NORTHROP GRUMMAN

BETHPAGE FACILITY

SEPTEMBER 2002

Investigation Work Plan
South Receiving Basin
Revision 1

DVIRKA AND BARTILUCCI
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

RLA/JOBS/NORTHROP1965(08/02/02)

INVESTIGATION WORK PLAN
SOUTH RECEIVING BASIN

Prepared for:

NORTHROP GRUMMAN CORPORATION
Bethpage, New York

Prepared by:

DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
Woodbury, New York

SEPTEMBER 2002

♦1965\F0801203.doc(R02)

INVESTIGATION WORK PLAN
SOUTH RECEIVING BASIN

NORTHROP GRUMMAN CORPORATION
BETHPAGE, NEW YORK

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

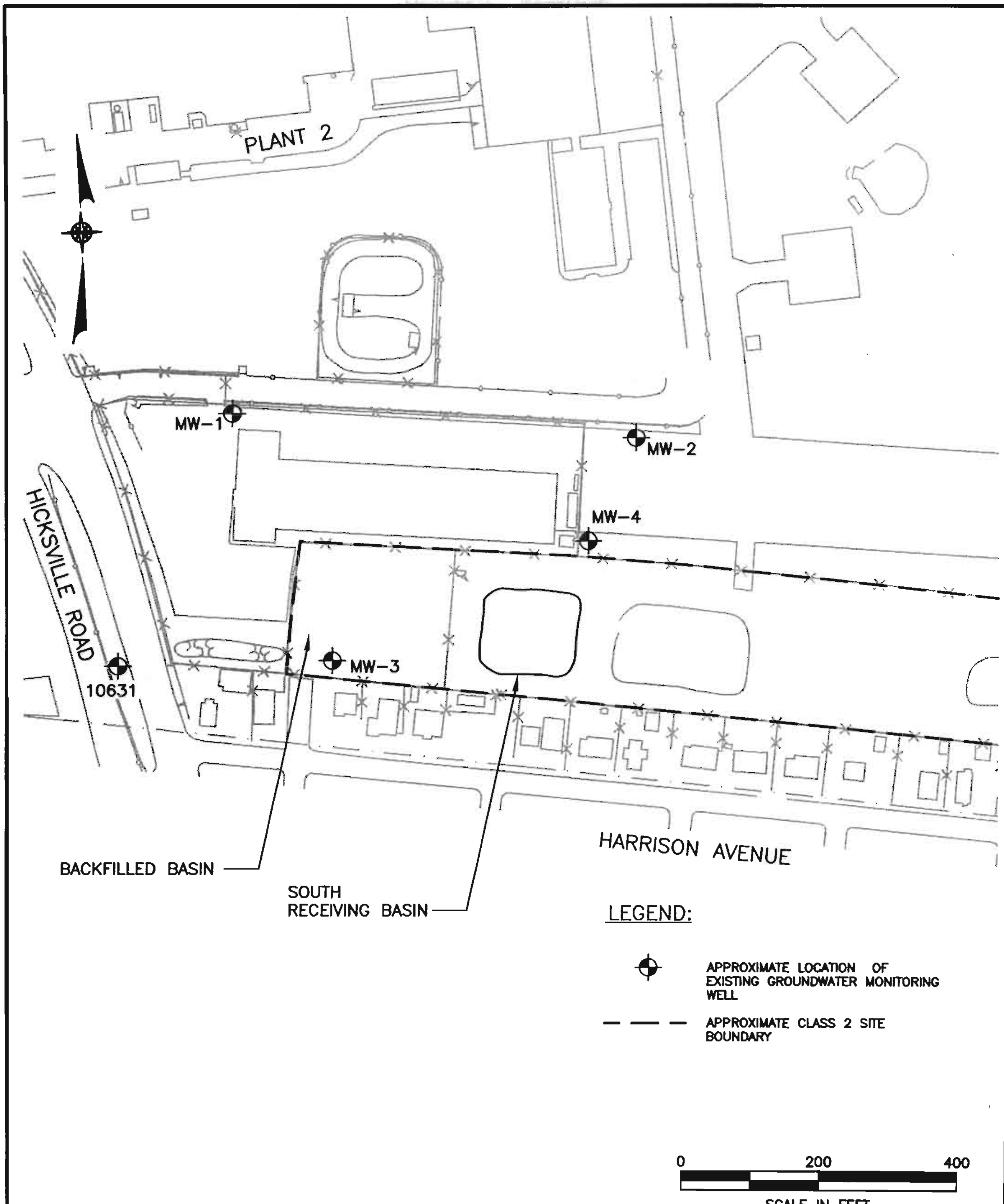
List of Appendices

TABLE OF CONTENTS (continued)

List of Figures

List of Tables

Section 1



Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

NORTHROP GRUMMAN CORPORATION
BETHPAGE FACILITY
SOUTH RECEIVING BASIN

SITE PLAN

FIGURE 1-2

F:\1965\1965-FIGURE-1-2.dwg, 09/18/02 01:38:27 PM, LGlubiak

This Investigation Work Plan has been prepared in accordance with the NYSDEC guidelines for preparation of Quality Assurance and Quality Control Plans including the 2000 Analytical Services Protocol (ASP).

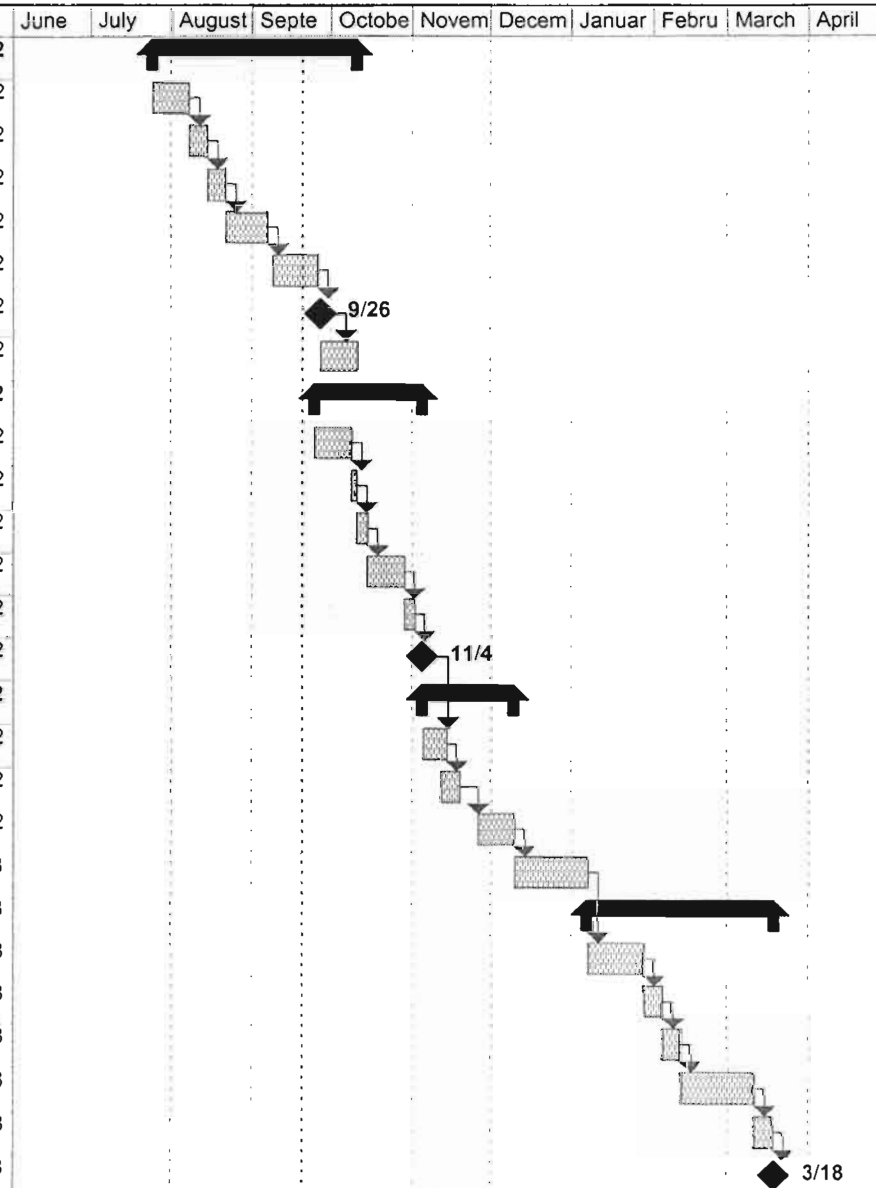
The Work Plan provides the following information relative to conducting the Remedial Investigation (RI):

- Project/Site Background;
- Data Use Objectives;
- Sampling Program;
- Quality Assurance/Quality Control Samples;
- Sampling and Handling Procedures;
- Decontamination Procedures;
- Laboratory Sample Custody Procedures;
- Sample Documentation;
- Equipment Calibration and Preventative Maintenance;
- Control and Disposal of Investigation-derived Material;
- Documentation, Data Reduction and Reporting;
- Data Validation;
- Performance and System Audits; and
- Corrective Action.

The schedule for implementation of this project is provided in Figure 1-3. Specific deadlines for completion of tasks and subtasks are established throughout the project schedule to ensure timely completion of the work.

Northrop Grumman Corporation
Remedial Investigation for the South Receiving Basin

ID	Task Name	Duration	Start	Finish
1	**Task 1 - Work Plan**	**56 days**	**Thu 7/25/02**	**Thu 10/10/02**
2	Prepare Draft Work Plan	10 days	Thu 7/25/02	Wed 8/7/02
3	NGC Review	5 days	Thu 8/8/02	Wed 8/14/02
4	Revise Work Plan	5 days	Thu 8/15/02	Wed 8/21/02
5	NYSDEC Review	12 days	Thu 8/22/02	Fri 9/6/02
6	Revise Work Plan	13 days	Mon 9/9/02	Wed 9/25/02
7	Issue Final Work Plan	0 days	Thu 9/26/02	Thu 9/26/02
8	Final NYSDEC Review	10 days	Fri 9/27/02	Thu 10/10/02
9	**Task 2 - Health and Safety Plan**	**29 days**	**Wed 9/25/02**	**Mon 11/4/02**
10	Prepare Draft HASP	10 days	Wed 9/25/02	Tue 10/8/02
11	NGC Review	2 days	Wed 10/9/02	Thu 10/10/02
12	Revise HASP	2 days	Fri 10/11/02	Mon 10/14/02
13	NYSDEC Review	10 days	Tue 10/15/02	Mon 10/28/02
14	Revise HASP	4 days	Tue 10/29/02	Fri 11/1/02
15	Issue Final HASP	0 days	Mon 11/4/02	Mon 11/4/02
16	**Task 3 - Remedial Investigation**	**25 days**	**Tue 11/5/02**	**Mon 12/9/02**
17	Field Work	7 days	Tue 11/5/02	Wed 11/13/02
18	Laboratory Analysis	5 days	Tue 11/12/02	Mon 11/18/02
19	NYSDEC Review of Lab Data	10 days	Tue 11/26/02	Mon 12/9/02
20	**Task 4 - Backfill South Receiving Basin**	**20 days**	**Tue 12/10/02**	**Mon 1/6/03**
21	**Task 5 - Draft/Final Report**	**51 days**	**Tue 1/7/03**	**Tue 3/18/03**
22	Prepare Draft Report	15 days	Tue 1/7/03	Mon 1/27/03
23	NGC Review	5 days	Tue 1/28/03	Mon 2/3/03
24	Revise Report	5 days	Tue 2/4/03	Mon 2/10/03
25	NYSDEC Review	20 days	Tue 2/11/03	Mon 3/10/03
26	Revise Report	5 days	Tue 3/11/03	Mon 3/17/03
27	Issue Final Report	0 days	Tue 3/18/03	Tue 3/18/03



Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Figure 1-3

Section 2

2.0 SAMPLING AND ANALYSIS PLAN

The purpose of this Generic Sampling and Analysis Plan is to provide general information on elements of the field investigation that is proposed for the SRB. Information relating to the number and locations of environmental samples planned to be collected as part of this site-specific field investigation will be provided in the Site-Specific Work Plan (see Section 4.0).

The following is a description of the field activities that may be conducted to support the RI at the SRB. For a detailed description of sampling and analytical procedures, refer to the QA/QC Plan in Section 3.0.

2.1 Surface Soil Sampling

Surface soil samples may be collected on-site at locations of known or suspected spill or disposal areas and areas of visually stained soil or stressed vegetation to determine the nature and extent of surficial soil contamination on-site. The number of samples to be collected will be based upon the size of the area being investigated and surface observation. Samples will be collected at a depth of 0 to 2 inches below ground surface using either a disposable polyethylene scoop, decontaminated stainless steel trowel or a sterile wooden tongue depressor. If the area is paved, samples will be collected 0 to 2 inches below the pavement. Detailed sampling procedures are described in Section 3.5 of this Work Plan. Site-specific sampling methods, if different from this Generic Work Plan, will be provided in the Site-Specific Work Plan. Specific sampling locations and analytical methods will be described in the Site-Specific Work Plan.

2.2 Direct Push Soil Sampling

Direct push sampling techniques can allow for the relatively rapid collection of soil samples with minimal disturbance of the ground surface and generation of soil cuttings. Soil samples can be collected with a probe from various depths in the vicinity of the suspected contaminant source to determine the depth of the source and degree of contamination in the vadose zone. The geology of the site must be evaluated to determine if direct push (soil probe) sampling techniques are feasible. If probe sampling is not feasible at a site due to the subsurface geology, sampling will then be completed utilizing standard drilling techniques such as hollow stem augers with split spoon sampling. The probes will be installed utilizing a decontaminated screen point and sampler fitted with a disposable acetate liner. Detailed sampling procedures are provided in the QA/QC Plan in Section 3.0. Probe locations and analytical methods will be provided in the Site-Specific Work Plan. Probe holes will be abandoned according to procedures described in Section 2.5.

2.3 Direct Push Groundwater Screening and Sampling

Collection of groundwater samples utilizing direct push sampling techniques include utilization of a groundwater probe sampler. Direct push sampling techniques will be utilized to collect groundwater samples to define the horizontal and vertical extent of groundwater contamination on- and off-site.

The direct push sampling techniques are useful for preliminary contaminant plume delineation based on actual groundwater sampling. Drawbacks to this method include the fact that this is a one-time sample only. The geology and hydrogeology of the site must be evaluated to determine if it is amenable to direct push sampling techniques. Probe sampling is typically only applicable in unconsolidated deposits.

Groundwater probes will be installed utilizing a decontaminated screened sampler. The decontaminated probe and rods will be driven until the sampler tip is approximately 1-foot below the target sampling depth. Once that depth has been reached, the expandable drive point will be disengaged and the rods pulled back a distance of about 2 feet to expose the screened sampler. Disposable polyethylene tubing, equipped with a bottom check valve, will be used to convey groundwater to the surface for collection. Each sample, upon retrieval, will be analyzed in the field for pH, conductivity, turbidity and temperature. In situations where samples are collected for screening or when fast analyses results are required, a portable gas chromatograph will be used.

If necessary, samples may be collected for iron and manganese to provide additional information for potential treatment of groundwater. Prior to the collection of metals samples, groundwater turbidity will be measured. If the turbidity is less than 50 NTUs, one sample will be collected for total metals analyses. If turbidity is greater than 50 NTUs, a filtered sample will also be collected and analyses performed for both filtered and total metals. Refer to the QA/QC Plan (Section 3.0) for more detailed sampling procedures. Site-specific sampling locations and analytical methods will be provided in the Site-Specific Work Plan. Probe holes will be sealed and abandoned according to Section 2.5.

2.4 Monitoring Well Drilling and Groundwater Monitoring

Groundwater monitoring involves periodic sampling and analysis of groundwater from monitoring wells. The design of effective monitoring wells requires careful consideration of the hydrogeology and subsurface geochemistry at the site. Information obtained from site reconnaissance, geophysical investigations or nearby existing wells can be useful in deciding appropriate monitoring well drilling, construction and development methods for the site. The design of a monitoring well should be based upon site-specific conditions and cannot be completed using a "one size fits all" method or material. The goal of monitoring well design is to construct wells that will produce depth and location-specific hydrogeologic, geologic and groundwater quality data. Precautions must be made to ensure that well completion and development procedures minimize disturbance to the natural geologic environment and groundwater samples. Additionally, monitoring well installation techniques must minimize the potential for cross-contamination through the subsurface.

2.4.1 Drilling Methods

The selection of drilling and well completion methods for monitoring well construction will be based on site-specific conditions, including geologic materials to be penetrated, anticipated depth of drilling, potential for cross-contamination and accessibility to boring locations on the site. The selection of an appropriate drilling method for the construction of monitoring wells will be based on minimizing both the disturbance of geologic materials penetrated and the introduction of air, fluids and mud. The use of drilling mud and additives will be avoided, where possible, because the introduction of any foreign material has the potential for interfering with the chemical quality of water obtained from the monitoring wells and determination of aquifer characteristics through the use of slug tests. The following evaluations of various drilling techniques are based on these factors and the physical limits of each method.

2.4.1.1 - Hollow Stem Augers

The hollow stem auger method is among the most desirable drilling methods for the construction of monitoring wells. Hollow stem auger drill rigs are generally mobile, relatively fast and inexpensive to operate in unconsolidated materials. No drilling fluids are used and disturbance to the geologic materials penetrated is minimal. Depths of borings constructed using augers vary based upon soil types; however, borings up to 100 feet and greater are possible (maximum depth limit is about 200 feet). Clayey soils restrict the depth to which auger drilling can be accomplished. Augers typically cannot be used in bedrock, unless it is highly weathered, and the use of hollow stem auger drilling in heaving sand environments may also present difficulty.

2.4.1.2 - Mud Rotary

Mud rotary drilling operates in the same fashion as the air rotary drilling technique, except that water and drilling mud are circulated down the drill pipe and back up the borehole to remove drill cuttings. Mud rotary drilling offers better control of contaminated cuttings and water removed from the boring and does not cause exposure to vapors as in air rotary techniques. The borehole is held open by the hydrostatic pressure of the circulating mud and the mud cake that develops on the borehole wall during the drilling process. Viscosity of the drilling mud is controlled to minimize the infiltration of the drilling fluid into porous formations penetrated by the drilling equipment. The introduction of mud into the borehole can cause groundwater chemistry or in-situ permeability to be altered. Monitoring wells installed in mud-rotary borings often require extra well development and may detect solutes attributable to the mud that cause an inaccurate assessment of groundwater chemistry. Under certain conditions, mud rotary techniques can be effective by using a continuous supply of potable water without additives. Alternatively, mud can be used to advance a boring to a depth several feet above the zone of interest, at which time mud can be replaced with potable water and the borehole continued to final depth.

Based upon the advantages and disadvantages of the various drilling methods described above, the preferred drilling methods are typically hollow stem augers for drilling in the overburden and mud rotary using potable water without additives in the bedrock. However, the final selection of the drilling method will be based on site-specific geologic and hydrostatic conditions. Alternate methods of drilling must be specified in the Site-Specific Work Plan together with the rationale for selection.

2.4.2 Subsurface Soil Sampling

Subsurface soil samples will be collected during construction of monitoring wells and soil borings. Soil borings will be advanced to delineate the extent of subsurface soil contamination on-site. The depth of the boring and sampling intervals will be determined in the Site-Specific Work Plan. Samples typically will be obtained continuously from the ground surface to provide detailed stratigraphic and soil quality information.

Soil samples obtained from decontaminated split spoons will be observed and logged for geologic characteristics, odors and staining, and screened with an FID or PID. The data obtained from this screening will be used to select soil samples from each borehole for chemical analysis. All subsurface soil samples selected for chemical analysis will be collected from within the unsaturated zone unless contamination at the water table interface is evident, in which case, samples of soil in the saturated zone may be collected.

The number and locations of the samples to be collected, and the analytical methods to be utilized, will be provided in the Site-Specific Work Plan.

2.4.3 Overburden Monitoring Wells and Microwells/Piezometers

Monitoring well and microwell/piezometer boreholes constructed in the overburden will typically be installed using decontaminated 4 1/4-inch ID hollow stem augers. If difficulties with "running sands" are encountered which hinder soil sampling, potable water will be added to the hollow stem augers to maintain a positive hydrostatic head. Additionally, if difficulties with elevated levels of explosive or toxic gases, such as methane and hydrogen sulfide are encountered, potable water or mud may be introduced into the hollow stem augers to suppress the gas. If the depth of boring or nature of unconsolidated deposits prevent the efficient use of 4 1/4-inch ID hollow stem augers, then other methods such as those described in Section 2.6.1 may be considered. The use of alternative drilling methods, if any, will be described and justified in the Site-Specific Work Plan.

The final depth of each borehole will be below the water table at a depth that will allow 6 inches of sand pack to be placed between the screen bottom and bottom of the boring, as well as allow the screen to intersect the water table. For mid-depth or deep overburden wells, the borings must be deep enough to allow 6 inches of sand pack between well screen bottom and boring bottom, and allow the screen to intersect the zone of concern. If the boring is drilled too deep, for any reason, the borehole must be filled to a depth of 6 inches below the planned screen location with a bentonite slurry or other suitable impermeable material. At a minimum, overburden borings will be constructed for the installation of monitoring wells and piezometers that screen the water table. The actual number and depth of borings, as well as analytical sampling methods, will be determined on a site-specific basis and contained in the Site-Specific Work Plan.

Cuttings generated from the construction of the boreholes will be handled in accordance with NYSDEC TAGM No. 4032 "Disposal of Drill Cuttings" dated November 1989. In general, this TAGM allows for on-site disposal of cuttings as long as certain criteria are met.

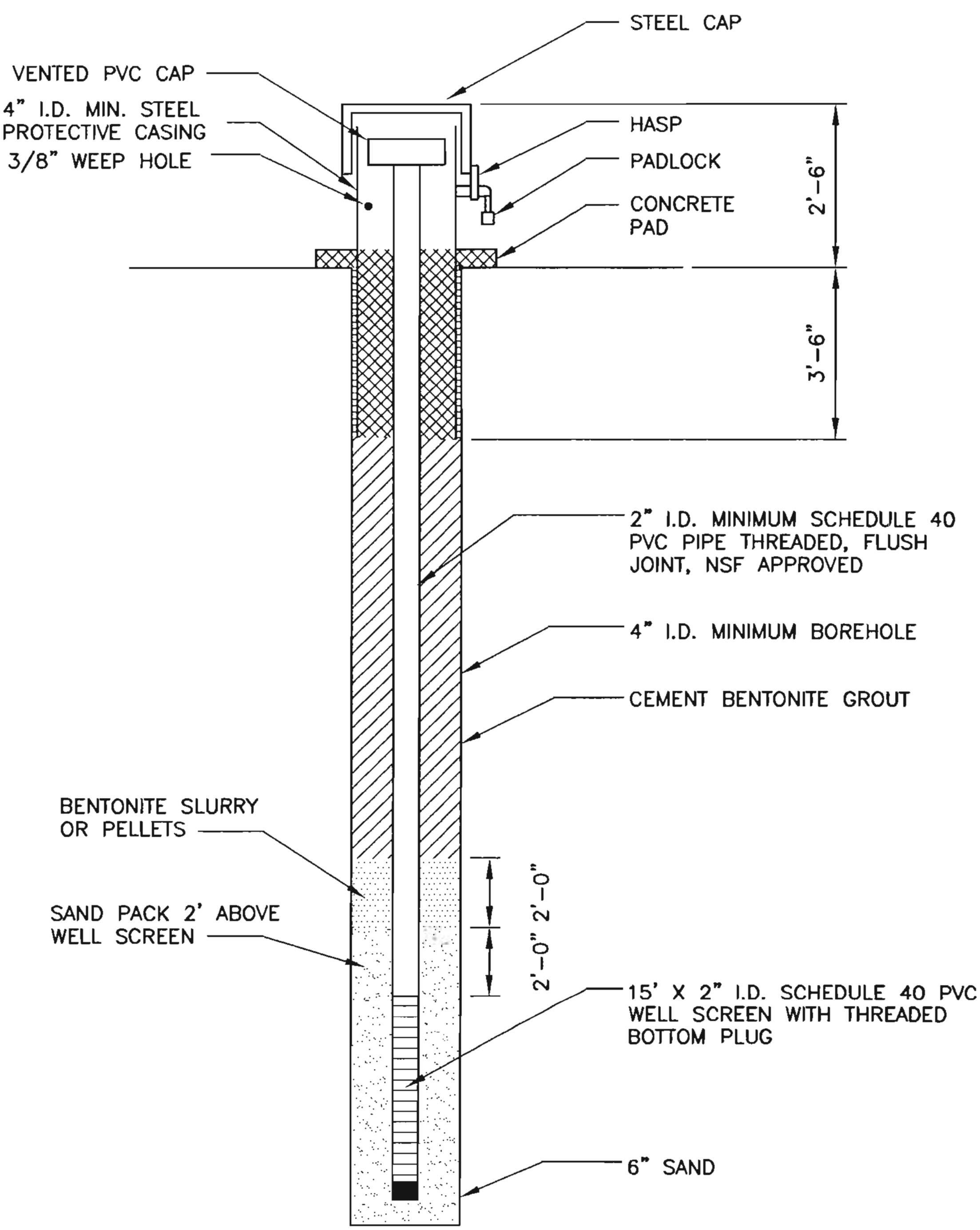
Monitoring wells will typically be installed for the purpose of groundwater sampling. Piezometers will typically be installed when sampling is not required, but water level data is necessary. The following discussion regarding monitoring wells also pertains to piezometers. The depth of overburden monitoring wells will be determined on the basis of the geology and hydrogeology of the site and the goals of the monitoring program. In the case of overburden wells, the goal in general is to monitor the potential effects of near surface contaminants on groundwater.

In order to properly define the movement of contaminants both vertically and horizontally, it is essential to collect depth-discreet water level data. Monitoring wells completed at the water table will provide a portion of the data needed to determine the vertical direction of groundwater movement. Water levels from several of these wells, if they are completed in the same hydrogeologic unit, will also provide information on the horizontal direction of shallow groundwater flow. If the overburden area of concern is relatively thick, then a series of mid-depth or deep monitoring wells will be required to properly assess groundwater conditions. The need for and depth of mid-depth or deep overburden wells will be provided in the Site-Specific Work Plan.

The diameter of monitoring wells should be the minimum practical size that will be compatible with the strength requirements of the well materials and allow for groundwater sampling. Small diameter monitoring wells will decrease the amount of water to be removed for well development and purging, and minimize the potential need for containment of contaminated water. Additionally, small diameter wells will minimize the potential impact on groundwater chemistry caused by disturbance during well drilling. Overburden monitoring wells will typically be constructed of decontaminated 2-inch ID, Schedule 40, 0.010-inch slot PVC well screen and threaded, flush joint PVC casing. No solvents will be utilized to construct the wells. These site-specific cases where non-aqueous phase liquids (NAPLs) are present or suspected, the use of stainless steel wire-wrap screens may be considered if the chemical is incompatible with PVC materials. In addition, when site-specific conditions dictate, different size screen openings may be utilized. Justification for the use of alternate screen material and size will be provided in the Site-Specific Work Plan.

The well screen in a monitoring well will be long enough to permit entry of water from the vertical zone to be monitored. The length of the screen will be kept to a minimum for water level data to be obtained from the well to represent information that is depth-discreet. In wells where the length of the screen is long, the resulting water level represents an average water level for the materials opposite the screen, and is sometimes insufficient to determine accurate groundwater flow characteristics. The overburden water table monitoring well screens will generally be 10 to 15 feet long. The screen will typically be installed with 5 feet above the water table in order to intercept the water table under varying seasonal groundwater elevations. The selection of screen lengths will be provided in the Site-Specific Work Plan. A generalized construction diagram for a well with a steel protective casing is shown on Figure 2-1. A generalized flush-mounted well construction diagram is shown on Figure 2-2. The type of well utilized will be based on site-specific considerations.

At the completion of borehole construction and soil sampling, the well screen and riser pipe will be lowered into the hollow stem auger and set at the desired depth. Sand pack of a grain size appropriate for the selected screen opening size and geologic conditions will be placed into the annular space to a minimum height of 2 feet above the top of the well screen using a tremie pipe or other suitable method. Generally, number 2 morie sand will be used. During this time, the auger will be slowly removed. The well pipe will also be pulled up no more than 1/2-foot to



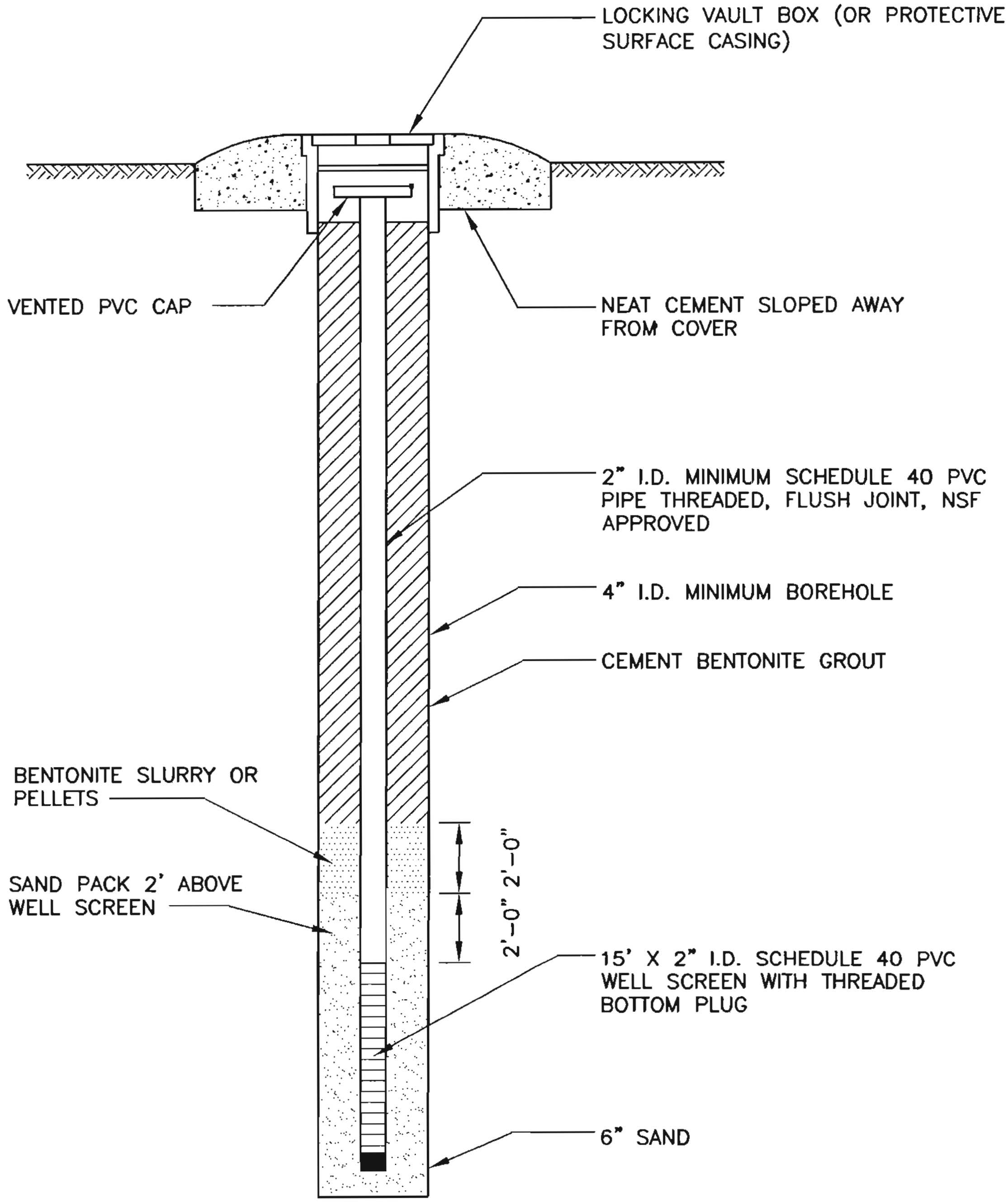
NORTHROP GRUMMAN CORPORATION
SOUTH RECEIVING BASIN

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

PLAN FOR CONSTRUCTION OF OVERBURDEN MONITORING WELLS

FIGURE 2-1

F:\1965\1965-FIGURE-2-1.dwg, 08/02/02 08:52:20 AM, DCortes



Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

NORTHROP GRUMMAN CORPORATION
SOUTH RECEIVING BASIN

PLAN FOR CONSTRUCTION OF MONITORING WELLS WITH LOCKING VAULT

FIGURE 2-2

F:\1965\1965-FIGURE-2-2.dwg, 08/01/02 06:11:00 PM, DCortes allow sand material to fill the borehole beneath the well screen. Upon completing the placement of the sand pack, a minimum 2-foot thick bentonite pellet, chip or slurry seal will be tremied in the annular space. Bentonite pellets or bentonite chips, if used, will be hydrated with potable water and allowed to swell for a minimum of 1/2 hour before introducing the cement bentonite grout in the remaining annular space. The cement-bentonite grout will be pressure pumped into the annular space by the tremie method.

The monitoring wells will be completed with either a flush mount curb box or riser pipes. Wells completed with riser pipes will be constructed with approximately 2 1/2 feet of riser above ground surface and protected with a locking steel casing with minimum diameter of 4 inches. The protective casing will be at least 5 feet in length and secured into the borehole using concrete sand or gravel mix. The surface seal will be completed with a 3-foot diameter formed concrete pad and will be constructed to drain surface water away from the well. The protective casing will have a locking cap and weep hole, and be marked with the monitoring well identification. In cases where monitoring wells will be installed in roadways, parking lots or through floors, flush mount protective casings will be used. In such cases, a locking water tight PVC well cap will be installed inside of a curb box with bolted, water tight cover. Protective casing types will be specified in the Site-Specific Work Plan.

2.4.4 Borehole and Monitoring Well Logging

All borehole construction and monitoring well installation will be logged and documented by a geologist. Notes will be kept in both bound field books and on Boring Logs and Monitoring Well Construction Logs (see QA/QC Plan in Section 3.0). The Boring Logs will include the depths of stratigraphic changes, description of all samples, details of drilling techniques, listing of soil samples collected for laboratory analyses and measurements made with PIDs or FIDs. In addition, soil will be visually inspected for staining and checked for odors. Well construction specifications will be provided in the Monitoring Well Construction Logs. The Modified Burmeister Classification System will be used to describe soil samples recovered from the borings. A Daily Field Activity Report (see QA/QC Plan in Section 3.0) will be completed whenever there are drilling activities (or any other field activities) undertaken as part of the investigation.

2.4.5 Monitoring Well Development

Monitoring wells will be developed by pumping and surging for 2 hours, or until the turbidity of the groundwater achieves a reading of 50 NTUs (nephelometric turbidity units) or less. Well development will be supplemented by measurements of field parameters, including temperature, pH and specific conductance. Development will continue until the field parameters stabilize for a minimum of three consecutive readings of 10 percent variability or less. When possible, well development water will be recharged on-site. Refer to Section 3.0 for further discussion on containment and disposal of development water. All equipment used for the development of monitoring wells will be decontaminated prior to use and between wells.

2.4.6 Groundwater Level Measurement

Groundwater level measurements, where applicable, will be obtained from each of the wells installed as part of the RI. Existing wells may also be utilized for groundwater level measurements. If feasible, all groundwater level measurements will be made within an eight hour period of uniform weather conditions. Additionally, a study of the influence of the local tidal cycles may be conducted at sites adjacent to major water bodies in order to quantify potential variations in local groundwater flow. In addition, water levels may be obtained from surface water bodies that are suspected of influencing groundwater flow on or near the site by installing a fixed measuring point such as a staff gauge or permanent mark, on a fixed surface and measuring the depth to the surface of the water body. The measuring points will be surveyed for location and elevation.

All water and LNAPL level measurements, where appropriate, will be made using a fixed reference point at each measurement location. Down hole instruments will be decontaminated between each measurement location (see Section 3.6 of the QA/QC Plan). The static water level will be measured to the nearest 0.01-foot. Groundwater level data will be used to construct groundwater potentiometric surface maps and used to determine local horizontal flow direction, as well as vertical gradients. Where LNAPL is present, a corrected groundwater potentiometric surface elevation will be calculated in order to supplement the groundwater elevation data and provide a corrected groundwater elevation contour map, if necessary.

2.4.7 Groundwater Sampling

The depth to the water level in each well to be sampled will be measured in order to calculate the liquid bore volume necessary for purging. Depth to water will be measured with respect to a reference point established at the top of the well casing. Water level measurements will be obtained using a decontaminated electronic water level indicator.

The wells will be purged until a minimum of three to five bore volumes have been removed or until the well is dry, whichever occurs first. The number of bore volumes purged will be a function of the pH, temperature and conductivity, and will continue until stabilization of these parameters is achieved. Purge water will be recharged on-site, if possible.

Disposable polyethylene bailers with disposable nylon or polypropylene rope will be used for purging and sampling of the wells. Deep wells or wells that require large volumes of water to be removed may be purged and sampled using decontaminated, downhole pumps and decontaminated or disposable tubing. Once the well has been sufficiently purged, sampling will begin. If groundwater recovery is very slow, it may be necessary to wait several hours, or overnight, for sufficient volume to become available for the necessary sample analyses. Locations of the monitoring wells, and analytical sampling methods, will be provided in the Site-Specific Work Plan.

2.5 Probe Hole, Borehole and Well Abandonment

Direct push probe holes and soil borings which are not completed as monitoring wells will be fully sealed in a manner appropriate for the geologic conditions to prevent contaminant migration through the borehole. Sealing of the well or borehole will include the following methods: overboring or removal of the casing to the greatest extent possible followed by perforation of any casing left in place; removal of all casing and other well construction material within the upper 5 feet of the boring or within 5 feet of the proposed excavation level; sealing by pressure injection with cement bentonite grout using a tremie pipe to a depth extending the entire length of the boring to within 5 feet below the ground surface or the proposed excavation level; sealing the remaining 5 feet to ground surface with neat cement grout; and restoration of the sealed site to a safe condition. Well abandonment will follow the methods described in "Groundwater Monitoring Well Decommissioning Procedures," NYSDEC Division of Hazardous Waste Remediation, dated May 1995.

2.6 Air Screening

Ambient air monitoring for volatile organic compounds (VOCs) and particulate levels will be performed throughout the field program based on the provisions of the NYSDOH generic Community Air Monitoring Plan (CAMP). The provisions of the CAMP are intended to provide a measure of protection for the downwind community. In addition, ambient screening instruments will be used to determine the necessary levels of personal protective equipment.

2.6.1 VOC Monitoring, Response Levels and Actions

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. Either a flame ionization detector (i.e., Century Foxboro OVA) or a photoionization detector (i.e., Photovac Micro Tip) calibrated daily will be utilized to detect total organic vapors. This equipment will be used to calculate 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute and instantaneous readings will be recorded and available for State (DEC and DOH) personnel to review.

2.6.2 Particulate Monitoring, Response Levels and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 ug/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for State (DEC and DOH) personnel to review.

2.7 Surveying and Mapping

Sampling locations may be surveyed by a New York State licensed surveyor for horizontal and vertical control. Vertical and horizontal control of the monitoring well/piezometer casing will allow for calculation of groundwater elevations for the development of groundwater contour maps. The ground surface, protective casing and measuring point in the inner casing will be surveyed.

Vertical and horizontal control of the soil borings and monitoring wells allow for the preparation of geologic and hydrogeologic cross sections. Additional on- and off-site sampling points, such as surface soil and soil vapor survey locations, will be surveyed, if necessary.

Control points for use in the preparation of a topographic map of the study area will also be surveyed, if necessary. Coordination between the aerial photographer and the surveyor will be required in order to select the necessary control points for preparation of the topographic map.

Section 3

3.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN

The purpose of this Generic Quality Assurance/Quality Control (QA/QC) Plan is to describe the detailed sample collection and analytical procedures that will ensure high quality, valid data for use in the RI to be conducted at the SRB.

3.1 Data Usage

The data generated from the sampling program will be used to determine the nature, extent and source(s) of impacted soil at the site.

3.2 Sampling Program Design and Rationale

The following presents a general discussion of the sampling that may be conducted in support of the RI.

- Surface Soil - Surface soil samples may be collected on site to determine the extent of impacted surface soil.
- Subsurface Soil - Subsurface soil samples will be collected on site to determine the extent of impacted subsurface soil.
- Groundwater - Groundwater samples may be obtained from monitoring wells and/or groundwater probes to characterize groundwater quality.

For a detailed discussion of the sampling program and selection of sample matrices and locations, see the Site-Specific Work Plan provided in Section 4.0.

3.3 Analytical Parameters

Subsurface soil samples collected from the SRB will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), Resource Conservation and Recovery Act (RCRA) metals, and polychlorinated biphenyls (PCBs).

Table 3-1 presents a summary of the parameters/sample fraction together with the typical sample location, type of sample, sample matrix, type of sample container, method of sample preservation, holding time and analytical method.

3.4 Data Quality Requirements

Data quality requirements and assessments are provided in the 6/2000 NYSDEC ASP, which includes the detection limit for each parameter and sample matrix. Note that quantification limits, estimated accuracy, accuracy protocol estimate precision and precision protocol are determined by the laboratory and will be in conformance with the requirements of the 6/2000 NYSDEC ASP, where applicable. Table 3-2 presents a summary of the data quality requirements.

The methods of analysis will be in accordance with SW846 and 6/2000 NYSDEC ASP. Specific analytical procedures and laboratory QA/QC descriptions are not included in this QA/QC Plan, but will be available upon request from the laboratory selected to perform the analyses. The laboratory will be New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified for organic and inorganic analyses and also be NYSDOH Contract Laboratory Protocol (CLP) certified.

Table 3-1

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Soil Borings	Grab	Subsurface Soil	SVOCs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	6/00 NYSDEC ASP, Method 8270
	Grab	Subsurface Soil	PCBs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	6/00 NYSDEC ASP, Method 8082
	Grab	Subsurface Soil	RCRA Metals	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for analysis, 6 months for all other metals	6/00 NYSDEC ASP, Method 6010/7471
	Grab	Subsurface Soil	VOCs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	7 days after VTSR for analysis	6/00 NYSDEC ASP, Method 8260

VTSR - Verified time of sample receipt at the laboratory.

Table 3-2

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY AND COMPLETENESS

Parameter	Sample Matrix	CRDL* (ug/l)	Estimated Accuracy	Accuracy Protocol	Estimated Precision	Precision Protocol
Volatile Organics	Liquid Solid	5-10 5-10	0.87 - 2.48 ug/l	Vol. IB, Chapter 4, Method 8260, Table 7	0.11 - 4.00 ug/l	Vol. IB, Chapter 4, Method 8260, Table 7
Base Neutrals	Liquid Solid	10-50 330-1600	0.29 - 1.23 ug/l	Vol. IB, Chapter 4, Method 8270, Table 7	0.13 - 1.05 ug/l	Vol. IB, Chapter 4, Method 8270, Table 7
Acid Extractables	Liquid Solid	10-50 330-1600	0.29 - 1.23 ug/l	Vol. IB, Chapter 4, Method 8270, Table 7	0.13 - 1.055 ug/l	Vol. IB, Chapter 4, Method 8270, Table 7
Pesticides/PCBs	Liquid Solid	0.5-1.0 8.0-160	0.69 - 10.79 ug/l	Vol. IB, Chapter 4, Method 8082, Table 4	0.16 - 3.50 ug/l	Vol. IB, Chapter 4, Method 8082, Table 4
Metals	Liquid Solid	0.2-5000 0.2-5000	--	Vol. IA, Chapter 3, Method 6010**, Table 4	--	Vol. IA, Chapter 3, Method 6010**, Table 4

*Contract Required Detection Limits

**and SW-846 Methods for:
Mercury 7470

Table 3-2 (continued)

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY AND COMPLETENESS

Matrix/Parameter	Precision (%)	Accuracy (%)
Soils		
VOCs[a]	See Table 2-2a	See Table 2-2a
Extractables[a]	See Table 2-2b	See Table 2-2b
Pesticides/PCBs	See Table 2-2c	See Table 2-2c
Metals[b]	± 25	75-125
Groundwater		
VOCs[a]	See Table 2-2a	See Table 2-2a
Extractables[a]	See Table 2-2b	See Table 2-2b
Pesticides/PCBs	See Table 2-2c	See Table 2-2c
Metals[b]	± 25%	75-125

NOTES:

(a) Accuracy will be determined as percent recovery of surrogate spike compounds and matrix spike compounds. Surrogate and matrix spike compounds for VOCs, extractables, and pesticides/PCBs are listed in Tables 3-2a, 3-2b and 3-2c, respectively. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

(b) Accuracy will be determined as percent recovery of matrix spikes when appropriate or the percent recovery of a QC sample if spiking is inappropriate. Precision will be determined as relative percent difference of matrix spike duplicate samples, or duplicate samples if spiking is inappropriate.

(c) Precision will be determined as the average percent difference for replicate samples. Accuracy will be determined as the percent recovery of matrix spike samples or laboratory control samples, as appropriate.

Source: NYSDEC ASP

Table 3-2b (continued)

**DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS***

	Matrix	Precision	Accuracy %
Matrix Spike Compounds (continued)			
2-Chlorophenol	Water	≤ 20	27-123
	Solid	≤ 25	25-102
4-Chloro-3-methylphenol	Water	≤ 20	23-97
	Solid	≤ 25	26-103
4-Nitrophenol	Water	≤ 20	10-80
	Solid	≤ 25	11-114

*Accuracy will be determined as percent recovery of these compounds. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

Source: NYSDEC ASP

Table 3-2c

DATA QUALITY REQUIREMENTS

ADVISORY RECOVERY LIMITS
SURROGATE AND MATRIX SPIKE COMPOUNDS
FOR PESTICIDES/PCBs*

	Advisory Recovery Limits (%)	
	Water	Soil/Sediment
Surrogate Compound		
Decachlorobiphenyl	60-150	60-150
Tetrachloro-m-xylene	60-150	60-150
Matrix Spike Compound		
Lindane	56-123	46-127
Heptachlor	40-131	35-130
Aldrin	40-120	34-132
Dieldrin	52-126	31-134
Endrin	56-121	42-139
4,4'-DDT	38-127	23-134

*Samples do not have to be reanalyzed if these recovery limits are not met.

Source: NYSDEC ASP

General sampling approaches and equipment are described in this section. A summary of the RI sampling program, including sample media, depths, equipment, rationale and analytical parameters is provided in Section 4.0.

When taking soil samples, an attempt will be made to maintain sample integrity by preserving its physical form and chemical composition to as great an extent as possible. An appropriate sampling device (i.e., decontaminated or dedicated equipment) will be utilized to transfer the sample into the sample container. Every effort will be made to ensure that the sample is a proper representation of the matrix from which it was collected. The sample will be transferred into the sample bottle as quickly as possible, with no mixing, to ensure that the volatile fraction is not lost.

The materials involved in groundwater sampling are critical to the collection of high quality monitoring information, particularly where the analyses of volatile, pH sensitive or reduced chemical constituents are of interest. The materials for bailers and pump parts will be PTFE (e.g., Teflon[R]) stainless steel and/or polyethylene.

There will be several steps taken after the transfer of the soil or water sample into the sample container that are necessary to properly complete collection activities. Once the sample is transferred into the appropriate container, the container will be capped and, if necessary, the outside of the container will be wiped with a clean paper towel to remove excess sampling material. The container will not be submerged in water in an effort to clean it. Rather, if necessary, a clean paper towel moistened with distilled/deionized water will be used.

The sample container will then be properly labeled. Information such as sample number, location, collection time and sample description will be recorded in the field log book. Associated paper work (e.g., Chain of Custody forms) will then be completed and will stay with the sample. The samples will be packaged in a manner that will allow the appropriate storage temperature to be maintained during shipment to the laboratory. Samples will be delivered to the laboratory within 48 hours of collection.

3.5.1 Sample Handling, Packaging and Shipping

All samples will be placed in the appropriate containers as specified in the 6/00 NYSDEC ASP. The holding time criteria identified in the ASP will be followed as specified in Table 3-1.

Prior to packaging any samples for shipment, the sample containers will be checked for proper identification and compared to the field log book for accuracy. The samples will then be wrapped with a cushioning material and placed in a cooler (or laboratory shuttle) with a sufficient amount of bagged ice or "blue ice" packs in order to keep the samples at 4°C until arrival at the laboratory.

All necessary documentation required to accompany the sample during shipment will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will then be sealed with fiber (duct) or clear packing tape, and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure laboratory receipt within 48 hours of sample collection in accordance with NYSDEC requirements. The laboratory will be notified prior to the shipment of the samples.

3.5.2 Soil (Surface)

1. Be certain that the sample location is noted on Location Sketch.
2. If a dedicated sampling device is not used, be certain that the sampling equipment has been decontaminated utilizing the procedures outlined in Section 3.6.
3. Remove laboratory precleaned sample container from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 3.8).

4. At the sample location, clear surface debris (e.g., vegetation, rocks, twigs, etc.). Collect an adequate amount of soil from a depth of 0 to 2 inches using a decontaminated or disposable scoop and/or sterile wooden tongue depressor. Transfer the sample directly into the sample container.

5. Return the sample container to the cooler.

6. If reusable, decontaminate the sampling equipment according to the procedures described in Section 3.6.

7. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

3.5.3 Soil (Probe)

1. Be certain that the sample location is noted on Location Sketch.

2. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.

3. Drive the probe to the desired sampling depth.

4. Retrieve the soil probe and immediately after opening it, obtain an organic vapor measurement with a FID or PID.

5. Remove a sample aliquot from the soil probe using a disposable scoop or sterile wooden tongue depressor, place into the open sample container and replace the container cover.

6. Return the sample container to the cooler.

7. If reusable, decontaminate the sampling equipment according to the procedures described in Section 3.6.

8. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

3.5.4 Soil (Borehole, Split Spoon)

1. Be certain that the sample location is noted on Location Sketch.

2. Be certain that the sampling equipment (split spoon) has been decontaminated utilizing the procedures outlined in Section 3.6.

3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 3.8).

4. Drill into the soil to the desired depth and drive the split spoon sampler.

5. Retrieve the split spoon and immediately after opening the split spoon, obtain an organic vapor measurement with a PID or FID and fill out Boring Log Form (see Section 3.19)

6. Remove a sample aliquot from the split spoon using a disposable scoop or sterile wooden tongue depressor, place into the open sample container and replace the container cover.

7. Return the sample container to the cooler.

8. If reusable, decontaminate the sampling equipment according to the procedures described in Section 3.6.

9. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

3.5.5 Groundwater Monitoring Well

1. Measure the depth of water using a decontaminated water level indicator and compute the volume of standing water in the well.

2. Remove three to five times the volume of standing water from the well until field measurements (pH, conductivity, temperature and turbidity) stabilize, or until the well is dry, whichever occurs first. Turbidity should be less than 50 NTUs prior to collection of a sample for metals analysis.

3. Remove the laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.

4. Obtain a sample by using a disposable polyethylene bailer.

5. If the turbidity of the sample is greater than 50 NTUs, the metals portion of the sample will be filtered in the field or by the laboratory. Both the filtered and unfiltered portion of the sample will be analyzed.

6. Gently pour the sample into the sample container taking care not to spill on the outside of the container or overfill container and replace the cover on the sample container.

Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is done by filling the vial such that there is a meniscus on top. Carefully slide the septum, Teflon side down, onto the top of the vial and cap the vial. Check for bubbles by turning the vial upside down and tapping it lightly. If bubbles appear, reopen the vial, remove the septum and add more sample (or resample). Replace the septum, recap and check for bubbles. Continue until vial is bubble-free.

7. Return sample container to sample cooler.

8. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

3.6 Decontamination Procedures

Whenever possible, all field sampling equipment should be sterile/disposable and dedicated to a particular sampling point. In instances where this is not possible, a field cleaning/ decontamination procedure will be used in order to mitigate cross contamination between sample locations. A decontamination station/pad will be established for all field activities. This will be an area located away from the source of contamination so as not to adversely impact the decontamination procedure, but close enough to the sampling locations to keep equipment transport handling to a minimum after decontamination.

3.6.1 Field Decontamination Procedures

All nondisposable equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling location and prior to leaving the site). Different decontamination procedures are used for various types of equipment that are used to collect samples. When using field decontamination, sampling should commence in the area of the site with the lowest contamination, if known or probable, and proceed through to the areas of highest contamination.

3.6.2 Decontamination Procedure for Drilling/Probing Equipment

All equipment such as drill rigs and other mobile equipment will receive an initial cleaning prior to use at the site. The frequency of subsequent cleanings while on site will depend on how the equipment is actually used in relation to collecting environmental samples. All wash/rinse solutions will be collected and recharged on site after testing, if possible. If an appropriate location for on-site recharge is not available, the next preferable option is to discharge to a municipal sewer system. Until an appropriate discharge alternative is determined, all wash/rinse solutions will be collected and contained on site in 55-gallon drums.

After the initial decontamination, cleaning may be reduced to those areas that are in close proximity to materials being sampled. Drill rig/probe items such as augers, drill/probe rods and drill bits will be cleaned in between sample locations.

Drilling/probing equipment will be decontaminated in the following manner:

- Wash thoroughly with nonresidual detergent (alconox) and tap water using a brush to remove particulate matter or surface film. Pressure washing will be utilized, if necessary, to remove any oil and/or tar accumulations on the back of the rig, auger flights, drill rods, drilling head, etc. Any loose paint chips, paint flakes and rust must also be removed;
- Steam clean (212°F); and
- Once decontaminated, remove all items from the decontamination area.

Also, following the general cleaning procedures described above, all downhole/drilling items, such as split spoon samplers, Shelby tubes, rock corers, or any other item of equipment which will come in direct contact with a sample during drilling, will be decontaminated by pressure washing and/or steam cleaning.

3.6.3 Decontamination Procedure for Sampling Equipment

Teflon, PVC, polyethylene and stainless steel sampling equipment decontamination procedures will be the following:

- Wash thoroughly with nonresidual detergent (alconox) and clean potable tap water using a brush to remove particulate matter or surface film;
- Steam clean (if necessary);
- Rinse thoroughly with tap water;
- Rinse thoroughly with distilled water;
- Rinse in a well ventilated area with methanol (pesticide grade) and air dry;
- Rinse thoroughly with distilled water and air dry;
- Wrap completely in clean aluminum foil with dull side against the equipment. For small sampling items, such as scoops, decontamination will take place over a drum specifically used for this purpose;

The first step, a soap and water wash, will be performed to remove all visible particulate matter and residual oil, grease and tar. Pressure washing will be utilized followed by steam cleaning, if necessary. This step will be followed by a tap water rinse and a distilled/deionized water rinse to remove the detergent. Next, a high purity solvent rinse will be used for trace organics removal. Methanol has been chosen because it is not an analyte of concern on the Target Compound List. The solvent will be allowed to evaporate and then a final distilled/deionized water rinse will be performed. This rinse removes any residual traces of the solvent. The aluminum wrap will protect the equipment and keep it clean until it is used at another sampling location.

3.6.4 Decontamination Procedure for Well Casing and Development Equipment

Field cleaning of well casings will consist of a manual scrubbing to remove foreign material and steam cleaning, inside and out, until all traces of oil, grease and tar are removed. This material will then be stored in such a manner so as to preserve it in this condition. Special attention to threaded joints will be necessary to remove cutting oil or weld burn residues, if necessary.

Materials and equipment that will be used for the purposes of well development will also be decontaminated by steam cleaning. An additional step will involve flushing the interior of any hose, pump, etc. with a nonphosphate detergent solution and potable water rinse prior to the development of the next well. This liquid waste will be disposed of on site, if possible after testing.

3.7 Laboratory Sample Custody Procedures

A NYSDOH ELAP and CLP certified laboratory meeting the requirements for sample custody procedures, including cleaning and handling sample containers and analytical equipment, will be used to analyze samples collected during the RI. The selected laboratory's Standard Operating Procedures will be made available upon request.

3.8 Field Management Documentation

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with the sampling plan and QA/QC Plan in an efficient and high quality manner. Field management procedures will include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if required); preparing a Location Sketch; completing Sample Information Records, Chain of Custody Forms, and Test Pit, Boring, Drilling and Well Construction Logs; maintaining a daily Field Log Book; completing Daily Equipment Calibration Logs; preparing Daily Field Activity Reports; completing Field Change Forms; and filling out a Daily Air Monitoring Form. Copies of each of these forms are provided in Appendix B. Proper completion of these forms and the field log book are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the samples were collected and handled properly.

3.8.1 Location Sketch

For each sampling point, a Location Sketch will be completed using permanent references and distances to the sampling point noted, if possible.

3.8.2 Sample Information Record

At each sampling location, a Sample Information Record Form is filled out including, but not limited to, the following information:

- Site name;
- Sample crew;
- Sample location;
- Field sample identification number;
- Date;
- Time of sample collection;
- Weather conditions;
- Temperature;
- Sample matrix;
- Method of sample collection and any factor that may affect its quality adversely;
- Well information (groundwater only);
- Field test results;
- Analysis to be performed; and
- Remarks.

3.8.3 Chain of Custody

The Chain of Custody Form will be completed and is initiated at the laboratory with container preparation and shipment to the site. The form remains with the sample at all times and bears the name of the person assuming responsibility for the samples. This person is tasked with ensuring secure and appropriate handling of the containers and samples. When the form is complete, it will indicate that there was no lapse in sample accountability.

A sample is considered to be in an individual's custody if any of the following conditions are met:

- It is in the individual's physical possession; or
- It is in the individual's view after being in his or her physical possession; or
- It is secured by the individual so that no one can tamper with it; or
- The individual puts it in a designated and identified secure area.

In general, Chain of Custody Forms are provided by the laboratory selected to perform the analytical services. At a minimum, the following information will be provided on these forms:

- Project name and address;
- Project number;
- Sample identification number;
- Date;
- Time;
- Sample location;
- Sample type;
- Analysis requested;

- Number of containers and volume taken;
- Remarks;
- Type of waste;
- Sampler(s) name(s) and signature(s); and
- Spaces for relinquished by/received by signature and date/time.

For this particular study, forms provided by the laboratory will be utilized.

The Chain of Custody Form will be filled out and signed by the person performing the sampling. The original of the form will travel with the sample and will be signed and dated each time the sample is relinquished to another party, until it reaches the laboratory or analysis is completed. The field sampler will keep one copy and a copy will be retained for the project file. The sample bottle will also be labeled with an indelible marker with a minimum of the following information:

- Sample number;
- Analysis to be performed; and
- Date of collection.

A copy of the completed form will be returned by the laboratory with the analytical results.

3.8.4 Split Samples

Whenever samples are being split with another party, a Receipt for Samples Form will be completed and signed. A copy of the Chain of Custody Form will accompany this form.

3.8.5 Field Log Book

Field log books will be bound and have consecutively numbered, water resistant pages. All pertinent information regarding the site and sampling procedures will be documented. Notations will be made in log book fashion, noting the time and date of all entries. Information recorded in this notebook will include, but not be limited to, the following:

The first page of the log will contain the following information:

- Project name and address;
- Name, address and phone number of field contact;
- Waste generator and address, if different from above;
- Type of process (if known), generating waste;
- Type of waste; and
- Suspected waste composition, including concentrations.

Daily entries will be made for the following information:

- Purpose of sampling;
- Location of sampling point;
- Number(s) and volume(s) of sample(s) taken;
- Description of sampling point and sampling methodology;
- Date and time of collection, arrival and departure;
- Collector's sample identification number(s);
- Sample distribution and method of storage and transportation;
- References, such as sketches of the sampling site or photographs of sample collection;

- Field observations, including results of field analyses (e.g., pH, temperature, specific conductance), water levels, drilling logs, and organic vapor and dust readings; and

- Signature of personnel responsible for completing log entries.

3.8.6 Daily Field Activity Report

At the end of each day of field work, the Field Operations Manager, or designee, will complete this form noting personnel on site and summarizing the work performed that day, equipment, materials and supplies used, results of field analyses, problems and resolutions. This form will be signed and subject to review. A copy of the Daily Field Activity Report form is provided in Appendix B.

3.8.7 Field Changes and Corrective Actions

Whenever there is a required or recommended investigation/sampling change or correction, a Field Change Form will be completed by the Field Operations Manager, and approved by a NGC representative and the NYSDEC Project Manager, if required.

3.9 Calibration Procedures and Preventive Maintenance

The following information regarding equipment will be maintained at the project site:

1. Equipment calibration and operating procedures which will include provisions for documentation of frequency, conditions, standards and records reflecting the calibration procedures, methods of usage and repair history of the measurement system. Calibration of field equipment will be performed daily at the sampling site so that any background contamination can be taken into consideration and the instrument calibrated accordingly.

2. A schedule of preventive maintenance tasks, consistent with the instrument manufacturer's specific operation manuals, that will be carried out to minimize down time of the equipment.

3. Critical spare parts, necessary tools and manuals will be on hand to facilitate equipment maintenance and repair.

Calibration procedures and preventive maintenance, in accordance with the NYSDEC 6/2000 ASP, for laboratory equipment, will be contained in the laboratory's standard operating procedures (SOP) which will be available upon request.

3.10 Performance of Field Audits

During field activities, the QA/QC officer will accompany sampling personnel into the field, in particular in the initial phase of the field program, to verify that the site sampling program is being properly conducted, and to detect and define problems so that corrective action can be taken early in the field program. All findings will be documented and provided to the Field Operations Manager. A copy of the Field Audit Form is provided in Appendix B.

3.11 Control and Disposal of Contaminated Material

During construction and sampling of the monitoring wells and soil borings, contaminated waste, soil and water may be generated from drill cuttings, drilling fluids, decontamination water, development water and purge water. All soil cuttings generated during the RI will be handled in a manner consistent with NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4032, Disposal of Drill Cuttings.

All water generated during the investigation, including decontamination water, drill water and purge water, will be recharged on site, if possible, following testing. The Site-Specific Work Plan will provide detailed information on the disposal of water generated during the investigation. If it is not possible to recharge water on site, the next preferred option is discharge of the water to a municipal sewer system. This will be evaluated in preparation of the Site-Specific Work Plan.

Department of Transportation approved 55-gallon drums will be used for the containment of soil cuttings and water, and for disposal of personal protective clothing and disposable sampling equipment (i.e., bailers, scoops, tongue depressors, etc.). The drums will be marked, labeled with a description of the contents and from what location they were collected. All drums will be sealed and stored on site in a secure area.

3.12 Documentation, Data Reduction and Reporting

Mitkem Corporation, a NYSDOH ELAP and CLP certified laboratory meeting the New York State requirements for documentation, data reduction and reporting will be used for all laboratory analysis. All data will be cataloged according to sampling locations and sample identification nomenclature that is described in Section 3.5.1 of this Work Plan. The laboratory analysis will be reported in the NYSDEC ASP Category B deliverables format.

3.13 Data Validation

As described in Section 3.12 above, summary documentation regarding data validation will be completed by the laboratory using NYSDEC forms contained in the 6/2000 NYSDEC ASP and submitted with the data package.

Data validation will be performed in order to define and document analytical data quality in accordance with NYSDEC requirements that investigation data must be of known and acceptable quality. The analytical and validation processes will be conducted in conformance with the NYSDEC ASP dated June 2000.

Because the NYSDEC Analytical Services Protocol is based on the USEPA CLP, the USEPA Functional Guidelines for Evaluating Organics and Inorganics Analyses for the Contract Laboratory Program (CLP) will assist in formulating standard operating procedures (SOPs) for the data validation process. The data validation process will ensure that all analytical requirements specific to this work plan, including the QA/QC Plan are followed. Procedures will address validation of routine analytical services (RAS) results based on the NYSDEC Target Compound List for standard sample matrices.

The data validation process will provide an informed assessment of the laboratory's performance based upon contractual requirements and applicable analytical criteria. The report generated as a result of the data validation process will provide a base upon which the usefulness of the data can be evaluated by the end user of the analytical results. A 20% data validation will be performed on all laboratory data.

During the review process, it will be determined whether the contractually required laboratory submittals for sample results are supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of data. Each data package will be checked for completeness and technical adequacy of the data. Upon completion of the review, the reviewers will develop a QA/QC data validation report for each analytical data package.

"Qualified" analytical results for any one field sample will be established and presented based on the results of specific QC samples and procedures associated with its sample analysis group or batch. Precision and accuracy criteria (i.e., QC acceptance limits) will be used in determining the need for qualifying data. Where test data have been reduced by the laboratory, the method of reduction will be described in the report. Reduction of laboratory measurements and laboratory reporting of analytical parameters will be verified in accordance with the procedures specified in the NYSDEC program documents for each analytical method (i.e., recreate laboratory calculations and data reporting in accordance with the method specific procedure). The standard operating guideline manuals and any special analytical methodology required will specify documentation needs and technical criteria and will be taken into consideration in the validation process. Copies of the complete data package and the validation report, including the laboratory results data report sheets, with any qualifiers deemed appropriate by the data reviewer, and a supplementary field QC sample result summary statement, will be submitted to the NYSDEC.

The following is a description of the two-phased approach to data validation which will be used in the RI. The first phase is called checklisting and the second phase is the analytical quality review, with the former being a subset of the latter.

- Checklisting - The data package will be checked for correct submission of the contract required deliverables, correct transcription from the raw data to the required deliverable summary forms and proper calculation of a number of parameters.
- Analytical Quality Review - The data package will be closely examined to recreate the analytical process and verify that proper and acceptable analytical techniques have been performed. Additionally, overall data quality and laboratory performance will be evaluated by applying the appropriate data quality criteria to the data to reflect conformance with the specified, accepted QA/QC standards and contractual requirements.

At the completion of the data validation, a Summary Data Validation/Usability Report will be prepared as part of the site investigation report.

3.14 Performance and System Audits

Mitkem Corporation, a NYSDOH ELAP and CLP certified laboratory which has satisfactorily completed performance audits and performance evaluation samples will be used to perform sample analyses for the RI.

3.15 Corrective Action

A NYSDOH ELAP and CLP certified laboratory will meet the requirements for corrective action protocols, including sample "clean up" to attempt to eliminate/mitigate matrix interference.

The 6/2000 NYSDEC ASP protocol includes both mandatory and optional sample cleanup and extraction methods. Cleanup is required by the 6/2000 NYSDEC ASP in order to meet contract required detection limits. There are several optional cleanup and extraction methods noted in the

6/2000 NYSDEC ASP protocol. These include florisil column cleanup, silica gel column cleanup, acid-base partition, steam distillation and sulfuric acid cleanup for PCB analysis.

High levels of matrix interference may be present in waste, soil and sediment samples. This interference may prevent the achievement of ASP detection limits if no target compounds are found. In order to avoid unnecessary dilutions, the optional cleanup methods noted in the 6/2000 NYSDEC ASP will be required to be performed by the laboratory as necessary.

3.16 Trip Blanks

The primary purpose of a trip blank is to detect other sources of contamination that might potentially influence contaminant values reported in actual samples, both quantitatively and qualitatively. The following have been identified as potential sources of contamination:

- Laboratory reagent water;
- Sample containers;
- Cross contamination in shipment;
- Ambient air or contact with analytical instrumentation during preparation and analysis at the laboratory; and
- Laboratory reagents used in analytical procedures.

A trip blank will consist of a set of 40 ml sample vials filled at the laboratory with laboratory demonstrated analyte free water. Trip blanks will be handled, transported and analyzed in the same manner as the samples acquired that day, except that the sample containers themselves are not opened in the field. Rather, these sample containers only travel with the sample cooler. The temperature of the trip blanks will be maintained at 4°C while on site and during shipment. Trip blanks will return to the laboratory with the same set of bottles they accompanied in the field.

The purpose of a trip blank is to control sample bottle preparation and blank water quality as well as sample handling. Thus, the trip blank will travel to the site with the empty sample bottles and back from the site with the collected samples in an effort to simulate sample handling conditions. Contaminated trip blanks may indicate inadequate bottle cleaning or blank water of questionable quality. Trip blanks will be implemented only when collecting water samples, including field blanks, and analyzed for volatile organic compounds only.

3.17 Method Blanks/Holding Blanks

A method blank is an aliquot of laboratory water or soil which is spiked with the same internal and surrogate compounds as the samples. The purpose of the method blank is to define and determine the level of laboratory background contamination. Frequency, procedure and maximum laboratory containment concentration limits are specified in the 6/2000 NYSDEC ASP. A holding blank is an aliquot of analyte-free water that is stored with the environmental samples in order to demonstrate that the samples have not been contaminated during laboratory storage. This blank will be analyzed using the same analytical procedure as the samples.

3.18 Matrix Spikes/Matrix Spike Duplicates and Spiked Blanks

Matrix spike samples are quality control procedures, consistent with 6/2000 NYSDEC ASP specifications, used by the laboratory as part of its internal Quality Assurance/Quality Control program. The matrix spikes (MS) and matrix spike duplicates (MSD) will be aliquots of a designated sample (water or soil) which are spiked with known quantities of specified compounds. These QA/QC samples will be used to evaluate the matrix effect of the sample upon the analytical methodology, as well as to determine the precision of the analytical method used. A matrix spike blank will be an aliquot of analyte-free water, prepared in the laboratory, and spiked with the same solution used to spike the MS and MSD. The matrix spike blank (MSB) will be subjected to the same analytical procedure as the MS/MSD and used to indicate the appropriateness of the spiking solution by calculating the spike compound recoveries. The procedure and frequency regarding the MS, MSD and MSB samples are defined in the 6/2000 NYSDEC ASP.

3.19 Field Blank (Field Rinsate Blank)/Equipment Blank

The field blank will consist of an aliquot of analyte-free water, supplied by the laboratory, which is opened in the field and is generally poured over or through a sample collection device after it is decontaminated, collected in a sample container and returned to the laboratory as a sample for analysis. It is a check on sampling procedures and cleanliness (decontamination) of sampling devices. Generally, a field blank will be collected daily or for a "batch" of sample matrices collected in the same manner (such as water and soil/sediment) up to a maximum of 20 samples. Field blanks will be analyzed for the suite of chemicals analyzed for in the environmental samples collected in that "batch." Field blanks will not be analyzed when using dedicated or disposable (one use only) sampling equipment unless directed otherwise.

Section 4

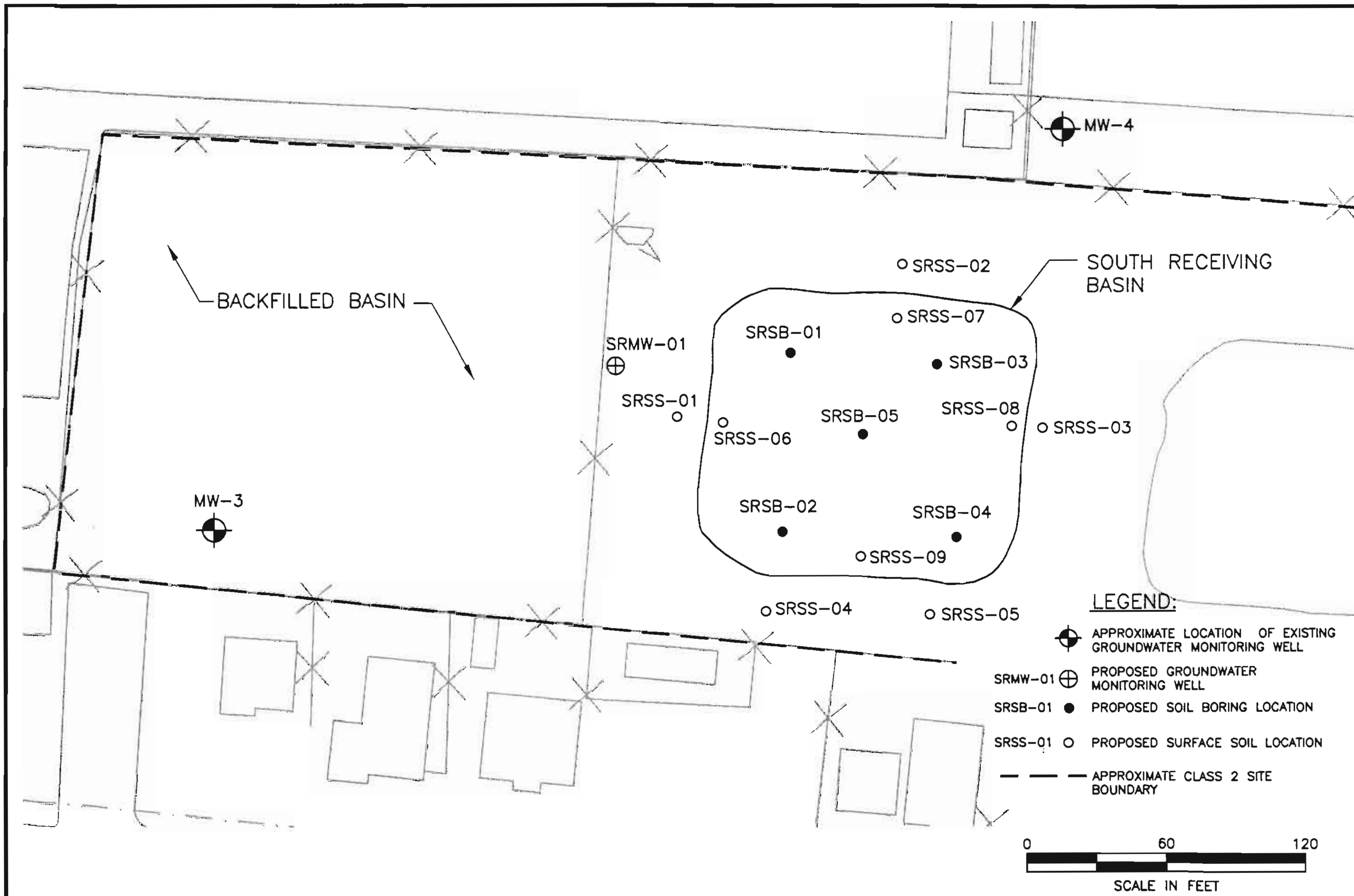
4.0 SITE SPECIFIC WORK PLAN

The purpose of the Site Specific Work Plan is to describe the detailed sampling and analysis to be conducted as part of the RI of the SRB property. The proposed sample locations are provided on Figure 4-1. However, it should be noted that the exact locations of the samples will be determined in the field based on field conditions, equipment access and utility clearance. Detailed descriptions of the sampling and analysis to be conducted are provided below:

It is proposed to advance a total of four equally spaced soil borings, utilizing the geoprobe technique, within the "floor" of the SRB. It is proposed to advance the four soil borings to a depth of 20 feet below the bottom of the basin. Continuous 2-foot soil samples will be collected from each soil boring. In addition, a Geoprobe soil boring will be advanced to the water table in the center of the SRB. Continuous 2-foot soil samples will be collected to a depth of 20 feet beneath the bottom of the SRB. Soil samples will be collected every 5 feet from 20 feet below the bottom of the SRB to the water table. All soil boring samples collected will be analyzed for VOCs (Method 8260), SVOCs (Method 8270), RCRA metals (Method 6010/7471) and PCBs (Method 8082).

Two surface soil samples (0 to 2 inches) will be collected from the south side of the SRB toward the fence line. Likewise, a surface soil sample will be collected from the three remaining locations around the perimeter of the SRB outside of the berm area. In addition, a composite surface soil sample of the gray surface sediments of the SRB and a surface soil sample from each of the SRB side walls will also be collected. It is proposed to analyze each surface soil sample for VOCs (Method 8260), SVOCs (Method 8270), RCRA metals (Method 6010/7471) and PCBs (Method 8082).

A composite soil sample of the soil piles located to the west of the SRB will be collected and analyzed for VOCs (Method 8260), SVOCs (Method 8270), RCRA metals (Method 6010/7471) and PCBs (Method 8082).



Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

NORTHROP GRUMMAN CORPORATION
BETHPAGE FACILITY
SOUTH RECEIVING BASIN

SAMPLE LOCATION MAP

FIGURE 4-1

F:\1965\1965-FIGURE-4-1.dwg, 09/18/02 02:12:33 PM, LGlubiak

It is proposed to install a shallow groundwater monitoring well immediately downgradient or to the west of the SRB. A groundwater sample will be collected from this monitoring well and analyzed for VOCs (Method 8260), SVOCs (Method 8270), RCRA metals (Methods 6010/7471) and PCBs (Method 8082). All laboratory samples will be analyzed on a 1-week turn-around basis.

4.1 Health and Safety

D&B will be responsible for ensuring that the work associated with this project is performed in accordance with safe working practices, including applicable Occupational Safety and Health Administration (OSHA) requirements. All site personnel will have hazardous waste operations and emergency response (HAZWOPER) training in accordance with 29 CFR 1910.120, will be trained and certified in the proper use of personal protective equipment (PPE), and will have knowledge and understanding of construction standards. Certifications regarding training and expertise will be submitted to NGC prior to the start of work.

4.2 Waste Disposal

D&B has made provision to contain all investigation derived waste in DOT approved 55-gallon drums. NGC will be responsible for the proper off-site transportation and disposal of the investigation derived waste.

Appendix A

APPENDIX A

PHOTO LOG

South Receiving Basin Looking Southeast.

South Receiving Basin Looking Northeast.

South Receiving Basin Looking North.

South Receiving Basin Looking Northwest.

South Receiving Basin Looking Southwest.

Edge of South Receiving Basin Looking South.

Appendix B

APPENDIX B

FIELD FORMS

EXHIBIT 1

LOCATION SKETCH

DVIRKA
AND
BARTILUCCI

LOCATION SKETCH

Project ______________________ Sample Crew ______________________

Sample(s) Location(s) ______________________

Sample(s) and/or Well Number(s) ______________________

____

Location of sample points, wells, borings, etc., with reference to three permanent reference points. Measure all distances, clearly label roads, wells and permanent features.

EXHIBIT 2

SAMPLE INFORMATION RECORDS

DVIRKA
AND
BARTILUCCI

SAMPLE INFORMATION RECORD

ITE ______________________ SAMPLE CREW ______________________

AMPLE LOCATION/WELL NO. ______________________

IELD SAMPLE I.D. NUMBER ______________________ DATE ______________________

IME ____________ WEATHER ____________ TEMPERATURE ____________

SAMPLE TYPE:

GROUNDWATER ______________________ SEDIMENT ______________________

SURFACE WATER ______________________ AIR ______________________

SOIL ______________________ OTHER (Describe, e.g., septage,leachate)

____

WELL INFORMATION (fill out for groundwater samples):

DEPTH TO WATER ____________ MEASUREMENT METHOD ____________

DEPTH OF WELL ____________ MEASUREMENT METHOD ____________

VOLUME REMOVED ____________ REMOVAL METHOD ____________

FIELD TEST RESULTS:

COLOR ____________ pH ____________ ODOR ____________

TEMPERATURE (°F) ____________ SPECIFIC CONDUCTANCE (umhos/cm) ____________

TURBIDITY ______________________

PID/FID READING ____________ VISUAL DESCRIPTION ____________

____

CONSTITUENTS TO BE ANALYZED:

____________ ____________ ____________ ____________

____________ ____________ ____________ ____________

REMARKS: ______________________

____

____

WELL CASING VOLUMES

GAL/FT	1-1/4" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.10	2-1/2" = 0.24	3-1/2" = 0.50	6" = 1.46

P-0794.PM4

DVIRKA
AND
BARTILUCCI

WATER SUPPLY SAMPLE INFORMATION RECORD

Name: ______________________________

Address: ______________________________

Telephone: ______________________________

Date and Time Sampled: ______________________________

Sample Location: ______________________________

Sample Number: ______________________________

Well Information: ______________________________

Depth and Type of Well: ______________________________

Date Constructed: ______________________________

Type of Construction and Diameter: ______________________________

Driller: ______________________________

Estimated Usage (gpm): ______________________________

Water Use(s): ______________________________

Type of Treatment Device and Location: ______________________________

Date and Location Last Sampled: ______________________________

Homeowner's Perception of Water Quality: ______________________________

Comments: (Use of bottled water, etc.) ______________________________

WSS

Sketch of Lot, Building, and Well and Septic System Location

Sketch of Water Treatment System and Sampling Locations

Photograph of Water Treatment System

EXHIBIT 3

CHAIN OF CUSTODY FORM

CHAIN OF CUSTODY RECORD

PAGE ____ OF ____ | NO ____

JOB #:

CLIENT:

PROJECT ID:

PROJECT MGR:

RUSH [ ] YES [ ] NO DUE DATE

BOTTLE SET #	CLIENT SAMPLE ID	DATE / TIME SAMPLED	MATRIX	LAB ID	QC Y / N	TESTS / BOTTLE TYPE AND PRESERVATION / FIELD FILTERED - CIRCLE Y or N								SAMPLE REMARKS
						Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	

GENERAL REMARKS

MATRIX CODES

A - AIR
AQ - AQUEOUS
C - COMPLEX
D - DRUM WASTE
OI - OIL
S - SOIL
SL - SLUDGE
W - WIPE
O - OTHER
FB - FIELD BLANK
TB - TRIP BLANK

BOTTLES PREPARED BY	DATE / TIME	BOTTLES REC'D BY	DATE / TIME
SIGNATURE		SIGNATURE	
SAMPLES COLLECTED BY	DATE / TIME	RECEIVED IN LAB BY	DATE / TIME
SIGNATURE		SIGNATURE	

REMARKS ON SAMPLE RECEIPT

[ ] BOTTLES INTACT
[ ] CUSTODY SEALS
[ ] PRESERVED
[ ] SEALS INTACT
[ ] CHILLED
[ ] SEE REMARKS

LABORATORY COPY

EXHIBIT 4

RECEIPT OF SAMPLES FORM

DVIRKA
AND
BARTILUCCI

Receipt for Samples

Project Name: ______________________ Field Log Book Reference Number: ______________________

Project Address: ______________________ Sampled By: ______________________

Project Number: ______________________ Split With: ______________________

SAMPLE NUMBERS	DATE	TIME	COMP	GRAB	SPLIT SAMPLES	LOG BOOK PAGE NO.	TAG NUMBERS	SAMPLE LOCATION	NO. OF CONTAINERS	REMARKS

Transferred by (Signature)		Received by (Signature)		Telephone
Date	Time	Title	Date	Time

EXHIBIT 5

TEST PIT LOG FORM

DVIRKA
AND
BARTILUCCI

TEST PIT LOG

TEST PIT LOCATION SKETCH MAP

N

TEST PIT NO.	
PROJECT NO./NAME	LOCATION
EXCAVATOR/EQUIPMENT/OPERATOR	
INSPECTOR/OFFICE	START/FINISH DATE
ELEVATION OF: GROUND SURFACE/BOTTOM OF PIT (FT. ABOVE MSL)	CONDITION OF PIT
REMARKS:	

DEPTH	SAMPLE INTERVAL	OVA SCREEN	DESCRIPTION OF MATERIALS	REMARKS
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

NJDEPTPL

EXHIBIT 6

BORING LOG FORM

BORING LOG

Dvirka and Bartilucci CONSULTING ENGINEERS	Project No.: Project Name:	Boring No.: Sheet __ of __ By:
Drilling Contractor: Driller: Drill Rig: Date Started:	Geologist: Drilling Method: Drive Hammer Weight: Date Completed:	Boring Completion Depth: Ground Surface Elevation: Boring Diameter:

Depth (ft.)	Soil Sample				PID Per 6" (ppm)	Sample Description	USCS
	No.	Type	Blows Per 6"	Rec. (feet)			
-0-							
-1-							
-2-							
-3-							
-4-							
-5-							
-6-							
-7-							
-8-							
-9-							
-10-							

Sample Types:
SS = Split Spoon
HA = Hand Auger
GP = Geoprobe Sampler
CC = Concrete Core

NOTES:

EXHIBIT 7

DRILLING LOG FORM

DVIRKA AND BARTILUCCI

DRILLING LOG

DRILLING CONTRACTOR

Driller ____________

Inspector ____________

Rig Type ____________

Drilling Method ____________

Drive Hammer Weight ____________

PROJECT NAME ____________

PROJECT # ____________

Location/Address ____________

BORING NUMBER ____________

Sheet ____ of ____

Boring Location ____________

GROUNDWATER OBSERVATIONS

Water Level			
Time			
Date			
Casing Depth			

Weather ____________

Date/Time Start ____________

Date/Time Finish ____________

Plot Plan

Sample Depth	Sample Number	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	COMMENTS

SPT = STANDARD PENETRATION TEST

Soil Stratigraphy Summary ____________

EXHIBIT 8

WELL CONSTRUCTION LOG FORM

Dvirka and Bartilucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

SITE ______________________ JOB NO. ________ WELL NO. ________

TOTAL DEPTH ________ SURFACE ELEV. ________ TOP RISER ELEV. ________

WATER LEVELS (DEPTH, DATE, TIME) ________ DATE INSTALLED ________

RISER DIA ___ MATERIAL ________ LENGTH ____

SCREEN DIA ___ MATERIAL ________ LENGTH ____ SLOT SIZE ________

SCHEMATIC

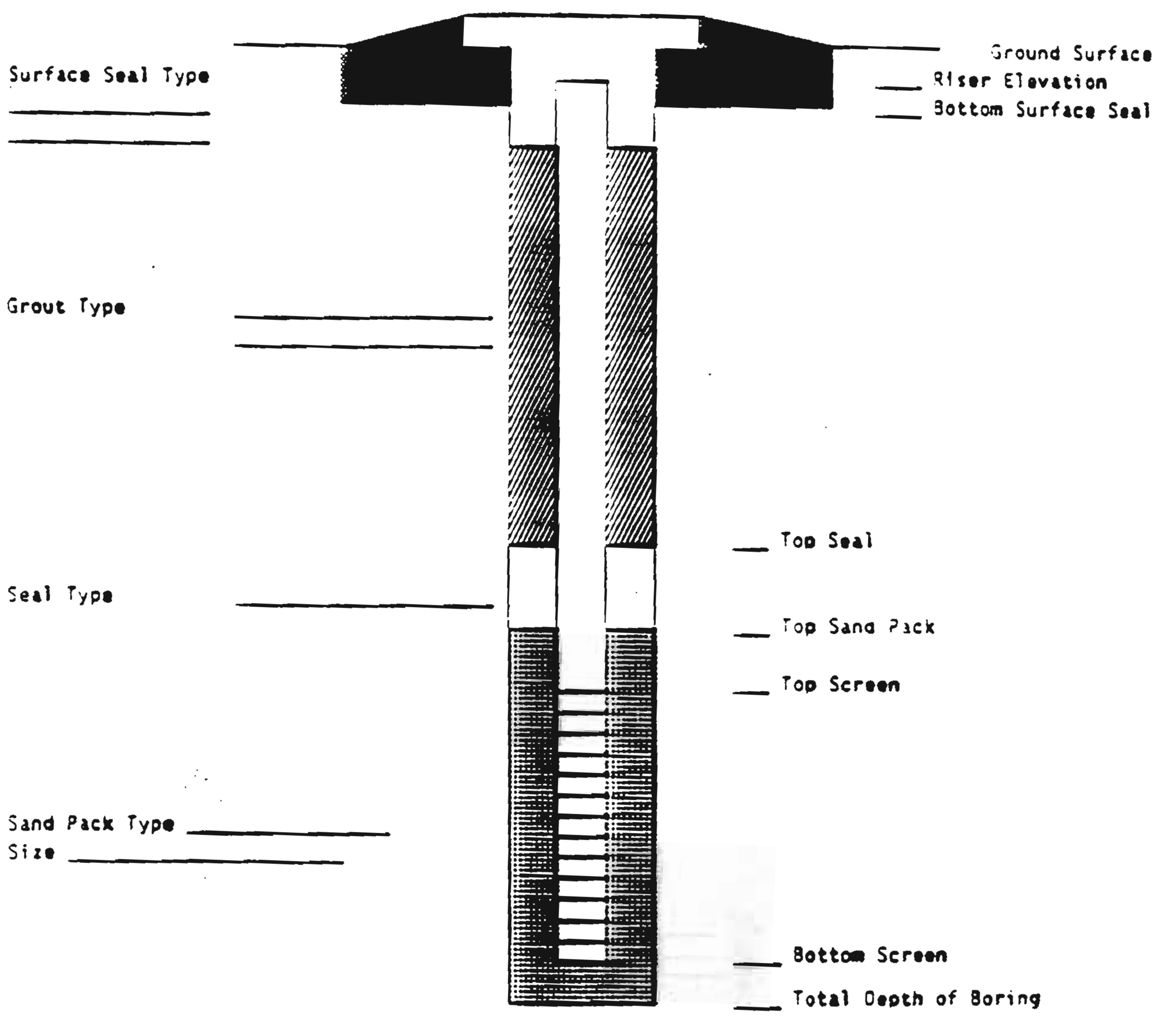


EXHIBIT 9

DAILY EQUIPMENT CALIBRATION LOG FORM

DVIRKA
AND
BARTILUCCI

DAILY EQUIPMENT CALIBRATION LOG

Project Name: ______________________________

Project Number: ____________________ Calibrated By: ____________________

Date	Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

EXHIBIT 10

DAILY FIELD ACTIVITY REPORT

EXHIBIT 11

FIELD CHANGE FORM

DVIRKA
AND
BARTILUCCI

FIELD CHANGE FORM

Project Name: ______________________________

Project Number: ____________________ Field Change Number: ____________

Location: ______________________________ Date: ____________

Field Activity Description: ______________________________

Reason for Change: ______________________________

Recommended Disposition: ______________________________

______________________________ ____________

Field Operations Officer (D&B Consulting Engineers) (Signature) Date

Disposition: ______________________________

______________________________ ____________

On-site Supervisor (NYSDEC) (Signature) Date

Distribution: Project Manager (D&B)
Project Manager (NYSDEC)
Field Operations Officer
On-site Supervisor (NYSDEC)

Others as Required: ____________

DB-FCF

EXHIBIT 12

FIELD AUDIT FORM

DVIRKA
AND
BARTILUCCI

FIELD AUDIT FORM

Site: ______________________ Date: ______________________

Persons On-site: ______________________ QA/QC Officer Conducting Audit:

______________________ ______________________

______________________ Project:

______________________ ______________________

1. Is safety equipment in use (hardhats, respirators, gloves etc.): YES NO

2. Is a decontamination station, equipment and supplies on site and in working order:

	Methanol	YES	NO
	Alconox	YES	NO
	D.I. Water	YES	NO
	Scrub Brushes	YES	NO
	Steam Cleaner	YES	NO

Comments: ______________________

____

____

3. Is the decontamination pad set up so water is contained: YES NO

Comments: ______________________

____

____

4. Is the site/investigation areas secured (fence, markers, etc.) or otherwise in accordance with project requirements: YES NO

Comments: ______________________

____

____

FLDAUDIT

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

5. Is contaminated material properly stored and in a secure area or otherwise in accordance with project requirements: YES NO
Are the drums of waste (water, soil, ppe) labeled properly: YES NO

Comments: ______________________________

____

____

6. Are field forms filled out properly, legibly and timely:

Field Log Book	YES	NO
Chain of Custody	YES	NO
Equipment Calibration Log	YES	NO
Daily Field Activity Report	YES	NO
Location Sketch	YES	NO
Sample Information Record	YES	NO
Equipment Usage Form	YES	NO
Boring Logs	YES	NO

Comments: ______________________________

____

____

7. Is the proper sampling and field measurement equipment, including calibration supplies on site: YES NO

Comments: ______________________________

____

____

DVIRKA
AND
BARTILUCCI

FIELD AUDIT FORM
(continued)

8. Are there adequate sample containers, including deionized water for QA/QC:

	Field Blanks	YES	NO
	Trip Blanks	YES	NO

Comments: ______________________________

____

____

9. Is the equipment decontaminated in accordance with project requirements:

Sampling equipment	YES	NO
Construction equipment	YES	NO

Comments: ______________________________

____

____

10. Is field measurement equipment calibrated:

Daily	YES	NO
Properly	YES	NO

Comments: ______________________________

____

____

11. Are samples collected and labeled properly: YES NO

Comments: ______________________________

____

____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

12. Are samples stored at 4°C: YES NO

Comments: ______________________________

____

____

13. Are coolers properly sealed and packed for shipment including Chain of Custody taped to underside of lid: YES NO

Comments: ______________________________

____

____

14. Is a copy of the Field Investigation Work Plan available on site: YES NO

Comments: ______________________________

____

____

15. Is a copy of each equipment manual on-site: YES NO

Comments: ______________________________

____

____

16. Is a copy of the QA/QC Plan available on site: YES NO

Comments: ______________________________

____

____

DVIRKA
AND
BARTILUCCI

FIELD AUDIT FORM
(continued)

17. Are investigation personnel familiar with the Work Plan and QA/QC Plan: YES NO

Comments: ______________________________

____

____

18. Are quality control samples taken:

Trip Blanks	YES	NO
Field Blanks	YES	NO

Comments: ______________________________

____

____

19. Are samples shipped in a timely and appropriate manner: YES NO

Comments: ______________________________

____

____

20. Has the laboratory been contacted regarding planned shipment of samples: YES NO

Comments: ______________________________

____

____

21. Certification - Based upon my audit at the above project, I hereby certify/do not certify compliance with QA/QC requirements for the project:

______________________ ______________________

Dated Signed

DVIRKA
AND
BARTILUCCI

FIELD AUDIT FORM
(continued)

General Comments: ______________________________

____

____

____

EXHIBIT 13

NYSDEC SAMPLE IDENTIFICATION, PREPARATION AND ANALYSIS SUMMARY FORMS

To be included with all lab data and with each workplan

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements					
		*VOA GC/MS Method #	*BNA GC/MS Method #	*VOA GC Method #	*Pest PCBs Method #	*Metals	*Other

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOLATILE (VOA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Analytical Protocol	Extraction Method	Auxiliary Cleanup	Dil/Conc Factor

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
INORGANIC ANALYSES

Laboratory Sample ID	Matrix	Metals Requested	Date Rec'd at Lab	Date Analyzed