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OFF-SITE INVESTIGATION - ADDENDUM

**Duva Property
Town of Clay, New York**

**New York State Department of
Environmental Conservation Site No. 7-34-051**

**Prepared as Required by
NYSDEC Order on Consent
Index No. A7-0233-90-05**

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DECEMBER 1992

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CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

1.1 GENERAL

The Duva Property (referred to herein as "Site") is located in the Town of Clay, north of Syracuse, New York. The Site occupies approximately five acres of a partially wooded field and is situated south of West Taft Road and immediately north of a residential development as shown in Figure 1.1.

Implementation of a Remedial Investigation/Feasibility Study (RI/FS) was begun in December 1990 under the Terms and Conditions of an Order on Consent (Index No. A7-0233-90-05) entered into by the New York State Department of Environmental Conservation (NYSDEC) and the participating respondents, including General Electric (GE), the Estate of Peter Duva, and Donald W. Miller, Inc. The RI field activities were performed by Conestoga-Rovers & Associates (CRA) between December 1990 and December 1991.

An off-Site investigation was performed to determine the potential extent of contamination in areas downgradient of the Site. The off-Site investigation was conducted in accordance with various correspondence between the NYSDEC and GE including:

- i) NYSDEC request for additional groundwater quality data, dated November 22, 1991 (Maiurano to Ianniello);

- ii) GE proposal for the sampling of monitoring wells dated December 10, 1991 (Ianniello to Jackson);
- iii) GE transmittal of the CRA off-Site groundwater sampling protocols dated December 12, 1991 (Ianniello to Jackson);
- iv) GE proposal for temporary groundwater probe locations dated January 13, 1992 (Ianniello to Maiurano);
- v) NYSDEC acceptance of the locations for additional groundwater probes dated February 10, 1992 (Maiurano to Ianniello);
- vi) GE transmittal of the proposed Work Plan for the installation of four off-Site groundwater monitoring wells, dated June 9, 1992 (Ianniello to Jackson and O'Toole, Jr.); and
- vii) NYSDEC acceptance of Work Plan for the installation of four additional groundwater wells dated June 16, 1992 (Maiurano to Ianniello).

The off-Site investigation was conducted in the residential area located immediately downgradient (south and southeast) of the Site. A number of groundwater sampling events took place beginning in December 1991. Additionally, four temporary monitoring wells were installed off-Site in July 1992.

All samples collected were submitted to Galson Laboratories (Galson) for analysis. Results of these analyses are presented in Tables 1, 2 and 3.

Groundwater samples were collected from temporary monitoring wells and subsurface probes installed at various off-Site locations. Initial sampling events conducted in wells located immediately adjacent to the Site and two wells installed on the north side of the Platinum Drive right-of-way were described in the RI Report.

This Addendum has been prepared to supplement the data presented in the RI Report and describes the sampling events completed following submittal of the RI Report. As such, this document includes:

- i) identification of the off-Site areas sampled;
- ii) a description of the field investigation activities conducted at the Site;
- iii) validation and summary presentation of the data obtained; and
- iv) pertinent conclusions derived from the data obtained.

1.2 SITE DESCRIPTION

The off-Site area under consideration is located immediately south of the Miller/Duva property and extends south and southeast from the Site to encompass lands demonstrated to be hydraulically downgradient of the Site. The general layout of the off-Site area is illustrated on Figure 1.2. The area under consideration includes:

- i) the east end of Platinum Drive in the Town of Clay, New York; and
- ii) the western portion of Victoria Park Drive and all of Emerald Drive in the Town of Salina, New York.

The land is primarily residential (single family residences) with some wood lots situated southeast of the Site.

2.0 DESCRIPTION OF FIELD ACTIVITIES

Three field investigation programs were completed following submittal of the RI Report, including:

- i) December 1991 sampling from four temporary probes inserted in the right-of-way of Platinum Drive (two subsequent attempts to sample through temporary probes were unsuccessful);
- ii) installation/sampling of four new temporary monitoring wells in July 1992; and
- iii) November 1992, sampling of seven monitoring wells.

The scope of work associated with the various activities is presented in the subsections which follow.

2.1 TEMPORARY PROBE INSTALLATION/SAMPLING

On December 18-19, 1991, four groundwater samples were collected utilizing an AMS Retract A-Tip soil vapor probe assembly. Locations and sampling protocols are described below. Sample locations are illustrated on Figure 1.2.

2.1.1 Sample Locations

Location GW-A was located on the downgradient side of the sanitary sewer, at the upstream termination of the sewer on the southeast corner of 5024 Platinum Drive east of MW-13.

GW-B was located on the southwest corner of 5022 Platinum Drive downgradient of the sanitary sewer, approximately two feet southeast of the manhole.

GW-C was located between the sanitary and storm sewers alongside Emerald Drive south of GW-B.

GW-D was located immediately downgradient of MW-13 in the right-of-way south of Platinum Drive.

Samples were collected at each location using the AMS Retract-A-Tip soil vapor probe assembly as described in the following:

- i) all sampling equipment was decontaminated prior to use at each location;
- ii) a pilot hole was advanced at each location to a depth of 8 to 10 feet below grade;
- iii) a new teflon tube was attached to the sampling probe tip and the sampling probe was advanced to the desired depth;

- iv) a peristaltic pump was used to draw groundwater through the tube; once a steady flow was obtained, two 4 ml vials were filled and placed in a cooler; pumping was continued and, if sufficient water was available, a second set of vials were filled after three minutes of purging and again after six minutes; the last set of samples collected were submitted for analyses of site specific organic compounds;
- v) the sampling probe was removed and the surface restored; sampling equipment was decontaminated after use; purge water and unused sample water was discharged to the on-Site water treatment plant; and
- vi) sample preparation and handling protocols were consistent with the RI/FS Work Plan and associated documents.

On April 2, 1992, groundwater sample collection was attempted at seven downgradient off-Site sample locations. An AMS Retract-A-Tip probe assembly was driven seven to nine feet until a significant increase in resistance, indicating the top of the clay till, was encountered. A peristaltic pump was then tied into the sampling tube and activated. At all locations, fine sand and silt clogged the intake screen. It is not known whether the sampling did not work in these locations due to different geologic conditions than those encountered, or solely due to a level of groundwater.

A second attempt to collect samples on May 7-8, 1992, was unsuccessful at six of the seven sample locations. A geoprobe subsurface sampling probe was utilized during the event. The probe was driven, as described above and retracted after it hit the till to leave a void space in the soil.

A teflon tube was then raised and lowered in quick succession to collect and recover any groundwater which collected in the void and probe. The probe was allowed to sit undisturbed if water was not readily available; collection of samples was then attempted after the rest period. Sand was drawn into the probe and tubing causing it to plug at all but one location. A groundwater sample heavily laden with sand was collected from the sampling location at the southern end of Emerald Drive. The collected sample was submitted to Galson for analysis.

2.2 OFF-SITE MONITORING WELLS

Four temporary off-Site monitoring wells were installed in July 1992 to facilitate collection of off-Site groundwater samples due to the limited and inconsistent success associated with sampling through the temporary probes. The wells were installed at the following locations, as illustrated on Figure 1.2:

- i) in the Town of Salina right-of-way adjacent to 301 Victoria Park Drive (MW-14);
- ii) in the Town of Salina right-of-way adjacent to 119 Emerald Drive (MW-15);
- iii) in the Town of Salina right-of-way adjacent to 101 Emerald Drive (MW-16); and

- iv) in the Town of Clay adjacent to the southern boundary of the lot at 5026 Platinum Drive (MW-17).

All wells were installed in accordance with the protocols approved for use during the RI. Well installation logs are presented in Appendix A. All four wells were developed prior to sampling; well development records are also included in Appendix A.

The four newly installed wells plus existing monitoring wells MW-11, MW-12 and MW-13 were sampled on July 24, 1992. All samples submitted to the laboratory were inadvertently analyzed for trimethylbenzenes (Method 8020) only. All seven wells were resampled on August 31, 1992 and/or September 1, 1992. A third round of samples was collected from these wells on November 4, 1992. Samples obtained were analyzed for target compound list volatile organic compounds (TCL VOCs). Data obtained from these two rounds are presented on Tables 2 and 3 for the August/September event and November event, respectively.

Water elevations were measured in all accessible wells during the last two sampling events. Groundwater elevation data are presented in Table 4. In addition, a contour map displaying groundwater elevations is presented in Figure 2.1.

2.3 SAMPLE ANALYSES

Samples were analyzed for the TCL VOCs and/or 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. Analytical methods were as follows:

- i) TCL VOCs by Method 8240, USEPA SW-846, Third Edition, 1986; and
- ii) 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene by Method 8020, USEPA SW-846, Third Edition, 1986.

In order to provide for the requested accelerated analytical turnaround time, quality assurance/quality control (QA/QC) deliverables associated with this event were consistent with the basic requirements of SW-846.

Validation of the data was performed as presented in Appendix B.

3.0 ASSESSMENT OF CHEMICAL PRESENCE

3.1 CHEMICAL PRESENCE

The distribution and degree of residual VOC contamination present in the groundwater from locations MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, GW-A, GW-B, GW-C, GW-D, and GW-E are summarized in this section. Tables 1, 2, and 3 summarize the analytical data for samples taken at these locations during the various sampling events.

No significant VOCs were reported in the samples taken from MW-11, MW-12, MW-14, MW-15, or MW-16. Trace amounts of methylene chloride, acetone, trichloroethene, and xylene (total) were detected in some samples, but were present at levels below the practical quantitation limits (PQL). Samples collected from GW-E contained acetone at a reported concentration of 25 mg/L. The estimated presence of trace amounts of acetone and methylene chloride may represent a laboratory artifact. These VOCs are not present in samples from the Duva property.

Samples collected from GW-A contained reported concentrations of several VOCs. 1,2-Dichloroethene (total) was reported at a concentration of 360 µg/L at this location, which represents the highest concentration of VOCs for each of the locations sampled. Additionally, vinyl chloride and xylene (total) were both reported at 54 µg/L at this location. Several other VOCs were reported at trace concentrations (e.g., <5.3 µg/L) at this location as well.

Samples collected from GW-B, GW-C, and GW-D also contained reported concentrations of a number of VOCs. Samples taken from GW-D displayed a 1,2-dichloroethene (total) concentration of 320 µg/L and a trichloroethene concentration of 130 µg/L. Samples collected from both GW-B and GW-C contained reported levels of trichloroethene as well, with concentrations of 89 µg/L and 110 µg/L, respectively. Both of these sample locations also contained reported levels of 1,2-dichloroethene at concentrations of 75 µg/L and 54 µg/L, respectively. In addition, 1,1,1-trichloroethane was reported in a detected quantity at each of the three locations and trace amounts of other VOCs were detected at levels below the PQL at each of the three locations.

Samples collected from monitoring well MW-13 contained trichloroethene at levels of 7 µg/L and 5 µg/L, respectively. Several other VOCs were estimated at levels below the PQL as well.

Samples collected in July 1992 and September 1992 from monitoring well MW-17 was reported to contain 1,2-dichloroethene (total) at a concentration of 22 µg/L and trichloroethene at a concentration of 16 µg/L, however, in the sample collected in November 1992 neither of these VOCs were detected in the samples. Additionally, the trace amounts of VOCs reported in the samples collected in July 1992 and September 1992 from MW-17 were not present in the samples collected in November 1992.

4.0 CONCLUSIONS

Based on the analytical data provided from the various sampling events, it is apparent that the concentrations of VOCs present in the groundwater at each of the locations sampled has been substantially reduced over time.

By comparing the data presented in Tables 1, 2, and 3, the trend in the reduction in VOCs is clearly defined. Successive sampling events indicate reductions in both the total number of VOCs present and in the associated concentration of VOCs. The most recent sampling data (November 1992) displayed virtually no VOCs. This clearly indicates that VOCs in each of the locations sampled have been reduced over time.

Tests performed to date have clearly identified the terminus of the contaminated plume and have delineated the extent of the off-site migration of contaminants. Additionally, the analytical data provided indicate a reduction in the spread of contaminants off Site. This reduction in VOCs over time provides strong evidence that the projects undertaken on Site have been successful in reducing the spread of contamination from on-Site source areas.



FIGURES

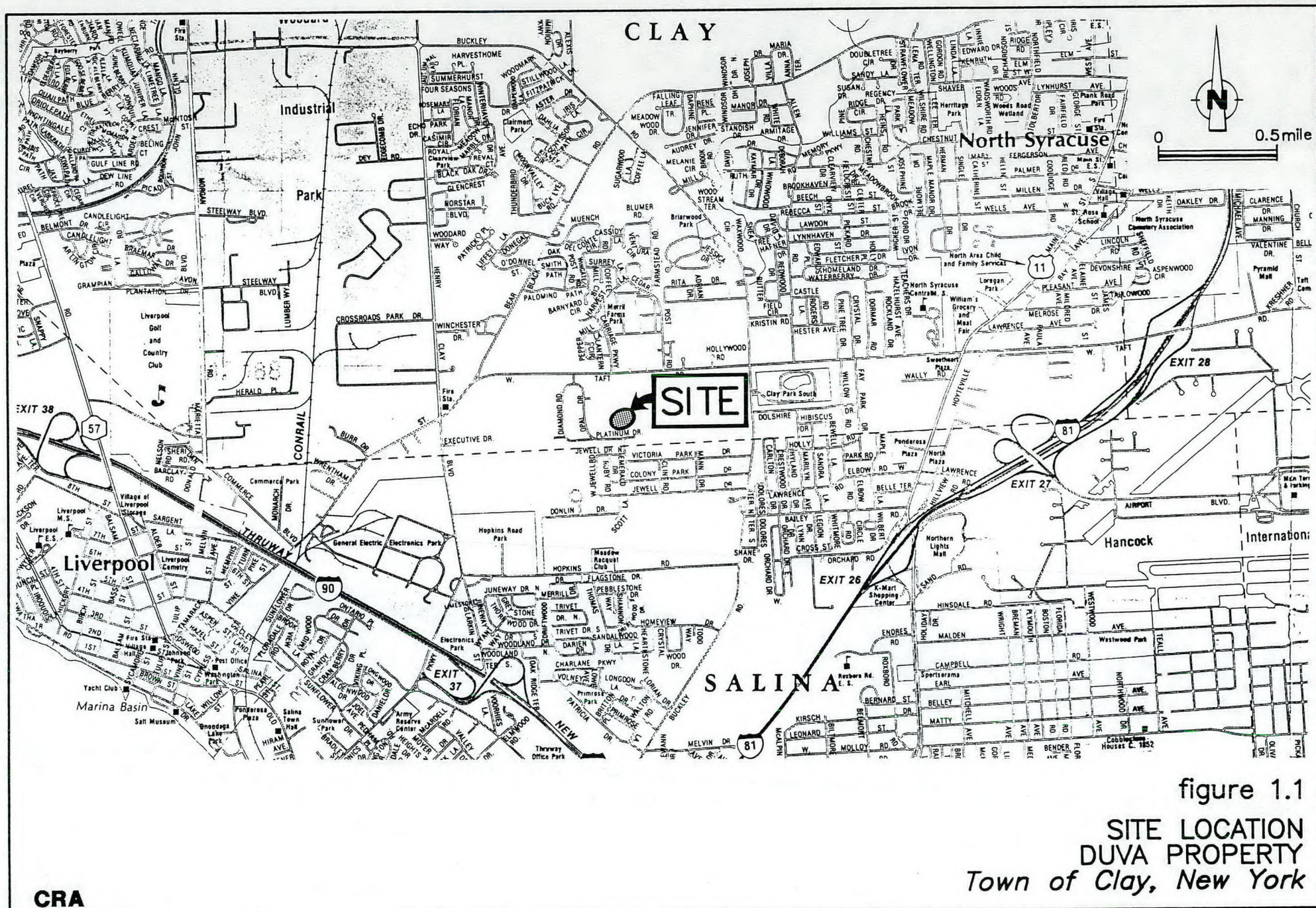


figure 1.1
 SITE LOCATION
 DVA PROPERTY
 Town of Clay, New York

CRA

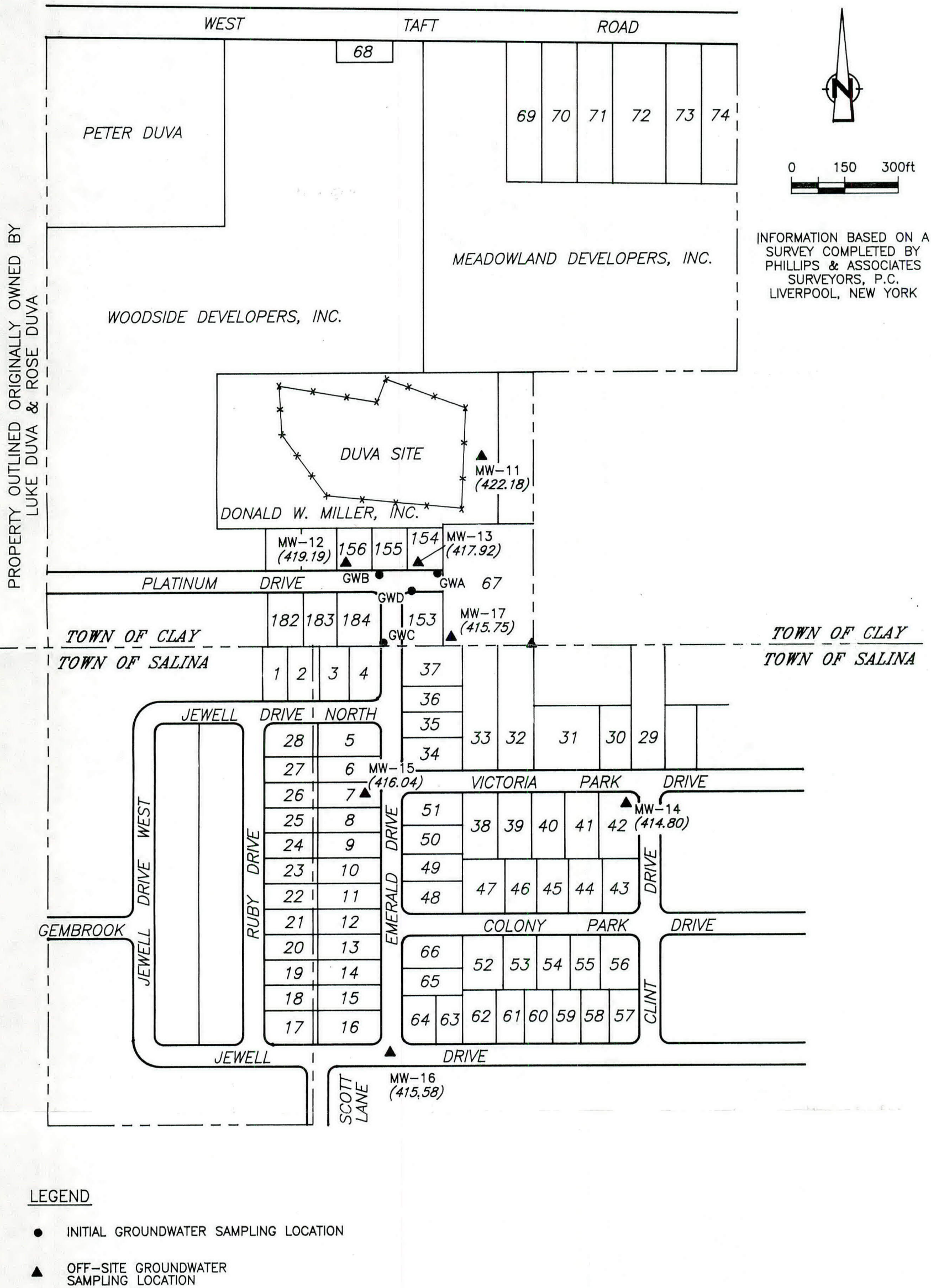


figure 1.2
SAMPLE LOCATIONS
DUVA PROPERTY
Town of Clay, New York

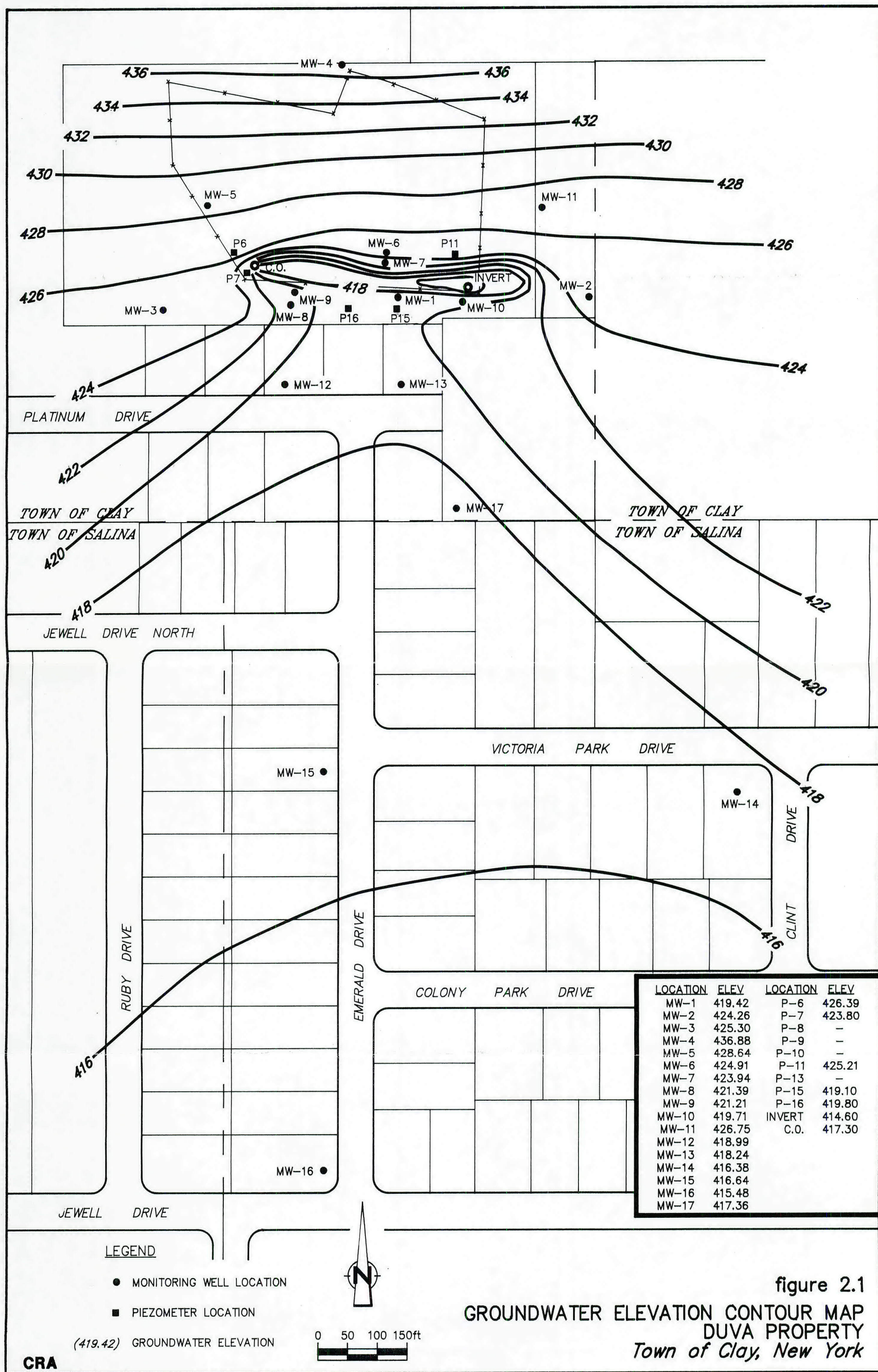


figure 2.1

TABLES

TABLE 1
VOLATILE ORGANIC COMPOUNDS
OFF-SITE GROUNDWATER SAMPLE DATA
DUVA PROPERTY RI/FS
DECEMBER 1991

Sample I.D.	GW-A	GW-B	GW-C	GW-D
Units:	µg/L	µg/L	µg/L	µg/L
Sample Date:	12/19/91	12/19/91	12/19/91	12/18/91
Compound				
Chloromethane	ND(25)	ND(10)	ND(10)	ND(25)
Bromomethane	ND(25)	ND(10)	ND(10)	ND(25)
Vinyl chloride	54D	ND(10)	ND(10)	ND(25)
Chloroethane	ND(25)	ND(10)	ND(10)	ND(25)
Methylene chloride	ND(13)	ND(5)	ND(5)	ND(13)
Acetone	ND(25)	ND(10)	ND(10)	ND(25)
Carbon disulfide	ND(13)	ND(5)	ND(5)	ND(13)
1,1-Dichloroethene	ND(13)	ND(5)	ND(5)	ND(13)
1,1-Dichloroethane	ND(13)	2J	1J	6JD
1,2-Dichloroethene (total)	360D	75	54	320D
Chloroform	ND(13)	ND(5)	ND(5)	ND(13)
1,2-Dichloroethane	ND(13)	ND(5)	ND(5)	ND(13)
2-Butanone	ND(25)	ND(10)	ND(10)	ND(25)
1,1,1-Trichloroethane	35D	7	9	17D
Carbon tetrachloride	ND(13)	ND(5)	ND(5)	ND(13)
Vinyl acetate	ND(25)	ND(10)	ND(10)	ND(25)
Bromodichloromethane	ND(13)	ND(5)	ND(5)	ND(13)
1,2-Dichloropropane	ND(13)	ND(5)	ND(5)	ND(13)
cis-1,3-Dichloropropene	ND(13)	ND(5)	ND(5)	ND(13)
Trichloroethene	4JD	89	110	130 D
Dibromochloromethane	ND(13)	ND(5)	ND(5)	ND(13)
1,1,2-Trichloroethane	ND(13)	ND(5)	ND(5)	ND(13)
Benzene	ND(13)	ND(5)	ND(5)	ND(13)
Trans-1,3-dichloropropene	ND(13)	ND(5)	ND(5)	ND(13)
Bromoform	ND(13)	ND(5)	ND(5)	ND(13)
4-Methyl-2-pentanone	ND(25)	ND(10)	ND(10)	ND(25)
2-Hexanone	ND(25)	ND(10)	ND(10)	ND(25)
Tetrachloroethene	ND(13)	2J	3J	7JD
1,1,2,2-Tetrachloroethane	ND(13)	ND(5)	ND(5)	ND(13)
Toluene	17D	ND(5)	ND(5)	ND(13)
Chlorobenzene	ND(13)	ND(5)	ND(5)	ND(13)
Ethylbenzene	12JD	ND(5)	ND(5)	ND(13)
Styrene	ND(13)	ND(5)	ND(5)	ND(13)
Xylene (total)	54D	ND(5)	ND(5)	ND(13)
1,2,4-Trimethylbenzene	5.3	ND(0.5)	ND(0.5)	ND(0.5)
1,3,5-Trimethylbenzene	1.7	ND(0.5)	ND(0.5)	ND(0.5)
Methyltertiarybutylether	ND	ND(0.5)	ND(0.5)	ND(0.5)
Benzene,1,2-dichloro-	31J	ND(0.5)	ND(0.5)	6J
Unknown				

Notes:

ND Non-detected at the stated detection limit.

J Associated value is below the practical quantitation limits, and was qualified as estimated by the laboratory.

D Analyzed at a dilution.

TABLE 2
GROUNDWATER SAMPLES - VOLATILES
GENERAL ELECTRIC
DUVA PROPERTY RI/FS
MAY, JULY, SEPTEMBER 1992

Sample Location:	GW-E	GW-E-RE	MW-11	MW-12	MW-13	MW-14
Compound	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Chloromethane	ND(10)J	ND(10)J	ND(10)	ND(10)	ND(10)	ND(10)
Bromomethane	ND(10)J	ND(10)J	ND(10)	ND(10)	ND(10)	ND(10)
Vinyl chloride	ND(10)J	ND(10)J	ND(10)	ND(10)	ND(10)	ND(10)
Chloroethane	ND(10)J	ND(10)J	ND(10)	ND(10)	ND(10)	ND(10)
Methylene chloride	ND(5)J	ND(5)J	ND(10)	ND(5)	ND(5)	ND(5)
Acetone	25J	31J	3J	3J	ND(10)	ND(10)
Carbon disulfide	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
1,1-Dichloroethene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
1,1-Dichloroethane	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
1,2-Dichloroethene (total)	ND(5)J	ND(5)J	ND(5)	ND(5)	2J	ND(5)
Chloroform	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
1,2-Dichloroethane	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
2-Butanone	ND(10)J	ND(10)J	ND(10)	ND(10)	ND(10)	ND(10)
1,1,1-Trichloroethane	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Carbon tetrachloride	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Vinyl acetate	ND(10)J	ND(10)J	ND(10)	ND(10)	ND(10)	ND(10)
Bromodichloromethane	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
1,2-Dichloropropane	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
cis-1,3-Dichloropropene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Trichloroethene	ND(5)J	ND(5)J	1J	ND(5)	7	ND(5)
Dibromochloromethane	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
1,1,2-Trichloroethane	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Benzene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
trans-1,3-Dichloropropene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Bromoform	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
4-Methyl-2-pentanone	ND(10)J	ND(10)J	ND(10)	ND(10)	ND(10)	ND(10)
2-Hexanone	ND(10)J	ND(10)J	ND(10)	ND(10)	ND(10)	ND(10)
Tetrachloroethene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
1,1,2,2-Tetrachloroethane	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Toluene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Chlorobenzene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Ethylbenzene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Styrene	ND(5)J	ND(5)J	ND(5)	ND(5)	ND(5)	ND(5)
Xylene (total)	ND(5)J	ND(5)J	ND(5)	1J	4J	4J
1,2,4-Trimethylbenzene	ND(0.5)J	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
1,3,5-Trimethylbenzene	ND(0.5)J	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

TABLE 2
GROUNDWATER SAMPLES - VOLATILES
GENERAL ELECTRIC
DUVA PROPERTY RI/FS
MAY, JULY, SEPTEMBER 1992

Sample Location:	MW-15	MW-16	MW-17	MW-30	090192-RB	W072492-01
	Dup.				(Rinse Blank)	(Rinse Blank)
Compound	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Chloromethane	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA
Bromomethane	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA
Vinyl chloride	ND(10)	ND(10)	1J	ND(10)	ND(10)	NA
Chloroethane	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA
Methylene chloride	ND(5)	ND(5)	ND(5)	1J	ND(5)	NA
Acetone	3J	4J	2J	2J	8J	NA
Carbon disulfide	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
1,1-Dichloroethene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
1,1-Dichloroethane	ND(5)	ND(5)	3J	ND(5)	ND(5)	NA
1,2-Dichloroethene (total)	ND(5)	ND(5)	22	ND(5)	ND(5)	NA
Chloroform	ND(5)	ND(5)	ND(5)	ND(5)	6	NA
1,2-Dichloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
2-Butanone	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA
1,1,1-Trichloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Carbon tetrachloride	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Vinyl acetate	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA
Bromodichloromethane	ND(5)	ND(5)	ND(5)	ND(5)	2J	NA
1,2-Dichloropropane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
cis-1,3-Dichloropropene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Trichloroethene	ND(5)	ND(5)	16	ND(5)	ND(5)	NA
Dibromochloromethane	ND(5)	ND(5)	ND(5)	ND(5)	1J	NA
1,1,2-Trichloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Benzene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
trans-1,3-Dichloropropene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Bromoform	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
4-Methyl-2-pentanone	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA
2-Hexanone	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA
Tetrachloroethene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
1,1,2,2-Tetrachloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Toluene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Chlorobenzene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Ethylbenzene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Styrene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	NA
Xylene (total)	ND(5)	2J	4J	ND(5)	ND(5)	NA
1,2,4-Trimethylbenzene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	NA
1,3,5-Trimethylbenzene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	NA

Notes:

ND() Not detected at the practical quantitation limit (PQL) stated within parenthesis.
J The associated value is estimated.
RE Reanalysis.
NA Not Analyzed.

TABLE 3
VOLATILES
GROUNDWATER SAMPLES
GENERAL ELECTRIC - DUVA
NOVEMBER 1992

Sample Location:	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17	MW-30	RB-1	Trip Blank
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Compounds										
Chloromethane	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Bromomethane	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Vinyl Chloride	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Chloroethane	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Methylene Chloride	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Acetone	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	2 J	ND(10)
Carbon Disulfide	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
1,1-Dichloroethene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
1,1-Dichloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
1,2-Dichloroethene (Total)	ND(5)	ND(5)	1 J	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Chloroform	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
1,2-Dichloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
2-Butanone	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
1,1,1-Trichloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Carbon Tetrachloride	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Vinyl Acetate	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Bromodichloromethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
1,2-Dichloropropane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
cis-1,3-Dichloropropene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Trichloroethene	ND(5)	ND(5)	5	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Dibromochloromethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
1,1,2-Trichloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Benzene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	2 J	ND(5)	ND(5)
trans-1,3-Dichloropropene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)

TABLE 3
VOLATILES
GROUNDWATER SAMPLES
GENERAL ELECTRIC - DUVA
NOVEMBER 1992

<i>Sample Location:</i>	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17	MW-30	RB-1	Trip Blank
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
<i>Compounds</i>										
Bromoform	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
4-Methyl-2-pentanone	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
2-Hexanone	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Tetrachloroethene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
1,1,2,2-Tetrachloroethane	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Toluene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Chlorobenzene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Ethylbenzene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Styrene	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)
Xylene (Total)	ND(5)	ND(5)	1 J	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)

Notes:

ND() Not detected at the practical quantitation limit (PQL) stated within parenthesis.

J The associated value is estimated.

TABLE 4
GROUNDWATER ELEVATION DATA
DUVA PROPERTY RI/FS
DECEMBER 1991

<i>Well I.D. Number</i>	<i>Date</i>	<i>Top of Casing Elevation</i>	<i>Water Level at Top of Casing</i>	<i>Groundwater Elevation</i>
MW-1	11/06/92	428.01	8.59	419.42
MW-2	11/06/92	426.78	2.52	424.26
MW-3	11/06/92	428.66	3.36	425.30
MW-4	11/06/92	439.64	2.76	436.88
MW-5	11/06/92	431.80	3.16	428.64
MW-6	11/06/92	428.05	3.14	424.91
MW-7	11/06/92	428.54	4.60	423.94
MW-8	11/06/92	428.88	7.49	421.39
MW-9	11/06/92	429.13	7.92	421.21
MW-10	11/06/92	427.57	7.86	419.71
MW-11	09/26/92	430.35	8.17	422.18
MW-11	11/06/92	430.35	3.60	426.75
MW-12	09/26/92	424.11	4.92	419.19
MW-12	11/06/92	424.11	5.12	418.99
MW-13	09/26/92	423.57	5.65	417.92
MW-14	11/06/92	423.57	5.33	418.24
MW-14	09/26/92	418.62	3.82	414.80
MW-15	11/06/92	418.62	2.24	416.38
MW-15	09/26/92	418.56	2.52	416.04
MW-16	11/06/92	418.56	1.92	416.64
MW-16	09/26/92	418.88	3.30	415.58
MW-17	11/06/92	418.88	3.40	415.48
MW-17	09/26/92	421.57	5.82	415.75
P-6	11/06/92	421.57	4.21	417.36
P-7	11/06/92	428.41	2.02	426.39
P-8	11/06/92	428.84	5.04	423.80
P-9	11/06/92	429.32	Dry	-
P-10	11/06/92	-	3.07	-
P-11	11/06/92	-	6.93	-
P-12	11/06/92	429.13	3.92	425.21
P-13	11/06/92	-	4.01	-
P-15	11/06/92	428.13	9.03	419.10
P-16	11/06/92	427.10	7.30	419.80

APPENDIX A

WELL INSTALLATION LOGS AND DETAILS

WELL DEVELOPMENT DATA SHEET

Project Name: DUVA PROPERTY

Project Number: 3442

Monitoring Well Number: MW-14

Date of Development: 7/23/92

Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 2.15 feet

Groundwater Elevation: _____ feet Casing Depth: 23.5 feet

Well Bottom Depth: 33.50 feet Casing Diameter: 2.0 inches

Screen/Corehole Diameter: 2.0 inches

One Well Volume: 5.02 gallons Required Number of Well Volumes: 5

Required Development Volume: 25.1 gallons NAPL present: ☐ Yes ☒ No

Development Method: PERISTALTIC PUMP / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number Volume	Total Gallons	Required Field Measurements			TURBIDITY NTUs Comments
		pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	5.	6.02	550	12.1	>200
2	10	6.02	530	13.5	>200
3	15	6.04	520	12.2	55
4	20	6.02	500	11.8	43
5	25	6.02	490	11.8	42

Comments: WELL RAPIDLY RECHARGES, INITIAL DRAWDOWN
three feet

WELL DEVELOPMENT DATA SHEET

Project Name: DWA Property Project Number: 3442
 Monitoring Well Number: MW-15 Date of Development: 7/23/92
 Well Type: ☒ Overburden ☐ Bedrock
 Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 2.10 feet
 Groundwater Elevation: _____ feet Casing Depth: 9.0 feet
 Well Bottom Depth: 14.0 feet Casing Diameter: 2.0 inches
 Screen/Corehole Diameter: 2.0 inches
 One Well Volume: 1.9 gallons Required Number of Well Volumes: 5
 Required Development Volume: 9.50 gallons NAPL present: ☐ Yes ☒ No
 Development Method: PERISTALTIC PUMP/BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTU's Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	2.0	7.80	1560	16.1	> 200
2	4.0	7.74	1920	16.2	> 200
3	6.0	7.70	2000	16.5	> 200
4	8.0	7.20	1580	17.2	> 200
5	10.0		1370	17.9	> 200
6	12.0	6.30	1210	18.3	> 200
7	14.0	6.30	1190	18.2	> 200
8	16.0	6.30	1170	18.2	> 200

Comments: RAPID Recharge

WELL DEVELOPMENT DATA SHEET

Project Name: DuVA Property

Project Number: 3442

Monitoring Well Number: MW-16

Date of Development: 7/23/92

Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 3.28 feet

Groundwater Elevation: _____ feet Casing Depth: 2.0 feet

Well Bottom Depth: 7.0 feet Casing Diameter: 2.0 inches

Screen/Corehole Diameter: 2.0 inches

One Well Volume: 0.59 gallons Required Number of Well Volumes: 5

Required Development Volume: 2.95 gallons NAPL present: ☐ Yes ☒ No

Development Method: PERISTALTIC PUMP / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTUs Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	0.59	6.04	1480	19.6	>200
2	1.18	6.04	2810	18.3	>200
3	1.77	6.02	2350	18.9	>200
4	2.36	6.12	3250	18.1	>200
5	2.95	6.10	4360	19.2	>200
6	3.54	6.04	4370	18.1	>200
7	4.13	6.04	4410	18.2	>200

Comments: _____

WELL DEVELOPMENT DATA SHEET

Project Name: Duva Property Project Number: 3442
 Monitoring Well Number: MW-17 Date of Development: 7/23/92
 Well Type: ☒ Overburden ☐ Bedrock
 Development Crew Members: _____

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 5.85 feet
 Groundwater Elevation: _____ feet Casing Depth: 3.0 feet
 Well Bottom Depth: 8.0 feet Casing Diameter: 2.0 inches
 Screen/Corehole Diameter: 2.0 inches
 One Well Volume: 0.34 gallons Required Number of Well Volumes: 5
 Required Development Volume: _____ gallons NAPL present: ☐ Yes ☒ No
 Development Method: PERISTALTIC PUMP / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTUS Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	0.34	6.00	550	14.8	>200
2	0.68	6.50	530	14.8	>200
3	1.02	6.02	510	15.1	>200
4	1.36	6.04	520	14.9	58
5	1.70	6.02	510	14.9	48

Comments: _____

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 6

PROJECT NAME DUNA Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) CLOUDY, 70°F
(p.m.) CLOUDY, Light rain 80°F

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E T I H N O G D	PENETRATION RECORD SPLIT SPOON BLOWS				R E C L O E V N E G R T E H D	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
F R O M	A T	T O			6"	6"	6"	6"			
0		2.0	1	SS	1	2	2	4	12"	SAND, some clay, Red-Brown, Fill MOIST 0.0 photon	0.0
2.0		4.0	2	SS	2	3	6	7	18"	SAND, some silt, Red-Brown, Fill NATIVE MOIST to WET, 0.0 photon	0.0
4.0		6.0	3	SS	4	4	8	4	10"	SAND, some silt small gravel, Red-Brown, MOIST to wet, Native, 0.0 photon	0.0
6.0		8.0	4	SS	1	1	3	3	14"	SAND, some small gravel, Red-Brown Wet, Native, 0.0 photon	0.0
8.0		10.0	5	SS	8	8	7	8	24"	SAND, some silt, RED SAND, Brown silt Wet, NATIVE	inter bedded 0.0
10.0		12.0	6	SS	7	7	7	7	24"	SAND, some silt, Red-grey, MOIST to WET, NATIVE	0.0
12.0		12.5	7	SS	5	7	4	5	24"	SAND, some silt, Red-grey MOIST to WET, NATIVE	0.0
12.5		14.0	-	-						SAND, some silt, Red-Brown, MOIST to WET, NATIVE	
14.0		16.0	8	SS	2	9	7	7	24"	SAND, some silt, Red + Brown, WET, NATIVE	0.0

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 2 OF 6

PROJECT NAME Duva Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK Drive

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			SAMPLING #	SAMPLING TYPE	PENETRATION RECORD SPLIT SPOON BLOWS				RECEIVED	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
FROM	AT	TO			6"	6"	6"	6"			
16.0		17.0	9	SS	4	7	6	6	24"	SAND, some silt, Red-Brown, wet	0.0
17.0		18.0								Silt, trace clay, grey-Brown	0.0
										MOIST TO WET, NATIVE	
18.0		20.0	10	SS	5	5	4	6	24"	Silt, trace clay, trace medium	0.0
										SAND, Red-Brown, MOIST TO WET	
										NATIVE	
20.0		22.0	11	SS	4	7	6	3	24"	Silt, trace clay, trace medium	0.0
										SAND, RED-BROWN, MOIST TO WET	
										NATIVE	
22.0		24.0	12	SS	8	9	5	6	24"	Silt, some fine sand, RED-BROWN,	0.0
										MOIST TO WET, NATIVE	
24.0		26.0	13	SS	5	6	6	6	24"	SAND, some silt, Red-Brown,	0.0
										MOIST TO WET, NATIVE	
26.0		28.0	14	SS	4	7	6	8	24"	SAND, some silt, RED-BROWN,	0.0
										MOIST TO WET, NATIVE	
30.0		32.0	15	SS	6	6	5	5	24"	SAND, some silt, little small to medium	0.0
										gravel, trace, clay, Red-Brown,	
										MOIST TO WET, NATIVE	

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 3 OF 6

PROJECT NAME DuVA Property

PROJECT NUMBER 3442

CLIENT GENERAL ELECTRIC

LOCATION 301 VICTORIA PARK DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF

DRILLER RON BUSH

SURFACE ELEVATION

WEATHER (a.m.)

(p.m.)

HOLE DESIGNATION MW.-14

DATE STARTED 7/9/92

DATE COMPLETED 7/9/92

DRILLING METHOD HSA

CRA SUPERVISOR R. BAUER

[illegible]

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 4 OF 6

PROJECT NAME DWA PROPERTY
 PROJECT NUMBER 3442
 CLIENT GENERAL ELECTRIC
 LOCATION 119 EMERALD DRIVE

DRILLING CONTRACTOR PARRATT - WOLFF
 DRILLER RON BUSH
 SURFACE ELEVATION _____
 WEATHER (a.m.) CLEAR 65°F
 (p.m.) CLEAR 80°F

HOLE DESIGNATION MW-15
 DATE STARTED 7/10/92
 DATE COMPLETED 7/10/92
 DRILLING METHOD HSA
 CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E N O D E	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N T H D	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
FROM	TO				6"	6"	6"	6"			
0		2.0	1	SS	11	12	9	8	4"	SAND, medium gravel, CRUSHED STONE, Dark BROWN, MOIST, FILL	TOPSOIL Photon 0.0
2.0		4.0	2	SS	13	7	7	6	6"	SAND, medium gravel, Red-Brown MOIST, FILL	0.0
4.0		6.0	3	SS	1				6"	SAND, medium gravel, Brown - grey, WET, FILL	0.0
6.0		8.0	4	SS	11	6	3	3	12"	SAND, some medium gravel, trace silt, RED-BROWN, MOIST, NATIVE	0.0
8.0		8.5	5	SS	3	1	2	2	18"	GRAVEL, Brown grey, WET, NATIVE	0.0
8.5		10.0								FINE SAND, some silt, Brown-grey MOIST to WET, NATIVE	
10.0		12.0	6	SS	3	4	1	5	24"	SILT, some FINE SAND, BROWN-grey WET, NATIVE	0.0
12.0		13.7	7	SS	6	9	13	12	24"	SILT, some FINE SAND, Brown - grey, WET, NATIVE	0.0
13.7		14.0								SILT, some FINE SAND, trace clay, angular gravel, Red BROWN, MOIST, NATIVE	TILL 0.0
14.0		16.0	8	SS	7	16	13	15	24"	SILT, some clay, angular gravel, Red- BROWN, Dry to moist NATIVE	

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 5 OF 6

PROJECT NAME DWA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 101 EMERALD DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-16
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

[illegible]

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 6 OF 6

PROJECT NAME DUVA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 5026 PLATINUM DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER ROY BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-17
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HAND AUGER
CRA SUPERVISOR R. BAUER

[illegible]

WELL DEVELOPMENT DATA SHEET

Project Name: DUVA PROPERTY

Project Number: 3442

Monitoring Well Number: MW-14

Date of Development: 7/23/92

Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 2.15 feet

Groundwater Elevation: _____ feet Casing Depth: 23.5 feet

Well Bottom Depth: 33.50 feet Casing Diameter: 2.0 inches

Screen/Corehole Diameter: 2.0 inches

One Well Volume: 5.02 gallons Required Number of Well Volumes: 5

Required Development Volume: 25.1 gallons NAPL present: ☐ Yes ☒ No

Development Method: PERISTALTIC PUMP / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTUs Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	5.	6.02	550	12.1	>200
2	10	6.02	530	13.5	>200
3	15	6.04	520	12.2	55
4	20	6.02	500	11.8	43
5	25	6.02	490	11.8	42

Comments: WELL RAPIDLY RECHARGES, INITIAL DRAWDOWN
three feet

WELL DEVELOPMENT DATA SHEET

Project Name: DWA Property

Project Number: 3442

Monitoring Well Number: MW-15

Date of Development: 7/23/92

Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 2.10 feet

Groundwater Elevation: _____ feet Casing Depth: 9.0 feet

Well Bottom Depth: 14.0 feet Casing Diameter: 2.0 inches

Screen/Corehole Diameter: 2.0 inches

One Well Volume: 1.9 gallons Required Number of Well Volumes: 5

Required Development Volume: 9.50 gallons NAPL present: ☐ Yes ☒ No

Development Method: PERISTALTIC PUMP/BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTU's Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	2.0	7.80	1560	16.1	> 200
2	4.0	7.74	1920	16.2	> 200
3	6.0	7.70	2000	16.5	> 200
4	8.0	7.20	1580	17.2	> 200
5	10.0		1370	17.9	> 200
6	12.0	6.30	1210	18.3	> 200
7	14.0	6.30	1190	18.2	> 200
8	16.0	6.30	1170	18.2	> 200

Comments: RAPID Recharge

WELL DEVELOPMENT DATA SHEET

Project Name: DuVA Property Project Number: 3442
 Monitoring Well Number: MW-16 Date of Development: 7/23/92
 Well Type: ☒ Overburden ☐ Bedrock
 Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 3.28 feet
 Groundwater Elevation: _____ feet Casing Depth: 2.0 feet
 Well Bottom Depth: 7.0 feet Casing Diameter: 2.0 inches
 Screen/Corehole Diameter: 2.0 inches
 One Well Volume: 0.59 gallons Required Number of Well Volumes: 5
 Required Development Volume: 2.95 gallons NAPL present: ☐ Yes ☒ No
 Development Method: PERISTALTIC PUMP / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTUS Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	0.59	6.04	1480	19.6	>200
2	1.18	6.04	2810	18.3	>200
3	1.77	6.02	2350	18.9	>200
4	2.36	6.12	3250	18.1	>200
5	2.95	6.10	4360	19.2	>200
6	3.54	6.04	4370	18.1	>200
7	4.13	6.04	4410	18.2	>200

Comments: _____

WELL DEVELOPMENT DATA SHEET

Project Name: Duva Property Project Number: 3442

Monitoring Well Number: MW-17 Date of Development: 7/23/92

Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members : _____

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 5.85 feet

Groundwater Elevation: _____ feet Casing Depth: 3.0 feet

Well Bottom Depth: 8.0 feet Casing Diameter: 2.0 inches

Screen/Corehole Diameter: 2.0 inches

One Well Volume: 0.34 gallons Required Number of Well Volumes: 5

Required Development Volume: _____ gallons NAPL present: ☐ Yes ☒ No

Development Method: PERISTALTIC PUMP / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTU's Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	0.34	6.00	550	14.8	>200
2	0.68	6.50	530	14.8	>200
3	1.02	6.02	510	15.1	>200
4	1.36	6.04	520	14.9	58
5	1.70	6.02	510	14.9	48

Comments: _____

ROUTING SLIP

CONESTOGA-ROVERS & ASSOCIATES LTD.
STRATIGRAPHIC LOG

Submitted to ^{CALBASE}~~CONESTOGA~~ by

ROBERT BAUER

on

7/17/92

Requested ^{CALBASE}~~CONESTOGA~~ completion date

7/24/92

Submitted to drafting by

on

Requested drafting completion date

Submitted to _____ by Drafting on _____

Special Requests

* If questions, please call

Bob BAUER

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-47)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

PROJECT NO.: 3442

CLIENT: GENERAL ELECTRICAL

LOCATION: 301 VICTORIA PARK DRIVE

HOLE DESIGNATION: MW-14

(Page 1 of 2)

DATE COMPLETED: JULY 9, 1992

DRILLING METHOD: 4 1/4" ID HSA

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA
							(ppm)
	SC-SAND(FILL), some clay, red brown, moist		ROAD BOX	1SS	X	4	0
2.5	SM-SAND(NATIVE), some silt, red brown, moist to wet	-2.0		2SS	X	9	0
				3SS	X	12	0
5.0	SW-SAND, some small gravel, red brown, moist to wet	-4.0	8" BOREHOLE	4SS	X	4	0
	Same, except wet			5SS	X	15	0
7.5				6SS	X	14	0
	SM-SAND, some silt, interbedded, red brown, wet	-8.0		7SS	X	11	0
10.0	Same, except red and gray, moist to wet		CEMENT/BENTONITE GROUT	8SS	X	16	0
				9SS	X	13	0
12.5	Same, except red brown			10SS	X	9	0
	Same, except wet			11SS	X	13	0
15.0				12SS	X	14	0
			2" PVC PIPE	13SS	X	12	0
17.5	ML-SILT, trace clay, gray brown, moist to wet	-17.0		14SS	X	13	0
	Same, with trace medium sand, red brown			15SS	X	11	0
20.0			BENTONITE PELLET SEAL				
22.5	Same, except some fine sand		SAND PACK				
25.0	SM-SAND, some silt, red brown, moist to wet	-24.0					
27.5							
			WELL SCREEN				
30.0	Same, with little small to medium gravel, trace clay						
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-47)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-14

PROJECT NO.: 3442

(Page 2 of 2)
DATE COMPLETED: JULY 9, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: 301 VICTORIA PARK DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA (ppm)
35.0	ML-SILT(TILL), some clay, some angular gravel, dense, red brown, dry to moist END OF HOLE @ 34.0 FT. BGS	-33.5 -34.0	 SAND PACK WELL SCREEN 8" BOREHOLE <u>SCREEN DETAILS:</u> Screened Interval: 23.5 to 33.5' BGS Length -10.0' Diameter -2.0" Slot # 10 Material -PVC Sand pack interval: 21.5 to 34.0' BGS Material -Sand	16SS	X	33	0
37.5							
40.0							
42.5							
45.0							
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-48)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-15

PROJECT NO.: 3442

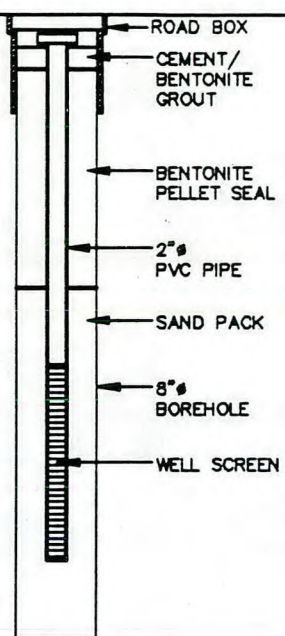
DATE COMPLETED: JULY 10, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: 119 EMERALD DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA (ppm)
2.5	SW-SAND(FILL), some medium gravel, crushed stone, dark brown, moist Same, except no crushed stone, red brown			1SS	X	21	0
5.0	Same, except brown gray, wet			2SS	X	14	0
7.5	SW-SAND(NATIVE), some medium gravel, trace silt, red brown, moist	-6.0		3SS	X		0
10.0	GW-GRAVEL, brown gray, wet SM-SAND, some silt, fine grained, brown gray, moist to wet ML-SILT, some fine sand, brown gray, wet	-8.0 -8.5 -10.0		4SS	X	9	0
12.5				5SS	X	3	0
15.0	ML-SILT(TILL), some fine sand, trace clay, trace angular gravel, red brown, moist Same, except some clay, dry to moist	-13.7		6SS	X	5	0
17.5	END OF HOLE @ 16.0 FT. BGS	-16.0		7SS	X	22	0
20.0				8SS	X	29	0
22.5			SCREEN DETAILS: Screened Interval: 9.0 to 14.0' BGS Length -5.0' Diameter -2.0" Slot # 10 Material -PVC Sand pack interval: 7.0 to 16.0' BGS Material -Sand				
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-49)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-16

PROJECT NO.: 3442

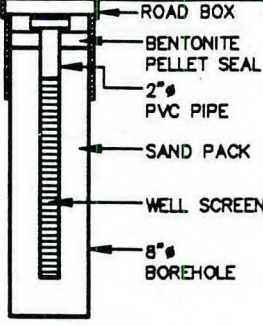
DATE COMPLETED: JULY 10, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: 101 EMERALD DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA (ppm)
	SC-SAND(FILL), some clay, orange brown, moist			1SS	X	13	0
-2.5	Same, except moist to wet			2SS	X	21	0
-5.0				3SS	X	13	0
-7.5	SC-SAND(NATIVE), some clay, orange brown, moist to wet	-6.0		4SS	X	29	0
	ML-SILT(TILL), some clay, some angular gravel, red brown, dry to moist	-7.0					
	END OF HOLE ② 8.0 FT. BGS	-8.0					
-10.0			<u>SCREEN DETAILS:</u> Screened Interval: 2.0 to 7.0' BGS Length -5.0' Diameter -2.0" Slot # 10 Material -PVC Sand pack interval: 1.0 to 8.0' BGS Material -Sand				
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-50)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-17

PROJECT NO.: 3442

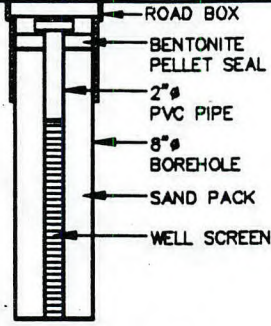
DATE COMPLETED: JULY 10, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: HAND AUGER

LOCATION: 5026 PLATINUM DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA (ppm)
2.5	SM-SAND(NATIVE), some silt, brown, moist to wet						
5.0							
7.5							
10.0	ML-SILT(TILL), some clay, some angular gravel, red brown, dry to moist	-8.0	<u>SCREEN DETAILS:</u> Screened Interval: 3.0 to 8.0' BGS Length -5.0' Diameter -2.0" Slot # 10 Material -PVC Sand pack interval: 1.0 to 8.0' BGS Material -Sand				
12.5	END OF HOLE ① 8.0 FT. BGS						
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○ WATER FOUND ∇ STATIC WATER LEVEL ▼

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 6

PROJECT NAME Duva Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) CLOUDY, 70°F
(p.m.) CLOUDY, Light rain 80°F

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E T H I N G D	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N T H D	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
F R O M	A T	T O			6"	6"	6"	6"			
0		2.0	1	SS	1	2	2	4	12"	SAND, some clay, Red-Brown, Fill MOIST <u>0.0</u> photon	photon 0.0
2.0		4.0	2	SS	2	3	6	7	18"	SAND, some silt, Red-Brown, Fill NATIVE MOIST to WET, <u>0.0</u> photon	0.0
4.0		6.0	3	SS	4	4	8	4	10"	SAND, some silt small gravel, Red-Brown, MOIST to wet, Native <u>0.0</u> photon	0.0
6.0		8.0	4	SS	1	1	3	3	14"	SAND, some small gravel, Red-Brown Wet, Native, <u>0.0</u> photon	0.0
8.0		10.0	5	SS	8	8	7	8	24"	SAND, some silt, RED SAND, Brown silt Wet, NATIVE	inter bedded 0.0
10.0		12.0	6	SS	7	7	7	7	24"	SAND, some silt, Red-grey, MOIST to WET, NATIVE	0.0
12.0		12.5	7	SS	5	7	4	5	24"	SAND, some silt, Red-grey MOIST to WET, NATIVE	0.0
12.5		14.0	-	-						SAND, some silt, Red-Brown, MOIST to WET, NATIVE	
14.0		16.0	8	SS	2	9	7	7	24"	SAND, some silt, Red + Brown, WET, NATIVE	0.0

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 2 OF 6

PROJECT NAME Duva Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK Drive

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E I N F O R M A T I O N	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N T S	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
F R O M	A T	T O			6"	6"	6"	6"			
16.0		17.0	9	SS	4	7	6	6	24"	SAND, some silt, Red-Brown, wet	0.0
17.0		18.0								Silt, trace clay, grey-Brown MOIST TO WET, NATIVE	0.0
18.0		20.0	10	SS	5	5	4	6	24"	Silt, trace clay, trace medium SAND, Red-Brown, MOIST TO WET NATIVE	0.0
20.0		22.0	11	SS	4	7	6	3	24"	Silt, trace clay, trace medium SAND, RED-BROWN, MOIST TO WET NATIVE	0.0
22.0		24.0	12	SS	8	9	5	6	24"	Silt, SOME FINE SAND, RED-BROWN, MOIST TO WET, NATIVE	0.0
24.0		26.0	13	SS	5	6	6	6	24"	SAND, some silt, Red-Brown, MOIST TO WET, NATIVE	0.0
26.0		28.0	14	SS	4	7	6	8	24"	SAND, some silt, Red-Brown, MOIST TO WET, NATIVE	0.0
30.0		32.0	15	SS	6	6	5	5	24"	SAND, some silt, little small to medium gravel, trace clay, Red-Brown, MOIST TO WET, NATIVE	0.0

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 3 OF 6

PROJECT NAME Duva Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

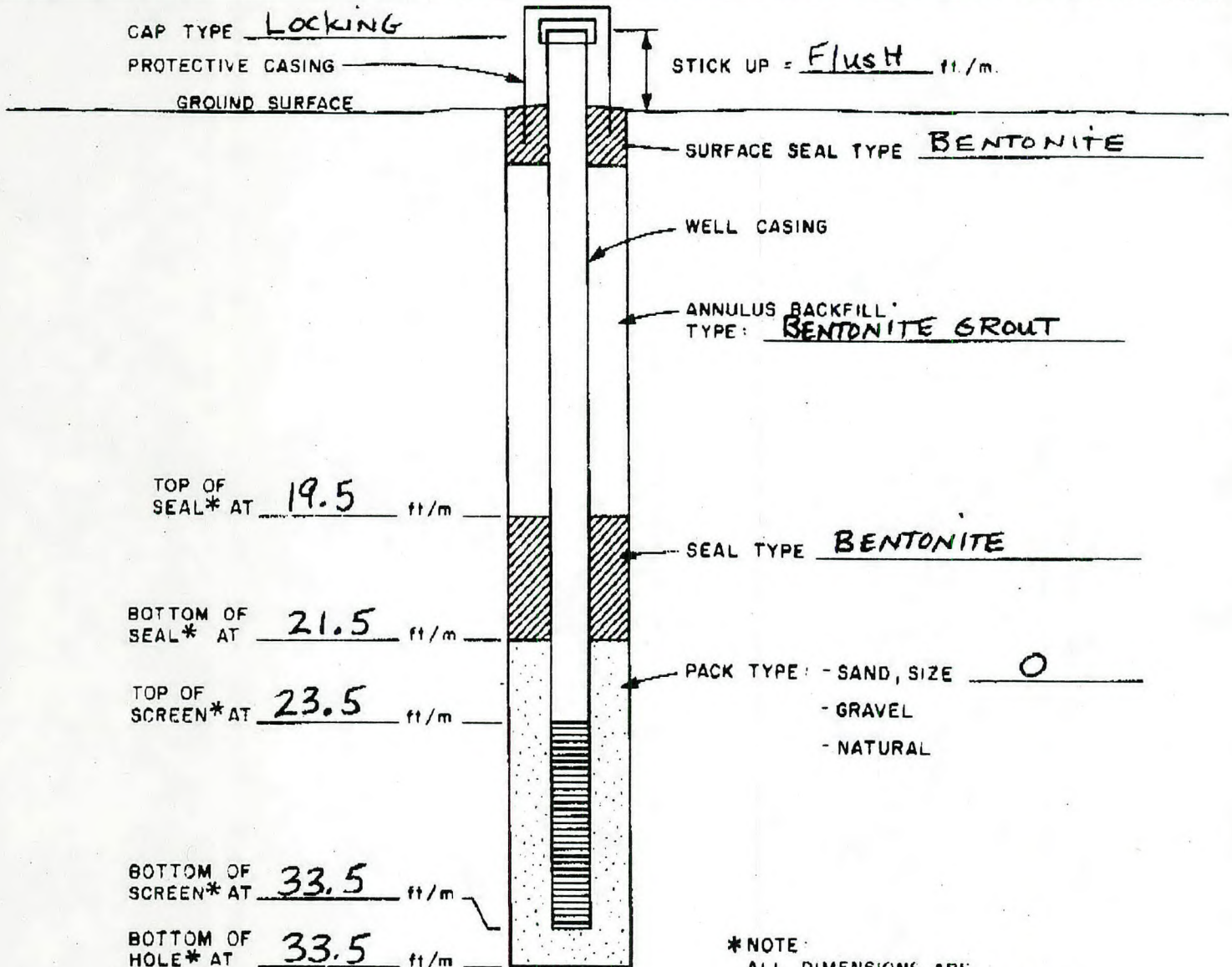
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WELL INSTRUMENTATION LOG

CAL KN

PROJECT NAME: DURA RI/FS (OFFSITE)
 PROJECT NO: 3442
 CLIENT: GENERAL ELECTRIC
 LOCATION: 301 VICTORIA PARK DRIVE

HOLE DESIGNATION: MW-14
 DATE COMPLETED: 7/9/92
 DRILLING METHOD: HSA
 CRA SUPERVISOR: R. BAUER



*NOTE:
 ALL DIMENSIONS ARE
 BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☒ other: MACHINE CUT
 SCREEN MATERIAL: ☐ stainless steel ☐ plastic ☒ other: PVC
 SCREEN LENGTH: 10 ft/m SCREEN DIAMETER: 2.0 in/cm SCREEN SLOT SIZE: 10
 WELL CASING MATERIAL: PVC WELL CASING DIAMETER: 2.0 in/cm
 HOLE DIAMETER: 8 INCHES
 DEVELOPMENT: METHOD: PERISTALTIC / BAILER DURATION: _____

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 4 OF 6

PROJECT NAME DWA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 119 EMERALD DRIVE

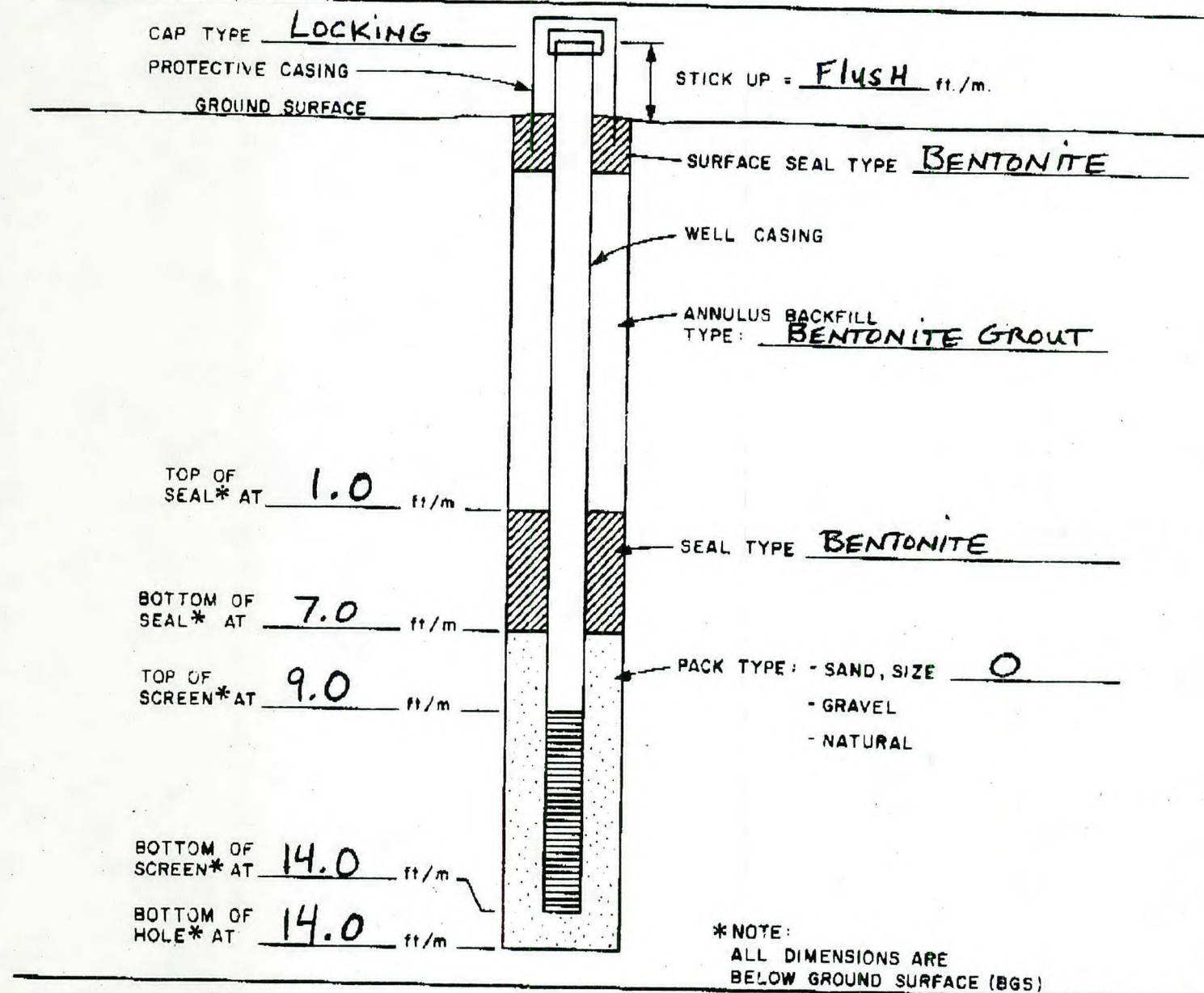
DRILLING CONTRACTOR PARRATT - WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) CLEAR 65°F
(p.m.) CLEAR 80°F

HOLE DESIGNATION MW-15
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E I N F O R M A T I O N	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N T E R H E A D	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
F R O M	A T	T O			6"	6"	6"	6"			
0		2.0	1	SS	11	12	9	8	4"	SAND, medium gravel, CRUSHED STONE, Dark Brown, MOIST, FILL	TOPSOIL Photon 0.0
2.0		4.0	2	SS	13	7	7	6	6"	SAND, medium gravel, Red-Brown MOIST, FILL	0.0
4.0		6.0	3	SS					6"	SAND, medium gravel, Brown - grey, WET, FILL	0.0
6.0		8.0	4	SS	11	6	3	3	12"	SAND, some medium gravel, trace silt, Red-Brown, MOIST, NATIVE	0.0
8.0		8.5	5	SS	3	1	2	2	18"	GRAVEL, Brown grey, WET, NATIVE	0.0
8.5		10.0								FINE SAND, some silt, Brown-grey MOIST to WET, NATIVE	
10.0		12.0	6	SS	3	4	1	5	24"	SILT, some FINE SAND, Brown grey WET, NATIVE	0.0
12.0		13.7	7	SS	6	9	13	12	24"	SILT, some FINE SAND, Brown - grey, WET, NATIVE	0.0
13.7		14.0	8	SS						SILT, some FINE SAND, trace clay, angular gravel, Red Brown, MOIST, NATIVE	TILL 0.0
14.0		16.0	8	SS	7	16	13	15	24"	SILT, some clay, angular gravel, Red - Brown, MOIST, NATIVE	

SENT BY AIRMAIL 1960 7-28-62 2 141.8 COMBUSTION NOVELTY 12 COMBUSTION NOVELTY 2

HOLE DESIGNATION: MW-15
DATE COMPLETED: 7/10/92
DRILLING METHOD: HSA
CRA SUPERVISOR: R. BAUER



* NOTE:
ALL DIMENSIONS ARE
BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☒ other: MACHINE CUT

SCREEN MATERIAL: ☐ stainless steel ☐ plastic ☒ other: PVC

SCREEN LENGTH: 5.0 ft/m SCREEN DIAMETER: 2.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: PVC WELL CASING DIAMETER: 2.0 in/cm

HOLE DIAMETER: 8 INCHES

DEVELOPMENT: METHOD: PERISTALTIC / BAILER DURATION: _____

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 5 OF 6

PROJECT NAME DWA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 101 EMERALD DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

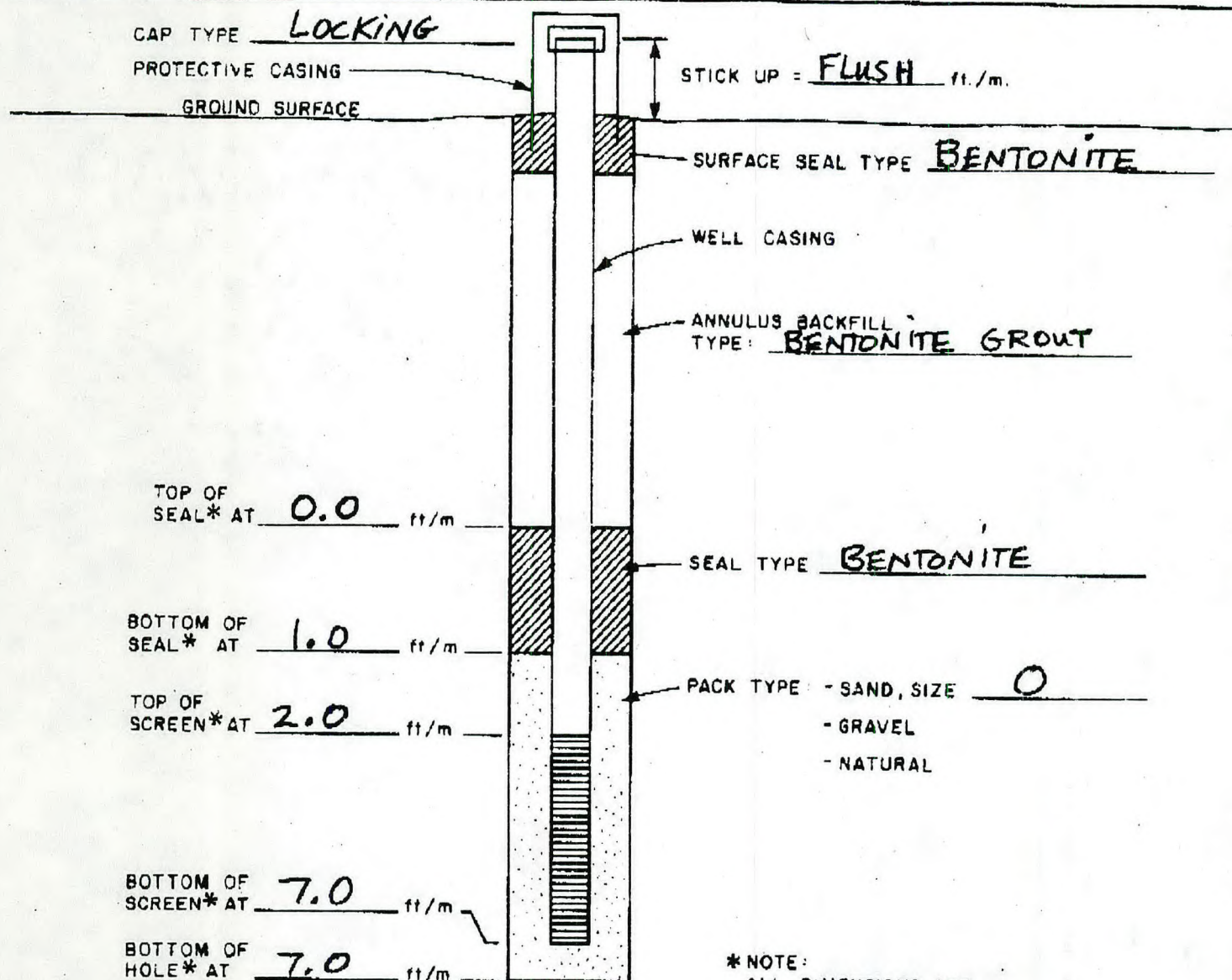
HOLE DESIGNATION MW-16
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

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WELL INSTRUMENTATION LOG

PROJECT NAME: DWA RI/FS (OFFSITE)
 PROJECT NO: 3442
 CLIENT: GENERAL ELECTRIC
 LOCATION: 101 EMERALD DRIVE

HOLE DESIGNATION: MW-16
 DATE COMPLETED: 7/10/92
 DRILLING METHOD: HSA
 CRA SUPERVISOR: R. BAUER



* NOTE:
 ALL DIMENSIONS ARE
 BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☒ other: MACHINE CUT

SCREEN MATERIAL: ☐ stainless steel ☐ plastic ☒ other: PVC

SCREEN LENGTH: 5.0 ft/m SCREEN DIAMETER: 2.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: PVC WELL CASING DIAMETER: 2.0 in/cm

HOLE DIAMETER: 8 INCHES

DEVELOPMENT: METHOD: PERISTALTIC/BAILER DURATION: _____

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 6 OF 6

PROJECT NAME DUVA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 5026 PLATINUM DRIVE

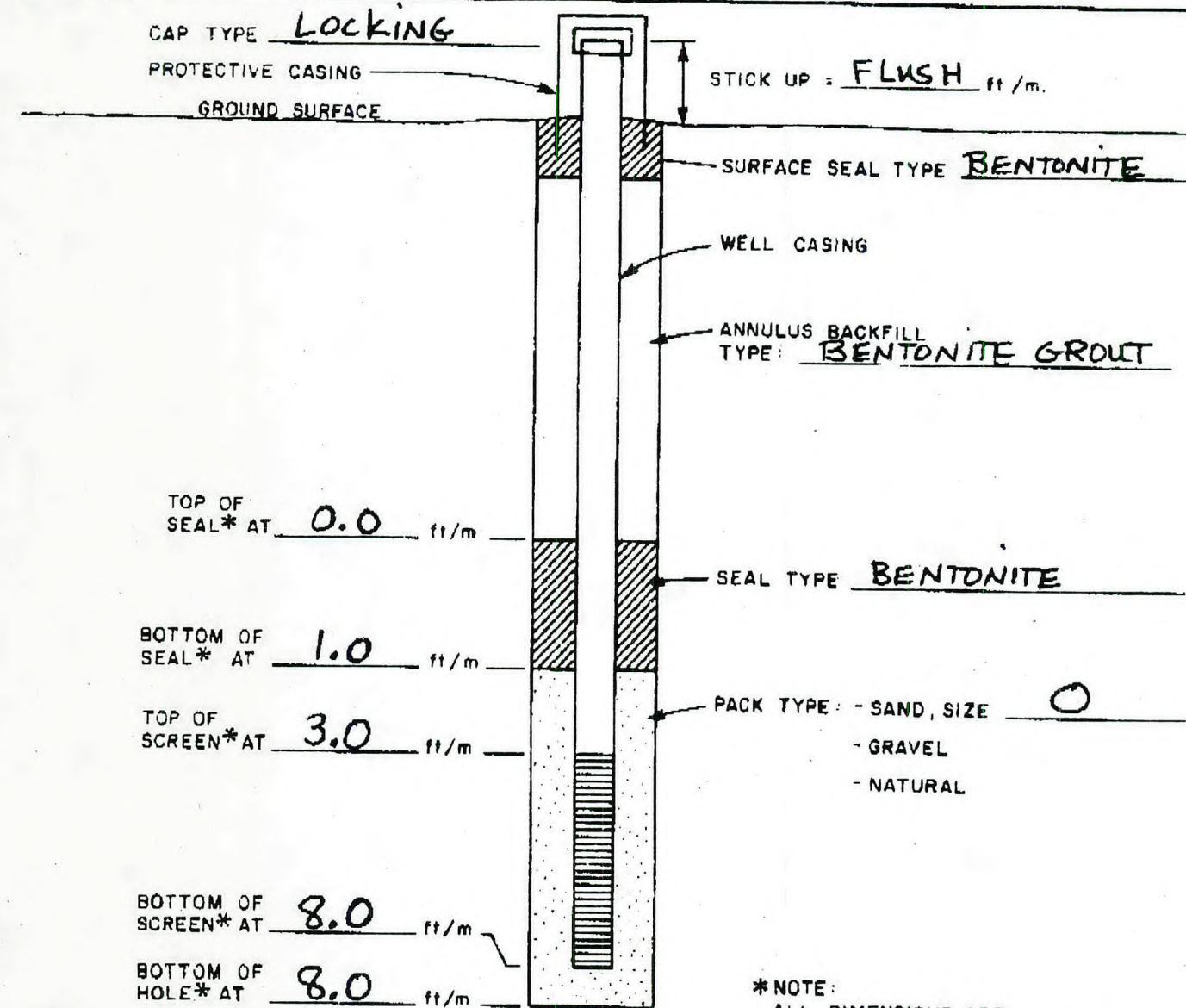
DRILLING CONTRACTOR PARATT-WOLFF
DRILLER ROY BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-17
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HAND AUGER
CRA SUPERVISOR R. BAUER

[illegible]

WELL INSTRUMENTATION LOG

PROJECT NAME: DWA RI/FS (OFFSITE) HOLE DESIGNATION: MW-17
 PROJECT NO: 3442 DATE COMPLETED: 7/10/92
 CLIENT: GENERAL ELECTRIC DRILLING METHOD: HAND AUGER
 LOCATION: 5026 PLATINUM DRIVE CRA SUPERVISOR: R. BAUER



* NOTE:
ALL DIMENSIONS ARE
BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☒ other: MACHINE CUT
 SCREEN MATERIAL: ☐ stainless steel ☐ plastic ☒ other: PVC
 SCREEN LENGTH: 5.0 ft/m SCREEN DIAMETER: 2.0 in/cm SCREEN SLOT SIZE: 10
 WELL CASING MATERIAL: PVC WELL CASING DIAMETER: 2.0 in/cm
 HOLE DIAMETER: 8 INCHES
 DEVELOPMENT METHOD: PERISTALTIC/BAILER DURATION: _____

WELL DEVELOPMENT DATA SHEET

Project Name: DUVA PROPERTY

Project Number: 3442

Monitoring Well Number: MW-14

Date of Development: 7/23/92

Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 2.15 feet

Groundwater Elevation: _____ feet Casing Depth: 23.5 feet

Well Bottom Depth: 33.50 feet Casing Diameter: 2.0 inches

Screen/Corehole Diameter: 2.0 inches

One Well Volume: 5.02 gallons Required Number of Well Volumes: 5

Required Development Volume: 25.1 gallons NAPL present: ☐ Yes ☒ No

Development Method: PERISTALTIC Pump / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTUs Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	5.	6.02	550	12.1	>200
2	10	6.02	530	13.5	>200
3	15	6.04	520	12.2	55
4	20	6.02	500	11.8	43
5	25	6.02	490	11.8	42

Comments: WELL RAPIDLY RECHARGES, INITIAL DRAWDOWN
three feet

WELL DEVELOPMENT DATA SHEET

Project Name: DWA Property

Project Number: 3442

Monitoring Well Number: MW-15

Date of Development: 7/23/92

Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 2.10 feet

Groundwater Elevation: _____ feet Casing Depth: 9.0 feet

Well Bottom Depth: 14.0 feet Casing Diameter: 2.0 inches

Screen/Corehole Diameter: 2.0 inches

One Well Volume: 1.9 gallons Required Number of Well Volumes: 5

Required Development Volume: 9.50 gallons NAPL present: ☐ Yes ☒ No

Development Method: PERISTALTIC PUMP/BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number	Total Gallons	Required Field Measurements			TURBIDITY NTU's Comments
		pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	2.0	7.80	1560	16.1	> 200
2	4.0	7.74	1920	16.2	> 200
3	6.0	7.70	2000	16.5	> 200
4	8.0	7.20	1580	17.2	> 200
5	10.0		1370	17.9	> 200
6	12.0	6.30	1210	18.3	> 200
7	14.0	6.30	1190	18.2	> 200
8	16.0	6.30	1170	18.2	> 200

Comments: RAPID Recharge

WELL DEVELOPMENT DATA SHEET

Project Name: DuVA Property

Project Number: 3442

Monitoring Well Number: MW-16

Date of Development: 7/23/92

Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members: RPB, WSM

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 3.28 feet

Groundwater Elevation: _____ feet Casing Depth: 2.0 feet

Well Bottom Depth: 7.0 feet Casing Diameter: 2.0 inches

Screen/Corehole Diameter: 2.0 inches

One Well Volume: 0.59 gallons Required Number of Well Volumes: 5

Required Development Volume: 2.95 gallons NAPL present: ☐ Yes ☒ No

Development Method: PERISTALTIC PUMP / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number Volume	Total Gallons	Required Field Measurements			TURBIDITY NTUs Comments
		pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	0.59	6.04	1480	19.6	> 200
2	1.18	6.04	2810	18.3	> 200
3	1.77	6.02	2350	18.9	> 200
4	2.36	6.12	3250	18.1	> 200
5	2.95	6.10	4360	19.2	> 200
6	3.54	6.04	4370	18.1	> 200
7	4.13	6.04	4410	18.2	> 200

Comments: _____

WELL DEVELOPMENT DATA SHEET

Project Name: Duva Property Project Number: 3442
 Monitoring Well Number: MW-17 Date of Development: 7/23/92
 Well Type: ☒ Overburden ☐ Bedrock

Development Crew Members : _____

WELL DEVELOPMENT INFORMATION

Ground Elevation: _____ feet Initial Depth to Water: 5.85 feet
 Groundwater Elevation: _____ feet Casing Depth: 3.0 feet
 Well Bottom Depth: 8.0 feet Casing Diameter: 2.0 inches
 Screen/Corehole Diameter: 2.0 inches
 One Well Volume: 0.34 gallons Required Number of Well Volumes: 5
 Required Development Volume: _____ gallons NAPL present: ☐ Yes ☒ No
 Development Method: PERISTALTIC Pump / BAILER SURGING

DEVELOPMENT FIELD MEASUREMENTS

Well Volume Number		Required Field Measurements			TURBIDITY NTUS Comments
Volume	Total Gallons	pH (S.U.)	Specific Conductance (umhos cm ³)	Temperature (°C)	
1	0.34	6.00	550	14.8	>200
2	0.68	6.50	530	14.8	>200
3	1.02	6.02	510	15.1	>200
4	1.36	6.04	520	14.9	58
5	1.70	6.02	510	14.9	48

Comments: _____

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 6

PROJECT NAME DIVA Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) CLOUDY, 70°F
(p.m.) CLOUDY, Light rain 80°F

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			SAMPLING #	SAMPLING TYPE	PENETRATION RECORD SPLIT SPOON BLOWS				RECOVERED	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
FROM	AT	TO			6"	6"	6"	6"			
0		2.0	1	SS	1	2	2	4	12"	SAND, some clay, Red-Brown, Fill MOIST <u>0.0</u> photon	photon 0.0
2.0		4.0	2	SS	2	3	6	7	18"	SAND, some silt, Red-Brown, Fill NATIVE MOIST to WET, <u>0.0</u> photon	0.0
4.0		6.0	3	SS	4	4	8	4	10"	SAND, some silt small gravel, Red-Brown, MOIST to wet, Native, <u>0.0</u> photon	0.0
6.0		8.0	4	SS	1	1	3	3	14"	SAND, some small gravel, Red-Brown Wet, Native, <u>0.0</u> photon	0.0
8.0		10.0	5	SS	8	8	7	8	24"	SAND, some silt, RED SAND, Brown silt Wet, NATIVE	inter bedded 0.0
10.0		12.0	6	SS	7	7	7	7	24"	SAND, some silt, Red-grey, MOIST to WET, NATIVE	0.0
12.0		12.5	7	SS	5	7	4	5	24"	SAND, some silt, Red-grey MOIST to WET, NATIVE	0.0
12.5		14.0	-	-						SAND, some silt, Red-Brown, MOIST to WET, NATIVE	
14.0		16.0	8	SS	2	9	7	7	24"	SAND, some silt, Red + Brown, WET, NATIVE	0.0

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 2 OF 6

PROJECT NAME DIVA Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK Drive

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M M P L E T I H N O G D	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N T H D	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
F R O M	A T	T O			6"	6"	6"	6"			
16.0		17.0	9	SS	4	7	6	6	24"	SAND, some silt, Red-Brown, wet	0.0
17.0		18.0								Silt, trace clay, grey-Brown MOIST TO WET, NATIVE	0.0
18.0		20.0	10	SS	5	5	4	6	24"	Silt, trace clay, trace medium SAND, Red-Brown, MOIST TO WET NATIVE	0.0
20.0		22.0	11	SS	4	7	6	3	24"	Silt, trace clay, trace medium SAND, RED-BROWN, MOIST TO WET NATIVE	0.0
22.0		24.0	12	SS	8	9	5	6	24"	Silt, SOME FINE SAND, RED-BROWN, MOIST TO WET, NATIVE	0.0
24.0		26.0	13	SS	5	6	6	6	24"	SAND, some silt, Red-Brown, MOIST TO WET, NATIVE	0.0
26.0		28.0	14	SS	4	7	6	8	24"	SAND, some silt, RED-BROWN, MOIST TO WET, NATIVE	0.0
30.0		32.0	15	SS	6	6	5	5	24"	SAND, some silt, little small to medium gravel, trace, clay, Red-Brown, MOIST TO WET, NATIVE	0.0

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 3 OF 6

PROJECT NAME DuVA Property

PROJECT NUMBER 3442

CLIENT GENERAL ELECTRIC

LOCATION 301 VICTORIA PARK DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF

DRILLER Ron Bush

SURFACE ELEVATION

WEATHER (a.m.)

(p.m.)

HOLE DESIGNATION MW-14

DATE STARTED 7/9/92

DATE COMPLETED 7/19/92

DRILLING METHOD HSA

CRA SUPERVISOR R. BAKER

[illegible]

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 4 OF 6

PROJECT NAME DWA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 119 EMERALD DRIVE

DRILLING CONTRACTOR PARRATT - WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) CLEAR 65°F
(p.m.) CLEAR 80°F

HOLE DESIGNATION MW-15
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E N O G D	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N G R E D	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
F R O M	A T	T O			6"	6"	6"	6"			
0		2.0	1	SS	11	12	9	8	4"	SAND, medium gravel, CRUSHED STONE, Dark BROWN, MOIST, FILL	TOPSOIL Photon 0.0
2.0		4.0	2	SS	13	7	7	6	6"	SAND, medium gravel, Red-Brown MOIST, FILL	0.0
4.0		6.0	3	SS	1				6"	SAND, medium gravel, Brown - grey, WET, FILL	0.0
6.0		8.0	4	SS	11	6	3	3	12"	SAND, some medium gravel, trace silt, Red-Brown, MOIST, NATIVE	0.0
8.0		8.5	5	SS	3	1	2	2	18"	GRAVEL, Brown grey, WET, NATIVE	0.0
8.5		10.0								FINE SAND, some silt, Brown-grey MOIST to WET, NATIVE	
10.0		12.0	6	SS	3	4	1	5	24"	SILT, some FINE SAND, BROWN grey WET, NATIVE	0.0
12.0		13.7	7	SS	6	9	13	12	24"	SILT, some FINE SAND, Brown - grey, WET, NATIVE	0.0
13.7		14.0	8	SS						SILT, some FINE SAND, trace clay, angular gravel, Red Brown, MOIST, NATIVE	TILL 0.0
14.0		16.0	8	SS	7	16	13	15	24"	SILT, some clay, angular gravel, Red- Brown, Dry to moist NATIVE	

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 5 OF 6

PROJECT NAME DUNA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 101 EMERALD DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-16
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

[illegible]

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 6 OF 6

PROJECT NAME DIVA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 5026 PLATINUM DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-17
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HAND AUGER
CRA SUPERVISOR R. BAUER

[illegible]

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-47)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-14

PROJECT NO.: 3442

(Page 1 of 2)
DATE COMPLETED: JULY 9, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: 301 VICTORIA PARK DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA (ppm)
	SC-SAND(FILL), some clay, red brown, moist		ROAD BOX	1SS		4	0
2.5	SM-SAND(NATIVE), some silt, red brown, moist to wet	-2.0		2SS		9	0
5.0	SW-SAND, some small gravel, red brown, moist to wet Same, except wet	-4.0	8" BOREHOLE	3SS		12	0
7.5				4SS		4	0
10.0	SM-SAND, some silt, interbedded, red brown, wet Same, except red and gray, moist to wet	-8.0		5SS		15	0
12.5	Same, except red brown Same, except wet		CEMENT/ BENTONITE GROUT	6SS		14	0
15.0				7SS		11	0
17.5	ML-SILT, trace clay, gray brown, moist to wet Same, with trace medium sand, red brown	-17.0	2" PVC PIPE	8SS		16	0
20.0				9SS		13	0
22.5	Same, except some fine sand		BENTONITE PELLET SEAL	10SS		9	0
25.0	SM-SAND, some silt, red brown, moist to wet	-24.0	SAND PACK	11SS		13	0
27.5				12SS		14	0
30.0	Same, with little small to medium gravel, trace clay		WELL SCREEN	13SS		12	0
32.5				14SS		13	0
				15SS		11	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-47)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-14

PROJECT NO.: 3442

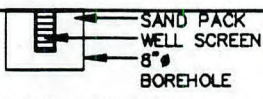
(Page 2 of 2)
DATE COMPLETED: JULY 9, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: 301 VICTORIA PARK DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA (ppm)
35.0	ML-SILT(TILL), some clay, some angular gravel, dense, red brown, dry to moist END OF HOLE @ 34.0 FT. BGS	-33.5 -34.0	 SAND PACK WELL SCREEN 8" BOREHOLE <u>SCREEN DETAILS:</u> Screened Interval: 23.5 to 33.5' BGS Length -10.0' Diameter -2.0" Slot # 10 Material -PVC Sand pack interval: 21.5 to 34.0' BGS Material -Sand	16SS	X	33	0
37.5							
40.0							
42.5							
45.0							
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-48)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-15

PROJECT NO.: 3442

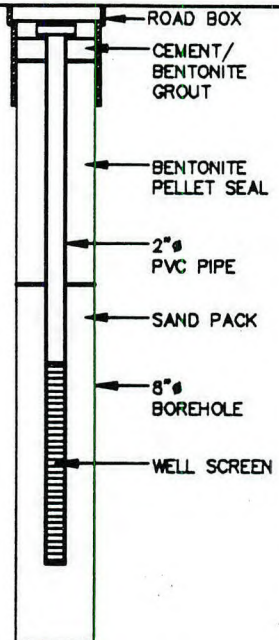
DATE COMPLETED: JULY 10, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: 119 EMERALD DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OV A (ppm)
2.5	SW-SAND(FILL), some medium gravel, crushed stone, dark brown, moist Same, except no crushed stone, red brown			1SS	X	21	0
	Same, except brown gray, wet			2SS	X	14	0
5.0				3SS	X		0
	SW-SAND(NATIVE), some medium gravel, trace silt, red brown, moist	-6.0		4SS	X	9	0
7.5				5SS	X	3	0
	GW-GRAVEL, brown gray, wet	-8.0		6SS	X	5	0
	SM-SAND, some silt, fine grained, brown gray, moist to wet	-8.5		7SS	X	22	0
10.0	ML-SILT, some fine sand, brown gray, wet	-10.0		8SS	X	29	0
12.5							
	ML-SILT(TILL), some fine sand, trace clay, trace angular gravel, red brown, moist	-13.7					
15.0	Same, except some clay, dry to moist						
17.5	END OF HOLE @ 16.0 FT. BGS	-16.0					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

SCREEN DETAILS:
 Screened Interval:
 9.0 to 14.0' BGS
 Length -5.0'
 Diameter -2.0"
 Slot # 10
 Material -PVC
 Sand pack interval:
 7.0 to 16.0' BGS
 Material -Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS  WATER FOUND  STATIC WATER LEVEL 

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-49)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-16

PROJECT NO.: 3442

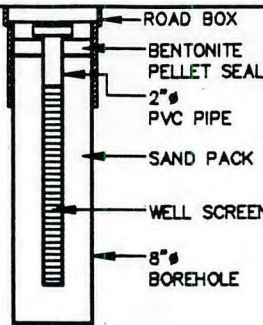
DATE COMPLETED: JULY 10, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: 101 EMERALD DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA (ppm)
2.5	SC-SAND(FILL), some clay, orange brown, moist		 ROAD BOX BENTONITE PELLET SEAL 2" PVC PIPE SAND PACK WELL SCREEN 8" BOREHOLE	1SS	X	13	0
5.0	Same, except moist to wet			2SS	X	21	0
7.5	SC-SAND(NATIVE), some clay, orange brown, moist to wet	-6.0		3SS	X	13	0
	ML-SILT(TILL), some clay, some angular gravel, red brown, dry to moist	-7.0		4SS	X	29	0
8.0	END OF HOLE @ 8.0 FT. BGS	-8.0					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

SCREEN DETAILS:

Screened Interval:

2.0 to 7.0' BGS

Length -5.0'

Diameter -2.0"

Slot # 10

Material -PVC

Sand pack interval:

1.0 to 8.0' BGS

Material -Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-50)

PROJECT NAME: DUVA PROPERTY (OFFSITE)

HOLE DESIGNATION: MW-17

PROJECT NO.: 3442

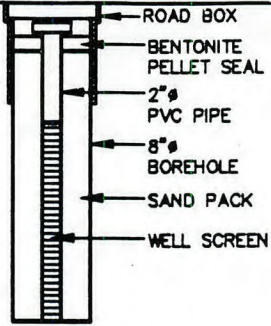
DATE COMPLETED: JULY 10, 1992

CLIENT: GENERAL ELECTRICAL

DRILLING METHOD: HAND AUGER

LOCATION: 5026 PLATINUM DRIVE

CRA SUPERVISOR: R. BAUER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	OVA (ppm)
2.5	SM-SAND(NATIVE), some silt, brown, moist to wet		 ROAD BOX BENTONITE PELLET SEAL 2" PVC PIPE 8" BOREHOLE SAND PACK WELL SCREEN				
5.0							
7.5							
10.0	ML-SILT(TILL), some clay, some angular gravel, red brown, dry to moist END OF HOLE ● 8.0 FT. BGS	-8.0	<u>SCREEN DETAILS:</u> Screened Interval: 3.0 to 8.0' BGS Length -5.0' Diameter -2.0" Slot # 10 Material -PVC Sand pack interval: 1.0 to 8.0' BGS Material -Sand				
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 6

PROJECT NAME DIVA Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK DRIVE

DRILLING CONTRACTOR PARRATT - Wolff
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) CLOUDY, 70°F
(p.m.) CLOUDY, Light rain 80°F

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E T I H N O D	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N T H	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
F R O M	A T	T O			6"	6"	6"	6"			
0		2.0	1	SS	1	2	2	4	12"	SAND, some clay, Red-Brown, Fill MOIST 0.0 photon	0.0
2.0		4.0	2	SS	2	3	6	7	18"	SAND, some silt, Red-Brown, Fill NATIVE MOIST to WET, 0.0 photon	0.0
4.0		6.0	3	SS	4	4	8	4	10"	SAND, some silt small gravel, Red-Brown, MOIST to wet, NATIVE 0.0 photon	0.0
6.0		8.0	4	SS	1	1	3	3	14"	SAND, some small gravel, Red-Brown Wet, NATIVE, 0.0 photon	0.0
8.0		10.0	5	SS	8	8	7	8	24"	SAND, some silt, RED SAND, Brown silt Wet, NATIVE	inter bedded 0.0
10.0		12.0	6	SS	7	7	7	7	24"	SAND, some silt, Red-grey, MOIST to WET, NATIVE	0.0
12.0		12.5	7	SS	5	7	4	5	24"	SAND, some silt, Red-grey MOIST to WET, NATIVE	0.0
12.5		14.0	-	-						SAND, some silt, Red-Brown, MOIST to WET, NATIVE	
14.0		16.0	8	SS	2	9	7	7	24"	SAND, some silt, Red + Brown, WET, NATIVE	0.0

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 2 OF 6

PROJECT NAME Duva Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK Drive

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION MW-14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E I N G D	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N T E D	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
F R O M	A T	T O			6"	6"	6"	6"			
16.0		17.0	9	SS	4	7	6	6	24"	SAND, some silt, Red-Brown, wet	0.0
17.0		18.0								Silt, trace clay, grey-Brown MOIST TO WET, NATIVE	0.0
18.0		20.0	10	SS	5	5	4	6	24"	Silt, trace clay, trace medium SAND, Red-Brown, MOIST TO WET NATIVE	0.0
20.0		22.0	11	SS	4	7	6	3	24"	Silt, trace clay, trace medium SAND, RED-BROWN, MOIST TO WET NATIVE	0.0
22.0		24.0	12	SS	8	9	5	6	24"	Silt, SOME FINE SAND, RED-BROWN, MOIST TO WET, NATIVE	0.0
24.0		26.0	13	SS	5	6	6	6	24"	SAND, some silt, Red-Brown, MOIST TO WET, NATIVE	0.0
26.0		28.0	14	SS	4	7	6	8	24"	SAND, some silt, Red-Brown, MOIST TO WET, NATIVE	0.0
30.0		32.0	15	SS	6	6	5	5	24"	SAND, some silt, little small to medium gravel, trace clay, Red-Brown, MOIST TO WET, NATIVE	0.0

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 3 OF 6

PROJECT NAME Duwa Property
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 301 VICTORIA PARK

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

HOLE DESIGNATION Mw - 14
DATE STARTED 7/9/92
DATE COMPLETED 7/9/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

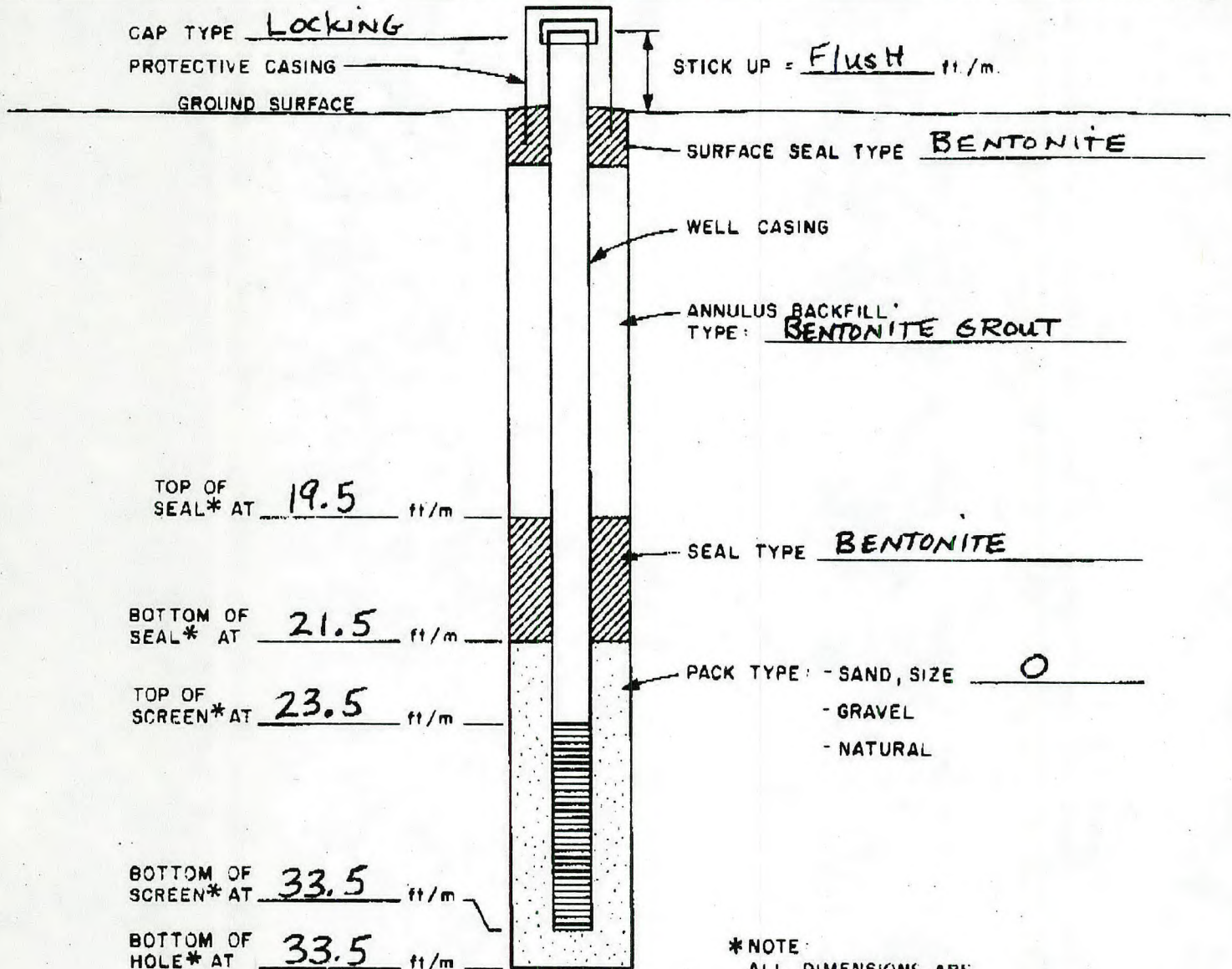
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WELL INSTRUMENTATION LOG

CAL KN

PROJECT NAME: DURA RI/FS (OFFSITE)
 PROJECT NO: 3442
 CLIENT: GENERAL ELECTRIC
 LOCATION: 301 VICTORIA PARK DRIVE

HOLE DESIGNATION: MW-14
 DATE COMPLETED: 7/9/92
 DRILLING METHOD: HSA
 CRA SUPERVISOR: R. BAUER



*NOTE:
 ALL DIMENSIONS ARE
 BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☒ other: MACHINE CUT

SCREEN MATERIAL: ☐ stainless steel ☐ plastic ☒ other: PVC

SCREEN LENGTH: 10 ft/m SCREEN DIAMETER: 2.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: PVC WELL CASING DIAMETER: 2.0 in/cm

HOLE DIAMETER: 8 INCHES

DEVELOPMENT: METHOD: PERISTALTIC / BAILER DURATION: _____

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 4 OF 6

PROJECT NAME DWA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 119 EMERALD DRIVE

DRILLING CONTRACTOR PARRATT - WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) CLEAR 65°F
(p.m.) CLEAR 80°F

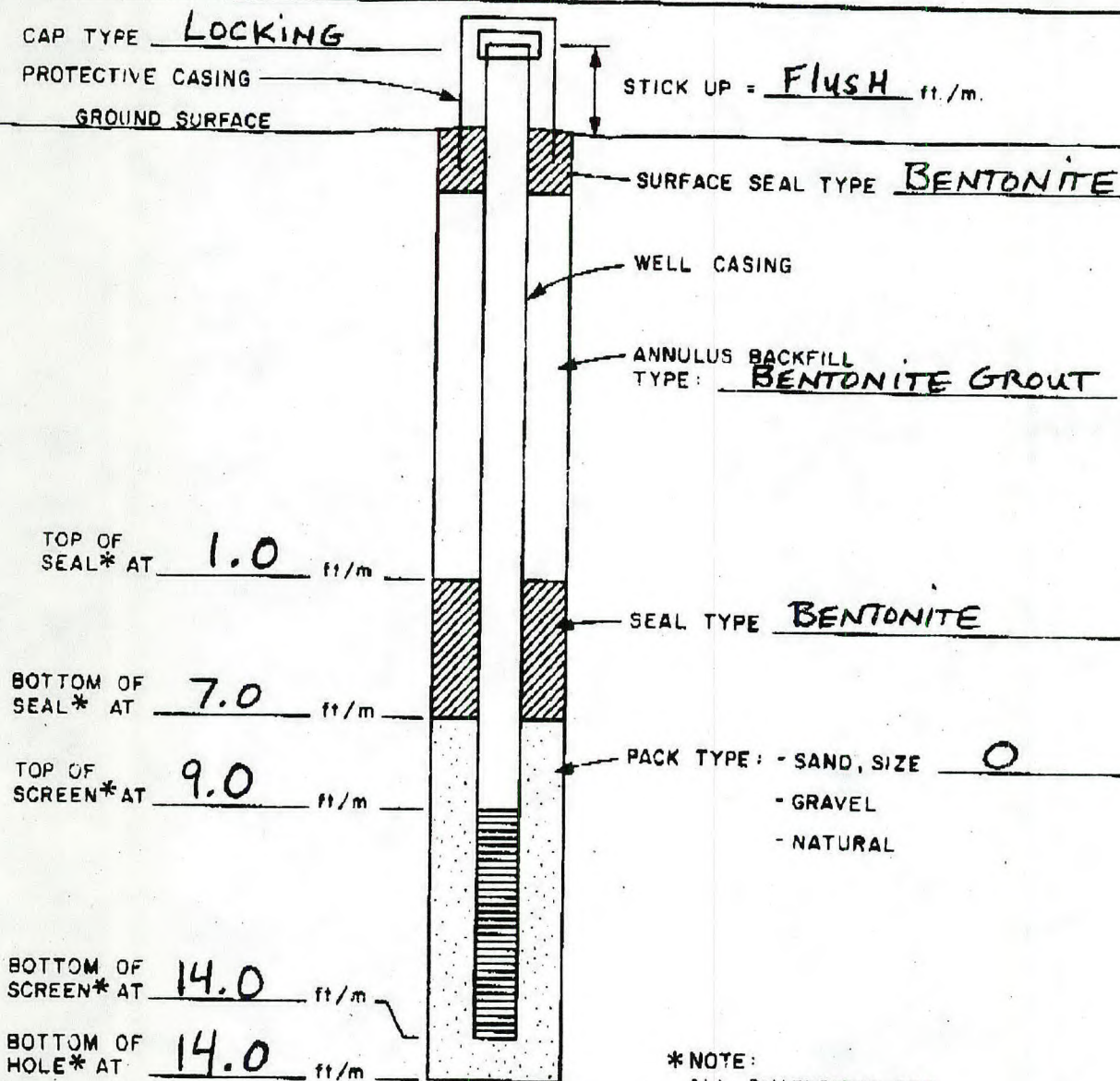
HOLE DESIGNATION MW-15
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

DEPTH OR ELEVATION (ft/m)			S A M P L E #	S A M P L E I N O G D	PENETRATION RECORD SPLIT SPOON BLOWS				R E C O R D E V E N T E R H D	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
FROM	AT	TO			6"	6"	6"	6"			
0		2.0	1	SS	11	12	9	8	4"	SAND, medium gravel, CRUSHED STONE, DARK BROWN, MOIST, FILL	TOP SOIL Photon 0.0
2.0		4.0	2	SS	13	7	7	6	6"	SAND, medium gravel, Red-Brown MOIST, FILL	0.0
4.0		6.0	3	SS	1				6"	SAND, medium gravel, Brown - grey, WET, FILL	0.0
6.0		8.0	4	SS	11	6	3	3	12"	SAND, some medium gravel, trace silt, RED-BROWN, MOIST, NATIVE	0.0
8.0		8.5	5	SS	3	1	2	2	18"	GRAVEL, Brown grey, WET, NATIVE	0.0
8.5		10.0								FINE SAND, SOME SILT, Brown-grey MOIST to WET, NATIVE	
10.0		12.0	6	SS	3	4	1	5	24"	SILT, some FINE SAND, Brown grey WET, NATIVE	0.0
12.0		13.7	7	SS	6	9	13	12	24"	SILT, some FINE SAND, Brown - Grey, WET, NATIVE	0.0
13.7		14.0	8	SS						SILT, some FINE SAND, trace clay, angular gravel, Red Brown, MOIST, NATIVE	TILL 0.0
14.0		16.0	8	SS	7	16	13	15	24"	SILT, some clay, angular gravel, Red-	

WELL INSTRUMENTATION LOG

PROJECT NAME: DUVA RI/FS (OFFSITE)
 PROJECT NO: 3442
 CLIENT: GENERAL ELECTRIC
 LOCATION: 119 EMERALD DRIVE

HOLE DESIGNATION: MW-15
 DATE COMPLETED: 7/10/92
 DRILLING METHOD: HSA
 CRA SUPERVISOR: R. BAUER



*NOTE:
 ALL DIMENSIONS ARE
 BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☒ other: MACHINE CUT

SCREEN MATERIAL: ☐ stainless steel ☐ plastic ☒ other: PVC

SCREEN LENGTH: 5.0 ft/m SCREEN DIAMETER: 2.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: PVC WELL CASING DIAMETER: 2.0 in/cm

HOLE DIAMETER: 8 INCHES

DEVELOPMENT: METHOD: PERISTALTIC/BAILER DURATION: _____

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 5 OF 6

PROJECT NAME DUNA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 101 EMERALD DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

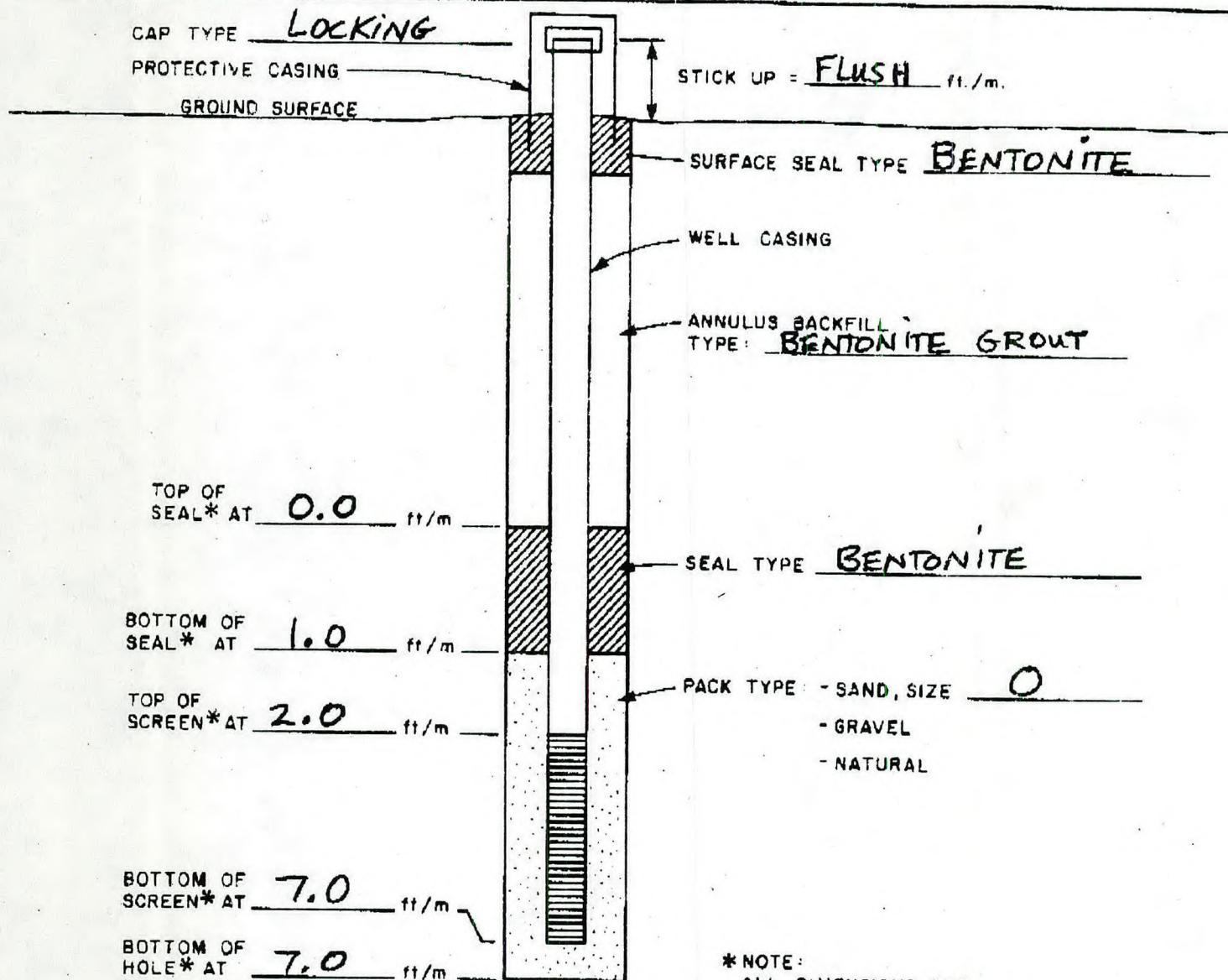
HOLE DESIGNATION MW-16
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HSA
CRA SUPERVISOR R. BAUER

[illegible]

WELL INSTRUMENTATION LOG

PROJECT NAME: DIVA RI/FS (OFFSITE)
 PROJECT NO: 3442
 CLIENT: GENERAL ELECTRIC
 LOCATION: 101 EMERALD DRIVE

HOLE DESIGNATION: MW-16
 DATE COMPLETED: 7/10/92
 DRILLING METHOD: HSA
 CRA SUPERVISOR: R. BAUER



* NOTE:
 ALL DIMENSIONS ARE
 BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☒ other: MACHINE CUT

SCREEN MATERIAL: ☐ stainless steel ☐ plastic ☒ other: PVC

SCREEN LENGTH: 5.0 ft/m SCREEN DIAMETER: 2.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: PVC WELL CASING DIAMETER: 2.0 in/cm

HOLE DIAMETER: 8 INCHES

DEVELOPMENT: METHOD: PERISTALTIC/BAILER DURATION: _____

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 6 OF 6

PROJECT NAME DIVA PROPERTY
PROJECT NUMBER 3442
CLIENT GENERAL ELECTRIC
LOCATION 5026 PLATINUM DRIVE

DRILLING CONTRACTOR PARRATT-WOLFF
DRILLER RON BUSH
SURFACE ELEVATION _____
WEATHER (a.m.) _____
(p.m.) _____

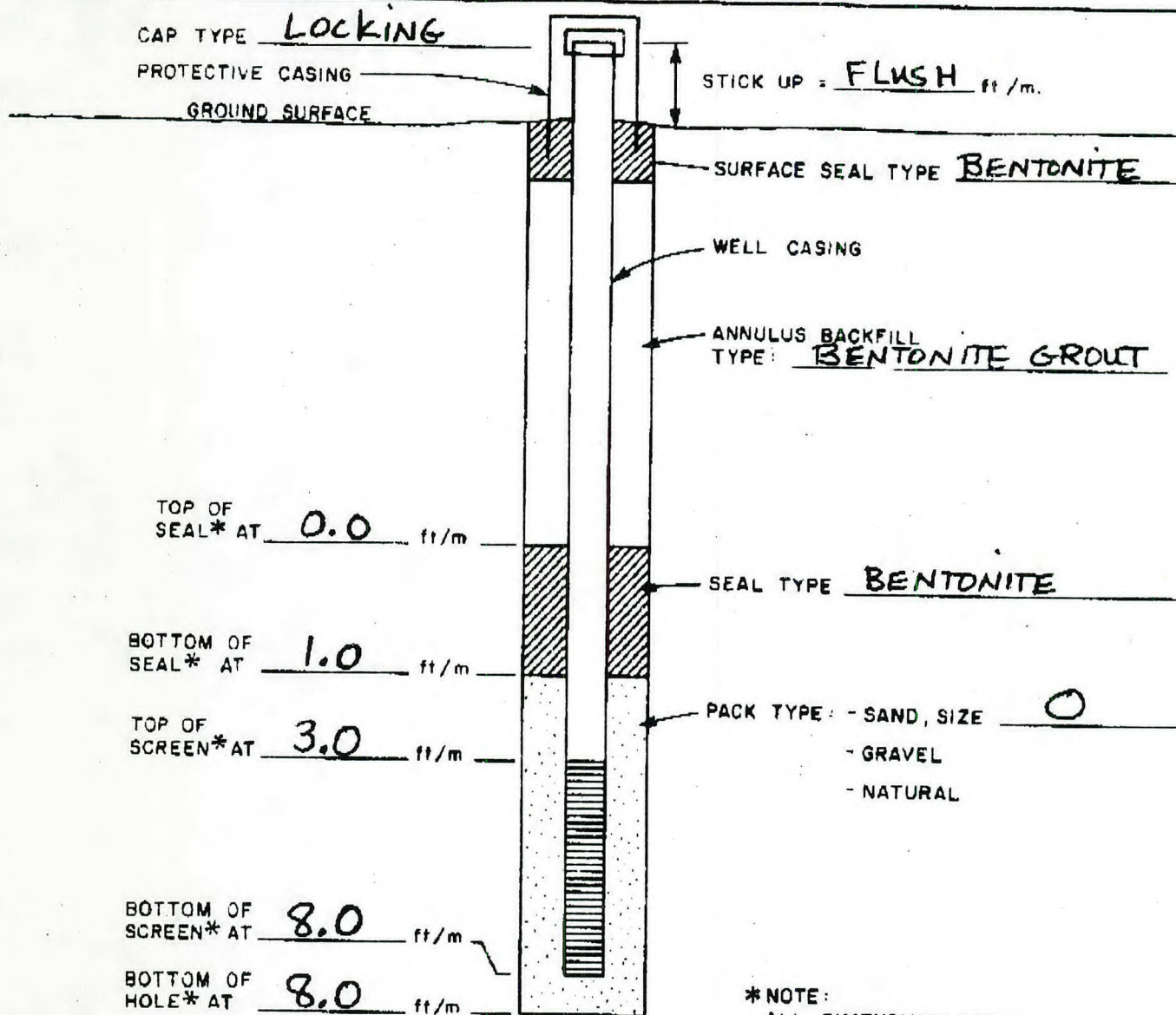
HOLE DESIGNATION MW-17
DATE STARTED 7/10/92
DATE COMPLETED 7/10/92
DRILLING METHOD HAND AUGER
CRA SUPERVISOR R. BAUER

[illegible]

WELL INSTRUMENTATION LOG

PROJECT NAME: DWA RIFs (OFFSITE)
 PROJECT NO: 3442
 CLIENT: GENERAL ELECTRIC
 LOCATION: 5026 PLATINUM DRIVE

HOLE DESIGNATION: MW-17
 DATE COMPLETED: 7/10/92
 DRILLING METHOD: HAND AUGER
 CRA SUPERVISOR: R. BAUER



*NOTE:
 ALL DIMENSIONS ARE
 BELOW GROUND SURFACE (BGS)

SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☒ other: MACHINE CUT
 SCREEN MATERIAL: ☐ stainless steel ☐ plastic ☒ other: PVC
 SCREEN LENGTH: 5.0 ft/m SCREEN DIAMETER: 2.0 in/cm SCREEN SLOT SIZE: 10
 WELL CASING MATERIAL: PVC WELL CASING DIAMETER: 2.0 in/cm
 HOLE DIAMETER: 8 INCHES
 DEVELOPMENT METHOD: PERISTALTIC/BAILER DURATION: _____



GROUNDWATER MONITORING WELL INSTALLATIONS

DUVA PROPERTY

NORTH SYRACUSE, NEW YORK



FISHER RD., EAST SYRACUSE, N.Y. 13057
TELEPHONE AREA CODE 315/437-1429
FAX 315/437-1770

July 20, 1992

Mr. Greg Gill
Conestoga-Rovers and Associates
7703 Niagara Falls Boulevard
Niagara Falls, New York 14304

Re: 92188
Duva Property
North Syracuse, New York

Dear Mr. Gill:

Enclosed are driller's field logs of four groundwater monitoring well installations made for you for the above project.

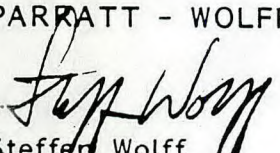
Soil samples from these borings were retained by your representative at the job site.

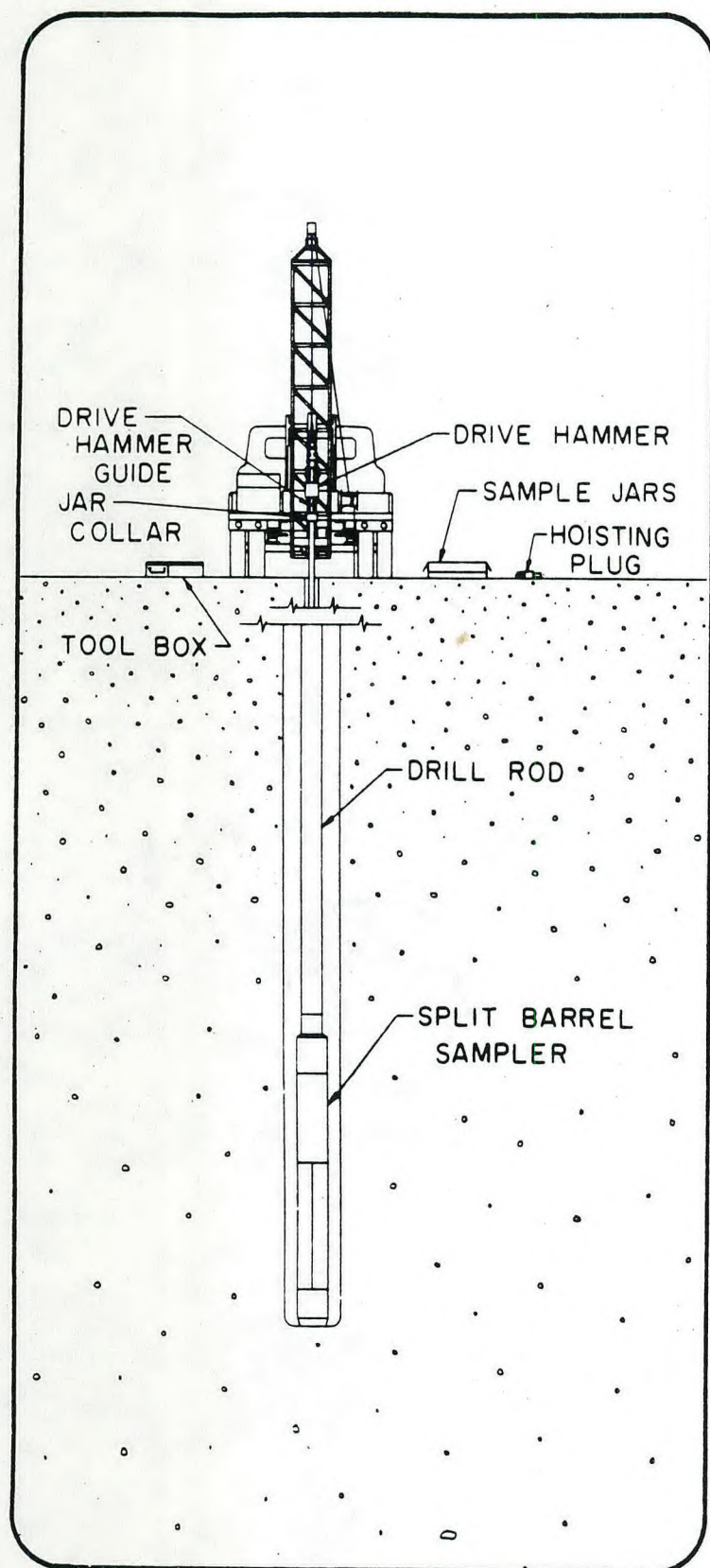
The borings were made at points located by you. Drilling, sampling and the well installations were done in accordance with your instructions.

Thank you for this opportunity to work with you.

Very truly yours,

PARRATT - WOLFF, INC.


Steffen Wolff
SW/lc
encs:



Split barrel sampling

The following excerpts are from "Standard Method for penetration test and split-barrel sampling of soils."¹ (ASTM designation: D-1586-67 AASHTO Designation: T-206-70.)

1. Scope

1.1 This method describes a procedure for using a split-barrel sampler to obtain representative samples of soil for identification purposes and other laboratory tests, and to obtain a measure of the resistance of the soil to penetration of the sampler.

2. Apparatus

2.1 Drilling Equipment — Any drilling equipment shall be acceptable that provides a reasonably clean hole before insertion of the sampler to ensure that the penetration test is performed on undisturbed soil, and that will permit the driving of the sampler to obtain the sample and penetration record in accordance with the procedure described in 3. Procedure. To avoid "whips" under the blows of the hammer, it is recommended that the drill rod have stiffness equal to or greater than the A-rod. An "A" rod is a hollow drill rod or "steel" having an outside diameter of 1-5/8 in. or 41.2 mm and an inside diameter of 1-1/8 in. or 28.5 mm, through which the rotary motion of drilling is transferred from the drilling motor to the cutting bit. A stiffer drill rod is suggested for holes deeper than 50 ft (15m). The hole shall be limited in diameter to between 2-1/4 and 6 in. (57.2 and 152mm).

2.2 Split-Barrel Sampler — The sampler shall be constructed with the dimensions indicated (in Fig. 1.) The drive shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The coupling head shall have four 1/2-in. (12.7-mm) (minimum diameter) vent ports and shall contain a ball check valve. If sizes other than the 2-in. (50.8-mm) sampler are permitted, the size shall be conspicuously noted on all penetration records.

2.3 Drive Weight Assembly — The assembly shall consist of a 140-lb (63.5-kg) weight, a driving head, and a guide permitting a free fall of 30 in. (0.76 m). Special precautions shall be taken to ensure that the energy of the falling weight is not reduced by friction between the drive weight and the guides.

2.4 Accessory Equipment — Labels, data sheets, sample jars, paraffin, and other necessary supplies should accompany the sampling equipment.

GENERAL NOTES

1. Soil boring logs, notes and other data shown are the results of personal observations and interpretations made by Parratt-Wolff, Inc.

Exploration records prepared by our drilling foreman in the field form the basis of all logs, and samples of subsurface materials retained by the driller are observed by technical personnel in our laboratory to check field classifications.

2. Explanation of the classifications and terms:

a. Bedrock — Natural solid mineral matter occurring in great thickness and extent in its natural location. It is classified according to geological type and structure (joints, bedding, etc.) and described as solid, weathered, broken or fragmented depending on its condition.

b. Soils — Sediments or other unconsolidated accumulations of particles produced by the physical and chemical disintegration of rocks and which may or may not contain organic matter.

PENETRATION RESISTANCE

COHESIONLESS SOILS

Blows Per Ft.	Relative Density
0 to 4	Very Loose
4 to 10	Loose
10 to 30	Medium Dense
30 to 50	Dense
Over 50	Very Dense

COHESIVE SOILS

Blows Per Ft.	Consistency
0 to 2	Very Soft
2 to 4	Soft
4 to 8	Medium Stiff
8 to 15	Stiff
15 to 30	Very Stiff
Over 30	Hard

Size Component Terms

Boulder	Larger than 8 inches
Cobble	8 inches to 3 inches
Gravel — coarse	3 inches to 1 inch
— medium	1 inch to 3/8 inch
— fine	3/8 inch to 4.76 mm
Sand — coarse	4.76 mm to 2.00 mm (#10 sieve)
— medium	2.00 mm to 0.42 mm (#40 sieve)
— fine	0.42 mm to 0.074 mm (#200 sieve)
Silt and Clay	Finer than 0.074 mm

Proportion By Weight

Major component is shown with all letters capitalized.

Minor component percentage terms of total sample are:

and ... 35 to 50 percent
some . 20 to 35 percent
little . 10 to 20 percent
trace . 1 to 10 percent

c. Gradation Terms — The terms coarse, medium and fine are used to describe gradation of Sand and Gravel.

d. The terms used to describe the various soil components and proportions are arrived at by visual estimates of the recovered soil samples. Other terms are used when the recovered samples are not truly representative of the natural materials, such as soil containing numerous cobbles and boulders which cannot be sampled, thinly stratified soils, organic soils, and fills.

e. Ground water — The measurement was made during exploration work or immediately after completion, unless otherwise noted. The depth recorded is influenced by exploration methods, soil type and weather conditions during exploration. Where no water was observed it is so indicated. It is anticipated that the ground water will rise during periods of wet weather. In addition, perched ground water above the water levels indicated (or above the bottom of the hole where no ground water is indicated) may be encountered at changes in soil strata or top of rock.

A BRIEF DESCRIPTION OF THE UNIFIED SOIL SYSTEM

The Unified Classification System is an engineering soil classification that is an outgrowth of the Air-Field classification developed by Casagrande.

The system incorporates the textural characteristics of a soil into the engineering classification. All soils are classified into fifteen groups, each group being designated by two letters. These letters are as follows: G—gravel, S—sand, M—Non plastic or low plasticity fines, C—plastic fines, Pt—peat, humus and swamp soils, O—organic, W—well graded, P—poorly graded, L—low liquid limit, H—high liquid limit.

GW and SW Groups

These groups comprise well graded gravelly and sandy soils which contain less than 5% of non plastic fines passing a #200 sieve. Fines which are present must not noticeably change the strength characteristics of the coarse grain fraction and must not interfere with its free draining characteristics. In areas subject to frost action the material should not contain more than about 3% of soil grains smaller than .02 millimeters in size.

GP and SP Groups

These groups are poorly graded gravels and sands containing less than 5% non plastic fines. They may consist of uniform gravels, uniform sands, or non uniform mixtures of very coarse material and very fine sand with intermediate sizes lacking. Materials of this latter type are sometimes referred to as skip graded, cap graded, or step graded.

GM and SM Groups

In general, these groups include gravels or sands which contain more than 12% of fines having little or no plasticity. The plasticity index and liquid limit of a soil in either of these groups plot below the "A" line on a plasticity chart. Gradation is not important and both low grade and poorly graded materials are included. Some sands and gravels in these groups may have a binder composed of natural cementing agents so proportioned that the mixture shows negligible swelling or shrinkage. Thus, the dry strength is provided by a small amount of soil binder or dry cementation of calcareous materials or iron oxide. A fine fraction of non cemented materials may be composed of silts or rock flour types having little or no plasticity, and the mixture will exhibit no dry strength.

GC and SC Groups

These groups comprise gravelly or sandy soils with more than 12% of fines which exhibit either low or high plasticity. The plasticity index and liquid limit of a soil in either of these groups plot above the "A" line on the plasticity chart. Gradation of these materials is not important. Plasticity of the binder fraction has more influence on the behavior of the soils than does the variation in gradation. A fine fraction is generally composed of clays.

ML and MH Groups

These groups include predominantly silty materials and micaceous or diatomaceous soils. An arbitrary division between the two groups has been established with a liquid limit of 50. Soils in these groups are sandy silts, clayey silts or organic silts with relatively low plasticity. Also included are loessial soils and rock flours. Micaceous and diatomaceous soils generally fall within the MH group, but may extend into the ML group when their liquid limit is less than 50. The same is true for certain types of kaolin clays and some illite clays having relatively low plasticity.

CL and CH Groups

The CL and CH groups embrace clays with low and high liquid limits respectively. They are primarily inorganic clays. Low plasticity clays are classified as CL and are usually lean clays, sandy clays, and silty clays. The medium plasticity and high plasticity clays are classified as CH. These include fat clays, gumbo clays, certain volcanic clays and bentonite.

OL and OH Groups

The soils in these groups are characterized by the presence of organic matter including organic silts and clays. They have a plasticity range that corresponds with the ML and MH groups.

Pt Group

Highly organic soils which are very compressible have undesirable construction characteristics and are classified in one group with the symbol Pt. Peat, humus and swamp soils with a highly organic texture are typical of the group. Particles of leaves, grass, branches of bushes and other fibrous vegetable matter are common components of these soils.

Borderline Classification

Soils in the GW, SW, GP and SP groups are non plastic materials having less than 5% passing the #200 sieve, while GM, SM, GC, and SC soils have more than 12% passing the #200 sieve. When these coarse grain materials contain between 5% and 12% of fines they are classified as borderline, and are designated by the dual symbol such as GW-GM. Similarly coarse grain soils which have less than 5% passing the #200 sieve, but which are not free draining or in which the fine fraction exhibits plasticity are also classed as borderline and are given a dual symbol. Still another type of borderline classification occurs when a liquid limit of a fine grain soil is less than 29 and the plasticity index lies in the range of four to seven. These limits are indicated by the shaded area on the plasticity chart.

Silty and Clayey

In the Unified System, these terms are used to describe soils whose Atterberg limits plot below and above the "A" line on the plasticity chart. The adjectives silty and clayey are used to describe soils whose limits plot close to the "A" line.

TEST BORING LOG

 FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Duva Property
 LOCATION Victoria Park Drive
 North Syracuse, New York
 DATE STARTED 7/9/92 DATE COMPLETED 7/9/92

HOLE NO. MW-14

SURF. EL.

JOB NO. 92188

 GROUND WATER DEPTH
WHILE DRILLING 6.8'

 BEFORE CASING
REMOVED 3.7'

 AFTER CASING
REMOVED Installed
Well

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING
 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/
 "/OR — % CORE RECOVERY # HAMMER FALLING

CASING TYPE - HOLLOW STEM AUGER
 DRILLER'S FIELD LOG

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
5.0	0.0'-	1		2/3		Brown moist to wet loose to medium dense fine to coarse SAND, little silt	
	2.0'			6/7	9		
	2.0'-	2		4/4			
	4.0'			8/4	12		
	4.0'-	3		1/1			
10.0	6.0'			3/3	4	Red-brown wet medium dense fine to coarse SAND, little interbedded silt	8.0'
	6.0'-	4		8/8			
	8.0'			7/8	15		
	8.0'-	5		5/4			
	10.0'			6/7	10		
15.0	10.0'-	6		7/7		Red-brown wet medium dense fine to medium SAND and SILT	11.0'
	12.0'			7/7	14		
	12.0'-	7		5/7			
	14.0'			4/5	11		
	14.0'-	8		2/9			
20.0	16.0'			7/7	16	Brown-red wet stiff SILT, little fine to medium sand	17.0'
	16.0'-	9		4/7			
	18.0'			6/6	13		
	18.0'-	10		6/6			
	20.0'-			5/7	11		
25.0	20.0'-	11		4/7		Red-brown wet stiff SILT and fine to medium SAND	19.0'
	22.0'			6/3	13		
	22.0'-	12		8/9			
	24.0'			5/6	14		
	24.0'-	13		5/6			
30.0	26.0'			6/6	12	Note: Installed 2" PVC 10 slot screen 33.0' to 23.0', 2" PVC riser to surface with flush mounted locking cover.	
	26.0'-	14		4/7			
	28.0'			6/8	13		
35.0	30.0'-	15		6/6		Red-brown wet medium dense fine to coarse SAND, little fine to coarse gravel, trace silt	30.0'
	32.0'			5/5	11		
	33.0'-	16		28/33			
	34.0'						
						Red moist hard SILT, little embedded fine to medium gravel	
						Bottom of Boring	34.0'



FISHER ROAD
EAST SYRACUSE, N.Y. 13057

AFTER CASING REMOVED **Installed Well**

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
WL 	0.0'-	1		11/12		Brown moist medium dense fine to coarse GRAVEL, trace fine to coarse sand	1.0'
	2.0'			9/8	21		
	2.0'-	2		13/7		Brown moist to wet medium dense to loose fine to coarse SAND, little fine to coarse gravel, trace silt	9.0'
	4.0'			7/6	14		
5.0	4.0'-	3		7/4		Brown wet loose to medium dense fine to medium SAND, some silt	13.7'
10.0	6.0'			3/4	7		
	6.0'-	4		11/6			
	8.0'			3/3	9		
	8.0'-	5		3/1			
10.0	10.0'			2/2	3	Red-brown wet very stiff SILT, little embedded fine to medium gravel	16.0'
15.0	10.0'-	6		3/4			
	12.0'			1/5	5		
	12.0'-	7		6/9			
	14.0'			13/12	22		
15.0	14.0'-	8		7/16		Bottom of Boring	16.0'
20.0	16.0'			13/15	29		
						Note: Installed 2" PVC 10 slot screen 14.0' to 9.0', 2" PVC riser to surface with flush mounted locking cover.	



APPENDIX B

DATA VALIDATION SUMMARY

MEMO

To: Mike Ianniello

From: ~~Doreen~~ Carden/js

Reference No.: 3442

Date: 10/06/92

Re: Analytical Data Quality Assessment and Validation
Off-Site Groundwater Sampling Program
Duva Property, Town of Clay, New York
May - September 1992

Copies to: R. Pyle

OVERVIEW

The following document details an assessment and validation of analytical results reported by Galson Technical Services (Galson) and H2M Labs Inc. (H2M) for environmental samples collected at the Duva Property Site located in the Town of Clay, New York during the Off-Site Groundwater Sampling Program. A summary of the groundwater samples, analytical methods, and parameters for which these samples were submitted is presented in Table 1.

Evaluation of the data was based on information derived from the raw data, finished data sheets, chain of custody forms, blank data, and recovery data for matrix and surrogate spikes. The assessment of analytical and in-house data included checks for: data consistency (by observing comparability of duplicate analyses); adherence to accuracy and precision criteria; transmittal errors; and anomalously high and low parameter values.

The quality assurance/quality control (QA/QC) criteria by which these data have been assessed are outlined in the methods referenced in Table 1 and the United States Environmental Protection Agency (USEPA) Functional Guidelines for Evaluating Organics Analyses hereinafter referred to as the "Guidelines". Based on a review of these data and related quality control data, the following were noted.

1.0 SAMPLE HOLDING TIMES

Based on the criteria outlined in the relevant methods and New York State Department of Environmental Conservation (NYSDEC) sample holding time

protocols, the following sample holding time requirements have been established for groundwater matrices:

TCL VOCs ⁽¹⁾	7 days from VTSR ⁽²⁾ to analysis
GC VOCs ⁽³⁾	7 days from VTSR to analysis

- (1) Target Compound List Volatile Organic Compounds (TCL VOCs) analyzed by Gas Chromatograph/Mass Spectrometer (GC/MS)
- (2) VTSR - Verified Time of Sample Receipt
- (3) Gas Chromatograph Volatile Organic Compounds (GC VOCs) consisted of 1,2,4- and 1,3,5-trimethylbenzene

By comparing the sampling date and VTSR of all samples (from the notation appearing on the chain of custody documents) with the reported dates of analyses, it is noted that all samples submitted for TCL VOCs and GC VOCs were analyzed within seven days of VTSR, thereby fulfilling the holding time requirements.

2.0 GC/MS TUNING AND MASS CALIBRATION

The analysis of TCL VOCs is based upon GC/MS methods. To ensure that the data produced by the instruments may be correctly interpreted, the tuning and performance criteria presented in the "Guidelines" have been assessed. These criteria have been established to assure mass resolution, identification, and to some degree, sensitivity.

A review of the GC/MS tuning and calibration data accompanying the Galson and H2M work orders indicated that all tuning and calibration criteria for bromofluorobenzene (BFB) were met during the sample analysis for TCL VOCs.

3.0 GC/MS CALIBRATION

In order to ensure that satisfactory instrument performance had been established for the analysis of TCL VOCs, the laboratory generated calibration have been assessed. Both initial and continuing calibration data were compared against the compliance requirements established by Method 89-1, NYSDEC September 1989 Analytical Services Protocol (ASP) and as presented in the "Guidelines". Based on the calibration data reported, the following observations were noted.

3.1 INITIAL CALIBRATION

Upon review of the initial calibration data reported by Galson and H2M, it was noted that all criteria for system performance calibration compounds (SPCCs) and calibration check compounds (CCCs) were met for TCL VOC determinations.

3.2 CONTINUING CALIBRATION

As a check on the instruments ability to generate reproducible calibration data, the percent difference (%D) of compound RRFs between the initial calibration and continuing calibration was assessed.

Only TCL compounds which yielded acceptable initial calibration data were evaluated by these criteria. All continuing calibration criteria for SPCCs and CCCs were met for TCL VOC analyses.

In addition, all TCL VOCs demonstrated continuing calibration RRFs greater than the minimum acceptable limit of 0.05, and %D less than 35 percent¹ indicating satisfactory linearity was established for these analyses.

4.0 GC CALIBRATION (GC VOCs)

In order to ensure that satisfactory instrument performance has been established for the analysis of GC VOCs, the laboratory generated calibration data have been assessed. The internal standard calibration data was compared against the compliance requirements established by Method 8020, USEPA SW-846 (3rd Edition). Based on the calibration data reported, the following observations were noted.

4.1 INTERNAL STANDARD CALIBRATION

All Relative Standard Deviations (RSDs) between Calibration Factors (CFs) for GC VOCs were less than the method control limit of 20 percent indicating that satisfactory linearity for these compounds was initially established.

4.2 QUALITY CONTROL (QC) CHECK SAMPLES

In accordance with calibration requirements for Method 8020, QC check samples were prepared for 1,2,4- and 1,3,5-trimethylbenzenes. All QC

¹ Control limit established by NYSDEC September 1989 Analytical Services Protocol (ASP).

check samples yielded recoveries within the method control limits of 85 to 115 percent.

5.0 INTERNAL STANDARDS PERFORMANCE - TCL VOCS

In order to ensure that GC/MS sensitivity and response are stable during each analytical sequence, the internal standard performance criteria established in Method 89-1 NYSDEC September 1989 ASP have been evaluated for the analysis of TCL VOCs. The criteria by which the internal standards have been assessed are as follows:

- i) internal standard area counts must not vary by more than a factor of two (-50 percent +100 percent) from the associated calibration standard; and
- ii) the retention time of the internal standard must not vary more than +30 seconds from the associated calibration standard.

Upon review of the internal standard area summary sheets (Form VIIIs) accompanying the Galson work orders, it was noted that the internal standard area count for chlorobenzene-d5 is below the lower limit. According to the "Guidelines" all sample results (positive or non-detected) associated with the outlying internal standard area count shall be qualified as estimated (data qualifier J). Qualification of sample data due to the outlying standard area count are presented in Table 2. All remaining internal standard area and retention time criteria were met for the analysis of TCL VOCs by Galson. All internal standard area and retention time criteria was met by H2M.

6.0 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples is assessed on the basis of surrogate spike recoveries. When properly employed in conjunction with sample preparation, surrogates can be used to determine the effectiveness of sample cleanup or matrix modifying techniques. In addition, fortifying the sample with a known amount of the surrogate compound prior to sample preparation serves as an indicator of the efficiency of analyte extraction, dissolution, or other analyte-matrix separation techniques. Based on the surrogate spike recoveries reported, the following observations were noted.

6.1 TCL VOCS

In accordance with Method 89-1, all samples submitted for TCL VOC determinations were spiked with the surrogate compounds

4-bromofluorobenzene, toluene-d₈, and 1,2-dichloroethane-d₄ prior to sample analysis. Sample GW-E reported outlying surrogate spike recoveries for the surrogate spike compounds 4-bromofluorobenzene and toluene-d₈ and was reanalyzed. The reanalysis of sample GW-E also reported outlying surrogate recoveries. As stipulated by the "Guidelines" if one TCL VOC surrogate recovery is outside the established control limits, but greater than 10 percent, all associated sample results (positive or non-detected) shall be qualified as estimated (data qualifier J). Qualification of sample data is presented in Table 3.

All remaining samples submitted for TCL VOC determinations yielded surrogate spike recoveries within the method control limits.

6.2 GC VOCS

For the determination of GC VOCs, Galson used a Photoionization Detector (PID) (Method 8020). The surrogate compound used to monitor laboratory performance for this analysis was fluorobenzene. All samples submitted for GC VOCs yielded surrogate spike recoveries within the laboratory control limits.

7.0 LABORATORY BLANK ANALYSES

The purpose of assessing the results of laboratory blank analyses was to determine the existence and magnitude of sample contamination problems. Laboratory blanks were analyzed at the frequency of one per 20 investigative samples and/or one per analytical sequence. Based on the laboratory blank data reported, the following were noted:

7.1 TCL VOCS

The NYSDEC September 1989 ASP stipulates that VOC laboratory blanks must contain less than the Contract Required Detection Limit (CRDL) of any TCL VOC with the exception of methylene chloride, acetone, toluene, and 2-butanone, whose blank concentration may not exceed five times the CRDL. Inspection of the VOC laboratory blanks analyzed by H2M and Galson yielded non-detected quantities of all TCL VOCs. Further, no tentatively identified compounds (TICs) were present in the VOC laboratory blanks. This indicated that the potential for sample contamination due to laboratory conditions and/or procedures was minimal during these analyses.

7.2 GC VOCS

All laboratory blanks submitted for GC VOC determinations yielded non-detected concentrations of the compounds of interest. This indicated that the potential for sample contamination attributable to laboratory conditions and/or procedures was minimal during these analyses.

8.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

The recoveries of MS/MSD analyses were used to assess the analytical accuracy of an individual sample basis, while the relative percent difference (RPD) between the MS and MSD indicated the analytical precision achieved for that sample.

8.1 TCL VOCS

MS/MSD analyses were performed for TCL VOCs on sample MW14 by H2M. Sample MW14 yielded a high MS/MSD recovery for the compound 1,1-dichloroethene as presented in Table 4. However, results for 1,1-dichloroethene in sample MW14 are reported as non-detected. Therefore, no qualification is required. All remaining MS/MSD recoveries and RPD values are within the laboratory established control limits.

8.2 GC VOCS

MS/MSD analyses were performed for GC VOCs by Galson on samples GW-E and MW-12. Sample MW-12 yielded MS/MSD recoveries and RPDs within the laboratory control limits. However, MS recoveries for GW-E and RPD values are outside of the established control limits. All MS/MSD results and associated sample data qualification are presented in Table 5.

9.0 BLANK SPIKE ANALYSES

The recoveries of blank spike analyses were evaluated to assess the analytical accuracy achieved by the laboratory. As the blank spike analyses are independent of potential matrix effects, they give a true indication of the analytical accuracy achieved by the laboratory for the respective analyses performed. Blank spike analyses were performed at a frequency of one per 20 investigative samples.

TCL VOC blank spike analyses were performed by Galson and H2M. One compound, 1,1-dichloroethene yielded a high recovery of 302 percent. However, all samples associated with the blank spike reported non-detected concentrations of 1,1-dichloroethene, therefore no qualification was required. All remaining blank spike recoveries are within the laboratory established control limits.

In addition, Galson analyzed QC check standards for GC VOCs. All QC check standard recoveries are within the laboratory established control limits, indicating accuracy was achieved for GC VOC analyses.

10.0 FIELD QA/QC

10.1 FIELD DUPLICATES

One field duplicate sample was collected and submitted to Galson and H2M to assess the aggregate analytical and sampling protocol precision. Samples MW-15 and MW-30 (Dup. of MW-15) were analyzed for TCL VOC and GC VOC determinations. The field duplicate results demonstrated adequate reproducibility indicating satisfactory laboratory and sampling protocol precision was achieved for this sampling event.

10.2 TRIP BLANKS

To evaluate the possibility of contamination arising from sample transport, the environment, and/or shipping, two trip blanks were submitted for GC and TCL VOC determinations. The results of the trip blank analyses yielded non-detected quantities of all GC and TCL VOCs.

10.3 HOLD BLANKS

As an additional check on potential cross-contamination of samples during laboratory handling and analysis, two hold blanks were stored and analyzed for TCL and GC VOCs by Galson. The hold blanks yielded non-detected quantities of GC and TCL VOCs. This indicated that the potential for cross-contamination was minimal during sample handling and analysis.

10.4 RINSATE BLANKS

Two rinsate blank samples (W-072492-01 and W-090192-RB) were collected to assess the efficiency of the equipment decontamination procedures associated with the groundwater sampling procedures.

Sample W-072492-01 was analyzed for GC VOCs and yielded non-detected quantities of the compounds of interest.

Sample W-090192-RB was analyzed for TCL VOCs and yielded a chloroform concentration of 6 µg/L. However, the sample collected immediately after the rinse blank yielded a non-detected concentration of chloroform, therefore qualification was not required. All remaining TCL VOCs yielded concentrations below the Instrument Detection Limit (IDL).

11.0 TENTATIVELY IDENTIFIED COMPOUNDS (TICS)

It was noted in several instances that TICs were found in the investigative samples analyzed for TCL VOCs by H2M. However, no TICs were detected in the laboratory blanks. TICs are presented in Table 6.

12.0 CONCLUSION

Based on the assessment detailed in the foregoing, the data produced by H2M and Galson are acceptable for their intended uses, with the specific qualifications presented in the provided text and tables.

TABLE 1
SAMPLE SUMMARY KEY
OFF-SITE GROUNDWATER SAMPLING PROGRAM
DUVA PROPERTY SITE
MAY - SEPTMEBER 1992

<i>Collection Date</i>	<i>Sample I.D.</i>	<i>Parameter</i>	<i>Method (1)</i>	<i>VTSR (2)</i>	<i>Analysis Date</i>
05/08/92	GW-E	Volatiles - GC/MS	89-1	05/08/92	05/08/92
		Volatiles - GC	SW-846 8020	05/08/92	05/15/92
05/08/92	GW-E RE	Volatiles - GC/MS	89-1	05/08/92	05/11/92
05/08/92	Trip Blank	Volatiles - GC/MS	89-1	05/08/92	05/08/92
		Volatiles - GC	SW-846 8020	05/08/92	05/15/92
09/01/92	MW-11	Volatiles - GC/MS	89-1	09/02/92	09/09/92
07/24/92		Volatiles - GC	SW-846 8020	07/24/92	07/28/92
09/01/92	MW-12	Volatiles - GC/MS	89-1	09/02/92	09/09/92
07/24/92		Volatiles - GC	SW-846 8020	07/24/92	07/28/92
09/01/92	MW-13	Volatiles - GC/MS	89-1	09/02/92	09/09/92
07/24/92		Volatiles - GC	SW-846 8020	07/24/92	07/28/92
09/01/92	MW-14	Volatiles - GC/MS	89-1	09/02/92	09/09/92
07/24/92		Volatiles - GC	SW-846 8020	07/24/92	07/29/92
09/01/92	MW-15	Volatiles - GC/MS	89-1	09/02/92	09/09/92
07/24/92		Volatiles - GC	SW-846 8020	07/24/92	07/29/92
09/01/92	MW-16	Volatiles - GC/MS	89-1	09/02/92	09/09/92
07/24/92		Volatiles - GC	SW-846 8020	07/24/92	07/29/92
09/01/92	MW-17	Volatiles - GC/MS	89-1	09/02/92	09/09/92
07/24/92		Volatiles - GC	SW-846 8020	07/24/92	07/29/92
09/01/92	MW-30	Volatiles - GC/MS	89-1	09/02/92	09/09/92
07/24/92		Volatiles - GC	SW-846 8020	07/24/92	07/29/92
07/24/92	WO72492-01	Volatiles - GC	SW-846 8020	07/24/92	07/29/92
07/24/92	Trip Blank	Volatiles - GC	SW-846 8020	07/24/92	07/29/92
09/01/92	090192-RB	Volatiles - GC/MS	89-1	09/02/92	09/09/92

Notes:

- (1) Method 89-1 referenced from NYSDEC September 1989 ASP, while Method 8020 was referenced from USEPA SW-846, 3rd Edition.
- (2) VTSR - Verified Time of Sample Receipt.

TABLE 2
 QUALIFICATION OF DATA DUE TO OUTLYING STANDARD AREA COUNT
 OFF-SITE GROUNDWATER SAMPLING PROGRAM
 DUVA PROPERTY SITE
 MAY - SEPTEMBER 1992

<i>Sample I.D.</i>	<i>Internal Standard Compound</i>	<i>Standard Area Count</i>	<i>Upper Limit</i>	<i>Lower Limit</i>	<i>Affected Compound</i>	<i>Qualified Concentration (µg/L)</i>
GW-E-RE	Chlorobenzene-D5	52123	210994	52749	4-Methyl-2-pentanone	10 UJ
					2-Hexanone	10 UJ
					Tetrachloroethene	5 UJ
					1,1,2,2-Tetrachloroethane	5 UJ
					Toluene	5 UJ
					Chlorobenzene	5 UJ
					Ethylbenzene	5 UJ
					Styrene	5 UJ
					Xylene (total)	5 UJ

Notes:

RE Sample was reanalyzed due to low surrogate spike recoveries.

U Non-detected at the state detection limit.

J Value is estimated due to outlying internal standard area count.

TABLE 3
 QUALIFICATION OF DATA DUE TO OUTLYING SURROGATE SPIKE RECOVERIES
 OFF-SITE GROUNDWATER SAMPLING PROGRAM
 DUVA PROPERTY SITE
 MAY-SEPTEMBER 1992

<i>Outlying Surrogate Compound</i>	<i>Percent Recovery</i>	<i>Control Limits</i>	<i>Sample Affected</i>	<i>Compound</i>	<i>Qualified Concentration (µg/L)</i>
Toluene-d8	.118*	88-110	GW-E	Chloromethane	10 UJ
Bromofluorobenzene	83*	86-115		Bromomethane	10 UJ
				Vinyl chloride	10 UJ
				Chloroethane	10 UJ
				Methylene chloride	5 UJ
				Acetone	25 J
				Carbon disulfide	5 UJ
				1,1-Dichloroethene	5 UJ
				1,1-Dichloroethane	5 UJ
				1,2-Dichloroethene (total)	5 UJ
				Chloroform	5 UJ
				1,2-Dichloroethane	5 UJ
				2-Butanone	10 UJ
				1,1,1-Trichloroethane	5 UJ
				Carbon tetrachloride	5 UJ
				Vinyl acetate	10 UJ
				Bromodichloromethane	5 UJ
				1,2-Dichloropropane	5 UJ
				cis-1,3-Dichloropropene	5 UJ
				Trichloroethene	5 UJ
				Dibromochloromethane	5 UJ
				1,1,2-Trichloroethane	5 UJ
				Benzene	5 UJ
				trans-1,3-Dichloropropene	5 UJ
				Bromoform	5 UJ
				4-Methyl-2-pentanone	10 UJ
				2-Hexanone	10 UJ
				Tetrachloroethene	5 UJ
				1,1,2,2-Tetrachloroethane	5 UJ
				Toluene	5 UJ
				Chlorobenzene	5 UJ
				Ethylbenzene	5 UJ
				Styrene	5 UJ
				Xylene (total)	5 UJ

TABLE 3
 QUALIFICATION OF DATA DUE TO OUTLYING SURROGATE SPIKE RECOVERIES
 OFF-SITE GROUNDWATER SAMPLING PROGRAM
 DUVA PROPERTY SITE
 MAY-SEPTEMBER 1992

<i>Outlying Surrogate Compound</i>	<i>Percent Recovery</i>	<i>Control Limits</i>	<i>Sample Affected</i>	<i>Compound</i>	<i>Qualified Concentration (µg/L)</i>
Toluene-d8	125*	88-110	GW-E-RE	Chloromethane	10 UJ
Bromofluorobenzene	77*	86-115		Bromomethane	10 UJ
				Vinyl chloride	10 UJ
				Chloroethane	10 UJ
				Methylene chloride	5 UJ
				Acetone	31 J
				Carbon disulfide	5 UJ
				1,1-Dichloroethene	5 UJ
				1,1-Dichloroethane	5 UJ
				1,2-Dichloroethene (total)	5 UJ
				Chloroform	5 UJ
				1,2-Dichloroethane	5 UJ
				2-Butanone	10 UJ
				1,1,1-Trichloroethane	5 UJ
				Carbon tetrachloride	5 UJ
				Vinyl acetate	10 UJ
				Bromodichloromethane	5 UJ
				1,2-Dichloropropane	5 UJ
				cis-1,3-Dichloropropene	5 UJ
				Trichloroethene	5 UJ
				Dibromochloromethane	5 UJ
				1,1,2-Trichloroethane	5 UJ
				Benzene	5 UJ
				trans-1,3-Dichloropropene	5 UJ
				Bromoform	5 UJ
				4-Methyl-2-pentanone	10 UJ (1)
				2-Hexanone	10 UJ (1)
				Tetrachloroethene	5 UJ (1)
				1,1,2,2-Tetrachloroethane	5 UJ (1)
				Toluene	5 UJ (1)
				Chlorobenzene	5 UJ (1)
				Ethylbenzene	5 UJ (1)
				Styrene	5 UJ (1)
				Xylene (total)	5 UJ (1)

Note:

- * Value is outside the established control limit.
- U Non-detected at the stated detection limit.
- J Value is estimated due to outlying surrogate spike recoveries.
- (1) Value has previously been qualified due to outlying standard area count.

TABLE 4
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS
OFF-SITE GROUNDWATER SAMPLE PROGRAM
DUVA PROPERTY SITE
MAY-SEPTEMBER 1992

<i>MS/MSD Sample I.D.</i>	<i>Compound</i>	<i>MS Recovery (Percent)</i>	<i>MSD Recovery (Percent)</i>	<i>RPD</i>	<i>Laboratory Control Limits (1)</i>
MW14	1,1-Dichloroethene	280*	280*	0	61-145 (14)
	Trichloroethene	110	120	8	71-120 (14)
	Benzene	110	120	8	76-127 (11)
	Toluene	110	120	8	76-125 (13)
	Chlorobenzene	110	120	8	75-130 (13)
<i>MS/MSD Sample I.D.</i>	<i>Compound</i>	<i>MS Recovery (Percent)</i>	<i>MSD Recovery (Percent)</i>	<i>RPD</i>	<i>Laboratory Control Limits (2)</i>
GW-E	1,2,4-Trimethylbenzene	70*	105	40*	85-115 (20)
	1,3,5-Trimethylbenzene	75*	105	33*	85-115 (20)
MW-12	1,2,4-Trimethylbenzene	105	105	0	85-115 (20)
	1,3,5-Trimethylbenzene	105	100	5	85-115 (20)

Notes:

- (1) Control limits established by NYSDEC. RPD control limits in parenthesis.
- (2) Control limits established by Galson. RPD control limits in parenthesis.
- * Value is outside the laboratory control limits.

TABLE 5
 QUALIFICATION OF SAMPLE DATA DUE TO OUTLYING
 MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES OR RPD VALUES
 OFF-SITE GROUNDWATER SAMPLING PROGRAM
 DUVA PROPERTY SITE
 MAY-SEPTEMBER 1992

<i>Sample I.D.</i>	<i>Compound</i>	<i>Outlying MS/MSD</i>	<i>Outlying RPD</i>	<i>Qualified Sample Concentration (µg/L)</i>
GW-E	1,2,4-Trimethylbenzene	70 / -	40	0.5 UJ
	1,3,5-Trimethylbenzene	75 / -	33	0.5 UJ

Notes:

U Non-detected at the stated detection limit.

J The value is estimated due to outlying matrix spike recovery and/or outlying RPD values.

TABLE 6
TENTATIVELY IDENTIFIED COMPOUNDS
OFF-SITE GROUNDWATER SAMPLING PROGRAM
DUVA PROPERTY SITE
MAY-SEPTEMBER 1992

<i>Sample I.D.</i>	<i>Tentatively Identified Compounds (TICs)</i>	<i>Concentration (µg/L)</i>
MW12	Methylpentane isomer	52J
	Hexane	800J
	Unknown	260J
MW13	Hexane	82J
	Hexane isomer	26J
MW14	Hexane	34J
	Unknown	10J
MW15	Unknown	10J
	Hexane	140J
	Unknown	40J
MW16	Unknown	7J
	Hexane	48J
	Unknown	13J
MW17	Hexane	76J
	Unknown	16J
MW30	Unknown	7J
	Hexane	110J
	Unknown	40J
W-090192-RB	Unknown	23J
	Hexane	18J
	Hexane isomer	6J

Note:

J All values have been qualified as estimated by H2M Labs.

MEMO

To: Mike Ianniello
From: ~~Doreen Carden~~/js
Reference No.: 3442
Date: 12/03/92
Re: Analytical Data Quality Assessment and Validation
Off-Site Groundwater Sampling Program
Duva Property, Town of Clay, New York
November 1992
Copies to: R. Bauer

OVERVIEW

The following document details an assessment and validation of analytical results reported by H2M Labs Inc. (H2M) for environmental samples collected at the Duva Property Site located in the Town of Clay, New York during the Off-Site Groundwater Sampling Program. A summary of the groundwater samples, analytical methods, and parameters for which these samples were submitted is presented in Table 1.

Evaluation of the data was based on information derived from the raw data, finished data sheets, chain of custody forms, blank data, and recovery data for matrix and surrogate spikes. The assessment of analytical and in-house data included checks for: data consistency (by observing comparability of duplicate analyses); adherence to accuracy and precision criteria; transmittal errors; and anomalously high and low parameter values.

The quality assurance/quality control (QA/QC) criteria by which these data have been assessed are outlined in the methods referenced in Table 1 and the United States Environmental Protection Agency (USEPA) Functional Guidelines for Evaluating Organics Analyses hereinafter referred to as the "Guidelines". Based on a review of these data and related quality control data, the following were noted.

1.0 SAMPLE HOLDING TIMES

Based on the criteria outlined in the relevant methods and New York State Department of Environmental Conservation (NYSDEC) sample holding time

protocols, the following sample holding time requirements have been established for groundwater matrices:

TCL VOCs	7 days from VTSR ⁽¹⁾ to analysis ⁽²⁾
	7 days from collection to analysis ⁽³⁾

- (1) VTSR - Verified Time of Sample Receipt
- (2) Holding times established by NYSDEC.
- (3) Holding times established by Guidelines.

By comparing the sampling date and VTSR of all samples (from the notation appearing on the chain of custody documents) with the reported dates of analyses, it is noted that all samples submitted for Target Compound List Volatile Organic Compounds (TCL VOCs) were analyzed within both the NYSDEC and Guidelines established holding times.

2.0 GC/MS TUNING AND MASS CALIBRATION

The analysis of TCL VOCs is based upon GC/MS methods. To ensure that the data produced by the instruments may be correctly interpreted, the tuning and performance criteria presented in the Guidelines have been assessed. These criteria have been established to assure mass resolution, identification, and to some degree, sensitivity.

A review of the GC/MS tuning and calibration data accompanying the H2M work order indicated that all tuning and calibration criteria for bromofluorobenzene (BFB) were met during the sample analysis for TCL VOCs.

3.0 GC/MS CALIBRATION

In order to ensure that satisfactory instrument performance had been established for the analysis of TCL VOCs, the laboratory generated calibration have been assessed. Both initial and continuing calibration data were compared against the compliance requirements established by Method 89-1, NYSDEC September 1989 Analytical Services Protocol (ASP) and as presented in the Guidelines. Based on the calibration data reported, the following observations were noted.

3.1 INITIAL CALIBRATION

Upon review of the initial calibration data reported by H2M, it was noted that all criteria for system performance calibration compounds

(SPCCs) and calibration check compounds (CCCs) were met for TCL VOC determinations.

3.2 CONTINUING CALIBRATION

As a check on the instruments ability to generate reproducible calibration data, the percent difference (%D) of compound RRFs between the initial calibration and continuing calibration was assessed.

Only TCL compounds which yielded acceptable initial calibration data were evaluated by these criteria. All continuing calibration criteria for SPCCs and CCCs were met for TCL VOC analyses.

One TCL compound (vinyl acetate) yielded a %D of 72 percent outside the established maximum 35 percent. However, all investigative sample results yielded non-detected quantities of vinyl acetate, therefore no qualification was required.

All remaining TCL VOCs demonstrated continuing calibration RRFs greater than the minimum acceptable limit of 0.05, and %D less than 35 percent indicating satisfactory linearity was established for these analyses.

4.0 INTERNAL STANDARDS PERFORMANCE - TCL VOCS

In order to ensure that GC/MS sensitivity and response are stable during each analytical sequence, the internal standard performance criteria established in Method 89-1 NYSDEC September 1989 ASP have been evaluated for the analysis of TCL VOCs. The criteria by which the internal standards have been assessed are as follows:

- i) internal standard area counts must not vary by more than a factor of two (-50 percent +100 percent) from the associated calibration standard; and
- ii) the retention time of the internal standard must not vary more than +30 seconds from the associated calibration standard.

Upon review of the internal standard area summary sheets (Form VIIIs) accompanying the H2M work orders, it was noted that all internal standard area and retention time criteria was met by the laboratory.

5.0 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples is assessed on the basis of surrogate spike recoveries. When properly employed in conjunction with sample preparation, surrogates can be used to determine the effectiveness of sample cleanup or matrix modifying techniques. In addition, fortifying the sample with a known amount of the surrogate compound prior to sample preparation serves as an indicator of the efficiency of analyte extraction, dissolution, or other analyte-matrix separation techniques. Based on the surrogate spike recoveries reported, the following observations were noted.

In accordance with Method 89-1, all samples submitted for TCL VOC determinations were spiked with the surrogate compounds 4-bromofluorobenzene, toluene-d₈, and 1,2-dichloroethane-d₄ prior to sample analysis.

All samples submitted for TCL VOC determinations yielded surrogate spike recoveries within the method control limits.

6.0 LABORATORY BLANK ANALYSES

The purpose of assessing the results of laboratory blank analyses was to determine the existence and magnitude of sample contamination problems. Laboratory blanks were analyzed at the frequency of one per 20 investigative samples and/or one per analytical sequence. Based on the laboratory blank data reported, the following were noted:

The NYSDEC September 1989 ASP stipulates that VOC laboratory blanks must contain less than the Contract Required Detection Limit (CRDL) of any TCL VOC with the exception of methylene chloride, acetone, toluene, and 2-butanone, whose blank concentration may not exceed five times the CRDL. Inspection of the VOC laboratory blanks showed positive concentrations of acetone and 2-hexanone. Qualification of sample data associated with laboratory blanks containing common laboratory contaminants was performed by elevating the limit of detection for the compounds of interest to the level found in the sample and reporting the sample results as non-detected (data qualifier U). In those cases where the sample concentration is below CRDL, the sample concentration is adjusted to the CRDL and reported as non-detected (data qualifier U). Presented in Table 2 is qualification of the affected sample data.

It should be noted that all investigative samples yielded non-detected quantities of 2-hexanone.

7.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

The recoveries of MS/MSD analyses were used to assess the analytical accuracy of an individual sample basis, while the relative percent difference (RPD) between the MS and MSD indicated the analytical precision achieved for that sample.

MS/MSD analyses were performed for TCL VOCs on sample MW-13 by H2M. Sample MW-13 yielded MS/MSD recoveries and RPD values within the NYSDEC established control limits indicating accuracy and precision were achieved for this sampling event.

8.0 BLANK SPIKE ANALYSES

The recoveries of blank spike analyses were evaluated to assess the analytical accuracy achieved by the laboratory. As the blank spike analyses are independent of potential matrix effects, they give a true indication of the analytical accuracy achieved by the laboratory for the respective analyses performed. Blank spike analyses were performed at a frequency of one per 20 investigative samples.

All compounds yielded blank spike recoveries within the established control limits.

9.0 FIELD QA/QC

9.1 FIELD DUPLICATES

One field duplicate sample was collected and submitted to H2M to assess the aggregate analytical and sampling protocol precision. Samples MW-14 and MW-30 (Dup. of MW-14) were analyzed for VOC determinations. The field duplicate results demonstrated adequate reproducibility indicating satisfactory laboratory and sampling protocol precision was achieved for this sampling event.

9.2 TRIP BLANKS

To evaluate the possibility of contamination arising from sample transport, the environment, and/or shipping, one trip blank was submitted for VOC determinations. The results of the trip blank analyses yielded non-detected quantities of all VOCs.

9.3 HOLD BLANKS

As an additional check on potential cross-contamination of samples during laboratory handling and analysis, one hold blank was stored and analyzed for TCL VOCs. The hold blanks yielded non-detected quantities of all VOCs, except acetone. However, acetone concentrations were found in the laboratory blank and all affected sample data has previously been qualified.

9.4 RINSATE BLANKS

One rinsate blank RB-1 was collected to assess the efficiency of the equipment decontamination procedures associated with the groundwater sampling procedures.

The rinse blank showed a positive concentration of acetone, however, acetone concentrations were also found in the laboratory blank and all affected sample data has previously been qualified in Section 6.

The rinse blank yielded non-detected quantities of all the remaining compounds of interest.

10.0 TENTATIVELY IDENTIFIED COMPOUNDS (TICS)

It was noted in three investigative samples that hexane was present. However, no TICS were detected in the laboratory blank. TICS are presented in Table 3.

11.0 CONCLUSION

Based on the assessment detailed in the foregoing, the data produced by H2M are acceptable for their intended uses, with the specific qualifications presented in the provided text and tables.

TABLE 1
SAMPLE SUMMARY KEY
OFF-SITE GROUNDWATER SAMPLING PROGRAM
DUVA PROPERTY SITE
NOVEMBER 1992

<i>Collection Date</i>	<i>Sample I.D.</i>	<i>Parameter</i>	<i>Method (1)</i>	<i>VTSR (2)</i>	<i>Analysis Date</i>
11/04/92	MW-11	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	MW-12	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	MW-13	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	MW-14	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	MW-15	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	MW-16	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	MW-17	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	MW-30 (Dup of MW-14)	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	RB-1 (Rinsate Blank)	Volatiles - GC/MS	89-1	11/05/92	11/09/92
11/04/92	Trip Blank	Volatiles - GC/MS	89-1	11/05/92	11/09/92

Notes:

(1) Method 89-1 referenced from NYSDEC September 1989 ASP.

TABLE 2
QUALIFIED SAMPLE DATA DUE TO BLANK CONTAMINATION
OFF-SITE GROUNDWATER SAMPLING PROGRAM
DUVA PROPERTY SITE
NOVEMBER 1992

<i>Blank I.D.</i>	<i>Compound</i>	<i>Blank Concentration (µg/L)</i>	<i>Associated Sample</i>	<i>Sample Concentration (µg/L)</i>	<i>Qualified Sample Concentration (µg/L)</i>
VBLK 11/9/92	Acetone	8J	MW-11	6J	10U
			MW-12	3J	10U
			MW-13	7J	10U
			MW-14	6J	10U
			MW-15	3J	10U
			MW-16	7J	10U
			MW-17	3J	10U
			MW-30	6J	10U

Notes:

- J Value is estimated by the laboratory.
- U Non-detected at the stated detection limit.

TABLE 3
TENTATIVELY IDENTIFIED COMPOUNDS
OFF-SITE GROUNDWATER SAMPLING PROGRAM
DUVA PROPERTY SITE
NOVEMBER 1992

<i>Sample I.D.</i>	<i>Tentatively Identified Compounds (TICs)</i>	<i>Concentration (µg/L)</i>
MW13	Hexane	73J
MW16	Hexane	19J
MW17	Hexane	5J

Note:

J All values have been qualified as estimated by H2M Labs.

