REMEDIAL INVESTIGATION AND FEASIBILITY STUDY WORK PLAN

TEE BIRD COUNTRY CLUB - NORTH COURSE
MOREAU, NEW YORK

Prepared for:

Tee Bird Country Club, Inc.

September 26, 2008

ALPHA GEOSCIENCE

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Geology

Hydrology

Remediation

Water Supply

Remedial Investigation and Feasibility Study Work Plan

Tee Bird Country Club – North Course
Moreau, New York

Prepared for:

Tee Bird Country Club, Inc.

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

September 26, 2008

New York State Department of Environmental Conservation
Office of Environmental Quality, Region 5
Division of Environmental Remediation
232 Golf Course Road – P.O. Box 220, Warrensburg, New York 12885
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Alexander B. Grannis
Commissioner

July 13, 2009

Mr. Scott Hulseapple
Alpha Geoscience
679 Plank Road
Clifton Park, NY 12065

Re: Tee Bird Country Club, Inactive Hazardous Waste Site No. 546028
Revised Remedial Investigation Work Plan
Town of Moreau, Saratoga County

Dear Mr. Hulseapple:

This is in response to your June 8, 2009 letter regarding the above referenced inactive hazardous waste disposal site. The New York State Department of Environmental Conservation (Department) finds the proposed modifications acceptable, given the following:

1. This letter, and your June 8, 2009 letter, are considered appended to Alpha's September 2008 remedial investigation work plan.

2. The proposed schedule is updated and submitted to this office for review and approval.

3. Please be advised that per Paragraph C, Section XIV of Order on Consent #A5-0532-1205, the Department shall have and utilize the right to obtain its own samples. Therefore, per Paragraph D, Section XIV of Order on Consent #A5-0532-1205, please notify this office of any and all proposed field activity schedules as soon as they are made available so that the Department can coordinate appropriately. Per 6 NYCRR Part 375-1.6(a)4, this should be at a minimum of 7 days in advance of any field activities.

4. Please submit a copy of the modified and appended work plan to the project repositories, copying this office on the transmission. Once the document repositories are complete, the remedial investigation work plan fact sheet announcement may be mailed to the project contact list.

Please provide the updated schedule by August 14, 2009. If you have any questions, please feel free to call me at (518) 623-1238.

Sincerely,

Alicia Thorne, P.E.
Environmental Engineer 2

AT:lc

ec: S. Owens, Esq. - NYSDEC, Albany
R. Huyck, P.E. - NYSDEC, Ray Brook
I. Ushe - NYSDOH, Troy

ALPHA GEOSCIENCE

Geology
Hydrology
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Water Supply

June 8, 2009

Ms. Alicia Thorne, P.E.
Environmental Engineer 2
NYSDEC, Region 5
Division of Environmental Remediation
232 Golf Course Road
Warrensburg, New York 12885

Re: Remedial Investigation/Feasibility Study Work Plan
Tee Bird Country Club
Town of Moreau, Saratoga County
NYSDEC Site No. 546028

Dear Ms. Thorne:

This letter summarizes our conversation on May 13, 2009 regarding the above referenced site. We discussed your verbal comments to the scope of work contained in the September 26, 2008 RI/FS Work Plan. Tee-Bird Country Club, in consultation with its legal and technical consultants, agrees to the following modifications to the scope of work.

- Soil samples collected from two soil cores, SS-1 and SS-2, beneath the asphalt cap (Section 5.1.2), where concentrations of PCBs are the greatest based on historic sampling, will be analyzed for semi-volatile organic compounds (SVOCs) plus TICs by USEPA SW-846 Method 8270C. This is in addition to the PCBs, VOCs, and metals already proposed in the work plan. It is understood that the NYSDEC agrees that all of the remaining samples may not need to be analyzed for parameters in addition to PCBs even if additional parameters are found in the samples from SS-1 and SS-2 at levels above the soil cleanup objectives. The laboratory analytical results for samples from SS-1 and SS-2 will be used, in consultation with the NYSDEC, to determine the number of remaining samples to be analyzed for additional parameters in addition to PCBs.

- Samples collected from the 1 to 2 foot and 2 to 3 foot intervals from the twenty soil cores beyond the limits of the asphalt cap (Section 5.1.3) will be analyzed for PCBs, regardless of whether PCBs are detected in the 0 to 1 foot interval sample.

It is understood that, if you agree with the above modifications, you will review the Community Participation Plan, the draft RI/FS Work Plan Fact Sheet, and Contact List for completion and issue a conditional approval letter for the work plan that incorporates or references the modifications listed above.

Please feel free to contact me regarding any questions or comments you have regarding this letter.

Sincerely,
Alpha Geoscience

Scott M. Hulseapple
Hydrogeologist

SMH/bms

cc: R. Huyck, NYSDEC
G. Litwin, NYSDOH
I. Ushe, NYSDOH
C. Vasudevan, NYSDEC
S. Owens, NYSDEC
D. Irwin
J. Privitera

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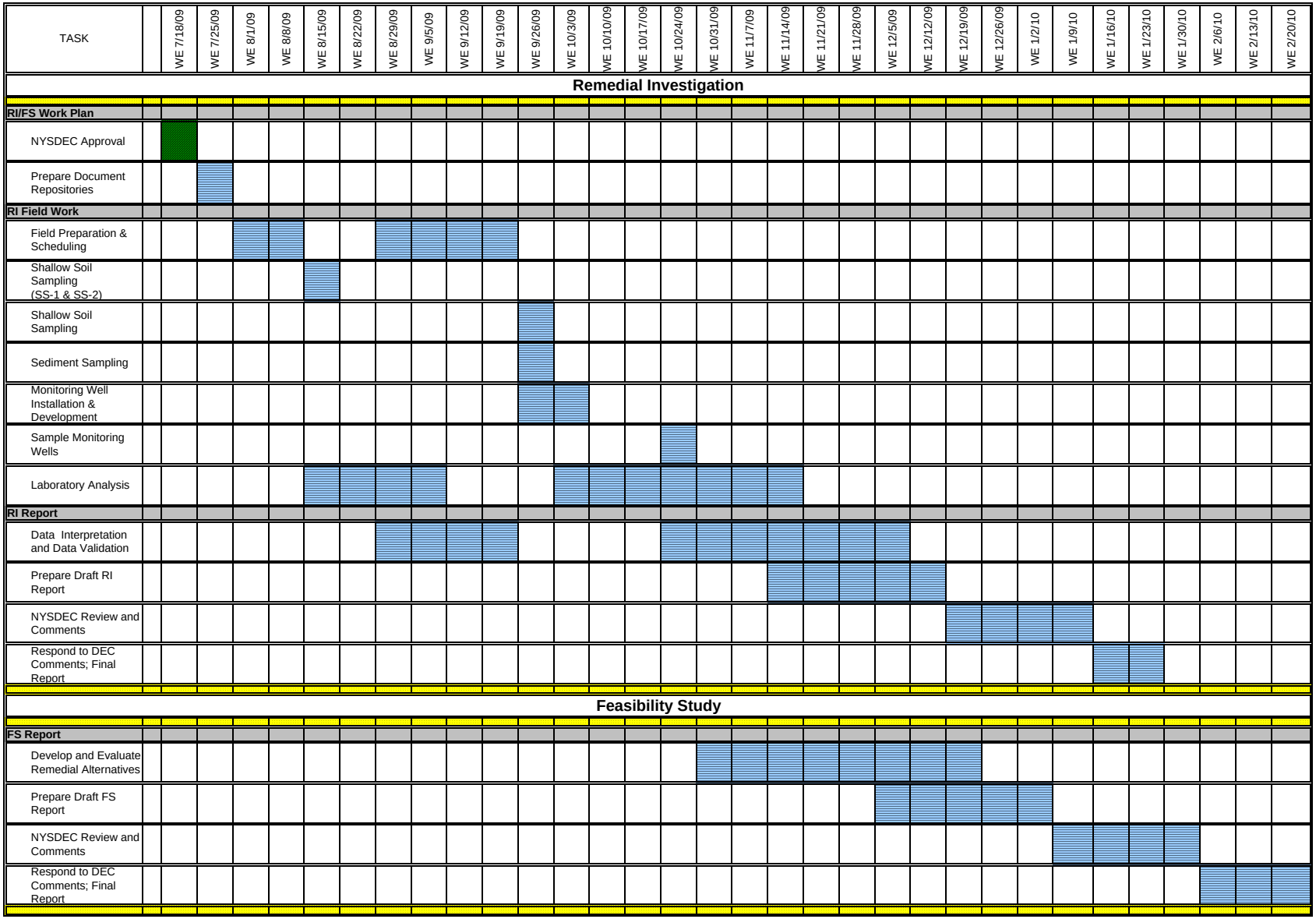
REVISED REMEDIAL INVESTIGATION & FEASIBILITY STUDY SCHEDULE
Tee Bird Country Club
Town of Moreau, New York



Note: Task and report completion dates are subject to change depending on unforeseen conditions such as contractor scheduling and extent of agency review and comment time. The schedule will be periodically revised to reflect such changes and will be submitted to the NYSDEC with the monthly progress reports.

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1.0 INTRODUCTION

Alpha Geoscience (Alpha) has prepared this Remedial Investigation/Feasibility Study Work Plan (RI/FS Work Plan) on behalf of Tee Bird Country Club, Inc. (Tee Bird) for a portion of the Tee Bird Country Club-North Course, on Reservoir Road, Town of Moreau, Saratoga County, New York. The country club is located on the south side of Reservoir Road, approximately one mile west of the Hudson River. Figure 1 is a map showing the location of the Site. The site is being investigated in accordance with Order on Consent Number A5-0532-1205 between Tee-Bird and the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC Site number for the site is 546028.

The "Site" consists of the country club parking lot and nearby areas that may be impacted by polychlorinated biphenyls (PCBs) applied to the surface of the parking lot for dust control circa 1977. A remedy approved by the NYSDEC, consisting of an asphalt cap placed over the parking lot, was implemented in 1984 in accordance with an agreement between Tee Bird and the NYSDEC. Figure 2 is a Site map showing the country club parking lot and nearby areas.

2.0 REMEDIAL INVESTIGATION OBJECTIVES

The objective of the RI is to define the lateral and vertical extent of impacts of PCBs on soil, ground water, and sediment. Tasks are proposed to collect sufficient data of adequate quality to define the nature and extent of contamination, identify potential migration pathways, and identify potential receptors. The tasks to be performed to achieve the RI objectives include collecting samples of soil beneath the asphalt cap, collecting soil samples along the periphery of the cap, installing ground water monitoring wells, collecting ground water samples, sampling existing water supply wells, and collecting samples of sediment from the nearby pond. The data from these tasks will provide a basis for a feasibility study that will include identification of appropriate and applicable remedial technologies and development of remedial alternatives that may be required to be implemented as a permanent remedy for the Site.

3.0 PREVIOUS STUDIES AND REGULATORY STATUS

In the early 1980's soil sampling by the NYSDEC detected the presence of PCBs in the parking lot at the Site, which was unpaved at the time. The NYSDEC entered into a consent agreement dated July 2, 1984, with Tee Bird that required Tee Bird to pave the parking lot as a remedial measure to address the presence of PCBs. NYSDEC personnel conducted periodic inspections of the paved parking area and collected and analyzed soil samples adjacent to the parking area in 1983, 1984, 1989, and 1990. No further investigation or remedial measures were required as a result of the inspections or soil sampling.

The NYSDEC issued a letter dated June 27, 2005 indicating that it was reclassifying the Site from a Class 3 Inactive Hazardous Waste Site to a Class 2 site and that a Remedial Investigation and Feasibility Study (RI/FS) is required. Tee Bird and the NYSDEC entered into Order on

Consent and Administrative Settlement # A5-0532-1205 (the "Order"). This work plan has been prepared in accordance with the Order.

4.0 SITE BACKGROUND

The Site consists of the Country Club parking lot and nearby areas that may be impacted by PCBs applied to the surface of the parking lot for dust control circa 1977. A remedy approved by the NYSDEC, consisting of an asphalt cap placed over the parking lot, was implemented in 1984 in accordance with an agreement between Teel Bird and the NYSDEC.

Alpha personnel interviewed Mr. Dan Irwin, on April 4, 2006 and May 3, 2006. Mr. Irwin, the former owner of the Tee Bird Country Club, indicated that the property was purchased in 1960 from Richard Huxton. At the time, the property was an inactive farm, with a farm house. The pond adjacent to the club house was reportedly present at that time. The club house and golf course were opened in 1962 as a nine-hole course. Subsequently, the golf course was expanded to eighteen holes. Mr. Irwin operated the course for many years and currently leases the golf course to the present operator. Mr. Irwin provided much of the historical site information reported in the following sections.

4.1 Existing Conditions

The country club consists of a public, 18-hole championship golf course, with a club house building, a maintenance building, a small open-air food stand, and a cart shed. The buildings are situated around paved and unpaved parking areas located in the north-central part of the property, near Reservoir Road. The paved parking area between the clubhouse and Reservoir Road (Figure 2) constitutes the capped PCB area. The cap consists of approximately 18-inches of gravel covered by asphalt. Natural clay exists immediately beneath the gravel according to the Site owner.

4.2 Physical Setting

The property is situated in the Hudson River Valley, which is oriented north to south between the Adirondack Mountains to the west and the Taconic and Green Mountains to the east. The property generally slopes gently to the southeast. Steeper slopes occur in several gullies, through which small, intermittent streams drain the property toward the southeast. These small streams join to the southeast of the property, forming the North Branch of the Snook Kill, which subsequently flows into the Snook Kill and then eastward to the Hudson River.

Elevations on the property range from approximately 280 feet above mean sea level (amsl) at the northwest corner of the property, along Burt Road, to approximately 200 feet amsl in the ravines at the southeast corner of the property. The direction of ground water flow at the Site is interpreted to be to the southeast based on the geology, topography, and surface water drainage.

The Site is underlain by Paleozoic-aged sedimentary bedrock consisting of shale according to geologic maps published by the New York State Geologic Survey. Bedrock in the area generally occurs at depths of 50 feet or more, under an overburden cover of glacial lake sediments. The glacial lake sediments are primarily silt and clay, with a surficial veneer of sand in some areas.

Two water supply wells are present on the property. One well is located near the northeast corner of the clubhouse and the other is located near the foundation of a former mobile home, north of the pond. Both wells have steel casing extending through the overburden and are drilled into bedrock. The clubhouse well is reportedly approximately 243 feet deep with 50 feet of casing. The clubhouse maintains a connection to the Village of Fort Edward water supply, but uses the well for water. The well adjacent to the mobile home foundation was drilled in 1974 and is approximately 240 feet deep. The well reportedly produces about three gallons per minute (gpm) of sulfur water and is not currently used.

4.3 Adjacent Areas

The area to the north of the Site (i.e., north of Reservoir Road) is wooded. The area to the west of the Site is rural with several residences located along Burt Road. These residences reportedly obtain their water supplies from shallow well points. The area to the south of the Site contains wooded areas, farm fields, and a small cemetery. There are several residences along Fort Edward Road (New York Route 197) approximately ½- to ¾-miles south of the site. These residences reportedly use deep wells (i.e., drilled bedrock wells) for their water supplies. The area to the east of the Site contains farm fields and wooded areas. There are a few residences located along Reservoir Road approximately ¼- to ½-mile east of the site. These residences reportedly are served by the Fort Edward municipal water supply.

4.4 Previous Investigations

Alpha conducted a Phase I Environmental Site Assessment (ESA) of the entire property in May 2006. In addition to the presence of PCBs in soils at or near the parking lot, petroleum storage tanks, and stored chemicals (fertilizers, pesticides, and paint) were identified in the vicinity of the maintenance garage. These materials are used during the course of normal operations. No indications of significant spills or releases were observed near during the Phase I ESA.

The samples collected by the NYSDEC in 1983 through 1990 are shown on Figure 3 with isoconcentration contours depicting the concentration of PCBs in the soil. The isoconcentration contours suggest that the lateral extent of PCBs at the Site is relatively limited beyond the asphalt cap. The sample data on the tables shown on Figure 3 indicate that PCB concentrations increase with depth at some locations and decrease with depth at other locations. The samples collected by the NYSDEC in 1983 and 1984 consisted of grab samples. The NYSDEC's samples collected in 1989 and 1990 were prepared by compositing aliquots from two to four locations. Concentrations detected in composite samples do not represent the concentration potentially present in an individual aliquot. Both the grab samples and composite samples were used to

depict the isoconcentration lines on Figure 3; therefore, the isoconcentration lines are generalized and are used as a guide for more detailed investigation proposed in this work plan.

5.0 SCOPE OF WORK AND FIELD SAMPLING PLAN

This section describes the tasks that will be completed during the RI. Table 1 summarizes the remedial investigation sample and analysis program. Sample locations are show on Figures 4 though 6.

5.1 Shallow Soil Sampling and Analysis

The objective of this task will be to define the horizontal and vertical extent of PCBs in the soil beneath and adjacent to the asphalt cap. Soil samples will be collected beneath the existing asphalt cap at ten locations and adjacent to the asphalt cap at twenty locations. The proposed sampling locations are shown on Figure 4. A direct push drilling rig or hand tools will be used to obtain the samples.

5.1.1 Soil Sampling Methods

The direct push "GeoProbe™" sampler consists of a stainless steel tube that is hydraulically pushed or pounded. The sampler contains a four-foot long two-inch diameter, clear, acetate liner (sleeve) that is retrieved and cut lengthwise to allow inspection and sample collection by the on-site hydrogeologist or geologist. A shovel, hand auger, or other suitable soil sampling device also may be used to collect shallow soil samples. The stainless steel sampling tube and any hand tools used to collect the soil samples will be decontaminated between each sampling location as described in section 6.5.

A geologic description of the samples will be recorded by the hydrogeologist/geologist and will include the boring identification, depth interval, composition, color, moisture and other notable features. Excess soil from the sample cores will be placed in a 55 gallon steel drum and stored on-site until the results of the soil sample analyses are received. The containerized soil will be spread on-site if no contaminants are detected at concentrations that exceed NYSDEC soil cleanup objectives (SCOs) in the soil samples collected from the soil borings. The containerized soil will be retained for disposal in accordance with TAGM 4032 and Draft DER-10 at a later date if compounds of concern are detected in the soil samples.

5.1.2 Soil Samples Beneath the Asphalt Cap

Ten soil cores will be collected from beneath the asphalt cap (SS-1 through SS-10 on Figure 4). The starting depth for soil samples collected beneath the asphalt cap will be the base of the subbase gravel beneath the asphalt (i.e., original grade). Samples from three depths (0 to 1 foot below ground surface (bgs), 1 to 2 feet bgs, and 2 to 3 feet bgs) from each core will be collected.

The samples will be placed in appropriate laboratory-supplied containers and submitted to the laboratory for analysis of PCBs and other parameters described below.

Two of the soil cores (SS-1 and SS-2) will be collected from the area of suspected contamination beneath the asphalt cap (based on the NYSDEC's 1984 to 1990 sample results) and submitted for analysis to determine the "compounds of concern" (COCs) for which all other Site samples will be analyzed. The six soil samples from soil cores SS-1 and SS-2 will be analyzed for volatile organic compounds (VOCs) plus ten tentatively identified compounds (TICs) by EPA Method 8260B and eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) by USEPA Methods 6010 and 7470 in addition to PCBs by EPA Method 8082. Two different soil cores (SS-3 and SS-4) will be selected for analysis if PCBs or other compounds are not detected in the samples from the first two cores (SS-1 and SS-2) selected for analysis.

The analytical results for the initial samples will be compared to Part 375 clean up objectives to determine the site specific COCs. The COCs for the remaining samples analyzed during the RI will be limited to PCBs if VOCs or metals are not detected in the soil samples from SS-1 through SS-4 at concentrations that exceed the NYSDEC's SCOs. The final list of COCs will be determined in consultation with the NYSDEC. The samples will be analyzed by a New York State Department of Health ELAP-certified laboratory.

5.1.3 Soil Samples Beyond the Limits of the Asphalt Cap

Oil containing PCBs was applied to the ground surface of the driveway and parking area. The Site grade has not been altered since 1977 when the PCB contaminated oils were sprayed on the parking lot surface, based on information provided by the site owner, Mr. Dan Irwin. Fill consisting of a subgrade gravel base for paving has only been placed on the parking lot area as part of the 1984 remedy. No fill reportedly has been placed on areas adjacent to the parking lot or on the cart paths. PCBs may have migrated downward from the ground surface, or may have been carried laterally by runoff from the application area, and then downward. Soil samples will be collected and analyzed to evaluate the lateral and vertical extent of migration beyond the limit of the asphalt cap. The starting depth for soil samples collected beyond the limit of the asphalt cap will be the existing ground surface or immediately below the vegetation, if present.

Soil samples will be collected from depths of approximately 0 to 12 inches bgs from locations SS-11 to SS-30 (Figure 4). The soil from each location will be placed in appropriate pre-cleaned laboratory-supplied containers and retained for analysis of the COCs identified using the method described in Section 5.1.2. The results will be used in consultation with the NYSDEC to determine locations where additional samples will be collected and analyzed.

Soil samples will be collected from 12 to 24 inches bgs and 24 to 36 inches bgs from locations at which COCs were detected in the samples collected from 0 to 12 inches bgs. The purpose of these samples is to evaluate the vertical extent of soil impacts. Both the 12 to 24 inch bgs and 24 to 36 inch bgs samples will be submitted to the laboratory; however the 24 to 36 inch bgs samples will be analyzed only if COCs are detected in the shallower samples at the

corresponding location. Final determination of soil sampling selection, including additional sample locations if warranted, and analysis will be made in consultation within the NYSDEC.

Additionally, samples will be collected from 0 to 2 inches bgs from the three locations where the maximum concentrations of PCBs were detected in the 0 to 12 inch bgs interval. The results of these samples will be used in the human health exposure assessment (Section 5.5.2).

5.2 Soil Borings and Monitoring Well Installations

Four soil borings will be advanced and three ground water monitoring wells will be installed adjacent to the asphalt cap. One soil sample will be collected from each soil boring drilled for the monitoring wells to evaluate the quality of the "deep" soil at the Site. Data from the wells will be used to evaluate the horizontal ground water gradient and potential impacts to ground water quality at the Site. The proposed locations of the soil borings and monitoring wells are shown on Figure 5.

Soil borings for the monitoring wells will be drilled with 4 ¼- inch inside diameter, hollow stem augers (HSAs). Each boring will be drilled to a depth approximately ten feet below the water table. The depth to water will be determined by the on-site geologist/hydrogeologist based on soil moisture content or the occurrence of standing water in the borehole. Soil sampling will be conducted continuously from the surface by driving a two-inch (outside diameter) split-spoon sampler with a 140-pound hammer falling 30 inches until either 24 inches of soil are penetrated or 100 blows are applied with less than six inches of penetration in accordance with the procedures specified in ASTM 1586. The number of blows required to achieve each six inches of penetration will be recorded. More than 100 blows may be applied at the discretion of field personnel to advance the sampler a minimum of six inches of total penetration. The split barrel samplers and drilling equipment will be decontaminated in accordance with the cleaning protocol described in Section 6.5 to minimize the potential of cross-contamination.

Drill cuttings and excess soil samples will be placed in a 55 gallon steel drum until the results of the soil sample analyses are received. The containerized soil will be spread on-site if no contaminants are detected above NYSDEC's SCOs in the soil samples collected from the soil borings. The containerized soil will be retained for disposal at a later date if compounds of concern are detected in the soil sample collected from the borings.

The soil sampler will be opened and the soil sample inspected upon retrieval. Split-spoon samples will be logged on-site by a hydrogeologist or geologist using a standard geologic description. The geologic description will include color, primary and secondary grain size, moisture, olfactory observations, and a physical description of contaminants, if any. One sample will be collected from each boring from the 4 to 6 foot depth interval for laboratory analysis. The samples will be placed in appropriate pre-cleaned containers supplied by the laboratory and submitted for analysis of the compounds of concern as described in section 5.1.2. The objective of the collection and analysis of these soil samples is to further assess the vertical extent of the compounds of concern.

A monitoring well will be installed in each completed soil boring. The monitoring wells will be constructed of two-inch diameter, flush-threaded, schedule 40, PVC screen and riser. A maximum of 15 feet of 10-slot screen will be used for each well. The screen will be placed so that the top of the screen extends above the water table.

The wells will be completed by placing a clean, Grade 1, filter sand pack approximately 0.5 feet below the base of the screen and extending approximately 1.0 feet above the top of the screen. A bentonite seal with a minimum thickness of two feet will be installed above the sand pack. The remainder of the borehole annular space will be grouted to the surface with a cement-bentonite grout. A locking, steel, protective casing will be cemented over each well to prevent unauthorized access and to provide protection for the wells from accidental impact. A concrete pad will be constructed around the top of each well with a sufficient thickness to minimize frost heave and leakage of surface water around the protective casing.

5.2.1 Monitoring Well Development

Each newly-installed monitoring well will be developed to remove residual formational silts and clays, thereby reducing turbidity during sampling that could potentially interfere with chemical analysis, to increase the hydraulic communication between the saturated zone and the well, and to improve the well yield.

Well development will be accomplished using dedicated polyethylene bailers with bottom check valves. Well development will be terminated when no appreciable sediment remains in the water being removed from the well, or when it is apparent that continued development will not result in reduced turbidity.

5.2.2 Well Surveying

The horizontal and vertical location of the newly installed monitoring wells will be surveyed relative to an arbitrary site datum. The monitoring well elevations will include a measurement of the ground surface adjacent to the well and the elevation at the top of the PVC well casing (i.e., reference elevation). These elevations will be used in conjunction with the water level monitoring data to calculate ground water elevations and determine ground water flow directions.

5.2.3 Water Level Measurements

The objective of measuring the water levels is to determine the direction of ground water flow. Water level measurements in the monitoring wells will be recorded before and after well development and prior to ground water sampling.

The water levels will be measured using an electric water level indicator to determine the depth of water to the nearest 0.01 foot at each well location. The raw data will be converted to

elevations relative to the arbitrary site datum using the surveyed well elevations. The water level measuring equipment will be decontaminated between measurements to avoid potential cross contamination.

5.3 Ground Water Sampling and Analysis

The objective of the ground water sampling is to evaluate the ground water quality relative to the compounds of concern identified in section 5.1.2. One ground water sample will be collected from each of the three monitoring wells using the following procedure:

The monitoring wells will be purged following the USEPA's Low-Flow sampling protocol (USEPA, 1996) before ground water samples are collected using either a peristaltic or 12-volt submersible pump with new polyethylene tubing. Field parameters, including dissolved oxygen (DO), oxidation-reduction potential (ORP), hydrogen ion activity (pH), temperature, specific conductivity, and turbidity, will be monitored using a multi-parameter meter with a flow-through cell connected directly to the pump discharge. The pumping rate will be controlled using a variable speed drive controller or a brass ball valve to maintain drawdown in the monitoring well to less than 0.3 feet. Purging will be complete when parameters remain stable during three consecutive measurements recorded at three- to five-minute intervals. The conditions will be noted and a ground water sample will be collected if field parameters are not stable after removing five wetted-screen volumes or if drawdown cannot be maintained at less than 0.3 feet. Laboratory-supplied sample containers will be filled and immediately placed in a cooler with ice after each sample is collected.

One ground water sample will be collected from the clubhouse water supply well from a conveniently located tap. The water will be allowed to run for a sufficient time to purge standing water from the plumbing. The duration that the water is allowed to run before sampling will take into account the rate of water use at the time of sampling and the capacity of the clubhouse plumbing, including any holding or pressure tanks. The minimum purging time will be 10 minutes. The capacity of the plumbing system and the volume of water purged will be recorded. The objective of the purging will be to collect a sample representative of the water produced by the clubhouse well. Laboratory-supplied containers will be filled directly from the selected tap after purging is completed.

Ground water sampling forms and chains of custody (Appendix C) will be completed at the time of sample collection. These forms will provide future reference regarding data on well purging and sample collection. Ground water samples will be submitted to a NYSDOH-approved laboratory for analysis of the compounds of concern (Section 5.1.2). If samples are to be analyzed for metals, unfiltered and field filtered samples will be submitted for analysis to evaluate both total and dissolved metals in the ground water.

5.4 Sediment Sampling and Analysis

Sediment samples will be collected from three locations in the nearby pond and one upstream and one downstream location to evaluate the extent of contaminants, if any. The method of sediment sampling will depend on the consistency and density of the sediment, and the depth of the water in the pond and stream. The depth of the pond and stream is reportedly sufficiently shallow to allow access by wading. The methods of sediment sampling may be modified in the field if the water content of the sediment is excessively high and cannot be retained in a standard suction-type sediment sampler. Sampling of the pond sediments may be conducted from a small boat if the water is too deep for wading. The proposed sampling locations are shown on Figure 6.

A sediment core will be collected from the pond from a depth of approximately 0 to 3 feet at each sampling location using a sediment coring device. The sediment core will be extruded from the sampler and a representative sample will be placed in glass containers for laboratory analysis of the compounds of concern. Discrete samples will be collected at each location from depths of 0 to 1 feet, 1 to 2 feet and 2 to 3 feet.

The upstream and downstream samples from the stream will be collected from a depth of 0 to 1 feet using the suction sediment sampler, hand auger, shovel, or other appropriate device. Samples from greater than one foot are not considered necessary due to the lower sedimentation rate in the stream. The sediment samples will be placed in a cooler and transferred to the laboratory following chain-of-custody procedures. The samples will be analyzed by a NYSDOH approved laboratory for the compounds of concern and total organic carbon (TOC).

5.5 Risk Assessment

The available data will be evaluated at the conclusion of the in RI in order to complete a qualitative analysis of the potential risk of adverse effects on human health and fish and wildlife resulting from the presence of chemicals in, on, and near the site. The purpose of the assessment is to evaluate the potential risk of adverse effects of the chemicals on human health and the environment. The results of the risk assessment will be used as the basis for future risk management decisions that will reduce the potential risk, if any, associated with the site.

5.5.1 Fish and Wildlife Resource Impact Analysis

The goal is to assess whether pathways for site contaminants to ecological receptors are complete. If no contaminants are detected in surface soils or sediment samples collected during the RI, detailed assessment of receptors will not be needed. The fish and wildlife assessment, if needed, will be completed using the following steps, in accordance with the *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* (NYSDEC, 1994).

Step I of the Fish and Wildlife Impact Analysis (FWIA) includes a site description, description of fish and wildlife resources values, and applicable fish and wildlife regulatory criteria.

Step IIA, the pathways analysis, involves the identification of pathways of contaminant migration and fish and wildlife exposure to these contaminants. If no significant resources or potential pathways are present, the impact on resources can be considered minimal. Furthermore, if field studies can demonstrate that no migration is occurring along the potential pathway, impact to fish and wildlife resources can be considered minimal.

Step IIB, criteria-specific analysis, will be conducted for all pathways that are determined to be potentially complete. Estimated exposure-point concentrations will be compared to applicable numerical criteria for each contaminant of concern in each of the potentially completed pathways. If exposure-point concentrations for any completed pathway exceed the applicable criteria, then Tee Bird, with the NYSDEC's agreement, will have the option to implement risk reduction remedies or conduct further, more detailed studies to support a baseline risk assessment.

5.5.2 Human Health Exposure Assessment

The purpose of the exposure assessment is to identify pathways through which people can be exposed under current and potential future use scenarios. The exposure assessment uses the current conditions at the Site and surrounding area to determine existing or potential exposure scenarios and exposure concentrations. Future site uses of the Site and surrounding area are also considered.

The qualitative human health exposure assessment (HHEA) will follow the general format and procedures set forth in the USEPA's *Risk Assessment Guidance for Superfund* (RAGS) (USEPA, 1989). The HHEA will include identification of chemicals of potential concern (COPCs) and an evaluation of potential exposure pathways, including a potable well survey.

The following items will be addressed within the HHEA scope of work:

- evaluation of Site history, chemical, hydrologic, demographic, and other information;
- identification and evaluation of potential exposure pathways through a review of data collection activities, analytical protocols, ground water well survey, current and surrounding land use, populations-at-risk, and other related data; and
- characterization of completed exposure pathways by the evaluation of chemical release sources, fate and transport, human exposure (contact) points and chemical intake routes.

The human exposure routes that present a potential toxic concern will be identified. Potential human exposures will be characterized using principles and procedures consistent with the following USEPA documents:

- *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Interim Final, Part A* (December 1989, EPA/540/1-89/002)

- *Guidance on Risk Characterization for Risk Managers and Risk Assessors.* Memorandum. February 26, 1992

- *Guidance for Data Usability in Risk Assessment, Interim Final* (October 1990, EPA/540/G-90/008)

- *Superfund Exposure Assessment Manual* (April 1988, EPA/540/1-88/001)

- *Exposure Factors Handbook* (March 1990, EPA/600/8-89/043).

6.0 QUALITY ASSURANCE/QUALITY CONTROL PROJECT PLAN

This Quality Assurance Project Plan (QAPP) focuses on specific quality assurance and quality control (QA/QC) activities, policies, applicable organization, objectives, and functional activities that are designed to achieve data quality goals for this specific project.

6.1 Quality Assurance Objectives

6.1.1 Objectives

The data quality objectives (DQO) for the measurement of data are governed by the parameters of precision, accuracy, representativeness, comparability, completeness (PARCC), and sensitivity. These measurement parameters are established so that the data collected are sufficient and of adequate quality for the intended use. Data collected and analyzed in conformance with the DQO process described in this work plan will be used in assessing the level of confidence associated with remedial investigation. The following sections define the various parameters of the DQO and state the requirements necessary to meet the objectives of each parameter.

6.1.1.1 Accuracy

The laboratory objective for accuracy is to be equal to or exceed the accuracy demonstrated for the applied analytical methods on similar samples. Percent Recovery Criteria, published by the NYSDEC as part of the 2005 NYSDEC Analytical Service Protocol (ASP) Superfund Contract Laboratory Program (CLP) and those determined from laboratory performance data, are used to evaluate accuracy in matrix spike and blank spike Quality Control samples. A matrix spike and blank spike will be performed once for every twenty samples as specified in the 2005 NYSDEC ASP.

Accuracy measures the bias in a measurement system. It is difficult to measure accuracy for the entire data collection activity; consequently, it will be assessed through use of known QC samples and matrix spikes.

Accuracy values will be assessed through percent recovery data. Routine, organic, analytical protocol requires a surrogate spike in each sample. Percent recovery is defined as:

$$\% \text{ Recovery} = (R/S) \times 100$$

where S is the spike surrogate concentration and R the reported surrogate concentration is (USEPA, 1987). Accuracy will be determined by laboratory internal QC samples and surrogate recoveries for organics.

6.1.1.2 Precision

The laboratory objective for precision is to equal or exceed the precision demonstrated for the applied analytical methods on similar samples. Precision is evaluated by the analyses of laboratory duplicate samples. Laboratory duplicate analyses will be performed once for every twenty samples as specified in the 2005 NYSDEC ASP.

Relative Percent Difference (RPD) criteria, prescribed by the NYSDEC as part of the 2005 NYSDEC Analytical Service Protocol (ASP) and those determined from laboratory performance data, are used to evaluate precision between duplicate samples. A matrix spike duplicate will be performed once for every twenty samples as specified in the 2005 NYSDEC ASP.

Precision evaluates the reproducibility of measurements under a specific set of conditions. Precision is a quantitative determination of the variability of a group of measurements compared to the average value of those measurements.

Precision usually is stated as the standard deviation but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), and relative range may be used pending review of the data.

The overall precision of measurement data is a mixture of sampling and analytical factors. Analytical precision is easy to control and quantify; however, sampling precision is unique to each sampling location. Sampling precision will be evaluated by collecting field duplicate samples.

Precision will be determined from duplicate samples and will be expressed as the relative percent difference (%RPD):

$$\%RPD = 100 \times ABS(X_1-X_2) / ((X_1+X_2)/2)$$

where X_1 and X_2 are reported concentrations for each duplicate sample and subtracted differences represent absolute values (USEPA, 1987). A goal of maximum 50% RPD for water and 100% RPD for soil duplicate samples will be used to evaluate the degree of data usability.

6.1.1.3 Representativeness

The representativeness of the data from the sampling locations depends on the sampling procedures in the field. The sampling and handling procedures are designed to obtain representative samples of soil, sediment and ground water.

The representativeness of the analytical data is a function of the laboratory procedures used to process the samples. The objective of representativeness is to provide results of the same quality as that produced by separate analyses of similar samples using the same methods run during the same time period within the same laboratory. Representativeness will be evaluated by comparing the quality control data for these samples with other data for similar samples analyzed at the same time.

6.1.1.4 Comparability

Analytical results produced for this program can be comparable to results of other laboratories by the use of the following procedures/programs: instrument standards traceable to National Institute of Standards and Technology (NIST) or NYSDEC sources; the use of standard methodology; reporting results from similar matrices in consistent units; applying appropriate levels of quality control within the context of the laboratory quality assurance program; and participation in inter-laboratory studies to document laboratory performance. The QA program documents internal performance and the inter-laboratory studies document performance compared with other laboratories. Periodic laboratory proficiency studies are conducted to monitor intra-laboratory performance.

6.1.1.5 Completeness

The goal of completeness is to generate the maximum amount of valid data. Completeness of the data will be evaluated following the review and validation of the field and laboratory quality control procedures, and the review of the laboratory deliverables.

All data that is judged to be of acceptable quality will be considered complete and usable including data that may be considered estimated due to qualifying circumstances. Data that are rejected will not be considered acceptable or complete and will not be used in evaluating Site conditions. Field and QA/QC criteria must meet the quality control limits for data to be considered complete. If field or laboratory quality control criteria are slightly exceeded and professional judgment indicates that the data are still usable, then the data will be considered complete provided that the exceedance does not significantly affect the use of the data in

identifying whether there is an environmental concern. The target level to determine completeness will be 90 percent, calculated as follows:

$$\% \text{ completeness} = 100 \times (\text{all data} - \text{unusable data}) / \text{all data}$$

Four general levels of evaluation of data acceptability will be considered. The highest degree of completeness is the finding that all the deliverables are valid and acceptable. The second level is the presence of minor flaws which do not significantly affect the validity of the data. The third level of completeness is flaws which bring the validity of a measurement into question (e.g., surrogate recoveries or matrix spikes which are outside the acceptable range). Data in the second and third levels are typically qualified as estimated and flagged as such, and are usable with the knowledge that such data lack the precision or accuracy of unqualified data. The lowest level of completeness is multiple failures to meet established acceptance criteria or a high degree of failure in one category that results in subsequent rejection of the data. Rejected data are unusable for purposes of the site assessments.

6.1.1.6 Sensitivity

The sensitivity or detection/quantification limits that are desired for each analysis are those specified by NYSDEC as part of the 2005 Analytical Service Protocol (ASP). It is understood that such limits are affected by matrix interferences. Pending the failure of cleanup procedures, reporting limits may be evaluated as a result of dilution.

6.2 Quality Control Procedures

Descriptions of the sampling procedures that will be used are presented in Section 5.0.

6.2.1 Sample Collection and Preservation

Samples will be transferred directly to properly preserved sample containers and labeled immediately after collection. Table 3 lists the appropriate sample containers, volume requirements, and preservation techniques. Alternative sample containers may be used or the container size may be reduced to preserve the integrity of the sample. Samples requiring refrigeration for preservation will be promptly transferred to coolers containing ice or coolant packages. Samples will be properly stored until shipped or transported to the analytical laboratory and proper chain-of-custody will be maintained. Samples will be extracted and/or analyzed within the holding times specified in Table 3. Holding times begin from the verified time of sample receipt (VTSR).

6.2.2 Field Quality Assurance Samples

This section identifies the field sampling necessary to meet the requirements of the DQO.

6.2.2.1 Field/Rinse Blanks

Field/equipment blanks will consist of organic-free deionized water that is passed through and/or over cleaned sampling equipment. One field/equipment blank will be collected for each sample delivery group or 20 field samples, whichever occurs first. Field/equipment blanks will not be collected if dedicated sampling equipment is used. The field/equipment blanks will be subject to the same analyses as the associated environmental samples.

6.2.2.2 Field Duplicate Samples

Field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. Field duplicate samples are defined as a second sample collected from the same location, at the same time, in the exact same manner as the first and placed into a separate container (with no prior mixing). Field duplicate samples will be collected at a frequency of one per every twenty (20) samples per matrix. Each duplicate sample will be analyzed for the same parameters as the original sample collected that day to evaluate the variability in the field and laboratory. Acceptance and control limits for the laboratory will follow NYSDEC ASP guidelines for organic analyses and deviations will be identified in the validation report. Blind field duplicate RPD control limits will not exceed 50% for aqueous matrixes and 100% for soil samples.

6.2.2.3 Trip Blanks

The purpose of a trip blank is to place a mechanism of control on sample bottle preparation and blank water quality, and sample handling. The trip blank travels to the Site with the empty sample bottles and back from the Site with the collected samples. Trip blanks will be used for aqueous samples at a frequency of one (1) for each day that samples are sent to the laboratory for volatile analysis.

6.2.3 Laboratory Quality Assurance Samples

This section identifies the types of laboratory samples that are necessary to meet the DQO.

6.2.3.1 Method Blanks

Method blanks are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instrument as the sample is prepared and analyzed in the laboratory. A method blank is defined as an aliquot of laboratory water on which every step of the method is performed and analyzed along with the samples. Method blanks will be analyzed at a frequency of one (1) for every twenty (20) samples analyzed, or more frequently, per the analytical method.

6.2.3.2 Matrix Spikes and Matrix Spike Duplicates

Two types of spiked samples will be analyzed as part of the analytical QA/QC program, and include matrix spikes (MS) and matrix spike duplicates (MSD). Matrix spike samples are analyzed to evaluate instrument and method performance on samples of similar matrix. Matrix spike duplicates are analyzed to determine the precision of the method and instrument. These samples are analyzed and the "percent recovery" is determined which is used to assess matrix interference affects on the methods. MS/MSD samples will be analyzed at a frequency of one (1) for every twenty (20) samples collected per matrix.

6.3 Sample Custody

The samples will be transported to the laboratory with a completed chain-of-custody record. The Chain-of-Custody Record is a form supplied by the laboratory conducting the analysis. Signed chain-of-custody forms will be included with each cooler to document delivery of the samples. A copy will be kept with the sampling personnel. These forms will contain, at a minimum:

- sampling location;
- sample identification;
- sampler's name;
- date and time of sampling;
- number of containers per sampling location;
- analysis requested;
- type of preservations, if applicable; and,
- a continuous record of possession.

The sample cooler temperature and the integrity of the sample containers will be checked and documented by the laboratory upon receipt. Discrepancies noted during sample receipt will be documented in the laboratory's sample receiving/storage log, and the Project Manager will be notified. Samples will be protected from sunlight and stored at a temperature of 4°C until extraction or analysis in accordance with the holding times identified in Table 3. A copy of the chain-of-custody form to be used is in Appendix C. Alternatively, a chain-of-custody form provided by the laboratory will be used.

6.4 Equipment Operation and Calibration

6.4.1 Field Equipment

Field equipment which may be used during the collection of environmental samples includes various soil sampling materials (bowls, scoops, etc.) and hand tools such as a shovel, hand auger or post hole digger.

Field instruments that require calibration, such as water quality monitors used during groundwater sampling, and PIDs, will be calibrated in a accordance with the manufacturer's recommendations. At a minimum, equipment will be calibrated on a daily basis.

6.4.2 Laboratory Equipment

The Laboratory's Operations Director and Project Manager will be responsible for the operation of laboratory analytical instruments in accordance with the schedules and procedures specified by the most current edition of USEPA SW-846.

6.5 Equipment Decontamination

The drilling program will include cleaning procedures to minimize the potential to introduce contaminants into the subsurface soil or transfer contaminants between borings or well locations. Decontamination will be performed at a designated area where wash liquids and sediment will be retained and subsequently containerized. The equipment that contacts the subsurface soil will undergo an initial cleaning process to remove possible contaminants that may have been encountered during mobilization of the equipment. While at each work site, the drilling equipment that contacts the subsurface soil at the Site will be cleaned between borings and drilling locations to prevent cross-contamination, as described below. Drilling equipment also will be cleaned before leaving each work site at the conclusion of drilling activities.

Equipment associated with the geoprobe drilling rig and hand tools used for the shallow soil sampling will be washed by hand using an Alconox and tap water solution followed by a tap water rinse and distilled water rinse. The cleaning process for the equipment associated with the auger drilling rig will include the use of a high-pressure steam cleaner. Potable water will be used for all cleaning and drilling procedures. Smaller pieces of drilling equipment and/or sampling tools may be hand-washed in small buckets using an Alconox and tap water solution followed by a tap water rinse and distilled water rinse. A hexane (pesticide grade) rinse may be performed between the tap water wash and the distilled water rinse where sampling equipment is observed to be impacted by organic compounds (for example, odor, sheen, or detected vapors).

6.6 Data Reduction, Validation, and Reporting

The laboratory will be conducting analyses on samples in accordance with referenced USEPA SW-846 method protocols, NYSDEC ASP and the laboratory's QA Manual. Laboratory data reduction will be incorporated into their in-house effort for the appropriate parameters.

6.6.1 Data Reduction, Handling, and Reporting

Specific laboratory procedures and instrumentation may be found in the laboratory's QA Manual and/or standard operating procedures. The laboratory will use the data production and reporting procedures described below.

ASP Category B-type analytical data packages and document sample preparation, extraction, and analysis will be provided for the analyses. The ASP Category B data packages will be provided in a sequentially numbered hard copy report. A digital format such as Access database, Excel spreadsheet, PDF format, or other conventional format may be supplied upon request.

The analyst has the primary responsibility and accountability for the correctness and completeness of the analytical data. Each laboratory analyst has responsibility for QA/QC functions at their level and within their assigned tasks. Initial review by the analyst and supervisor is completed in relation to compliance with methodology and acceptability of precision and accuracy results. Review at the QA Officer level includes these elements in addition to a review of data acceptability based upon internal and project specific QC criteria. Tertiary review occurs with the laboratory management where pertinent information pertaining to each specific analysis is compiled. The data generated from the various laboratory sections is transferred to laboratory's QA Officer. Analytical data forms are then processed and data packages are prepared.

6.6.2 Data Validation

The laboratory data validation process begins with the appropriate laboratory personnel who will review the raw and reduced data for possible calculation and transcription errors. Additionally, these personnel will check unusually high or low parameter values. The Laboratory QA Officer will perform a final laboratory validation of the data which will include a review of QC sample analyses and data completeness. The laboratory report will then be reviewed and approved by the manager of analytical services prior to its release. An independent data validation will be performed upon receipt of the analytical data packages.

Independent data validation is a systematic process of evaluating analytical data quality by comparing the data generation process (sample collection through sample analysis) to established QC criteria. Data quality criteria are based on the project DQOs and the intended use of the data. A data validation report establishes data usability by determining the degree of adherence to QC criteria of the analytical data. The resulting sample data are determined to be usable as is, approximated, or unusable for the particular use established by the project DQOs. The analytical

data will be validated by an independent data validator in accordance with the criteria set forth in this RI/FS Work Plan and QAPP and with the guidance of the USEPA SW-846 Method protocols and NYSDEC ASP.

Data that are outside control limits will be documented and communicated to the Data Manager. Decisions to repeat sample collection will be made based on the impact data deficiencies may have on the overall data quality objectives. A *Data Usability Summary Report* (DUSR) will be generated and incorporated into the report.

6.7 Corrective Actions

Instrument and methods performance and data validity will be monitored throughout the sampling and analysis program. Laboratory instruments will be calibrated according to the requirements of the ASP and calibration data will be documented. If instrument performance or data fall outside acceptable limits, then the lab will immediately notify the Data Manager and corrective actions will be taken if holding times permit. These actions may include one or more of the following:

- Recalibration or standardization of instruments,
- Acquiring new standards,
- Replacing equipment,
- Repairing equipment, and
- Re-analyzing or re-collecting samples.

System reviews will be conducted in a timely manner to detect errors and problems early and avoid the prospect of repeating large segments of work.

7.0 REMEDIAL INVESTIGATION REPORT

A *Remedial Investigation Report* (RI Report) will be prepared that describes investigation methods, presents the data, and interprets the results. A base map will be provided to show the locations of the sampling locations, ground water monitoring wells and relevant Site features. The report will contain a summary of historical information and the results and interpretation from previous investigations, as appropriate. Analytical data will be tabulated and compared to appropriate standards, criteria, and guidance values (SCGs). The report will include a discussion of the significance of the soil, ground water, and sediment analytical results from the remedial investigation and the results of the FWIA and HHEA. Maps will be presented to graphically show the sampling results and the interpreted direction of ground water flow. The findings and interpretations will be used with the historical data to provide recommendations for future actions.

8.0 FEASIBILITY STUDY

A focused feasibility study (FS) will be conducted to develop and evaluate appropriate remedial options to mitigate contaminants. The FS will be conducted concurrently and in an interactive fashion with the RI in accordance with the NYSDEC's DER-10. The first step involves the development of remedial action alternatives. These alternatives are screened, as necessary or appropriate, during the second step. The third and final step involves the detailed analysis of the remaining remedial alternatives according to the selection criteria specified in the National Contingency Plan (NCP). This process culminates in the recommendation of one or more remedial alternatives.

8.1 Feasibility Study Objectives

The objectives of the FS are to identify and evaluate appropriate remedial technologies and to develop a site remedy to mitigate contaminants identified during the RI. The FS will be the basis for selecting a site remedy that is protective of public health and the environment.

8.2 Feasibility Study Tasks

The tasks that will be completed during the FS include the following:

FS Task 1 – Establish Remedial Goals
FS Task 2 – Identify Applicable Standards, Goals, and Guidance
FS Task 3 – Identify General Response Actions
FS Task 4 – Identify Applicable Remedial Technologies
FS Task 5 – Assemble Technologies into Alternatives
FS Task 6 – Analyze the Alternatives
FS Task 7 – Recommend a Remedy for the Site

The scope of each FS task will be conducted in general accordance with Section 4.0 of DER-10.

8.3 Feasibility Study Report

Upon the completion of the RI and FS process, a *Feasibility Study Report* (*FS Report*) will be prepared to document the remedy selection process. The *FS Report* will include a discussion of the tasks completed during the FS with sufficient detail and supporting data in tabulated and graphical form to substantiate the selection of an appropriate site remedy.

9.0 PROJECT MANAGEMENT

The project organization and the responsibilities of key personnel are defined below. Figure 7 presents the program lines of authority and generic project organization. Resumes and qualifications for key project personnel are provided in Appendix D.

9.1 Responsibilities

9.1.1 Project Manager

The Project Manager, Scott Hulseapple, is responsible for assuring that the project is properly staffed and is ultimately responsible for the technical direction and quality of the work performed by project personnel. The Project Manager is responsible for establishing appropriate budgets and schedules, making available appropriate forms of training, and monitoring the performance of the staff. The Project Manager may talk with regulatory agencies regarding methodologies and requirements. The Project Manager is also responsible for monitoring the implementation of the quality assurance program. Specific responsibilities include:

- Assure the provision of necessary facilities, equipment, and funding;
- Review and approve Project Controlling Documents (PCDs) (i.e., RI Work Plan, QAPP, and HASP);
- Support the efforts of the Project Manager, Field Manager, QA Officer (QAO), and Laboratory Manager(s) in matters concerning the quality of work products; and,
- Assure effective response to corrective action requirements identified by any member of the project team.

9.1.2 Field Manager

The Field Manager, Trevor Gowan is responsible for the day to day management of field operations. The Field Manager schedules and plans the work activities of field staff, provides periodic reports on the progress of work, and reviews the field logs and other forms of field documentation. The Field Manager will work closely with the Quality Assurance Officer (QAO) to plan and schedule audits, if any, assure proper training of field personnel, and immediately communicate any situations that may affect the quality of work products. The Field Manager is responsible for assuring that the work proceeds according to the Work Plan and bears responsibility for guaranteeing the technical quality of the work. Specific responsibilities include:

- Oversee and monitor performance of staff;
- Plan the activities of and coordinate field personnel on specific assignments;
- Provide a liaison between the client, field, laboratory staff, and any other subcontractors; and

- Assure completion of corrective actions, as needed.

9.1.3 Laboratory QA Manager

The Laboratory QA Manger is responsible for QA/QC in all aspects of laboratory operations. The Lab QA Officer ensures that laboratory staff uses recognized procedures and accepted laboratory practices. The Lab QA Officer is responsible for ensuring appropriate instrument maintenance and calibrations. The Lab QA Officer is responsible for method development and documentation of procedures. The Lab QA Officer is responsible for training and designating qualified personnel for laboratory assignments. The Laboratory QA Manger is responsible for assuring compliance with applicable analytical assignments. The Laboratory QA Manager is responsible for assuring compliance with applicable analytical methodology, strict adherence to Standard Operating Procedures (SOPs) and QA/QC requirements. The Lab QA Officer is responsible for ensuring that laboratory analyses are completed according to schedule, and bears responsibility for guaranteeing the technical accuracy and quality of the work. Specific responsibilities include:

- Provide sufficient equipment, space, resources, and personnel to conduct analyses and carry out the laboratory QA programs and this QAPP;
- Ensure appropriate documentation of laboratory methods;
- Ensure that all laboratory records are maintained securely and are retrievable;
- Assess the quality of purchased laboratory materials, reagents, and chemicals in relation to their impact on the quality of analytical results; and
- Ensure the implementation of appropriate corrective action for any QA/QC deficiencies identified.

9.1.4 Quality Assurance Officer

The QA Officer (QAO), Don Annè, is responsible for implementation of the QAPP in both field and laboratory operations. The Project Manager delegates to the QAO the authority to take any actions necessary to ensure the reliability and validity of work and deliverables according to this QAPP. The QAO has, by definition, a level of authority equal to that of the Field Manger and Laboratory QA Manager. The QAO is responsible for developing and implementing procedures to appropriately document all project activities, to provide specific means of measuring conformance to specifications, managing the corrective actions program, and providing periodic reports to management. Specific responsibilities include:

- Develop, document, and perform QA activities to ensure that appropriate QC measures are being used and documented;
- Ensure all records related to quality assurance are documented and maintained securely and are retrievable;
- Conduct periodic performance audits and/or surveillance to measure conformance to specifications;

- Prepare periodic quality reports and QA sections of final reports;
- Ensure corrective actions are implemented and documented;
- Acquire and maintain required certifications, and manage performance evaluation tests.

9.1.5 Field Personnel

Field personnel are responsible for executing their work assignments in conformance with documented procedures and for the immediate identification of conditions adverse to the quality performance of the work or work products. They are responsible for acquainting themselves with the technical requirements of work assigned and seeking training or guidance as necessary to comply with those requirements. They are responsible for documenting their activities according to applicable SOPs and reviewing their own work and the work of others presented to them for peer review. They will immediately cause work to cease on any activity that in their judgment does not meet applicable quality and safety standards, will appropriately document and report such conditions to management, and will be active in the resolution of any such conditions. Specific responsibilities include the following:

- Ensure that work is performed according to the applicable specifications;
- Ensure that QA/QC measures are implemented and documented;
- Ensure the quality of work and work products; and,
- Communicate QA and safety concerns to the field manager or QAO.

9.1.6 Project Engineer

The Project Engineer, Alan Tavenner, P.E., of Delaware Engineering, P.C. (Delaware) will be the professional engineer who will provide supervision and certification of the feasibility study for this project. Mr. Tavenner will review and evaluate the RI data as it pertains to the FS process and selection of an appropriate remedial alternative. He will perform the feasibility study in conformance with DER-10 and Section 8.0 of this work plan.

10.0 SCHEDULE

Figure 8 is a tentative schedule to implement the scope of work described in this Work Plan. This schedule is flexible and NYSDEC and Alpha will work with all of the parties to complete this project as efficiently as possible. The schedule will be periodically revised as needed to reflect changes and will be reissued and submitted to the NYSDEC with the monthly progress reports.

11.0 REFERENCES

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USEPA SW-846. Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods.

TABLES

Table 1
Remedial Investigation Sample and Analysis Program
Tee Bird Country Club
Town of Moreau, New York

Task Number - Matrix	Location Name	Sample Depth (inches)	Analysis[1]	Number of Field	Rationale
1 - Shallow Soil	SS-1 through SS-4	0-12	PCBs, VOCs, Met	4	Identify contaminants of concern (COCs) for remaining samples. Assess soil quality near the area of maximum detected concentrations of PCBs.
		12-24	PCBs, VOCs, Met	4	
		24-36	PCBs, VOCs, Met	4	
	SS-5 through SS-10	0-12	COCs	6	Assess vertical and lateral extent of impacts to shallow soil beneath the asphalt cap.
		12-24	COCs	6	
		24-36	COCs	6	
	SS-11 through SS-30	0-12	COCs	20	Assess vertical and lateral extent of impacts to shallow soil beyond the extent of the asphalt cap. Samples collected from 0 to 2 inches bgs will be used to assess human health exposure.
		0-2	COCs	3	
		12-24	COCs	20[2]	
		24-36	COCs	20[2]	
2 - Deep Soil	MW-1 through MW-3	4-6 feet	COCs	3	Asses soil quality at a depth below suspected surficial impacts.
3 - Ground Water	MW-1 through MW-3 and existing water supply well	Middle of screened interval	COCs	4	Assess ground water quality at the site.
4 - Sediment	SED-1 and SED-5	0-12	COCs, TOC	2	Assess sediment quality in pond influent and effluent streams.
	SED-2 through SED-4	0-12	COCs, TOC	3	Assess sediment quality in pond. Sediment samples will be analyzed for total organic carbon to evaluate bioavailability of organic COCs
		12-24	COCs, TOC	3	
		24-36	COCs, TOC	3	

Notes:

1 - PCBs means polychlorinated biphenyls.

VOCs means volatile organic compounds.

Met means RCRA 8 metals (arcenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).

COCs mean contaminants of concern and includes PCBs plus VOCs and/or metals as described in Section 5.1.

TOC means total organic carbon

See Table 2 for analytical methods and QA/QC sample frequency.

2 - Maximum number of samples submitted. Actual number of samples analyzed will be determined as described in Section 5.1

Table 2
Analytical Parameters and QA/QC Samples
Tee Bird Country Club
Town of Moreau, New York

Analysis	Method[1]	QA/QC Sample Frequency			
		Field Equipment Blanks	Trip Blanks	Field Duplicates	MS/MSD or MS/MD[2]
Soil/Sediment Samples Samples					
Organic Analyses					
Polychlorinated Biphenyls (PCBs)	8082	1 per 20[3]	--	1 per 20	1 per 20
Volatile Organic Compounds (VOCs)	8260B	1 per 20	--	1 per 20	1 per 20
Inorganic/Wet Chemistry Analyses					
RCRA 8 Metals[4]	6010B/7470	1 per 20	--	1 per 20	1 per 20
Total Organic Carbon	415.1	--	--	1 per 20	1 per 20
Aqueous Samples					
Organic Analyses					
Polychlorinated Biphenyls (PCBs)	8082	1 per 20	--	1 per 20	1 per 20
Volatile Organic Compounds (VOCs)	8260B	1 per 20	1 per day[5]	1 per 20	1 per 20
Inorganic Analyses					
Total/dissolved[6] RCRA 8 Metals	6010B/7470	1 per 20	--	1 per 20	1 per 20

Notes:

1 - USEPA SW-846 method from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*

2 - Matrix spike/matrix spike duplicate pair (organic analysis) or matrix spike/matrix duplicate pair (inorganic analysis)

3 - One QA/QC sample (or sample pair) per twenty field samples or one every two weeks, whichever is more frequent.

4 - RCRA 8 Metals include arcenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

5 - One trip blank per sample cooler

6 - Field filtered using 0.45 micron disposable filter cartridge.

Table 3
Sample Analysis, Container, Preservation, and Holding Times
Tee Bird Country Club
Town of Moreau, New York

Analysis Method	Matrix	Sample Containers and Volumes	Preservation	Holding Times
VOCs Method 8260B	Soil/Sediment	4-8 oz. Glass container with Teflon®-lined cap	Cool to 4ºC	10 days
PCBs Method 8082	Soil/Sediment	4-8 oz. Glass container with Teflon®-lined cap	Cool to 4ºC	5/40 days
RCRA Metals (6010 or 7470 Series)	Soil/Sediment	4-8 oz. Glass container with Teflon®-lined cap	Cool to 4ºC	6 months
Total Organic Carbon Method 415.1	Sediment	4-8 oz. Glass container with Teflon®-lined cap	Cool to 4ºC	28 days
VOCs Method 8260B	Water	2 x 40 mL glass vial with Teflon®-lined septum	Cool to 4ºC, HCl to pH<2	10 days
PCBs Method 8082	Water	1-Liter amber glass container with Teflon®-lined cap	Cool to 4ºC	5/40 days
Total RCRA Metals (6010 or 7470 Series)	Water	1-Liter amber glass container with Teflon®-lined cap	Cool to 4ºC HNO_3 to pH<2	6 months (26 days for Hg only)
Dissolved RCRA Metals (6010 or 7470 Series)	Water	1-Liter amber glass container with Teflon®-lined cap	Field Filter - 0.45 µm Cool to 4ºC HNO_3 to pH<2	6 months (26 days for Hg only)

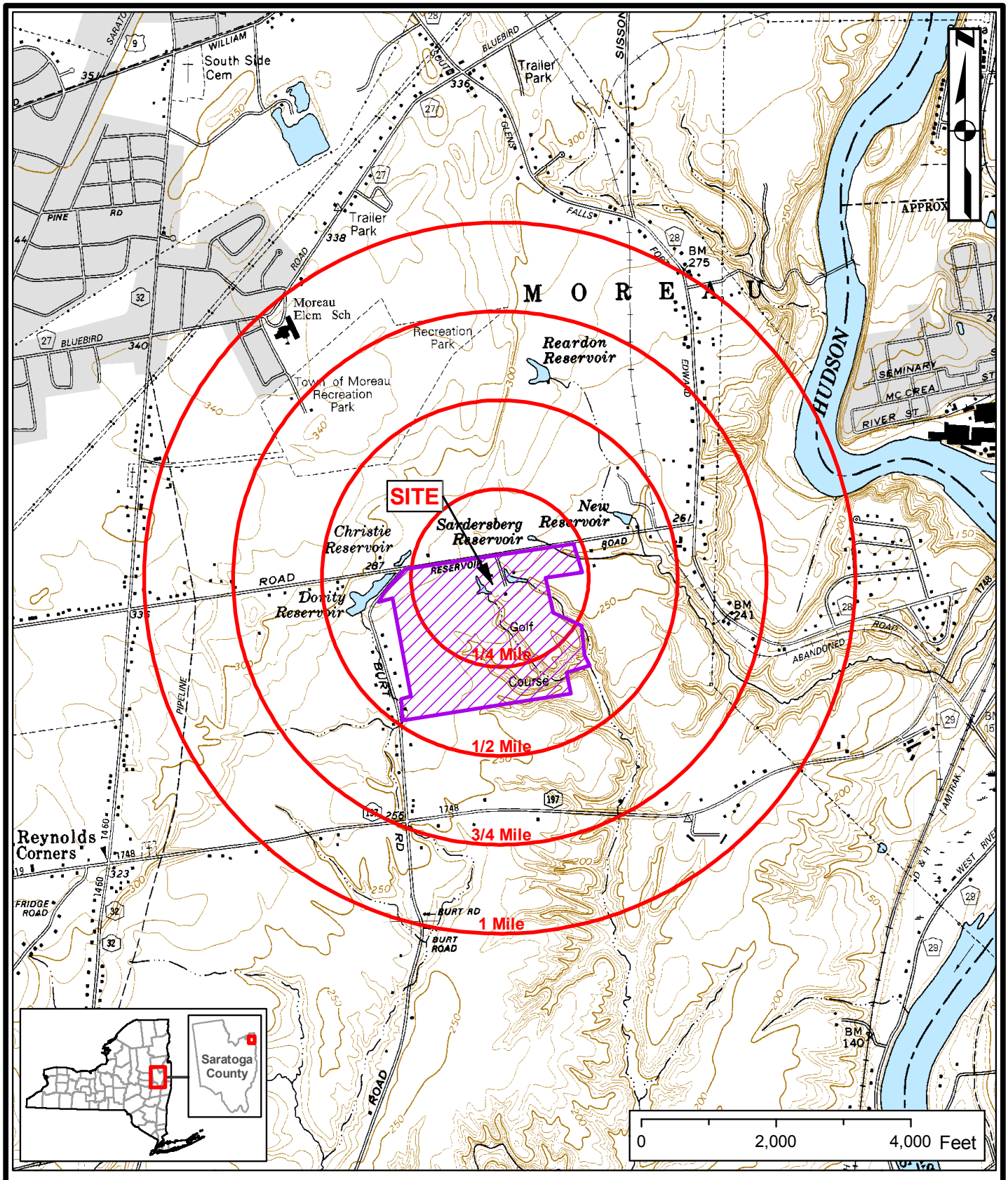
Notes:

5/40: 5 days to extraction from time of collection/40 days to analyze.

All holding times are verified time of sample receipt (VTSR).

RCRA Metals include arcenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

FIGURES



LEGEND

Property Boundary (approx.)

Source:
NYSDOT 7.5-minute topographic map (Portions of Gansevoort, Fort Miller, Glens Falls, and Hudson Falls quadrangles)

ALPHA GEOSCIENCE
Proj. No. 05132

FIGURE 1
Site Location Map

Tee Bird Country Club, Inc.
Town of Moreau, New York

Saratoga County, New York

Map Document: (Z:\projects\2005\05121-05140\05132 - TeeBird PCBs\Figures and Drawings\GIS\Fig1_Site Location.mxd)
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ALPHA GEOSCIENCE
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FIGURE 2
Site Map

Tee Bird Country Club, Inc.
Town of Moreau, New York

Saratoga County, New York

Map Document: (Z:\projects\2005\05121-05140\05132 - TeeBird PCBs\Figures and Drawings\GIS\Fig2_Site Map.mxd)
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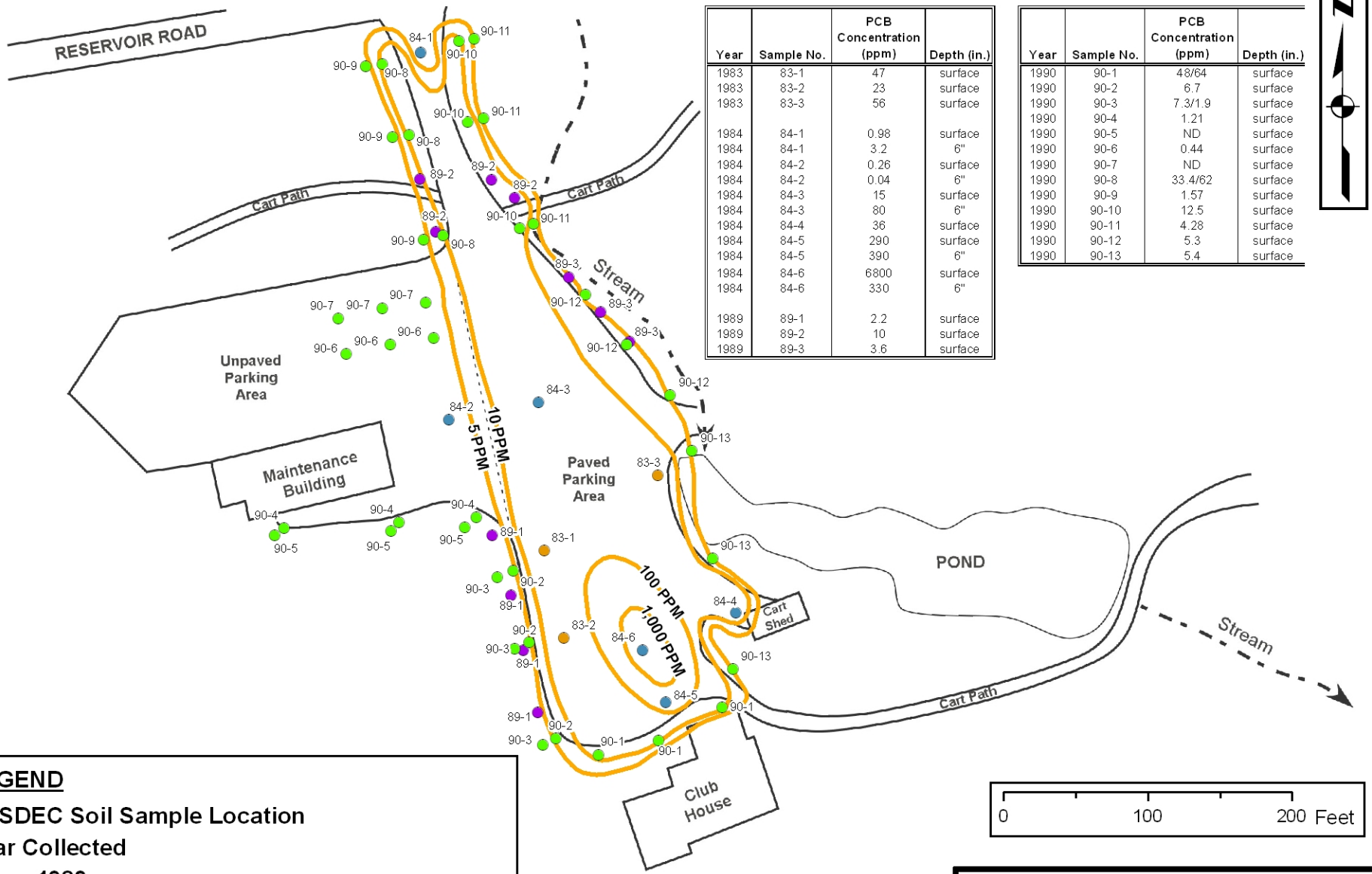

Year	Sample No.	PCB Concentration (ppm)	Depth (in.)
1983	83-1	47	surface
1983	83-2	23	surface
1983	83-3	56	surface
1984	84-1	0.98	surface
1984	84-1	3.2	6"
1984	84-2	0.26	surface
1984	84-2	0.04	6"
1984	84-3	15	surface
1984	84-3	80	6"
1984	84-4	36	surface
1984	84-5	290	surface
1984	84-5	390	6"
1984	84-6	6800	surface
1984	84-6	330	6"
1989	89-1	2.2	surface
1989	89-2	10	surface
1989	89-3	3.6	surface

Year	Sample No.	PCB Concentration (ppm)	Depth (in.)
1990	90-1	48/64	surface
1990	90-2	6.7	surface
1990	90-3	7.3/1.9	surface
1990	90-4	1.21	surface
1990	90-5	ND	surface
1990	90-6	0.44	surface
1990	90-7	ND	surface
1990	90-8	33.4/62	surface
1990	90-9	1.57	surface
1990	90-10	12.5	surface
1990	90-11	4.28	surface
1990	90-12	5.3	surface
1990	90-13	5.4	surface

LEGEND

NYSDEC Soil Sample Location

Year Collected

- 1983
- 1984
- 1989
- 1990

PCB Concentration Contour - Shallow Soil

Notes:
- Basemap: Features traced using SaratogaCounty 24-inch Resolution Natural Color Orthoimagery (April 2004), NYS Office of Cyber Security & Critical Infrastructure Coordination.
- Soil sample locations are approximate based on unscaled NYSDEC drawings.

ALPHA GEOSCIENCE
Proj. No. 05132

FIGURE 3
NYSDEC Sample Results 1983 - 1990
Tee Bird Country Club, Inc.
Town of Moreau, New York
Saratoga County, New York

Map Document: (C:\Documents and Settings\Scott\Desktop\Tee Bird\Figures and Drawings\GIS\Fig3_previous Inv.mxd)
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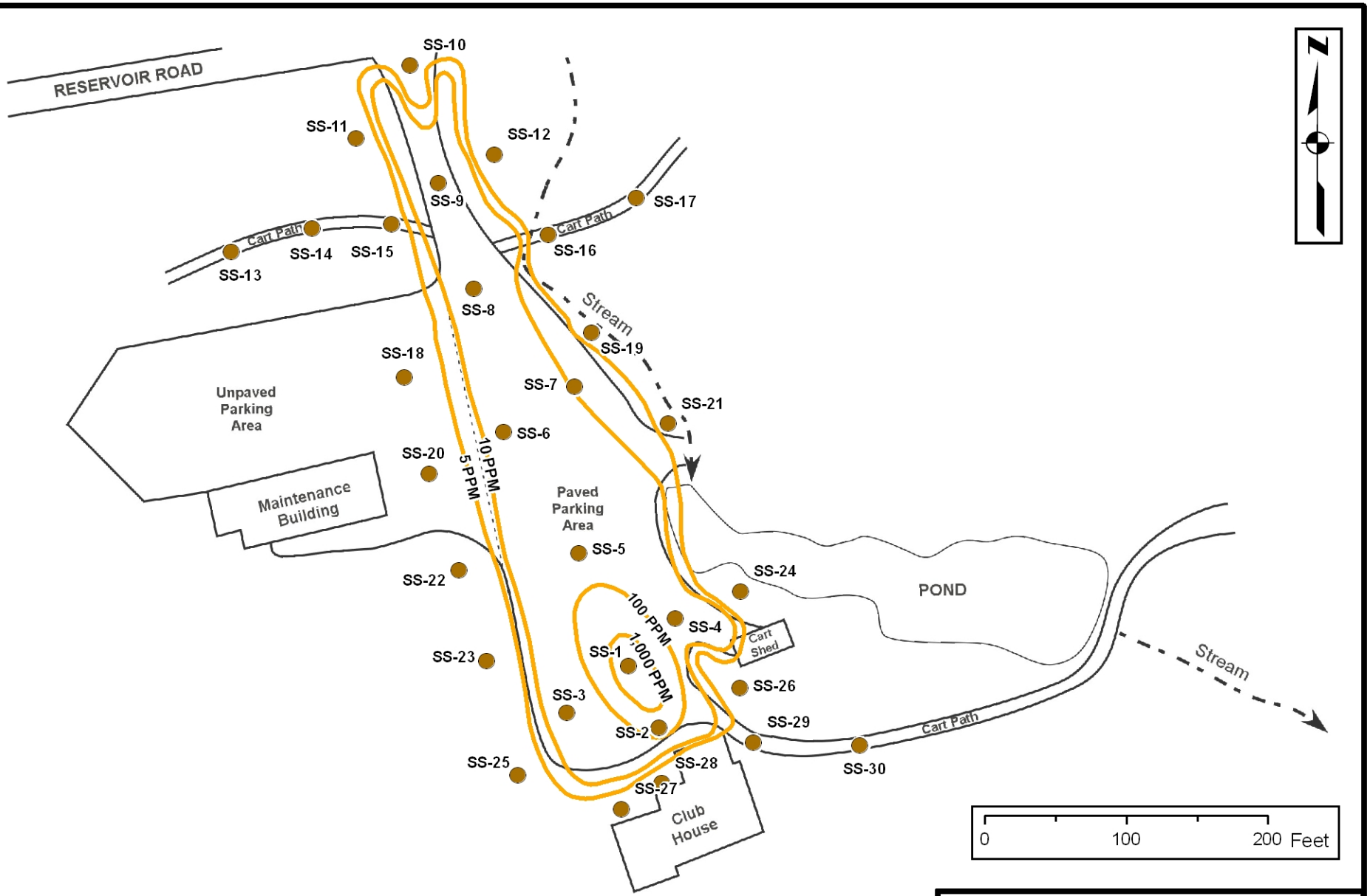

LEGEND

- Proposed Shallow Soil Sample Location
- PCB Concentration Contour - Shallow Soil

Notes:
- Basemap: Features traced using SaratogaCounty 24-inch Resolution Natural Color Orthoimagery (April 2004), NYS Office of Cyber Security & Critical Infrastructure Coordination.
- Proposed locations are approximate and may be modified based on site conditions.

ALPHA GEOSCIENCE
Proj. No. 05132

FIGURE 4
Proposed Shallow Soil Sampling Locations

Tee Bird Country Club, Inc.
Town of Moreau, New York
Saratoga County, New York

Map Document: (Z:\projects\2005\05121-05140\05132 - TeeBird PCBs\Figures and Drawings\GIS\Fig4_ProposedSoil.mxd)
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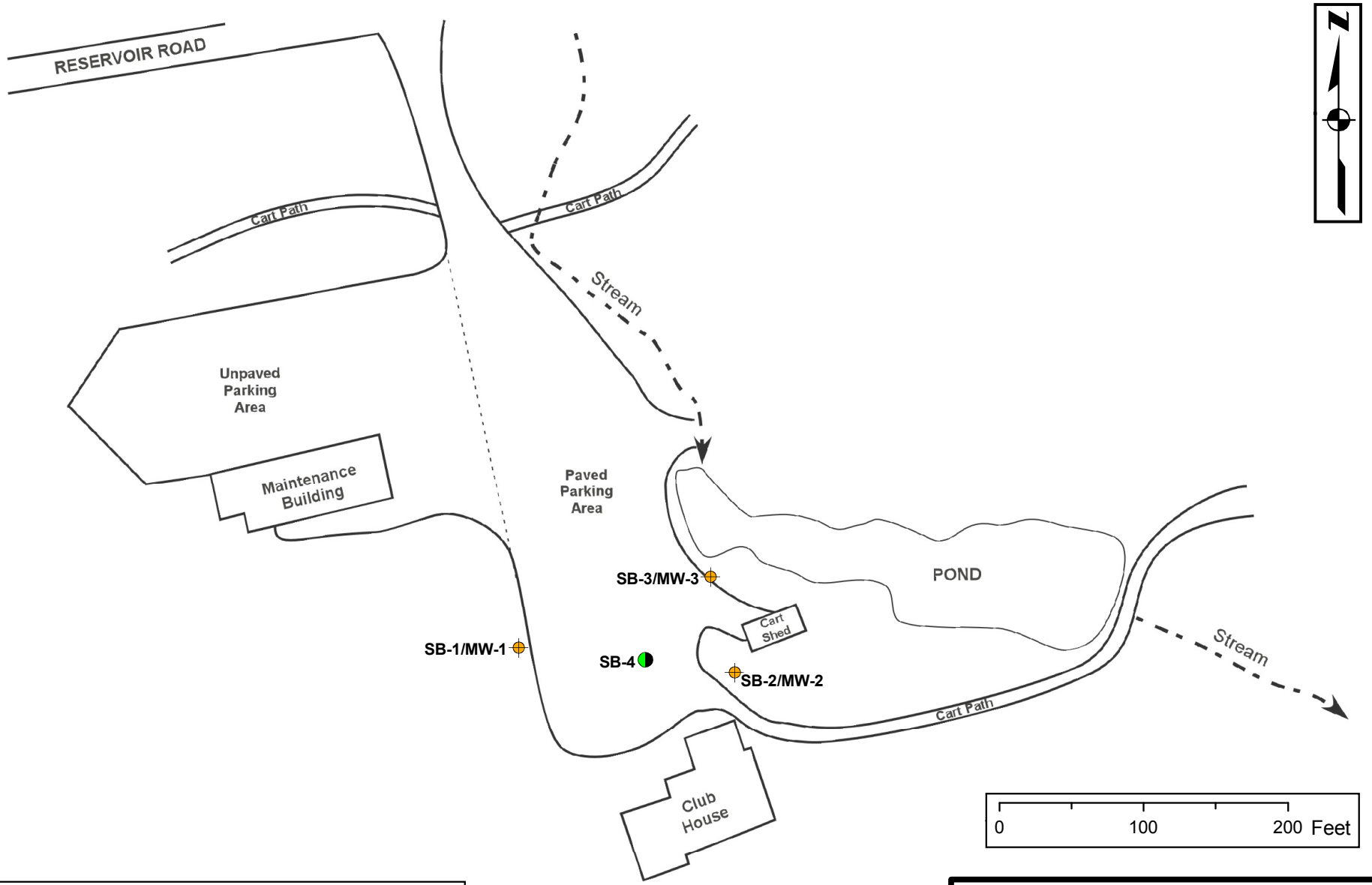

LEGEND

- SB-1/MW-1 — Proposed Soil Boring and Monitoring Well Location
- SB-4 — Proposed Soil Boring Location

Notes:
- Basemap: Features traced using SaratogaCounty 24-inch Resolution Natural Color Orthoimagery (April 2004), NYS Office of Cyber Security & Critical Infrastructure Coordination.
- Proposed locations are approximate and may be modified based on site conditions.

ALPHA GEOSCIENCE
Proj. No. 05132

FIGURE 5

Proposed Deep Soil Sampling and Monitoring Well Locations

Tee Bird Country Club, Inc.
Town of Moreau, New York
Saratoga County, New York

Map Document: (Z:\projects\2005\05121-05140\05132 - TeeBird PCBs\Figures and Drawings\GIS\Fig5_ProposedMW.mxd)
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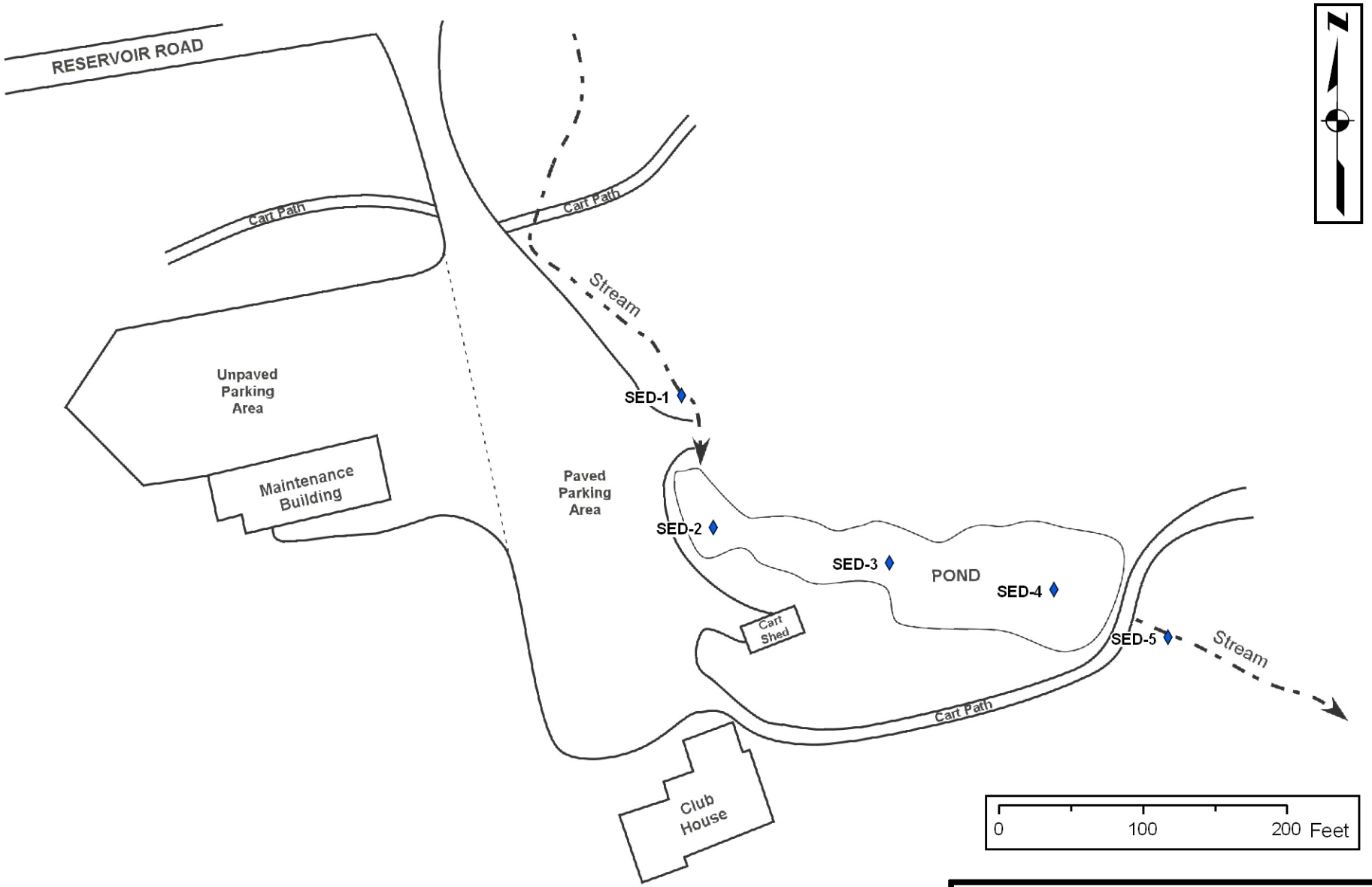

LEGEND

♦ Proposed Sediment Sampling Location

Notes:
- Basemap: Features traced using SaratogaCounty 24-inch Resolution Natural Color Orthoimagery (April 2004), NYS Office of Cyber Security & Critical Infrastructure Coordination.
- Proposed locations are approximate and may be modified based on site conditions.

ALPHA GEOSCIENCE
Proj. No. 05132

FIGURE 6
Proposed Sediment Sampling Locations
Tee Bird Country Club, Inc.
Town of Moreau, New York
Saratoga County, New York

Map Document: (Z:\projects\2005\05121-05140\05132 - TeeBird PCBs\Figures and Drawings\GIS\Site Map.mxd)
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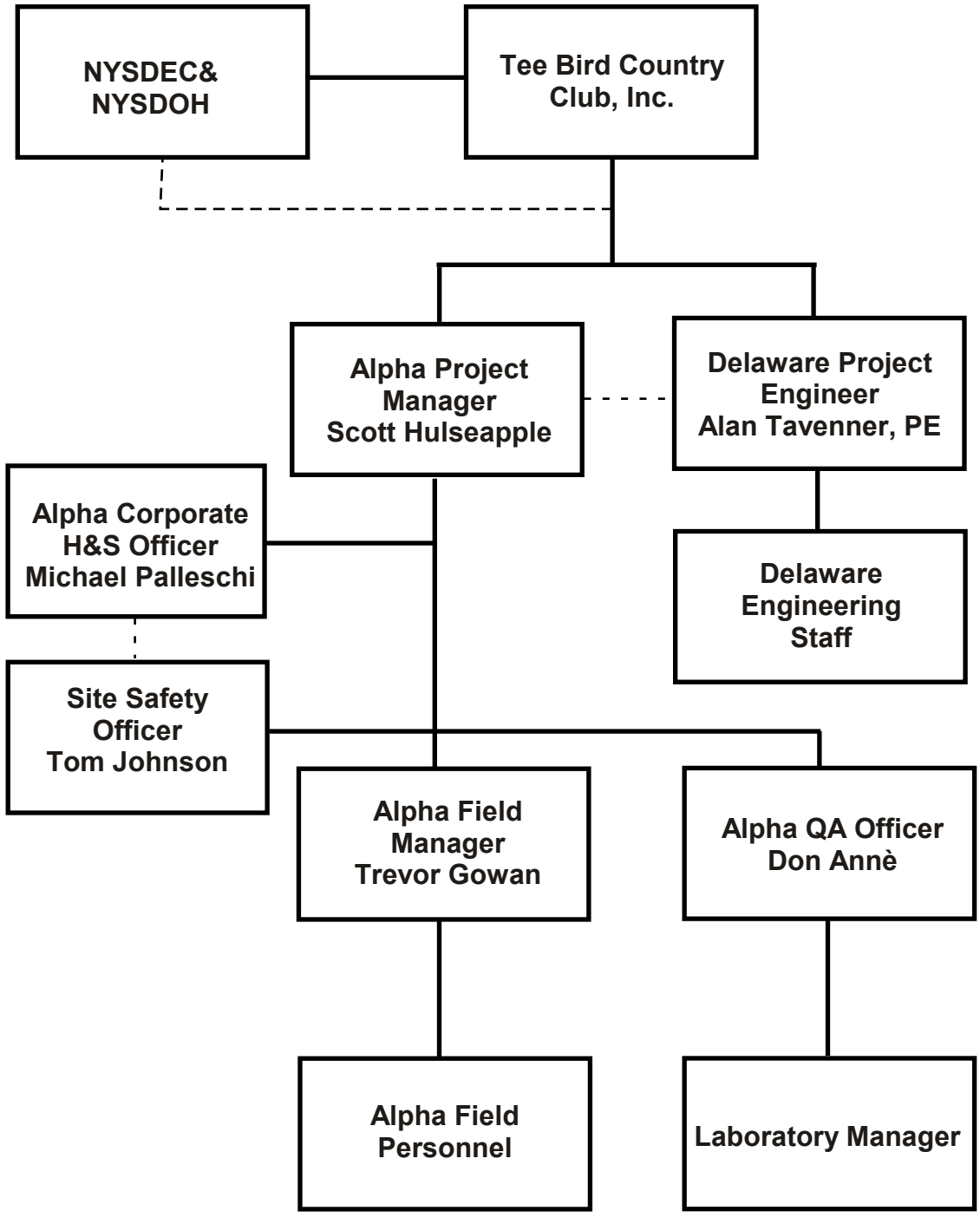


ALPHA
GEOSCIENCE
Proj. No. 05132

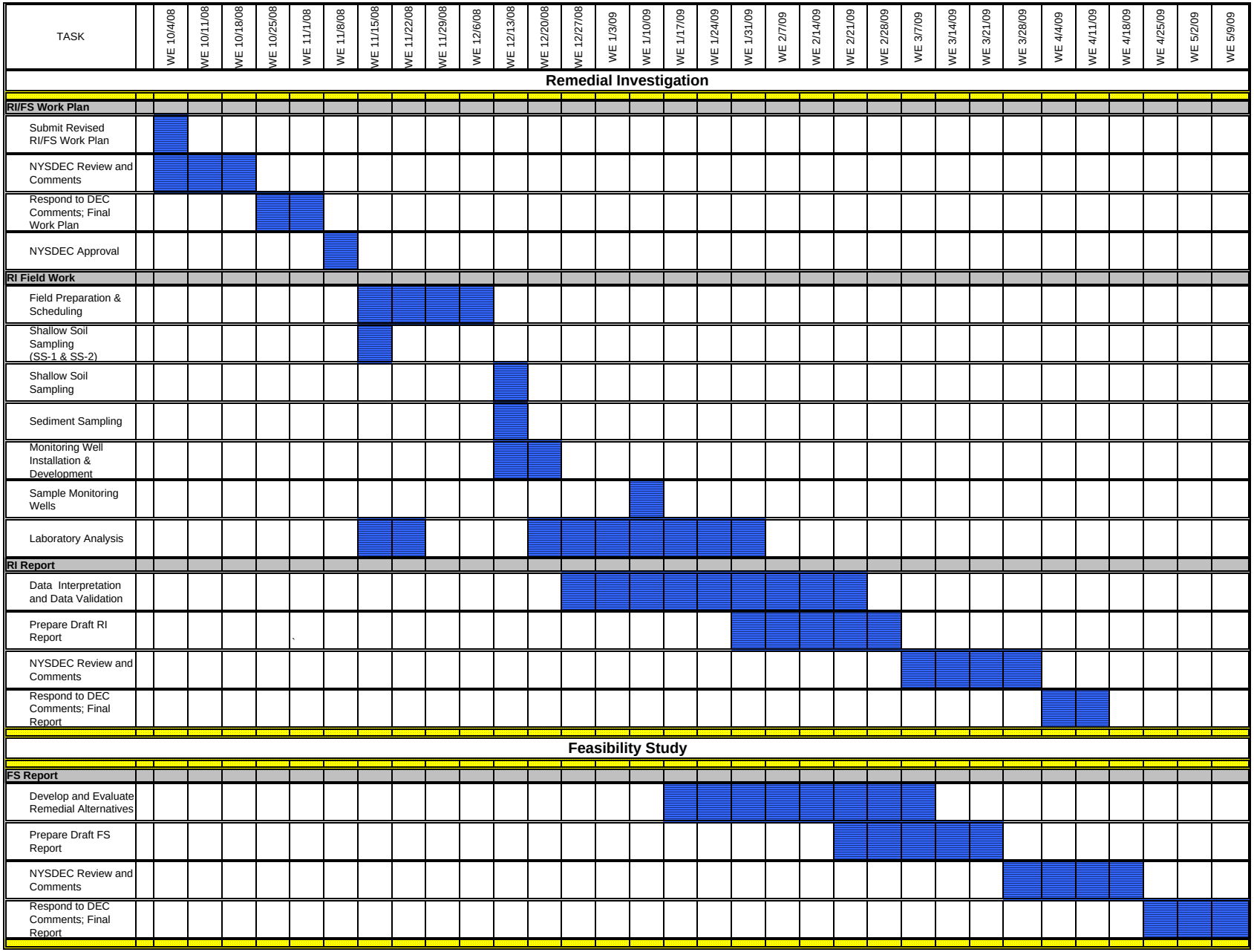
FIGURE 7

Project Organization

Tee Bird Country Club, Inc.
Town of Moreau, New York
Saratoga County, New York

DRAFT

FIGURE 8
PROPOSED SCHEDULE
Tee Bird Country Club
Town of Moreau, New York



APPENDIX A
Citizens Participation Plan

CITIZENS' PARTICIPATION PLAN

Prepared for:

Tee Bird Country Club, Inc.
30 Reservoir Road
Moreau, New York 12828

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

September 26, 2008

TABLE OF CONTENTS

1.0 INTRODUCTION

Alpha Geoscience (Alpha) has prepared this *Citizens' Participation Plan* (CPP) on behalf of the Tee Bird Country Club, Inc. (Tee Bird) as part of the Remedial Investigation/Feasibility Study (RI/FS) of the Tee Bird Country Club-North Course on Reservoir Road in the Town of Moreau, Saratoga County, New York. The RI/FS is being conducted in accordance with Order on Consent Number A5-0532-1205 between Tee-Bird and the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC Site number for the site is 546028.

This CPP is designed to encourage communication between the community, NYSDEC, and Tee Bird during implementation of the RI/FS. Implementation of this CPP will provide interested citizens, officials and others with accurate and timely information regarding the Site remedial activities. Additionally, implementation of this plan will provide the NYSDEC and Tee Bird with an opportunity to obtain input from the public in developing a remedial program.

The "Site" consists of the country club parking lot and nearby areas that may be impacted by polychlorinated biphenyls (PCBs) applied to the surface of the parking lot for dust control circa 1977. A remedy approved by the NYSDEC, consisting of an asphalt cap placed over the parking lot was implement in accordance with a 1984 Agreement between Tee Bird and the NYSDEC. NYSDEC personnel conducted periodic inspections of the cap and collected and analyzed soil samples in 1983, 1984, 1989, and 1990. No further investigation or remedial measures were required as a result of the inspections or sampling. The NYSDEC issued a letter on June 27, 2005 indicating it was reclassifying the Site from a Class 3 Inactive Hazardous Waste Disposal Site (IHWDS) to a Class 2 and that a RI/FS is required. Tee Bird and the NYSDEC entered into Order on Consent and Administrative Settlement #A5-0532-1205 in December 2007. The RI/FS is being conducted in accordance with the 2007 Order on Consent.

2.0 BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The Tee Bird Country Club consists of a public, 18-hole championship golf course, with a club house building, a maintenance building, a small, open-air food stand, and a cart shed located on Reservoir Road in the Town of Moreau, Saratoga County, New York. The "Site" consists primarily of the country club parking lot and nearby areas that may be impacted by PCBs applied to the surface of the parking lot for dust control circa 1977.

Two water supply wells are present on the property. One well is located near the southwest corner of the clubhouse and the other is located near the foundation of a former mobile home, south of the pond. Both wells have steel casing extending through the overburden and are drilled into bedrock. The clubhouse well is reportedly approximately 243 feet deep with 50 feet of casing. The clubhouse maintains a connection to the Village of Fort Edward water supply, but relies on the well for water. The well adjacent to the mobile home foundation was drilled in 1974 and is approximately 240 feet deep. The well reportedly produces about three gallons per minute (gpm) of sulfur water and is not currently used.

2.2 SITE HISTORY

In the early 1980's soil sampling by the NYSDEC detected the presence of PCBs in the parking lot at the Site, which was unpaved at the time. A remedy approved by the NYSDEC, consisting of an asphalt cap placed over the parking lot, was implemented in 1984 in accordance with an agreement with the NYSDEC. The cap consists of approximately 18-inches of gravel covered by asphalt. Natural clay exists immediately beneath the gravel according to the Site owner. NYSDEC personnel conducted periodic inspections of the paved parking area and collected and analyzed soil samples adjacent to the parking area in 1983, 1984, 1989, and 1990. No further investigation or remedial measures were required as a result of the inspections or soil sampling.

The NYSDEC issued a letter dated June 27, 2005 indicating that it was reclassifying the Site from a Class 3 Inactive Hazardous Waste Site to a Class 2 site and that a Remedial Investigation and Feasibility Study (RI/FS) is required. Tee Bird and the NYSDEC entered into Order on Consent and Administrative Settlement #A5-0532-1205 (the "Order"). This CPP has been prepared in accordance with the Order.

3.0 PROJECT DESCRIPTION

The purpose of the Remedial Investigation (RI) is to sufficiently determine the nature and extent of contamination at the Site and gather the information necessary to prepare and support the Feasibility Study (FS). The FS is designed to evaluate appropriate remedial technologies, formulate possible remedial alternatives and evaluate those remedial alternatives to determine which are most appropriate.

The following are considered major elements in the RI/FS and IRM process for the Site:

- Performance of the RI, culminating in a RI Report;
- Development and analysis of remedial alternatives, culminating in FS Report;
- Preparation of a Proposed Remedial Action Plan (PRAP) by the NYSDEC followed by a public comment period; and,
- Issuance of a Record of Decision (ROD) by the NYSDEC stating the selected remedial alternatives.

In addition to this Citizens' Participation Plan, an RI/FS Work Plan (Work Plan) and a site-specific Health and Safety Plan (HASP) have been prepared to guide the work required to complete the RI/FS for the Site. The Work Plan describes the activities to be conducted in the RI/FS and provides a detailed description of the methodologies that will be used. The tasks described in the RI/FS Work Plan include:

- Sampling shallow soil to evaluate the horizontal and vertical extent of soil impacts near the parking lot where oil was applied for dust control purposes.
- Installing ground water monitoring wells to assess ground water flow direction.
- Collecting ground water samples to assess impacts to ground water.

- Collecting sediment samples from the stream and pond adjacent to the parking lot to evaluate impacts to sediments.
- Conducting a Fish and Wildlife Resource Impact Analysis and a Human Health Impact Assessment.
- Preparing a RI report to present the data gathered during the investigation and an interpretation of the data.
- Preparing a FS report to evaluate potential remedial options for the site.

The Work Plan also contains a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP). The QAPP outlines data quality objectives and details the specific sampling procedures and the relevant sampling and analytical protocols to ensure that the data collected during the RI are of sufficient quality to support the remedial decisions.

4.0 IDENTIFICATION OF NEW YORK STATE CONTACTS

This section lists New York State Department of Environmental Conservation and Department of Health personnel involved in the RI/FS. A listing of potentially interested parties (Site Contact List) is provided in Section 8.0.

New York State Department of Environmental Conservation

Ms. Alicia Thorne, P.E.
Environmental Engineer 2
Project Manager
NYSDEC, Region 5
Division of Environmental Remediation
232 Golf Course Road, P.O. Box 220
Warrensburg, NY 12885

Phone: (518) 623-1238
Email: ajthorne@gw.dec.state.ny.us

New York State Department of Health

Mr. Ian Ushe
Sanitary Engineer
Bureau of Environmental Exposure Investigation
New York State Department of Health
Flanigan Square-547 River Street
Troy, New York 12180-2216

Phone: (518) 402-7880
Email: beei@health.state.ny.us

5.0 IDENTIFICATION OF DOCUMENT REPOSITORIES

Local document repositories, where information concerning this Site can be found, have been established at:

Crandall Public Library
251 Glen Street
Glens Falls, New York 12801
Phone: (518) 792-6508

Operating Hours:
- 9AM to 9PM Monday through Thursday
- 9AM to 6PM Friday
- 9AM to 5PM Saturday
- 1PM to 5PM Sunday (Sept to May)
- The library is closed on Sunday from the June 22 through Labor Day.

Copying services are available at the Crandall Library for $0.10 per page (8 ½" x 11" sheet).

Town of Moreau Office Building
61 Hudson Street
South Glens Falls, NY 12803
Phone (518) 792-1030

Operating Hours:
8AM to 4PM Monday through Friday

Copying services are available at the Town Hall for $0.25 per page (8 ½" x 11" sheet).

Also, the documents are available to read at the NYSDEC Region 5, offices in Warrensburg, New York:

New York State Department of Environmental Conservation
Region 5 – Warrensburg Office
232 Golf Course Road
Warrensburg, NY 12885
Phone: (518) 623-1238

Operating Hours:
Monday through Friday: 8:30 A.M. to 4:45 P.M.

Documents contained in the repositories include:

- 1984 Remediation Agreement
- 2007 Order on Consent
- Remedial Investigation/Feasibility Study Work Plan
- Citizens Participation Plan
- Fact Sheet announcing the RI

Additional documents will be developed during the RI/FS and will be made available in the repositories. The availability of the documents will be announced through fact sheets, public meetings, and other means.

6.0 DESCRIPTION OF SPECIFIC CITIZEN PARTICIPATION ACTIVITIES

The citizen participation activities have been designed based on State and Federal regulatory requirements and policies regarding citizen participation. The activities discussed below will be performed to keep the public informed and involved in the remedial program, and to insure that the State and Federal regulatory requirements on citizen participation are met. The activities described below may be augmented based upon changes in the project scope, length of project, public interest and/or other factors. As necessary, this CPP will be updated as the project progresses.

As part of this CPP, the NYSDEC and Tee Bird have established a preliminary site Contact List (*i.e.*, mailing list) which is included in Section 8.0. These mailing lists will be updated during the RI/FS on an as-needed basis. Those on the mailing lists will receive notices as to the availability of various key documents (*e.g.*, RI Report, FS Report) when they are placed in the Document Repository and will also receive notice of upcoming public meetings. They will also receive any information or fact sheets that may be developed.

Two fact sheets will be prepared for distribution to the interested parties on the site contact list. The first fact sheet will be distributed following NYSDEC approval of the RI/FS Work Plan. This fact sheet will detail the major tasks associated with the RI. If there are public comments or questions on the RI investigation, these will be addressed during and before completion of the RI.

A second fact sheet will be prepared and distributed to the public detailing the NYSDEC Proposed Remedial Action Plan (PRAP). The fact sheet will invite the public to attend a public meeting to discuss the PRAP. The NYSDEC will also disseminate a press notice regarding the public meeting. There will be a thirty-day public comment period to allow public review of the PRAP. Following public review and input, the PRAP may be modified. The NYSDEC will then choose the remedial action through a Record of Decision (ROD). The ROD documents the NYSDEC's decision-making process.

7.0 GLOSSARY OF KEY TERMS

Feasibility Study (FS): A study undertaken to develop and evaluate options for remedial action. The Feasibility Study emphasizes data analysis and is generally performed concurrently and in an interactive fashion with the Remedial Investigation using data gathered during the Remedial Investigation. The Remedial Investigation data are used to define the objectives of the program, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives. The term also refers to a report that describes the results of the study.

Availability Session: Scheduled gathering of DEC staff and the public in a setting less formal than a public meeting. Encourages "one-to-one" discussions in which the public meets with DEC staff on an individual or small-group basis to discuss particular questions or concerns.

***Citizen Participation Plan (CPP)*:** A document that describes the site-specific citizen participation activities that will take place to complement the "technical" activities. This plan may be updated or altered as public interest or the technical aspects of the program change.

Citizen Participation Specialist: A DEC staff member within the Office of Public Affairs who provides guidance, evaluation and assistance to help the DEC Project Manager carry out his/her site-specific citizen participation program.

Consent Order: A legal and enforceable agreement between the DEC and the Potentially Responsible Parties wherein those parties agree to undertake investigation and/or cleanup work at a site. The Consent Order typically includes a description of the remedial actions to be undertaken at the site and a schedule for their implementation.

Construction: Construction consists of carrying out the designed remedial alternative. Construction may be as straightforward as excavation of contaminated soil with disposal at a permitted hazardous waste management facility. On the other hand, it may involve: drum sampling and identification; encapsulation; groundwater collection and treatment; or other technologies. Construction costs may vary from several thousand dollars to many millions of dollars, depending on the size of the site, soil, groundwater and other conditions, and the nature of the wastes.

Contact List(s): Names, addresses and/or telephone numbers of officials, groups, organizations, media and individuals interested and/or affected by a particular Inactive Hazardous Waste Disposal Site. Interest, stage of remediation and other factors guide how comprehensive these lists become. The contact lists are used to inform the interested/affected public.

Contractor: A person or firm hired to furnish materials or perform services, especially during Construction.

DEC Project Manager: A DEC staff member within the Division of Environmental Remediation (usually an engineer, geologist, or hydrogeologist) responsible for the day-to-day administration of activities at one or more Inactive Hazardous Waste Disposal Sites. The DEC Project Manager works with the Citizen Participation Specialist as well as fiscal and legal staff to accomplish site-related goals and objectives.

Document Repository: Typically a regional DEC office and/or public building, such as a library, near a particular site at which documents related to remedial and citizen participation activities at the site are available for public review. The Document Repository provides access to documents at times and a location convenient to the public.

Fact Sheet: Written discussion of a site's remedial process, or some part of it, prepared for the public in easily understandable language. May be prepared for the general public or a particular segment. Uses may include, for example, discussion of an element of the remedial program, availability of a report or other information, or announcement of a public meeting. Information sheets may be mailed to all or part of the interested public, distributed at Public Meetings, Availability Sessions, or delivered on an "as requested" basis.

Inactive Hazardous Waste Disposal Site: Any area or structure used for the long-term storage or final placement of hazardous waste including, but not limited to, dumps, landfills, lagoons, and artificial treatment ponds, as to which area or structure no permit or authorization issued by the Department or a federal agency for the disposal of hazardous waste was in effect after August 25, 1979.

Interim Remedial Measures (IRM): A discrete set of activities to address both emergency and non-emergency site conditions which can be undertaken without extensive investigation and evaluation to prevent, mitigate, or remedy environmental damage or the consequences of environmental damage attributable to a site, including but not limited to the following activities: removal of wastes and contaminated materials including environmental media; construction of diversion ditches, collection systems, or groundwater collection systems; construction of fences or other barriers; installation of water filters or provision otherwise of alternative water supplies.

Maintenance/Monitoring: Denotes post-closure activities to insure continued effectiveness of the remedial actions. Typical maintenance/monitoring activities include: inspection by an engineering technician; measurement of level of water in monitoring wells; or collection and analysis of groundwater and/or surface water samples. Maintenance/monitoring may be required indefinitely at some sites.

PCBs: A class of nonpolar chlorinated hydrocarbons. Commercial PCBs are mixtures of chlorinated biphenyl isomers with varying degrees of chlorination. PCBs have not been produced in the U.S. since 1977. They were formerly used as additives in hydraulic fluids, fire retardants, lubricants, pesticide extenders and heat transfer systems. PCBs' thermal stability, nonflammability, and high dielectric capability made them very useful in electrical equipment.

Potentially Responsible Parties (PRPs): Individuals or entities (e.g., site owners, operators, transporters or generators of hazardous waste) potentially responsible for or contributing to the contamination problems at an Inactive Hazardous Waste Disposal Site.

Proposed Remedial Action Plan (PRAP): A document which explains to the public the remedial alternative which is proposed for implementation at a site based on the evaluations performed in the Feasibility Study.

Public Meeting: Scheduled gathering of DEC and perhaps DOH staff and the public to give and receive information, ask questions and discuss concerns. A public meeting may take one of the

following forms: large-group meeting called by the DEC or participation by the DEC at a meeting sponsored by another organization such as a Town Board.

Record of Decision (ROD): A document issued by the DEC which states the remedial alternative selected by the agency and formally approved by the Commissioner.

Registry of Inactive Hazardous Waste Disposal Sites: New York State's official inventory of Inactive Hazardous Waste Disposal Sites. The Registry contains a brief description of the site, its location, past and current owners, other known PRPs, past usage, and known or suspected contaminants.

Remedial Design (RD): Once a remedial alternative has been selected, technical drawings and specifications for remedial construction at a site are developed. Design documents are used to bid and construct the chosen remedial actions. Remedial design is prepared by consulting engineers with experience in remedial actions at Inactive Hazardous Waste Disposal Sites.

Remedial Investigation (RI): A process to determine the nature and extent of contamination by collecting and analyzing data from the site. It includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for, and proposed extent of, a remedial program for the site.

Responsiveness Summary: A formal or informal written or verbal summary and response by the DEC to public questions and comments. Typically prepared during or after important elements in a site's remedial program. The Responsiveness Summary may list and respond to each question/comment, or summarize and respond to questions in categories. The Responsiveness Summary is released with the ROD.

8.0 CONTACT LIST

8.1 FEDERAL OFFICIALS

United States Senators:

Senator Charles E. Schumer — Telephone: (518) 431-4070
Leo O'Brien Federal Office Building
1 Clinton Square
Room 420
Albany, NY 12207

Senator Hillary Rodham Clinton — Telephone: (518) 431-0120
Leo W. O'Brien Federal Office Building
1 Clinton Square
Room 821
Albany, NY 12207

United States Representative:
Hon. Kirsten E. Gillibrand Telephone: (518) 581-8247
487 Broadway
Saratoga Springs, New York 12866

United States Environmental Protection Agency
Alan J. Steinberg Telephone: (212) 637-3660
Regional Administrator
United States Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

8.2 STATE OFFICIALS

New York State Senate (43rd District)
(Vacant)

New York State Assembly (113th District)
Hon. Teresa R. Sayward Telephone: (518) 792-4546
140 Glen Street
Glens Falls, NY 12801

New York State Department of Environmental Conservation
Ms. Alicia Thorne, PE Telephone: (518) 623-1238
Environmental Engineer 2
Director, Remedial Bureau A
Division of Environmental Remediation
New York State Department of Environmental Conservation – Region 5
232 Golf Course Road
Warrensburg, New York 12885

New York State Department of Health
Mr. Ian Ushe Telephone: (518) 402-7880
Sanitary Engineer
Bureau of Environmental Exposure Investigation
New York State Department of Health
Flanigan Square, 547 River Street
Troy, New York 12180-2216

8.3 SARATOGA COUNTY OFFICIALS

Board of Supervisors
Mr. George Hargrave – Chair Telephone: (518) 885-2240
40 McMaster Street
Ballston Spa, New York 12020

Clerk
Ms. Kathleen Marchione Telephone: (518) 885-2213
40 McMaster Street
Ballston Spa, New York 12020

8.4 TOWN OFFICIALS

Supervisor
Preston L. Jenkins, Jr Telephone: (518) 792-1030
Town of Moreau Office Building
P.O. Box 1349
61 Hudson Street
South Glens Falls, NY 12803

Clerk
Jeanne Fleury Telephone: (518) 792-1030
Town of Moreau Office Building
P.O. Box 1349
61 Hudson Street
South Glens Falls, NY 12803

8.5 LOCAL MEDIA

Newspapers
The Post Star Telephone (518) 792-3131
Lawrence & Cooper Streets
Glens Falls, New York 12801

The Saratogian Telephone (518) 584-4242
20 Lake Avenue
Saratoga Springs, New York 12866

Television Stations
Capital News 9 Telephone: (518) 459-9999
104 Watervliet Avenue Extension
Albany, New York 12206

8.6 ENVIRONMENTAL/RECREATION GROUPS

Sierra Club Hudson-Mohawk Group Telephone: (518) 489-5721
Contact: Susan Lawrence, Chair
P.O. Box 8447
Albany, NY 12208-8447

Adirondack Mountain Club, Glens Falls-Saratoga Chapter
P.O. Box 2314
Glens Falls, NY 12801

League of Women Voters of Saratoga County

P.O. Box 1029
Saratoga Springs, NY 12866

8.7 ADJACENT/NEARBY RESIDENTS, BUSINESSES, PROPERTY OWNERS

The adjacent/affected property owners and resident portion of the list is maintained confidentially in project files, not in a CPP or repository.

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APPENDIX B
Health and Safety Plan

SITE SPECIFIC HEALTH AND SAFETY PLAN
FOR THE REMEDIAL INVESTIGATION

TEE BIRD COUNTRY CLUB – NORTH COURSE
TOWN OF MOREAU, NEW YORK

Prepared for:

Tee Bird Country Club, Inc.
Reservoir Road
Moreau, New York

June 9, 2008

Site Specific Health and Safety Plan
For the Remedial Investigation

Tee Bird Country Club – North Course
Town of Moreau, New York

Prepared for:

Tee Bird Country Club, Inc.
Reservoir Road
Moreau, New York

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

APPROVALS:

Project Manager: Scott M. Hulseapple	Signature	6/9/08 Date
Project Health Safety Officer: Thomas M. Johnson	Signature	6/9/08 Date
Alpha Corporate Health and Safety Officer: Michael D. Palleschi	Signature	6/9/08 Date

June 9, 2008

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ATTACHMENTS

1.0 GENERAL INFORMATION

1.1 Introduction

This Site Specific Health and Safety Plan (HASP) addresses the activities associated with the scope of work stated herein and will be implemented by the On-Site Safety Representative (OSSR) and Field Manager during site work. Compliance with this HASP is required of all persons and third parties who enter this site work area(s). Assistance in implementing this plan can be obtained from the Corporate Health and Safety Officer, Project Health and Safety Officer (HSO), or the Project Manager. The content of the HASP may change or be revised based on additional information made available to health and safety personnel, monitoring results, or changes in the scope of work. Any proposed changes must be reviewed by the OSSR and Project Manager and are subject to approval by the HSO.

This HASP has been written for the use of Alpha Geoscience and its employees. It may also be used as a guidance document by properly trained and experienced subcontractors; however, Alpha Geoscience does not guarantee the health or safety of any person entering this site. All subcontractors and third parties are responsible for the health and safety of their own employees.

Due to the potential hazards in the work areas and the activities occurring therein, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury at this site. The health and safety guidelines in this HASP were prepared for a specific project scope of work and should not be used on any other project or site without prior research by trained health and safety specialists.

Alpha Geoscience specifically disclaims any responsibility for the use of this HASP by unauthorized persons. The HASP is written for the specific site conditions, purpose, dates, and specified personnel and must be amended if these conditions change.

Alpha Geoscience, subcontractors, and Tee Bird, Inc. will be solely responsible for the health and safety of their respective employees. All personnel conducting the proposed site work will be properly trained in accordance with OSHA requirements for the respective work performed.

1.2 Project Personnel

1.2.1 Personnel Responsibilities

Alpha site project personnel will include the Project Manager (PM), Corporate Health and Safety Officer (HSO), On-Site Safety Representative (OSSR), and Field Personnel. The responsibilities and required qualifications of these personnel are described in Table 1-1.

TABLE 1-1

PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS

TITLE/NAME	GENERAL DESCRIPTION	SPECIFIC RESPONSIBILITIES	REQUIRED TRAINING AND MEDICAL SURVEILLANCE
Project Manager _____ Scott M. Hulseapple	Has authority to direct site operations. Responsible for control over site activities.	Prepares and organizes the background review of the job at hand, the Sampling and Analysis Plan, the Health and Safety Plan, and the field team. Obtains permission for site access and coordinates activities with appropriate Tee Bird personnel. Briefs the field teams on their specific assignments. Confers with the HSO and the OSSR to ensure that safety and health requirements are met. Responsible for preparation of the final report and support files for the site activities.	40-hr. Hazardous Waste Training including 8-hr. update (29 CFR 1910.120). 8-hr. Manager/Supervisor Hazardous Waste Training (29 CFR 1910.120). Respirator use training (if on-site work). Initial site specific training (if required by on-site work). Medical surveillance participant (if on-site work).

TABLE 1-1

PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS

TITLE/NAME	GENERAL DESCRIPTION	SPECIFIC RESPONSIBILITIES	REQUIRED TRAINING AND MEDICAL SURVEILLANCE
Corporate Health & Safety Officer _____ Michael D. Palleschi _____	Advises the Project Manager on all aspects of project health and safety matters. Recommends stopping work if any operations threaten worker or public health or safety.	Coordinates safety and health program activities. Monitors compliance with Heath and Safety Plan and addresses site safety questions or issues. Participates in preparation of the HASP. Ensures that site workers are familiar with the requirements and function of protective clothing and equipment. Knows emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire and police department. Notifies emergency personnel, when necessary. Coordinates the acquisition of emergency medical care.	40-hr. Hazardous Waste Training including 8-hr. update (29 CFR 1910.120). 8-hr. Manager/Supervisor Hazardous Waste Training (29 CFR 1910.120) Respirator use training Initial site specific training (if required by on-site work). Initial HASP review Medical surveillance participant

TABLE 1-1

PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS

TITLE/NAME	GENERAL DESCRIPTION	SPECIFIC RESPONSIBILITIES	REQUIRED TRAINING AND MEDICAL SURVEILLANCE
Site Safety Officer Representatives _____ Thomas M. Johnson _____	Coordinates with the HSO and Project Manager on all aspects of health and safety on site. Recommends stopping work if any operations threaten worker or public health or safety.	Coordinates and implements field aspects of the health and safety plan. Conducts Tailgate Safety Meetings and completes all documentation forms required by the HASP. Monitors site personnel for signs of stress, such as cold exposure, heat stress and fatigue. Monitors on-site hazards and conditions. Ensures that protective clothing and equipment are properly used, stored and maintained. Knows emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire and police department. Notifies emergency personnel, when necessary. Coordinates the acquisition of emergency medical care.	40-hr. Hazardous Waste Training including 8-hr. update (29 CFR 1910.120). 8-hr. Manager/Supervisor Hazardous Waste Training (29 CFR 1910.120) Respirator use training Initial site specific training (if required by on-site work). Initial HASP review Daily review of site conditions Daily site specific "Tailgate" safety meeting. Medical surveillance participant

TABLE 1-1

PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS

TITLE/NAME	GENERAL DESCRIPTION	SPECIFIC RESPONSIBILITIES	REQUIRED TRAINING AND MEDICAL SURVEILLANCE
Field Personnel _____ Bill Stelmack Chuck Begeal Trevor Gowan Matt Dupee Steve Trader Kevin Phelan _____	Responsible for field team operations and safety Reports to Project Manager, HSO, and SSO.	Manages field operations. Executes the Work Plan and schedule. Enforces safety procedures. Coordinates with the On-Site Safety Officer in determining protection level. Enforces site control. Documents field activities and sample collection. Complies with Health and Safety Plan. Notifies the On-Site Safety Officer, HSO, or Project Manager of unsafe conditions	40-hr. Hazardous Waste Training including 8-hr. update (29 CFR 1910.120). Respirator use training. Initial site specific training (if required by on-site work). Initial HASP review Daily site specific "Tailgate" safety meeting. Medical surveillance participant

1.2.2 Authorized Alpha Geoscience Site Personnel

The Project Manager must approve personnel who will be authorized to work at the subject site while operations are being conducted. Authorization requires confirmation of conformance with OSHA 29 CFR 1910.120 training and medical examination requirements and other applicable regulations and review and sign-off of this HASP. Documentation of training and medical examination will be submitted for each employee and subcontractor assigned to perform field work. All personnel must comply with facility safety requirements, as applicable. Table 1-2 provides a list of Alpha personnel who may perform work at the site, and their health and safety related qualifications.

TABLE 1-2
ALPHA STAFF TRAINING SUMMARY

Name	40-hr. Haz-woper	8-hr. Haz-woper	8-hr. Super/ Mgr	CPR	First Aid
Thomas M. Johnson	X	X	X		
Michael D. Palleschi	X	X	X		
Scott M. Hulseapple	X	X	X	X	X
Bill Stelmack	X	X		X	X
Charles Begeal	X	X			
Trevor Gowan	X	X			
Matt Dupee	X	X			
Steven Trader	X	X			
Kevin J. Phelan	X	X			

1.2.3 Emergency Coordinator

The Site Emergency Coordinator shall be the SSO. The SSO shall verify appropriate emergency contacts before beginning work on-site.

1.2.3.1 Emergency Phone Numbers

Saratoga Sheriff Department:	**911** or (518) 885-6761
NY State Police	**911** or (518) 583-7000
South Glens Falls Fire Department:	**911** or (518) 798-4020
Glens Falls Hospital:	**911** or (518) 926-1000
Hospital Address:	*100 Park Street* *Glens Falls, New York 12801*
Ambulance:	**911**

1.2.3.2 National or Regional Sources of Assistance

EPA (RCRA-Superfund Hotline) 800-424-9346
Chemtrec (24 Hours) 800-424-9300
Bureau of Explosives (24 Hours).....202-293-4048
Centers for Disease Control (Biological Agents) 404-633-5313
National Response Center (NRC).....800-424-8802
DOT (Office of Hazardous Operations) 202-426-0656
DOT (Regulatory Matters).....202-426-2075

Pesticide Health Hotline 800-858-7378
Occupational Medical Services, P.C. (Saratoga Care-Corp Health) ..518-580-2296

1.2.3.3 Hospital Route

From the site, turn left onto Reservoir Road. Proceed one mile and turn right onto Gansevoort Road (NY Route 32). Proceed 2.5 miles to Main Street (US Route 9/NY Route 32). Proceed 0.8 miles to Park Street. Turn left onto Park Street. The hospital is 0.2 miles on the left. A hospital route map is included in Attachment 1.

1.2.4 Subcontractors

Subcontracts may be issued for various tasks including soil boring and monitoring well installation. Other subcontracts may be issued for additional tasks, however, none are anticipated. Subcontractors shall comply with the requirements outlined in this HASP and in accordance with OSHA 29 CFR 1910 and 29 CFR 1926; but in all cases subcontractors shall be responsible for site safety related to or affected by their own field operations (*e.g.*, heavy equipment operations).

1.3 Signature and Acknowledgment

SITE NAME: Tee Bird Country Club, Inc.; Tee Bird Country Club – North Course, Remedial Investigation

All personnel working at or visiting the site within the exclusion zone must acknowledge by signing below that they have reviewed the contents of this HASP. All personnel acknowledge that they participate in a medical surveillance program and have been trained in accordance with 29 CFR 1910.120 (OSHA's Hazardous Waste Operations and Emergency Response standard). Each person agrees that he/she has read and understands this HASP and agrees to comply with it.

Name	Signature	Date	Company
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

1.4 Medical Surveillance

Alpha Geoscience personnel, and subcontractors, working at the site will participate in a medical surveillance program that meets the requirements of 29 CFR 1910.120. Alpha's medical surveillance program is outlined in the Corporate Policy Manual, Medical Surveillance Program.

Employees working at hazardous waste sites are provided with annual and termination medical examinations to ensure that they are medically fit to perform work and wear personal protective equipment. The scope of the medical exams includes a physical examination, audiometric testing, pulmonary function testing, visual testing, blood testing and urinalysis. The results of the examinations are confidential. Employees are provided with medical certificates and employees and their supervisors are informed of any restrictions or limitations.

Employees may access their medical records by contacting Alpha's Corporate Health and Safety Officer.

2.0 PROJECT INFORMATION

2.1 Site Description

The Tee Bird Country Club is located on the south side of Reservoir Road, approximately one mile west of the Hudson River. Facilities at the site include a golf course, club house, and maintenance buildings. The site is being investigated in accordance with Order on Consent Number A5-0532-1205 between Tee Bird and the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC Site number for the site is 546028.

2.2 Background Information

The "Site" consists primarily of the country club parking lot and nearby areas that may be impacted by polychlorinated biphenyls (PCBs) applied to the surface of the parking lot for dust control circa 1977.

In the early 1980's soil sampling by the NYSDEC detected the presence of PCBs in the parking lot at the Site, which was unpaved at the time. A remedy approved by the NYSDEC, consisting of an asphalt cap placed over the parking lot, was implemented in 1984 in accordance with an agreement with the NYSDEC. NYSDEC personnel conducted periodic inspections of the paved parking area and collected and analyzed soil samples adjacent to the parking area in 1983, 1984, 1989, and 1990. No further investigation or remedial measures were required as a result of the inspections or soil sampling.

The NYSDEC issued a letter dated June 27, 2005 indicating that it was reclassifying the Site from a Class 3 Inactive Hazardous Waste Site to a Class 2 site and that a Remedial Investigation and

Feasibility Study (RI/FS) is required. Tee Bird and the NYSDEC entered into Order on Consent and Administrative Settlement #A5-0532-1205 (the "Order") to investigate and remediate the PCB-impacted soil.

2.3 Purpose of Site Work

The RI is being conducted in accordance with the Order. The objective of the RI is to define the lateral and vertical extent of impacts of PCBs on soil, ground water, surface water, and sediment. The following section presents the tasks which will be performed during the remedial investigation.

2.4 Scope of Work

The work to be performed under this Health and Safety Plan includes collecting shallow samples of soil beneath the asphalt cap, collecting shallow soil samples along the periphery of the cap, installing ground water monitoring wells, collecting ground water samples, sampling existing water supply wells, and collecting samples of sediment from the nearby pond.

The tasks that will be performed during the proposed work include:

Task 1 **Shallow Soil Sampling:** Shallow soil samples will be collected using either a direct-push GeoProbe rig or hand tools. The soil samples will be screened in the field by the site geologist or hydrogeologist. Selected samples will be submitted for laboratory analysis.

Task 2 **Monitoring Well Installation:** Monitoring wells will be installed using a hollow stem auger type drilling rig. Soil samples will be screened in the field by the site geologist or hydrogeologist. Selected samples will be submitted for laboratory analysis. The wells will be developed using dedicated bailers or a Watera pump.

Task 3 **Ground Water Sampling:** Ground water samples will be collected from the newly installed monitoring wells using the USEPA's low-flow sampling protocols. Water samples will also be collected from the existing water supply wells. Ground water samples will be collected by the site geologist or hydrogeologist and submitted for laboratory analysis.

Task 4 **Sediment Sampling:** Sediment samples will be collected from the small stream and shallow pond located east of the country club parking lot. The sediment samples will be submitted for laboratory analysis. The method of sediment sampling will depend on the consistency and density of the sediment and the depth of the water in the pond and stream. The depth of the pond and stream is reportedly sufficiently shallow to allow access by wading. The methods of sediment sampling may be modified in the field if the water content of the sediment is excessively high and cannot be retained in a

standard suction-type sediment sampler. Sampling of the pond sediments may be conducted from a small boat if the water is too deep for wading.

These task numbers are referenced in the following sections pertaining to potential hazards, risks, and personal protection.

2.5 Scheduled Dates of Site Work

Remedial investigation field activities are anticipated to be completed during the spring and summer months of 2008. Field work is anticipated to be completed Monday through Friday during regular business hours (8:00 AM to 5:00 PM). The schedule may be altered to accommodate the site occupants and to make use of available daylight hours. The Project Manager will be responsible for notifying the On-Site Safety Representative and subcontractors of the specific schedule for project tasks to be performed that are governed by this HASP.

3.0 HEALTH AND SAFETY RISK ANALYSIS

3.1 Hazard Analysis

Chemical and non-chemical hazards may be associated with the sampling and well installation tasks.

The overall hazard is considered to be:

_X_ Low
___ Moderate
___ High

3.2 Non-Chemical Hazard Summary

Table 3-1 provides a summary assessment of non-chemical hazards. A review of potential hazards will be performed at least five working days prior to commencing work, to identify site conditions that may have changed.

TABLE 3-1

ASSESSMENT OF NON-CHEMICAL HAZARDS
(Hazard mitigation is discussed in Sections 5 and 6 for each "Yes" response)

Non-Chemical Hazard	Yes	No	Task No.(s)	Non-Chemical Hazard	Yes	No	Task No.(s)
1. Electrical (overhead lines)	X		1,2	16. Shoring		X	
2. Electrical (underground lines)	X		1,2	17. Biologic		X	
3. Gas/Water lines	X		1,2	18. Holes/Ditches	X		1,2,3,4
4. Drilling Equipment	X		1,2	19. Steep Grades	X		1,2,3,4
5. Excavation Equipment		X		20. Slippery Surfaces	X		1,2,3,4
6. Machinery	X		1,2	21. Uneven Terrain	X		1,2,3,4
7. Heat Exposure	X		1,2,3,4	22. Unstable Surfaces		X	
8. Cold Exposure		X		23. Elevated Surfaces (scaffolding)		X	
9. Oxygen Deficiency		X		24. Poor Lighting		X	
10. Confined Spaces		X		25. Vehicle Traffic	X		1,2,3,4
11. Noise	X		1,2	26. Insects/vermin	X		1,2,3,4
12. Ionizing Radiation		X		27. Poisonous Plants	X		1,2,3,4
13. Non-ionizing Radiation		X		28. Water Bodies	X		4
14. Fire	X		1,2	29. Unstable Soil Conditions		X	
15. Explosive Atmospheres		X		30. Dust/particulates	X		1,2

3.3 Site Contaminant Source(s) and Data

The “Site” consists primarily of the country club parking lot and nearby areas that may be impacted by polychlorinated biphenyls (PCBs) that were applied to the surface of the parking lot for dust control circa 1977.

NYSDEC personnel have conducted periodic inspections of the paved parking area and collected and

analyzed soil samples adjacent to the parking area in 1983, 1984, 1989, and 1990. These data indicate that concentrations of PCBs of up to 6,800 parts per million (ppm) have been detected in soils. Ninety percent of the soil samples analyzed had reported concentrations of PCBs less than 300 ppm. There are no analytical data available for ground water or sediments.

3.4 Chemical Hazard Summary

The following chemicals are known or suspected to be encountered during the investigation. Material Safety Data Sheets are included in Attachment 2.

TABLE 3-2

ASSESSMENT OF CHEMICAL HAZARDS

Chemical Name	OSHA PEL(1)	Concentration Present		Ionization Potential (eV)	Health Hazards/ Target Organs	Symptoms Of Overexposure
		Soil	Water			
Polychlorinated biphenyls (PCBs)	1 mg/m^3 (42% chlorine) 0.5 mg/m^3 (54% chlorine)	Up to 6,800 ppm total PCBs	Unknown	NA	Potential occupational carcinogen; Skin, eyes, liver, reproductive system	Eye irritation, chloracne, liver damage, reproductive effects, potential occupational carcinogen
Hydrochloric acid (sample preservative)	5 ppm	NA	NA	12.74	Eyes, skin, respiratory system	Irritation nose, throat, larynx; cough, choking; dermatitis; solution: eye, skin burns; liquid: frostbite; in animals: laryngeal spasm; pulmonary edema
Nitric acid (sample preservative)	2 ppm	NA	NA	11.95	Eyes, skin, respiratory system, teeth	Irritation eyes, skin, mucous membrane; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion
Hexane (de-contamination fluid)	500 ppm	NA	NA	10.18	Eyes, skin, respiratory system, central nervous system, peripheral nervous system	Irritation eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weakness; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)

Notes:
(1) – Permissible exposure limit established by the US Department of Labor Occupational Safety and Health Administration. , Unless noted otherwise, the PELs are time weighted averages (TWA) for up to a 10-hour work day during a 40-hour work week.
ppm – parts per million
mg/m^3 – milligrams per cubic meter or air
NA – Not applicable

3.5 Natural Hazards

Natural hazards such as unfavorable weather conditions, poisonous plants and bites from poisonous or disease-carrying animals and insects (e.g., snakes, ticks) cannot always be avoided. Please refer to Section 7.0 for a discussion of precautions and emergency procedures.

3.6 Confined Space Entry

Confined space entry is not anticipated and therefore is not addressed in this HASP. If confined space entry is necessary, work will be halted and the Project HSO will be notified prior to proceeding.

3.7 Spill Containment

Field activities associated with this site are unlikely to require spill containment and therefore spill containment is not addressed in this HASP.

4.0 HEALTH AND SAFETY FIELD IMPLEMENTATION

4.1 Personal Protective Equipment (PPE) Requirements

PPE may be upgraded or downgraded by the Corporate HSO, Project HSO, or qualified On-Site Safety Representative based on site conditions. Reference to required PPE will be by Level of Protection (A-D). A summarized description of PPE by level of protection is indicated below:

LEVEL A: Should be worn when the highest level of respiratory, skin and eye protection is needed.

LEVEL B: Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection. Level B is the primary level of choice when encountering unknown environments.

LEVEL C: Should be worn when the criteria for using air-purifying respirators are met and a lesser level of skin protection is needed.

LEVEL D: Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.

Table 4-1 presents the specific PPE requirements for the proposed work.

TABLE 4-1

PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS

Job Task	Level of Protection	PPE Suit	PPE Gloves	PPE Feet	PPE Head	PPE Eye	PPE Ear	PPE Respirator	Level of Upgrade
1	D	Std., Road	L	Sturdy/ Steel Booties*	HH	Glass	Plugs or muff	Monitor	Half APR, HEPA
2	D	Std., Road	L	Sturdy/ Steel Booties*	HH	Glass	Plugs or muff	Monitor	Half APR, HEPA
3	D	Std., Road	L	Sturdy	--	Glass	--	Monitor	Half APR, HEPA
4	D	Std., Float	L	Water	--	Glass	--	Monitor	Half APR

SUIT:
Std = Standard work clothes
Tyvek = Uncoated Tyvek disposable coverall
PE Tyvek = Polyethylene-coated Tyvek
Lt PVC = Light wt. PVC raingear
Med PVC = Medium wt. PVC suit
Road = Roadwork vest
Float = Lifevest

GLOVES:
Work = Work gloves (canvas,leather)
Neo = Neoprene gloves
PVC = PVC gloves
N = Nitrile gloves
V = Vinyl gloves
L = Latex gloves

FEET:
Sturdy= Sturdy work boots
Steel = Steel-toe boots
Steel+ = Steel toe PVC boots
Booties = PVC booties
Water = Water proof hip waders

HEAD:
HH = Hardhat

EYE:
Glass = Safety glasses
Goggle = Goggles
Shield = Face shield

EAR:
Plugs = Earplugs
Muff = Ear muff

RESPIRATOR:
APR = Air purifying respirator
Full APR = Full face APR
Half APR = Half face APR
PAPR = Powered APR
SAR = Airline supplies air respirator
OV = Organic Vapor cartridge
AG = Acid gas cartridge
OV/AG = Organic vapor/Acid gas cartridge
D/M = Dust/mist pre-filter and cover for cartridge
HEPA = High efficiency particulate air filter cartridge
Monitor = perform air monitoring to determine need for respirator; add respiratory protection if needed.

OTHER:
* = use if contact with wet soil or water

4.2 Monitoring of Work Areas

Visual monitoring will be conducted by the On-Site Safety Representative or designee. Cement and/or bentonite dust will be generated during the preparation of the grout for well installation (Task 2). The OSSR will instruct the Alpha field personnel to don particulate respirators and goggles when handling dry cement and bentonite. Field personnel who are not actively involved with handling, mixing, and

installing grout will remain upwind and outside the immediate work area to avoid exposure to dust or particulates.

4.3 Site Zones/Delineation

Exclusion Zone:

___X___ Areas within cones and/or caution tape.
___X___ Within 40-ft radius of drill rig operations, or as practical based on site conditions.

4.4 Site Communication

___X___ By telephone/cell phone
_____ By other means (describe):

4.5 Site Security

___X___ Restricted access: Cones will delineate the work area and non-authorized personnel will remain outside the work area.
_____ Fenced

5.0 AIR MONITORING AND ACTION LEVELS

5.1 General

Atmospheric conditions will be monitored during on-site field sampling activities to determine the possible need to upgrade the personal protection of on-site workers and/or continue the work under the provisions of a Vapor Emission Response Plan as outlined in the Community Air Monitoring Plan (Attachment 3). Atmosphere at the sample extraction point, soil cuttings, and fluids produced during drilling shall be monitored. In addition, real-time air monitoring will be performed in the worker's breathing zone (BZ) and at the perimeter of the work area during all ground intrusive activities.

5.1.1 Soil Sampling Operations/Monitoring Well Installation

These activities shall be initiated in modified Level D protection with the contingency to upgrade the level of protection based on the comparison of real-time monitoring results to the action levels outlined in this HASP.

Monitoring shall be performed regularly during the drilling activities. A photoionization detector (PID) shall be used to monitor the BZ, the borehole, and all geological samples upon their retrieval. Drill cuttings and fluids produced during drilling shall also be monitored. A Combustible Gas Indicator (CGI) equipped with an oxygen alarm shall be used to monitor the borehole for the presence of combustible gases if compounds of concern include potentially combustible gases. Any soil cuttings or fluids produced during drilling shall also be monitored using a PID.

5.1.2 Monitoring Well Development and Groundwater Sample Collection

These activities shall be initiated in modified Level D protection with the contingency to upgrade the level of protection based on the comparison of real-time monitoring results to the action levels outlined in this HASP.

The PID shall be used to monitor both the worker's BZ and the area immediately around the well casing. Prior to initiating development, testing, or sampling activities, the field team will stand upwind of the well casing and remove the well cap, stand back, and allow the well casing to vent. If action levels are not exceeded in the worker's BZ, development, testing, and/or sampling activities may proceed.

5.2 Action Levels

Instrumentation will include a PID equipped with an 10.2 electron volt (eV) lamp, a combustible gas indicator (CGI) to monitor for combustibles. A real-time particulate monitor such as the MIE *personal*DataRAM® (pDR), will be used as conditions warrant. The action levels in this HASP will apply to all site work conducted during the duration of RI activities at the project site.

If visible dust from work activities is noted while working in modified Level D, engineering controls, such as wetting the work zone area with water to control dust, will be implemented to the extent feasible. However, an upgrade to Level C respiratory protection is required if engineering controls do not successfully address the problem.

INSTRUMENT	READING/ACTION LEVELS	LEVEL OF RESPIRATORY PROTECTION/ACTION
PID	Continuous sustained readings of up to 1 ppm above background (typically to 0.2 ppm) in the Breathing Zone (BZ)	Modified Level D
PID	Continuous sustained readings of 1 ppm to 5 ppm above background in the BZ	Level C
PID	Continuous readings at 5 to 250 ppm above background in the BZ	Level B
CGI	Less than 10% Lower Explosive Limit (LEL) at the borehole	Proceed with caution
CGI	Greater than 10% LEL at the borehole	Cease work, vent, and restart work only after LEL returns to 0%

pDR	Downwind particulate level must be less than 150 ug/m^3 greater than the upwind particulate level	Cease work, implement dust control, and restart work only after the particulate levels are acceptable

5.3 Exposure Monitoring/Air Sampling Program

Personal and site perimeter air monitoring will not be conducted unless modified Level D action levels are exceeded at the perimeter of the EZ. The determination to perform personal and perimeter air monitoring will be determined by the SSO in consultation with the PM. If a site perimeter air monitoring program is deemed necessary, work activities will be halted and a site-specific monitoring plan consistent with the New York State Department of Health (NYSDOH) Community Air Monitoring Plan (Ground Intrusive Activities) guidelines will be implemented (Attachment 3).

5.4 Instrument Calibration and Maintenance

Instrument calibration and maintenance shall be performed according to manufacturer's specifications and documented on Field Instrument Calibration Logs or in the Field Log Book. At a minimum, PID calibration will be completed on a daily basis. The CGI will be calibrated according to manufacturer's recommended frequency (*e.g.*, daily or weekly).

6.0 SITE OPERATING PROCEDURES

6.1 Initial Site Entry Procedures

- Review Initial Health and Safety Mobilization Checklist.
- Locate nearest available telephone or check cell phone reception.
- Determine prevailing wind direction; establish exclusion zone and equipment cleaning area.
- Provide Emergency Information. Confirm emergency phone numbers and hospital route.
- Ensure availability of at least one vehicle for emergency use.
- Determine location of site emergency response office/personnel.
- Prior to working on site, conduct an inspection for physical and chemical hazards.
- Conduct or review utility clearance prior to start of work with appropriate site personnel.
- Note specialized protocols or permits particular to work tasks associated with the project.

6.2 Daily Operating Procedures

- Conduct and document daily Tailgate Safety Meetings prior to work start.

- Use personal protective equipment (PPE) as specified.
- Remain upwind of operations and airborne sources, if possible.
- Establish a work/rest regime when ambient temperatures and protective clothing create a potential heat or cold stress hazard.
- Do not carry cigarettes, gum, etc. into exclusion areas.
- Refer to On-Site Safety Representative for specific concerns for each individual site task.
- Use buddy system where appropriate. Two people are required during sediment sampling (HASP Task 4). One person is to remain on shore during sample collection.
- Be alert to your own physical condition. Watch buddy for signs of fatigue, exposure, etc.
- All accidents must be reported immediately to the OSSR and HSO.
- Contain liquids and cuttings generated during drilling.
- Limit contact of clean equipment with subsurface materials and waste.
- Practice contamination avoidance, on- and off-site. Activities should be planned ahead of time.
- Apply immediate first aid to cuts, scratches, abrasions, etc.

6.3 Utility Clearance

All work is being performed on the Tee Bird Country Club property. The location, identification, and marking of all utilities will be the responsibility of Tee Bird, Inc. Alpha or its subcontractor will file a Utility Clearance Request with Tee Bird and Dig Safely-New York and review those identified utility locations with Tee Bird prior to commencing work.

6.3.1 Electrical Overhead Lines

The presence of overhead electrical lines presents a potential electrical shock hazard for drilling tasks. Equipment used for drilling has the potential to come in contact with the overhead wires. If possible, the sampling locations will be moved to a safe location that meets the objective of the work plan. If this is not possible, the lines must be fitted with insulator sleeves and equipment should be kept a safe distance (minimum of 20 feet clearance, horizontal and vertical) from the overhead electrical lines at all times. Alpha Geoscience's Field Manager and the drilling contractor will review the drilling locations to verify safe distances from overhead lines, if the work site is within 20 feet of those lines.

6.3.2 Underground Utilities

Equipment used for drilling has the potential to come in contact with underground utilities. No ground penetration work will occur until Dig Safely-New York utility clearance has been obtained and Tee Bird's site representative has inspected the drilling locations.

6.4 Additional Site-Specific Operating Procedures

Non-chemical hazards have been identified (Table 3-1) in association with certain tasks or activities. The following sections describe precautions that should be considered to mitigate the identified hazards.

6.4.1 Airborne Dust/Particulates

The potential for generating excessive fugitive dust during drilling activities is very low because of the moisture content of the natural soil. Dust likely will be generated during the preparation of the slurry grout to backfill each borehole. Worker exposure can be mitigated by employing work practices that will minimize or eliminate dust and particulates in the work zone. Work practices include wetting dry or dusty materials as soon as practical and remaining upwind of work areas whenever possible. Airborne particulates will be monitored by visual observation and corrective measures will be implemented for control, as necessary. A *Community Air Monitoring Plan* (CAMP) is included in Attachment 3.

6.4.2 Drilling Equipment

Drilling equipment represents hazards primarily from moving parts and the creation of pinch points during work. Additional hazards may exist due to the presence of overhead or underground utilities, as described and addressed above. Operators of heavy equipment are to be responsible for the safe operation of the equipment and must be familiar with all controls. All personnel working within the vicinity of heavy equipment should be familiar with the location of emergency shut-off devices.

6.4.3 Machinery

A variety of mechanical, hydraulic, pneumatic and electrical machinery may be used during drilling activities. Machinery may include pumps, generators, hand drills, jack hammers, tampers, etc. Work crews will be cognizant of the hazards inherent in the use of such machinery and will take precautionary measures to reduce or eliminate the risk of fire, electrical shock or explosion. The operator will inspect machinery prior to use to ensure that moving parts and electrical cables are not excessively worn or deteriorated. Machinery with the potential to create a shock hazard will be properly grounded during use.

6.4.4 Overt Chemical Exposure

Typical response procedures include:

SKIN CONTACT:	Use copious amounts of cleaner and water. Wash/rinse affected area thoroughly, and then provide appropriate medical attention. Eye wash will be provided on-site at the CRZ and/or SZ. Eyes should be rinsed for 15 minutes upon chemical contamination.
INHALATION:	Move to fresh air and/or, if necessary, decontaminate/transport to hospital.
INGESTION:	Decontaminate and transport to emergency medical facility.
PUNCTURE WOUND OR LACERATION:	Decontaminate and transport to emergency medical facility. The SSO will provide medical data sheets to medical personnel as requested.

6.4.5 Adverse Weather Conditions

In the event of adverse weather conditions, the Field Manger or SSO will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (*e.g.*, mud, ice, rain).
- Limited visibility.
- Potential for electrical storms.

6.4.6 Cold Exposure and Heat Stress (Seasonal Applicability)

Prolonged exposure to cold environments can result in reduced mental alertness, confusion, irritability, and loss of consciousness. High wind can aggravate exposure to cold temperatures due to wind chill effects. Personnel working in cold environments will be familiar with the symptoms of excessive exposure to cold including severe shivering and/or pain in the extremities. The effects of a cold environment will be minimized by wearing appropriate clothing and covering the extremities (including face, hands, and feet). Periodic warm up at breaks may be necessary depending on the temperatures and the work schedule.

Heat stress can be a major hazard for workers in hot weather and when wearing protective clothing. Heat stress can occur very rapidly, within as little as 15 minutes, depending on the ambient conditions and the work performed. Heat stress can cause rashes, cramps, discomfort, and drowsiness in its early stages, resulting in impaired functional ability. Continued heat stress can lead to heat stroke and death. Heat stress will be controlled and minimized by training, judiciously scheduling work and rest periods if necessary, frequently replacing fluids, avoiding excessive protective clothing, and monitoring personnel who wear protective clothing that limits the dissipation of body heat and moisture.

6.4.7 Occupational Noise

Excessive levels of noise will be generated by drilling equipment during site work. Personnel working in the vicinity of such equipment should use either earplugs or protective hearing muffs to reduce the noise to acceptable levels. Documentation of training and audiometric testing will be submitted for employees and subcontractors who are assigned to field work.

6.4.8 Fire Hazards

The potential risk of a fire hazard is considered very low based on the type of work that will be performed, the equipment to be used, and the anticipated work environment. The primary risk of fire likely is associated with the fuel to be used for the drilling rig or other equipment. Monitoring of the atmosphere in the work zone will be based on observation of the presence or accumulation of petroleum vapors that may indicate a potential fire hazard. Care will be taken to avoid generating ignition sources if such vapors are present during work activities, and corrective measures will be taken to eliminate the source or the accumulation of such vapors. The work will be performed entirely outside and although there is a low risk of fire hazard from the presence of motor fuels, it is not anticipated that there is a risk of explosive vapors. A PID or combustible gas indicator will be used to monitor vapors at the work sites.

Personnel within the work zone will be familiar with the location, operation, and proper selection of fire extinguishing equipment. Fully charged and inspected fire extinguishers will be immediately available at the work site. Emergency plans must be immediately implemented in the event of a fire.

6.4.9 Snakes And Ticks

6.4.9.1 Snake Bite Prevention and First Aid

On project sites, precautions against the possible presence of snakes should be taken when walking through overgrown vegetation and when moving debris (*e.g.*, lumber, scrap metal, *etc.*). If someone is bitten by a snake, and the snake bite occurs in a location that is within an hour's drive of a medical facility, a conservative approach is safest. Keeping the victim quiet, lying or sitting, and reassuring him/her are all that is required. He/she should be transported safely (no speeding) to the nearest medical facility.

Even when significant envenom occurs, symptoms develop slowly over many hours and can usually be controlled with appropriate treatment. Field treatments advised against include ice, cutting and suction around the wound, and tourniquets. Studies indicate that ice leads to increased tissue destruction. Cutting and sucking out the wound can be shown to offer some help if it is done with the correct technique and equipment and if the victim has received a large dose of venom. In light of the

damage that can be done, the risk of such a procedure is too high. It is best to transport the person immediately to a medical facility.

6.4.9.2 Tick Bite Prevention and First Aid

Routinely check for ticks after being outdoors. Remove ticks as soon as possible before they embed. To minimize exposure, wear light-colored clothing so ticks may be more easily detected. Tuck pants into boots or socks and wear long sleeved shirts. Apply tick/insect repellent to clothing.

When a tick is found embedded, remove it by grasping it with a tweezers as close to the skin as possible and gently pull it straight out. Do not twist or jerk the tick because the head may remain embedded. Once the tick is removed, wash the bite area and your hands with soap and water and apply an antiseptic to the bite. Save the tick in a jar labeled with the date and the place where the tick was acquired. A physician may find this information and the tick specimen helpful in diagnosis if an infection results.

6.4.10 Vehicle Traffic

Most of the work areas are located at or near roads, parking areas, or other areas of the facility that receive traffic. The primary vehicular traffic through these areas is expected to be associated with facility operations. Where applicable, vehicular movement near the work area will be controlled using traffic cones or similar methods to protect workers and equipment.

6.4.11 Lockout/Tagout

A lockout/tagout program will be implemented for work performed near potentially energized systems. The SSO will determine the need for the lockout/tagout system at each work area. No work at or near energized systems is anticipated during this project.

6.4.12 Insects, Vermin, and Poisonous Plants

The potential exists for field personnel to encounter insects, vermin, and poisonous plants, because work will be performed outdoors. Level D personal protective equipment is specified for the proposed work (Table 4-1). The work boots and sturdy work clothes (long sleeves and long pants) are expected to provide adequate protection from potential exposure to insects, vermin, and poisonous plants. Insect repellent that is applied directly to the skin also may be used, if necessary. No other insecticides or insect repellent will be allowed. Field personnel that are injured by insects, vermin, or poisonous plants will notify the SSO for assistance, if medical attention is required.

6.4.13 Water Bodies

Some of the proposed work areas are located adjacent to or near surface water bodies, including small streams, open storm water channels, and the on-site pond. Sediment samples (HASP Task 4) will be collected from the stream and pond. The method of sediment sampling will depend on the consistency and density of the sediment, and the depth of the water in the pond and stream. The depth of the pond and stream is reportedly sufficiently shallow to allow access by wading. The methods of sediment sampling may be modified in the field if the water content of the sediment is excessively high and cannot be retained in a standard suction-type sediment sampler. Sampling of the pond sediments may be conducted from a small boat if the water is too deep for wading. Personnel in the boat must wear a floatation device.

Field personnel will be cognizant of the water levels in nearby surface water bodies. Work will be performed at least 10 feet from the edge of water bodies or drop-offs to water bodies. Workers will be tied off/harnessed and wear a flotation device, if working within 6 feet of a drop-off or surface water body. Work may be suspended at the discretion of the Field Manager, in consultation with the SSO, and Project Manager, if surface water levels are at, above, or approaching flood stage.

6.4.14 Uneven Terrain/Holes and Ditches

There is uneven terrain, a drainage ditch, and/or holes within the work area. The Field Manager and field personnel will inspect the immediate work area at each work location prior to commencing work at that area, and will identify and delineate areas of hummocky ground, depressions, or other hazards. Workers will avoid walking or working in these areas.

6.4.15 Steep Slopes

There are several small, but steep, slopes along some areas where samples are to be collected. The work area will be inspected by the Field Manager and field personnel prior to work at each well location. Workers will avoid these slopes whenever possible or take appropriate safety precaustions when working on or near slopes.

6.4.16 Slippery Surfaces

The preparation of cement and bentonite slurry (Task 2) will generate a wet mixture that is slippery and may spill or splash onto work surfaces. Field personnel will use work practices to minimize material spillage and will use clean water to rinse slurry off surfaces or equipment. The work areas and wet areas will be controlled by limiting access, working upslope where practical, and wearing foot wear or protective boots that have gripper soles.

6.5 Cleaning Procedures

Depending on the specific job task, cleaning may include individual personnel and/or heavy equipment. Cleaning procedures will depend on the level of dust and/or soil particles, if any.

The specified level of protection for the two tasks (Level D) does not itself define the extent of personal protection or equipment decontamination. Heavy equipment normally will require cleaning of excess soil particles between well locations. The following sections summarize general cleaning protocols.

6.5.1 Heavy Equipment

Heavy equipment will be cleaned between work areas, at the end of the day, and before leaving the site. Operators or other designated personnel will remove loose soil and pressure or steam wash the equipment after use, preferably at or near each individual work site. The wheel wells, tires, sides of vehicles, etc. may be pressure washed or brushed clean of debris. Containment systems for collection of decontamination fluids and materials are not necessary based on the anticipated low levels of contamination.

6.5.2 Cleaning Wastes

Spent cleaning water will be contained in a 55 gallon steel drum until the results of the soil and water sample analyses are received. The containerized cleaning fluids will be spread on-site if no contaminants are detected in the samples collected. The containerized cleaning water will be retained for disposal at a later date if compounds of concern are detected in the samples.

Hexane may be used to decontaminate soil sampling equipment if gross, oily contamination is encountered. The quantity used is anticipated to be small. If used, the hexane will be allowed to evaporate.

6.5.3 Personnel and PPE

Protective gloves will be disposed and replaced between areas of activity and whenever the gloves become soiled. Soil adhering to footwear will be manually removed at each work location using a brush or suitable implement.

6.6 Procedures for Waste Handling of Anticipated Cleaning Wastes

6.6.1 Waste Generation

Anticipated: Yes __X__ No _____

Types: Liquid __X__ Solid __X__ Sludge _____ Gas _____

Quantity: The expected volume of solids (soil and plastic) is less than one cubic yard at each drilling location. The expected volume of liquid is less than 5 gallons at each drilling location.

Characteristics:

Corrosive ___ Ignitable ___ Radioactive ___ Volatile ___
Toxic ___ Reactive ___ Unknown ___ Carcinogenic __X__
Other (specify): ____non-toxic/inert_____

Known Non-Hazardous: Yes __X__ No ____

Known Hazardous Waste or Extremely Hazardous waste: Yes ____ No __X__

Potentially Hazardous Waste or Extremely Hazardous Waste: Yes ___ No __X__

Waste Requires Analysis: Yes ____ No __X__

Specify Type: Cleaning wastes, if any, will be combined with soil and solid wastes for disposal as described in Section 6.6.3.

6.6.2 Storage Methods Proposed

Soil cuttings and well development water will be temporarily stored in 55 gallon drums and stored on-site until the results of the soil and ground water sample analyses are received. The containerized soil and ground water will be spread on-site if no contaminants are detected above NYSDEC soil cleanup objectives or ground water quality standards in the samples. The containerized soil and/or ground water will be retained for disposal at a later date if compounds of concern are detected above NYSDEC soil cleanup objectives or ground water quality standards. The drums will be labeled with the following information.

(1) The composition of the waste (e.g. soil, plastic, etc.)
(2) The nature of the waste (e.g., drill cuttings, cleaning fluid).
(3) The name of owner (Tee Bird)
(4) The date of accumulation; and,

(5) A phone contact for questions (the Alpha Geoscience office)

6.6.3 Disposal

Tee Bird will be responsible for the collection, transportation, and disposal of all wastes generated during the remedial investigation, as necessary. Alpha will coordinate disposal, as an agent for Tee Bird.

6.7 Site Inspections

It is anticipated that the scope of work associated with this HASP will be conducted within four days. Weekly site inspections will be conducted and documented by the SSO or Field Manager, if the work period exceeds four days.

7.0 EMERGENCY RESPONSE PROCEDURES

The Emergency Response Plan will be prepared to address the site specific nature of hazards and potential emergencies. Emergency procedures will be implemented as appropriate.

7.1 Emergency Response Planning

Step 1: Distribute site map which includes site layout, and evacuation route. Review this information during initial Tailgate Safety training and periodically.

Step 2: Distribute Emergency Response Contact List and directions and map to the nearest hospital**.** Ensure that emergency communication equipment is available.

Step 3: Notify site representatives of your presence.

Step 4: Provide emergency equipment for initial first aid, fire protection, and personal protection. Designate a vehicle for emergency transport.

Step 5: Ensure that personnel who are certified in first aid and CPR are available to respond to injuries in an emergency.

Step 6: Conduct training for site personnel in emergency response during initial orientation. Establish alarm and methods of notification and communication during an emergency.

7.2 Lines of Authority and Personnel Responsibilities

During an emergency, the Field Personnel shall have the authority to commit the necessary resources for responding to the emergency and shall assume the following responsibilities:

Step 1: Determine the extent of the incident and direct the initial response. At a minimum, the Alpha Geoscience Project Manager and the Alpha Geoscience Health and Safety Officer must be notified as soon as possible. Additional notifications and assistance from outside agencies may be made based on the extent of the incident. Make the additional required notifications.

Step 2: Direct the OSSR to conduct perimeter air monitoring, and monitor wind speed and wind direction to determine the extent of impacted areas.

Step 3: Alert personnel of the emergency using an air horn or other suitable means of communication. Initiate evacuation procedures, if necessary.

Step 4: Prepare the Accident/Injury Report and send it to Alpha's Corporate Health and Safety Officer.

7.3 Evacuation Procedures

If evacuation is required, the Field Personnel shall:

Step 1: Activate the communication system to alert site workers of evacuation. Personnel shall be advised to remain upwind of contaminants, if possible, and to proceed to the local assembly area that is designated by the OSSR at each work location.

Step 2: Account for all personnel at the assembly area.

Step 3: Notify site representative of the need to initiate evacuation procedures for other site personnel.

Step 4: Notify the Fire and Police Departments and request their assistance for evacuating the surrounding area and residences.

7.4 Emergency Medical Treatment

Refer to the Hospital Route directions and map (Attachment 1). If an injury/medical emergency occurs, the following procedures shall be used:

Step 1: Notify the Field Manager immediately.

Step 2: The Field Manager shall ensure that medical treatment is provided for the injured person immediately. The Field Manager shall summon first aid responders and notify the hospital and the local Emergency Medical Service (EMS) if necessary.

Step 3: If the injured/ill person is within the exclusion zone, steps should be taken to decontaminate him/her and remove the PPE if it can be done without worsening the injury.

Step 4: First aid responders shall use universal precautions for infection control when providing first aid.

Step 5: Prepare an Accident/Injury Report and deliver it to Alpha's Corporate Health and Safety Officer within 24 hours.

7.5 Spill Control

If a spill of hazardous material occurs, the following steps shall be taken to mitigate the incident:

Step 1: Notify the Field Manager, and he/she shall assess the extent of the spill to determine if it can be safely mitigated with the personnel and protective equipment available at the site.

Step 2: If the release is beyond the field team's mitigation capabilities, the Field Manager shall evacuate the site personnel to a safe location upwind of the release and notify the Project Manager and Fire Department and Emergency Response.

Step 3: The Project Manager shall notify Tee Bird, the Corporate Health and Safety Officer, and regulatory agency(s), if necessary.

Step 4: If the spill can be safely mitigated using defensive actions, first don the appropriate PPE. Initially, Level C PPE should be worn unless air monitoring indicates a downgrade in PPE is acceptable.

Step 5: Takes steps to secure the area and to prevent unauthorized persons from entering the area.

Step 6: Takes steps to contain the spill and to prevent it from reaching sewers, storm ditches, etc.

Step 7: Clean up the spill with absorbent and/or neutralizers, and remove affected soil as appropriate. Place waste in sealed, labeled containers for disposal.

7.6 Emergency and Medical Resources

Job related injuries must be immediately reported to the OSSR or the Corporate HSO. An accident/injury/illness report will be completely and properly filled out and submitted to the project

HSO and Corporate HSO, in accordance with applicable reporting procedures.

Any personnel requiring emergency medical attention will be evacuated from the work zone if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened.

7.7 Fire Contingency Measures

The likelihood of fire for the work at the well locations is very low. Alpha personnel and subcontractors are not trained professional fire fighters. Whether or not a fire can be quickly contained and extinguished, personnel will notify the OSSR, Corporate HSO, Tee Bird, and others in the area and vacate the structure or area. Anyone who sees a fire shall immediately notify emergency personnel.

Personnel who use fire extinguishers shall be trained in their use.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- All combustible materials shall be stored away from energized equipment, fuel-powered equipment and flammable materials.
- Fire extinguishers will be placed in areas where a fire hazard may exist.
- When a fire cannot be controlled with the fire extinguisher, the exclusion zone will be evacuated.
- Before workers begin operations in an area, the OSSR will give instruction on egress procedures and assembly points.

Response: The following procedures will be used in the event of a fire:

- Anyone who sees a fire will summon help then notify the OSSR.
- When the emergency alarm sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest muster location.
- Field team members shall attempt to utilize the buddy system immediately after being alerted of the fire and remain together throughout the emergency. Workers will assemble at a predetermined muster point for a head count.
- When a worker has extinguished a small fire, the OSSR, Corporate HSO, and Tee Bird will be notified.

8.0 RECORDKEEPING

The Project Manager and Corporate Health and Safety Officer will assure that field documentation is properly completed in a timely manner. Copies of forms to be used during field work are included in Attachment 4. All HASP documentation, including tailgate safety meeting forms and OSSR/Field Manager Jobsite Safety Checklists, are to be forwarded to the Project Manager or the Corporate Health

and Safety Officer for review on a regular basis. Health and safety forms and documentation will be retained in the project file after the review process.

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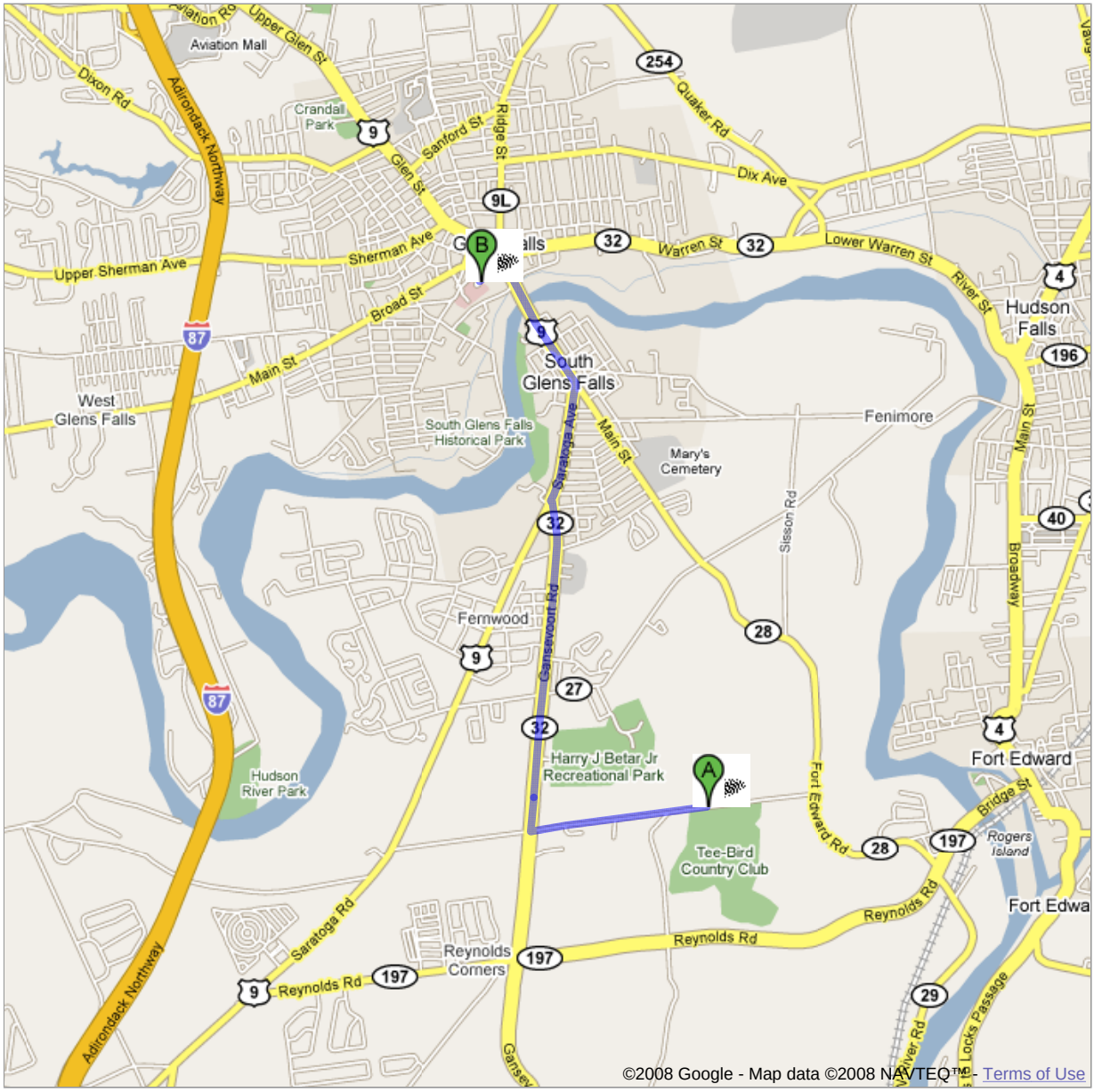
ATTACHMENT 1

Hospital Route Map

Start **Reservoir Rd**
End **Glens Falls Hospital**
100 Park St, Glens Falls, NY 12801
Travel **4.5 mi – about 11 mins**

Directions from Tee Bird Country Club to Glens Falls Hospital



Reservoir Rd

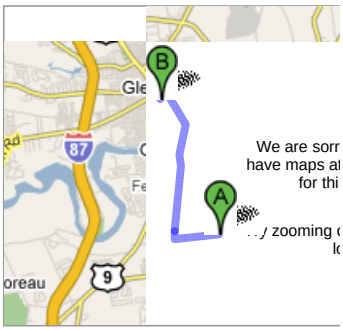
Drive: 4.5 mi – about 11 mins

1.	Head **west** on **Reservoir Rd** toward **Burt Rd**	1.0 mi 3 mins
2.	Turn **right** at **Gansevoort Rd/RT-32** Continue to follow RT-32	2.5 mi 5 mins
3.	Turn **left** at **RT-32/US-9**	0.8 mi 3 mins
4.	Turn **left** at **Park St**	0.2 mi 1 min

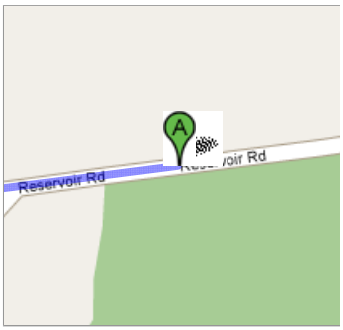
Glens Falls Hospital
100 Park St, Glens Falls, NY 12801

These directions are for planning purposes only. You may find that construction projects, traffic, or other events may cause road conditions to differ from the map results.

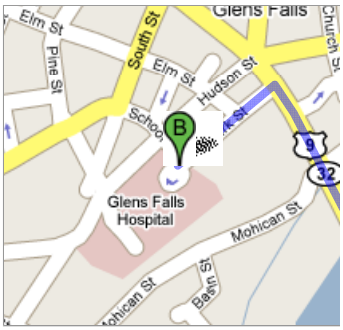
Overview



Start



End



ATTACHMENT 2

Material Safety Data Sheets

Polychlorinated Biphenyls
Hydrochloric Acid
Nitric Acid
Hexane
Isobutylene
Liquinox

MONSANTO CO -- ASKAREL CAT#:M-508A-1 & M-508A-2,(PCBS),AROCLOR SERIES(SUPP) -- 5910-00-197-4068

========== Product Identification ==========

Product ID:ASKAREL CAT#:M-508A-1 & M-508A-2,(PCBS),AROCLOR SERIES(SUPP)
MSDS Date:09/01/1993
FSC:5910
NIIN:00-197-4068
MSDS Number: BWMPP
=== Responsible Party ===
Company Name:MONSANTO CO
Address:800 N LINDBERGH BLVD
City:ST LOUIS
State:MO
ZIP:63167
Country:US
Info Phone Num:314-694-6661
Emergency Phone Num:314-694-6661, CHEMTREC 800-424-9300
CAGE:76541
=== Contractor Identification ===
Company Name:ACCUSTANDARD INC
Address:125 MARKET ST
Box:City:NEW HAVEN
State:CT
ZIP:06513
Country:US
Phone:800-442-5290
CAGE:0U4A8
Company Name:MONSANTO COMPANY
Address:800 N LINDBERGH BLVD
Box:City:SAINT LOUIS
State:MO
ZIP:63167
Country:US
Phone:314-694-6661 OR 800-332-3111
CAGE:76541

========== Composition/Information on Ingredients ==========

Ingred Name:POLYCHLORINATED BIPHENYLS (PCBS) (SARA III)
CAS:1336-36-3
RTECS #:TQ1350000
Other REC Limits:NONE RECOMMENDED
ACGIH TLV:1 MG/M3; 9394
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:CHLORODIPHENYL;42% CHLORINE (AROCHLOR 1242) (SARA III)
CAS:53469-21-9
RTECS #:TQ1356000
Other REC Limits:NONE RECOMMENDED
OSHA PEL:S, 1 MG/M3
ACGIH TLV:S, 1MG/M3; 9394
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:AROCLOR 1248 (SARA III)
CAS:12672-29-6
RTECS #:TQ1358000
Other REC Limits:NONE RECOMMENDED
EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

Ingred Name:CHLORODIPHENYL;54% CHLORINE (AROCHLOR 1254) (SARA III)
CAS:11097-69-1
RTECS #:TQ1360000
Other REC Limits:NONE RECOMMENDED
OSHA PEL:S, 0.5 MG/M3
ACGIH TLV:S, 0.5MG/M3; 9394
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:AROCLOR 1260 (SARA III)
CAS:11096-82-5
RTECS #:TQ1362000
Other REC Limits:NONE RECOMMENDED
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:AROCLOR 1221, 1232 (SARA III)
CAS:1336-36-3
RTECS #:TQ1350000
Other REC Limits:NONE RECOMMENDED
ACGIH TLV:1 MG/M3; 9394
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:AROCLOR 1016   (SARA III)
CAS:12674-11-2
RTECS #:TQ1351000
Other REC Limits:NONE RECOMMENDED
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:OTHERS
Other REC Limits:NONE RECOMMENDED

========== Hazards Identification ==========

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:REPEAT/PROLONG CONTACT MAY CAUSE
    CHLORACNE IN SOME PEOPLE.SKIN:ABSROBED THRU INTACT SKIN.LOC ACTION
    SIMILAR TO COMMON ORG SOLVENTS-REMOVES NATURAL FATS/OILS RESULTING
    IN DRYING/CRACKING.EYE:MODERATELY IRRIT.INGEST:SLIGHTLY
    TOXIC.INHAL:ANIMAL EXPERIMENTS SHOWED 54% CHLORINATED MATL PRODUCES
    MORE LIVER INJURY THAN 42%.
Explanation of Carcinogenicity:PER MSDS:PCBS HAVE BEEN LISTED IN IARC
    GROUP 2B & IN NTP.
Effects of Overexposure:CHLORACNE. DRYING & CRACKING SKIN. MODERATELY
    EYE IRRITANT. SLIGHTLY TOXIC BY INGEST. LIVER INJURY.
Medical Cond Aggravated by Exposure:A POTENTIAL EXISTS FOR CONTRACTING
    OF CHLORACNE IN SOME PEOPLE.

========== First Aid Measures ==========

First Aid:INGEST:CONSULT PHYSICIAN.DO NOT INDUCE VOMIT OR GIVE ANY OILY
    LAXATIVES.SKIN:IF LIQ/SOLID PCBS SPLASHED/SPILLED ON SKIN REMOVE
    CONTAMIN CLOTH.WASH SKIN THOROUGHLY W/SOAP/WATER.EYES:IRRIGATE
    IMMED W/CO PIOUS QUANT OF RUNNING WTER FOR @LEAST
    15MINS.PETROLATUM-BASED OPHTHALMIC OINTMENT MAY BE APPLIED TO
    RELIEVE IRRIT EFFECTS.INHAL:REMOVE TO FRESH AIR.IF RASH/RESP IRRIT
    PERSIST CALL PHYSICIAN.(SUPPLEM)

========== Fire Fighting Measures ==========

Flash Point:FIRE-RESISTANT
Extinguishing Media:PCBS ARE FIRE-RESISTANT COMPOUNDS.
Fire Fighting Procedures:STD FIREFIGHTING WEARING APPAREL & SCBA SHOULD BE WORN WHEN FIGHTING FIRES THAT INVOLVE POSSIBLE EXPO TO CHEM COMBUST PROD.CLEAN WELL/DECONTAMIN EQMPT AFT USE.
Unusual Fire/Explosion Hazard:IF PCB TRANSFORMER INVOLVED IN FIRE-RLATED INCIDENT OWENR OF TRANSFORMER MAY BE REQUIRED TO REPORT INCIDENT.CONSULT/FOLLOW FED/STATE/LOC REGS.

========== Accidental Release Measures ==========

Spill Release Procedures:REMOVE NON-ESSENTIAL PERSONNEL.ADEQUATELY VENTILATED.CONTAIN SPILL/LEAK.PREVENT MATL ENTERING SEWER SYS/NAVIGABLE WATERWAYS/STREAMS.REMOVE BY MEANS OF ABSORPTIVE MATL(SAWDUST,VERMICULITE,DRYSAND,CLAY, DIRT,ETC)OR TRAP/REMOVE BY PUMPING.USE PPE.

========== Handling and Storage ==========

Handling and Storage Precautions:NONE SPECIFIED BY MFG.
Other Precautions:FED REGS UNDER TSCA REQUIRE PCBS AND PCB ITEMS TO BE MARKED.(CHECK REGS FOR DETAILS).AVOID BREATH VAP/MIST.PCB IN ELECT EQPMT REPORTED TO PROD PCDD & PCDF DURING FIRE SITUATIONS-FROM NON PCB CMPD-SEE EQMPT MFG.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:USE NIOSH/MSHA APPROVE EQPMT WHEN AIRBORNE EXPO LIMITS EXCEEDED.FULL FACEPIECE EQMPT RECOMMENDED-CAN REPLACE FACESHIELD &/OR CHEM SPLASH GOGG.CONSULT RESP MFG FOR TYP/CONDITIONS.OBSERVED RESP USE LIMI TATIONS.SCBA/SUP AIR RESP.29CFR1910.134.
Ventilation:PROVIDE VENTI TO CONTROL EXPO LEVELS BELOW AIRBORNE EXO LIMITS.USE LOC MECHANICAL EXHAU VENTI @SOURCES OF AIR CONTAMIN.
Protective Gloves:APPROP GLOVES(VITON)SEE MFG FOR TYP/OPER
Eye Protection:CHEM SPLASH GOGGLES & FACE SHIELD
Other Protective Equipment:EYEBATHS/SAFT SHOWER.PROT CLOTHING FOR BARRIER.PROT APRON.
Work Hygienic Practices:LAUNDER CONTAMIN CLOTH BEF REUSE.CLEAN PROT EQPMT BEF REUSE.WASH THOROUGHLY AFT HANDLING.AVOID BREATH VAP/MIST,CONTACT.
Supplemental Safety and Health
1016;1221;1232;1242;1248;1254;1260.FLPT:170C 1016;141 150C 1221;152-154C 1232;176-180C 1242;193-196C 1248;NONE 1254/1260.1STAID:DR:LG AMTS INGEST GASTRIC LAVAGE SUGGESTED.HOT PCBS MAY CAUSE THERMAL BU RNS.IF ELECTR EQMPT ARCS OVER PCBS/OTHER CHLORINATED HYDROCARBON DIELECTRIC FLUIDS MAY DECOMPOSE TO PRODUCE HCL-RESP IRR

========== Physical/Chemical Properties ==========

HCC:T6
Vapor Pres:VARIES
Spec Gravity:1.18-1.56 VAR
Viscosity:VARIES
Appearance and Odor:MOBILE OIL/VIS LIQ/STICKY RESIN;APHA COLOR 40/100/150;DEPENDS ON AROCLOR SELECT

========== Stability and Reactivity Data ==========

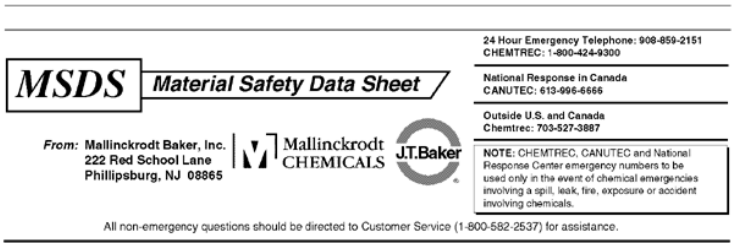
Stability Indicator/Materials to Avoid:YES

NONE SPECIFIED BY MFG.
Stability Condition to Avoid:NONE SPECIFIED BY MFG.
Hazardous Decomposition Products:CO,CO2,HCL,PHENOLICS,ALDEHYDES & OTHER
TOXIC COMBUST PRODS UNDER SEVERE CONDITIONS(EXPO TO FLAME/HOT
SURFACE).

========== Disposal Considerations ==========

Waste Disposal Methods:ALL WASTES/RESIDUES CONTAINING
PCBS:COLLECT,PLACE IN PROPER CNTNR,MARK,DISPOSE IN MANNER
PRESCRIBED BY EPA REGS(40CFR761)& APPLICABLE STATE/LOC REGS.VAR
FED/STATE/LOC REGS REQUIRE REPORTING PCB SPILLS & CLEANUP
LEVELS.CONSULT ATTORN/OFFICAILS.

MSDS Number: **H3886** * * * * * *Effective Date:* ***02/16/06*** * * * * * *Supercedes:* ***05/07/03***



HYDROCHLORIC ACID (10%-33%)

1. Product Identification

Synonyms: This MSDS applies to the concentrated standard used to make laboratory solutions and any solution that contains more than 10% but less than 33% Hydrochloric acid. For diluted product, see MSDS for Hydrochloric Acid (less than 10%).
CAS No.: 7647-01-0
Molecular Weight: 36.46
Chemical Formula: HCl in H2O
Product Codes:
J.T. Baker: 0323, 0327, 0365, 4654, 4657, 5618, 5619
Mallinckrodt: 2608, 2625, H151, H168, V035

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Hydrogen Chloride	7647-01-0	10 - 33%	Yes
Water	7732-18-5	67 - 90%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:
Corrosive! Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure, and death.
Ingestion:
Corrosive! Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea, and in severe cases, death.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and discolor skin.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth. Long term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye disease may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. May react with metals or heat to release flammable hydrogen gas.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Water or water spray. Neutralize with soda ash or slaked lime.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving hydrochloric acid. Stay away from ends of tanks. Cool tanks with water spray until well after fire is out.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Hydrochloric acid:
- OSHA Permissible Exposure Limit (PEL):
5 ppm (Ceiling)
- ACGIH Threshold Limit Value (TLV):
2 ppm (Ceiling), A4 Not classifiable as a human carcinogen

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Pungent odor.
Solubility:
Infinitely soluble.
Density:

1.05 @ 15C (59F)
pH:
For HCL solutions: 0.1 (1.0 N), 1.1 (0.1 N), 2.02 (0.01 N)
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
101 - 103C (214 - 217F)
Melting Point:
No information found.
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A strong mineral acid, concentrated hydrochloric acid is highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.
Conditions to Avoid:
Heat, direct sunlight.

11. Toxicological Information

Hydrochloric acid: Inhalation rat LC50: 3124 ppm/1H; Oral rabbit LD50: 900 mg/kg. Investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Hydrogen Chloride (7647-01-0)	No	No	3
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.
Environmental Toxicity:
This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 200L

International (Water, I.M.O.)

Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 200L

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\--------------------------------
Ingredient                                    TSCA  EC   Japan  Australia
----------------------------------------------  ----  ---  -----  ---------
Hydrogen Chloride (7647-01-0)                  Yes  Yes   Yes      Yes
Water (7732-18-5)                              Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\--------------------------------
                                                      --Canada--
Ingredient                                    Korea  DSL   NDSL  Phil.
----------------------------------------------  -----  ---   ----  -----
Hydrogen Chloride (7647-01-0)                  Yes   Yes   No     Yes
Water (7732-18-5)                              Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                          -SARA 302-    ------SARA 313------
Ingredient                                RQ    TPQ     List  Chemical Catg.
----------------------------------------  ---   -----   ----  --------------
Hydrogen Chloride (7647-01-0)             5000  500*    Yes        No
Water (7732-18-5)                         No    No      No         No

--------\Federal, State & International Regulations - Part 2\----------------
                                                 -RCRA-    -TSCA-
Ingredient                                CERCLA     261.33     8(d)
----------------------------------------  ------     ------    ------
Hydrogen Chloride (7647-01-0)             5000       No         No
Water (7732-18-5)                         No         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  Yes
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Mixture / Liquid)
```

Australian Hazchem Code: 2R
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Avoid breathing vapor or mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****
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****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet

Nitric acid, 20-70%

ACC# 16550

Section 1 - Chemical Product and Company Identification

MSDS Name: Nitric acid, 20-70%
Catalog Numbers: AC124660000, AC124660010, AC124660011, AC124660025, AC124660026, AC124665000, AC124665001, AC133620000, AC133620010, AC133620011, AC133620025, AC133620026, AC424000000, AC424000025, AC424000026, AC424000250, AC424005000, AC424005001, AC613205000, A198C-212, A198C4X-212, A200-212, A200-500, A200-500LC, A200-612GAL, A200212LC, A200C-212, A200C212EA, A200C212LC, A200C4X-212, A200C4X212L, A200S-212, A200S-500, A200S212LC, A200SI-212, A206C-212, A206C4X-212, A467-1, A467-2, A467-250, A467-500, A483-212, A509-212, A509-212LC, A509-500, A509SK-212, A509SK-212LC, MCC-030822, NC9596579, S719721, S71972SC
Synonyms: Azotic acid; Engraver's acid; Aqua fortis.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7732-18-5	Water	30-80	231-791-2
7697-37-2	Nitric acid	20-70	231-714-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear to yellow liquid.
Danger! May be fatal if inhaled. Causes severe eye and skin burns. Causes severe respiratory and digestive tract burns. Strong oxidizer. Contact with other material may cause a fire. Acute pulmonary edema or chronic obstructive lung disease may occur from inhalation of the vapors of nitric acid. Corrosive to metal.
Target Organs: Lungs, eyes, skin, mucous membranes.

Potential Health Effects

Eye: Causes severe eye burns. Direct contact with liquid may cause blindness or permanent eye damage.
Skin: Causes skin burns. May cause deep, penetrating ulcers of the skin. Concentrated nitric acid dyes human skin yellow on contact.
Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the digestive tract. May cause systemic effects.
Inhalation: Effects may be delayed. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Aspiration may lead to pulmonary edema. May cause systemic effects. May cause acute

pulmonary edema, asphyxia, chemical pneumonitis, and upper airway obstruction caused by edema. Depending on the conditions, the vapor or fumes of nitric acid may actually be a mixture of nitric acid and various oxides of nitrogen. The composition may vary with temperature, humidity, and contact with other organic materials.
Chronic: Exposure to high concentrations of nitric acid vapor may cause pneuomonitis and pulmonary edema which may be fatal. Symptoms may or may not be delayed. Continued exposure to the vapor & mist of nitric acid may result in a chronic bronchitis, & more severe exposure results in a chemical pneumonitis. The vapor & mists of nitric acid may erode the teeth, particularly affecting the canines & incisors.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with other material may cause fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. May react with metal surfaces to form flammable and explosive hydrogen gas. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 4; Flammability: 0; Instability: 0; Special Hazard: OX

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Provide ventilation. Evacuate unnecessary personnel. Approach spill from upwind. Use water spray to cool and disperse vapors and protect personnel.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not breathe dust, mist, or vapor. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Avoid contact with clothing and other combustible materials. Discard contaminated shoes. Do not use with metal spatula or other metal items. Use only with adequate ventilation or respiratory protection.
Storage: Do not store near combustible materials. Do not store in direct sunlight. Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Store away from alkalies. Separate from organic materials. Inspect periodically for damage or evidence of leaks or corrosion.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use a corrosion-resistant ventilation system.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Water	none listed	none listed	none listed
Nitric acid	2 ppm TWA; 4 ppm STEL	2 ppm TWA; 5 mg/m3 TWA 25 ppm IDLH	2 ppm TWA; 5 mg/m3 TWA

OSHA Vacated PELs: Water: No OSHA Vacated PELs are listed for this chemical. Nitric acid: 2 ppm TWA; 5 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles and face shield.
Skin: Wear butyl rubber gloves, apron, and/or clothing.
Clothing: Wear appropriate clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear to yellow
Odor: strong odor - acrid odor - suffocating odor
pH: 1.0 (0.1M soln)
Vapor Pressure: 51 mm Hg @ 25 deg C
Vapor Density: 2.17 (air=1)
Evaporation Rate: Not available.
Viscosity: 0.761 cps @ 25 deg C
Boiling Point: 86 deg C
Freezing/Melting Point:-42 deg C
Decomposition Temperature: Not available.
Solubility: Soluble in water.
Specific Gravity/Density:1.4
Molecular Formula:HNO3
Molecular Weight:63.01

Section 10 - Stability and Reactivity

Chemical Stability: Stable. Decomposes when in contact with air, light, or organic matter. The yellow color is due to release of nitrogen dioxide on exposure to light.
Conditions to Avoid: High temperatures, light, confined spaces.
Incompatibilities with Other Materials: Metals, reducing agents, strong bases, acetic acid, alcohols, acetone, aniline, hydrogen sulfide, metal powders, carbides, aldehydes, organic solvents, combustible materials, chromic acid, flammable liquids, cyanides, sulfides, Incompatible with many substances.
Hazardous Decomposition Products: Nitrogen oxides.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7732-18-5: ZC0110000
CAS# 7697-37-2: QU5775000; QU5900000
LD50/LC50:
CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;
.

CAS# 7697-37-2:
Inhalation, rat: LC50 = 260 mg/m3/30M;
Inhalation, rat: LC50 = 130 mg/m3/4H;
Inhalation, rat: LC50 = 67 ppm(NO2)/4H;
.

Carcinogenicity:
CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 7697-37-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: Terrestial: During transport through the soil, nitric acid will dissolve some of the soil material, in particular, the carbonate based materials. The acid will be neutralized to some degree with adsorption of the proton also occurring on clay materials. However, significant amounts of acid are expected to remain for transport down toward the ground water table. Upon reaching the ground water table, the acid will continue to move, now in the direction of the ground water flow.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NITRIC ACID	NITRIC ACID
Hazard Class:	8	8
UN Number:	UN2031	UN2031
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7732-18-5 is listed on the TSCA inventory.
CAS# 7697-37-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 7697-37-2: 1000 lb final RQ; 454 kg final RQ
SARA Section 302 Extremely Hazardous Substances
CAS# 7697-37-2: 1000 lb TPQ
SARA Codes
CAS # 7697-37-2: immediate, delayed, fire.
Section 313
This material contains Nitric acid (CAS# 7697-37-2, 20-70%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 7697-37-2 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
CAS# 7697-37-2 is considered highly hazardous by OSHA.
STATE
CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
CAS# 7697-37-2 can be found on the following state right to know lists: California, New Jersey,

Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C

Risk Phrases:

R 35 Causes severe burns.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36 Wear suitable protective clothing.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger / Protection)

CAS# 7732-18-5: No information available.
CAS# 7697-37-2: 1

Canada - DSL / NDSL

CAS# 7732-18-5 is listed on Canada's DSL List.
CAS# 7697-37-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of E, C, D1A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

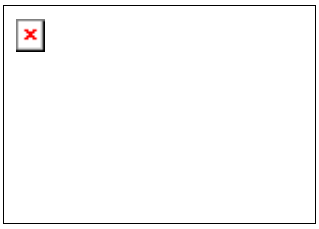
CAS# 7697-37-2 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/30/1998
Revision #16 Date: 2/11/2008

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET



Date-Issued: 07/08/2000
MSDS Ref. No: 210100
Date-Revised: 02/21/2001
Revision No: 2

Hexane

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Hexane
PRODUCT DESCRIPTION: Hexane
PRODUCT CODE: 210100
PRODUCT FORMULATION NAME: Hexane
CHEMICAL FAMILY: Aliphatic Petroleum Hydrocarbon
GENERIC NAME: n-Hexane

MANUFACTURER

Americhem Sales Corporation
340 North Street
Mason, MI 48854
Contact: Americhem Sales Corporation
Product Stewardship: 517-676-9363
Transportation: 517-676-9363

24 HR. EMERGENCY TELEPHONE NUMBERS

CHEMTREC (U.S.): (800) 424-9300
Canutec (613) 996-6666
Emergency Phone: 800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Wt.%	CAS#	EINECS#
Hexane	100	110-54-3	203-777-6

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear, Colorless liquid.

IMMEDIATE CONCERNS: CAUTION! May cause eye and skin irritation.

POTENTIAL HEALTH EFFECTS

EYES: Moderate Irritation and Discomfort.

SKIN: Moderate irritation and discomfort. Defatting of skin and redness are possible. Toxic systemic effects from absorbtion are expected to be minor.

INGESTION: Gastrointestinal tract irritation and/or discomfort is possible.

INHALATION: Vapors may be mildly irritating to lungs. Overexposure may result in dizziness, headache, excitation, central nervous system depression.

CHRONIC:

Chronic high level n-Hexane exposure damages the nervous system initially producing a lack of feeling in the extremities and possibly progressing to a more severe nerve damage.

Inhalation of high levels (1000 and 5000 ppm) of n-Hexane has produced testicular damage in rats. Mice exposed to the same dose levels showed no testicular effects.

ROUTES OF ENTRY: Absorption, Inhalation

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4. FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water for 15 minutes. If irritation persists, seek medical attention.

SKIN: Wash exposed area with mild soap and water. Get medical attention if irritation develops or persists.

INGESTION: Do not induce vomiting. Danger from aspirating into lungs exceeds short term toxic effects. Get immediate medical help.

INHALATION: Remove victim from area of exposure. If unconscious, give oxygen. Give artificial respiration if not breathing. Get immediate medical attention.

NOTES TO PHYSICIAN: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

---

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: (-15°F)ASTM D56

FLAMMABLE LIMITS: 1.2 to 7.7

AUTOIGNITION TEMPERATURE: Not Available

EXTINGUISHING MEDIA: Use dry chemical, foam, or carbon dioxide.

EXPLOSION HAZARDS: Carbon oxides formed when burned. Highly flammable vapors

which are heavier than air may accumulate in low areas and/or spread along ground away from handling site. Flash back along vapor trail is possible.

FIRE FIGHTING PROCEDURES: Proper respiratory equipment to protect against the hazardous effects of combustion products is recommended. Water in a straight hose stream may cause fire to spread and should be used as a cooling medium only.

---

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL:

Extinguish possible sources of ignition. Evacuate all unprotected personnel and ventilate area. Only personnel equipped with proper respiratory, skin/eye protection should enter spill area. Dike area to contain spill and clean up by absorbing on an inert absorbant or other means. Don't flush into sewers or natural waterways.

LARGE SPILL:

Contain material as described above and call the local fire or police department for immediate emergency assistance.

---

7. HANDLING AND STORAGE

HANDLING:

Do not get in eyes, on skin or on clothing. Do not breathe vapors, mist, fume or dust. Do not swallow, may be aspirated into lungs. Wear protective equipment and/or garments if exposure conditions warrant. Wash thoroughly after handling. Launder contaminated clothing before reuse. Use only with adequate ventilation.

STORAGE:

Store unopened containers under cool, dry and ventilated conditions. Keep away from heat, sparks and flame.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

	EXPOSURE LIMITS					
	OSHA PEL		ACGIH TLV		Supplier OEL	
	ppm	mg/m^3	ppm	mg/m^3	ppm	mg/m^3

Hexane	**TWA**	50[1]	180	50	176	NL	NL
	STEL	NL	NL	NL	NL	NL	NL

OSHA TABLE COMMENTS:

1. NL = Not Listed

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Wear safety glasses with side shields or goggles when handling this material.

SKIN: To prevent any contact, wear impervious protective clothing such as neoprene or butyl rubber gloves, apron, boots or whole bodysuit, as appropriate.

RESPIRATORY: Use NIOSH/MSHA approved respirators when vapors or mist concentrations exceed permissible exposure limits.

PROTECTIVE CLOTHING: Chemical resistant boots, apron, etc. as necessary to prevent contamination of clothing and skin contact.

WORK HYGIENIC PRACTICES: Good personal hygiene practices should always be followed.

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9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid

ODOR: Mild Hydrocarbon Odor

APPEARANCE: Waxy flakes

COLOR: Colorless

pH: Not Available

PERCENT VOLATILE: 100

VAPOR PRESSURE: 5.5 psi at (100°F)

VAPOR DENSITY: ~3 (Air=1)

BOILING POINT: (151°F) to (157°F)

SOLUBILITY IN WATER: Negligible

EVAPORATION RATE: 8.1 (n-Butyl Acetate=1)

SPECIFIC GRAVITY: 0.675 (water=1) at (60°F)

10. STABILITY AND REACTIVITY

STABLE: YES

HAZARDOUS POLYMERIZATION: NO

CONDITIONS TO AVOID: Exposure to excessive heat, open flames and sparks. Avoid conditions that favor the formation of excessive mists and/or fumes.

STABILITY: Stable

POLYMERIZATION: Will not occur

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of Carbon when burned.

INCOMPATIBLE MATERIALS: Strong oxidizing agents.

11. TOXICOLOGICAL INFORMATION

12. ECOLOGICAL INFORMATION

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of waste at an appropriate waste disposal facility according to current applicable laws and regulations.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: Hexanes

PRIMARY HAZARD CLASS/DIVISION: 3

UN/NA NUMBER: 1208

PACKING GROUP: II

REPORTABLE QUANTITY (RQ) UNDER CERCLA: 5000#

LABEL: Flammable Liquid

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES:

FIRE: YES **PRESSURE GENERATING:** NO **ACUTE:** YES **CHRONIC:** YES

313 REPORTABLE INGREDIENTS: n-Hexane (110-54-3) - 45 - 70% by wt.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA REGULATORY: Sec. 103 - Yes; RQ = 5000 lbs.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA REGULATORY: This material or its components are listed in the TSCA inventory.

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16. OTHER INFORMATION

REVISION SUMMARY

Revision #: 2

This MSDS replaces the January 08, 2001 MSDS. Any changes in information are as follows:
In Section 1
Prepared By

NFPA CODES

HEALTH: 1 **FIRE:** 3 **REACTIVITY:** 0

HMIS CODES

HEALTH: 1 **FIRE:** 3 **REACTIVITY:** 0 **PROTECTION:** C

MANUFACTURER DISCLAIMER: The information in this MSDS was obtained from sources which we believe are reliable. However, the above information is provided without warranty, expressed or implied, regarding its correctness. The conditions or methods if handling, storage, use and disposal of the

product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibilty and expressly dislcaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the procuct.

ADDITIONAL MSDS INFORMATION: Danger! Extremely flammable. Treat as an osha class IB flammable liquid. This substance has not been identified as a carcinogen by NTP, IARC, or OSHA. Collateral exposure to Alcohol, Acetone, Methyl ethyl ketone and Chloroform may potentiate or enhance the toxic effects of hexane. Reproductive effects have been reported in animal studies. An overexposure to vapors from this product may cause headaches, dizziness, nausea and loss of consciousness. Chronic exposure to liquid and/or vapors may adversely affect kidneys, liver, and respiratory system or aggravate preexisting conditions. Avoid breathing vapors and liquid contact with eyes and/or skin.

PID ANALYZERS

hnu

Instrumentation for Environmental, Process & Industrial Hygiene Monitoring

Isobutylene in Air MSDS

Home

MATERIAL SAFETY DATA SHEET - CALIBRATION CHECK GAS/ISOBUTYLENE IN AIR

PRODUCT NAME: 100 PPM ISOBUTYLENE/AIR (100 PPM ISOBUTYLENE/AIR) MSDS
Version:4 Date: January, 2004

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1. Chemical Product and Company Identification **PID ANALYZERS, LLC** 25 Walpole Park Drive South Walpole, MA 02081 TELEPHONE NUMBER: (508) 660-5001 **24-HOUR EMERGENCY NUMBER: 1-617-699-4307** FAX NUMBER: (508) 660-5040 E-MAIL: sales@hnu.com

PRODUCT NAME: ISOBUTYLENE (100 PPM – 0.9%) IN AIR
CHEMICAL NAME: Isobutylene in air

COMMON NAMES/ SYNONYMS: Calibration Gas

CLASSIFICATION: 2.2 WHIMIS CLASSIFICTATION: A, D2A, D2B

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2. COMPOSITION/ INFORMATION ON INGREDIENTS
INGREDIENT %: Isobutylene 0.0001-0.9/Air 99-99.9999
VOLUME:17L
PEL-OSHA: N/A
TLV-ACGIH: N/A
LD50or LC50Route/Species:N/A
FORMULA: C4H8/Air 99.0

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3. HAZARDS IDENTIFICATIONEMERGENCY OVERVIEW Release of this product may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene may cause drowsiness and other central nervous system effects in high concentrations; however, due to the low concentration of this gas mixture, this is unlikely to occur.

ROUTE OF ENTRY:
Skin: No
Contact Skin: No
Absorption: No
Eye Contact: No
Inhalation: Yes
Ingestion:No

HEALTH EFFECTS:
Exposure Limits: Yes
Irritant: No
Sensitization: No
Reproductive Hazard: No

Mutagen: No
Carcinogenicity: No
NTP: No
IARC: No
OSHA: No

EYE EFFECTS: N/A.
SKIN EFFECTS: N/A.

MATERIAL SAFETY DATA SHEET - CALIBRATION CHECK GAS
PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR
INGESTION EFFECTS: Ingestion unlikely. Gas at room temperature.
INHALATION EFFECTS: Due to the small size of this cylinder, no unusual health effects from over-exposure are anticipated under normal routine use.

NFPA HAZARD CODES HMIS HAZARD CODES RATING SYSTEM
Health: **1**
Flammability: **0**
Flammability: **0**
Reactivity: **0**

***0= No Hazard, 1= Slight Hazard, 2= Moderate Hazard, 3= Serious Hazard, 4= Severe Hazard**

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4. FIRST AID MEASURES EYES: N/A

SKIN: N/A

INGESTION: Not required

INHALATION: PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASED OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED THE SELF-CONTAINED BREATHING APPARATUS. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

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5. FIRE-FIGHTING MEASURES These containers hold gas under pressure, with no liquid phase. If involved in a major fire, they should be sprayed with water to avoid pressure increases, otherwise pressures will rise and ultimately they may distort or burst to release the contents. The gases will not add significantly to the fire, but containers or fragments may be projected considerable distances - thereby hampering fire fighting efforts.

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6. ACCIDENTAL RELEASE MEASURES In terms of weight, these containers hold very little contents, such that any accidental release by puncturing etc. will be of no practical concern.

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7. HANDLING AND STORAGE Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Use only in well-ventilated areas. Do not heat cylinder by any means to increase rate of product from the cylinder. Do not allow the

temperature where cylinders are stored to exceed 130oF (54oC).

---

8. EXPOSURE CONTROLS/PERSONAL PROTECTION Use adequate ventilation for extended use of gas.

MATERIAL SAFETY DATA SHEET - CALIBRATION CHECK GAS PRODUCT NAME:
ISOBUTYLENE (1 PPM – 0.9%) IN AIR

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9. PHYSICAL AND CHEMICAL PROPERTIES PARAMETER: VALUE: Physical state : Gas Evaporation point : N/A pH : N/A Odor and appearance : Colorless, odorless gas

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10. STABILITY AND REACTIVITY Stable under normal conditions. Expected shelf life 24 months.

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11. TOXICOLOGICAL INFORMATION No toxicological damage caused by this product.

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12. ECOLOGICAL INFORMATION No ecological damage caused by this product.

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13. DISPOSAL INFORMATION Do not discharge into any place where its accumulation could be dangerous. Used containers are acceptable for disposal in the normal waste stream as long as the cylinder is empty and valve removed or cylinder wall is punctured.

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14. TRANSPORT INFORMATION
United States DOT/Canada TDG PROPER SHIPPING NAME:
Compressed Gas N.O.S. Compressed Gas N.O.S. (Isobutylene in Air)
HAZARD CLASS: 2.2
IDENTIFICATION NUMBER: UN1956
SHIPPING LABEL: NONFLAMMABLE GAS

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15. REGULATORY INFORMATION Isobutylene is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

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16. OTHER INFORMATION This MSDS has been prepared in accordance with the Chemicals (Hazard Information and Packaging for Supply (Amendment) Regulation 1996. The information is based on the best knowledge of PID Analyzers, LLC , and its advisors and is given in good faith, but we cannot guarantee its accuracy, reliability or completeness and therefore disclaim any liability for loss or damage arising out of use of this data. Since conditions of use are outside the control of the Company and its advisors we disclaim any liability for loss or damage when the product is used for other purposes than it is intended.
MSDS/S010/248/January, 2004

Top

LIQUINOX MSDS

Section 1 : PRODUCT AND COMPANY IDENTIFICATION

Chemical family: Detergent.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Supplier: Same as manufacturer.

Product name: Liquinox

Section 2 : INGREDIENT INFORMATION

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE

Section 3 : HAZARD IDENTIFICATION

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of acute exposure

Eye contact: May cause irritation.

Skin contact: Prolonged and repeated contact may cause irritation.

Inhalation: May cause headache and nausea.

Ingestion: May cause vomiting and diarrhea.
May cause gastric distress.

Effects of chronic exposure: See effects of acute exposure.

Section 4 : FIRST AID MEASURES

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
If irritation persists, seek medical attention.

Ingestion: Do not induce vomiting, seek medical attention.
Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.

Section 5 : FIRE FIGHTING MEASURES

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.
Use water spray to cool fire exposed containers.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Explosion Data

Sensitivity to static discharge: Not available.

Sensitivity to mechanical impact: Not available.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: Containers may rupture if exposed to heat or fire.

Section 6 : ACCIDENTAL RELEASE MEASURES

Leak/Spill: Contain the spill.
Prevent entry into drains, sewers, and other waterways.
Wear appropriate protective equipment.
Small amounts may be flushed to sewer with water.
Soak up with an absorbent material.
Place in appropriate container for disposal.
Notify the appropriate authorities as required.

Section 7 : HANDLING AND STORAGE

Handling procedures and equipment: Protect against physical damage.
Avoid breathing vapors/mists.
Wear personal protective equipment appropriate to task.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Avoid extreme temperatures.
Launder contaminated clothing prior to reuse.

Storage requirements: Store away from incompatible materials.
Keep containers closed when not in use.

Section 8 : EXPOSURE CONTROLS / PERSONAL PROTECTION

Precautionary Measures

Gloves / Type:

Wear appropriate gloves.

Respiratory / Type: None required under normal use.

Eye / Type:

Safety glasses recommended.

Footwear / Type: Safety shoes per local regulations.

Clothing / Type: As required to prevent skin contact.

Other / Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Exposure limit of material: Not available.

Section 9 : PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid.

Appearance & odor: Odourless.
Pale yellow.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): @ 20°C (68°F).
17

Vapour density (air=1): >1

Volatiles (%)

By volume: Not available.

Evaporation rate (butyl acetate = 1): < 1.

Boiling point (°C): 100 (212F)

Freezing point (°C): Not available.

pH: 8.5

Specific gravity @ 20 °C: (water = 1).
1.083

Solubility in water (%): Complete.

Coefficient of water\oil dist.: Not available.

VOC: None

Chemical family: Detergent.

Section 10 : STABILITY AND REACTIVITY

Chemical stability: Product is stable under normal handling and storage conditions.

Conditions of instability: Extreme temperatures.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizing agents.

Hazardous decomposition products: See hazardous combustion products.

Section 11 : TOXICOLOGICAL INFORMATION

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Section 12 : ECOLOGICAL INFORMATION

Environmental toxicity: No data at this time.

Environmental fate: No data at this time.

Section 13 : DISPOSAL CONSIDERATIONS

Waste disposal: In accordance with local and federal regulations.

Section 14 : TRANSPORT INFORMATION

D.O.T. CLASSIFICATION: Not regulated.

Special shipping information: Not regulated.

Section 15 : REGULATORY INFORMATION

Canadian Regulatory Information

WHMIS classification: Not controlled.

DSL status: Not available.

USA Regulatory Information

SARA hazard catagories sections 311/312: Immediate (Acute) Health Hazard: No.
Delayed (Chronic) Health Hazard: No.
Fire Hazard: No.
Sudden Release of Pressure: No.
Reactive: No.

SARA Section 313: None

TSCA inventory: All components of this product are listed on the TSCA inventory.

NFPA

Health Hazard: 1

Flammability: 0

Reactivity: 0

HMIS

Health Hazard: 1

Flammability: 0

Physical hazard: 0

PPE: A

Section 16 : OTHER INFORMATION

Supplier MSDS date: 2006/07/14

Data prepared by: Global Safety Management
3340 Peachtree Road, #1800
Atlanta, GA 30326

Phone: 877-683-7460
Fax: (877) 683-7462

Web: www.globalsafetynet.com
Email: info@globalsafetynet.com.

General note: This material safety data sheet was prepared from information obtained from various sources, including product suppliers and the Canadian Center for Occupational Health and Safety.

ATTACHMENT 3

Community Air Monitoring Plan

Community Air Monitoring Plan
Tee Bird Country Club
Moreau, New York

Alpha Geoscience (Alpha) has prepared this Community Air Monitoring Plan (CAMP) to be implemented during the remedial investigation (RI) at the Tee Bird Country Club – North Course in the Town of Moreau, Saratoga County, New York (the "Site"). The site is being investigated in accordance with the Order on Consent (#A5-0532-1205) between Tee Bird Country Club, Inc. (Tee Bird) and the New York State Department of Environmental Conservation (NYSDEC).

A CAMP requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities that may impact air quality are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Site Background

The Tee Bird Country Club is located on the south side of Reservoir Road, approximately one mile west of the Hudson River. Facilities at the site include a golf course, club house, and maintenance buildings. The "Site" consists primarily of the country club parking lot and nearby areas that may be impacted by polychlorinated biphenyls (PCBs) that were applied to the surface of the parking lot for dust control circa 1977.

In the early 1980's soil sampling by the NYSDEC detected the presence of PCBs in the parking lot at the Site, which was unpaved at the time. A remedy approved by the NYSDEC, consisting of an asphalt cap placed over the parking lot, was implemented in 1984 in accordance with an agreement with the NYSDEC. NYSDEC personnel conducted periodic inspections of the paved parking area and collected and analyzed soil samples adjacent to the parking area in 1983, 1984, 1989, and 1990. No further investigation or remedial measures were required as a result of the inspections or soil sampling. The NYSDEC issued a letter dated June 27, 2005 indicating that it was reclassifying the Site from a Class 3 Inactive Hazardous Waste Site to a Class 2 site and that a Remedial Investigation and Feasibility Study (RI/FS) is required. This RI is being conducted in accordance with the NYSDEC's requirement and the Order on Consent.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area may be necessary. The scope of work to be performed during the RI includes collecting shallow soil samples, installing three ground water monitoring wells, collecting ground water samples, and collecting sediment samples. The first RI task includes collecting and analyzing soil samples for PCBs, VOCs, and heavy metals to determine the contaminants of concern for the remaining investigation. The soil samples will be collected from the area where the greatest concentrations of PCBs have previously been detected beneath the asphalt cap.

Periodic monitoring for VOCs will be conducted consistent with the monitoring requirements specified in the Health and Safety Plan. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location.

Continuous monitoring consists of measuring air quality using a device capable of continuous measurement and data logging. The device can display instantaneous and time-averaged values. Continuous particulate monitoring will be performed if visible dust cannot be controlled in the work area as described below. Continuous VOC monitoring will be conducted if periodic photoionization detector (PID) measurements are greater than the action levels described below.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored in the work area on a periodic basis using a PID equipped with a 10.2 electron volt (eV) lamp. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The PID will be calibrated at least daily following the manufacturer's instructions.

- If the ambient air concentration of total organic vapors in the work area or exclusion zone exceeds 5 parts per million (ppm) above background for 15-minutes, 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 can resume with continued monitoring.

- If total organic vapor levels in 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 can 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 based on a continuous 15-minute average.

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

All readings will be recorded and documented in a log book, field notes, or appropriate field data form.

Particulate Monitoring, Response Levels, and Actions

The potential for generating excessive fugitive dust during drilling and well installation activities is very low because of the anticipated moisture content of the soil that will be encountered. Dust likely will be generated for short periods of time during the preparation of the slurry grout to backfill each borehole. Exposure can be mitigated by employing work practices that will minimize or eliminate dust and particulates in the work zone. Work practices include wetting dry or dusty materials as soon as practical. Airborne particulates will be monitored by visual observation and corrective measures will be implemented for control, as necessary.

Fugitive dust migration will be visually assessed during all work activities. If dust cannot be controlled in the work area, or persists for more than 15 minutes, then 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.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) 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 may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed

- 150 $\mu g/m^3$ 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 $\mu g/m^3$ above the upwind level, work will be stopped and re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

All readings will be recorded and documented in a log book, field notes, or appropriate field data form.

Z:\projects\2005\05121-05140\05132 - TeeBird PCBs\RI Work Plan\HASP\CAMP.doc

ATTACHMENT 4

HASP Forms

Initial Site Visit Check List
Daily Safety Meeting Log
Incident Report
Air Monitoring Log
Instrument Calibration Log
Dig Safely Location Request Form

DAILY SAFETY MEETING LOG
ALPHA GEOSCIENCE

PROJECT No. and Name: _____ _____

DATE: _____ _____

Description of Work to be Performed:

Description of Concerns or Modifications:

Description/Discussion of Potential Hazards and Protections: (check those that apply for the work shift)

Excessive Noise:	_____	Heavy Equipment:	_____
Overhead Elec. or Objects:	_____	Explosive Gas:	_____
PPE	_____	Traffic	_____
Chemical Splash/Exposure:	_____	Scaffolding:	_____
Heat/Cold Stress:	_____	Confined Space Entry:	_____
Slip/Trip:	_____	First Aid Kit:	_____
Excavation/Shoring:	_____	Utilities	_____
Electrical Shock:	_____	Emergency Routes:	_____
Fire Extinguisher	_____	Pinch Points	_____
Slopes	_____	Surface Water	_____
Pressure Hoses	_____	Hand Tool Use	_____

NAME:	COMPANY:

Meeting Conducted by : _____

Name and Signature

INITIAL MOBILIZATION HEALTH AND SAFETY CHECKLIST

This checklist should be used by the Site Safety Officer during the initial site mobilization to ensure that all site personnel are aware of applicable site H&S requirements and complying with the HASP.

		Initials
1.	HASP cover sheet is signed and current.	_____
2.	Review Health and Safety Plan (HASP) with employees.	_____
3.	All site personnel (and subcontractors) must sign HASP Acknowledgement Sheet.	_____
4.	Check that training certifications are current and available on-site for all site personnel:	
	- 40-Hour HAZWOPER Training	_____
	- 8-Hour Refresher Training (within past year)	_____
	- Supervisor Training (for Field Supervisor and Project Manager)	_____
	- Medical Certification	_____
	- Respirator Fit Test (if Level C PPE may be required)	_____
	- First Aid and CPR Certification (for at least one person on-site)	_____
5.	The following notices should be posted in the office area:	
	- OSHA Poster	_____
	- Hospital Route Map	_____
	- Emergency Contacts/Telephone List	_____
	- Site Map showing evacuation routes and assembly areas	_____
	- State posters as required	_____
6.	Check that PPE is available on-site as specified in the HASP. At a minimum, most projects require Level D with provisions for upgrading to Level C:	
	- Hard hat (check that suspension is properly attached and in good condition)	_____
	- Safety glasses with side shields (check for ANSI Z87.1 embossment on frames)	_____
	- Steel-toed safety boots	_____
	- Ear plugs available, if needed	_____
	- Respirators stored in a clean, sanitary condition (i.e., sealed bags)	_____
	- Chemical protective clothing with duct tape (if upgrade is needed)	_____
7.	Ensure that air monitoring equipment and required calibration gas/devices are available on-site as specified in the HASP.	_____
8.	Ensure that decontamination equipment is available as specified in the HASP. Generally, the following decontamination equipment is often required for personnel decontamination stations:	
	- Containers and labels for disposal of used PPE	_____
	- Plastic sheeting to cover ground	_____
	- Tubs and scrub brushes for outer PPE/boot wash and rinse	_____
	- Detergent and rinse water	_____
	- Separate provisions for cleaning, disinfecting and drying respirators	_____
9.	Ensure that the site control and emergency response equipment is readily available on-site as specified in the HASP. Generally, the following equipment is required for most sites:	
	- First aid kit and bloodborne pathogens response kit and blanket	_____
	- Communications equipment	_____
	- Vehicle designated for emergency use	_____
	- Fire extinguisher (ensure it is charged and inspected monthly)	_____
	- Emergency eyewash/flushing equipment (if corrosive chemicals are used)	_____
	- Hazard warning tape	_____
	- Flashlight and tool kit	_____
10.	Ensure that containers of chemicals brought on-site are labeled with the identity and appropriate hazard warning. Also, MSDSs must be on-site for each chemical.	_____
11.	Ensure that the required forms are available on-site and used to document field activities in accordance with the HASP.	_____

Alpha Geoscience
Job-Related Injury/Accident/ Illness Report

Initial Report Date:
Job Site/Project No.:
Personnel Involved:
Date/Time of Incident:

Location:

Description of Conditions:

Description of Injury/Illness:

Date/Time of Report to Alpha:

Action:

Follow-up:

Summary/Closure:

Reporting:

Corrective Actions:

Prepared by: _____

Signature and Date

AIR MONITORING FORM

Project Name:_____ Date:_____ Analyst:_____
Project No.:_____ Equipment Type:_____

Weather Conditions: _____

Calibration Information: _____

Monitoring Limits: _____

Field Operation/Activity:_____

_____

Parameter*	Location	Time	Measurement

*Parameters: Organic Vapors (OV), Hydrogen Sulfide (H_2S),
Percent Lower Explosive Limit (%LEL),
Oxygen (O_2), Methane (CH_4), etc.

INSTRUMENT CALIBRATION LOG

Client Name and Site:	Project Manager:	Task Number:

Calibration Event:

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
ument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

Person Calibrating:	Date:
Instrument Type:	Calibration Gas:
Model:	Calibration Gas Concentration (ppm):
Serial #:	Reading (ppm):
Calibrator Model:	Adjusted Reading (If Necessary):
Comments:	

nts:

NOTE: Return to HSM Upon Completion of Site Work.

Dig Safely. New York

Dig Safely and Dig Safely. New York are used under license from Dig Safe System, Inc.

Location Request Information Sheet

Fill out this helpful information sheet before you call Dig Safely New York.

Company Id #: _____ Today's Date: _____

Excavating Company: _____

Caller's Name: _____

Excavator's Address: _____

City: _____ State: _____ Zip: _____

Fax: _____ Phone: _____

Field Contact Name: _____

Cellular or Field Office#: _____

Work Being Done For (If Applicable): _____

Work Date: _____ Time: _____

NYS law requires at least 2 full working days notice, not including the day you call.

Excavation Site: State: _____ County: _____

Name of City, Town, or Village: _____

Street Address of Work Site: _____

Between What Two Streets: _____

Other Pertinent Details / Additional Site: _____

_____

_____

Type of Work: _____

Means of Excavation: _____ Are You Blasting ☐ Yes ☐ No

Is the Dig Site within 25 ft. from Road Edge ☐ Yes ☐ No

Ticket ID #: _____

Members Contacted (Facility Operators)

☐ _____ ☐ _____

☐ _____ ☐ _____

☐ _____ ☐ _____

☐ _____ ☐ _____

Call Before You Dig ~ 1-800-962-7962

5063 Brittonfield Pkwy., E. Syracuse, NY 13057

Dig Safely. New York

Dig Safely and Dig Safely. New York are used under license from Dig Safe System, Inc.

Location Request Information Sheet

Fill out this helpful information sheet before you call Dig Safely New York.

Company Id #: _____ Today's Date: _____

Excavating Company: _____

Caller's Name: _____

Excavator's Address: _____

City: _____ State: _____ Zip: _____

Fax: _____ Phone: _____

Field Contact Name: _____

Cellular or Field Office#: _____

Work Being Done For (If Applicable): _____

Work Date: _____ Time: _____

NYS law requires at least 2 full working days notice, not including the day you call.

Excavation Site: State: _____ County: _____

Name of City, Town, or Village: _____

Street Address of Work Site: _____

Between What Two Streets: _____

Other Pertinent Details / Additional Site: _____

_____

_____

Type of Work: _____

Means of Excavation: _____ Are You Blasting ☐ Yes ☐ No

Is the Dig Site within 25 ft. from Road Edge ☐ Yes ☐ No

Ticket ID #: _____

Members Contacted (Facility Operators)

☐ _____ ☐ _____

☐ _____ ☐ _____

☐ _____ ☐ _____

☐ _____ ☐ _____

Call Before You Dig ~ 1-800-962-7962

5063 Brittonfield Pkwy., E. Syracuse, NY 13057

APPENDIX C
Field Forms

Geologic Log
Monitoring Well Completion Log
Organic Vapor Screening Log
Water Level Measurements
Work Plan Field Modifications
Chain of Custody Record
Low-Flow Ground Water Sampling Form

Alpha Geoscience 679 Plank Road Clifton Park, New York 12065	**GEOLOGIC LOG**	**Boring ID:** Page of

Project Number/Name: Location:

Drilling Contractor/Personnel:

Geologist/Hydrogeologist: Start/ Finish Date:

Drilling Equip/Method: Size/Type of Bit:

Sampling Method: Well Installed?

Elevation/Ground Surface:

Depth to Ground Water from Ground Surface (Date):

REMARKS:

Depth (Ft)	Sample No.	PID (ppm)	Recovery (ft)	DESCRIPTION	REMARKS

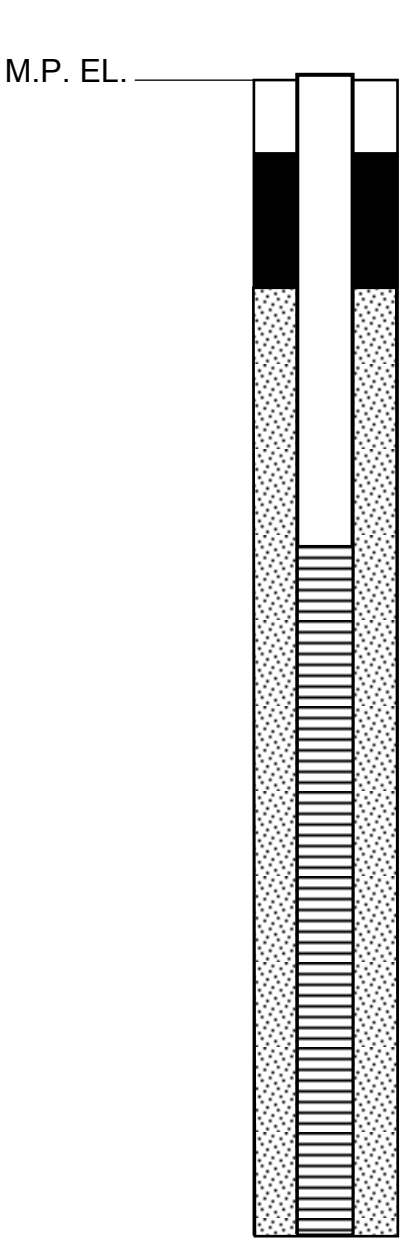
Proportions Used: Trace=0-10% Little=10-20% Some=20-35% And-35-50%

MONITORING WELL COMPLETION LOG

ALPHA GEOSCIENCE
679 Plank Road
Clifton Park, New York
(518) 348-6995

Well _____
Project _____
Project No. _____
Client _____
Date Drilled _____
Date Developed _____

WELL CONSTRUCTION DETAILS



INSPECTION NOTES

Geologist _____
Drilling Contractor _____
Type of Well _____
Static Water Level _____ Date _____
Measuring Point _____
Total Well Depth _____

Riser Pipe
Material _____ Diameter _____
Length _____ Joint Type _____

Screen
Material _____ Diameter _____
Slot Size _____ Length _____
Stratigraphic Unit Screened _____

Packing
Sand _____ Gravel _____ Natural _____
Amount _____ Interval _____

Seal
Type _____ Interval _____

Locking Case: _____ Yes ☐ No ☐
Diameter _____

Notes:

ALPHA GEOSCIENCE
679 Plank Road
Clifton Park, NY 12065

ORGANIC VAPOR SCREENING LOG

PROJECT: PAGE of
CLIENT:
LOCATION: DATE COLLECTED:
INSTRUMENT USED: LAMP: 10.2 eV DATE ANALYZED:
DATE INSTRUMENT CALIBRATED: By: ANALYST:
TEMPERATURE OF SOIL:

Location ID	Sample Number	Depth (ft)	Sample Type	Background Reading (ppm)	Sample Reading (ppm)	Remarks

WATER LEVEL MEASUREMENTS

ALPHA GEOSCIENCE

679 Plank Road
Clifton Park, New York 12065

Project Name: _____
Project No. _____
Location _____
Weather: _____
Field Personnel: _____
Measuring Device: _____

Well No.	Date	Time	Depth to Water	Reference Point	Meas. Pt. Elevation	Water Level Elev.	Remarks

ALPHA GEOSCIENCE

WORK PLAN FIELD MODIFICATIONS

Project Name: _____

Project Number: _____

Date: _____

Modification Description:

Rationale:

Name:		Signature:		Affiliation:	
Name:		Signature:		Affiliation:	
Name:		Signature:		Affiliation:	
Name:		Signature:		Affiliation:	

CHAIN OF CUSTODY RECORD *ALPHA GEOSCIENCE*

CLIENT NAME:	**SAMPLER'S NAME(S):**
PROJECT NAME/NO.:	**SAMPLER'S SIGN. :**
PROJECT LOCATION:	**LABORATORY & LAB CONTACT:**

Lab ID	Sample ID	Date Sampled	Time AM/PM	No. of Containers	Type of Preservative	Sample Matrix	Sample Type	ANALYSIS REQUESTED

RELINQUISHED BY: (signature)	**RECEIVED BY: (signature)**	**DATE / TIME**
RELINQUISHED BY: (signature)	**RECEIVED BY: (signature)**	**DATE / TIME**
RELINQUISHED BY: (signature)	**RECEIVED BY: (signature)**	**DATE / TIME**

SEND LAB REPORT TO: Alpha Geoscience, 679 Plank Road, Clifton Park, New York 12065

PHONE NUMBER: (518) 348-6995 **FAX: 783-1793**

METHOD OF SAMPLE SHIPMENT: courier overnight mail **ALPHA CONTACT:**

SPECIAL INSTRUCTIONS:

FOR LAB USE: Samples received in good condition? Yes _____ No _____
LAB REMARKS:

LOW-FLOW GROUND WATER SAMPLING RECORD

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

PROJECT NAME _____ **WELL ID** _____
PROJECT NUMBER _____ **DATE** _____
SITE LOCATION _____ Page 1 of ____

GENERAL

Weather Conditions _____
Site Access/Conditions _____
Physical Condition of Well _____

PURGING INFORMATION

Total well depth (from top of casing): _____ feet
Depth to water surface before purging (from top of casing): - _____ feet
Height of water column: (a) = _____ feet
Screen length (b) _____ feet
Lesser of a and b _____ feet
Well diameter (d): _____ inches d^2 x 0.0408 x _____ gal/ft

WELL VOLUMES:
2" Diam. = 0.16 gal/ft
4" Diam. = 0.65 gal/ft.
6" Diam. = 1.47 gal/ft.

One wetted screen volume before purging (1 gallon = 3.785 liters): = _____ gallons or _____ liters
Volume of water equal to five wetted screen volumes: = _____ gallons or _____ liters

Pump Type:_____ WQ Meter Type:_____

Time	Volume Purged (Gallons/ Liters)	Depth to Water (feet)	SC (mmhos/cm or umhos/cm)	Temp. (^{o}C or ^{o}F)	pH (SU)	Dissolved Oxygen (mg/L)	RedOx Potential (mV)	Turbidity (NTU)
Stabilization Criteria*		Drawdown <0.3 ft	+/- 10%	+/- 0.2 ^{o}C	+/- 0.2 SU	+/- 0.2 mg/L	+/- 20 mV	+/- 10%

* - Stabilization based on three consecutive readings collected at 3 to 5 minute intervals. Minimum of 30 minutes of purging, maximum of five wetted screen volumes.

Total Volume of Water Purged: _____ gallons/liters
Depth of pump intake: _____ feet btoc

OBSERVATIONS

Color _____ Odor _____
Turbidity _____ Sheen _____
Presence of NAPL _____ Other _____
Remarks _____

SAMPLING INFORMATION

Field Personnel _____
Sampling Method _____
Sample Date _____ Time _____
Sample Description _____
Analysis _____

APPENDIX D
Key Personnel Resumes

SCOTT M. HULSEAPPLE
SENIOR HYDROGEOLOGIST

EDUCATION: M.S., Hydrology, The University of Arizona, 1995
B.S., Geology/Environmental Sciences, State University of New York at Binghamton, 1992

PROFESSIONAL LICENSE: Registered Professional Geologist #2445, Kentucky

SPECIAL TRAINING:
Commercial Geothermal Design Series offered by HeatSprings Energy Geothermal Education and Training
Geothermal Drilling and Hydrogeology offered by HeatSprings Energy Geothermal Education and Training
Vermont Stream Geomorphic Assessment Protocols by the Vermont Department of Environmental Conservation
Ground Water Modeling Theory and Application by Waterloo Hydrogeologic, Waterloo, Ontario
Remediation by Natural Attenuation offered by the University of Wisconsin – Madison
Analysis and Design of Aquifer Tests offered by the National Ground Water Association
OSHA Hazardous Waste Operations and Emergency Response Supervisor Training
OSHA 8-Hour Hazardous Waste Operations and Emergency Response Refresher

EXPERIENCE SUMMARY:

Mr. Hulseapple has over thirteen years experience in the environmental field. His experience includes coordinating and conducting geological and hydrogeologic field work for remedial investigations, hazardous waste and petroleum impacted sites, and various other subsurface investigations. He has experience in monitoring well installation; ground water, soil, and air sampling; soil and rock logging; and aquifer testing and analysis. He has an extensive background in the analysis of geologic and hydrogeologic data and evaluation of corrective actions through the preparation and interpretation of geological cross sections, ground water contour maps, and computer modeling. Mr. Hulseapple has prepared remedial investigation work plans and reports, monthly and quarterly monitoring reports, spill investigation reports, and closure reports.

SELECTED PROJECT EXPERIENCE:

Geologic and Hydrogeologic Investigation and Remediation

Mr. Hulseapple participates in geologic and hydrogeologic site characterizations for commercial sites, private industries, utilities, and municipalities. The work involves defining site geology, assessing ground water and surface water conditions, and evaluating environmental impacts.

< Project manager for a remedial investigation and feasibility study (RI/FS) program at a 112-year-old 630-acre manufacturing facility in Schenectady, New York. Areas of concern at the site included adjacent water bodies, three former industrial landfills, manufacturing operations, and storage tanks. The RI included an extensive sampling program aimed at assessing the potential for contaminants of concern (chlorinated solvents, BTEX, and PAHs) to naturally attenuate. The RI/FS program, which began in 1995, required the coordination of a project team of professionals from several disciplines including geology, hydrogeology, ecology, environmental engineering, environmental risk assessment, database management, and geographical

information systems and included the installation of over 200 monitoring wells, the collection more than 1,000 soil, ground water, surface water, sediment, and biota samples. The RI and FS are complete and the NYSDEC presented its proposed remedial action plan (PRAP) in November 2004. The proposed remedy includes an agronomic cover to close the three former landfills and enhanced bioremediation to treat chlorinated solvents in the ground water.

< Project manager for the supplemental remedial investigation of a former manufactured gas plant in Plattsburgh, New York. The investigation focused on evaluating the extent of the impacts to the fractured limestone bedrock and ground water. The near vertical nature of the bedrock fractures and the proximity of the site to other sources of petroleum contamination complicated the investigation. The NYSDEC finalized the record of decision (ROD) for the site in March 2004 and included long-term monitoring of the ground water and environmental easements.

< Project manager for the remedial investigation of a former heavy equipment manufacturing facility in Batavia, New York. The investigation is being conducted under the NYSDEC's Voluntary Cleanup Program and focuses on chlorinated solvents, which have been found in soil, ground water, and soil vapor at the site. The site is located upgradient from a public ground water supply aquifer and the investigation includes the evaluation of off-site impacts. The investigation has included the installation of more than 30 monitoring wells, a bench-scale study to evaluate the potential for the bioremediation of chlorinated solvents, the development of a numerical ground water fate and transport model, the evaluation of indoor air quality, and design of a pilot study to evaluate the effectiveness of enhanced biodegradation using whey powder to reduce levels of chlorinate solvents in the subsurface.

< Designed and performed a pilot study and full-scale remediation program at a former gasoline station in Hancock, Delaware County, New York. The remedial program used chemical oxidation to reduce levels of petroleum compounds in ground water.

< Designed and performed a pilot study at a former heavy equipment manufacturing facility in Batavia, New York to evaluate the effectiveness of enhanced biodegradation to reduce levels of chlorinate solvents in soils and ground water.

< Project manger for the long-term ground water monitoring program at an industrial site in Durham, North Carolina. The monitoring program was part of a monitored natural attenuation remedial action which targeted chlorinated solvents and petroleum in ground water.

< Managed the field investigation to characterize leachate from a former industrial landfill in Schenectady, New York. Contaminants of concern included PCBs, BTEX, PAHs, and metals.

< Performed pumping tests at a former medical equipment manufacturing plant in Argyle, New York. Contaminants of concern at the site include Freon-12 and solvents. The program required designing and managing the field program to ensure efficient data collection and subsequent evaluation.

< Performed and analyzed aquifer tests and implemented a long-term monitoring pilot program for overburden dewatering and ground water recovery program at an 18-acre manufacturing facility in New York. Contaminants of concern at the site include PCBs, chlorinated solvents, and lubricating oils, which exist as non-aqueous-phase liquids in a fractured bedrock aquifer. Conducted field sampling of overburden ground water monitoring wells and bedrock monitoring wells. Supervised soil boring, bedrock monitoring well, and DNAPL recovery well installation. Participated in DNAPL recovery activities from bedrock monitoring wells.

GIS and Environmental Database Management

Mr. Hulseapple integrates geographical information systems (GIS) and environmental database management for

data analysis and presentation for a variety of project-related tasks. Mr. Hulseapple is proficient with the latest GIS and database software including ArcGIS, Microsoft Access, and Schlumberger's HydroGeo Analyst.

< Managed the NYSDOH's Upstate Source Water Assessment Program (SWAP). This project included the evaluation of all more than 12,000 public ground water supplies for susceptibility to potential contamination. The project was completed by automating the report generation process from the NYSDOH's Safe Drinking Water Information System database using a combination of Access database programmers and ArcView GIS.

< Maintained databases for the City of Tucson, Arizona's wastewater recharge facility. The program evaluated the long-term effectiveness of recharging treated wastewater into a sand and gravel aquifer for use as irrigation water during peak summer use periods.

< Developed, managed, and maintained the environmental database for the investigation of several project sites.

Computer Modeling

Mr. Hulseapple has experience using Visual MODFLOW Pro in modeling subsurface investigations. Models designed and run include:

< Constructed, ran, and evaluated model simulations to estimate the affects of pumping brine from several remediation wells on the vertical brine profile associated with the collapse of a salt mine in western New York. The model involved simulation of 3-D variable fluid density and mixing of brine and fresh water using SEAWAT-2000.

< Evaluated model simulations to evaluate ground water flow and contaminant transport at a former heavy equipment manufacturing plant in upstate New York. The model was used to evaluate potential remedial alternatives.

Phase I ESA

Mr. Hulseapple conducted over 30 Phase I Environmental Site Assessments in New York, New Jersey, and Pennsylvania. He was responsible for conducting fieldwork, historical record searches, writing reports and proposals, and contacting clients. Technical duties included: sampling of water, soil, asbestos, and radon; test pit, soil boring, and monitoring well installation; identifying potential environmental liabilities; aerial photo interpretation; and environmental site investigations.

PROFESSIONAL AFFILIATIONS:

National Ground Water Association
Hudson-Mohawk Professional Geologists' Association
New York State Council of Professional Geologists

EMPLOYMENT:

2006 – Present, Alpha Geoscience, Senior Hydrogeologist
1995 – 2006, URS Corporation/Dames & Moore, Hydrogeologist
2001/2002 Spring Terms, Union College, Department of Geosciences, Assistant Adjunct Professor
1993 – 1995, Tucson Water, Hydrologist Intern
1992 – 1993, Huntington/Empire Soils Investigations, Inc., Environmental Scientist

Z:\Alpha\resumes\SMH\smh-resume.doc

THOMAS M. JOHNSON, C.P.G.
HYDROGEOLOGIST

EDUCATION:	MS Geology, State University of NY Fredonia, 1982 BS Geology, State University of NY Cortland, 1976
SPECIAL TRAINING:	MTBE in Ground Water Conference, June 2001 Certified 40-Hour OSHA Health and Safety Certified 8-Hour OSHA Supervisory Course
PROFESSIONAL REGISTRATION:	The American Institute of Professional Geologists Registered Certified Professional Geologist, Virginia Licensed Geologist; State of Washington

EXPERIENCE SUMMARY:

Mr. Johnson has experience conducting a variety of contaminant hydrology, waste management and remedial projects since 1979. He has broad experience with projects in the Federal and State-equivalent CERCLA and RCRA programs and has provided expert opinions and testimony on technical topics related to hazardous waste and petroleum contamination and with regard to remedial technology selection, appropriateness of costs, and cost allocation for site remediation. Mr. Johnson also has a strong practical background in field investigation, data interpretation, evaluation of remedial needs, management of site remediation and report preparation. He has designed and implemented extensive field investigations primarily for private sector clients and managed these projects to final remediation. He is experienced in all aspects of project implementation including conceptualization and budgeting, agency negotiations, work plan development and contracting.

SELECTED PROJECT EXPERIENCE:

Hazardous Waste Site Investigations/Remediation

Mr. Johnson has designed, implemented and performed hundreds of investigative and remedial projects at sites involving hazardous waste, solid waste or releases of petroleum since 1979. He is familiar with regulatory requirements for investigations and remediation and interacts regularly with agency personnel on behalf of the client. His effective negotiating and communication skills are used to develop efficient, cost effective work scopes and remedial solutions. Significant projects include:

< Investigated and remediated of a Brownfields site for redevelopment as a regional shopping center. Mr. Johnson coordinated the efforts of engineers, architects, environmental consultants, and the construction contractor to complete the project in conjunction with construction activities. The project was performed in accordance with New York and USEPA CERCLA requirements. The site was subsequently delisted as a hazardous waste site.

< Evaluation of a completed RI/FS at a municipal landfill CERCLA site and development of an alternate remediation plan to support a Record of Decision. The alternate plan provided the client with an effective solution at a cost of millions less than the option specified in the feasibility study.

< Managed a project to prepare and submit RCRA closure plans for storage tanks, incinerator, and surface impoundment at an inactive Union Carbide chemical manufacturing plant in Brownsville, Texas. Surface impoundment closure consisted of collecting data to support closure of the basin. Tanks and incinerators were closed by decontamination and decommissioning in accordance with regulations.

< Investigation of the cause and extent of a petroleum release from newly installed underground storage tanks (UST). The project included management of site remediation and detailed engineering analysis of a failed

fiberglass UST. Information was obtained to evaluate insurance claims and to support litigation. Forensic work documented improper installation leading to tank failure and improper selection of materials resulting in premature corrosion of tank lines.

< Managed material handling, sampling and categorization operations at the cleanup of the Enterprise Avenue CERCLA site in Philadelphia, PA. Responsible for establishing sampling protocols and tracking procedures for the processing and staging of more than 2500 drums of illegally disposed hazardous waste.

< Managed a project which included the entry of 15 years of soil, air, ground water and surface water sample data into a computer database for a CERCLA site at which remediation had been completed and long term monitoring had been initiated. Routine queries and statistical analyses were used to evaluate performance of the slurry wall and cap containment system.

< Provided environmental coordination and consulting services to the developer for major expansion of the Carousel Center Mall in Syracuse, N.Y. through an area occupied by major oil storage facilities known as Oil City. Responsibilities included investigation and remediation of select properties, technical interface with major oil companies, and facilitator with the NYSDEC and NYSDOH.

< Principal hydrogeologist for an investigation of a CERCLA inactive pesticide disposal site near Flint, Michigan. Developed and implemented a sampling and monitoring program to identify the type, degree and extent of pesticides in the subsurface resulting from improper disposal. Later testified as an expert witness regarding the scope and findings of the investigation.

< Conducted a comprehensive regional hydrogeologic characterization of bedrock aquifers in western New York, northwestern Pennsylvania, southern Ontario, Canada and beneath Lake Erie as part of a CERCLA investigation. The project involved computer modeling of flow and transport to assess the impacts of deep well injection of hazardous waste on regional ground water quality.

< Co-managed a CERCLA RI/FS to identify appropriate remedial actions and determine extent and significance of contaminants in surface water, ground water, soil and sediment. The site included an active tar plant and an inactive coking plant. A three-dimensional, numeric, ground water model was used to define and predict contaminant concentrations, contaminant migration pathways both on and off site, and potential impacts on a nearby municipal well field.

Expert Testimony/Opinion

Mr. Johnson=s extensive and experience with a broad range of sites, facilities and contaminated media form the basis for his credentials as an expert witness. He has been an environmental consultant performing hydrogeologic and geologic investigations, and remediating petroleum releases and hazardous waste sites since the late 1970's. He has worked with attorneys representing both plaintiffs and defendants on cases which have been tried in court and which have been successfully settled without litigation. Representative projects include:

< Prepared the technical case, in cooperation with defendant=s counsel, to challenge investigation and remediation efforts and cost claims by the State of New York at a former gasoline retail station in Tallman, New York. Reviewed all technical and cost information and prepared expert disclosure providing opinions regarding contributions from nearby sites, and the technical approach, scope of services, and expenditures by the State of New York for remediation of the defendant=s site. The case settled the first day of trial with a substantially reduced claim against the defendant.

< Evaluated the approach and effectiveness of an aquifer/water supply remedial project completed by another consultant, on behalf of a major insurance company. The evaluation revealed the use of inappropriate investigative methods and installation of an ineffective remedial system. The insurance company successfully challenged and minimized claims.

< Provided technical support, conducted a hydrogeologic investigation and prepared expert reports for attorneys at a site where the plaintiffs water supply was impacted by contamination from an adjacent dry cleaning facility. The case was settled out of court with plaintiff receiving payment for property damage and medical costs.

< Interpreted, reviewed and critiqued plaintiff=s hydrogeologic expert testimony in defense of a claim against an insurance company. Provided expert testimony contesting plaintiff=s assertions regarding the migration of petroleum from an underground storage tank through fractured bedrock. The case was decided in favor of the insurance company (defendant).

< Provided technical support to defendant=s counsel, and reviewed and analyzed information in a case to allocate cleanup costs between two parties that had allegedly contaminated a sand and gravel aquifer on Long Island, N.Y. Information from the analysis was used to achieve a settlement.

< Provided technical support and expert testimony on behalf of defendants in a case involving discharge of surface water onto plaintiffs=s property. Evaluated hydrologic conditions at defendants property to determine ground water and surface water relationships and potential downgradient impacts.

< Provided technical support during a trial to determine whether work completed by another consultant constituted a Phase I Environmental Site Assessment per ASTM requirements.

Phase I Environmental Site Assessments

Mr. Johnson is familiar with the requirements of the American Society of Testing Materials (ASTM) for conducting Phase I Environmental Site Assessments (ESAs) and has provided expert opinion for a suit evaluating adherence to ASTM guidelines. He has performed numerous ESAs for buyers, sellers and lending institutions at a variety of residential, commercial and industrial properties. His extensive experience with investigation and remediation of environmentally impacted sites is utilized to thoroughly evaluate environmental conditions during property transactions. Typical Phase I ESAs performed include:

< Performed Phase I ESA=s for the Carousel Center regional shopping center in Syracuse, New York in 1995, 2000 and 2002. A report was prepared and provided to potential lenders and investors. Participated in discussions with potential investors and provided relevant information to address their concerns on environmental matters related to the site.

< Performed a Phase I Environmental Site Assessment for two parcels being purchased by a developer for inclusion in a plan to build improved access roads to a major shopping facility in the Albany, NY area.

< Provided technical direction on a project where six industrial sites were assessed for environmental liability for the potential buyer. The project included identification of areas of environmental concern and preparation of cost estimates for remediation of such areas. As a result of the quantification of the environmental liability, the property transaction was successfully negotiated.

< Prepared a series of letters and reports for major a developer describing the environmental conditions of a group of properties in central New York which were purchased for development of a major regional shopping center. The reports were used by potential lenders and investors to determine if any environmental liabilities were associated with the properties. Financing of the project was successfully obtained by the developer.

< Performed Phase I ESAs at a series of previously undeveloped sites to evaluate their use for construction of cellular communication towers. The assessments focused on identification of potential environmental impacts from adjacent properties.

< Evaluated environmental conditions at a property occupied by a greenhouse and nursery as part of redevelopment of the property for a restaurant. The Phase I ESA report identified potential environmental conditions that included the storage and use of fertilizers and pesticides, and a petroleum release at a former gasoline retail station adjacent to the site.

< Conducted a Phase I ESA at an abandoned property formerly used as a bakery/residence during foreclosure proceedings. Potential environmental conditions of concern included a fuel oil storage tank, a petroleum release upgradient of the site, and potential public health issues.

< Provided expert opinion and litigation support to evaluate the adequacy of Phase I ESAs as compared to ASTM guidelines for manufacturing facilities in Indiana and Tennessee.

< Performed a Phase I ESA at a commercial property in New Paltz, New York that was formerly occupied by a post office, liquor store and laundromat. Primary impacts included petroleum releases at the subject property and an adjacent gas station.

< Performed a Phase I ESA for a property in Albany, New York used for automobile salvage and recycling. Potential environmental impacts included past releases of petroleum and automotive fluids from vehicles and storage tanks.

< Performed a Phase I ESA for a 5,000 acre property that included a former paper mill located on 25 acres. The site included paper processing buildings, settling ponds, a waste water treatment plant, two hydroelectric stations and a maintenance garage. Potential impacts were limited to possible historical releases from petroleum and chemical bulk storage tanks.

PROFESSIONAL AFFILIATIONS: American Institute of Professional Geologists
Hudson-Mohawk Professional Geologists Association

EMPLOYMENT:
1994- Present, Alpha Geoscience (Vice President, 1998 to present)
1993-1994, RUST Environment & Infrastructure
1986-1993, Dunn Corporation
1985-1986, ERT, Inc./ENSR
1979-1985, D'Appolonia/IT Corp.
1976-1977, U.S. Geological Survey

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DONALD C. ANNÉ
SENIOR CHEMIST

EDUCATION: M.S., Chemical Oceanography, Florida Institute of Technology, 1981
B.A., Earth Sciences, Millersville University of Pennsylvania, 1975

SPECIAL TRAINING:
Certified 40-Hour OSHA Health and Safety
Certified 8-Hour OSHA Supervisory Course
Ground Water Geochemistry (NWWA)
Ground Water Pollution and Hydrology (Princeton Associates)
Quality Assurance Programs for Environmental Monitoring Data (Stat-A-Matrix)

PROFESSIONAL AFFILIATIONS: American Chemical Society (AFS), 1979-Present

EXPERIENCE SUMMARY:

Mr. Anné has more than 27 years of environmental chemistry experience specializing in data validation, environmental sampling, analytical methodologies, petroleum fingerprinting, laboratory audits, field sampling audits, and preparing Quality Assurance Project Plans and Quality Assurance Manuals. Mr. Anné's experience includes analytical laboratory work with gas chromatography, atomic absorption, infrared spectrometry and wet chemistry methods.

PROJECT EXPERIENCE:

Quality Assurance/Quality Control of Chemical Data

Mr. Anné has more than 20 years experience as a data validator and quality assurance officer. Mr. Anné has validated data from most EPA Regions and under several independent state programs, including the NYSDEC. He has performed laboratory and field audits as well as written Quality Assurance Project Plans. Mr. Anné has written, reviewed, and initiated laboratory Quality Assurance Manuals for laboratories to maintain their regulatory compliance. Typical project experience includes:

< Senior Chemist responsible for data validation. Reviewed chemical data for several projects under the NYSDEC regulations. Performed both data usability summary reports (DUSR) and full data validation on NYSDEC directed projects. The clients included industry, universities, municipalities, and utilities.

< Senior Chemist responsible for data validation. Reviewed chemical data for several projects under the New Jersey ISRA regulations. The clients included industry and utilities.

< Supervising Environmental Scientist responsible for data validation. Reviewed chemical laboratory data for adherence to QA/QC protocols for several key projects, including National Priorities List sites and RCRA Corrective Actions located in EPA Regions I, II, III, IV, V, and IX. Validated analytical data, outlined problems and actions to be taken, and qualified all affected data. Consulted with project managers on data usability, and recommended corrective actions to support project goals. Responded to comments made by regulators regarding data quality.

< Supervising Environmental Scientist recognized by the New York State Department of Environmental Conservation (NYSDEC) to perform third party data validation. Attended NYSDEC workshop on data validation as part of the requirements set forth by NYSDEC. Performed data validation in support of NYSDEC STARS and ASP programs as well as data in support of the NYSDEC Part 360 Regulations for landfills. Validated data for an Albany area municipal landfill.

< Supervising Environmental Scientist responsible for developing and preparing Quality Assurance Project Plans (QAPPs) for several state and federal Superfund sites and federal RCRA corrective action sites. Negotiated with regulators for the acceptance of the QAPPs. The sites were located throughout the eastern United States.

< Environmental Chemist responsible for developing a laboratory QA/QC program which fulfilled requirements of the EPA and agencies from the States of Texas and Louisiana. Implemented and managed the program throughout DOE's SPR Environmental laboratories. Received verbal commendations from EPA and the Texas Water commission on the QA/QC Program.

Environmental Chemistry

Mr. Anné is experienced in sampling soil, water, air, and wastes in accordance with federal and state guidelines. He has performed field sampling audits and prepared sampling plans for numerous projects in accordance with applicable programmatic requirements. Mr. Anné is familiar with the geochemical aspects of fate and transport of contaminants. Mr. Anné's typical project experience includes:

< Data manager for the Pennwalt Corporation's RCRA Corrective Action RFI Phase I program. The project included quantifying and characterizing soil contamination and hydrogeologic flow systems of 12 SWMUs at a flourochemicals plant in Thorofare, New Jersey. Validated and prepared QA/QC reports for data generated during the project. Qualified all data in preparation of the final report. Work was performed under the direction of NJDEP.

< Project Chemist in charge of field sampling activities, including coordinating and scheduling all subcontracted laboratory work for more than 25 sites in Connecticut. Trained field teams in sampling techniques for soil, groundwater, and surface water; chain of custody requirements; sampling QA/QC protocols; and analytical requirements. Work was performed under the scrutiny of ConnDEP.

< Field Team Leader for a major hazardous waste drum excavation project. Supervised all field activities including site safety; excavation; removal, sampling, and over packing of drums; staging and sampling of contaminated soil; and preparation of samples. Coordinated excavation and laboratory subcontractors. Work was performed under the scrutiny of ConnDEP.

< Created an environmental monitoring program for the Bryan Mound site of DOE's Strategic Petroleum Reserve for testing ground water and surface water. Developed sampling protocols, frequency of sampling, and lists of target analytes. This program was designed to provide baseline data for pre-spill conditions in the event of a release. The site was under scrutiny by EPA Region V and the Texas Water commission.

< Project Chemist responsible for developing analytical QA/QC program that included sampling and chemical analyses of surface water, groundwater, soil, and sediment matrices as part of a Remedial Investigation/Feasibility Study (RI/FS). The RI/FS involved more than 25 sites throughout the State of Connecticut. Work was under the guidance of ConnDEP.

Analytical Chemistry

Mr. Anné has experience working in both fixed-base and mobile laboratories. His experience includes the use of gas chromatography, atomic absorption spectrometers, infrared spectrometers, and numerous wet chemistry and preparation equipment methods. He has served in the laboratory as an analyst, laboratory advisor, and QA officer. He has interfaced with regulators in the area of analytical chemistry and has experience in petroleum fingerprinting techniques and methods. Typical projects include:

< Analytical Chemist for the mobile laboratory responsible for sample preparation in support of several projects for a range of clients located in three EPA regions and in conjunction with several state agencies. Extracted, concentrated, and prepared water and soil samples for analyses by GC/FIND, GC/ECD, GC/PID, and GC/MS. Samples were prepared for PCB, pesticide, polynuclear aromatic hydrocarbon, and petroleum hydrocarbon analyses.

< Performed bench scale experiments for St. Lawrence Zinc in order to obtain the optimum level of Phlotec necessary to treat discharged water to resolve an N.O.V. for the SPDES outfall. The optimum level of Phlotec would precipitate enough dissolved zinc for the water to meet the discharge requirement. Also performed routine analyses of samples after implementing the treatment, to insure that the proper concentration was being used.

< Environmental Chemist in charge of project to design updates for the DOE's laboratories at its SPR facilities. Evaluated IR and FT-IR instrumentation and personal computers to link with existing and future instrumentation. Wrote procedures for the acceptance of an alternative oil & grease method for NPDES permit monitoring by EPA Region V. Coordinated all site activities necessary for implementing upgrades.

< Environmental Chemist in charge of replacing obsolete total organic carbon (TOC) analyzers for the SPR laboratories. Evaluated state-of-the-art TOC analyzers and recommended replacement TOC analyzer. Negotiated with supplier and wrote technical specification for the bid process required by DOE. Supervised installation and set-up of all new TOC analyzers.

< Analytical Chemist for Berkley Products Company responsible for product development. Analyzed competitors' products and formulated new coatings with equal or better quality. Responsible for solvent operations which included managing the waste solvent recovery operations, solvent formulation, and manufacturing QA/QC. Worked with sales and manufacturing staff to address and resolve client complaints. Received two cash bonuses for suggestions on the manufacture of products which saved the company money.

EMPLOYMENT:

2005- present, Alpha Geoscience
1998-2005, Alpha Environmental Consultants, Inc.
1990-1998, McLaren/Hart
1986-1990, Fred C. Hart Associates
1985-1986, Boeing Petroleum Services
1982-1985, Petroleum Operations and Support Services
1981-1982, Dravo Utility Constructors
1979-1981, Florida Institute of Technology
1975-1979, Berkley Products Company

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TREVOR M. GOWAN
GEOLOGIST

EDUCATION: B.A. Geology, 2004, Hobart College

SPECIAL TRAINING: Certified 40-Hour OSHA Health and Safety
Certified 8-Hour OSHA Annual Health and Safety Refresher Course

EXPERIENCE SUMMARY:

Mr. Gowan's experience includes the geological logging of soil and rock; supervising the drilling and installation of bedrock monitoring and production wells; monitoring, sampling and testing of ground water; and conducting surface water testing and flow measurements. He also has experience with investigating potentially contaminated sites, such as petroleum tank sites.

SELECTED PROJECT EXPERIENCE:

< Conducted water quality sampling on a weekly basis for the Akzo Brine Mitigation project. Sampling involves using a Waterra pump to purge the wells while monitoring field parameters.

< Supervised drilling and installation of 500-foot deep overburden monitoring wells and 600- to 850-foot deep bedrock monitoring wells. Duties included logging of overburden materials and logging the bedrock. Provided oversight to the drillers to confirm proper drilling depths of screened zones.

< Supervised the drilling and installation of ground water monitoring wells at a solid waste landfill. The wells were installed as part of the leachate monitoring system.

< Supervised the drilling and installation of ground water test wells and monitoring wells at a proposed spring water bottling facility in upstate New York.

< Supervised the drilling and installation of temporary ground water test wells and soil borings as part of a Phase II Environmental Site Assessment in Schodack, New York.

< Installed well points for monitoring ground water depth and quality at a former petroleum bulk storage facility in Schoharie County, New York.

< Conducted petroleum recovery and ground water monitoring at an apartment complex. Contaminants of concern included number 6 heating oil that was used in the apartment building.

< Performed pumping tests for a municipal well in Fleichmanns, New York.

< Conducted routine groundwater quality sampling for trichloroethylene (TCE) monitoring program for a former retail dry cleaner in Newburgh, New York.

< Conducted routine groundwater quality sampling for trichloroethylene (TCE) monitoring program for a former retail dry cleaner in New Paltz, New York.

< Maintained databases for the ongoing brine mitigation program of the former Akzo mine near Geneseo, New York.

PROFESSIONAL AFFILIATIONS: Hudson Mohawk Professional Geologist Association
New York State Council of Professional Geologists

EMPLOYMENT: 2004- Present, Alpha Geoscience

ALAN W. TAVENNER, PE

EXPERIENCE PROFILE:
Mr. Tavenner has 23 years of experience planning, permitting and design of environmental projects which includes municipal water, sewer, drainage, and building projects as well as investigation, feasibility study, and design of remedial measures for polluted industrial sites.

EDUCATION: MS-Civil Engineering, University of Missouri, Columbia (May 1985)
BS-Geological Engineering, University of Missouri, Rolla (May 1983)

CERTIFICATIONS: Professional Engineer, New York State (1992)

EMPLOYMENT HISTORY:
1998-present: Delaware Engineering, Albany, New York
1989 - 1995: Dunn Geoscience Corporation, Albany, New York
1995 - 1998: RUST Environment & Infrastructure, Albany, New York
1985 - 1989: U.S. Environmental Protection Agency, Superfund Branch, Dallas, Texas

PROFESSIONAL EXPERIENCE:

HAZARDOUS WASTE/PETROLEUM SPILL REMEDIATION

INVESTIGATION AND REMEDIAL PLANNING; OXY USA - PRINCETON, NJ: Project manager for completion of the RI/FS and remedial plan for extensive groundwater contamination, abandoned waste lagoons, and former manufacturing areas at a former ink plant. In place closure of the waste lagoons was approved and significantly reduced clean-up costs for the site.

DESIGN FOR SEDIMENT AND WATER PROCESSING; NYSDEC, PLATTSBURGH, NY: Design engineer for development of construction plans for removal and dewatering of 130,000 yards of PCB contaminated sediment from Lake Champlain.

DESIGN AND CONSTRUCTION, GROUNDWATER AND SOIL CLEAN-UP - NYSDEC, HYDE PARK, NY: Project manager for design, construction, and O&M of the Now Corporation site remediation. Work consisted of groundwater/vapor recovery and treatment as well as on-site treatment of soil through low temperature thermal desorption.

CONSTRUCTION, O&M; MARTIN MARIETTA - SYRACUSE, NY: Project manager and engineer for installation of a bioventing system to treat soils affected by a gasoline spill at Electronics Park Facility.. Responsible for design, construction, start-up, and first three months O&M. The project was completed on a design-build-operate basis.

GROUNDWATER TREATMENT – URANIUM MILLS, NEW MEXICO: Project manager for investigation and clean-up of extensive groundwater contamination by heavy metals around two large tailings impoundments in Grants and Churchrock, NM.

DESIGN FOR SEDIMENT AND WATER TREATMENT - OCCIDENTAL CHEMICAL, BUFFALO, NY: Engineer for testing and design of systems to treat dredged sediment and water from removal of contaminated river sediments. Systems included a plant for 1.7 MGD water, filter presses for sediment processing and temporary buildings.
GROUNDWATER TREATMENT - MARTIN MARIETTA, NEW HARTFORD, NY: Project manager and engineer for design, construction oversight, and O&M of a recovery and treatment system for contaminated groundwater.

DESIGN AND CONSTRUCTION; ORANGE & ROCKLAND UTILITIES, NYACK, NY. Project engineer for design, excavation, and off-site disposal of 10,000 yards of PCB and petroleum contaminated soil from O&R's Nyack yard.

UTILITY CLOSURE AND DEMOLITION - WARREN CT. SUBDIVISION, HAVERSTRAW, NY: Project engineer for negotiation and preparation of plans for abandonment of a subdivision constructed on a former industrial waste landfill. Abandonment included removal of houses, reconstruction or sealing of storm and sanitary sewers, surface drainage improvements, and fencing. The project was completed on a design-build basis.

SOIL & GOUNDWATER CLEAN-UP; MARTIN MARIETTA - FARRELL RD. PLANT , GEDDES, NY: Manager for Construction QC of installation of soil and groundwater clean-up systems at two areas of a former electronics plant and design/construction of a fuel oil recovery system at a third area of the site. Start-up testing and permitting support for the systems was performed following installation.

CONSTRUCTION SERVICES FOR SITE REMEDIATION, NYSDEC - BINGHAMTON, NY: Project manager for engineering and construction QA services related to excavation and on-site treatment of pesticide contaminated soil by base-catalyzed thermal treatment.

CLOSURE OF HAZARDOUS WASTE STORAGE AREAS, GENERAL ELECTRIC, SCHENECTADY, NY: Project Manager and Engineer responsible for closure of thirteen 90-day RCRA permitted hazardous waste management units. The work included sampling, decontamination, and certification reports to document closure.

O&M AT CLOSED LANDFILLS, GENERAL ELECTRIC, FT. EDWARD, NY: Project manger for operation and maintenance at four closed GE landfills. Services include improvements to reduce costs and simplify operation, routine maintenance and testing, groundwater sampling, reporting, and general upkeep of the sites.

PETROLEUM SPILL CLEAN-UP - ULSTER CO. DPW, KINGSTON, NY: Project engineer for design and construction of soil vapor and groundwater recovery and treatment systems for a petroleum spill at a Ulster County DPW yard. The systems were operated for three years and closure was approved by the State.

SOIL CLEAN-UP; MARTIN MARIETTA - FRENCH ROAD, UTICA, NY: Project manager for installation of air pollution controls, start-up, and first year O&M of an ex-situ soil vapor extraction cell.

MUNICIPAL INFRASTRUCTURE PROJECTS

WATER PLANT AND SUPPLIES – HUNTER, NY: Responsible for construction of a new 0.5MGD filtration plant, development of additional water supplies and system integration.

WASTEWATER PLANT - KENT, NY: Design of tertiary wastewater treatment system for 270 unit development in the NY Watershed.

WATER SYSTEM IMPROVEMENTS, FLEISCHMANNS, NY: Rehabilitation of surface water influenced springs, and development of alternate water supplies and storage tank.

WATER SYSTEMS IMPROVEMENTS – KEESEVILLE, NEW YORK: Responsible for design and construction of new 1.0MGD contact filtration plant, storage tank construction and repairs, replacement of seven mile of water mains, and pressure control structures, and changes to the system operation to chronic resolve pressure and distribution problems.

WATER FILTRATION PLANT – FT. EDWARD, NEW YORK: Design of a 1.2 MGD water filtration plant for the Village. The system includes: elevated and in-ground storage, pumping systems, chemical addition, filtration, system automation, and waste sludge management.

WATER SYSTEMS IMPROVEMENTS – MIDDLEBURGH, NEW YORK: Design of improvements including a back-up 0.5MGD well, rehabilitation of the existing well, new storage facility, remote operations, and water main replacements.

WASTEWATER SYSTEM UPGRADE - NYS HARRIMAN LODGE, E. JEWETT, NY: Responsible for site studies, design, and construction of the system for a State camp to meet wastewater requirements for the NYC Watershed. An I&I study was completed and corrective work completed to allow construction of 20,000 GPD subsurface (septic) system.

WATER SYSTEMS IMPROVEMENTS – WINDHAM, NEW YORK: Rehabilitation and upgrade of existing storage tanks and water supply wells as well as remote monitoring and automation of operations.

WATER SYSTEM IMPROVEMENTS – GREENVILLE, NEW YORK: Design and construction of a filter system testing to remove iron/sulfur and pumping/storage systems to improve flow and pressure in the Town supply. Work was done by municipal employees as force account work under our technical direction.

WATER SYSTEM IMPROVEMENTS - CANAJOHARIE, NEW YORK: Responsible for design and construction of a new 1.5MGD slow sand filter plant, a new pumping station and water tower and other miscellaneous improvements to improve and simplify operations. The system was converted to gravity, eliminating $100K per year electrical costs

WATER SYSTEM EXTENSION – NORWICH, NEW YORK: Responsible for planning, design, and construction of a two mile extension of City water to a new State facility. Project included two pumping stations and a fire supply.

WATER AND SEWER LINE EXTENSION - CITY OF ROME, NEW YORK: Provided engineering for the construction of an expansion to the City of Rome water and sewer systems. The project included construction of one mile of water main, two miles of sanitary sewer force main, and a sewage pumping station.

WASTEWATER PRE-TREATMENT; GUILFORD MILLS, SCHENECTADY, NEW YORK: Prepared design plans and provided technical support in construction of a 0.5 MGD industrial wastewater pre-treatment system. The system utilized chlorination and equalization to remove dyes to allow discharge to the municipal sewer system

WASTEWATER PILOT TEST; GENERAL ELECTRIC -SCHENECTADY, NY: Site engineer responsible for set-up and conduct of pilot testing of a polymer feed system on one 15 MGD train of the 60 MGD treatment plant. Testing was done during major storm water run-off events to investigate improvements in suspended solids and chemical removal.

WASTEWATER TREATMENT - PYRAMID COMPANIES - SYRACUSE, NEW YORK: Provided engineering services related to permitting, design, construction, and start-up of the 0.3 MGD filtration and carbon polishing system to treat effluent from maintenance de-watering of under-drains from the Carousel Center Mall.

SOLID WASTE

LANDFILL CLOSURE - CITY OF ROME, NEW YORK: Project manager for closure of the 50 acre Tannery Road landfill. Closure included waste grading, a NY-Part 360 cover system, a 5000 foot slurry/sheet pile cut-off wall, leachate recovery system, wetland mitigation, and gas flare installation. The construction contract value was $4.5 million and work was completed on time in budget.

LEACHATE/GAS COLLECTION - WASTE MANAGEMENT, FRANKFORT, NY: Project manager and engineer for various improvements at this closed solid waste landfill, including modifications to the leachate collection drain, installation of new gas extraction wells, and replacement of failed gas headers.

LANDFILL GAS RECOVERY; NEO/COMMONWEALTH EDISON, ALBANY, NY: Design engineer for gas collection improvements in conjunction with construction of new cells and Electric CoGen plant at the Albany County landfill.