DUNN
GEOSCIENCE CORP.

12 METRO PARK RD. •
ALBANY, NEW YORK 12205
518/458-1313
FAX 518/458-2472

Early Warning Groundwater Monitoring System Plan Luther Forest Well Field Malta, New York CERCLA II-90219

Prepared for:

General Electric Company
New York State Energy
Research and Development
Authority

Prepared by:

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, New York 12205

Date:

December 4, 1989
Revised March 20, 1990

15 (12-75)

New York State Department of Environmental Conservation

MEMORANDUM

TO: Daniel Steenberge, Reg. Hazardous Waste Remediation Engineer, Region 5
FROM: Joseph L. Slack, Director, Bureau of Eastern Remedial Action, DHWR
SUBJECT: Revised Early Warning Groundwater Monitoring System Plan - Malta Rocket Test Site (Id. No. 546022)

DATE: MAR 2 2 1990

Attached is a copy of the Revised Early Warning Groundwater Monitoring System Plan for the Malta Rocket Test site.

Please have staff review this document and provide your written comments to Jonathan Greco, of my staff by April 20, 1990.

If you have any questions, he can be reached at (518) 457-3976.

Attachment

15 (12-75)

New York State Department of Environmental Conservation

MEMORANDUM

TO: Johnathan Greco - BERA-DHWR - Albany
FROM: Glenn Bruso - DHWR - Region 5 - Warrensburg
SUBJECT: Revised Early Warning Groundwater Monitoring System Plan - Malta Rocket Test Site, Site #546022
DATE: Malta (T), Saratoga (Co.)
April 10, 1990

With regard to the revised March 20, 1990 edition of the above noted plan, the following comments are offered:

1. The plan is not specific as to what public water supply will be used to supply the water to be used in the drilling process. I would assume the use of water from the Luther Forest well field would be the logical choice.

2. The plan indicates that any future water samples for metals will be filtered. While we can't stop them from taking filtered samples, we should indicate that any decisions made about metals in groundwater will be based predominately on unfiltered samples.

3. Per our recent telephone conversations, page 19 of the plan indicates that all existing early warning monitoring wells will be redeveloped.

Glenn N. Bruso, P.E.
Senior Sanitary Engineer

GNB:chb

cc: D. Steenberge

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

APPENDICES

1.0 INTRODUCTION

This report presents the activities performed and supervised by Dunn Geoscience Corporation for the design and implementation of an early warning groundwater monitoring system for the Luther Forest Well Field in the Town of Malta, Saratoga County, New York and the plan for operation of an early warning monitoring system pursuant to EPA Administrative Order Index No. CERCLA II-90219. The work was performed in accordance with the December 3, 1986 (revised March 3, 1987) Work Plan prepared by Dunn Geoscience Corporation for General Electric Company of Fairfield, Connecticut. This report has been prepared for General Electric Company and New York State Energy Research and Development Authority and submitted in fulfillment of EPA Administrative Order Index No. CERCLA II-90219 Paragraph 38.

The Luther Forest Well Field is located north of Knapp Road in the Town of Malta, Saratoga County, New York (Figure 1). The well field consists of five wells operated by the Saratoga Water Company and provides service to approximately 5,000 to 6,000 people. The well field is located approximately 6,000 feet southwest of the Saratoga Research and Development Center (SRDC), operated by the New York State Energy Research and Development Authority (NYSERDA). The SRDC is a New York State Class 2 Inactive Hazardous Waste Site and a Federal NPL Site. Past sampling of groundwater supply wells at the SRDC has shown the presence of carbon tetrachloride, trichloroethylene and boron.

Preliminary hydrogeologic information developed by others at the SRDC site suggested that some portion of the groundwater underneath the test site flows in a southwesterly direction from the test site, while another portion of the groundwater breaks out as surface water, seeping into ravines approximately 3,000 feet from the well field.

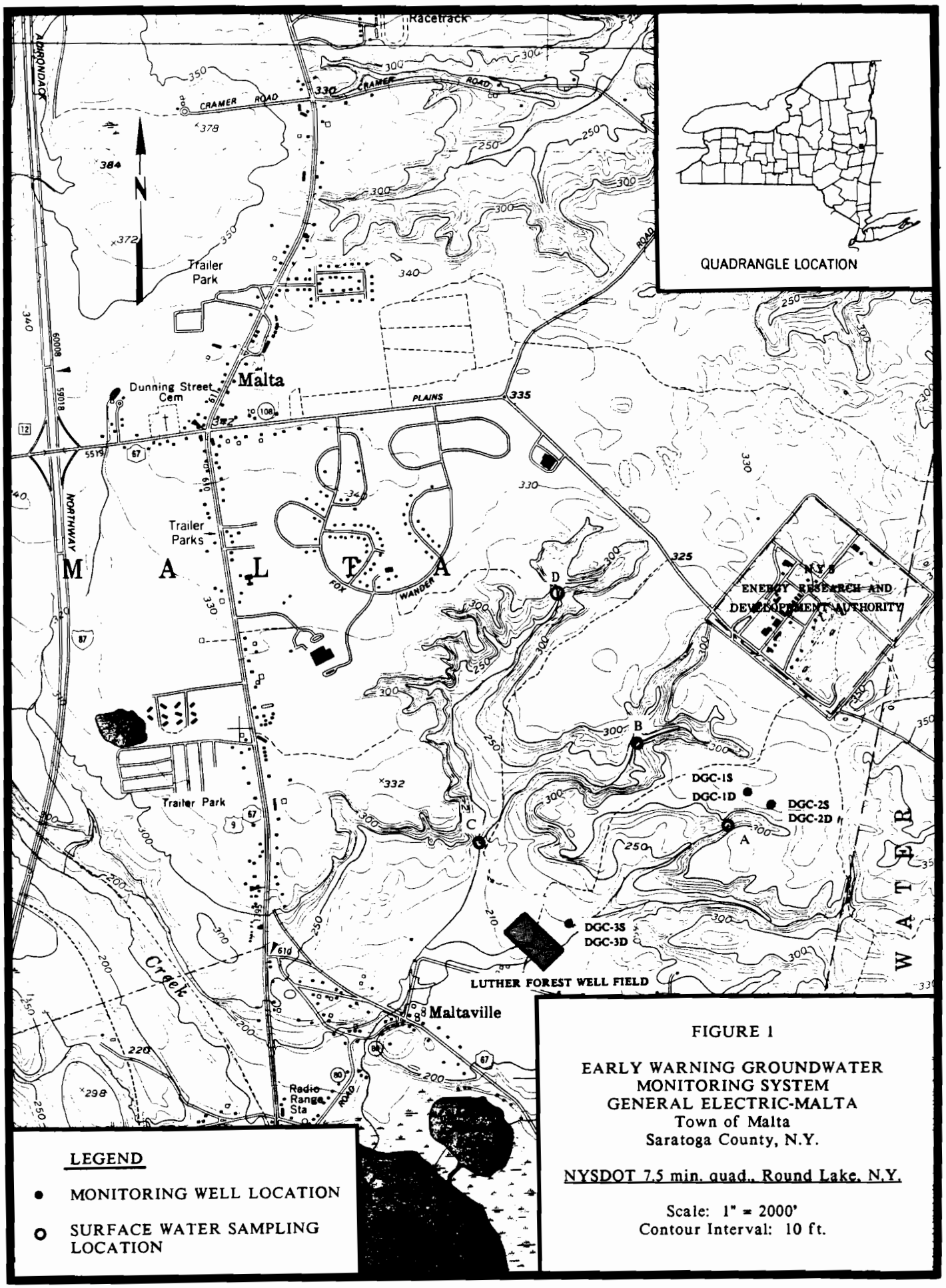


FIGURE 1

EARLY WARNING GROUNDWATER MONITORING SYSTEM
GENERAL ELECTRIC-MALTA
Town of Malta
Saratoga County, N.Y.

NYSDOT 7.5 min. quad., Round Lake, N.Y.

Scale: 1" = 2000'
Contour Interval: 10 ft.

Water samples obtained from the ravines were generally clean, with the exception of one sampling location where organic chemicals were detected. However, observed concentrations were much lower than levels reported in the supply wells at the SRDC site.

The purpose for the installation of the early warning monitoring system is as follows:

- To determine if surface waters are impacting the well field by sampling four surface water points; and,

- To determine if groundwater is impacting the well field by installing and sampling an early warning groundwater monitoring well network.

The scope of work developed to meet the project objectives was designed to provide a network of water quality sampling points to detect the presence, if any, of volatile organic compounds in groundwater and surface water prior to reaching the well field. The scope of work developed is briefly outlined below:

- Drilling and installation of monitoring wells at four distinct locations.
- Subsurface split-barrel soil sampling.
- Hydraulic conductivity testing.
- Monitoring well surveying.
- Establishment of four surface water sampling locations.
- Conduct quarterly groundwater and surface water sampling and analysis.

2.0 METHODOLOGY

This investigation was designed to provide a system of water quality sampling points to detect the presence, if any, of volatile organic compounds in groundwater and surface water prior to it reaching the well field. The selection of well locations and surface water sampling points is based on Dunn's knowledge of the area geology and hydrogeology, available information on the groundwater chemistry detected at the SRDC, and the objective to detect any volatile organic constituents as early as possible.

The spatial distribution of monitoring wells and stream sampling points for this investigation was based upon the following:

- Groundwater within the Lake Albany sand generally flows toward the southwest and provides discharge into the two streams between the SRDC and the Luther Forest Well Field.

- Surface water infiltration from the streams transecting the well field site provides recharge to the well field.

Locations of monitoring wells and stream sampling points are presented in Figure 1 and Plate 1.

2.1 Drilling and Monitoring Well Installation

The installation of three well pairs (DGC-1, DGC-2 and DGC-3) was accomplished over the 13-day period from April 29 to May 15, 1987. The drilling and installation of the monitoring wells was performed by CATOH Environmental Companies, Inc. of Weedsport,

New York and was supervised by Alan G. Hall, Hydrogeologist. A summary of monitoring well installation details is located in Table 1 and locations are shown on Plate 1.

Test borings were advanced using 4 1/4-inch I.D. hollow-stem augers. An all-terrain vehicle mounted CME-75 soil boring rig was utilized for all drilling. Water used in the drilling process was obtained from a local fire hydrant. Subsurface soil sampling was conducted in accordance with the ASTM Standard D-1586 in the deep boring of each well pair. The samples were collected at the standard 5-foot intervals and were described using a modified version of the Burmister System and the Unified Soil Classification System. Representative portions of all samples were retained by Dunn Geoscience Corporation for possible future examination. Boring logs describing subsurface materials encountered in each boring are included as Appendix A.

Installation and design of each well was based on the data gathered during the test boring drilling which provided information regarding the water table, sediment characteristics, and stratigraphic relationships. Each well assembly was constructed in the boring immediately following drilling. All wells were constructed of a 0.010-inch slot, schedule 40 PVC well screen attached to a 2-inch diameter, schedule 40 PVC riser pipe. With the exception of DGC-2S and DGC-3S, which were installed with 15 and 18 feet of screen, respectively, all wells were installed with 20 feet of screen. This was done to minimize the potential dilution of groundwater samples that can be associated with exceptionally long screen sections. Intake screens in each well were set on one-half foot of Morie grade 00 silica sand. The annulus around the well screen was packed with the silica sand one-half to two and one-half feet above the top of the screen, sealed with one and one-half to two and one-half feet of bentonite pellets, and then grouted to the ground surface with a

TABLE 1

Luther Forest Well Field
Early Warning Groundwater Monitoring System - Malta, N.Y.
Monitoring Well Information

Well No.	Date Completed MN-DY-YR	Inspector	Drilling Company	Driller	Ground Elevation (ft)	Stickup (ft)	Well Diameter (in)	Measuring Point Elevation (ft)	Measuring Point
DGC-1S	5-13-87	A. Hall (DGC)	CATOH	Buchanon	321.2	2.87	2	324.07	PVC
DGC-1D	5-12-87	A. Hall (DGC)	CATOH	Barrow	321.2	2.13	2	323.33	PVC
DGC-2S	5-15-87	A. Hall (DGC)	CATOH	Buchanon	307.5	2.12	2	309.62	PVC
DGC-2D	5-14-87	A. Hall (DGC)	CATOH	Buchanon	307.5	2.55	2	310.05	PVC
DGC-3S	5-7-87	A. Hall (DGC)	CATOH	Barrow	212.6	2.68	2	215.28	PVC
DGC-3D	5-6-87	A. Hall (DGC)	CATOH	Barrow	212.6	2.42	2	215.02	PVC
10-S	7-15-86	SPS (B&B)	Empire	NA	327.0	2.58	2	329.58	PVC
10-D	5-6-87	SPS (B&B)	Empire	NA	327.1	1.83	2	328.93	PVC
13-S	5-6-87	SPS (B&B)	Empire	NA	327.1	2.16	2	329.26	PVC
13-D	5-6-87	SPS (B&B)	Empire	NA	327.3	1.98	2	329.28	PVC

Well No.	Formation Screened	Well Depth (ft)	Boring Depth (ft)	Screen Depth (ft)		Screen Elevation (ft)		Sand Pack Depth (ft)	
				TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
DGC-1S	Sand, little Silt	58.0	58.5	38.0	58.0	283.2	263.2	37.0	58.5
DGC-1D	Silt and fine Sands	78.0	91.0	58.0	78.0	263.2	243.2	55.5	78.5
DGC-2S	Sand, little Silt	35.0	35.5	20.0	35.0	287.5	272.5	17.5	35.5
DGC-2D	Sand, little Silt	55.0	59.0	35.0	55.0	272.5	252.5	33.0	55.5
DGC-3S	Sand and Gravel	23.0	23.5	5.0	23.0	207.6	189.6	4.5	23.5
DGC-3D	Clay and Silty Clay	46.0	46.5	26.0	46.0	186.6	166.6	25.0	46.5
10-S	Sand, trace Silt	41.0	47.0	30.97	40.97	286.03	296.03	25.0	43.0
10-D	Silt and Clay	74.5	92.0	64.54	74.54	252.56	262.56	60.0	78.0
13-S	Sand, trace Silt	40.3	47.0	30.42	45.42	281.68	296.68	25.0	43.0
13-D	Sand, some Silt	66.9	72.0	69.42	79.42	247.88	257.88	52.0	70.0

DGC Well Elevations from 7/25/87 surveying data

Well information for 10-S, 10-D, 13-S, and 13-D obtained from Blasland & Bouck report, "Hydrogeologic and Water Quality Investigation at the Saratoga Research and Development Center - Agreement No. 920-M&O-87"

DGC = Dunn Geoscience Corporation

B&B = Blasland & Bouck Engineers, P.C.

NA = Not Available

cement-bentonite mixture. A lockable, protective steel casing was installed over the riser pipe and cemented into place. Individual well construction diagrams are included as Appendix A.

DGC-1 and DGC-2 well pairs are located north and northeast, respectively, from the headwaters of the westernmost stream that flows near the well field. The purpose for these locations is to provide groundwater quality information as groundwater approaches the discharge point at the stream head. DGC-1S (shallow) screens the entire saturated thickness of the Lake Albany sands, from a depth of 38 to 58 feet, the sand-silt interface. DGC-1D (deep) screens the gray silt and clay below the sands, from a depth of 58 to 78 feet. DGC-2S and DGC-2D screen the entire saturated thickness to the sand-silt interface, with screen placements at 20 to 35 feet and 35 to 55 feet, respectively. Deep monitoring well DGC-2DX, screened from 35 to 55 feet had to be abandoned due to the inability to retrieve a tremie hose from the adjacent shallow boring, DGC-2SX, during drilling. Running sands within the annulus of DGC-2SX had closed in on the tremie hose at a depth of approximately 35 feet, making it irretrievable. Various methods were attempted to recover the tremie hose, including flushing water through the hose to loosen the sand, but were unsuccessful. The annulus of DGC-2SX was tremied with a cement/bentonite grout to the ground surface and abandoned. A portion of the tremie hose was retrieved after pulling out the augers. The new DGC-2 well pair was relocated approximately 100 feet in a northwesterly direction towards the DGC-1 well pair. Abandonment procedures for DGC-2DX involved cutting the PVC well below grade and using a tremie hose to fill the well with grout to the ground surface.

Wells DGC-3S (shallow) and DGC-3D (deep) were located at the slopebreak adjacent to the terrace gravel/silt and clay intersection. DGC-3S was drilled to a depth of approximately 23 feet below ground surface, allowing the groundwater quality to be sampled in the

northeast corner of the terrace-gravel aquifer. DGC-3S also monitors groundwater quality where the first infiltration of water from the stream northeast of the well field enters the aquifer. The deep well (DGC-3D) screens the silt and clay below the terrace-gravel aquifer at an interval of 26 to 46 feet. The specific reasons for the deep well were to monitor groundwater quality within the lower saturated zone and to provide information on vertical gradients at the DGC-3 location. Knowledge of the vertical gradients of groundwater flow are important when assessing the relationship of saturated intervals hydraulically communicating with each other.

In addition to the three well pairs described above, one additional well at location DGC-4DX was drilled. The proposed wells at location DGC-4DX were abandoned for two reasons:

1. No terrace gravel deposit was encountered during the drilling of DGC-4DX (stopped at 29.2 feet); and,

2. Several old and rusted 55-gallon and smaller drums were discovered in the vicinity of the borings.

Subsequent discussion with Mr. William Mackey in June of 1987 indicated that the unmarked and rusted 55 gallon drums were abandoned by a pig farm that used to be in the area of Van Patten's field. As described by Mr. Mackey, the pig farmer used the 55 gallon drums to go to area restaurants to get food scraps for the pigs. Presumably, the smaller pails observed were used to transfer food from the 55 gallon drums to any feeding troughs employed at the pig farm. Based on the information given by Mr. Mackey, the drums observed in Van Patten's field are not suspected of containing hazardous waste. As

recently as February 1990, the two to four drums observed in 1987 are reportedly still in their original location.

2.2 Decontamination Procedures

A steam cleaner was used to clean all equipment prior to drilling to remove possible contaminants encountered during mobilization to the site. To prevent cross-contamination, the drilling equipment was also decontaminated between wells. A well screen and riser pipe was stem cleaned just prior to well construction.

2.3 Well Development

Well development was performed from May 29 to June 6, 1987. Each monitoring well was developed by using a PVC bailer with the exception of DGC-3S, in which a centrifugal pump was employed. A bailer was used as a surge-block device, loosening any fine-grained material, while the centrifugal pump was used to remove the water and sediment from the well, inducing recharge of formation water. This procedure continued until the water had sufficiently cleared or five well volumes of water had been removed. To prevent cross-contamination during the well development process, a clean dedicated PVC bailer was used for each well or the polyethylene discharge tubing used for pumping was discarded upon completion of development.

Following installation, each new monitoring well will be developed to remove formational silts and clays in the vicinity of the borehole. Each well will be developed to the fullest extent practical with a goal of 50 NTUs (nephelometric turbidity units). During development, field turbidity values will be measured using an HF Instruments DRT15B nephelometric turbidity meter.

2.4 Surveying

Monitoring well locations and elevations were surveyed on July 23, 1987. United States Geological Survey datum were used to determine ground level and PVC stickup elevations at each well. The wells were located in relative position to existing ground features such as paved roads, benchmarks, permanent structures, and property lines.

2.5 Groundwater and Surface Water Sampling

Quarterly sampling of the early warning monitoring network began on June 29, 1987, following sampling procedures that were outlined in the March, 1987 Work Plan (Appendix C). Each of the six wells and four stream locations were sampled and subsequently analyzed for volatile organics compounds (VOCs) using EPA Test Method 624 until the January 19, 1989 sampling event, when VOC analysis was switched to EPA Test Method 524.2 in order to retain the same detection levels as the New York State Department of Environmental Conservation (NYSDEC). Other compounds analyzed in past sampling events have included aluminum, boron and lead. The August 15, 1989 sampling event included the sampling and analysis of the Saratoga Water Services, Inc. Luther Forest Water Supply wells.

The NYSDEC witnesses the quarterly sampling events and collects selected split samples. Dunn collects split samples wherever the NYSDEC takes samples and analyzes for the same suite of compounds. A letter report discussing analytical results is prepared by Dunn following each sampling event and submitted to the NYSDEC and USEPA.

3.0 HYDROGEOLOGY

The unconsolidated deposits overlying bedrock are of glacial origin, formed during the Wisconsin stage of the Pleistocene glaciation. The structure of these deposits are associated with the buried Colonie Channel running approximately north to south beneath the area of investigation. Locally, the Colonie Channel is cut through the Canajoharie Shale. Typically overlying the shale are low-permeability, blanket-like glacial till sediments, usually consisting of dark gray to dark brown, compact mixtures of gravel, boulders, sand and clay. The till was deposited at the base of the glacial lobe during episodes of glacial advance and retreat. Overlying and occasionally stratigraphically equivalent to the till are moderately permeable, ice-contact sand and gravel deposits consisting of brown, well to poorly sorted sand, gravel, silt and clay.

In the area of the SRDC, ice-contact deposits are overlain by approximately 100 feet of silt and clay deposited into the calm waters of Glacial Lake Albany which occupied the Hudson Lowlands immediately following deglaciation of the area. The lake-bottom deposits are reddish gray to dark gray varved silt and clay with very low permeabilities. Overlying the lake-bottom deposits are additional Lake Albany deposits of moderate permeability consisting primarily of gray to brown sand with thin silt lenses or laminae. Locally, the lake sands are commonly overlain by coarser, slightly more permeable lake sands that contain trace to significant quantities of gravel. The most recent surficial deposit is the aeolian sand consisting of well-sorted, fine to medium sand with little silt and formed by the reworking of lake sand deposits by wind action. At well pairs DGC-1 and DGC-2, the total observed thickness of sandy deposits is up to 55 feet.

The top 24 feet of surficial deposits at the Luther Forest Well Field differs from surficial deposits at the SRDC. At well pair DGC-3, lacustrine sands deposited into the Glacial

Lake Coveville are observed from ground surface to approximately 15 feet in depth. These sands are generally light brown, silty, fine to medium-sized sand. Based on geologic information from well DGC-3D, beneath the lake sands to a depth of approximately 24 feet lie terrace gravel deposits created by the ancient Mohawk River as it flowed around the ice block that formed the present-day Round Lake. The terrace gravel aquifer is situated directly on Lake Albany silt and clay and can be observed at the ground surface southwest of the well field along Route 67.

Groundwater is observed in the unconsolidated deposits at the site under unconfined or water table conditions. The water table is free to rise and fall in response to groundwater recharge and discharge. It is restricted in the downward direction as a result of the low permeability of the glaciolacustrine silt and clay aquiclude deposits which underlie it.

Groundwater within the Coveville terrace gravel aquifer exists under water-table conditions and provides water to the Luther Forest Well Field. Recharge to the aquifer is primarily from infiltration of precipitation where the deposits are exposed to the ground surface, infiltration of precipitation transmitted through the Lake Coveville sands, and infiltration of surface water from the streams which transect the site. The interaction between surface water and groundwater is exhibited by the existence of streams where groundwater breaks out as surface water from Lake Albany sands, seeping into ravines between the test site and the well field. The streams have eroded through the lake sands and flow on the underlying silt and clay. Upon entering the well field area, a portion of stream flow infiltrates the Coveville sands recharging the underlying aquifer. The quantity of stream flow entering the Luther Forest aquifer will vary according to well field production. Based on boring log information from DGC-1D, DGC-3D, production well PW-2 and 10D (a well located on SRDC property), a geologic cross section (Plate 2) extending from the test site area to the well field was created, displaying the vertical and

horizontal distribution of the deposits. Plate 3 shows the location of the cross-section in plan view.

4.0 QUARTERLY SAMPLING AND ANALYSIS

Subsequent to well development, an initial round of groundwater and surface water sampling was performed on June 29-July 1, 1987, with a limited follow-up sampling occurring on July 31, 1987. As part of the initial sampling, all 6 wells (DGC-1S, 1D, 2S, 2D, 3S and 3D) and surface water sampling locations (SW-A, B, C and D) were analyzed for volatile organic compounds (EPA Test Method 624), aluminum and boron. The follow-up sampling round consisted of sampling well DGC-2D and SW-C for volatile organics only.

Results of the initial sampling round on June 29, 1987 reported benzene at a concentration of 3.5 ug/L in the blind duplicate sample of well DGC-2D and tetrachloroethylene at 2.0 ug/L in surface water location SW-C. The follow-up sampling round for VOC analysis was performed on July 31, 1987 at DGC-2D and SW-C, with results reported as ND (Not Detected) for all compounds at both locations. Due to the very low concentrations reported, the lack of quality control verification and reported absence of these compounds in the resampling round and in NYSDEC split samples, it was concluded that the Luther Forest Well Field did not appear to be impacted by the SRDC site.

Since July 1987, Dunn Geoscience has collected samples quarterly from the early warning monitoring system wells and surface water locations according to the following schedule:

November 5, 1987	January 19-20, 1989
January 19-20, 1988	April 10, 1989
April 18-19, 1988	July 12, 1989
July 20-21, 1988	August 15, 1989
October 11-12, 1988	

Split samples from selected wells are collected and analyzed by NYSDEC. In January of 1989, the original analytical protocol was changed from EPA Test Method 624 to Test Method 524.2, allowing for lower detection limits. Analytical results from the last nine quarters of sampling have generally been ND for all volatile organic compounds.

A discussion of the January, April and July, 1989 sampling rounds in which various compounds were reported at various levels is presented below.

The January 19, 1989 sampling event reported carbon tetrachloride at concentrations of 1.1 ug/L in both surface water sampling location SW-B and its blind duplicate sample. Surface water sample SW-C, collected further downstream from SW-B, revealed no carbon tetrachloride (reporting limit = 0.5 ug/L). The absence of carbon tetrachloride at SW-C was attributed to the volatization and dilution occurring between SW-B and SW-C.

A blind duplicate sample was collected from SW-B during the April 10, 1989 sampling event to verify the presence of carbon tetrachloride. Based on the analytical results reported, no volatile organic compounds were detected at any of the monitoring wells or surface water sampling locations with the exception of methylene chloride. Trace amounts of methylene chloride were detected in all sample analyses, including the trip blank and the field blank, indicating probable laboratory contamination.

The July 12, 1989 sampling of the early warning monitoring system was observed by NYSDOH personnel, with split samples collected by NYSDEC at monitoring well DGC-3S and surface water location SW-B. Methylene chloride was again detected in all samples submitted by Dunn for analysis, indicating probable laboratory contamination. In addition, concentrations of dichlorodifluoromethane were reported in all groundwater samples, surface water sample SW-A, the field blank, and the trip blank.

Dichlorodifluoromethane, also known as Freon 12, is a common refrigerant and is believed to have contaminated some samples obtained by Dunn during the shipment process to the analytical laboratory (Enseco/Erco). Dichlorodifluoromethane was not detected in the split sample collected by NYSDEC from well DGC-3S, but trichloroethylene (TCE) was reported at a concentration of 2 ug/L. TCE, however, was not detected in the DGC-3S groundwater sample or any other sample collected by Dunn and analyzed by Enseco/ERCO by EPA Test Method 524.2.

As a result of the reported TCE in the NYSDEC split sample of DGC-3S, a follow up sampling event was performed on August 15, 1989. In addition to re-sampling the entire early warning monitoring system, Dunn collected split samples of the NYSDOH sampling of the Saratoga Water Services Inc. Luther Forest Water Supply wells. Split samples of DGC-3S were collected by the NYSDEC and NYSDOH. The NYSDEC also collected split samples at surface water sampling location SW-A and well DGC-3D. Analytical results of the Dunn samples reported concentrations of methylene chloride, 1,2-Dichlorocthane, chloromethane, and napthalene in various samples. Based on a review of laboratory QA/QC information, the above parameters were considered the result of laboratory contamination. TCE was not detected in any of the samples collected at DGC-3S by Dunn, NYSDEC or NYSDOH. NYSDEC split samples reported no detections of volatile organic compounds. No dichlorodifluoromethane was reported in any samples collected during this sampling round, confirming probable sample contamination during shipment of the July samples. 1,1,1-Trichloroethane was detected in well DGC-2D at a concentration of 1.3 ug/L. 1,1,1-Trichloroethane has not been previously detected in the early warning monitoring wells or the production wells. A duplicate sample from well DGC-2D was collected and analyzed as part of the 4th quarter 1989 sampling event and no 1,1,1-Trichloroethane was detected.

Samples collected by Dunn and NYSDOH from the Luther Forest Water Supply wells indicated the presence of chloroform in wells PW-2 and PW-3. Chloroform is a trihalomethane commonly produced as a by-product of water chlorination. Its presence is most likely the result of the leakage of chlorinated water from the chlorination area into wells PW-2 and PW-3.

5.0 PLAN FOR COMPLETION AND OPERATION OF EARLY WARNING MONITORING WELL SYSTEM

To date, a total of six early warning groundwater monitoring wells have been installed in three locations as shown on Plate 1. These wells are designated DGC-1D, DGC-1S, DGC-2D, DGC-2S, DGC-3D and DGC-3S. Monitoring well pairs DGC-1 and DGC-2 are located approximately 3,500 feet north-northeast of the well field. The wells in these two pairs are completed to screen the entire saturated thickness of lacustrine sand and silty sand deposits in the area between the SRDC site and the Luther Forest well field. Well pair DGC-3 is located in the area between the Luther Forest well field and a stream which transects the well field. The shallow well, DGC-3S is completed in glacial Lake Coveville terrace gravel and monitors groundwater quality in the sand and gravel aquifer. Well DGC-3D is screened in the lacustrine silt and clay deposit underlying the sand and gravel aquifer. Details regarding the installation and depth of these monitoring wells is shown in Table 1. Because the owner of the property on which well pair DGC-3 is located rechanneled the stream in 1988, Dunn will review results of samples taken from these wells carefully to insure that the rechanneling did not impact groundwater conditions. Because wells DGC-3S and 3D are upgradient of the rechanneled stream, however, Dunn does not anticipate that there will be any effect on the monitoring wells.

Dunn proposes to attempt to locate DGC-4S and DGC-4D to intersect the northern edge of the terrace gravel/deposit. An additional monitoring well installation (DGC-5S) is also proposed due to the presence of a production well on land owned by Robert Van Patten. Proposed locations for each well are shown on Plate 3. Soil boring/monitoring well installations will follow those outlined for the current early warning monitoring wells except that stainless steel screens will be utilized with PVC riser pipe as agreed to with the USEPA. The three proposed wells (DGC-4S, 4D and 5S) will be drilled using 4-1/4 inch I.D. hollow stem augers in accordance with the methodology described in Section 2.1.

Prior to initiating drilling activities and between borings, drilling equipment will be decontaminated as described in Section 2.2. Each well will be developed and surveyed as described in Sections 2.3 and 2.4. Additionally, all existing early warning monitoring wells will be redeveloped with a goal of 50 NTUs final turbidity value. Each new well will then become part of the early warning monitoring well network and sampled on a quarterly basis. DGC-4S (shallow) will be installed to screen the terrace gravel aquifer at a depth of approximately 10 to 15 feet below ground surface. This well will be designed to monitor the terrace gravel aquifer in the area where the aquifer first receives infiltrating water from the stream west of the well field. The deep well (DGC-4D) will screen approximately the top 20 feet of the underlying silt and clay. The purposes of well DGC-4D will be to monitor groundwater quality within the lower saturated zone and to provide information on vertical gradients at that location.

Well DGC-5S will be installed as a monitoring well for the additional production well on Van Patten's property. Installation and operation of wells DGC-4S, 4D and 5S are contingent upon gaining access from Robert Van Patten's estate or successor in interest. Well DGC-5S, similar to DGC-4S, will monitor the quality of the groundwater adjacent to the stream west of the well field. The stream may be influent or effluent along this section under current conditions; however, the addition of the production wells could potentially alter the nature of the stream from influent to effluent. Under this scenario DGC-5S will provide an additional sampling point where the quality of the groundwater originating from the stream may be evaluated before reaching the production wells. The relocated site for the DGC-4 well pair and DGC-5S would be on Van Patten's property. As of this writing, this additional investigation has not been initiated pending access authorization from Van Patten's estate or successor in interest.

In addition to the monitoring wells discussed above, two additional well pairs (10S, 10D, 13S and 13D), which have been sampled in the past but not recently, will also be sampled quarterly. The location of these wells is shown in Figure 1 and their depth in Table 1. Following approval of this early warning monitoring plan, each of the four wells listed above will be sampled and analyzed for TCL (Target Compound List) volatile organics, semi-volatiles, metals plus boron, pesticides and PCBs using CLP protocols. The results of this one round will be combined with the results of one round of sampling to be conducted as part of the site remedial investigation to determine if any sampling beyond the present regular monitoring (i.e., EPA Test Method 524.2) is warranted in these wells. If no site related TCL parameters are detected and validated in the initial TCL sampling, then wells 10 and 13 will be sampled and analyzed by EPA Test Method 524.2 (Table 2 analytes) until the confirmatory sampling is conducted as part of the remedial investigation. If a site related TCL parameter beyond those currently analyzed is observed and validated, it will be added to the present list of analytes. The above sample analytical results will be validated in accordance with EPA Region II Site Operations Plan for validating data as transmitted to the respondents in USEPA March 5, 1990 correspondence.

Thus, assuming that access can be obtained to Van Patten's property, the entire early warning groundwater monitoring system will be comprised of the following wells:

Well	Status
DGC-1D	Installed
DGC-1S	Installed
DGC-2D	Installed
DGC-2S	Installed
DGC-3D	Installed
DGC-3S	Installed

DGC-4D	Contingent on access to Van Patten property
DGC-4S	Contingent on access to Van Patten property
DGC-5S	Contingent on access to Van Patten property
10D	Installed
10S	Installed
13D	Installed
13S	Installed

The completion of the early warning monitoring system will be accomplished within thirty (30) days of Respondents receipt of EPA approval of the plan or within 30 days of gaining legal access to all properties, whichever is later.

Dunn also will continue its quarterly surface water sampling. The locations of these sampling points, SW-A, B, C and D, are shown on Figure 1 of this report.

Quarterly sampling and analysis of the early warning groundwater monitoring wells and surface water sampling points will be continued with a minimum of seven (7) days prior notice of each sampling round. Sampling procedures are detailed in Appendix D. Samples will continue to be analyzed for volatile organic compounds by EPA Test Method 524.2. A list of the analytes is included as Table 2. The next sampling event is scheduled for May (2nd quarter) 1990. Results of each round of sampling will continue to be evaluated and reported directly to USEPA and NYSDEC as described in Paragraph 58 of Administrative Order CERCLA II-90219. Additionally, copies of quarterly reports will be sent to Mr. Alan Grant, NYSDEC and Mr. Gary Litwin, NYSDOH.

As part of the sampling and analysis QA/QC measures, 2 blind duplicate samples are collected and analyzed along with a trip blank and field blank for each round. Chain-of-

custody forms are maintained throughout the shipment of samples to the analytical laboratory. Daily laboratory procedural blanks are also analyzed and reported. Laboratory analytical results will be validated in accordance with USEPA Region II Site Operations Plan for validating data as transmitted to the respondents. Should initial analytical results show any previously undetected exceedance of state or federal groundwater or drinking water standards, then a resampling of the monitoring point (either surface water or monitoring well) will be conducted within 14 days of receipt of the laboratory water quality results.

Table 2

Luther Forest Well Field
Early Warning Groundwater Monitoring System - Malta N.Y.
List of Method 524.2 Analytes

Dichlorodifluoromethane	Carbon tetrachloride
Chloromethane	Benzene
Vinyl Chloride	1,2-Dichloroethane
Bromomethane	Trichloroethene
Chloroethane	1,2-Dichloropropane
Trichlorofluoromethane	Bromodichloromethane
1,1-Dichloroethene	Dibromomethane
Methylene chloride	cis-1,3-Dichloropropene
trans-1,2-Dichloroethene	1,1,2-Trichloroethane
1,1-Dichloroethane	Tetrachloroethene
2,2-Dichloropropane	1,3-Dichloropropane
cis,1,2-Dichloroethene	Dibromochloromethane
Chloroform	Chlorobenzene
Bromochloromethane	Ethylbenzene
1,1,1-Trichloroethane	Toluene
1,1-Dichloropropene	trans-1,3-Dichloropropene
1,1,1,2-Tetrachloroethane	Bromobenzene
m & p-Xylene(s)	1,3,5-Trimethylbenzene
o-Xylene	2-Chlorotoluene
Styrene	4-Chlorotoluene
Isopropyl benzene	tert-Butylbenzene
Bromoform	1,2,4-Trimethylbenzene
1,1,2,2-Tetrachloroethane	sec-Butylbenzene
1,2,3-Trichloropropane	p-Isopropyltoluene

n-Propylbenzene

1,4-Dichlorobenzene

1,2-Dichlorobenzene

Hexachlorobutadiene

1,2,3-Trichlorobenzene

1,3-Dichlorobenzene

n-Butylbenzene

1,2,4-Trichlorobenzene

Naphthalene

6.0 STATEMENT OF ACCESS STATUS

In order to fully implement the Early Warning Monitoring System Plan, the permission of two local landowners is required: William R. Mackey (Luther Forest Corporation) and Robert Van Patten (Country Knolls Water Company). A five year access agreement (expires March 1, 1992) with Luther Forest Corporation was consummated on April 13, 1987. A copy of the agreement is attached in Appendix B.

The respondents, thus far, have been unsuccessful in their attempt to negotiate an agreement which would allow them access to the Van Patten property. The first contact with David Steenberg, Mr. Van Patten's attorney, was made by telephone some time prior to November 29, 1989. Mr. Steenberg confirmed he was the appropriate person to speak to and asked GE's attorney to send him a draft access agreement. That was done on November 29, 1989, and a copy of the letter and draft agreement is attached in Appendix B. Mr. Steenberg never replied and, on December 27, GE's attorney called Mr. Steenberg again. Mr. Steenberg replied that he was "discussing the matter with his client" and terminated the conversation very abruptly. GE's attorney followed this conversation up with another letter dated January 3, 1990, a copy of which is attached in Appendix B. Mr. Steenberg never replied to that letter. GE's attorney has tried to reach Mr. Steenberg several times since, most recently on March 7, March 9, and March 14. On March 9, GE's attorney finally succeeded in speaking to Mr. Steenberg's secretary who stated that Mr. Van Patten had died. Another letter, also attached in Appendix B, was sent on March 9. On March 14, a message was once again left with Mr. Steenberg's secretary. In addition, on March 14, 1990, Dunn contacted Eric Hanson, Environmental Hydrogeology Corp., who served as Mr. Van Patten's hydrogeologist, in an attempt to determine who would be responsible for the family business after Mr. Van Patten's death. Mr. Hanson indicated

that Mr. Robert Van Patten, Jr. was the individual most likely to be responsible for this business. GE's attorney will continue to attempt to obtain access through Mr. Steenberg.

APPENDIX A

Boring Logs and Monitoring Well
Construction Diagrams

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-1S

PROJECT	Malta Test Site					SHEET 1 OF 1
CLIENT	GE Malta					JOB No. 2194-1-4935
DRILLING CONTRACTOR	CATOH Environmental Companies, Inc.					MEAS. PT. ELEV. 324.07
PURPOSE	Monitoring Well Installation					GROUND ELEV. 321.2
DRILLING METHOD	Hollow Stem Auger		SAMPLE	CORE	CASING	DATUM M.S.L.
DRILL RIG TYPE	CME-75/Truck	TYPE			H.S.A.	DATE STARTED 5/12/87
GROUNDWATER DEPTH	41.3	DIA.			4¼" ID	DATE FINISHED 5/13/87
MEASURING POINT	Top of PVC	WEIGHT				DRILLER B. Buchanon
DATE OF MEASUREMENT	6/2/87	FALL				INSPECTOR Alan Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
					No Samples Taken Bottom of Boring = 58.5' 0.010 slot screen 38.0-58.0' 00 Sand 37.0-58.5' Bentonite Pellets 35.0-37.0' Cement/Bentonite Grout 0.0-35.0'	
5						
10						

FORM003

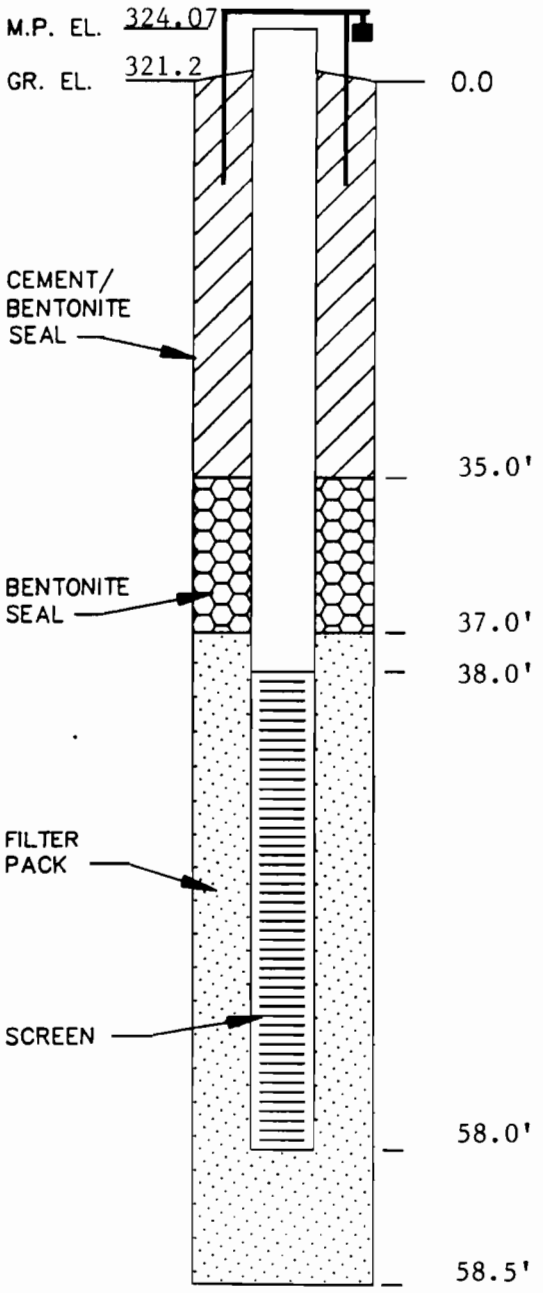
MONITORING WELL COMPLETION LOG

WELL NO. DGC-1S

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project Malta Test Site
Client GE Malta
Location Malta, NY
Project No. 2194-1-4935
Date Drilled 5/12/87 - 5/13/87
Date Developed 6/2/87

WELL
CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Alan G. Hall
Drilling Contractor CATOH Environmental Co., Inc.

Type of Well Monitoring
Static Water Level 41.3 Date 6/2/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 58.0'
Total Depth of Boring 58.5'

Drilling Method
Type Hollow Stem Auger Diameter 4¼ ID
Casing

Sampling Method
Type Diameter
Weight Fall
Interval

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 41.0' Joint Type Flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 20'
Stratigraphic Unit Screened Sand, little Silt

Filter Pack
Sand X Gravel Natural
Grade Morie 00
Amount 5 bags Interval 37.0' - 58.5'

Seal(s)
Type Bentonite Pellets Interval 35.0' - 37.0'
Type Interval
Type Interval

Locking Casing ☒ Yes ☐ No
Notes:

FORM005-9/87

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-1D

PROJECT Malta Test Site						SHEET 1 OF 4
CLIENT GE Malta						JOB No. 2194-1-4935
DRILLING CONTRACTOR CATOH Environmental Companies, Inc.						MEAS. PT. ELEV. 323.33
PURPOSE Monitoring Well Installation						GROUND ELEV. 321.2
DRILLING METHOD Hollow Stem Auger		SAMPLE	CORE	CASING		DATUM M.S.L.
DRILL RIG TYPE CME-75/ATV	TYPE	SS		HSA		DATE STARTED 5/7/87
GROUNDWATER DEPTH 44.3	DIA.	2" OD		4¼" ID		DATE FINISHED 5/12/87
MEASURING POINT Top of PVC	WEIGHT	140#				DRILLER D. Barrow
DATE OF MEASUREMENT 6/2/87	FALL	30"				INSPECTOR Al Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	1, 2, 2, 2	SP		Dk br f S, t $; orgs, rts	Rec=2.0'
					-0.65 Tn f S, t $	Damp
5	S-2	4, 4, 5, 6	SP		Br mf S	Rec=1.6' Damp
					Br m(-)f S	Rec=1.65'
					-9.45	Damp
10	S-3	6, 9, 9, 12	SP		Lt br m(-)f S	
					Light brown medium (-) to fine SAND.	
						Stop augers @ 14' 5/7/87 Start 5/8/87
15	S-4	2, 2, 2, 2	SP		Lt br mf S	Rec=1.5' Moist
20	S-5	5, 11			(LACUSTRINE)	

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-1D
PROJECT Malta Test Site		SHEET 2 OF 4
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
		12 35	SW		Lt br c(-)mfS	Rec=1.3 Moist Tight sands
25	S-6	5 6 6 6	SP		Lt br mf S	Rec=1.35 Moist
30	S-7	1 2 2 5	SP		Same -29.7 Lt br f S, t $ Light brown fine SAND, trace Silt.	Rec=1.4 Moist
35	S-8	1 2 2 3	SP		Same -34.8 Br f S	Rec=1.3 Moist
						Water @ 39.0'
40	S-9	1 1 2 4	SP		Br f S, t $	Rec=1.2 WET
	S-10	1 2			(LACUSTRINE)	

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-1D
PROJECT Malta Test Site		SHEET 3 OF 4
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-10	10 35	SM		Br f S, s $; inc. $ w/depth	Rec=2.0 WET Tight
50	S-11	2 7 31 56	SM		Br f S, a(-)$	Rec=2.0 WET V. tight
55	S-12	3 5 8 13	SM		Same -54.87 Gr f S, a(-) $ Gray fine SAND, a (-) Silt	Rec=2.0 WET
60	S-13	10 8 8 24	SM		Same	Rec=0.5 WET Wash hole at 64.0' to hole sand down
65	S-14	2 5 3 6	ML		Gr $ 1, f S	Rec=1.3 WET wash in spoon
	S-15	5 12			(LACUSTRINE)	

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-1D
PROJECT Malta Test Site		SHEET 4 OF 4
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-15	11 11	ML		Gr $	Rec=0.75 WET wash in hole
		4				
75	S-16	7 14 23	ML		Same	Rec=1.15 WET 3' silt in augers, stop 5/8/87 5/9/87 wash hole cont. augering
		13			Gr $ & Cy$	Rec=1.6
80	S-17	7 12 18	ML		-79.17 Gr $	WET
		12			Gr Cy$	Rec=1.55
	S-18	19 33 42	ML		-81.75 Gr $; 1 C	WET
		9				
85	S-19	15 12 18			Gr $; s br $	Rec=1.8 WET
		4				Wash to 89'
90	S-20	12 20 32			Gr $ 1, f S	Rec=2.0 WET
					(LACUSTRINE)	
					Bottom of Boring = 91.0'	
					0.010 slot screen	58.0 - 78.0'
					00 Sand	55.5 - 78.5'
					Bentonite Pellets	53.5 - 55.5'
					Cement/Bentonite Grout	0 - 53.5'
					Formational Collapse	78.0 - 91.0'

RMO

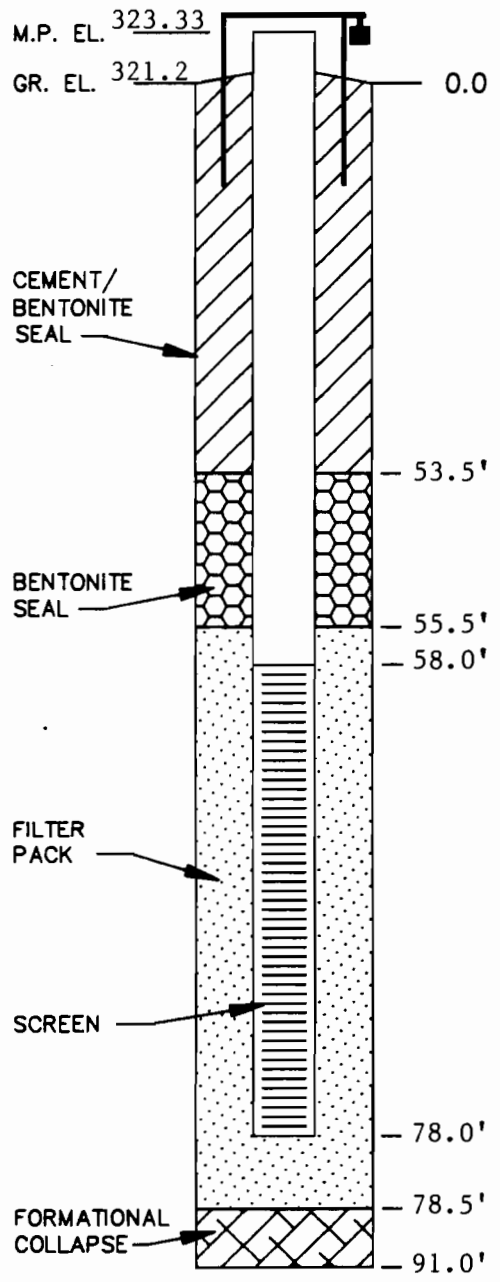
MONITORING WELL COMPLETION LOG

WELL NO. DGC-1D

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project Malta Test Site
Client GE Malta
Location Malta, NY
Project No. 2194-1-4935
Date Drilled 5/7/87-5/12/87
Date Developed 6/2/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Alan G. Hall
Drilling Contractor CATOH Environmental Co., Inc.

Type of Well Monitoring
Static Water Level 44.3' Date 6/2/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 78.0'
Total Depth of Boring 91.0'

Drilling Method
Type Hollow Stem Auger Diameter 4¼" ID
Casing

Sampling Method
Type S.S. Diameter 2" OD
Weight 140 lb. Fall 30"
Interval Standard

Riser Pipe Left in Place
Material PVC Diameter 2" ID
Length 60.13' Joint Type Flush

Screen
Material PVC Diameter 2" ID
Slot Size 0.010" Length 20'
Stratigraphic Unit Screened Silt and Fine Sands

Filter Pack
Sand X Gravel Natural
Grade Morie 00
Amount 5 bags Interval 55.5'-78.5'

Seal(s)
Type Bentonite Pellets Interval 53.5'-55.5'
Type Interval
Type Interval

Locking Casing ☒ Yes ☐ No
Notes:

FORM020-11/87

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-2S

PROJECT	Malta Test Site					SHEET 1 OF 1
CLIENT	GE Malta					JOB No. 2194-1-4935
DRILLING CONTRACTOR	CATOH Environmental Companies, Inc.					MEAS. PT ELEV. 309.62
PURPOSE	Monitoring Well Installation					GROUND ELEV. 307.5
DRILLING METHOD	Hollow Stem Auger		SAMPLE	CORE	CASING	DATUM M.S.L.
DRILL RIG TYPE	CME-75 Truck	TYPE			H.S.A.	DATE STARTED 5/14/87
GROUNDWATER DEPTH	26.0	DIA.			4¼" ID	DATE FINISHED 5/15/87
MEASURING POINT	Top of PVC	WEIGHT				DRILLER B. Buchanon
DATE OF MEASUREMENT	6/2/87	FALL				INSPECTOR Alan Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
					No Samples Taken	
					Bottom of Boring = 35.5'	
					0.010 slot screen 20.0-35.0'	
					00 Sand 17.5-35.5'	
					Bentonite Pellets 15.0-17.5'	
					Cement/Bentonite Grout 0.0-15.0'	
5						
10						

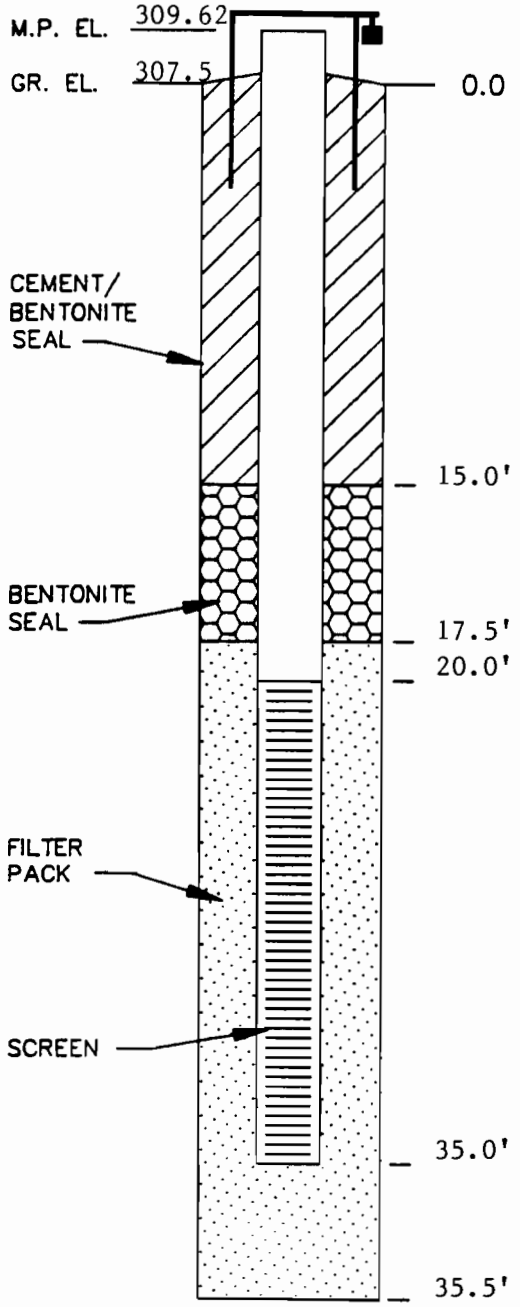
MONITORING WELL COMPLETION LOG

WELL NO. DGC-2S

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project Malta Test Site
Client GE Malta
Location Malta, NY
Project No. 2194-1-4935
Date Drilled 5/14/87 - 5/15/87
Date Developed 6/2/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Alan G. Hall
Drilling Contractor CATOH Environmental Co., Inc.

Type of Well Monitoring
Static Water Level 26.0 Date 6/2/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 35.0'
Total Depth of Boring 35.5'

Drilling Method
Type Hollow Stem Auger Diameter 4¼ ID
Casing

Sampling Method
Type Diameter
Weight Fall
Interval

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 22.2' Joint Type Flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 15'
Stratigraphic Unit Screened Sand, little Silt

Filter Pack
Sand X Gravel Natural
Grade Morie 00
Amount 4 bags Interval 17.5' - 35.5'

Seal(s)
Type Bentonite Pellets Interval 15.0' - 17.5'
Type Interval
Type Interval

Locking Casing ☒ Yes ☐ No
Notes:

FORM005-9/87

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-2D

PROJECT Malta Test Site						SHEET 1 OF 3
CLIENT GE Malta						JOB No. 2194-1-4935
DRILLING CONTRACTOR CATOH Environmental Companies, Inc.						MEAS. PT. ELEV. 310.05
PURPOSE Monitoring Well Installation						GROUND ELEV. 307.5
DRILLING METHOD Hollow Stem Auger		SAMPLE	CORE	CASING		DATUM M.S.L.
DRILL RIG TYPE CME-75/Truck	TYPE	SS		HSA		DATE STARTED 5/14/87
GROUNDWATER DEPTH 26.7	DIA.	2"		4¼"		DATE FINISHED 5/14/87
MEASURING POINT Top of PVC	WEIGHT	140#				DRILLER B. Buchanon
DATE OF MEASUREMENT 6/1/87	FALL	30"				INSPECTOR Al Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	1 2 2 2			Lt br mf S, t $; rts	Dry Rec=0.7
5	S-2	2 3 3 2			Lt br mf S	Dry Rec=1.6 Coarser near bottom
10	S-3	2 3 2 2			Lt br m(+)f S Light brown medium (+) to fine SAND.	Dry Rec=1.5
15	S-4	2 2 2 4			Lt br mf S, t $	Dry Rec=1.35
20					(LACUSTRINE)	

MOD

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-2D
PROJECT Malta Test Site		SHEET 2 OF 3
CLIENT GE Malta		JOB No. 2194-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-5	1, 4, 4, 7			Br mf S, t $ -20.2 Br $ & C -20.6 Lt br f S, 1 $ Light brown fine SAND, little Silt.	Rec=1.5 WET/Dry
						Water @ 24.5'
25	S-6	4, 4, 4, 4			Same	Rec=1.65 WET
30	S-7	2, 2, 2, 3			Same	Rec=1.8 WET
35	S-8	4, 5, 7, 8			Same	Rec=1.3 WET
40	S-9	4, 4, 6, 8			Same; $ & C parting	Rec=1.5 WET
					(LACUSTRINE)	

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-2D
PROJECT Malta Test Site		SHEET 3 OF 3
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-10	2 3 4 4			Same	Rec=1.7 WET
50	S-11	4 6 10 11			Same	Rec=1.6 WET Tight Driller notes change @ 53'
55	S-12	3 5 6 8			Gr Cy$ & $ -55.85 Gr f S, s $	Rec=1.4 WET
	S-13	8 12 16 18			Gr Cy$ (LACUSTRINE)	Rec=1.7 WET
60					Bottom of Boring = 59.0' Formational Collapse .010" slot screen 00 Sand Bentonite Pellets Cement/Bentonite Grout	55.0 - 59.0' 35.0 - 55.0' 33.0 - 55.5' 30.0 - 33.0' 0 - 30.0'

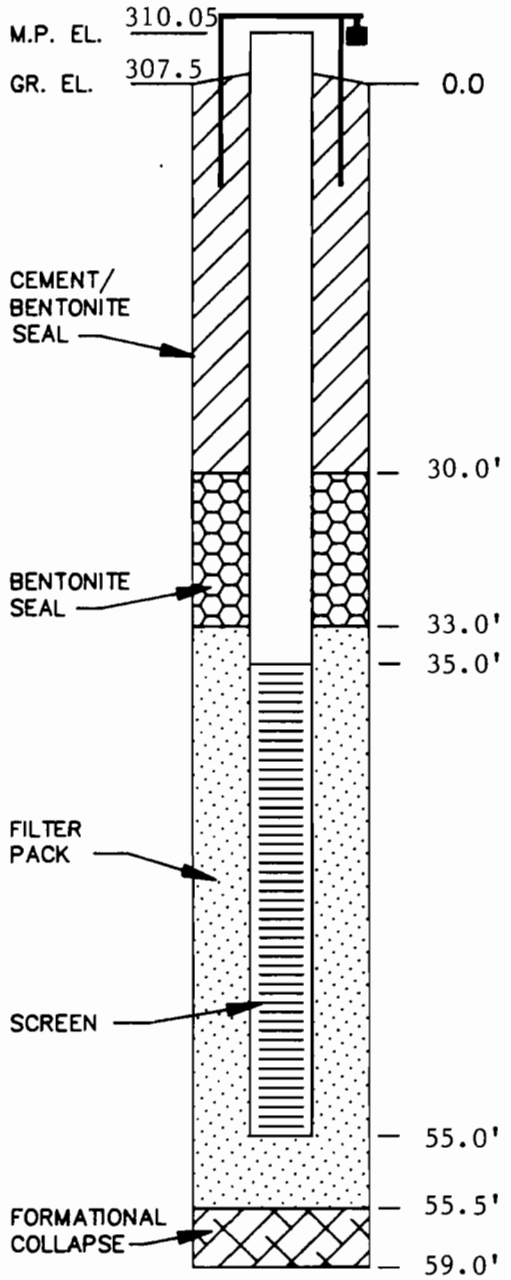
MONITORING WELL COMPLETION LOG

WELL NO. DGC-2D

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project Malta Test Site
Client GE Malta
Location Malta, NY
Project No. 2194-1-4935
Date Drilled 5/14/87
Date Developed 6/1/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Alan G. Hall
Drilling Contractor CATOH Environmental Co., Inc.

Type of Well Monitoring
Static Water Level 26.7' Date 6/1/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 55.0'
Total Depth of Boring 59.0'

Drilling Method
Type Hollow Stem Auger Diameter 4¼" ID
Casing

Sampling Method
Type S.S. Diameter 2" OD
Weight 140 lb. Fall 30"
Interval Standard

Riser Pipe Left in Place
Material PVC Diameter 2" ID
Length 37.55' Joint Type Flush

Screen
Material PVC Diameter 2" ID
Slot Size 0.010" Length 20'
Stratigraphic Unit Screened Sand, little Silt

Filter Pack
Sand X Gravel Natural
Grade Morie 00
Amount 5 bags Interval 33.0'-55.5'

Seal(s)
Type Bentonite Pellets Interval 30.0'-33.0'
Type Interval
Type Interval

Locking Casing ☒ Yes ☐ No
Notes:

FORM020-11/87

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-2SX

PROJECT	Malta Test Site					SHEET 1 OF 1
CLIENT	GE Malta					JOB No. 2194-1-4935
DRILLING CONTRACTOR	CATOH Environmental Companies, Inc.					MEAS. PT. ELEV.
PURPOSE	Monitoring Well Installation					GROUND ELEV.
DRILLING METHOD	Hollow Stem Auger		SAMPLE	CORE	CASING	DATUM
DRILL RIG TYPE	CME-75/ATV	TYPE			H.S.A.	DATE STARTED 5/4/87
GROUNDWATER DEPTH		DIA.			4¼" ID	DATE FINISHED 5/5/87
MEASURING POINT		WEIGHT				DRILLER D. Barrow
DATE OF MEASUREMENT		FALL				INSPECTOR Alan Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
					No Samples Taken Bottom of boring = 35.5' Hole abandoned 5/5/87; Tremie hose caught in boring due to running sands; hole grouted to surface	
5						
10						

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-2DX

PROJECT Malta Test Site						SHEET 1 OF 3
CLIENT GE Malta						JOB No. 2194-1-4935
DRILLING CONTRACTOR CATOH Environmental Companies, Inc.						MEAS. PT. ELEV.
PURPOSE Monitoring Well Installation						GROUND ELEV.
DRILLING METHOD Hollow Stem Auger		SAMPLE	CORE	CASING		DATUM
DRILL RIG TYPE CME-75/ATV	TYPE	SS		HSA		DATE STARTED 4/30/87
GROUNDWATER DEPTH	DIA.	2" OD		4¼" ID		DATE FINISHED 5/5/87
MEASURING POINT	WEIGHT	140#				DRILLER Denny Barrow
DATE OF MEASUREMENT	FALL	30"				INSPECTOR Al Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	1, 1, 1, 1	SP		Dk br m(-)f S; orgs	Rec=2.0
					-0.45	Dry
					Lt br m(-)f S; orgs	
5	S-2	3, 4, 4, 6	SW		Lt br c(-)m(+)f S	Rec=2.0 Dry
10	S-3	2, 3, 4, 4	SW		Lt br c(-)m(+)f S Light brown coarse (-) medium (+) to fine SAND.	Rec=1.68 Moist
15	S-4	1, 2, 3, 4	SW		Same	Rec=1.55 Moist
20	S-5	2, 4			(LACUSTRINE)	

MOD

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-2DX
PROJECT Malta Test Site		SHEET 2 OF 3
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-5	6 8	SW		Same	Rec=1.45 Moist
		1				
25	S-6	4 6 10	SW		Br c(-)m(+)f S Brown coarse (-) medium (+) to fine SAND.	Rec=1.4 WET
		2				
30	S-7	4 6 9	SW		Br mf S	Rec=2.0 WET
		2			Br f S, 1 $	
35	S-8	6 13 20	SP/CL		-34.92 Br C & $; freq S & $ prts -35.42 Br f S, 1 $	Rec=2.0 WET
		1				
40	S-9	2 2 3	SP		Same	Rec=2.0 WET
		rod wt				Stop @ 44' 4/30 Start again 5/1
	S-10	rod wt			(LACUSTRINE)	

RMO

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-2DX
PROJECT Malta Test Site		SHEET 3 OF 3
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-10	2 3	SP		Same	Rec=1.45' WET
		2	SP/CL		Same	
50	S-11	5			-49.3	
		5			Br $ & C; s prts	Rec=1.4
		6			-49.7	WET
					Br f S, 1 $	
		2				
55	S-12	6	CL		Same	Rec=2.0
		6				WET
		12			-55.12	
		5			Gr $ & C; vvd $ seams	
	S-13	10	CL		Same	Rec=0.75
		12				WET
		24			(LACUSTRINE)	
					0.010 slot screen	35.0 - 55.0'
					00 Sand	33.7 - 55.5'
					Bentonite pellets	31.0 - 33.7'
60					Cement/Bentonite Grout	0 - 31.0'
					Hole abandoned 5/5/87 due to tremie hose in DGC-2SX; well grouted to surface; 50' PVC well remains in hole	

)RMC

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-3S

PROJECT	Malta Test Site					SHEET 1 OF 1
CLIENT	GE Malta					JOB No. 2194-1-4935
DRILLING CONTRACTOR	CATOH Environmental Companies, Inc.					MEAS. PT. ELEV. 215.28
PURPOSE	Monitoring Well Installation					GROUND ELEV. 212.6
DRILLING METHOD	Hollow Stem Auger		SAMPLE	CORE	CASING	DATUM M.S.L.
DRILL RIG TYPE	CME-75/ATV	TYPE			H.S.A.	DATE STARTED 5/7/87
GROUNDWATER DEPTH	12.1	DIA.			4¼" ID	DATE FINISHED 5/7/87
MEASURING POINT	Top of PVC	WEIGHT				DRILLER D. Barrow
DATE OF MEASUREMENT	5/29/87	FALL				INSPECTOR Alan Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
5					No Samples Taken Bottom of boring = 23.5' 0.010" slot screen 5.0-23.0' 00 Sand 4.5-23.5' Bentonite Pellets 35.0-37.0' Cement/Bentonite Grout 0.0-4.5'	
10						

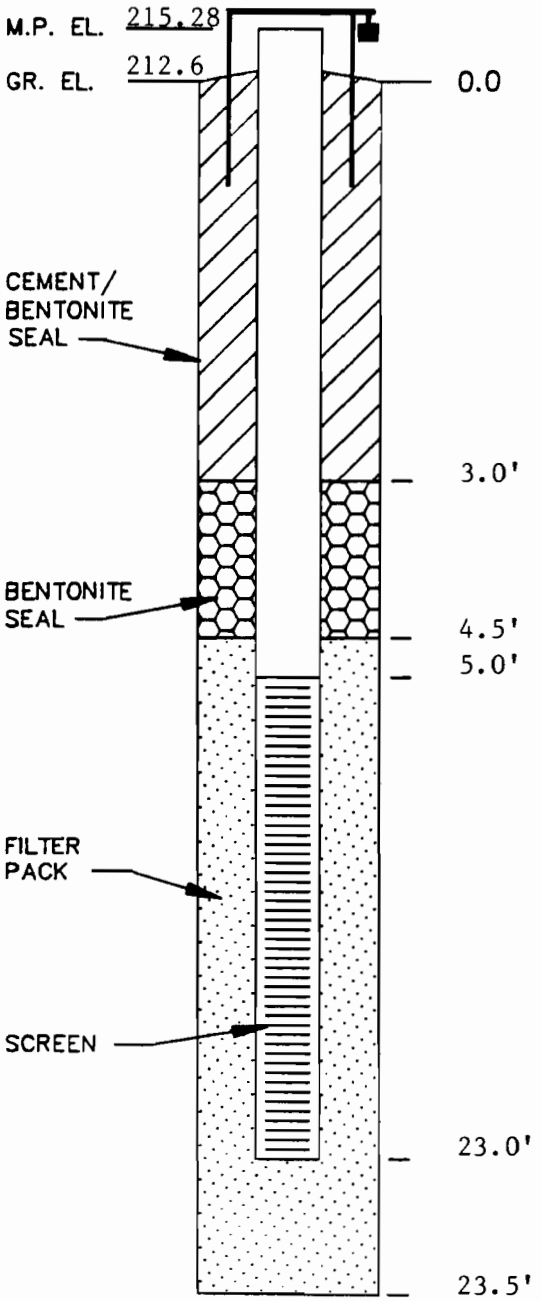
MONITORING WELL COMPLETION LOG

WELL NO. DGC-3S

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project Malta Test Site
Client GE Malta
Location Malta, NY
Project No. 2194-1-4935
Date Drilled 5/7/87
Date Developed 5/29/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Alan G. Hall
Drilling Contractor CATOH Environmental Co., Inc.

Type of Well Monitoring
Static Water Level 12.1 Date 5/29/89
Measuring Point (M.P.) Top of PVC
Total Depth of Well 23.0'
Total Depth of Boring 23.5'

Drilling Method
Type Hollow Stem Auger Diameter 4¼ ID
Casing

Sampling Method
Type S.S. Diameter 2" OD
Weight 140 lb. Fall 30"
Interval Standard

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 7.68' Joint Type Flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 18'
Stratigraphic Unit Screened Sand and Gravel

Filter Pack
Sand X Gravel Natural
Grade Morie 00
Amount 3½ bags Interval 4.5' - 23.5'

Seal(s)
Type Bentonite Pellets Interval 3.0' - 4.5'
Type Interval
Type Interval

Locking Casing ☒ Yes ☐ No
Notes:

FORM005-9/87

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-3D

PROJECT Malta Test Site						SHEET 1 OF 3
CLIENT GE Malta						JOB No. 2194-1-4935
DRILLING CONTRACTOR CATOH Environmental Companies, Inc.						MEAS. PT. ELEV. 215.02
PURPOSE Monitoring Well Installation						GROUND ELEV. 212.6
DRILLING METHOD Hollow Stem Auger		SAMPLE	CORE	CASING		DATUM M.S.L.
DRILL RIG TYPE CME-75/ATV	TYPE	SS		HSA		DATE STARTED 5/6/87
GROUNDWATER DEPTH 11.4	DIA.	2"		4¼"		DATE FINISHED 5/6/87
MEASURING POINT Top of PVC	WEIGHT	140#				DRILLER Denny Barrow
DATE OF MEASUREMENT 6/1/87	FALL	30"				INSPECTOR Al Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	2, 3, 2, 2			Br mf(+) S; frqt rts	Rec=1.05 Dry/Damp
5	S-2	4, 4, 5, 5			Lt br mf (+) S, t $	Rec=1.45 V. Moist Water @ 5.5'
10	S-3	1, 2, 2, 3			Br f S, t $ Brown fine SAND, trace Silt. (LACUSTRINE)	Rec=1.65 WET
15	S-4	1, 1, 2, 3			Same -15.9 Br f S, a(-) mf G	Rec=2.0 WET
20	S-5	3, 4			Br cmfS, tfG -19.67	

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-3D
PROJECT Malta Test Site		SHEET 2 OF 3
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-5	7 12			Br mf G a(-), cm S Brown medium to fine GRAVEL and (-), coarse to medium Sand. (FLUVIAL)	Rec=1.25 WET
25	S-6	2 3 4 8			Gr c; vvd	Rec=1.35 Moist PP=1.25 ton/ft^2 Driller notes augering changes at 24' (clay)
30	S-7	4 3 7 8			Same	Rec=1.75 Moist PP=1.0 ton/ft^2
35	S-8	3 3 4 6			Gr $yC & C	Rec=1.9 Moist Less Stiff PP=0.75 ton/ft^2
40	S-9	3 4 6 11			Same	Rec=2.0 Moist Less Stiff PP=0.65 ton/ft^2
	S-10	2 5			Rd Gr $yC & C; frqt Gr and Bl Gr partings	

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-3D
PROJECT Malta Test Site		SHEET 3 OF 3
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-10	9 11			(LACUSTRINE)	Rec=2.0 Moist Less Stiff PP=1.25 ton/ft^2
					Bottom of Boring = 46.5'	
					.010" Slot Screen	26.0 - 46.0'
					00 Sand	25.0 - 46.5'
					Bentonite Pellets	23.0 - 25.0'
50					Cement/Bentonite Grout	0 - 23.0'

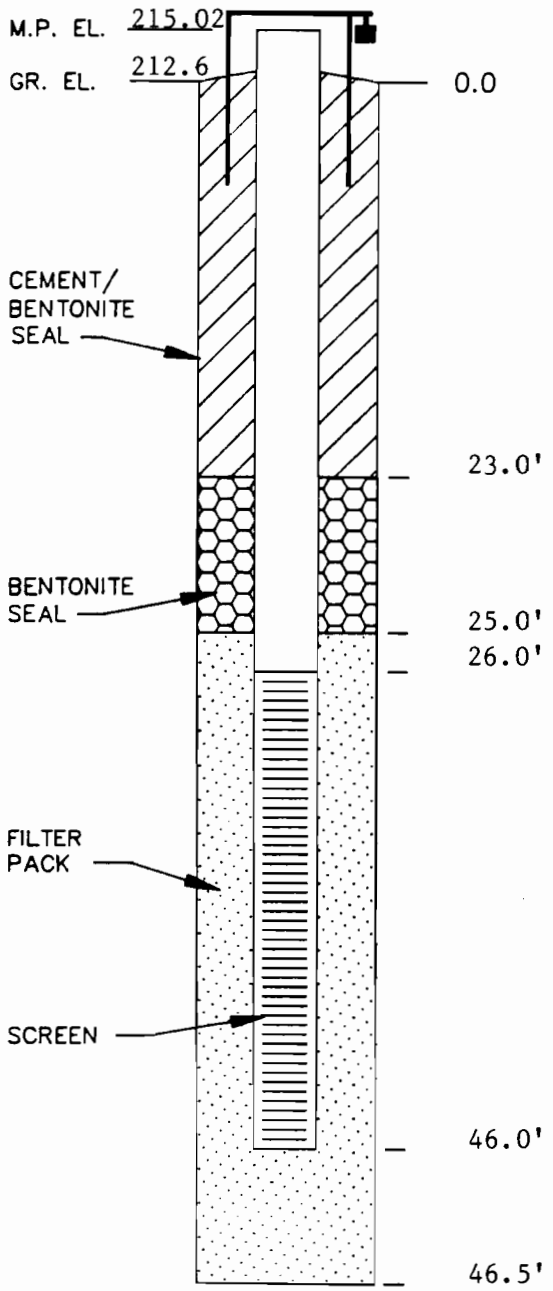
MONITORING WELL COMPLETION LOG

WELL NO. DGC-3D

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project Malta Test Site
Client GE Malta
Location Malta, NY
Project No. 2194-1-4935
Date Drilled 5/6/87
Date Developed 6/1/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Alan G. Hall
Drilling Contractor CATOH Environmental Co., Inc.

Type of Well Monitoring
Static Water Level 11.4 Date 6/1/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 46.0'
Total Depth of Boring 46.5'

Drilling Method
Type Hollow Stem Auger Diameter 4¼ ID
Casing

Sampling Method
Type S.S. Diameter 2" OD
Weight 140 lb. Fall 30"
Interval Standard

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 28.42' Joint Type Flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 20'
Stratigraphic Unit Screened clay and silty clay

Filter Pack
Sand X Gravel Natural
Grade Morie 00
Amount 5 bags Interval 25.0' - 46.5'

Seal(s)
Type Bentonite Pellets Interval 23.0' - 25.0'
Type Interval
Type Interval

Locking Casing ☒ Yes ☐ No
Notes:

FORM005-9/87

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-4DX

PROJECT Malta Test Site						SHEET 1 OF 2
CLIENT GE Malta						JOB No. 2194-1-4935
DRILLING CONTRACTOR CATOH Environmental Companies, Inc.						MEAS. PT. ELEV.
PURPOSE Monitoring Well Installation						GROUND ELEV.
DRILLING METHOD Hollow Stem Auger		SAMPLE	CORE	CASING		DATUM
DRILL RIG TYPE CME-75/ATV	TYPE	SS		HSA		DATE STARTED 4/29/87
GROUNDWATER DEPTH	DIA.	2"		4¼"		DATE FINISHED 4/30/87
MEASURING POINT	WEIGHT	140#				DRILLER Denny Barrow
DATE OF MEASUREMENT	FALL	30"				INSPECTOR Al Hall

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	1, 1, 1, 1	SW		Dk to lt br mf (+) S, 1 $, 1 f G; orgs.	Rec=1.5 Moist
5	S-2	2, 4, 4, 6	ML		Br $ & C; freq prt f S	Rec=1.9 Moist
10	S-3	3, 3, 3, 2	CL		Gr Cy$ -11.1 Gr $ & C Gray SILT and CLAY.	Rec=2.0 WET PP=1.25 ton/ft^2
						Augers @ 15' 4/29
15	S-4	1, 1, 1, 2	CL		Same	Rec=2.0 WET Continue augering 4/30
20					(LACUSTRINE)	

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-4DX
PROJECT Malta Test Site		SHEET 2 OF 2
CLIENT GE Malta		JOB No. 2194-1-4935

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-5	1 2 2 5	CL		Same	Rec=2.0 WET PP=1-1.5 ton/ft^2
25	S-6	1 2 1 3	CL		Same -26.3 Gr Cy$ -26.9 Gr $ & C (LACUSTRINE)	Rec=2.0 WET PP=1.0 ton/ft^2
30					Bottom of Boring = 29.2' Hole abandoned 4/30/87; No terrace gravel intersected; Grout hole to surface	

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH - FT.	SAMPLES	SAMPLE NO	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTIONS
							Drilled with CME - 55, hollow stem auger, 4" I.D. Installed 4" steel surface casing with cement.. Casing had cap and was secured with padlock.
0		1	16	0.5			Brown fine to medium SAND, trace silt, damp.
5		2	8	0.9			Light brown fine to medium SAND, trace silt, damp.
10		3	8	1.2			Brown fine to medium SAND, trace silt, damp.
15		4	6	1.1			
20		5	10	1.2			
25		6	11	1.4			
30		7	10	1.3			
35		8	20	1.6			Dark brown fine to medium SAND, trace silt, wet.
40		9					Brown fine to medium sand, wet.

HOLE NO. 10 - S SURFACE ELEV. 327.0 DATE STARTED 7/14/86 BY SPS

LOCATION NYSERDA - Malta SHEET 1 OF 2 DATE FINISHED 7/15/86 MISC.

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH-FT.	SAMPLES	SAMPLE NO	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTIONS
							Brown SILT.
45		10	10	1.3			Brown fine to medium SAND, SILT, wet.
							Boring terminated at 47'.
50							3' sump installed from 43' to 40' below grade, 2" PVC 6 - slot screen installed from 40' to 30', riser to above grade. 2Q sand pack from 43' to 25'. Bentonite pellets from 25' to 23'. Bentonite - Cement grout from 23' to 7' below grade. Cement grout from 7' to surface.

HOLE NO. 10 - S SURFACE ELEV. 327.0 DATE STARTED 7/14/86 BY SPS

LOCATION NYSERDA - Malta SHEET 2 OF 2 DATE FINISHED 7/15/86 MISC.

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH-FT.	SAMPLES	SAMPLE NO.	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN
0						
5						
10						
15						
20						
25						
30						
35						
40						

DESCRIPTIONS

Drilled with Acker - II rig. Mud rotary to 45'. Driven 4" casing method to 92'. Installed 4" steel surface casing with cement. Casing had cap and was secured with padlock.

Refer to 10 - S for geology from 0' to 40'.

HOLE NO. 10 - D SURFACE ELEV. 327.1 DATE STARTED 7/16/86 BY SPS

LOCATION NYSERDA - Malta SHEET 1 OF 3 DATE FINISHED 7/17/86 MISC.

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH-FT.	SAMPLES	SAMPLE NO	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTIONS
45		1	25	1.6			Brown very fine SAND and SILT.
50		2	26	1.3			
55		3	21	NR			Brown SILT.
60		4	25	0.9			
65		5	72	NR			
70		6	54	NR			Brown SILT and CLAY.
75		7	26	0.4			Gray very fine SAND and SILT with varves of brown clay.
80		8	8	2.0			Blue - gray CLAY, little silt.
85		9	26	1.7			Blue - gray CLAY and SILT.

HOLE NO. 10 - D SURFACE ELEV. 327.1 DATE STARTED 7/16/86 BY SPS

LOCATION NYSERDA - Malta SHEET 2 OF 3 DATE FINISHED 7/17/86 MISC.

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH - FT.	SAMPLES	SAMPLE NO	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN
90		10	29	1.0		
95						

DESCRIPTIONS

Blue - gray CLAY and SILT.

Boring terminated at 92'.

3.5' sump installed from 78' below grade, 2" PVC 6 - slot screen installed from 74.5' to 64.5', riser to above grade. 20 sand pack from 78' to 60'. Bentonite pellets from 60' to 58'. Bentonite - Cement grout from 58' to surface.

HOLE NO. 10 - D SURFACE ELEV. 327.1 DATE STARTED 7/16/86 BY SPS

LOCATION NYSERDA - Malta SHEET 3 OF 3 DATE FINISHED 7/17/86 MISC.

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH-FT.	SAMPLES	SAMPLE NO	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTIONS
							Drilled with CME - 55, hollow stem auger, 4" I.D. Installed 4" steel surface casing with cement. Casing had cap and was secured with padlock.
0		1	10	1.5			Light brown fine to medium SAND, trace silt, damp.
5		2	8	1.3			
10		3	16	1.7			Dark brown fine to medium SAND, trace silt, damp.
15		4	6	1.4			
20		5	6	1.5			
25		6	6	1.4			
30		7	20	1.4			
35		8	20	2.0			Dark brown fine to medium sand, trace silt, wet.
40		9	39	2.0			Dark brown fine SAND.

HOLE NO. 13 - S SURFACE ELEV. 327.1 DATE STARTED 7/15/86 BY SPS

LOCATION NYSERDA - Malta SHEET 1 OF 2 DATE FINISHED 7/16/86 MISC.

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH-FT.	SAMPLES	SAMPLE NO	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTIONS
							Dark brown SILT, wet.
45		10	19	0.5			Gray SILT, trace clay, wet.
							Boring terminated at 47'.

3' sump installed from 43' to 40' below grade, 2" PVC 6 - slot screen installed from 40' to 30', riser to above grade. 20 sand pack from 43' to 25'. Bentonite pellets from 25' to 23'. Bentonite - Cement grout from 23' to 7'. Cement grout from 7' to surface.

HOLE NO. 13 - S SURFACE ELEV. 327.1 DATE STARTED 7/15/86 BY SPS

LOCATION NYSERDA - Malta SHEET 2 OF 2 DATE FINISHED 7/16/86 MISC.

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH-FT.	SAMPLES	SAMPLE NO	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTIONS
0							Refer to 13 - S for geology from 0' to 40'.
40		1	24	0.1			Brown Clayey SILT.

Drilled with Acker - II rig. Mud rotary to 45'. Driven 4" casing method to 72'. Installed 4" steel surface casing with cement. Casing had cap and was secured with padlock.

HOLE NO. 13 - D SURFACE ELEV. 327.1 DATE STARTED 7/18/86 BY SPS

LOCATION NYSERDA - Malta SHEET 1 OF 2 DATE FINISHED 7/21/86 MISC.

SUBSURFACE LOG

BLASLAND & BOUCK ENGINEERS, P.C.

DEPTH-FT.	SAMPLES	SAMPLE NO	N	RECOVERY	WELL COLUMN	GEOLOGIC COLUMN	DESCRIPTIONS
45		2	22	0.5			Brown - gray SILT and trace very fine SAND.
50		3	35				Grey layered SILT, CLAY, and fine SAND.
55		4	30				Gray fine SAND.
60		5	33	NR			
65		6	44	0.8			Gray very fine SAND, some silt.
70		7	40	0.9			Boring terminated at 72'.
75							

3' sump installed from 70' to 67' below grade, 2" PVC 6 - slot screen installed from 67' to 57'. riser to above grade. 20 sand pack from 70' to 52'. Bentonite pellets from 52' to 50'. Bentonite - Cement grout from 50' to surface.

HOLE NO. 13 - D SURFACE ELEV. 327.3 DATE STARTED 7/18/86 BY SPS

LOCATION NYSERDA - Malta SHEET 2 OF 2 DATE FINISHED 7/21/86 MISC.

APPENDIX B

Luther Forest Corporation Access Agreement
Proposed Van Patten Access Agreement
and Correspondence

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY

FAIRFIELD, CONNECTICUT 06431

THOMAS M. ARMSTRONG

COUNSEL - CORPORATE ENVIRONMENTAL PROGRAMS

(203) 373-2868

March 4, 1987

William R. Mackay
Luthor Forest Corporation
1202 Troy-Schenectady Road
Latham, NY 12110

Re: Saratoga Research and Development Center

Dear Mr. Mackay,

I am an environmental counsel with General Electric Company. GE proposes to undertake certain investigations at Saratoga Research and Development Center ("SRDC") which would result in certain activities within and beyond the one mile safety easement. GE seeks permission to enter upon the land of Luthor Forest Corporation (see attached) to conduct these activities.

I have enclosed a proposal from Dunn Geoscience Corp. and a drawing (not to scale) showing the approximate location of the monitoring wells: DGC-4S, DGC-4D, DGC-3S, DGC-3D, DGC-1, and DGC-2; and sampling points A,B and C. According to a recent title search, GE believes all monitoring wells and sampling points are located on property of Luthor Forest Corporation ("LFC"). Some portion of the wells and/or sampling points are believed to be within the one mile safety easement. According to the title search, GE believes the Wright-Malta Corporation ("W-M") is owner of a safety easement, except that the New York State Energy Research and Development Authority has retained some ownership interest in the safety easement. GE seeks authorization from all three entities to conduct the proposed hydrologic and monitoring studies. GE is cognizant that the Corporations and Authority have previously agreed to such hydrologic and monitoring studies. According, GE proposes identical terms:

- GE and its consultant will not unduly interfere with your business activities,
- GE will provide you with the general location of all groundwater monitoring wells,
- GE will notify you prior to commencement of hydrologic and monitoring studies,
- GE agrees that its hydrologic and monitoring studies shall be without prejudice to you or to it,
- GE shall hold you harmless for the actions of GE or its contractor in the performance of any hydrologic and monitoring studies on your property.
- GE agrees this access authorization agreement shall remain in effect for five (5) years and it shall resubmit the agreement to you for approval if access is required beyond March 1, 1992.

Please indicate your approval by signing and mailing the enclosed copy of this letter to Thomas Smith of Bond, Schoeneck & King, 1 Lincoln Center, Syracuse, NY 13202. Should you have any questions please call Mr. Smith, however, I have made every effort to conform this agreement to the one previously approved by your Corporation.

Very truly yours,

T.M. Armstrong

Accepted and Agreed to by Luthor Forest Corporation

by _____

Date June 13 1988

cc: M. Miller
T. Smith

SIDLEY & AUSTIN
A PARTNERSHIP INCLUDING PROFESSIONAL CORPORATIONS

ONE FIRST NATIONAL PLAZA
CHICAGO, ILLINOIS 60603
312: 853-7000 FAX: 312-853-7312

2049 CENTURY PARK EAST
LOS ANGELES, CALIFORNIA 90067
213: 553-8100 FAX: 213-556-6541

875 THIRD AVENUE
NEW YORK, NEW YORK 10022
212: 418-2100 FAX: 212-418-2165

1722 EYE STREET, N.W
WASHINGTON, D.C. 20006
TELEPHONE 202: 429-4000
TELEX 89-463
FACSIMILE 202: 429-6144

18 KING WILLIAM STREET
LONDON, EC4N 7SA, ENGLAND
441: 621-1616 FAX: 441-626-7937

5 SHENTON WAY
SINGAPORE 0106
65: 224-5000 FAX: 65-224-0530

ASSOCIATED OFFICE:

HASHIDATE LAW OFFICE
IMPERIAL TOWER, 7TH FLOOR
1-1, UCHISAIWAICHO 1-CHOME
CHIYODA-KU, TOKYO 100 JAPAN
03-504-3800 FAX: 03-504-1009

November 29, 1989

VIA FEDERAL EXPRESS

Earl David Steenberg, Esq.
P.O. Box 425
Ushers Road
Clifton Park, New York 12065

Re: Malta Rocket Fuel Area Superfund Site

Dear Mr. Steenberg:

As we discussed over the telephone, I am enclosing a draft access agreement which would allow certain companies, including General Electric ("GE"), whom Sidley & Austin represents, access to the property of your client, Robert Van Patten. As I mentioned, a number of other companies are now the subjects of a unilateral order issued by U.S. EPA in late September 1989. That order, a copy of which is attached, requires us, inter alia, to submit a plan for a monitoring system to U.S. EPA by December 4. Installation of that monitoring system is required to be completed within 30 days after U.S. EPA approves the plan. Because part of the monitoring system will have to be located on Mr. Van Patten's property, we will need access to his property.

I hope that the attached draft agreement will meet with the approval of Mr. Van Patten. If you or he have any suggested changes, please let me know as soon as possible since we need to get this finalized promptly. My direct line is 202/429-4107. If I cannot be reached, you should contact Angus Macbeth at 202/429-6171.

Thank you for your cooperation.

Very truly yours,

Peggy L. O'Brien

cc: Larry Boggs, Esq.
John Harssen
Angus Macbeth, Esq.
John Uruskyj
Phil Gitlen, Esq.
Gus Spallo, Esq.

November 29, 1989
D R A F T

ACCESS AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 1989, by and between ROBERT VAN PATTEN ("Van Patten") and the following companies or entities: GENERAL ELECTRIC COMPANY, NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY (the "Respondents") and THE UNITED STATES DEPARTMENT OF DEFENSE ("DOD").

WITNESSETH:

WHEREAS, pursuant to an administrative order (the "Order") signed by the EPA Regional Administrator for Region II on September 28, 1989, the Respondents and others were ordered to perform a remedial investigation and feasibility study ("RI/FS") at the Malta Rocket Fuel Area Superfund site (the "Site") located in Malta, New York and to install an early warning monitoring system ("EWMS");

WHEREAS, although the United States Environmental Protection Agency ("EPA") has identified DOD as a potentially responsible party at the Site, EPA has not included DOD as a respondent in the Order;

WHEREAS, Van Patten owns property adjacent to the Site to which the Respondents, DOD and their contractors will need

access if they are to install and operate the EWMS as required by the Order;

WHEREAS, the Respondents and DOD have requested permission from Van Patten to enter upon those portions of his land necessary for the purpose of installing and operating the EWMS; and

WHEREAS, Van Patten is willing to grant to the Respondents and DOD access to those portions of his land for the aforesaid purposes subject to the terms and conditions hereinafter set forth.

NOW THEREFORE, in consideration of the premises and the mutual promises and covenants hereinafter set forth, the parties agree as follows:

1. Van Patten hereby grants the Respondents, DOD and their authorized contractors, subcontractors, agents and other representatives permission to enter upon the property owned by Van Patten located adjacent to the Site for the purpose of installing and operating the EWMS as required by the Order.

2. Van Patten hereby grants EPA and its designated representatives, including but not limited to their employees, agents, contractors and consultants, permission to enter upon the property owned by Van Patten located adjacent to the Site for the

purpose of observing the work carried out pursuant to EPA's Order of September 28, 1989. Van Patten grants permission to EPA and its designated representatives to have full access to and freedom of movement at the property owned by Van Patten adjacent to the Site at all times, including, but not limited to, any time that work under EPA's Order of September 28, 1989, is being performed, for purposes of inspecting and observing the implementation of the Order, verifying the information submitted to EPA by respondents, or for any other purpose reasonably related to EPA oversight of the implementation of the Order.

3. Van Patten shall be notified at least forty-eight (48) hours before the Respondents and/or DOD seek access to his property and shall have the right to have a representative present when all sampling is conducted. Van Patten's representative shall have the right to approve the location of any drilling or sampling before it is performed. Van Patten shall have the right to take splits of all samples and the right to receive soil and/or water quality data within ten (10) days of its receipt by the Respondents and DOD.

4. In installing and operating the EWMS, as described above, the Respondents and DOD will enter upon and utilize only that property of Van Patten which is reasonably required to effectively accomplish such activities.

5. After the EWMS has satisfied its purpose, all material and equipment, except groundwater monitoring wells and stakes used to mark sampling locations or survey results, which are used by the Respondents and DOD in operating the EWMS shall be removed from the property of Van Patten. Any groundwater monitoring wells or stakes left on Van Patten's property after conclusion of the EWMS shall be maintained in place and in good condition by Van Patten.

6. The Respondents shall indemnify and hold harmless Van Patten from and against all claims, actions, costs, expenses, damages and liabilities arising from all negligent acts or omissions of the Respondents and their authorized contractors, subcontractors, agents and other representatives resulting in injury to persons and occurring on the property of Van Patten in the course of the exercise of the rights granted under this Agreement.

7. This Agreement will terminate upon the completion of the RI/FS and EWMS to EPA's satisfaction pursuant to the Order. Provided, however, that Van Patten's obligation to maintain in place and in good condition any groundwater monitoring wells or stakes which remain after completion shall continue until all remedial activities connected with the Site are completed.

IN WITNESS WHEREOF, the parties have executed this Agreement the day and year first above written.

ROBERT VAN PATTEN

_____

GENERAL ELECTRIC COMPANY

By_____
_____

NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY

By_____
_____

UNITED STATES DEPARTMENT OF DEFENSE

By_____
_____

SIDLEY & AUSTIN
A PARTNERSHIP INCLUDING PROFESSIONAL CORPORATIONS

ONE FIRST NATIONAL PLAZA
CHICAGO, ILLINOIS 60603
312: 853-7000 FAX: 312-853-7312

2049 CENTURY PARK EAST
LOS ANGELES, CALIFORNIA 90067
213: 553-8100 FAX: 213-556-5541

875 THIRD AVENUE
NEW YORK, NEW YORK 10022
212: 418-2100 FAX: 212-418-2165

1722 EYE STREET, N.W
WASHINGTON, D.C. 20006
TELEPHONE 202: 429-4000
TELEX 89-463
FACSIMILE 202: 429-6144

18 KING WILLIAM STREET
LONDON, EC4N 7SA, ENGLAND
441: 621-1616 FAX: 441-626-7937

5 SHENTON WAY
SINGAPORE 0106
65: 224-5000 FAX: 65-224-0530

ASSOCIATED OFFICE:

HASHIDATE LAW OFFICE
IMPERIAL TOWER, 7TH FLOOR
1-1, UCHISAIWAICHO 1-CHOME
CHIYODA-KU, TOKYO 100 JAPAN
03-504-3800 FAX: 03-504-1009

January 3, 1990

VIA FEDERAL EXPRESS

Earl David Steenberg, Esq.
P.O. Box 425
Ushers Road
Clifton Park, NY 12065

Re: Malta Rocket Fuel Area Superfund Site

Dear Mr. Steenburg:

I am writing to inquire about the status of your review of the access agreement which I sent you on November 29, relating to the property of your client, Robert Van Patten. From our rather brief telephone conversation of December 27, I gather you are still discussing this with your client. As I pointed out in my November 29 letter, we are eager to have this agreement finalized promptly so that work can begin as soon as EPA approves the work plan. I look forward to hearing from you.

Very truly yours,

Peggy L. O'Brien

cc: Alison Hess, EPA
Virginia Capon, EPA
Larry Boggs
John Harssen
Angus Macbeth
Phil Gitlen
John Uruskyj
Dennis Colton
Gus Spallo

SIDLEY & AUSTIN
A PARTNERSHIP INCLUDING PROFESSIONAL CORPORATIONS

ONE FIRST NATIONAL PLAZA
CHICAGO, ILLINOIS 60603
312: 853-7000 FAX: 312-853-7312

2049 CENTURY PARK EAST
LOS ANGELES, CALIFORNIA 90067
213: 553-8100 FAX: 213-556-6544

875 THIRD AVENUE
NEW YORK, NEW YORK 10022
212: 418-2100 FAX: 212-418-2165

1722 EYE STREET, N.W.
WASHINGTON, D.C. 20006
TELEPHONE 202: 429-4000
TELEX 89-463
FACSIMILE 202: 429-6144

18 KING WILLIAM STREET
LONDON, EC4N 7SA, ENGLAND
441: 621-1616 FAX: 441-626-7937

5 SHENTON WAY
SINGAPORE 0106
65: 224-5000 FAX: 65-224-0530

ASSOCIATED OFFICE:

HASHIDATE LAW OFFICE
IMPERIAL TOWER, 7TH FLOOR
1-1, UCHISAIWAICHO 1-CHOME
CHIYODA-KU, TOKYO 100 JAPAN
03-504-3800 FAX: 03-504-1009

March 9, 1990

VIA FEDERAL EXPRESS

Earl David Steenberg, Esq.
Executive Ten Park
Ushers Road
Clifton Park, NY 12065

Re: Malta Rocket Fuel Area Superfund Site

Dear Mr. Steenberg:

I have tried repeatedly and unsuccessfully to reach you by telephone. I have received no reply to either of my earlier letters to you regarding the access agreement I sent you on November 29 for the Robert Van Patten property. I now understand that Mr. Van Patten recently passed away. This is most unfortunate but I still would appreciate some response regarding the access agreement. If you are not authorized to represent Mr. Van Patten's estate, I would like to be told who is so that I can contact them. The respondents to EPA's CERCLA § 106 Order have received the agency's comments on the Early Warning Monitoring Plan and presently are in the process of responding to those comments. Among other things, EPA wants to know why we have not gained access to the Van Patten property. If we cannot finalize an access agreement promptly (i.e., within the next several weeks) we will be forced to ask EPA to obtain access for us. Although the agency has the power to do this, we do not want to be placed in the position of having to ask EPA to do so.

I look forward to hearing from you promptly. My telephone number is 202-429-4107. If I am not available, you should speak to Angus Macbeth at 202-429-6171.

Very truly yours,

Peggy L. O'Brien

PLO/pla

cc: Alisa Hess, EPA
Virginia Capon, EPA
Larry Boggs
John Harssen
Angus Macbeth
Phil Gitlen
Gus Spallo
Dennis Colton
John Uruskyj

APPENDIX C

March 1987 Work Plan
Sampling Protocols

2.3 Decontamination Procedures

Prior to drilling the first boring, the equipment to be used in drilling and monitoring well installation will be cleaned to remove possible contaminants encountered during drilling at previous jobs. All equipment which is to come in contact with the soil, as well as water tanks, drill tools, pumps and hoses will undergo the initial cleaning procedure. While working at the site, the drilling equipment will be decontaminated between wells to prevent cross-contamination. Decontamination will take place at either the drilling location of the just completed well, or at a designated site selected by Dunn Geoscience personnel. The cleaning process will involve the use of a steam cleaner or high pressure hot water device. Uncontaminated water, from a public water supply, will be used for all decontamination procedures.

2.4 Well Development

Well development will be accomplished by one or more of the following techniques: overpumping, modified airlift or bailing. The appropriate technique will be chosen based on the depth to water, water bearing properties of the surrounding medium and effectiveness of the technique. Decontamination procedures will be performed between wells to prevent cross contamination. Well development will be terminated when the purged water is visually free of turbidity or upon the discretion of the on-site geologist/hydrogeologist.

2.5 Groundwater Sampling Procedures and Analysis

Prior to any water sample collection, static water levels will be measured to the nearest one-hundredth of a foot. The wells will then be exercised to dryness or until three volumes of water (based on the volume of water in the casing) are removed,

depending on well depth/volume and recovery rates for groundwater recharge. Purging will be accomplished using either dedicated five foot, bottom-fill PVC bailers, a Keck Geophysical Instrument, Inc., Model SP-81 submersible pump, or a suction lift pump with dedicated polypropylene tubing.

Groundwater sampling will take place within 2 hours of purging a well. Samples will be collected using bottom-filling, check valved teflon bailers lowered down the well with teflon coated stainless steel wire. Bailers will be decontaminated between samples using the following sequence: distilled water rinse, methanol spray wash, distilled water rinse (1 gallon per bailer).

Samples will be collected in standard laboratory-provided 40 ml VOA vials. Care will be taken when collecting the samples to minimize agitation and to assure that no headspace exists in the vials. Samples will be stored in ice-chilled coolers and subsequently shipped to the laboratory via overnight express mail. All sampling will be performed by experienced Dunn Geoscience hydrogeologists and chemists.

DEC approved, ERCO Laboratory in Cambridge, Massachusetts has been selected to perform the analyses. Samples will be analyzed for carbon tetrachloride, trichloroethylene and boron.

QA/QC measures will include 2 blind duplicate samples, selected on a rotating basis, and a trip blank and a field blank. Chain of custody forms will be maintained throughout the shipment of samples to the laboratory. Observations will be made and recorded regarding weather, surrounding air/water/soil conditions, and other pertinent field conditions.

APPENDIX D

March 1990 Sampling Plan

SAMPLING PLAN
LUTHER FOREST WELL FIELD
EARLY WARNING MONITORING SYSTEM
MALTA, NEW YORK
MARCH 20, 1990

General

The following protocols will be followed whenever groundwater and/or surface water samples are obtained at the Luther Forest Well Field Early Warning Monitoring System in Malta, New York. Modifications of these protocols may occur only after receiving the approval of the Dunn Geoscience Corporation project manager.

All persons involved with the sampling program will be technically competent and familiar with the sampling procedures described herein.

Pre-Sampling Preparation

Prior to any sampling event, the following steps must be taken by personnel responsible for sampling:

- Review the sampling procedures;
- Assemble all field equipment necessary for sample collection (see Table 1);
- Inspect the equipment to insure that it is in working order;
- Note and replace any items that are in short supply or are showing indication of wear;
- Contact the laboratory to obtain the appropriate sample containers and preservatives. Determine any constraints such as delivery time and confirm the method of sample shipment; and
- Establish a sampling team of at least two people.

TABLE 1
FIELD EQUIPMENT

Sampling Equipment

- Personal safety equipment (work boots, latex gloves);
- Sampling Plan;
- Monitoring well construction details;
- Insulated sample cooler containing prepared sampling containers, preservatives and wet ice or ice packs;
- Water level indicator;
- Tool box;
- Duct tape;
- Distilled water;
- Disposable towels;
- PVC bailers for well purging;
- Suction-lift pump and 1/2-inch polyethylene tubing for well purging;
- Dedicated teflon bailers with teflon-coated stainless steel wire;
- Field filtration equipment (if metals analysis are to be performed);

Documentation Equipment

- Waterproof pens not containing organic solvents;
- Chain-of-Custody forms; and
- Field notebook.

Upon receipt of the sampling containers from the laboratory, inventory of the containers will be taken, checking if the preservative has been added and assessing their general condition. Containers will be labeled with the sampling point location (except for blind duplicates) and required analysis at this time.

Coolers containing wet ice or ice packs will be utilized during the sampling round and subsequent transportation to the laboratory to maintain the proper temperature. The sampling will be planned so that there will be adequate time to allow ice pack freezing; usually a 24-hour period is required to assure that the ice pack will be frozen solid.

Wells will be evacuated using either a five foot, bottom-fill PVC bailer or a gasoline powered suction lift pump. Prior to evacuating the wells, all PVC bailers will be thoroughly cleaned with a non-metallic, non-phosphate detergent, such as Liquinox^{TM}. Each bailer will then be rinsed and/or soaked in tap water and rinsed with one gallon of distilled water. After rinsing, the bailers will be placed in plastic bags to insure that no outside contaminants are introduced. New nylon rope will be attached to the bailers for each sampling round. New 1/2-inch polyethylene tubing will be used at each well when utilizing the suction-lift pump.

Safety Equipment

Latex gloves will be worn by all sampling team members when obtaining water level measurements, exercising the wells and collecting groundwater samples. New latex gloves will be worn immediately prior to sampling each well.

Water Level Measurements/Well Evacuation

Water level measurements will be made with an electric tape prior to evacuating a well. At well pair locations (e.g., DGC-1S and DGC-1D), water level measurements will be taken at both wells prior to evacuating either well. The electric tape method involves lowering a probe into a well which, upon contact with the water, completes an electric circuit. At the instant that the circuit is closed, the tape is held at the measuring point (notch in the top of the well casing) and then partly withdrawn so that the distance from the point held to the nearest depth marker can be measured and added to or subtracted from the depth marker to obtain the depth to water. The portion of the tape that was in contact with the groundwater will be cleaned with distilled water prior to taking a measurement

in the next well. The collector's names, date, time, weather conditions, and other pertinent information will be entered in the field notebook.

Once the water level has been determined, the length of the water column in the well can be calculated. This is accomplished by subtracting the depth to water from the measured well depth (calculated from the top of the casing). Next, the length of the water column is multiplied by a conversion factor of 0.163 for 2-inch diameter wells to determine the number of gallons of water equaling one well volume of water. Finally, that value is multiplied by three to determine the volume of water required to evacuate the well of three well volumes.

If a bailer is used for evacuation, a sampling team member will remove the PVC bailer from the protective bag and lower it down the well until it comes in contact with the water. The sampling team member will continue to lower the bailer, allowing it to submerge. When the bailer has filled, he will remove the bailer from the well and discard the water into a calibrated five gallon pail. These steps will be repeated until three well volumes have been removed or until the well is essentially dry. After the bailer has been used to evacuate the well, it will be replaced in a plastic bag for subsequent cleaning.

When using a suction pump to evacuate the wells, 1/2-inch polyethylene tubing will be lowered into the top of the water column. The tubing will then be connected to the suction pump and the well evacuated as previously described.

The intake of the tubing will remain in the upper foot of the water column during pumping. The tubing may have to be continually lowered down the well if the yield of the well is insufficient to sustain the pumping rate. For this reason, a length of tubing greater than the total depth of the well should be used for the purging procedure. After the evacuation has been completed, the tubing will be discarded and new tubing used at the next location.

Sample Containers and Preservation Procedures

Sample containers provided by the laboratory will be glass or polyethylene depending on the analytical parameters of interest. The containers will be cleaned and otherwise prepared by the laboratory prior to shipment to the sampling team. VOA vials to be used for groundwater and surface water samples will contain the appropriate amount of

hydrochloric acid. This preservative is necessary to prevent rapid biodegradation of certain vulnerable purgeable organics (e.g., benzene).

Sampling Equipment

Groundwater samples will be collected using pre-cleaned dedicated teflon bailers with teflon check valves. The bailers will be lowered using teflon-coated stainless steel wire. All new sampling equipment will be cleaned by rinsing with detergent solution, tap water and distilled water, in that order. Each dedicated bailer is cleaned in the laboratory, stored and transported in a clean plastic bag prior to sampling.

Sample Withdrawal

Upon arriving at each well, the sampling team will check the well for any above-ground damage. Any damage will be recorded in the field notebook. As soon as sufficient water is available in the well and after preparing the appropriate sample bottles, the bailer will be removed from the protective bag and lowered slowly down the well. After the bailer is completely submersed, it will be slowly removed and the collected water discarded. The sample(s) will then be collected by again slowly lowering the bailer to a depth approximately in the center of the well's screen. Care will be taken to prevent the bailer or teflon-coated wire from coming in contact with any objects other than the well. Latex gloves will be worn by the sampler.

Although metals will not routinely be analyzed for in the Early Warning Monitoring System, the potential for future metals analyses does exist. Groundwater samples destined for metals analysis will be field filtered prior to preservation. Before the metal sample is placed in its sample bottle, it will first be filtered as described in Appendix 1. All metals samples will be tested to determine that the pH is less than 2 to ensure proper preservation. Samples will be tested either using a pH electrode or pH paper by placing a small volume of sample in a separate container and determining pH of this subsample.

Filtering of samples destined for volatile organic compounds (VOC) analysis is not acceptable. Water withdrawn for VOC samples will be poured directly from the bailer into the appropriate sample bottle. The VOC vials will be filled in a controlled manner, aimed at reducing groundwater contact with the air and assuring that no headspace remains after capping.

After collection of the sample(s), the sampling containers will be placed in coolers containing wet ice or ice packs for transportation to the laboratory. The field notebook will be filled out at each sampling location. Samples will be shipped by overnight express delivery to the analytical laboratory.

Stream Water Sample Collection

Stream water samples will be collected from the center of the stream adjacent to the appropriate location stake or flagging on the stream bank. Samples will be collected by using a clean VOA vial to transfer the stream water to the sample containers. This is necessary to prevent the loss of preservative from the sampling containers.

Field Notebook

Upon completion of sampling, the field notes will be complete and contain sufficient information for the person sampling to be able to reconstruct the sample collection and handling procedures at a later time.

Chain-of-Custody

The sampling team is responsible for the custody of the samples until the samples are properly dispatched to the receiving laboratory or given to an assigned custodian. The sampling team must insure that the containers are in their physical possession or in their view at all times or stored in a locked secure area. In general, a minimum number of people should be involved in the sample collection and handling process.

Samples must be accompanied by a chain-of-custody form (Figure 1). When transferring the possession of samples, the individuals relinquishing and receiving the samples will sign, date and note the time on the form. The form documents transfer of samples from the sampling team to the custody of another individual and/or the laboratory.

FIGURE 1

DUNN GEOSCIENCE CORP

Client Name:	DGC Contact:
Project No.:	Laboratory Contact:
Site Location:	Lab Identification:
	Date Report Required:
Sampler:	

Sample Identification	Date	Time	Sample Matrix	Collection Vessel	Lowering Device	Sample Container	Preserv.	Filter: Pore, Type	Comp. or Grab	Analysis Required	Comment

Name	Affiliation	Date	Time
Relinquished by:			
Received by:			
Relinquished by:			
Received by:			

Received by Laboratory:

Samples Intact & Properly Preserved:

KEY

Sample Matrix

1. Groundwater
2. Surface Water
3. Soil
4. Sediment
5. Sludge
6. NAPL
7. Tissue
8. Air Gases
9. Air Particulates
10. Leachate
11. Outfall/Discharge
12. Rock
13. Other

Collection Vessel

14. Bailer
15. Submersible Pump
16. Bladder Pump
17. Air/Vacuum Pump
18. Peristaltic Pump
19. Kemmerer
20. Core Sampler
21. Dredger
22. Shovel/Scoop
23. Filter
24. Dipper Bottle
25. Adsorbent
26. Split Spoon
27. Hand Auger
28. Other

Analytical Methods

29. EPA 601
30. EPA 602
31. EPA 624/8240
32. Pesticides/PCBs EPA 608/8080
33. Acid Extractables EPA EPA 625/8270
34. Base/Neutral Extractables EPA 625/8270
35. NYS Part 360
    1) Metals
    2) Wet Chemistry
36. NYS Part 5 Drinking Water
    1) Inorganic
    2) Herb/Pest
37. Other
38. See attached sheet
39. EPA 503
40. Appendix IX
41. Client Menu
42. TCLP
43. EP TOX

Material

A. Tubing
B. Coated
C. Clear glass
D. Amber glass
E. Metal
F. Polyethylene
G. Teflon
H. PVC
I. Nylon
J. Natural Fiber
K. Rubber
L. Tygon
M. Polypropylene
N. Stainless Steel
O. Polycarbonate
P. Polysulfone
Q. Fiberglass
R. VOA Vial
S. Teflon lined Cap
T. Other

Lowering Device

44. Chain
45. Monofilament
46. Braid
47. Wire

Filter Material

48. Teflon
49. Cellulose
50. Glass Fiber
51. Paper
52. Polysulfone

Preservatives

53. Nitric Acid
54. Sulfuric Acid
55. Hydrochloric Acid
56. Sodium Hydroxide
57. Sodium Thiosulfate
58. Chilled
59. Other

APPENDIX 1

Field Filtration

The purpose of filtering groundwater samples is to remove suspended particulate matter which has been drawn through the screen from the surrounding geologic materials during the process of evacuating the sampling the well. These particulates may naturally contain metals that may desorb into the sample once a preservative (particularly acid) is added. Thus, since samples truly representative of in-situ groundwater quality are desired, filtering is required. Additionally, twenty-five percent of the groundwater samples destined for metals analysis will be analyzed unfiltered for purposes of comparison to the filtered samples.

Filtration will be accompliahed by one of three possible techniques depending on degree of turbidity. For samples that are relatively free of suspended material, a Nalgene disposable filter unit will be used. Filter units are factory sealed in plastic bags, and are used at only one well and then disposed. Water is drawn through the filter by using a hand pump which develops a vacuum. For samples which are highly turbid, one of the two following methods will be used: 1) A Geotech barrel filter field filtration unit is filled with water withdrawn from the well; a fresh 0.45-micron cellulose filter is then placed in the filter receptable and the base of the unit secured; pressure is applied on the sample with a hand pump, forcing filtrate out of the unit; approximately 50-100 ml of filtrate will be run to waste before the sample is collected. 2) Alternatively, a vacuum pump used in conjunction with filter flasks and a Buchner funnel will be used to filter the sample.

In either case, barrel filter or Buchner funnel, the filter apparatus will be cleaned between wells using a metal-free soap solution followed by rinsing with distilled water. At the next site, the apparatus will again be rinsed, using some of the sample about to be filtered.