.67 gal/min
Total Volume Purged: 10 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 5
Shuttle ID:
Trip Blank ID: 5
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: Bailer had been left in well by ABB

Field Team Leader: Kelly Murray

K Murray

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray/M. Denoxowicz
Sampling Location: Cecil Field

Sample ID: FL-ABR-8
Date: 6/12/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: ~~FL-ABR-8~~ MD 1342

Screened Interval 91-101 BLS

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 102.71 ft TOC
Depth to Water: 7.17 ft TOC
Column of Water in Well: 95.54 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 95.54 feet
Volume of Water in Well: 15.57 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 47 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

TOC elev = 77.95 NGVD

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1236	1241	1305	1324	1329	1341
Volume Removed (gal.):	2	4	19	36	41	50
pH:	5.35	5.45	5.58	—	—	—
Specific Conductance (μmhos/cm):	101.1	~~[illegible]~~ 99	113.1	—	—	—
Temperature (Degrees C):						
Turbidity (ntu):	18.71	5.26	76.4	10.55	9.91	9.80
:						

Starting Purge Time: 1234
Ending Purge Time: 1342
Average Purge Rate: 0.74 gal/min
Total Volume Purged: ~~45~~ 50 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 5
Shuttle ID:
Trip Blank ID: 5
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

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Golder Associates

For BLD 815

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-ABB-9
Date: 6/11/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1315

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.0 ft TOC
Depth to Water: 6.10 ft TOC
Column of Water in Well: 7.9 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.9 feet
Volume of Water in Well: 1.29 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 3.9 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Metals-Clear / Vols & SVOC - Lt Grey

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6		
Time:	1241	1244	1247	1253	1255	1300	1302	13
Volume Removed (gal.):	3	7	9	13	15	19	21	2
pH:	6.00	6.13	6.18	—	—	—	—	—
Specific Conductance (µmhos/cm):	558	601	566	—	—	—	—	—
Temperature (Degrees C):								
Turbidity (ntu):	109.4	100.9	65.9	33.1	31.5	17.5	13.41	12.
:								

1308 1311 1313 1315
26 28 29 31
11.66 11.68 10.44 9.93

Starting Purge Time: 1238
Ending Purge Time: 1315
Average Purge Rate: 0.84 gal/min
Total Volume Purged: 4.31 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	23		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 4
Shuttle ID:
Trip Blank ID: 4
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

Note: COULD NOT GET TURBIDITY LOW over Pumped 10 Well Volume

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: M. Demasovich / E. Murray
Sampling Location: Cecil

Sample ID: FL-ABB-10
Date: 6/11/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1218

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15.0 ft TOC
Depth to Water: 5.90 ft TOC
Column of Water in Well: 9.1 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 9.1 feet
Volume of Water in Well: 1.48 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.44 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Metals - Clear / VOCs & SVOC - Lt Grey

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1112	1115	1117	1120	1123	1125
Volume Removed (gal.):	3	6	9	11	13	15
pH:	5.48	5.70	5.68	–	–	–
Specific Conductance (μmhos/cm):	219	243	225	–	–	–
Temperature (Degrees C):						
Turbidity (ntu):	123.7	79.8	65.6	66.80	34.5	33.3
:						

1147 1148 1150 1153
25 29 31
76.5 48.0 40.9 45.5

1129 1142
17 2:
35.2 145.

1155 1158 1200 1204 ~~1206~~
33 36 38 40 42
38.7 34.0 36.9 35.7 39.5

Starting Purge Time: 1109
Ending Purge Time: 1214
Average Purge Rate: 0.75 gal/min
Total Volume Purged: 57 gallons
~50

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	2 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	10	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

1209 1212
44 46
43.3 33.2
1214 1217
50 52
48 41.5

Chain of Custody #: 4
Shuttle ID:
Trip Blank ID: 4
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: H_2O smells like Sulfur
Had to stop purging @ 20 Gal to dump purged H_2O resumed @ 1143

Field Team Leader: Kelly Murray

K Murray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: E Murray
Sampling Location: Cecil Field
1845 Washrack

Sample ID: FL-MW-2
Date: 6/8/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1553

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 48.5 ft TOC
Depth to Water: 6.76 ft TOC
Column of Water in Well: 41.74 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 41.74 feet
Volume of Water in Well: 6.80 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 20.5 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes ~~No~~

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1524	1534	1542	1552		
Volume Removed (gal.):	6	12	18	24		
pH:	5.19	5.28	5.09	5.14		
Specific Conductance (μmhos/cm):	144.6	136.8	129.0	129.3		
Temperature (Degrees C):						
Turbidity (ntu):	5.31	2.68	2.29	2.20		
:						

Starting Purge Time: 1515
Ending Purge Time: 1553
Average Purge Rate: 0.63 gal/min
Total Volume Purged: 24 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	23	No	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 1
Shuttle ID:
Trip Blank ID: TB-1 (gw)
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: ~~[illegible]~~ MGD

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-3
Date: 6/9/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 954

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.00 ft TOC
Column of Water in Well: 8.5 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.5 feet
Volume of Water in Well: 1.39 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 5 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes / No

Appearance of Sample: Metals - Clear SVOCs VOCs - Brown

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6	
Time:	935	937	941	944	947	951	954
Volume Removed (gal.):	1.5	4	7	9	13	18	20
pH:	4.69	4.60	4.55	–			
Specific Conductance (μmhos/cm):	97	95	94	–			
Temperature (Degrees C):							
Turbidity (ntu):	585	646	534	61.2	44.1	16.98	7.81
:							

Starting Purge Time: 933
Ending Purge Time: 954
Average Purge Rate: 0.95 gal/min
Total Volume Purged: ~20 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 2
Shuttle ID:
Trip Blank ID: TB-2
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: Kelly Murray / M. Denosowitz
Sampling Location: (ecil Field
1845 Washrack

Sample ID: FL-IMW-2
Date: 6/8/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1720

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 38.5 ft TOC
Depth to Water: ~~38.5~~ 6.75 ft TOC
Column of Water in Well: 31.75 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 31.75 feet
Volume of Water in Well: 5.18 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 16 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear - Sulfur Odor

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6	
Time:	1645	1654	1658	1702	1704	1708	1714 1717
Volume Removed (gal.):	5	12	13	16	17	18	22 24
pH:	5.78	5.85	–	5.71	5.66	–	–
Specific Conductance (μmhos/cm):	292	251	–	206	189	–	–
Temperature (Degrees C):				–			–
Turbidity (ntu):	557	84	47.9	34.1	30.2	24.0	36 14.50
:							

Starting Purge Time: 1640
Ending Purge Time: 1720
Average Purge Rate: 0.60 gal/min
Total Volume Purged: 24 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 1
Shuttle ID:
Trip Blank ID: TB-1 (SW)
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

FN: g:\common\murray\forms\sampfrm3.xls

Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

For Bld 1845

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray/M. Demosowicz
Sampling Location: Cecil Field

Sample ID: FL-IMW-1
Date: 6/16/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1452

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 37.5 ft TOC
Depth to Water: 7.57 ft TOC
Column of Water in Well: 29.93 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 29.93 feet
Volume of Water in Well: 4.88 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 15 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: SVOC VOCs Metals - Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1416	1434	1442	1448	1450	
Volume Removed (gal.):	7	14	20	23	25	
pH:	~~116.3~~ 5.65	5.51	5.51			
Specific Conductance (μmhos/cm):	116.3	113.0	107.1			
Temperature (Degrees C):						
Turbidity (ntu):	49	16	14.09	9.34	8.70	
:						

Starting Purge Time: 1405
Ending Purge Time: 1452
Average Purge Rate: 0.53 gal/min
Total Volume Purged: 25 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 7
Shuttle ID:
Trip Blank ID: 7
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: Dup 4

Field Team Leader: Kelly Murray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Dewasowicz
Sampling Location: 1845

Sample ID: FL-SMW-1
Date: 6/8/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1342

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 7.20 ft TOC
Column of Water in Well: 7.3 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.3 feet
Volume of Water in Well: 1.2 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: ~4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1330	1334	1338			
Volume Removed (gal.):	1.5	2.5	6			
pH:	4.23	4.32	4.41			
Specific Conductance (μmhos/cm):	132.1	136.6	124.5			
Temperature (Degrees C):						
Turbidity (ntu):	26.5	4.72	2.00			
:						

Starting Purge Time: 1329
Ending Purge Time: 1342
Average Purge Rate: 0.44 gal/min
Total Volume Purged: ~4 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	No	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #:
Shuttle ID:
Trip Blank ID: TB-1 (gw)
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

Kelly Murray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denoso
Sampling Location: Cecil Field

Sample ID: FL-SMW-5
Date: 6/9/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1318

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 7.02 ft TOC
Column of Water in Well: 7.48 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.48 feet
Volume of Water in Well: 1.22 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes / No

Appearance of Sample: Metals: VOCs - Clear / SVOC - light Grey

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1305	1309	1311	1315	1317	
Volume Removed (gal.):	4	7	10	14	16	
pH:	4.66	4.76	4.73	—	—	
Specific Conductance (μmhos/cm):	76.7	81.9	82.9	—	—	
Temperature (Degrees C):						
Turbidity (ntu):	134.8	42.6	21.1	8.65	8.10	
:						

Starting Purge Time: 1301
Ending Purge Time: 1318
Average Purge Rate: 0.94 gal/min
Total Volume Purged: 16 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 2
Shuttle ID:
Trip Blank ID: TB-2
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name:	NGC/Cecil Field	Sample ID:	FL-SMW-4
Project Number:	973-3778	Date:	6/9/98
Sampled by:	K. Murray/M. Denosowicz	Sampling Method:	bailer/pump
Sampling Location:	Cecil Field	Type of Sampling Equipment:	stainless steel/poly
		Time of Sample Collection:	1120

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well:	14.5	ft TOC
Depth to Water:	7.10	ft TOC
Column of Water in Well:	7.4	ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter:	2	inches
Casing Volume:	0.163	gal/ft
Column of Water in Well:	7.4	feet
Volume of Water in Well:	1.2	gallons
Minimum Well Volumes to Purge:	3	
Min. Volume to be Purged:	4	gallons
Method of Purging:	Peristaltic pump	
Well Purged Dry?:	Yes No	

Appearance of Sample: Metals - Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1058	1059	1102	1107	1108	1109
Volume Removed (gal.):	2	3	4	7	10	11
pH:	4.81	4.70	4.68	—	—	—
Specific Conductance (μmhos/cm):	98	106	105	—	—	—
Temperature (Degrees C):						
Turbidity (ntu):	187.5	400	130.6	78.3	30.8	23.7
:						

1116 1119
18 22
— —
— —
9.2 2.67

1111 111
13 1
— —
— —
29.5 2

Starting Purge Time: 1055
Ending Purge Time: 1120

Average Purge Rate: 0.88 gal/min
Total Volume Purged: ~22 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 2
Shuttle ID:
Trip Blank ID: 2 TB-2
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: Well was not locked

Field Team Leader: Kelly Murray

K Murray

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray
Sampling Location: Cecil Field 1845 Washrack

Sample ID: F[illegible]-SMW-2
Date: 6/9/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: [illegible]30

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.37 ft TOC
Column of Water in Well: 8.13 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 13 feet
Volume of Water in Well: .33 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear - Sulfur Odor

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	823	827	829			
Volume Removed (gal.):	1.5	3	5			
pH:	4.85	4.93	5.06			
Specific Conductance (μmhos/cm):	237	165	151			
Temperature (Degrees C):						
Turbidity (ntu):	34.6	5.52	8.88			
:						

Starting Purge Time: 821
Ending Purge Time: 830
Average Purge Rate: C .50 gal/min
Total Volume Purged: 5 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 2
Shuttle ID:
Trip Blank ID: TB-2 (sp)
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: DUP-1

Field Team Leader: Kelly Murray

K. Murray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: 1845

Sample ID: FL-BMW-1
Date: 6/8/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1250

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 48.5 ft TOC
Depth to Water: 7.47 ft TOC
Column of Water in Well: 41.83 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 41.83 feet
Volume of Water in Well: 6.69 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 20 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1220	1227	1241	1250		
Volume Removed (gal.):	6	12	18	24		
pH:	4.78	4.42	5.15	5.06		
Specific Conductance (μmhos/cm):	162	158.5	174.6	182.5		
Temperature (Degrees C):						
Turbidity (ntu):	8.45	ND ~~6.1525~~	0.78	0.59		
:						

Starting Purge Time: 1156
Ending Purge Time: 1250
Average Purge Rate: 0.44 gal/min
Total Volume Purged: ~~11~~ 24 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3 3	No	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 1
Shuttle ID:
Trip Blank ID: TB-1 (GW)
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

K Murray

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-DMW-3
Date: 6/10/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1257

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 50.5 ft TOC
Depth to Water: 6.13 ft TOC
Column of Water in Well: 44.37 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 44.37 feet
Volume of Water in Well: 7.23 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 22 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear at Sampling

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1104	1113	1143	1148	1154	1208
Volume Removed (gal.):	7	14	21	24	28	31
pH:	5.68	5.64	5.76	–		
Specific Conductance (μmhos/cm):	436	323	180	–		
Temperature (Degrees C):						
Turbidity (ntu):	Note 1	Note 1	41.9	58.9	46.7	50.6
:						

1217 1221 1226 1230 1212
36 39 41 45 33
– 16.9 ~~21.5~~
34.2 27.4 27.1 1238 1240 1241
1234 1236 54 55 42.5
48 50 52
15.31 14:45 13.09 12.88 12.98
1245 1248 1250
59 61
66 51
11.30 10.95
1255
1258 60
63
10.25 9.62

Starting Purge Time: 1055
Ending Purge Time: 1257
Average Purge Rate: 0.54 gal/min
Total Volume Purged: ~26 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	ND	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 3
Shuttle ID:
Trip Blank ID: 3
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: 1) Developing crew has turbidity meter

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Demosowicz
Sampling Location: Cecil Field

Sample ID: FL-IMW-3
Date: 10/10/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1456

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 38.5 ft TOC
Depth to Water: 6.13 ft TOC
Column of Water in Well: 32.4 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 32.4 feet
Volume of Water in Well: 5.27 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 16 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Metals - Clear / VOCs & SVOC - lt. Brown

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1414	1421	1427	1432	1435	1438 1440
Volume Removed (gal.):	5	10	15	18	19 20	22 24
pH:	5.60	5.70	5.7	–	–	
Specific Conductance (µmhos/cm):	110.2	94.0	103.8	–	–	
Temperature (Degrees C):						
Turbidity (ntu):	59.0	42.1	31.5	25.1	18.97	17.77 16.52
:						

14 1446 1448 1450 1452 1454
26 20 29 31 33 36
9.94 11.81 11.81 13.37 14.19 16.3

Starting Purge Time: 1408
Ending Purge Time: 1456
Average Purge Rate: 0.75 gal/min
Total Volume Purged: 4.32 gallons 26

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 3
Shuttle ID:
Trip Blank ID: 3
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

K. Murray

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-7
Date: 6/9/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1605

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 7.44 ft TOC
Column of Water in Well: 7.06 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.06 feet
Volume of Water in Well: 1.15 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample:

WELL PURGE DATA

1602 1403 1604
21 22 23
– – –
10.59 8.31 8.37

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6	
Time:	1545	1548	1550	1553	1555	1558	1600
Volume Removed (gal.):	~~6.43~~ 4	6	8	12	14	17	18
pH:	6.43	6.57	6.60	–	–	–	
Specific Conductance (μmhos/cm):	423	439	444	–	–	–	
Temperature (Degrees C):							
Turbidity (ntu):	660	114	127.9	112.2	61.2	34.6	15.36
:							

Starting Purge Time: 1542
Ending Purge Time: 1605
Average Purge Rate: 1.00 gal/min
Total Volume Purged: ~~17~~ 23 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 2
Shuttle ID:
Trip Blank ID: TB-2
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

K Murray

8 9 1 0 11

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-8
Date: 6/10/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 900

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 13.5 ft TOC
Depth to Water: 6.53 ft TOC
Column of Water in Well: 6.97 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 6.97 feet
Volume of Water in Well: 1.14 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6	
Time:	847	849	852	854	856	858	859 13
Volume Removed (gal.):	2	4	7	9	10	12	
pH:	5.41	5.32	5.27	–	–	–	
Specific Conductance (μmhos/cm):	156.3	117.5	115.3	–	–	–	
Temperature (Degrees C):							
Turbidity (ntu):	45.3	29.6	29.6	14.62	16.85	8.33	5.35
:							

Starting Purge Time: 845
Ending Purge Time: 900
Average Purge Rate: 0.87 gal/min
Total Volume Purged: 13 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 3
Shuttle ID:
Trip Blank ID: 3
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray/M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-9
Date: 6/10/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1008

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.75 ft TOC
Column of Water in Well: 7.75 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.75 feet
Volume of Water in Well: 1.26 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Metals & VOC - Clear / SVOC - light brown

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	948	950	954	957	959	101
Volume Removed (gal.):	2	4	8	11	13	15
pH:	5.22	4.95	4.86	—	—	—
Specific Conductance (μmhos/cm):	114.1	121.2	116.9	—	—	—
Temperature (Degrees C):						
Turbidity (ntu):	303	330	280	61.9	51.2	26.1
:						

1005 1006 1007 102
19 20 21 17
— — —
12.99 8.95 5.56 16.33

Starting Purge Time: 947
Ending Purge Time: 1008
Average Purge Rate: 1.00 gal/min
Total Volume Purged: 15.21 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	23	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 3
Shuttle ID:
Trip Blank ID: 3
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: Well had no cap

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray/M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-10
Date: 6/10/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1558

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 5.93 ft TOC
Column of Water in Well: 8.57 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.57 feet
Volume of Water in Well: 1.39 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.2 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear at Sampling

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1548	1550	1553	1555	1558	
Volume Removed (gal.):	2	4	7	9	11	
pH:	5.14	4.67	4.62	–		
Specific Conductance (μmhos/cm):	62.1	66.2	62.5	–		
Temperature (Degrees C):						
Turbidity (ntu):	31.3	28.2	14.45	5.27	5.29	
:						

Starting Purge Time: 1547
Ending Purge Time: 1558
Average Purge Rate: 1.00 gal/min
Total Volume Purged: 11 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 3
Shuttle ID:
Trip Blank ID: 3
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

K. Murray

FN: g:\common\murray\forms\sampfrm3.xls

Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Renkosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-11
Date: 6/11/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1334

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15 ft TOC
Depth to Water: 7.25 ft TOC
Column of Water in Well: 7.75 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.75 feet
Volume of Water in Well: 1.26 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 3.8 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1524	1527	1530	1532	1533	
Volume Removed (gal.):	2	5	7	8	9	
pH:	5.36	5.22	5.24	—	—	
Specific Conductance (μmhos/cm):	188	188	184	—	—	
Temperature (Degrees C):						
Turbidity (ntu):	227	799	12.89	7.91	5.96	
:						

Starting Purge Time: 1527
Ending Purge Time: 1334
Average Purge Rate: 1.3 gal/min
Total Volume Purged: ~9 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 4
Shuttle ID:
Trip Blank ID: 4 (gw)
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: KM | BMW
Sampling Location: 815 N of Hangar

Sample ID: SMW-12
Date: 6/15/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1605

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15 ft TOC
Depth to Water: 6.50 ft TOC
Column of Water in Well: 8.50 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.50 feet
Volume of Water in Well: 1.39 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1549	1553	1600			
Volume Removed (gal.):	2	4	6			
pH:	6.20	6.12	6.09			
Specific Conductance (μmhos/cm):	261	197.2	162.1			
Temperature (Degrees C):	—	—	—			
Turbidity (ntu):	12.6	10.03	5.45			
:						

Starting Purge Time: 1545
Ending Purge Time: 1600
Average Purge Rate: 0.40 gal/min
Total Volume Purged: ~6 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	None	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 6
Shuttle ID:
Trip Blank ID: TB-6
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: Dup 2

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: KM/BMW
Sampling Location: N Side of 815

Sample ID: ~~tet~~ FC-IMW-12
Date: 6/15/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1215

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 35 ft TOC
Depth to Water: 6.55 ft TOC
Column of Water in Well: 28.45 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 28.45 feet
Volume of Water in Well: 4.6 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 14 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1142	1155	1210	1215		
Volume Removed (gal.):	4	10	16	25		
pH:	6.03	6.18	5.89	6.06		
Specific Conductance (μmhos/cm):	257	199.8	184.3	157.0		
Temperature (Degrees C):						
Turbidity (ntu):	12.1	10.33	9.40	6.50		
:						

Starting Purge Time: 1136
Ending Purge Time: 1215

Average Purge Rate: 0.64 gal/min KM
Total Volume Purged: ~25 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	None	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 6
Shuttle ID:
Trip Blank ID: TB-6
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: Kmt/Bmw
Sampling Location: 815 N Side of Hangar

Sample ID: FC-DMW-12
Date: 6/15/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1200

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 50 ft TOC
Depth to Water: 6.55 ft TOC
Column of Water in Well: 43.45 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 43.45 feet
Volume of Water in Well: 7.08 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 21 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1130	1135	1140	1150	1155	
Volume Removed (gal.):	6	12	19	26	32	
pH:	5.52	5.13	5.08	5.81	5.64	
Specific Conductance (μmhos/cm):	68.4	74.5	82.1	101.2	100.8	
Temperature (Degrees C):						
Turbidity (ntu):	28.0	13.1	15.1	8.30	6.81	
:						

Starting Purge Time: 1125
Ending Purge Time: 1200

Average Purge Rate: ~~0.45~~ 0.91 gal/min
Total Volume Purged: 32 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	None	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 6
Shuttle ID:
Trip Blank ID: TB-6
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

FN: g:\common\murray\forms\sampfrm3.xls

Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW - 13
Date: 6/11/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1036

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.50 ft TOC
Column of Water in Well: 8.0 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.0 feet
Volume of Water in Well: 1.30 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1023	1026	1029	1033	1036	1037
Volume Removed (gal.):	6	8	11	13	15	17
pH:	4.93	4.75	4.74	—	—	
Specific Conductance (μmhos/cm):	120.2	116.4	109.7	—	—	
Temperature (Degrees C):						
Turbidity (ntu):	181.8	187.7	140.9	22.7	~~10.19~~ 9.91	9.17
:						

Starting Purge Time: 1017
Ending Purge Time: 1036
Average Purge Rate: 0.81 gal/min
Total Volume Purged: 17 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 4
Shuttle ID:
Trip Blank ID: TB-4
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

K Murray

FN: g:\common\murray\forms\sampfrm3.xls

Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Dergosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-14
Date: 6/19/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 810

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.91 ft TOC
Column of Water in Well: 7.59 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.59 feet
Volume of Water in Well: 1.24 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 3.71 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	753	759	804	808	809	
Volume Removed (gal.):	5	10	15	18	19	
pH:	5.47	5.26	5.26	—		
Specific Conductance (μmhos/cm):	130.5	132.1	131.8	—		
Temperature (Degrees C):						
Turbidity (ntu):	214	23.2	14.37	9.97	9.35	
:						

Starting Purge Time: 748
Ending Purge Time: 810
Average Purge Rate: 0.86 gal/min
Total Volume Purged: 19 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	No	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 10
Shuttle ID:
Trip Blank ID: 10
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Jenosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-15
Date: 6/11/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 930

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15.5 ft TOC
Depth to Water: 6.85 ft TOC
Column of Water in Well: 8.65 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.65 feet
Volume of Water in Well: 1.41 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.23 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Very silty brown - Cleared up after ~20 gal.

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	916	923	929			
Volume Removed (gal.):	22	26	30			
pH:	4.74	4.89	5.05			
Specific Conductance (μmhos/cm):	113.5	113.2	124.5			
Temperature (Degrees C):						
Turbidity (ntu):	10.7	7.10	8.50			
:						

Starting Purge Time: 847
Ending Purge Time: 930
Average Purge Rate: 0.70 gal/min
Total Volume Purged: ~30 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 4
Shuttle ID:
Trip Blank ID: TB-4
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

Kelly Murray

Note: Turbidity measurements began after ~20 gal because purge water was obviously silty and well dev. crew had note.

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray/M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-16
Date: 6/12/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1508

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 5.76 ft TOC
Column of Water in Well: 8.74 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.74 feet
Volume of Water in Well: 1.42 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.27 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6	7
Time:	~~23~~ 1455	1457	1459	1501	1503	1505	1507
Volume Removed (gal.):	2	4	6	8	10	12	
pH:	4.62	4.68	4.76	4.77			
Specific Conductance (μmhos/cm):	108.1	102.0	88.8	82.7			
Temperature (Degrees C):							
Turbidity (ntu):	125.6	281	124.6	43.3	13.52	7.95	7.89
:							

Starting Purge Time: 1453
Ending Purge Time: 1506

Average Purge Rate: ~~0.22~~ 0.80 gal/min
Total Volume Purged: 4.12 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 5
Shuttle ID:
Trip Blank ID: 5
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

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Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Benosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-17
Date: 6/18/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 810

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15.0 ft TOC
Depth to Water: 7.67 ft TOC
Column of Water in Well: 7.33 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.33 feet
Volume of Water in Well: 1.19 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	808		808			
Volume Removed (gal.):	5	7	9			
pH:	5.93	5.86	5.94			
Specific Conductance (μmhos/cm):	146.5	145.2	157.5			
Temperature (Degrees C):						
Turbidity (ntu):	2.02	1.30	1.38			
:						

1319

Starting Purge Time: 755
Ending Purge Time: 810
Average Purge Rate: 0.6 gal/min
Total Volume Purged: 9 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	No	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 9
Shuttle ID:
Trip Blank ID: 9
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: M. Dmuzowicz / Ralph M
Sampling Location: Cecil Field

Sample ID: FL-SMW-18
Date: 6/16/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1300

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15 ft TOC
Depth to Water: 7.30 ft TOC
Column of Water in Well: 7.70 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.70 feet
Volume of Water in Well: 1.26 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: ~ 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	~~1215~~ 1220	1230	1236	1241	1245	1248
Volume Removed (gal.):	13	15	20	23	25	28
pH:	5.14	5.10	5.17			
Specific Conductance (μmhos/cm):	141.5	131.2	131.0			
Temperature (Degrees C):						
Turbidity (ntu):	750	492	181.0	150.1	25.8	12.86
:						

1258 36 – – 9.70

1251 30 10.55 12 3 9.

Starting Purge Time: ~~[illegible]~~ MD 1215
Ending Purge Time: 1300
Average Purge Rate: 0.80 gal/min
Total Volume Purged: 7.36 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 7
Shuttle ID:
Trip Blank ID: 7
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: M. Denosowicz / Ralph
Sampling Location: Cecil Field

Sample ID: FL-IMW-18
Date: 6/16/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1119

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 31.0 ft TOC
Depth to Water: 7.58 ft TOC
Column of Water in Well: 23.42 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 23.42 feet
Volume of Water in Well: 3.82 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 12 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

5.43

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6		
Time:	1043	1056	1100	1104	1107	1110	1113	1116
Volume Removed (gal.):	4	13	15	17	20	22	24	26
pH:	5.56	5.55	5.44	5.42	5.36	—	—	—
Specific Conductance (μmhos/cm):	162.0	176.7	144.6	131.2	118.8	—	—	—
Temperature (Degrees C):								
Turbidity (ntu):	37.5	13.79	11.60	12.06	10.37	11.97	11.24	11.[illegible]
:								

Starting Purge Time: 1036
Ending Purge Time: 1119
Average Purge Rate: 0.60 gal/min
Total Volume Purged: 26 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3 MS	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 7
Shuttle ID:
Trip Blank ID: 7
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: Dup - 3

Field Team Leader: Kelly Murray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: M. Benosowitz / R.
Sampling Location: Cecil Field

Sample ID: FL-DMW-18
Date: 6/16/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1001

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 44.0 ft TOC
Depth to Water: 7.28 ft TOC
Column of Water in Well: 36.72 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 36.72 feet
Volume of Water in Well: 5.99 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 18 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Metals - Clear Yellowish / VOCs & SVOCs light Brown

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6	7	8
Time:	817	830	836	845	848	853	858	901
Volume Removed (gal.):	5	12	15	20	22	25	28	30
pH:	5.29	5.13	5.08	—	—	—	—	—
Specific Conductance (µmhos/cm):	68.1	62.9	70.6	—	—	—	—	—
Temperature (Degrees C):								
Turbidity (ntu):	214	176	186.1	322	173.1	170.8	154.9	156
:								

	9	10	11	12	13	14	15	16	17
	906	911	921	930	938	945	951	954	956
	33	36	40	45	50	55	57	59	60
	145.5	135.5	126.4	113.3	105.3	102.9	98.5	99.9	96.6
							97.4		

Starting Purge Time: 0809
Ending Purge Time: 1001
Average Purge Rate: 1.2 gal/min
Total Volume Purged: 27.2 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 7
Shuttle ID:
Trip Blank ID: TB-7
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

FN: g:\common\murray\forms\sampfrm3.xls

Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: E. Murray/M. Demosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW 19
Date: 6/19/95
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1016

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 7.22 ft TOC
Column of Water in Well: 7.28 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.28 feet
Volume of Water in Well: 1.19 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1009	1009	1015	1016		
Volume Removed (gal.):	5	10	15	16		
pH:	5.51	5.18	5.19	—		
Specific Conductance (μmhos/cm):	69.9	62.5	59.6	—		
Temperature (Degrees C):						
Turbidity (ntu):	85.1	29.6	5.61	4.68		
:						

Starting Purge Time: 959
Ending Purge Time: 1016
Average Purge Rate: 0.94 gal/min
Total Volume Purged: 16 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	No	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 10
Shuttle ID:
Trip Blank ID: 10
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: F. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-20
Date: 6/14/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 934

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.12 ft TOC
Column of Water in Well: 8.38 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.38 feet
Volume of Water in Well: 1.37 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes ~~No~~

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	921	923	928	931	933	
Volume Removed (gal.):	3	5	10	13	15	
pH:	5.07	5.14	4.98	—	—	
Specific Conductance (μmhos/cm):	69.7	81.4	64.1	—	—	
Temperature (Degrees C):						
Turbidity (ntu):	18.35	216	14.54	8.32	3.98	
:						

Starting Purge Time: 918
Ending Purge Time: 934
Average Purge Rate: 0.94 gal/min
Total Volume Purged: 15 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	No	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 10
Shuttle ID:
Trip Blank ID: 10
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-21
Date: 6/19/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 848

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 7.01 ft TOC
Column of Water in Well: 7.49 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.49 feet
Volume of Water in Well: 1.22 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	840	845	847			
Volume Removed (gal.):	5	10	12			
pH:	5.13	4.78	4.65			
Specific Conductance (μmhos/cm):	52.1	49.1	48.1			
Temperature (Degrees C):						
Turbidity (ntu):	94.4	7.86	7.31			
:						

Starting Purge Time: 835
Ending Purge Time: 848
Average Purge Rate: 0.92 gal/min
Total Volume Purged: 12 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	No	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 10
Shuttle ID:
Trip Blank ID: 10
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Bld 875 Cecil Field

Sample ID: F1-SMW-22
Date: 6/22/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 802

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 8.43 ft TOC
Column of Water in Well: 6.07 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 6.07 feet
Volume of Water in Well: 0.99 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 3 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	742	745	751	756	759	801
Volume Removed (gal.):	3	5	10	15	18	20
pH:	5.83	5.51	5.46	–	–	
Specific Conductance (μmhos/cm):	136.7	137.5	121.3	–	–	
Temperature (Degrees C):						
Turbidity (ntu):	301	297	94.6	13.36	7.41	7.03
:						

Starting Purge Time: 739
Ending Purge Time: 802
Average Purge Rate: 0.87 gal/min
Total Volume Purged: ~20 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 11
Shuttle ID:
Trip Blank ID: 11
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: E. Murray/M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-SMW-23
Date: 6/18/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1038

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15 ft TOC
Depth to Water: 7.30 ft TOC
Column of Water in Well: 7.7 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.7 feet
Volume of Water in Well: 1.26 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1029	1035	1037			
Volume Removed (gal.):	5	10	12			
pH:	5.02	5.13	5.08			
Specific Conductance (μmhos/cm):	118.4	108.2	107.4			
Temperature (Degrees C):						
Turbidity (ntu):	49.8	5.53	3.71			
:						

Starting Purge Time: 1024
Ending Purge Time: 1038
Average Purge Rate: 0.86 gal/min
Total Volume Purged: 12 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	No	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 9
Shuttle ID:
Trip Blank ID: 9
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Benosavir
Sampling Location: Cecil Field

Sample ID: FL-IMW-23
Date: 6/18/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1013

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 35.0 ft TOC
Depth to Water: 7.52 ft TOC
Column of Water in Well: 27.48 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 27.48 feet
Volume of Water in Well: 4.48 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 14 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes / No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1002	1007	1013			
Volume Removed (gal.):	5	10	15			
pH:	5.13	4.97	4.99			
Specific Conductance (μmhos/cm):	109.7	110.7	109.9			
Temperature (Degrees C):						
Turbidity (ntu):	5.06	3.78	3.32			
:						

Starting Purge Time: 953
Ending Purge Time: 1013
Average Purge Rate: 0.75 gal/min
Total Volume Purged: 15 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 9
Shuttle ID:
Trip Blank ID: 9
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: The grout has settled and probably should be prepared

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray/M. Denoscowicz
Sampling Location: Cecil Field

Sample ID: FL-DMW-23
Date: 6/18/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 913

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 45.0 ft TOC
Depth to Water: 7.79 ft TOC
Column of Water in Well: 37.21 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 37.21 feet
Volume of Water in Well: 6.06 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 18.2 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	851	859	907	912		
Volume Removed (gal.):	5	10	15	18		
pH:	5.36	5.24	5.24	—		
Specific Conductance (µmhos/cm):	86.8	86.4	89.5	—		
Temperature (Degrees C):						
Turbidity (ntu):	1.75	1.11	0.97	0.86		
:						

Starting Purge Time: 842
Ending Purge Time: 913
Average Purge Rate: 0.58 gal/min
Total Volume Purged: 18 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 9
Shuttle ID:
Trip Blank ID: TB-9 (GW)
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: Well not grouted completely

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Cecil Field

Sample ID: ~~6/19/98~~ FL-SMW-24
Date: 6/16/19/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1137

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 7.71 ft TOC
Column of Water in Well: 6.79 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 6.79 feet
Volume of Water in Well: 1.11 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1121	1127	1131	1136		
Volume Removed (gal.):	5	10	15	16		
pH:	5.62	5.69	5.89	–		
Specific Conductance (μmhos/cm):	120.9	123.9	122.8	–		
Temperature (Degrees C):						
Turbidity (ntu):	285	89.7	8.49	8.30		
:						

Starting Purge Time: ~~7.7~~ 1115
Ending Purge Time: 1137
Average Purge Rate: 0.73 gal/min
Total Volume Purged: 16 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 10
Shuttle ID:
Trip Blank ID: 10
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: C. Murray/M. Deinosouiz
Sampling Location: Bld 815

Sample ID: FL-SMW-25
Date: 6/22/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 855

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.83 ft TOC
Column of Water in Well: 7.67 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.67 feet
Volume of Water in Well: 1.25 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	850	853	854			
Volume Removed (gal.):	3	4	5			
pH:	4.68	4.43	4.50			
Specific Conductance (μmhos/cm):	70.0	66.2	56.0			
Temperature (Degrees C):						
Turbidity (ntu):	24.1	9.31	4.46			
:						

Starting Purge Time: 847
Ending Purge Time: 855
Average Purge Rate: 0.63 gal/min
Total Volume Purged: 5 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 11
Shuttle ID:
Trip Blank ID: 11
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS: No Cap

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denosowicz
Sampling Location: Bld 815

Sample ID: FL-SMW-26
Date: 6/22/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 929

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.79 ft TOC
Column of Water in Well: 7.71 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.71 feet
Volume of Water in Well: 1.26 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	920	926	928			
Volume Removed (gal.):	4	6	8			
pH:	5.20	5.19	5.14			
Specific Conductance (μmhos/cm):	135.4	133.8	133.0			
Temperature (Degrees C):						
Turbidity (ntu):	65.8	7.41	3.69			
:						

Starting Purge Time: 916
Ending Purge Time: 929
Average Purge Rate: 0.62 gal/min
Total Volume Purged: 8 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 11
Shuttle ID:
Trip Blank ID: 11
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Denoscavitz
Sampling Location: B10 815

Sample ID: FL-SMW-27
Date: 6/22/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1029

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 6.40 ft TOC
Column of Water in Well: 8.10 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.10 feet
Volume of Water in Well: 1.32 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1011	1016	1018	1024	1027	1028
Volume Removed (gal.):	3	7	10	14	15	16
pH:	6.00	6.06	6.20	—	—	—
Specific Conductance (μmhos/cm):	254	282	291		—	—
Temperature (Degrees C):						
Turbidity (ntu):	29.0	9.12	63.4	15.13	9.19	8.46
:						

Starting Purge Time: 1008
Ending Purge Time: 1029
Average Purge Rate: 0.76 gal/min
Total Volume Purged: 16 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	NO	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 11
Shuttle ID:
Trip Blank ID: 11
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray/M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-ABB-1
Date: 6/17/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 943

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 12.5 ft TOC
Depth to Water: 5.43 ft TOC
Column of Water in Well: 7.07 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.07 feet
Volume of Water in Well: 1.15 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 3.5 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample: lt. brown - Could not get Turbidity down

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	805	811	813	816	822	832
Volume Removed (gal.):	3	7	9	13		22
pH:	5.59	5.29	5.27	—	—	—
Specific Conductance (μmhos/cm):	128.1	114.9	125.3	—	—	—
Temperature (Degrees C):						
Turbidity (ntu):	740	321	474	467	330	14.19
:						

839 841 850 854 835 837
28 32 36 40 24 25
16.19 299 167 39.6 13.69 17.0

Pump off @ 15sec.

Starting Purge Time: 802
Ending Purge Time: 943
Average Purge Rate: ~~0.39~~ 0.73 gal/min
Total Volume Purged: ~~1.46~~ 74 gallons

KM 6-17-

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

pump off since last read.

Chain of Custody #: 8
Shuttle ID: ~~8~~
Trip Blank ID: 8
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

910 914 916 922 924 926 930
45 48 50 52 55 57 64
122.9 118.3 151.8 139.8 105.8 57.5 49.3

Field Team Leader: Kelly Murray

932 936 939 940 943
66 68 70 71 74

FN: g:\common\murray\forms\sampfrm3.xls

Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray/M. Denosowicz
Sampling Location: Cecil Field

Sample ID: FL-ABB-2
Date: 6/17/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1147

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15.0 ft TOC
Depth to Water: 7.19 ft TOC
Column of Water in Well: 7.81 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 7.81 feet
Volume of Water in Well: 1.27 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample: lt. brown - could get turbidity down

WELL PURGE DATA

Dark Brown Small like petro

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6		
Time:	1042	1046	1053	1101	1110	1119	1127	1138
Volume Removed (gal.):	2	5	10	15	19	25	30	35
pH:	5.75	5.95	6.08	—	—	—	—	—
Specific Conductance (μmhos/cm):	212	281	244	—	—	—	—	—
Temperature (Degrees C):								
Turbidity (ntu):	105.5	389	208	116.7	97.1	67.5	60.1	47.4
:								

1146
40
—
—
47.8

Starting Purge Time: 1040
Ending Purge Time: 1147
Average Purge Rate: 0.60 gal/min
Total Volume Purged: 40 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 8
Shuttle ID:
Trip Blank ID: 8
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

Kelly Murray

FN: g:\common\murray\forms\sampfrm3.xls

Golder Associates

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778
Sampled by: K. Murray / M. Donosowicz
Sampling Location: Cecil Field 1349

Sample ID: FL-ABB-3
Date: 6/17/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1349

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 16.0 ft TOC
Depth to Water: 7.00 ft TOC
Column of Water in Well: 9.00 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 9.00 feet
Volume of Water in Well: 1.47 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.4 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes / No

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1320	1327	1341	1346	1348	
Volume Removed (gal.):	5	10	20	23	25	
pH:	4.63	4.70	4.65	–	–	
Specific Conductance (μmhos/cm):	49.8	52.4	47.7	–		
Temperature (Degrees C):					–	
Turbidity (ntu):	1277	1334	15.1	7.38	6.93	
:						

Starting Purge Time: 1314
Ending Purge Time: 1349
Average Purge Rate: 0.71 gal/min
Total Volume Purged: ~~4.25~~ 25 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3		HCl - lab	
Appendix IX SVOCs	1 L amber	2	No	none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #: 8
Shuttle ID:
Trip Blank ID: 8
Lab Name: Savannah Laboratories
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

Kelly Murray

Well cover appears damaged but still intact. Bailer was found in well when ope

GROUNDWATER SAMPLE COLLECTION FORM

Project Name:	NGC/Cecil Field	Sample ID:	FL-ABB-4
Project Number:	973-3778	Date:	6/17/98
Sampled by:	K. Murray / M. Denosowicz	Sampling Method:	bailer/pump
Sampling Location:	Cecil Field	Type of Sampling Equipment:	stainless steel/poly
		Time of Sample Collection:	1527

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well:	16.01	ft TOC
Depth to Water:	7.42	ft TOC
Column of Water in Well:	8.59	ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter:	2	inches
Casing Volume:	0.163	gal/ft
Column of Water in Well:	8.59	feet
Volume of Water in Well:	1.400	gallons
Minimum Well Volumes to Purge:	3	
Min. Volume to be Purged:	4.20	gallons
Method of Purging:	Peristaltic pump	
Well Purged Dry?:	Yes / No	

Appearance of Sample: Clear

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6	
Time:	1456	1501	1507	1513	1519	1524	1527
Volume Removed (gal.):	5	10	15	20	25	30	32
pH:	4.97	4.93	4.98	—	—	—	—
Specific Conductance (μmhos/cm):	79.4	82.1	86.5	—	—	—	—
Temperature (Degrees C):							
Turbidity (ntu):	125.2	115.2	56.7	32.5	14.92	11.50	10.58
:							

Starting Purge Time:	1450	Average Purge Rate:	0.86 gal/min
Ending Purge Time:	1527	Total Volume Purged:	~~32~~ 30 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
Appendix IX VOCs	40 mL glass	~~2~~ 3	NO	HCl - lab	
Appendix IX SVOCs	1 L amber	2		none	
Appendix IX Metals	250 mL plastic	1		HNO_3 - lab	

Chain of Custody #:	8	REMARKS:	
Shuttle ID:			
Trip Blank ID:	8		
Lab Name:	Savannah Laboratories		
Air Bill #:		Field Team Leader:	Kelly Murray

KMurray

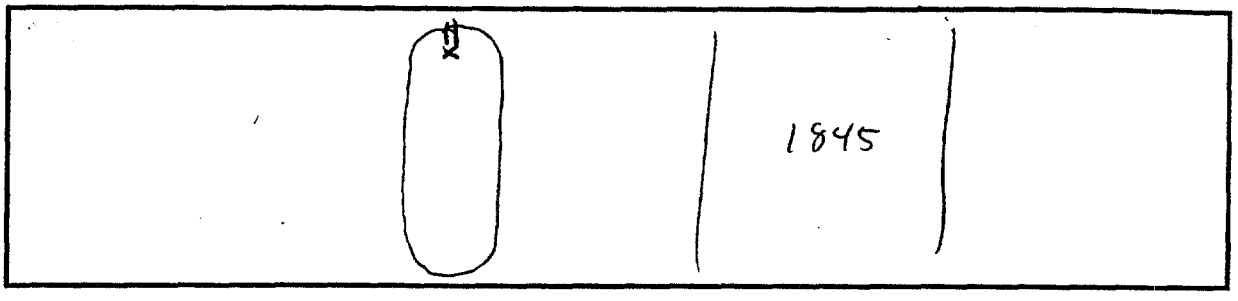
1/

SURFACE WATER/SEDIMENT SAMPLE COLLECTION FORM

Project Name: NGC/CF/FC
Project Number: 973-3778
Sampled by: RFM
Sampling Location: NORTH OUTFALL OF RET. POND BY 1845

Surface Water Sample ID: FL-SW-1
Sediment Sample ID: —
Date: 6/18/95
Sampling Method: GRAB
Type of Sampling Equipment: SAMPLE CONTAINERS

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth Interval	Description
FL-SW-1	15:51	—	—

Analysis	Container Type and Size	Quantity	Surface Water?	Sediment?	Comments
8260	40 ML CL GLASS	3	✓		
8270	1LT AMBER GLASS	2	✓		
AQ METALS	500 ML PLASTIC	1	✓		
HG	250 ML PLASTIC	1	✓		

Chain of Custody #: 117221
Shuttle ID: —
Trip Blank ID: FL-TB-11 ~~GSEO-1SWF~~ (SOIL) RFM
Lab Name: SAVANNAH LABS
Air Bill #: —

REMARKS:

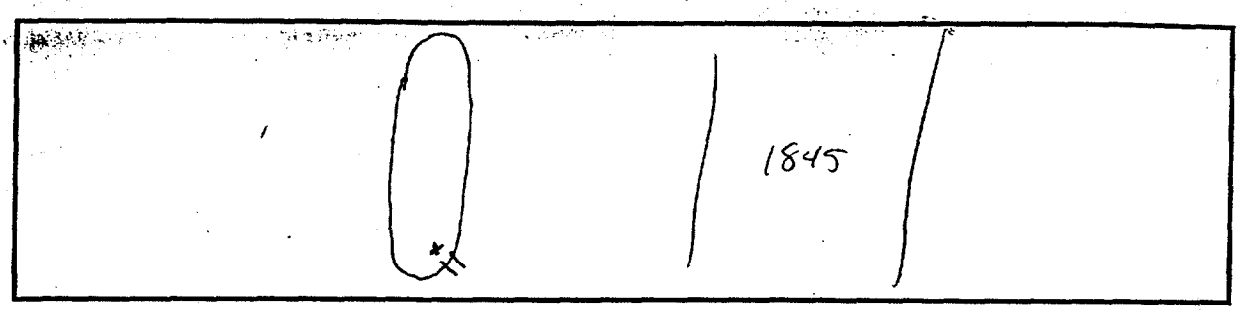
Field Team Leader: Ralph F. Morrill Jr.

SURFACE WATER/SEDIMENT SAMPLE COLLECTION FORM

Project Name: NGC/CF/FL
Project Number: 973-3774
Sampled by: RFM
Sampling Location: SE CORNER OUTFALL OF RET POND BY 1645

Surface Water Sample ID: FL-SW-2
Sediment Sample ID: —
Date: 6/24/98 (RFM)
Sampling Method: GRAB
Type of Sampling Equipment: SAMPLE CONTAINER

SAMPLE COLLECTION LOCATION SKETCH:



Sample ID	Time Collected	Sample Depth/Interval	Description
FL-SW-2	15:20	—	—

Analysis	Container Type and Size	Quantity	Surface Water?	Sediment?	Comments
8260	40 ML CL GLASS	3	✓		
8270	1 LT AMB GLASS	2	✓		
AQ METALS	500 ML PLASTIC	1	✓		
HG	250 ML PLASTIC	1	✓		

Chain of Custody #: 74990
Shuttle ID: —
Trip Blank ID: FL-TB-1 (SED/SOIL)
Lab Name: SAVANNAH
Air Bill #: —

REMARKS:

Field Team Leader: Ralph F. Murphy Jr.

APPENDIX C-3

Groundwater Sample Collection Records – Confirmation Sampling Event

GROUNDWATER SAMPLE COLLECTION FORM

SAV ANNAH

Project Name:	NGC/Cecil Field	Sample ID:	SMW-22 + EDB-1 @1400
Project Number:	973-3778.203A	Date:	7/21/98
Sampled by:	Bob Wojcik/Mike Bruinsma	Sampling Method:	bailer/pump
Sampling Location:		Type of Sampling Equipment:	stainless steel/poly
		Time of Sample Collection:	1405

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well:	14.5	ft TOC
Depth to Water:	7.76	ft TOC
Column of Water in Well:	6.74	ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter:	2	inches
Casing Volume:	0.163	gal/ft
Column of Water in Well:	6.74	feet
Volume of Water in Well:	1.1	gallons
Minimum Well Volumes to Purge:	3	
Min. Volume to be Purged:	3.3	gallons
Method of Purging:	Peristaltic pump	
Well Purged Dry?:	Yes No	

Appearance of Sample:

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1352	1355	1357			
Volume Removed (gal.):	2 GAL	3	4			
pH:	5.48	5.51	5.56			
Specific Conductance (μmhos/cm):	120	120	120			
Temperature (Degrees C):	26.4	26.3	25.9			
Turbidity (ntu):	—	—	—			
:						

Starting Purge Time:	1348	Average Purge Rate:	gal/min
Ending Purge Time:	1357	Total Volume Purged:	gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
8260	0 mL glas	6*		HCl - lab	

* = samples will be split between 2 laboratories.

Chain of Custody #:		REMARKS:	BAILER #15
Shuttle ID:			
Trip Blank ID:			
Lab Name:	Savannah/Columbia		
Air Bill #:		Field Team Leader:	Kelly Murray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SMW-15
Date: 7/21/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1520

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14 ft TOC
Depth to Water: 6.0 ft TOC
Column of Water in Well: 8 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8 feet
Volume of Water in Well: 1.3 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 3.9 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample:

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1509	1511	1513			
Volume Removed (gal.):	2.0	3.0	4			
pH:	5.58	5.54	5.53			
Specific Conductance (μmhos/cm):	145	145	145			
Temperature (Degrees C):	28.3	27.6	27.6			
Turbidity (ntu):						
:						

Starting Purge Time: 1506
Ending Purge Time: 1514
Average Purge Rate: gal/min
Total Volume Purged: 1.5 gallons
5 GAL

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Siz	Quantity	Filter	Preservative and Sourc	Comments
8260	0 mL glas	6*		HCl - lab	

* = samples will be split between 2 laboratories.

Chain of Custody #:
Shuttle ID:
Trip Blank ID:
Lab Name: Savannah/Columbia
Air Bill #:

REMARKS: BAILER #11

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SMW-25
Date: 7/21/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly B#04
Time of Sample Collection: 1540

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 14.5 ft TOC
Depth to Water: 5.93 ft TOC
Column of Water in Well: 8.6 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.6 feet
Volume of Water in Well: 1.4 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.2 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes (No)

Appearance of Sample:

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1528	1530	1532			
Volume Removed (gal.):	1.5	3.0	4.5			
pH:	5.24	5.12	5.14			
Specific Conductance (μmhos/cm):	70	70	70			
Temperature (Degrees C):	30.4	27.2	27.4			
Turbidity (ntu):						
:						

Starting Purge Time: 1525
Ending Purge Time: 1532
Average Purge Rate: gal/min
Total Volume Purged: 5 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Size	Quantity	Filter	Preservative and Source	Comments
8260	0 mL glas	6*		HCl - lab	

* = samples will be split between 2 laboratories.

Chain of Custody #:
Shuttle ID:
Trip Blank ID:
Lab Name: Savannah/Columbia
Air Bill #:

REMARKS:

Field Team Leader: Kelly Murray

KMurray

GROUNDWATER SAMPLE COLLECTION FORM

Project Name: NGC/Cecil Field
Project Number: 973-3778.203A
Sampled by: Bob Wojcik/Mike Bruinsma
Sampling Location:

Sample ID: SMW-9
Date: 7/21/98
Sampling Method: bailer/pump
Type of Sampling Equipment: stainless steel/poly
Time of Sample Collection: 1450

COLUMN OF WATER IN WELL BEFORE PURGE

Total Depth of Well: 15 ft TOC
Depth to Water: 6.31 ft TOC
Column of Water in Well: 8.69 ft

VOLUME OF WATER TO BE PURGED

Casing Inside Diameter: 2 inches
Casing Volume: 0.163 gal/ft
Column of Water in Well: 8.69 feet
Volume of Water in Well: 1.4 gallons
Minimum Well Volumes to Purge: 3
Min. Volume to be Purged: 4.25 gallons
Method of Purging: Peristaltic pump
Well Purged Dry?: Yes No

Appearance of Sample:

WELL PURGE DATA

	Purge 1	Purge 2	Purge 3	Purge 4	Purge 5	Purge 6
Time:	1441	1443	1445			
Volume Removed (gal.):	2	3	4.5			
pH:	5.04	4.99	5.02			
Specific Conductance (μmhos/cm):	110	110	110			
Temperature (Degrees C):	30.7	30.1	30.2			
Turbidity (ntu): (TURBIDITY):						

Starting Purge Time: 1439
Ending Purge Time:
Average Purge Rate: 0. gal/min
Total Volume Purged: 5.0 gallons

SAMPLE CONTAINERS REQUIRED

Analysis	Container Type and Siz	Quantity	Filter	Preservative and Sourc	Comments
8260	0 mL glas	6*		HCl - lab	

* = samples will be split between 2 laboratories.

Chain of Custody #:
Shuttle ID:
Trip Blank ID:
Lab Name: Savannah/Columbia
Air Bill #:

REMARKS: BAILER # 2

Field Team Leader: Kelly Murray

Kmurray

APPENDIX C-4

Equipment Calibration Records

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: Cecil Field

Project Number: 973-3778

Date: 6-8-98

Instrument (Name/Model No./Serial No.): pHmeter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer: Hach

Lot Numbers:

Serial No. GAI 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1120		4.00 7.00	none	4.01 7.00	KM MD	
1744		4.01 7.00	none	4.12 6.97	MD MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: Kelly Murray Signature: Kelly Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: Cecil Field

Project Number: 973-3778

Date: 4/8/98

Instrument (Name/Model No./Serial No.): Hanna Cond. meter

Calibration Standard Manufacturer: Myron L

Manufacturer

Lot Numbers: 01489-95

Serial No. GAI 017516

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1120		2060 µmhos 46.7 µmhos		2009 46.9	km km	
1746		46.7 umhos		55.2	MJ	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: Kelly Murray Signature: Kelly Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: Cecil Field

Project Number: 973-3778

Date: 6-9-98

Instrument (Name/Model No./Serial No.): Hanna Cond. Meter

Calibration Standard Manufacturer: Nyron-L

Manufacturer Hanna Cond. meter

Lot Numbers: 01489-95

Serial No. GAI- 01756

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
7159	~~2060~~	~~2060 umhos~~ 46.7 umhos		~~46.8~~ 46.8	MD MD	
1252		46.7		~~47.5~~ 46.8 7.	MD	Check
1622		46.7		62.6	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: C Murray

Signature: Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: Cecil Field

Project Number: 973-3778

Date: 6-9-98

Instrument (Name/Model No./Serial No.): pH meter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer: Hach

Lot Numbers:

Serial No. GAI 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
0807	4.17 7.01	4.01 7.00	None	4.17 7.01	KM	
1256	~~4.1~~ KM	4.01 7.00	None	4.14 7.1	MD	Check
1624		4.01 7.00		4.19 7.08	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: KMurray

Signature: KMurray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Ceril Field

Project Number: 973-3778

Date: 6/10/98

Instrument
(Name/Model No./Serial No.):

Calibration Standard Manufacturer: Myron-L

Manufacturer Hanna Cond Meter

Lot Numbers: 01489-95

Serial No. GAI 01756

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
813		46.7		46.7	MB	
1359		46.7		46.7	MD	Check
1609		46.7		43.1	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: Murray

Signature: Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC (Cecil Field)

Project Number: 973-3778

Date: 6/10/98

Instrument (Name/Model No./Serial No.): pH Meter

Calibration Standard Manufacturer: Cole Porter

Manufacturer: Hach

Lot Numbers:

Serial No. 6A 014602

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
818		4.01 7.00		4.12 7.07	MD MD	
1401		4.01 7.00		4.04 7.01	MD MD	Check
1611		4.01 7.00		4.06 7.02	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: Murray

Signature: Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Cecil Field

Project Number: 973-3778

Date: 6/11/98

Instrument
(Name/Model No./Serial No.):

Calibration Standard Manufacturer: Myron-L

Manufacturer Hanna Cond Meter

Lot Numbers: 01489-95

Serial No. GAL 01756

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
759		46.7		46.7	MD	
1300		46.7		46.7	MD	Check
1500		46.7		46.7	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: Murray

Signature: Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NOC Cecil Field

Project Number: 973-3778

Date: 6/11/98

Instrument (Name/Model No./Serial No.): pH Meter

Calibration Standard Manufacturer: Cole Porter

Manufacturer Hach

Lot Numbers:

Serial No. GAF 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
803		4.01 7.00		4.07 6.95	MD	
1300		4.01 7.00		4.16 7.01	MJ	Check
1605		4.01 7.00		4.14 7.03	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: Murray

Signature: Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: _____

Project Number: 973-3778

Date: 6/12/98

Instrument
(Name/Model No./Serial No.): _____

Calibration Standard Manufacturer: Myron-L

Manufacturer Hanna Cond Meter

Lot Numbers: 01489-95

Serial No. _____

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
800		46.7		46.7		MGD
		See Bldg 815 Form				

FN: g:\common\murray\forms\fldcalrd.doc

Name: Murray

Signature: Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC Cecil Field

Project Number: 973-3778

Date: 6/12/98

Instrument (Name/Model No./Serial No.): pH Meter

Calibration Standard Manufacturer: Cole Porter

Manufacturer: Hach

Lot Numbers:

Serial No. GAT 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
800		4.01 7.00		4.12 7.17		
		See	Bldg.	815	Book	

FN: g:\common\murray\forms\fldcalrd.doc

Name: Murray

Signature: Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC / Cecil Field

Project Number: 973-3778

Date: 6/12/98

Instrument (Name/Model No./Serial No.): pH Meter

Calibration Standard Manufacturer: Cole Porter

Manufacturer: Hach

Lot Numbers:

Serial No. GAE 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
800		4.01 7.00		4.12 7.17	MD	
1200		4.01 7.00		3.75 6.75	MD	
1618		4.01 7.0		3.81 6.91	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: K. Murray

Signature: K Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Cecil Field

Project Number: 973-3778

Date: 6/12/98

Instrument (Name/Model No./Serial No.):

Calibration Standard Manufacturer: Myron-L

Manufacturer: Hanna Cond Meter

Lot Numbers: 01449-95

Serial No. GAI 01756

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
800		46.7		46.7 ~~46.7~~	MD	
1200		46.7		46.7	MD	
1618		46.7		46.7	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: L Murray

Signature: L Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Cecil Field

Project Number: 973-3778

Date: 6/15/98

Instrument (Name/Model No./Serial No.): pH meter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer: Hach

Lot Numbers:

Serial No. GAI 014162

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1100		4.01 7.00	none	4.12 7.09	KM	
1605		4.01 7.00	none	4.08 7.11	KM	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: K Murray

Signature: K Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Cecil Field

Project Number: 973-3778

Date: 6/15/98

Instrument (Name/Model No./Serial No.): Conductivity Meter

Calibration Standard Manufacturer: Myron L

Manufacturer Hanna

Lot Numbers: 01489-95

Serial No. GAT 01756

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1100		46.7	none	46.7	KM	
1605		46.7	none	46.2	KM	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: K Murray Signature: K Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC Keil Field

Project Number: 973-3278

Date: 6/16/98

Instrument (Name/Model No./Serial No.): pH meter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer Hach

Lot Numbers:

Serial No. GAI 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
737		4.01 7.00		3.88 7.12	MD	
1358		4.01 7.00		4.07 7.09	MD	
1530		4.01 7.00		3.88 7.01	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: L Murray

Signature: L Murray

Bld 815

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Cecil Field

Project Number: 973-3778

Date: 6/16/98

Instrument (Name/Model No./Serial No.): Conductivity meter

Calibration Standard Manufacturer: Nyron-L

Manufacturer: Hanna

Lot Numbers: 01489-95

Serial No. GAI 017560

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
736		46.7		46.7	MD	
1354		46.7		46.7	MD	
1530		46.7		44.4	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: L Murray

Signature: L Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Cecil Field

Project Number: 973-3728

Date: 6/17/98

Instrument (Name/Model No./Serial No.): Conductivity Meter

Calibration Standard Manufacturer: Myron-L

Manufacturer: Hanna

Lot Numbers: 01489-95

Serial No. GAI 01756

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
803		46.7		46.7	MD	
1316		46.7		46.7	MD	
1541		46.7		~~56.5~~ 45.4	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: KMurray

Signature: KMurray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NBC/Cecil Field

Project Number: 973-3378

Date: 6/17/98

Instrument (Name/Model No./Serial No.): pH meter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer: Hach

Lot Numbers:

Serial No. GAI 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
805	~~5~~	4.01 7.00		4.16 7.18	MD	
1316		4.01 7.00		4.04 7.08	MD	
1544		4.01 7.00		4.05 7.08	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: KMurray

Signature: KMurray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: N6C (Cecil Field)

Project Number: 973-3778

Date: 6/18/98

Instrument (Name/Model No./Serial No.): pH meter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer: Hach

Lot Numbers:

Serial No. GAI 01462

7.47

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
743		4.01 7.00		4.19 7.25	KM	
1153		4.01 7.00		4.06 7.13	KM	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: L Murray

Signature: L Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC (Cecil Field)

Project Number: 973-3778

Date: 6/18/98

Instrument (Name/Model No./Serial No.): Conductivity meter

Calibration Standard Manufacturer: Nyrox-L

Manufacturer: Hanna

Lot Numbers: 01489-95

Serial No. GAI 01756

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
741		46.7		46.7	MB	
1153		46.7		46.6	KM	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: L Murray

Signature: LMurray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Cecil Field

Project Number: 973-3778

Date: 6/19/98

Instrument (Name/Model No./Serial No.): Conductivity Off meter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer: ~~Hach~~ Hanna

Lot Numbers:

Serial No. ~~GAI 01462~~ 01756

KM 6/19/98

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
738		46.7		46.7	MD	
1006		46.7		46.7	MD	
1146		46.7		46.7	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: K Murray

Signature: K Murray

6.a1

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC/Cecil Field

Project Number: 913-3778

Date: 6/19/98

Instrument (Name/Model No./Serial No.): pH meter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer: Hach

Lot Numbers:

Serial No. GAZ 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
739		4.01 7.00		4.06 7.10	KM	
1107		4.01 7.00		4.09 7.13	KM	
1146		4.01 7.00		4.10 7.15	KM	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: K Murray

Signature: KMurray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC (Cecil Field) Bld 815

Project Number: 973-3778

Date: 6/22/98

Instrument (Name/Model No./Serial No.): Conductivity Meter

Calibration Standard Manufacturer: Myron-L

Manufacturer: Hanna

Lot Numbers: 01489-95

Serial No. GAI 01756

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
728		46.7		46.7	MD	
1200		46.7		46.7	MD	

FN: g:\common\murray\forms\fldcalrd.doc

Name: L Murray Signature: L Murray

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGG / Geil Field

Project Number: 973-3778

Date: 6/22/98

Instrument (Name/Model No./Serial No.): pH meter

Calibration Standard Manufacturer: Cole Parmer

Manufacturer: Hach

Lot Numbers:

Serial No. GAI 01462

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
729		4.01 7.00		4.11 7.22	MD MD	
1202		4.01 7.00		4.10 7.12	MD	EOD

FN: g:\common\murray\forms\fldcalrd.doc

Name: L Murray

Signature: L Murray

APPENDIX C-5

Equipment Calibration Records – Confirmation Sampling Event

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC / Cecil Field Resampling

Project Number: 973-3778 task 203A

Date: 7-21-98

Instrument (Name/Model No./Serial No.): pH meter

Manufacturer HANNA HI 9023

Serial No. 01755

Calibration Standard Manufacturer: C/P

Lot Numbers: 8-0399 8-0319

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1330	—	4.01 7.00	CAL TO	4.01 7.00	MB	

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Name: _____ Signature: _____

FIELD INSTRUMENT CALIBRATION AND QUALITY ASSURANCE RECORD

Project Name: NGC / Cecil Field Resampling

Project Number: 973-3778 task 203A

Date: 7-21-98

Instrument (Name/Model No./Serial No.): Conductivity meter

Calibration Standard Manufacturer: Myron L

Manufacturer: Myron L

Lot Numbers: 040980 55300

Serial No.

Time	Initial Settings	Standard/Gas Used	Adjustments Made	Final Settings	Initials	Comments
1330	445	445	0	445	MB	OK!

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Name: MBRUINSMA

Signature: MB

Golder Associates

✓ Murray

APPENDIX D

Investigative Derived Waste Tracking Log

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
1	5/27/98	Building 1845	SMW-7 Soil Cuttings	Yes	NW of Building No. 1845
2	5/27/98	Building 1845	SMW-7 Purge Development Water	Yes	NW of Building No. 1845
3	5/27/98	Building 1845	SMW-8 Soil Cuttings	Yes	NW of Building No. 1845
4	5/27/98	Building 1845	SMW-8 Development Water	Yes	NW of Building No. 1845
5	5/27/98	Building 1845	SMW-15 Soil Cuttings	Yes	NW of Building No. 1845
6	5/27/98	Building 1845	SMW-15 Development Water	Yes	NW of Building No. 1845
7	5/28/98	Building 1845	DMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
8	5/28/98	Building 1845	DMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
9	5/28/98	Building 1845	DMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
10	5/28/98	Building 1845	DMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
11	5/28/98	Building 1845	DMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
12	5/28/98	Building 1845	IMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
13	5/28/98	Building 1845	IMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
14	5/28/98	Building 1845	IMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
15	5/28/98	Building 1845	IMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
16	5/28/98	Building 1845	IMW-1 Cuttings/Mud	Yes	NW of Building No. 1845
17	5/28/98	Building 1845	SMW-1 Soil Cuttings	Yes	NW of Building No. 1845
18	5/28/98	Building 1845	SMW-1 Development Water	Yes	NW of Building No. 1845
19	5/28/98	Building 1845	SMW-10 Soil Cuttings	Yes	NW of Building No. 1845
20	5/28/98	Building 1845	SMW-10 Development Water	Yes	NW of Building No. 1845
21	5/28/98	Building 1845	SMW-10 Development Water	Yes	NW of Building No. 1845
22	5/29/98	Building 1845	SMW-2 Soil Cuttings	Yes	NW of Building No. 1845
23	5/29/98	Building 1845	SMW-2 Development Water	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
24	5/29/98	Building 1845	SMW-4 Soil Cuttings	Yes	NW of Building No. 1845
25	5/29/98	Building 1845	SMW-4 Development Water	Yes	NW of Building No. 1845
26	5/29/98	Building 1845	DMW-1 Development Water	Yes	NW of Building No. 1845
27	5/29/98	Building 1845	DMW-1 Development Water	Yes	NW of Building No. 1845
28	5/29/98	Building 1845	DMW-1 Development Water	Yes	NW of Building No. 1845
29	5/29/98	Building 1845	DMW-1 Development Water	Yes	NW of Building No. 1845
30	5/29/98	Building 1845	IMW-1 Development Water	Yes	NW of Building No. 1845
31	5/29/98	Building 1845	IMW-1 Development Water	Yes	NW of Building No. 1845
32	6/1/98	Building 1845	DMW-2 Mud	Yes	NW of Building No. 1845
33	6/1/98	Building 1845	DMW-2 Mud	Yes	NW of Building No. 1845
34	6/1/98	Building 1845	DMW-2 Mud	Yes	NW of Building No. 1845
35	6/1/98	Building 1845	DMW-2 Mud	Yes	NW of Building No. 1845
36	6/1/98	Building 1845	DMW-2 Mud	Yes	NW of Building No. 1845
37	6/1/98	Building 1845	DMW-2 Mud	Yes	NW of Building No. 1845
38	6/1/98	Building 1845	IMW-2 Mud	Yes	NW of Building No. 1845
39	6/1/98	Building 1845	IMW-2 Mud	Yes	NW of Building No. 1845
40	6/1/98	Building 1845	IMW-2 Mud	Yes	NW of Building No. 1845
41	6/1/98	Building 1845	IMW-2 Mud	Yes	NW of Building No. 1845
42	6/1/98	Building 1845	IMW-2 Mud	Yes	NW of Building No. 1845
43	6/1/98	Building 1845	IMW-2 Mud	Yes	NW of Building No. 1845
44	6/2/98	Building 1845	Decon.-1 Decon. Water	Yes	NW of Building No. 1845
45	6/2/98	Building 1845	Decon.-2 Decon. Water	Yes	NW of Building No. 1845
46	6/2/98	Building 1845	IMW-2 Development Water	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
47	6/2/98	Building 1845	IMW-2 Development Water	Yes	NW of Building No. 1845
48	6/2/98	Building 1845	IMW-2 Development Water	Yes	NW of Building No. 1845
49	6/2/98	Building 1845	IMW-2 Development Water	Yes	NW of Building No. 1845
50	6/2/98	Building 1845	IMW-2 Development Water	Yes	NW of Building No. 1845
51	6/2/98	Building 1845	IMW-2 Development Water	Yes	NW of Building No. 1845
52	6/2/98	Building 1845	DMW-2 Development Water	Yes	NW of Building No. 1845
53	6/2/98	Building 1845	DMW-2 Development Water	Yes	NW of Building No. 1845
54	6/2/98	Building 1845	DMW-2 Development Water	Yes	NW of Building No. 1845
55	6/2/98	Building 1845	DMW-2 Development Water	Yes	NW of Building No. 1845
56	6/2/98	Building 1845	DMW-2 Development Water	Yes	NW of Building No. 1845
57	6/2/98	Building 1845	SMW-13 Soil Cuttings	Yes	NW of Building No. 1845
58	6/2/98	Building 1845	SMW-13 Development Water	Yes	NW of Building No. 1845
59	6/2/98	Building 1845	SMW-3 Soil Cuttings	Yes	NW of Building No. 1845
60	6/2/98	Building 1845	SMW-3 Development Water	Yes	NW of Building No. 1845
61	6/3/98	Building 1845	DMW-3 Mud	Yes	NW of Building No. 1845
62	6/3/98	Building 1845	DMW-3 Mud	Yes	NW of Building No. 1845
63	6/3/98	Building 1845	DMW-3 Mud	Yes	NW of Building No. 1845
64	6/3/98	Building 1845	DMW-3 Mud	Yes	NW of Building No. 1845
65	6/3/98	Building 1845	DMW-3 Mud	Yes	NW of Building No. 1845
66	6/3/98	Building 1845	DMW-3 Mud	Yes	NW of Building No. 1845
67	6/3/98	Building 1845	IMW-3 Mud	Yes	NW of Building No. 1845
68	6/3/98	Building 1845	IMW-3 Mud	Yes	NW of Building No. 1845
69	6/3/98	Building 1845	IMW-3 Mud	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
70	6/3/98	Building 1845	IMW-3 Mud	Yes	NW of Building No. 1845
71	6/3/98	Building 1845	IMW-3 Mud	Yes	NW of Building No. 1845
72	6/3/98	Building 1845	SMW-6 Soil Cuttings	Yes	NW of Building No. 1845
73	6/3/98	Building 1845	SMW-6 Development Water	Yes	NW of Building No. 1845
74	6/4/98	Building 1845	SMW-5 Soil Cuttings	Yes	NW of Building No. 1845
75	6/4/98	Building 1845	SMW-5 Development Water	Yes	NW of Building No. 1845
76	6/4/98	Building 1845	SMW-5 Development Water	Yes	NW of Building No. 1845
77	6/4/98	Building 1845	SMW-9 Soil Cuttings	Yes	NW of Building No. 1845
78	6/4/98	Building 1845	SMW-9 Development Water	Yes	NW of Building No. 1845
79	6/4/98	Building 1845	SMW-9 Development Water	Yes	NW of Building No. 1845
80	6/4/98	Building 815	DMW-12 Mud	Yes	NW of Building No. 1845
81	6/4/98	Building 815	DMW-12 Mud	Yes	NW of Building No. 1845
82	6/4/98	Building 815	DMW-12 Mud	Yes	NW of Building No. 1845
83	6/4/98	Building 815	DMW-12 Mud	Yes	NW of Building No. 1845
84	6/4/98	Building 815	DMW-12 Mud	Yes	NW of Building No. 1845
85	6/4/98	Building 815	DMW-12 Mud	Yes	NW of Building No. 1845
86	6/5/98	Building 815	DMW-12 Soil Cuttings	Yes	NW of Building No. 1845
87	6/5/98	Building 815	SMW-12 Development Water	Yes	NW of Building No. 1845
88	6/5/98	Building 815	SMW-12 Development Water	Yes	NW of Building No. 1845
89	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
90	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
91	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
92	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
93	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
94	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
95	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
96	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
97	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
98	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
99	6/5/98	Building 815	DMW-12 Development Water	Yes	NW of Building No. 1845
100	6/5/98	Building 1845	DMW-3 Development Water	Yes	NW of Building No. 1845
101	6/5/98	Building 1845	DMW-3 Development Water	Yes	NW of Building No. 1845
102	6/5/98	Building 1845	DMW-3 Development Water	Yes	NW of Building No. 1845
103	6/5/98	Building 1845	DMW-3 Development Water	Yes	NW of Building No. 1845
104	6/5/98	Building 1845	DMW-3 Development Water	Yes	NW of Building No. 1845
105	6/5/98	Building 1845	DMW-3 Development Water	Yes	NW of Building No. 1845
106	6/5/98	Building 1845	DMW-3 Development Water	Yes	NW of Building No. 1845
107	6/5/98	Building 1845	IMW-3 Development Water	Yes	NW of Building No. 1845
108	6/5/98	Building 1845	IMW-3 Development Water	Yes	NW of Building No. 1845
109	6/5/98	Building 1845	IMW-3 Development Water	Yes	NW of Building No. 1845
110	6/5/98	Building 1845	IMW-3 Development Water	Yes	NW of Building No. 1845
111	6/5/98	Building 1845	IMW-3 Development Water	Yes	NW of Building No. 1845
112	6/5/98	Building 1845	IMW-3 Development Water	Yes	NW of Building No. 1845
113	6/5/98	Building 1845	IMW-3 Development Water	Yes	NW of Building No. 1845
114	6/5/98	Building 1845	IMW-3 Development Water	Yes	NW of Building No. 1845
115	6/5/98	Building 1845	Decon.-3 Decon.. Water	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
116	6/5/98	Building 1845	Decon.-4 Decon. Plastic	Yes	NW of Building No. 1845
117	6/8/98	Building 815	IMW-12 Mud	Yes	NW of Building No. 1845
118	6/8/98	Building 815	IMW-12 Mud	Yes	NW of Building No. 1845
119	6/8/98	Building 815	IMW-12 Mud	Yes	NW of Building No. 1845
120	6/8/98	Building 815	IMW-12 Mud	Yes	NW of Building No. 1845
121	6/8/98	Building 815	IMW-12 Mud	Yes	NW of Building No. 1845
122	6/8/98	Building 815	IMW-12 Mud	Yes	NW of Building No. 1845
123	6/8/98	Building 1845	SMW-11 Soil	Yes	NW of Building No. 1845
124	6/8/98	Building 1845	SMW-11 Development Water	Yes	NW of Building No. 1845
125	6/8/98	Building 1845	SMW-11 Development Water	Yes	NW of Building No. 1845
126	6/8/98	Building 1845	DMW-1 Purge Water	Yes	NW of Building No. 1845
127	6/8/98	Building 1845	IMW-1 Purge Water	Yes	NW of Building No. 1845
128	6/9/98	Building 815	SMW-16 Soil Cuttings	Yes	NW of Building No. 1845
129	6/9/98	Building 815	SMW-16 Development Water	Yes	NW of Building No. 1845
130	6/9/98	Building 815	SMW-18 Soil Cuttings	Yes	NW of Building No. 1845
131	6/9/98	Building 815	SMW-18 Development Water	Yes	NW of Building No. 1845
132	6/9/98	Building 815	DMW-18 Mud	Yes	NW of Building No. 1845
133	6/9/98	Building 815	DMW-18 Mud	Yes	NW of Building No. 1845
134	6/9/98	Building 815	DMW-18 Mud	Yes	NW of Building No. 1845
135	6/9/98	Building 815	DMW-18 Mud	Yes	NW of Building No. 1845
136	6/9/98	Building 815	DMW-18 Mud	Yes	NW of Building No. 1845
137	6/9/98	Building 815	DMW-18 Mud	Yes	NW of Building No. 1845
138	6/9/98	Building 815	DMW-18 Mud	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
139	6/10/98	Building 1845	Decon.-5 Decon. Water	Yes	NW of Building No. 1845
140	6/10/98	Building 1845	SMW-3 Purge Water	Yes	NW of Building No. 1845
141	6/10/98	Building 815	IMW-18 Mud	Yes	NW of Building No. 1845
142	6/10/98	Building 815	IMW-18 Mud	Yes	NW of Building No. 1845
143	6/10/98	Building 815	IMW-18 Mud	Yes	NW of Building No. 1845
144	6/10/98	Building 815	IMW-18 Mud	Yes	NW of Building No. 1845
145	6/10/98	Building 815	IMW-18 Mud	Yes	NW of Building No. 1845
146	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
147	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
148	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
149	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
150	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
151	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
152	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
153	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
154	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
155	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
156	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
157	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
158	6/10/98	Building 815	DMW-18 Development Water	Yes	NW of Building No. 1845
159	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845
160	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845
161	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
162	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845
163	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845
164	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845
165	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845
166	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845
167	6/10/98	Building 815	IMW-12 Development Water	Yes	NW of Building No. 1845
168	6/10/98	Parking Area	DMW-23 Mud	Yes	NW of Building No. 1845
169	6/10/98	Parking Area	DMW-23 Mud	Yes	NW of Building No. 1845
170	6/10/98	Parking Area	DMW-23 Mud	Yes	NW of Building No. 1845
171	6/10/98	Parking Area	DMW-23 Mud	Yes	NW of Building No. 1845
172	6/10/98	Parking Area	DMW-23 Mud	Yes	NW of Building No. 1845
173	6/10/98	Parking Area	DMW-23 Mud	Yes	NW of Building No. 1845
174	6/10/98	Building 1845	DMW-3, IMW-3 Purge Water	Yes	NW of Building No. 1845
175	6/10/98	Building 1845	SMW-10 Purge Water	Yes	NW of Building No. 1845
176	6/11/98	Building 815	IMW-18 Development Water	Yes	NW of Building No. 1845
177	6/11/98	Building 815	IMW-18 Development Water	Yes	NW of Building No. 1845
178	6/11/98	Building 815	IMW-18 Development Water	Yes	NW of Building No. 1845
179	6/11/98	Building 815	IMW-18 Development Water	Yes	NW of Building No. 1845
180	6/11/98	Building 815	IMW-18 Development Water	Yes	NW of Building No. 1845
181	6/11/98	Building 815	IMW-18 Development Water	Yes	NW of Building No. 1845
182	6/11/98	Building 815	IMW-18 Development Water	Yes	NW of Building No. 1845
183	6/11/98	Building 815	IMW-18 Development Water	Yes	NW of Building No. 1845
184	6/11/98	Parking Area	IMW-23 Mud	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
185	6/11/98	Parking Area	IMW-23 Mud	Yes	NW of Building No. 1845
186	6/11/98	Parking Area	IMW-23 Mud	Yes	NW of Building No. 1845
187	6/11/98	Parking Area	IMW-23 Mud	Yes	NW of Building No. 1845
188	6/11/98	Parking Area	IMW-23 Mud	Yes	NW of Building No. 1845
189	6/11/98	Building 815	SMW-21 Soil Cuttings	Yes	NW of Building No. 1845
190	6/12/98	Parking Area	DMW-23 Development Water	Yes	NW of Building No. 1845
191	6/12/98	Parking Area	DMW-23 Development Water	Yes	NW of Building No. 1845
192	6/12/98	Parking Area	DMW-23 Development Water	Yes	NW of Building No. 1845
193	6/12/98	Parking Area	DMW-23 Development Water	Yes	NW of Building No. 1845
194	6/12/98	Parking Area	IMW-23 Development Water	Yes	NW of Building No. 1845
195	6/12/98	Parking Area	IMW-23 Development Water	Yes	NW of Building No. 1845
196	6/12/98	Parking Area	IMW-23 Development Water	Yes	NW of Building No. 1845
197	6/12/98	Parking Area	IMW-23 Development Water	Yes	NW of Building No. 1845
198	6/12/98	Parking Area	IMW-23 Development Water	Yes	NW of Building No. 1845
199	6/12/98	FL/815	SMW-20 Soil Cuttings	Yes	NW of Building No. 1845
200	6/12/98	FL/815	SMW-19 Soil Cuttings	Yes	NW of Building No. 1845
201	6/12/98	1845/815	ABB 9&10 Purge Water	Yes	NW of Building No. 1845
202	6/12/98	Building 815	SMW-11 ABB 5&6 Purge Water	Yes	NW of Building No. 1845
203	6/12/98	Building 815	ABB 5&6 Purge Water	Yes	NW of Building No. 1845
204	6/12/98	Building 1845	Decon.-6 Decon. Plastics	Yes	NW of Building No. 1845
205	6/12/98	Building 1845	Decon.-7 Decon. Water	Yes	NW of Building No. 1845
206	6/15/98	FL/815	SMW-21 Development Water	Yes	NW of Building No. 1845
207	6/15/98	FL/815	SMW-20 Development Water	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
208	6/15/98	FL/815	SMW-19 Development Water	Yes	NW of Building No. 1845
209	6/15/98	FL/815	DMW-12 IMW-12 SMW-12 Purge Water	Yes	NW of Building No. 1845
210	6/16/98	Parking Area	SMW-23 Soil Cuttings	Yes	NW of Building No. 1845
211	6/16/98	Parking Area	SMW-23 Development Water	Yes	NW of Building No. 1845
212	6/16/98	Parking Area	SMW-24 Soil Cuttings	Yes	NW of Building No. 1845
213	6/16/98	Parking Area	SMW-24 Development Water	Yes	NW of Building No. 1845
214	6/16/98	Building 815	SMW-17 Soil Cuttings	Yes	NW of Building No. 1845
215	6/16/98	Building 815	SMW-17 Development Water	Yes	NW of Building No. 1845
216	6/16/98	Building 815	SMW-25 Soil Cuttings	Yes	NW of Building No. 1845
217	6/16/98	Building 815	SMW-25 Development Water	Yes	NW of Building No. 1845
218	6/17/98	Washrack	SMW-26 Soil Cuttings	Yes	NW of Building No. 1845
219	6/17/98	Washrack	SMW-26 Development Water	Yes	NW of Building No. 1845
220	6/17/98	Detention Pond	SMW-27 Soil Cuttings	Yes	NW of Building No. 1845
221	6/17/98	Detention Pond	SMW-27 Development Water	Yes	NW of Building No. 1845
222	6/17/98	Building 815	SMW-14 Soil Cuttings	Yes	NW of Building No. 1845
223	6/17/98	Building 815	SMW-14 Development Water	Yes	NW of Building No. 1845
224	6/17/98	Building 815	SMW-22 Soil Cuttings	Yes	NW of Building No. 1845
225	6/17/98	Building 815	SMW-22 Development Water	Yes	NW of Building No. 1845
226	6/17/98	1845/815	SMW-18 IMW-1 Purge Water	Yes	NW of Building No. 1845
227	6/17/98	Building 1845	DMW-1 ABB-1 Purge Water	Yes	NW of Building No. 1845
228	6/17/98	Building 815	DMW-18 IMW-18 Purge Water	Yes	NW of Building No. 1845
229	6/17/98	Parking Area	ABB-2 ABB-3 Purge Water	Yes	NW of Building No. 1845
230	6/17/98	Parking Area	ABB-4 Purge Water	Yes	NW of Building No. 1845

IDW DRUM TRACKING LOG

Drum Number	Date Collected	Generation Location	Contents	Labeled?	Staging Location
231	6/18/98	Building 815/Parking Area	Purge Water SMW-17, IMW-23, SMW-23, DMW-23	Yes	NW of Building No. 1845
232	6/19/98	Building 815/Parking Area	SMW-24, 19, 20, 21, Purge Water	Yes	NW of Building No. 1845
233	6/22/98	Building 815	SMW-25, 26, 27, 22, Purge Water	Yes	NW of Building No. 1845
234	6/17/98	Building 815	SMW-16, ABB-8, DMW-18, Purge Water	Yes	NW of Building No. 1845
235	6/24/98	FL Area	PPE/Plastic	Yes	NW of Building No. 1845
236	6/24/98	FL Area	PPE/Plastic	Yes	NW of Building No. 1845
237	7/21/98	Building 1845	Purge Water SMW-25, SMW-22, SMW-9, SMW-15	Yes	NW of Building 1845

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APPENDIX E

Laboratory Analytical Results

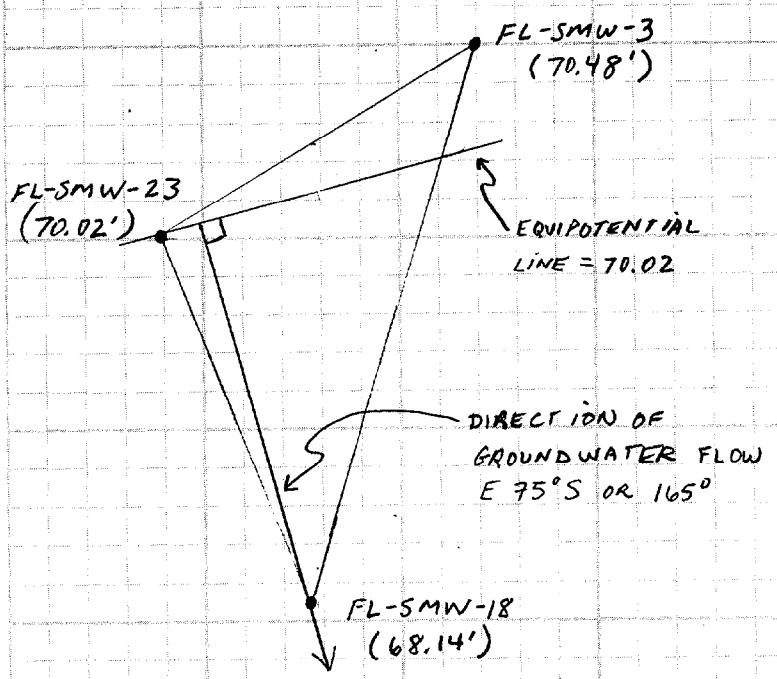
APPENDIX F

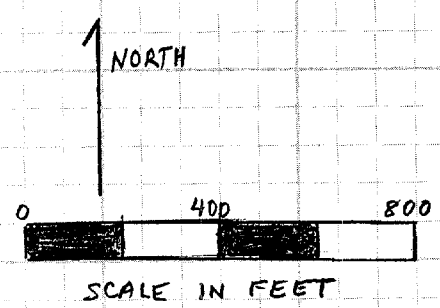
Hydrogeological Calculations

Golder Associates	SUBJECT HORIZONTAL HYDRAULIC GRADIENT CALCULATIONS		
	Job No. 973-3778 Ref. NGC/CECIL FIELD	Made by BMW Checked KW Reviewed JSP	Date 7/30/98 Sheet 1 Of 3

HYDRAULIC GRADIENT CALCULATIONS
— FLIGHT LINE FACILITIES
(BUILDINGS 1845 & 815)
WATER LEVEL DATA FROM JUNE 1998
(SHALLOW ZONE)

WELL	GW ELEV.
FL-SMW-23	70.02'
FL-SMW-3	70.48'
FL-SMW-18	68.14'





FL-SMW-3 to FL-SMW-18

$$\frac{\Delta h}{\Delta L} = \frac{70.48 - 68.14}{1190'} = \frac{2.34}{1190'}$$

Δh @ FL-SMW-3 to FL-SMW-23 = 70.48 - 70.02 = 0.46

$$\frac{0.46}{2.34} = 0.196 \times 1190' = 230 \text{ ft}$$

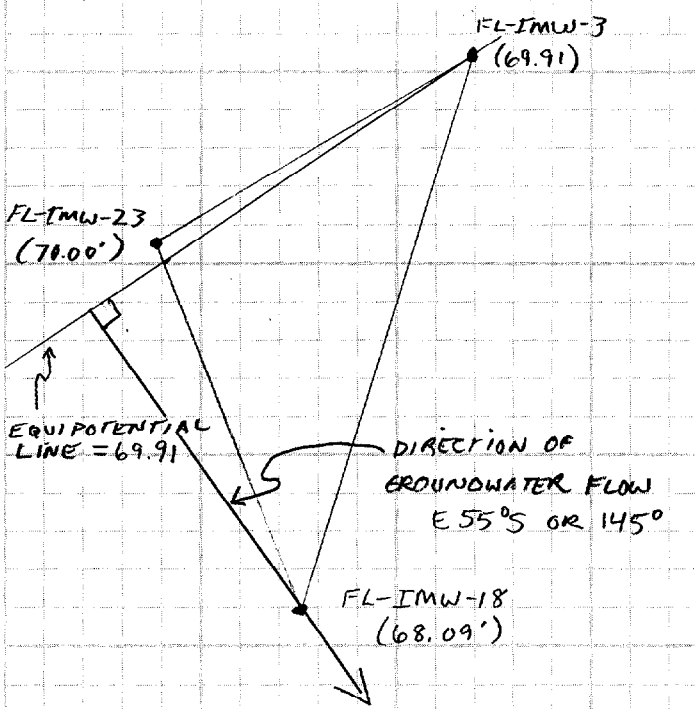
∴ THE FL-SMW-23 CONTOUR INTERSECTS THE LINE FROM FL-SMW-3 TO FL-SMW-18 APPROXIMATELY 230 ft FROM FL-SMW-3

$$i_{h(s)} = \frac{\Delta h}{\Delta L} = \frac{70.02 - 68.14}{820'} = \frac{1.88}{820'} = 2.3 \times 10^{-3} \text{ ft/ft}$$

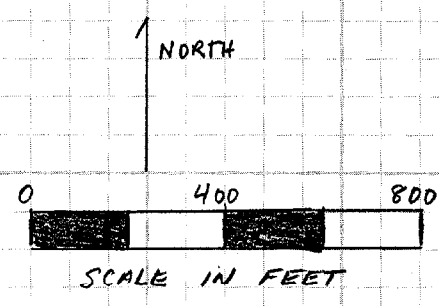
BEARING: E 75°S

Golder Associates	SUBJECT HORIZONTAL HYDRAULIC GRADIENT CALCULATIONS		
	Job No. 973-3778	Made by BMW	Date 7/30/98
	Ref. NGC/CEEIL FIELD	Checked KM	Sheet 2 Of 3
		Reviewed JSP	

INTERMEDIATE ZONE



WELL	GW ELEV.
FL-IMW-23	70.00'
FL-IMW-3	69.91'
FL-IMW-18	68.09



FL-IMW-23 to FL-IMW-18

$$\frac{\Delta h}{\Delta L} = \frac{70.00-68.09}{800'} = \frac{1.91}{800'}$$

Δh @ FL-IMW-23 to FL-IMW-3 = 70.00 − 69.91 = 0.09

$$\frac{0.09}{1.91} = 0.047 \times 800' = 38 \text{ ft}$$

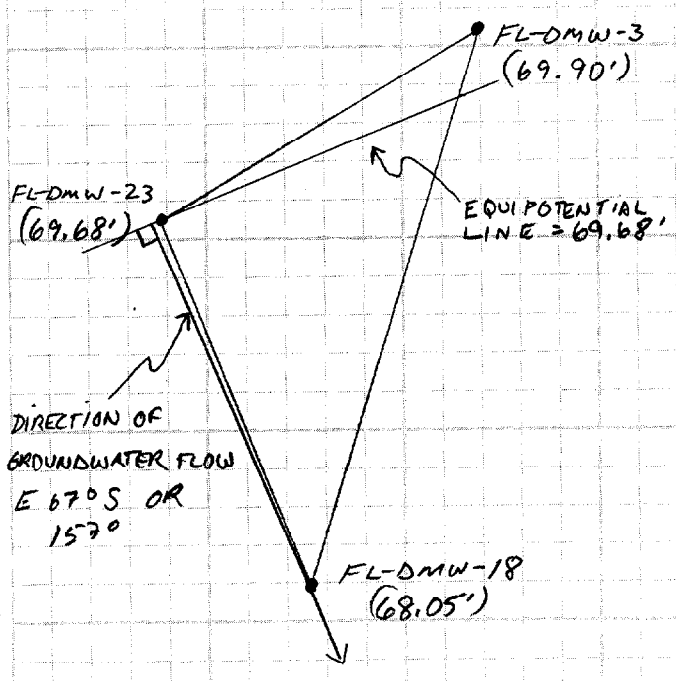
∴ THE FL-IMW-3 CONTOUR INTERSECTS THE LINE FROM FL-IMW-23 TO FL-IMW-18 APPROXIMATELY 38 ft FROM FL-IMW-23.

$$i_{h(I)} = \frac{\Delta h}{\Delta L} = \frac{69.91-68.09}{760'} = \frac{1.82}{760} = 2.4 \times 10^{-3} \text{ ft/ft}$$

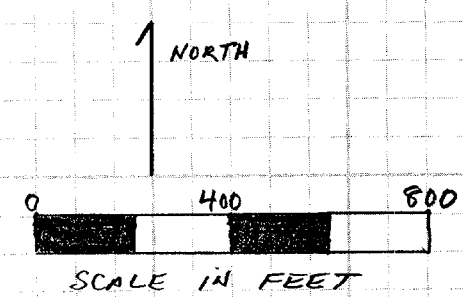
BEARING: E 55° S

Golder Associates	SUBJECT HORIZONTAL HYDRAULIC GRADIENT CALCULATIONS		
	Job No. 973-3778 Ref. NGL/CECIL FIELD	Made by BMW Checked KM Reviewed JP	Date 7/30/98 Sheet 3 Of 3

DEEP ZONE



WELL	GW ELEV
FL-DMW-23	69.68'
FL-DMW-3	69.90'
FL-DMW-18	68.05'



FL-DMW-3 to FL-DMW-18

$$\frac{\Delta h}{\Delta L} = \frac{69.90 - 68.05}{1190'} = \frac{1.85}{1190}$$

Δh @ FL-DMW-3 to FL-DMW-23 = 69.90 - 69.68 = 0.22

$$\frac{0.22}{1.85} = 0.119 \times 1190' = 142 \text{ ft}$$

∴ THE FL-DMW-23 CONTOUR INTERSECTS THE LINE FROM FL-DMW-3 TO FL-DMW-18 APPROXIMATELY 142 ft FROM FL-DMW-3.

$$i_{h(o)} = \frac{\Delta h}{\Delta L} = \frac{69.68 - 68.05}{820'} = \frac{1.63}{820} = 2.0 \times 10^{-3} \text{ ft/ft}$$

BEARING: E 67°S

Golder Associates	SUBJECT GROUNDWATER FLOW RATE CALCULATIONS		
	Job No. 973-3778	Made by BMW	Date 7/30/98
	Ref. NGC/CECIL FIELD	Checked KM	Sheet 1 Of 1
		Reviewed JSP	

OBJECTIVE: CALCULATE THE AVERAGE LINEAR VELOCITY OF GROUNDWATER FLOW AT THE FLIGHT LINE FACILITIES, CECIL FIELD USING GROUNDWATER ELEVATION DATA FROM JUNE 1998.

METHOD: USE THE EQUATION

$$\vec{V} = \frac{K \cdot i}{ne}$$

WHERE:
K = HYDRAULIC CONDUCTIVITY (ft/DAY)
i = HORIZONTAL HYDRAULIC GRADIENT (ft/ft)
ne = EFFECTIVE POROSITY (0.3)

SHALLOW ZONE

— NOTE: · K VALUES WERE OBTAINED FROM THE SITE I.G.R.I. BY ABB. —
· i VALUES ON PREVIOUS CALC. SHEETS

$$V_S = \frac{K \cdot i_{h(S)}}{ne} = \frac{(2.5\,ft/day)(2.3\times10^{-3}\,ft/ft)}{0.3}$$

$$= 0.02\ ft/day \times 365\ DAYS = 7\ ft/YEAR$$

INTERMEDIATE ZONE

$$V_I = \frac{K \cdot i_{h(I)}}{ne} = \frac{(17\,ft/day)(2.4\times10^{-3}\,ft/ft)}{0.3}$$

$$= 0.14\ ft/day \times 365\ DAYS = 50\ ft/YEAR$$

DEEP ZONE

$$V_D = \frac{K \cdot i_{h(D)}}{ne} = \frac{(22.5\,ft/day)(2\times10^{-3}\,ft/ft)}{0.3}$$

$$= 0.15\ ft/day \times 365\ DAYS = 55\ ft/YEAR$$

Golder Associates	SUBJECT VERTICAL HYDRAULIC GRADIENT CALCULATIONS		
	Job No. 973-3778	Made by BMW	Date 7/30/98
	Ref. NGC/CECIL FIELD	Checked KM	Sheet 1 Of 1
		Reviewed JSP	

OBJECTIVE: CALCULATE VERTICAL HYDRAULIC GRADIENTS BETWEEN WELL PAIRS AT NGC-CECIL FIELD FLIGHT LINE FACILITIES (BUILDINGS 1845 & 815) USING WATER LEVEL DATA FROM JUNE 1998

METHOD: VERTICAL HYDRAULIC GRADIENT (i_v) IS CALCULATED BY THE FOLLOWING EQUATION:

$$i_v = \frac{dh}{dl} = \frac{\Delta h}{\Delta l}$$

WHERE: Δh = CHANGE IN HEAD
Δl = VERTICAL DISTANCE BETWEEN MEASUREMENTS (CENTER OF WELL SCREENS)

NOTE: (+) GRADIENT INDICATES DOWNWARD FLOW
(−) GRADIENT INDICATES UPWARD FLOW

SHALLOW → INTERMEDIATE WELLS

FL-SMW-23 → FL-IMW-23: $\frac{70.02 - 70.00}{21.5'} = +9.3 \times 10^{-4}$ ft/ft

FL-SMW-3 → FL-IMW-3: $\frac{70.48 - 69.91}{26.5'} = +0.02$ ft/ft

FL-SMW-18 → FL-IMW-18: $\frac{68.14 - 68.09}{20.0'} = +2.5 \times 10^{-3}$ ft/ft

INTERMEDIATE → DEEP WELLS

FL-IMW-23 → FL-DMW-23: $\frac{70.00 - 69.68}{15'} = +0.02$ ft/ft

FL-IMW-3 → FL-DMW-3: $\frac{69.91 - 69.90}{12'} = +8.3 \times 10^{-4}$ ft/ft

FL-IMW-18 → FL-DMW-18: $\frac{68.09 - 68.05}{11.5'} = +2.5 \times 10^{-3}$ ft/ft