SURFACTANT INJECTION PILOT STUDY AND DNAPL RECOVERY STATUS LETTER REPORT

WORK ASSIGNMENT D007622-30.1

FORMER SPIC AND SPAN CLEANERS & DYERS, INC.
SITE NO. 224129
GREENPOINT/EAST WILLIAMSBURG INDUSTRIAL AREA
BROOKLYN, KINGS COUNTY, NY

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 Broadway, Albany, New York

Basil Seggos, Commissioner

DIVISION OF ENVIRONMENTAL REMEDIATION
Remedial Bureau B

URS Corporation- New York
257 West Genesee Street
Suite 400
Buffalo, New York 14202

FINAL
April 2018

SURFACTANT INJECTION

PILOT STUDY AND DNAPL RECOVERY STATUS LETTER REPORT

FOR THE

FORMER SPIC AND SPAN CLEANERS & DYERS, INC. SITE

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SITE ID NO. 224129

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
REMEDIAL BUREAU B
WORK ASSIGNMENT NUMBER D007622-30.1

PREPARED BY:

URS CORPORATION – NEW YORK
257 WEST GENESEE STREET, SUITE 400
BUFFALO, NY 14202

APRIL 2018

April 10, 2018

Mr. Michael Haggerty, QEP
Project Manager
Remedial Bureau B
Division of Environmental Remediation
NYS Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7016

Re: NYSDEC Standby Contract, Work Assignment No. D007622-30.1
Former Spic and Span Cleaners & Dyers, Inc., Site ID No. 224129
Surfactant Injection Pilot Study and DNAPL Recovery Status Letter Report

Dear Mr. Haggerty:

URS Corporation - New York (URS) has prepared this Surfactant Injection Pilot Study and Dense Non-aqueous Phase Liquid (DNAPL) Recovery Letter Report to summarize results of the surfactant injection (SI) pilot study and update the status of DNAPL removal activities completed in November and December 2017, at the 315 Kingsland Avenue property (i.e., Former Spic and Span Cleaners & Dyers, Inc. Site [New York State Department of Environmental Conservation {NYSDEC} Site Number 224129]) in the Greenpoint/East Williamsburg Industrial Area section of Brooklyn, New York (Figure 1). The work was completed under NYSDEC Work Assignment No. D007622-30.1. Copies of the daily field notes and site photos are provided in Appendix A.

URS conducted the SI pilot study between October 30th and November 3rd, 2017. Additional groundwater and surfactant extraction took place between November 7, 2017 and December 20, 2017. This report summarizes the results of the pilot study, and assesses the effectiveness of SI for DNAPL recovery as part of the overall evaluation of the remedial alternative for the Site.

The objective of the SI Pilot Study was to determine if Surfactant Enhanced Product Recovery (SEPR) technology would enhance DNAPL recovery at the Site and complete additional DNAPL recovery during the SI Pilot Study field work. The pilot study was conducted along the west side of Kingsland Avenue near the intersection of Norman Avenue. The pilot study generally followed the procedures provided in the NYSDEC approved SI Pilot Study Work Plan, dated September 2017 (included in Appendix B). Deviations from the approved plan are noted in this letter report. The pilot study made use of six pre-existing monitoring wells (DEC-024, DEC-024D, DEC-024DR, DEC-092D, DEC-136 and DEC-136D) and six extractions wells (EW-01 through EW-06). The locations of the pilot study wells are shown on Figure 2. Boring logs and well construction diagrams for these wells are provided in Appendix C.

As part of this SI Pilot Study, two reagents were used to mobilize DNAPL, a surfactant and hydrogen peroxide. The surfactant reduces surface tension between the DNAPL and the groundwater and promotes the formation of micelles that emulsifies the DNAPL, making it more mobile. The hydrogen peroxide is used not as an oxidizer, but as a reagent that dissociates to oxygen and water. The generation of oxygen gas in the subsurface promotes breakup of DNAPL and subsequent formation of micelles. The resulting emulsion and groundwater mixture was

recovered using a combination of pumping methods: a Waterra Inertial Hydrolift pump with dedicated/disposable HDPE tubing and check valves; Whale 12 volt submersible pumps; dedicated HDPE tubing with check valves via hand oscillation methods; and/or dedicated/disposable, 36 inch long 1-liter HDPE bailers.

Prior to the pilot test, baseline groundwater samples were collected from select monitoring and extraction wells (DEC-136, EW-04, and EW-06) used during the pilot study and analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by Method 8260C. In addition, initial water levels and DNAPL thicknesses were measured; any DNAPL detected was removed prior to the surfactant injections.

SURFACTANT INJECTION FIELD ACTIVITIES

Between October 31, 2017 and November 3, 2017, URS personnel mixed and injected eight 100-gallon batches of surfactant solution (consisting of E-Mulse-3, 7.9% hydrogen peroxide, and water) into wells DEC-136, EW-03, EW-04, and EW-06 using peristaltic pumps at a rate of approximately 1 to 2 gallons per minute. The first 100-gallon batch on October 31, 2018 and second batch on November 1, 2018 consisted of approximately 3 gallons of E–Mulse-3, 12.5 gallons of 7.9% hydrogen peroxide, and 86 gallons of water which resulted in a concentration of E-Mulse-3 at 30 milligrams / liter. The following six batches consisted of approximately 1 gallon of E–Mulse-3, 12.5 gallons of 7.9% hydrogen peroxide, and 86 gallons of water which resulted in a concentration of E-Mulse-3 at 10 milligrams / liter. E-Mulse-3 is a blend of non-ionic surfactants and a plant-based citrus solvent. The original plan specified injecting the surfactant solution solely into well DEC-136; however, the low formational hydraulic conductivity at DEC-136 limited the achievable injection rate and volume at this location. As a result, three nearby extraction wells (EW-03, EW-04, and EW-06), screened in the same upper sand and glacial till units, were utilized for injection. This modification was considered to be acceptable and appropriate because of the limited footprint of the injection area and the limited aerial extent and thickness of the targeted upper sand unit at the Site. In addition, the upper sand unit is essentially isolated by the underlying glacial till unit, which has a very low hydraulic conductivity. Table 1 summarizes DNAPL observations, surfactant solution volumes injected, fluid volumes removed, and samples collected during the week of the surfactant injection pilot study (i.e., October 30 through November 3, 2017).

Water levels were closely monitored during the surfactant mixture injections and several falling head tests were conducted to estimate the upper sand hydraulic conductivity. Falling head test data were evaluated from wells DEC-136, EW-03, EW-04, and EW-06, which are constructed in the upper sand unit and glacial till layer. Results were analyzed using AQTESOLV software and are included in Appendix D. Calculated hydraulic conductivities ranged from 2.08 E-05 to 8.75 E-06 centimeters/second.

Groundwater, DNAPL, and emulsion were subsequently recovered in wells DEC-136D, DEC-136, EW-02, EW-03, EW-04, EW-05, and EW-06 at the rate of approximately 1 to 2 gallons per minute. Table 2 summarizes the injection and removal volumes from each of these wells during the pilot study and subsequent recovery efforts (i.e., October – December 2017).

Water/DNAPL samples were collected from select wells before injection (baseline), during the test, and at the completion of the test for TCL VOC laboratory analysis by Method 8260C as

summarized in Table 3. Samples were collected in general accordance with the applicable procedures in the URS *Generic Field Activities Plan (URS August 2015)*.

Table 3 summarizes the analytical results from groundwater samples collected from DEC-136, EW-03, EW-04, EW-05, and EW-06. Baseline concentrations in these wells are considered to be from analyses conducted on October 30, 2017 or earlier dates in the analytical record (i.e., prior to the SI pilot study).

Analytical results obtained from emulsion samples collected in DEC-136, EW-04, and EW-06 after the surfactant mixture injections clearly show that tetrachloroethene (PCE) concentrations increased by up to nearly 3 orders of magnitude indicating that the surfactant mixture injections were effective in mobilizing residual PCE DNAPL present in the upper sand layer at the Site. By mid-November, PCE concentrations had generally decreased to levels near or below baseline conditions as a result of the groundwater, DNAPL, and emulsion removal activities, indicating that the recovery efforts were successful in capturing the majority of the injected surfactant mixtures. Appendix E presents a graphical representation of this data in DEC-136, EW-04, and EW-06.

An exception was noted at well EW-03, where the PCE concentration reported on November 15, 2017 was 170,000 ppb compared to the baseline concentration of 110,000 ppb on February 16, 2017.

DNAPL RECOVERY FIELD ACTIVITIES

Since June 2014, DNAPL has been removed from monitoring wells DEC-024, DEC-024D, DEC-092D, DEC-024DR, DEC-136, DEC-136D and the extraction wells (EW-01 through EW-06) using a Waterra Inertial Hydrolift pump with dedicated/disposable HDPE tubing and check valves, Whale 12 volt submersible pumps, and/or dedicated/disposable, 36 inch long 1-liter HDPE bailers. In total, approximately 304 gallons (3,803 lbs.) of DNAPL have been removed at the site through December 20, 2017 (Table 4). The quantity of DNAPL removed from wells has in some instances been estimated and/or calculated based upon a combination of the analytical data, visual appearance (e.g., appearance of an emulsion), and photoionization detector (PID) readings.

Well Surging/ Cumulative and Volume Recovered per Well

During November and December 2017, well surging and subsequent surfactant/DNAPL recovery took place at wells DEC-092D, DEC-136D, DEC-136, EW-02, EW-03, EW-04, EW-05, and EW-06. Surging was performed using a Whale 12 volt submersible pump with dedicated disposable HDPE tubing to induce a hydraulic gradient to the wells and promote DNAPL accumulation. The purge water removed from all wells had visible DNAPL, sheens, occasional blebs of product and/or emulsions, and also exhibited concentrated levels of VOCs as indicated by analytical data and elevated PID readings. Total groundwater/emulsion purge volumes were approximately: 95 gallons from DEC-092D; 30 gallons removed from DEC-136D; 137.5 gallons from DEC-136; 347.5 gallons removed from EW-02; 61 gallons from EW-03; 157 gallons from EW-04; 116.5 gallons from EW-05; and 63 gallons from EW-06 (see Table 2).

Waste Disposal

All recovered DNAPL and related waste generated from the SI pilot study and DNAPL recovery activities were containerized in Department of Transportation (DOT) approved 55-gallon drums and picked up by Island Pump & Tank Corp. of East Northport, NY (IP&T) for off-site disposal at a permitted facility. Copies of the hazardous waste manifests are provided in Appendix F.

RECOMMENDATIONS

DNAPL monitoring and removal activities should continue in 2018. Continued mass removal in the source area will have lasting positive impacts on the horizontal and vertical extent of the dissolved phase chlorinated groundwater plume. It is anticipated that with continued mass removal, the overall extent of the dissolved phase chlorinated groundwater plume will decrease in concentration and eventually diminish in extent. Information from the SI Pilot Study should be incorporated into the Feasibility Study for this Site.

Closing

We appreciate working with the Department on this challenging project. Please contact me at 716-856-5636 if you have any questions or comments.

Sincerely,

URS Corporation – New York

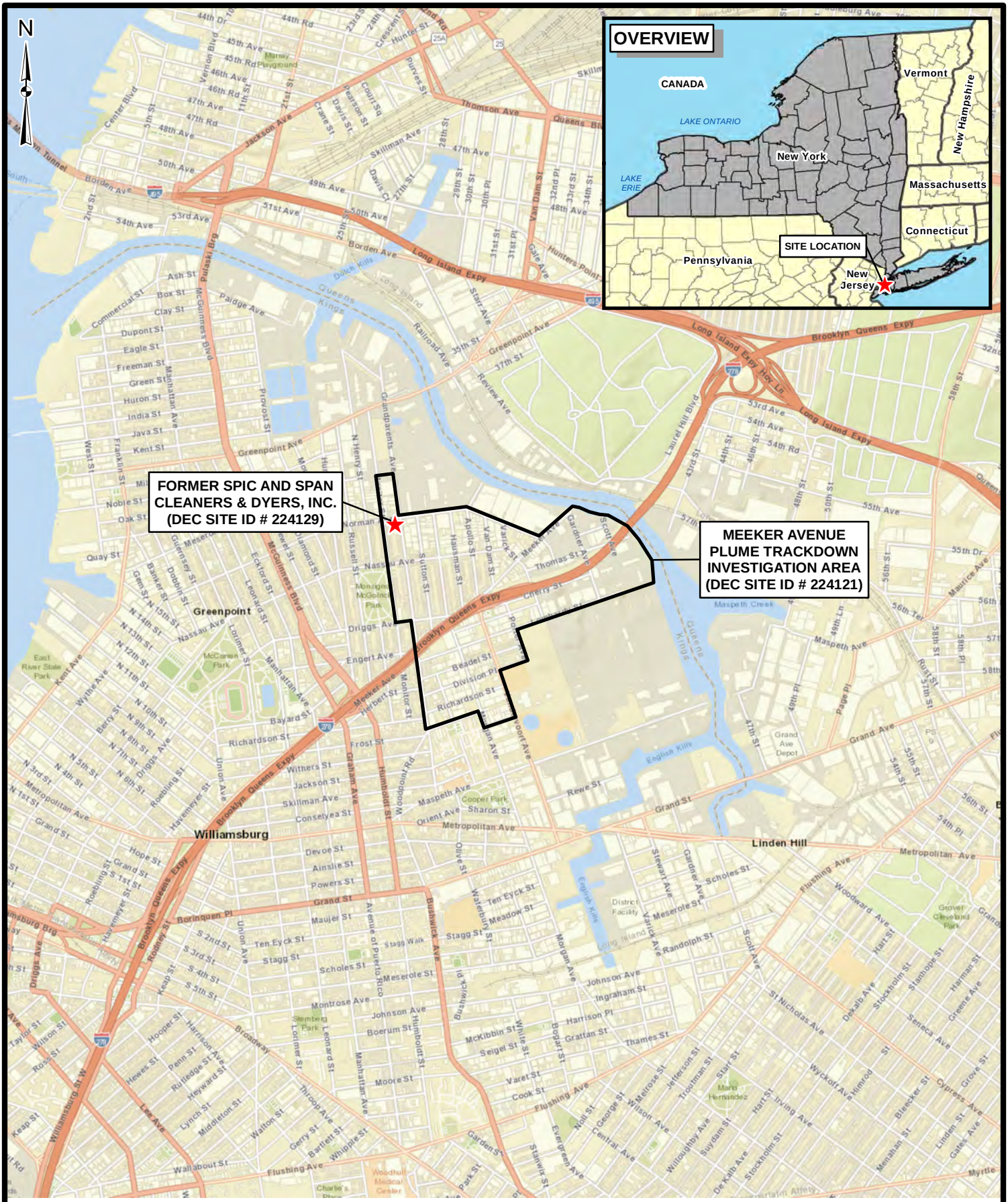
Michael Gutmann, PG
Project Manager

cc: File: 60429463 (R-1)
George Kisluk URS

Enc. Figure 1 - Site Location
Figure 2 - Pilot Study Well Locations

Table 1 - Surfactant Injection Pilot Study Summary
Table 2 - Surfactant Injection Pilot Study – Recovery Summary
Table 3 - Groundwater Analytical Results – Surfactant Enhanced Recovery Pilot Study
Table 4 - Summary of DNAPL Recovery By Well Location
Appendix A - Field Notes & Photos
Appendix B - SI Pilot Study Work Plan
Appendix C - Boring Logs and Well Construction Diagrams
Appendix D - Falling Head Hydraulic Conductivity Tests
Appendix E - Tetrachloroethene Concentration Graphs
Appendix F - Waste Disposal Documents

FIGURES

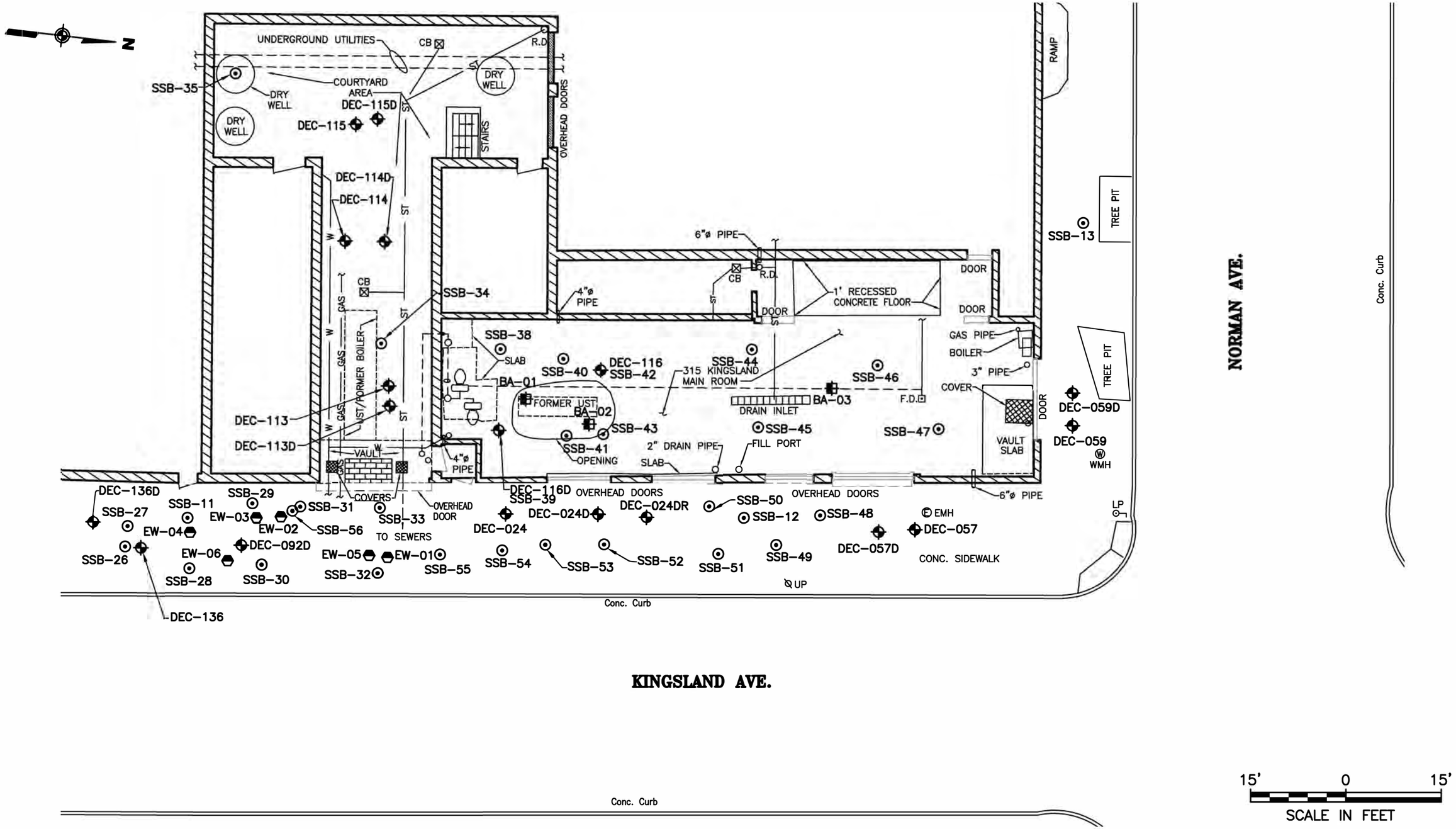


Source: ESRI World Street Map

2,000 0 2,000 Feet

URS	FORMER SPIC & SPAN CLEANERS & DYERS, INC. SITE SURFACTANT ENHANCED DNAPL RECOVERY PILOT TEST SITE LOCATION	FIGURE 1

J:\Projects\11174989.00000\DB\GIS\SpicSpan-ReportPilot Test\01 Site Location.mxd 2/1/2018



LEGEND:

CB	CATCH BASIN	GAS	NATURAL GAS LINE
R.D.	ROOF DRAIN	W	WATER LINE
F.D.	FLOOR DRAIN	ST	STORM SEWER
UST	UNDERGROUND STORAGE TANK		UNKNOWN UNDERGROUND UTILITIES

SSB-40	SOIL BORING
DEC-116	NYSDEC MONITORING WELL
EW-01	NYSDEC EXTRACTION WELL
BA-01	BUCKET AUGER BORING

FORMER SPIC AND SPAN CLEANERS SITE MONITORING WELL AND SOIL BORING LOCATIONS

URS

FIGURE 2

J:\Projects\11176390\CAD\KINGLAND AVE\UST REPORT\JAN 2017\FIGURE 2.dwg 1/23/17 - 2 RAL

TABLES

TABLE 1
SURFACTANT INJECTION PILOT STUDY SUMMARY
FORMER SPIC AND SPAN CLEANERS & DYERS, INC. SITE

WELL LOCATION	DAY 1 (10/30/17)			DAY 2 (10/31/17)			DAY 3 (11/1/17)					DAY 4 (11/2/17)					DAY 5 (11/3/17)		
	INITIAL DNAPL OBSERVATION/ RECOVERY	BASELINE SAMPLING FOR 8260C VOC ANALYSIS	SURFACTANT SOLUTION INJECTED* (gallons)	INITIAL DNAPL OBSERVATION/ RECOVERY	SURFACTANT SOLUTION INJECTED* (gallons)	FLUID REMOVAL (gallons)	INITIAL DNAPL OBSERVATION/ RECOVERY	SURFACTANT SOLUTION INJECTED (gallons)	FLUID REMOVAL (gallons)	END OF DAY DNAPL OBSERVATION/ RECOVERY	SAMPLED FOR 8260C VOC ANALYSIS	INITIAL DNAPL OBSERVATION/ RECOVERY	SURFACTANT SOLUTION INJECTED (gallons)	FLUID REMOVAL (gallons)	END OF DAY DNAPL OBSERVATION/ RECOVERY	SAMPLED FOR 8260C VOC ANALYSIS	INITIAL DNAPL OBSERVATION/ RECOVERY	FLUID REMOVAL (gallons)	SAMPLED FOR 8260C VOC ANALYSIS
DEC-136D	ND			ND			ND			ND		ND							
DEC-136	Trace	X	12	ND	12.5	15	ND		3.5	ND	X	ND	21	3			ND	3	X
EW-01	~1" / NA			ND			ND			ND		ND							
EW-02	3.85' / 0.25 L			ND			ND **/ 0.56 L			ND		ND**/ 0.28 L		1					
EW-03	ND		13	ND	90.5	4	ND	100		ND		ND	114	4		X	ND	5	X
EW-04	ND	X	33	ND	41.5	4.5	ND	100		ND		ND	91	4			ND	5	X
EW-05	ND			ND		20	ND		10.5	ND	X	ND		24		X	ND	5	
EW-06	ND	X	42	ND	55.5	5	ND		15	ND	X (2)	ND	74				ND	4	X
DEC-092D	ND			ND			ND			ND		ND							
DEC-024	ND			ND			trace			ND		ND							
DEC-024D	ND			ND			ND			ND		ND							
DEC-024DR	~1" / NA			ND			ND			ND		ND							

NOTES

ND = None Detected
NA = Not Attempted
L = liters

*Pumping rate into wells estimated at 1 to 2 gallons per minute (GPM).
**No DNAPL detected with interface probe. DNAPL was observed and recovered with a bailer.
Samples for VOCs were collected with hydrolift pump or bailer; wells were not purged. Objective of samples was to determine amount of surfactant enhanced DNAPL recovered
A sample of the surfactant solution was also collected for 8260C VOC analysis on 11/2/17.

TABLE 2
SURFACTANT INJECTION PILOT STUDY - RECOVERY SUMMARY
FORMER SPIC AND SPAN CLEANERS & DYERS, INC. SITE

WELL LOCATION	TOTAL SURFACTANT SOLUTION INJECTED INTO WELL (gallons)*	DAILY FLUID REMOVAL (gallons)										TOTAL FLUID REMOVED FROM WELL (gallons)
		10/31/2017	**11/1/2017**	**11/2/2017**	**11/3/2017**	**11/8/2017**	**11/9/2017**	**11/10/2017**	**11/14/2017**	**11/15/2017**	**12/20/2017**	
DEC-136D	0						30					30
DEC-136	45.5	15	3.5	3	3	9	30	12.5	14	31.5	16	137.5
EW-02	0			1		110	55	57	57	57	10.5	347.5
EW-03	317.5	4		4	5	9	11.5	7.5	1	9.5	9.5	61
EW-04	265.5	4.5		4	5	5	22.5	20.5	27.5	48.5	19.5	157
EW-05	0	20	10.5	24	5	13	24	16.5	3.5			116.5
EW-06	171.5	5	15		4	11	5	3	1	7.5	11.5	63
DEC-092D	0						95					95
	DAILY TOTALS	48.5	29	36	22	157	273	117	104	154	67	1007.5 **GRAND TOTAL REMOVED (gallons)**

*800 gallons total surfactant mixture injected

Blanks indicate no fluid removed

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
SURFACTANT ENHANCED RECOVERY PILOT STUDY
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

Location ID			DEC-092D	DEC-092D	DEC-092D	DEC-092D	DEC-092D
Sample ID			DEC-092D	03042013-FD-2	DEC-092D	DEC-092D	DEC-092D
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			08/06/12	03/04/13	03/04/13	03/04/13	07/16/14
Parameter	**Units**	**Criteria***		Field Duplicate (1-1)		Field Replicate (1-1)	
Volatile Organic Compounds							
1,1,1-Trichloroethane	UG/L	5	2.0				
1,1-Dichloroethane	UG/L	5	0.76				
1,1-Dichloroethene	UG/L	5	1.2				
1,2,4-Trichlorobenzene	UG/L	5	4.0				
1,2-Dichlorobenzene	UG/L	3					
1,2-Dichloroethene (cis)	UG/L	5	9.5				4
1,2-Dichloroethene (trans)	UG/L	5					
1,4-Dichlorobenzene	UG/L	3					
Acetone	UG/L	50					
Benzene	UG/L	1	1.8				
Bromodichloromethane	UG/L	50					
Chlorobenzene	UG/L	5					
Chloroform	UG/L	7					
Ethylbenzene	UG/L	5					
Methyl ethyl ketone (2-Butanone)	UG/L	50					
Methyl tert-butyl ether	UG/L	10	1.1				1
Methylcyclohexane	UG/L	-				NA	
Methylene chloride	UG/L	5					
Tetrachloroethene	UG/L	5	49,000	5,300	5,400	4,100	1,400
Toluene	UG/L	5	1.1				
Trichloroethene	UG/L	5	90				30
Vinyl chloride	UG/L	2	2.9				3
Xylene (total)	UG/L	5					

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, including April 2000 and June 2004 Addenda, Class GA.

Concentration Exceeds Criteria

Blank cell - Not Detected. NA - Not analyzed.

Only Detected Results Reported.

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
SURFACTANT ENHANCED RECOVERY PILOT STUDY
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

Location ID			DEC-092D	DEC-136	DEC-136	DEC-136	DEC-136
Sample ID			DEC-092D-WG	DEC-136	DEC-136	DEC-136	DEC-136-WG
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/09/17	10/30/17	11/01/17	11/03/17	11/09/17
Parameter	**Units**	**Criteria***					
Volatile Organic Compounds							
1,1,1-Trichloroethane	UG/L	5					
1,1-Dichloroethane	UG/L	5					
1,1-Dichloroethene	UG/L	5					
1,2,4-Trichlorobenzene	UG/L	5					
1,2-Dichlorobenzene	UG/L	3					
1,2-Dichloroethene (cis)	UG/L	5					
1,2-Dichloroethene (trans)	UG/L	5					
1,4-Dichlorobenzene	UG/L	3					
Acetone	UG/L	50					
Benzene	UG/L	1					
Bromodichloromethane	UG/L	50					
Chlorobenzene	UG/L	5					
Chloroform	UG/L	7					
Ethylbenzene	UG/L	5					
Methyl ethyl ketone (2-Butanone)	UG/L	50					
Methyl tert-butyl ether	UG/L	10					
Methylcyclohexane	UG/L	-					
Methylene chloride	UG/L	5					
Tetrachloroethene	UG/L	5	40,000	290,000	7,700,000	3,500,000	210,000
Toluene	UG/L	5					
Trichloroethene	UG/L	5					
Vinyl chloride	UG/L	2					
Xylene (total)	UG/L	5					

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, including April 2000 and June 2004 Addenda, Class GA.

Concentration Exceeds Criteria

Blank cell - Not Detected. NA - Not analyzed.

Only Detected Results Reported.

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
SURFACTANT ENHANCED RECOVERY PILOT STUDY
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

Location ID			DEC-136	DEC-136D	DEC-136D	EW-01	EW-02
Sample ID			DEC-136-WG	DEC-136D	DEC-136D-WG	EW-01	EW-02
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/15/17	02/25/15	11/09/17	02/26/15	02/25/15
Parameter	**Units**	**Criteria***					
Volatile Organic Compounds							
1,1,1-Trichloroethane	UG/L	5				6	9
1,1-Dichloroethane	UG/L	5				9	3
1,1-Dichloroethene	UG/L	5				21	6
1,2,4-Trichlorobenzene	UG/L	5				6	7
1,2-Dichlorobenzene	UG/L	3				3	1
1,2-Dichloroethene (cis)	UG/L	5		8	10	230	39
1,2-Dichloroethene (trans)	UG/L	5				4	
1,4-Dichlorobenzene	UG/L	3				1	1
Acetone	UG/L	50					
Benzene	UG/L	1					
Bromodichloromethane	UG/L	50				2	
Chlorobenzene	UG/L	5				4	2
Chloroform	UG/L	7				3	2
Ethylbenzene	UG/L	5				2	1
Methyl ethyl ketone (2-Butanone)	UG/L	50					
Methyl tert-butyl ether	UG/L	10		1			
Methylcyclohexane	UG/L	-				1	
Methylene chloride	UG/L	5			4.6	1	
Tetrachloroethene	UG/L	5	260,000	41	680	97,000	78,000
Toluene	UG/L	5				12	4
Trichloroethene	UG/L	5		13	4.6	1,200	460
Vinyl chloride	UG/L	2		3		13	1
Xylene (total)	UG/L	5				6.3	1.7

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, including April 2000 and June 2004 Addenda, Class GA.

Concentration Exceeds Criteria

Blank cell - Not Detected. NA - Not analyzed.

Only Detected Results Reported.

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
SURFACTANT ENHANCED RECOVERY PILOT STUDY
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

Location ID			EW-02	EW-03	EW-03	EW-03	EW-03
Sample ID			EW-02-WG	DUP-09	EW-03	EW-03	EW-03
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/09/17	02/16/17	02/16/17	11/02/17	11/03/17
Parameter	**Units**	**Criteria***		Field Duplicate (1-1)			
Volatile Organic Compounds							
1,1,1-Trichloroethane	UG/L	5					
1,1-Dichloroethane	UG/L	5					
1,1-Dichloroethene	UG/L	5					
1,2,4-Trichlorobenzene	UG/L	5					
1,2-Dichlorobenzene	UG/L	3					
1,2-Dichloroethene (cis)	UG/L	5		2,000	1,900		
1,2-Dichloroethene (trans)	UG/L	5					
1,4-Dichlorobenzene	UG/L	3					
Acetone	UG/L	50					
Benzene	UG/L	1					
Bromodichloromethane	UG/L	50					
Chlorobenzene	UG/L	5					
Chloroform	UG/L	7					
Ethylbenzene	UG/L	5					
Methyl ethyl ketone (2-Butanone)	UG/L	50					
Methyl tert-butyl ether	UG/L	10					
Methylcyclohexane	UG/L	-					
Methylene chloride	UG/L	5				2,300	
Tetrachloroethene	UG/L	5	420,000	100,000	110,000	73,000	100,000
Toluene	UG/L	5					
Trichloroethene	UG/L	5		4,200	3,900		
Vinyl chloride	UG/L	2					
Xylene (total)	UG/L	5					

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, including April 2000 and June 2004 Addenda, Class GA.

Concentration Exceeds Criteria

Blank cell - Not Detected. NA - Not analyzed.

Only Detected Results Reported.

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
SURFACTANT ENHANCED RECOVERY PILOT STUDY
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

Location ID			EW-03	EW-03	EW-04	EW-04	EW-04
Sample ID			EW-03-WG	EW-03-WG	EW-04	EW-04	EW-04
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/09/17	11/15/17	02/16/17	10/30/17	11/03/17
Parameter	**Units**	**Criteria***					
Volatile Organic Compounds							
1,1,1-Trichloroethane	UG/L	5					
1,1-Dichloroethane	UG/L	5					
1,1-Dichloroethene	UG/L	5					
1,2,4-Trichlorobenzene	UG/L	5					
1,2-Dichlorobenzene	UG/L	3					
1,2-Dichloroethene (cis)	UG/L	5	440		2,600		
1,2-Dichloroethene (trans)	UG/L	5					
1,4-Dichlorobenzene	UG/L	3					
Acetone	UG/L	50	3,500				
Benzene	UG/L	1					
Bromodichloromethane	UG/L	50					
Chlorobenzene	UG/L	5					
Chloroform	UG/L	7					
Ethylbenzene	UG/L	5					
Methyl ethyl ketone (2-Butanone)	UG/L	50	620				
Methyl tert-butyl ether	UG/L	10					
Methylcyclohexane	UG/L	-					
Methylene chloride	UG/L	5	210				
Tetrachloroethene	UG/L	5	16,000	170,000	200,000	210,000	1,100,000
Toluene	UG/L	5					
Trichloroethene	UG/L	5	230	930	950		
Vinyl chloride	UG/L	2					
Xylene (total)	UG/L	5					

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, including April 2000 and June 2004 Addenda, Class GA.

Concentration Exceeds Criteria

Blank cell - Not Detected. NA - Not analyzed.

Only Detected Results Reported.

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
SURFACTANT ENHANCED RECOVERY PILOT STUDY
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

Location ID			EW-04	EW-04	EW-05	EW-05	EW-05
Sample ID			EW-04-WG	EW-04-WG	EW-05	EW-05	EW-05
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/09/17	11/15/17	02/16/17	11/01/17	11/02/17
Parameter	**Units**	**Criteria***					
Volatile Organic Compounds							
1,1,1-Trichloroethane	UG/L	5					
1,1-Dichloroethane	UG/L	5					
1,1-Dichloroethene	UG/L	5					
1,2,4-Trichlorobenzene	UG/L	5					
1,2-Dichlorobenzene	UG/L	3					
1,2-Dichloroethene (cis)	UG/L	5		2,300	44,000	17,000	19,000
1,2-Dichloroethene (trans)	UG/L	5			240		
1,4-Dichlorobenzene	UG/L	3					
Acetone	UG/L	50					
Benzene	UG/L	1					
Bromodichloromethane	UG/L	50					
Chlorobenzene	UG/L	5					
Chloroform	UG/L	7					
Ethylbenzene	UG/L	5					
Methyl ethyl ketone (2-Butanone)	UG/L	50					
Methyl tert-butyl ether	UG/L	10					
Methylcyclohexane	UG/L	-			180		
Methylene chloride	UG/L	5	4,400				
Tetrachloroethene	UG/L	5	300,000	61,000	27,000	31,000	30,000
Toluene	UG/L	5					
Trichloroethene	UG/L	5		1,600	10,000	23,000	23,000
Vinyl chloride	UG/L	2			130		
Xylene (total)	UG/L	5					

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, including April 2000 and June 2004 Addenda, Class GA.

Concentration Exceeds Criteria

Blank cell - Not Detected. NA - Not analyzed.

Only Detected Results Reported.

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
SURFACTANT ENHANCED RECOVERY PILOT STUDY
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

Location ID			EW-06	EW-06	EW-06	EW-06	EW-06
Sample ID			EW-06	EW-06	EW-06	EW-06 PI	EW-06
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			02/16/17	10/30/17	11/01/17	11/01/17	11/03/17
Parameter	**Units**	**Criteria***					
Volatile Organic Compounds							
1,1,1-Trichloroethane	UG/L	5					
1,1-Dichloroethane	UG/L	5					
1,1-Dichloroethene	UG/L	5					
1,2,4-Trichlorobenzene	UG/L	5					
1,2-Dichlorobenzene	UG/L	3					
1,2-Dichloroethene (cis)	UG/L	5	1,700				
1,2-Dichloroethene (trans)	UG/L	5					
1,4-Dichlorobenzene	UG/L	3					
Acetone	UG/L	50					
Benzene	UG/L	1					
Bromodichloromethane	UG/L	50					
Chlorobenzene	UG/L	5					
Chloroform	UG/L	7					
Ethylbenzene	UG/L	5					
Methyl ethyl ketone (2-Butanone)	UG/L	50					
Methyl tert-butyl ether	UG/L	10					
Methylcyclohexane	UG/L	-					
Methylene chloride	UG/L	5					
Tetrachloroethene	UG/L	5	60,000	130,000	100,000	180,000	82,000
Toluene	UG/L	5					
Trichloroethene	UG/L	5	1,400				
Vinyl chloride	UG/L	2					
Xylene (total)	UG/L	5					

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, including April 2000 and June 2004 Addenda, Class GA.

Concentration Exceeds Criteria

Blank cell - Not Detected. NA - Not analyzed.

Only Detected Results Reported.

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
SURFACTANT ENHANCED RECOVERY PILOT STUDY
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

Location ID			EW-06	EW-06
Sample ID			EW-06-WG	EW-06-WG
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			11/09/17	11/15/17
Parameter	**Units**	**Criteria***		
Volatile Organic Compounds				
1,1,1-Trichloroethane	UG/L	5		
1,1-Dichloroethane	UG/L	5		
1,1-Dichloroethene	UG/L	5		
1,2,4-Trichlorobenzene	UG/L	5		
1,2-Dichlorobenzene	UG/L	3		
1,2-Dichloroethene (cis)	UG/L	5	1,000	1,200
1,2-Dichloroethene (trans)	UG/L	5		
1,4-Dichlorobenzene	UG/L	3		
Acetone	UG/L	50	7,700	1,300
Benzene	UG/L	1		
Bromodichloromethane	UG/L	50		
Chlorobenzene	UG/L	5		
Chloroform	UG/L	7		
Ethylbenzene	UG/L	5		
Methyl ethyl ketone (2-Butanone)	UG/L	50		
Methyl tert-butyl ether	UG/L	10		
Methylcyclohexane	UG/L	-		
Methylene chloride	UG/L	5		
Tetrachloroethene	UG/L	5	7,400	22,000
Toluene	UG/L	5		
Trichloroethene	UG/L	5	360	590
Vinyl chloride	UG/L	2		
Xylene (total)	UG/L	5		

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, including April 2000 and June 2004 Addenda, Class GA.

Concentration Exceeds Criteria

Blank cell - Not Detected. NA - Not analyzed.

Only Detected Results Reported.

TABLE 4
SUMMARY OF DNAPL RECOVERY BY WELL LOCATION
FORMER SPIC AND SPAN CLEANERS AND DYERS SITE

Date	DEC-024	DEC-024D	DEC-024DR	DEC-092D	DEC-136	DEC-136D	EW-01	EW-02	EW-03	EW-04	EW-05	EW-06
6/4/2014	n/r	0.42	0.61	0.24	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
6/9/2014	n/r	0.85	1.00	0.29	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
6/11/2014	n/r	0.42	1.35	0.40	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
2/4/2015	n/r	n/r	n/r	n/r	0.35	n/r	n/r	n/r	n/r	n/r	n/r	n/r
2/5/2015	n/r	0.03	0.50	0.03	45.42	n/r	4.03	n/r	n/r	n/r	n/r	n/r
2/6/2015	n/r	n/r	n/r	n/r	34.07	n/r	n/r	18.93	n/r	n/r	n/r	n/r
3/23/2015	n/r	n/r	n/r	n/r	102.21	n/r	n/r	n/r	n/r	n/r	n/r	n/r
3/24/2015	n/r	n/r	n/r	n/r	90.85	n/r	n/r	n/r	n/r	n/r	n/r	n/r
3/25/2015	n/r	n/r	n/r	n/r	94.64	n/r	n/r	n/r	n/r	n/r	n/r	n/r
3/26/2015	n/r	n/r	n/r	n/r	140.06	n/r	n/r	n/r	n/r	n/r	n/r	n/r
3/27/2015	n/r	n/r	n/r	n/r	85.17	n/r	n/r	n/r	n/r	n/r	n/r	n/r
9/14/2015	n/r	n/r	0.14	n/r	trace	0.33	trace	trace	n/r	n/r	n/r	n/r
9/15/2015	n/r	0.08	0.33	0.33	39.75	trace	trace	n/r	n/r	n/r	n/r	n/r
9/16/2015	n/r	trace	1.00	0.89	82.33	0.83	trace	n/r	n/r	n/r	n/r	n/r
9/17/2015	n/r	trace	0.11	0.29	51.10	0.17	0.17	trace	n/r	n/r	n/r	n/r
9/18/2015	n/r	trace	0.11	trace	14.20	0.14	0.19	trace	n/r	n/r	n/r	n/r
9/22/2015	n/r	n/r	n/r	trace	54.89	trace	0.69	trace	n/r	n/r	n/r	n/r
9/23/2015	n/r	0.50	1.22	0.11	34.07	trace	trace	trace	n/r	n/r	n/r	n/r
9/24/2015	trace	trace	trace	0.50	34.07	0.11	trace	0.17	n/r	n/r	n/r	n/r
9/25/2015	trace	trace	trace	trace	11.36	trace	0.28	trace	n/r	n/r	n/r	n/r
9/28/2015	trace	trace	n/r	trace	n/r	trace	trace	trace	n/r	n/r	n/r	n/r
9/29/2015	0.17	trace	trace	trace	12.30	trace	trace	trace	n/r	n/r	n/r	n/r
9/30/2015	0.61	0.17	0.25	trace	15.14	trace	trace	trace	n/r	n/r	n/r	n/r
10/1/2015	trace	0.22	trace	trace	1.32	trace	trace	trace	n/r	n/r	n/r	n/r
10/2/2015	trace	trace	trace	trace	trace	trace	trace	trace	n/r	n/r	n/r	n/r
10/5/2015	trace	trace	trace	trace	n/r	trace	trace	trace	n/r	n/r	n/r	n/r
10/6/2015	trace	trace	trace	trace	11.36	trace	trace	trace	n/r	n/r	n/r	n/r
10/7/2015	0.22	trace	trace	0.17	1.89	trace	trace	trace	n/r	n/r	n/r	n/r
10/8/2015	trace	trace	trace	0.11	0.00	trace	trace	trace	n/r	n/r	n/r	n/r
10/9/2015	trace	trace	trace	trace	0.00	trace	trace	trace	n/r	n/r	n/r	n/r
10/12/2015	trace	trace	trace	trace	0.00	trace	trace	trace	n/r	n/r	n/r	n/r
10/13/2015	trace	trace	trace	trace	7.57	trace	trace	trace	n/r	n/r	n/r	n/r
10/14/2015	trace	trace	trace	trace	6.62	trace	trace	trace	n/r	n/r	n/r	n/r
10/15/2015	trace	trace	trace	trace	2.08	trace	trace	trace	n/r	n/r	n/r	n/r
10/16/2015	trace	trace	trace	trace	trace	trace	trace	trace	n/r	n/r	n/r	n/r
10/27/2015	trace	trace	trace	trace	trace	trace	trace	trace	n/r	n/r	n/r	n/r
10/28/2015	trace	0.03	trace	trace	trace	0.03	trace	trace	n/r	n/r	n/r	n/r
10/29/2015	trace	trace	trace	trace	trace	trace	trace	trace	n/r	n/r	n/r	n/r
10/30/2015	trace	trace	trace	trace	trace	trace	trace	trace	n/r	n/r	n/r	n/r
2/22/2016	trace	trace	trace	trace	2.90	0.06	trace	0.64	n/r	n/r	n/r	n/r
2/23/2016	trace	trace	0.03	trace	3.40	trace	trace	1.24	n/r	n/r	n/r	n/r
2/24/2016	trace	trace	trace	trace	0.03	trace	trace	0.03	n/r	n/r	n/r	n/r
4/26/2016	0.48	0.00	trace	trace	0.00	0.00	0.06	0.41	n/r	n/r	n/r	n/r
4/27/2016	trace	0.00	trace	trace	1.10	0.00	1.00	1.09	n/r	n/r	n/r	n/r
4/28/2016	trace	0.00	trace	trace	0.26	0.00	trace	1.00	n/r	n/r	n/r	n/r
11/15/2016	n/r	n/r	n/r	n/r	n/r	n/r	0.41	n/r	n/r	n/r	n/r	n/r
11/16/2016	n/r	n/r	n/r	n/r	0.10	trace	n/r	0.06	n/r	n/r	n/r	n/r
11/17/2016	0.17	trace	trace	0.11	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
11/18/2016	n/r	n/r	n/r	n/r	0.75	n/r	n/r	n/r	n/r	n/r	n/r	n/r
11/29/2016	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	5.50	n/r	n/r
11/30/2016	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	4.00	n/r	4.90	0.50
12/1/2016	n/r	n/r	n/r	n/r	trace	n/r	n/r	n/r	n/r	n/r	n/r	n/r
12/2/2016	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	3.20	n/r	n/r
1/13/2017	0.00	0.00	0.00	0.00	trace	0.00	trace	1.24	0.00	0.00	0.00	0.00
1/17/2017	0.00	0.20	0.62	trace	trace	trace	0.12	1.57	trace	trace	0.00	trace
1/18/2017	trace	trace	trace	n/r	trace	0.00	0.03	1.73	trace	0.75	0.20	trace

TABLE 4
SUMMARY OF DNAPL RECOVERY BY WELL LOCATION
FORMER SPIC AND SPAN CLEANERS AND DYERS SITE

Date	DEC-024	DEC-024D	DEC-024DR	DEC-092D	DEC-136	DEC-136D	EW-01	EW-02	EW-03	EW-04	EW-05	EW-06
1/19/2017	trace	trace	trace	n/r	trace	0.00	0.03	1.51	0.07	0.15	0.07	trace
3/21/2017	0.02	0.01	0.01	0.00	0.02	0.01	0.08	4.21	0.00	0.01	0.00	0.00
3/22/2017	0.08	0.03	0.03	0.00	0.00	0.00	1.50	1.82	0.00	0.03	0.00	0.00
3/23/2017	0.88	0.01	0.01	0.00	0.00	0.00	0.75	2.53	0.00	0.00	0.00	0.00
10/30/2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00
10/31/2017	0.00	0.00	0.00	0.00	9.63	0.00	0.00	0.00	0.26	0.50	0.00	0.09
11/1/2017	0.00	0.00	0.00	0.00	2.70	0.00	0.00	0.00	0.00	0.00	0.00	0.27
11/2/2017	0.00	0.00	0.00	0.00	2.31	0.00	0.00	0.00	0.04	0.44	0.00	0.00
11/3/2017	0.00	0.00	0.00	0.00	1.05	0.00	0.00	0.00	0.05	0.55	0.00	0.07
11/8/2017	n/r	n/r	n/r	0.00	0.00	0.00	0.00	12.52	0.01	0.15	0.00	0.01
11/9/2017	n/r	n/r	n/r	0.00	0.63	0.00	0.00	10.21	0.02	0.68	0.00	0.00
11/10/2017	n/r	n/r	n/r	0.00	0.26	0.00	0.00	10.29	0.01	0.62	0.00	0.00
11/14/2017	n/r	n/r	n/r	0.00	0.36	0.00	0.00	10.29	0.02	0.17	0.00	0.00
11/15/2017	n/r	n/r	n/r	0.00	0.82	0.00	0.00	10.29	0.16	0.30	0.00	0.02
12/20/2017	n/r	n/r	n/r	0.00	0.42	0.00	0.00	6.40	0.16	0.33	0.00	0.03
Total DNAPL Recovery (L)	**2.63**	**2.96**	**7.32**	**3.47**	**999.55**	**1.68**	**9.34**	**98.46**	**4.80**	**13.36**	**5.17**	**0.99**
Total DNAPL Recovery (gallons)	**0.69**	**0.78**	**1.94**	**0.92**	**264.43**	**0.44**	**2.47**	**26.05**	**1.27**	**3.53**	**1.37**	**0.26**

Total DNAPL Recovery to Date(gallons)	**304.16**
Total DNAPL Recovery to Date(lbs)	**3803.41**

APPENDIX A

FIELD NOTES AND PHOTOS

Wx.: Overcast, light rain, 48°F, windy

URS: Mike Gutmann, Steve Moeller, Sean Connelly ✓

Vehicles: Rental Ford Explorer, Gutmann's personal Ford F-150 pickup

NYSEC: Mike Haggerty

07:15 Get ice at gas station on Greenpoint, then go to Storage Plus to wait for them to open so we can offload gear from my truck and get other supplies for Surfactant Injection Pilot Test at Former Spic & Span Cleaners this week.

08:00 Storage Plus opened, we offload gear from my truck into storage area F392; also get supplies from storage area for tasks today.

08:40 Leave storage area for Spic & Span site. Mike Haggerty of NYSDEC on site.

08:45 Sean & I arrive on site, Islands Pump & Tank is delivering 2x#120 plastic drums ProBoost Activator 7 (H_2O_2 sol. 7%) and 2 plastic carboys of Ethical Chem E-Mulse 3 (about 3 gal. in each).

Continued on Page

Read and Understood By

A M T 10/30/17
Signed Date Signed Date

MONDAY

09:00 We do Tailgate Safety Meeting and THA form.

* MiniRae 300 PID (SN# R19236) - bump check w/ 100 ppm isobutylene in air - cal. gas reads 162.9 ppm (too high)
* Recalibrated MiniRae 3000 with 100 ppm isobutylene in air cal. gas → now reads 100.5 ppm on bump check.

SAMPLE: EW-06 (Grab with bailer from bottom)
TIME: 11:22
ANALYSIS: 2x40 ml. VOA vials, unpres., 8260C VOCs

SAMPLE: EW-04 (Grab with bailer from bottom)
TIME: 11:13
ANALYSIS: 2x40 ml. VOA vials (unpres.), 8260C VOCs

SAMPLE: DEC-136
TIME: 10:21
ANALYSIS: 2x40ml. VOA vials (unpres.), 8260C VOCs

* Placed all samples in a cooler on ice.

Continued on Page

Read and Understood By

[signature] 10/30/17
Signed Date

Signed Date

(All depths BTOR)

PROJECT former Spic & Span Cleaners

Notebook No. — 3

Continued from Page 2

Well	DEPTH TO WATER (or LNAPL)	~~DEPTH~~ ~~TO~~ Thickness of DNAPL	DEPTH TO BOTTOM	BAILER DNAPL Check
DEC-24DR	18.64' (no LNAPL)	~1"	53.58'	0.03 Liters
DEC-24R	19.18' (no LNAPL)	none detected	53.67'	0 —
DEC-24 (petroleum odor)	17.81 (no LNAPL	none detected	49.30'	0 —
EW-01	19.21	~ 1.0"	56.40	0.03 Liters
EW-05	19.21	none detected	27.49	0 —
EW-06	17.87	None	25.69	- Took 2 40mL vial samples
EW-04	15.72	NONE	26.92	- Took 2 40mL vial samples
DEC-13D	15.86	None TRACE	26.65	SL. PCE ODOR TRACE TO BOTTOM ~ 10.5 ft bg
~~EW-03~~ SPC		TOOK ENVIRO SAMPLER OUT OF BAILER SHEEN ON	2 40 ml VIALS WATER	TOOK 2 40ml vials SHEEN ON SAMPLER PCE odor
EW-03	16.73	None	25.79	No DNAPL, No Sheen PID: 5.0 PPM
DEC-09D	19.33	None	60.63	No DNAPL PID: 3.2 PPM

Continued on Page

Read and Understood By

Signed — Date 10/30/17 — Signed — Date

4
PROJECT Former SPLC & Spun Cleaners

Notebook No. — 40
Continued from Page 3

Well	Depth To Water	Depth To DNAPL	Depth To Bottom	Bailer DNAPL Check
EW-02	18.85	~~1.0'' SPL~~ 55.15	62.0	6" 1st Bail DNAPL 2" 2nd Bail DNAPL
				3rd Bail 1" DNAPL PPM = 2358
DEC - 136D	19.55	None	53.47	None

1240 HRS

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

10-30-17

* Mix a batch of surfactant injection solution in 100 gallon poly tank (12.5 gal. 7% H_2O_2 "ProBoost Activator 7"; 2.5 gal. E-Muse 3 citrus-based surfactant; 85 gal. water from Cobra Kitchen ventilation)

11:30 Started pumping injection solution into DEC-136 with 1 peristaltic pump. At 11:45 started a second peristaltic pump also pumping from 100 gal. poly tank into DEC-136. Level in well rose to the top of riser, we shut pumps off. Level in DEC-136 is going down very slowly → @ 12:33, level is only down to ~3' bgs.

About 12 gallons total pumped into DEC-136

12:15 In consultation with Mike Masserty (NYSDEC), we decide to move pump hoses to well EW-04 and to pump surfactant into that well. Water level in well came up to 14' bgs @ 12:21, 13' bgs @ 12:23, 4.5' bgs @ 12:42, 2' bgs @ 12:48, TOR @ 12:51. Shut down pump. 12:28 - 8 gal. into well; 12:39 - 15 gal. pumped into well (surfactant sol.).

About 21 gallons total pumped into EW-04

Tank started @ 88 gal. mark

12:54 Moved tubes to well EW-06 and started pumping surfactant Continued on Page into

(Tank started at 87 gallon

Read and Understood By

Signed

10-30-17

Date

Sig ed

Da

13:20 Pumped ~17 gallons into EW-06

13:36 Pumped ~27 gallons into EW-06

Had some problems with tubing being curled in tank and stopping flow

14:09 Water level in EW-06 came up to ~1.5' bgs (29 gallons left in tank; so 38 gallons pumped into EW-06 so far. We shut down one pump. Level in EW-06 is going down.

~40 gallons total pumped into EW-06

14:15 Move one pump hose into EW-03 (26 gallons left in tank; pumping into both EW-06 & EW-03 with single pump) and start pumping surfactant solution into EW-03.

14:19 Move hose from EW-06 (almost at TOR), to EW-04 again (~23 gallons left in tank). Sean will monitor fall in water level in EW-06. (he also did a falling head test in DEC-136).

Continued on Page

Read and Understood By

Signed — Date 10-30-17

Signed — Date

14:33 About 15 gallons left in tank, still pumping into EW-01 and EW-03.

14:55 Finished pumping 100 gallons surfactant into wells.

15:00 Closed wells for the day. Mike waits at site for Island Pump & Tank to pickup drum of baled water/waste from wells (~2 gallons) and 1 drum of H_2O_2 & 1 carboy of Citrus surfactant to take back to their shop and bring back out tomorrow.

15:10 Sean and I take stuff back to storage area and pickup supplies to sample at Lombardy St. (bladder pump & controller, Horiba U-52, etc.).

15:35 Sean & I head back to Spic & Span site to meet Mike & go to Lombardy site.

15:45 Island Tank & Pump could not show up today, so Mike & Mike stored the waste water drum in a courtyard on site and the Mike took surfactant & H_2O_2 back to storage area.

16:15 We leave storage area to go to Lombardy St. site.

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16:30 We arrive at Lombardy St. to sample well DEC-93DR with QED Micropurge Bladder Pump.

We can't get the compressor/controller unit to pressurize properly. Mike called Pine Environmental → they say we probably have an internal leak inside the unit. Mike calls Pine in Rochester to try to get a replacement.

Pine said they'll send out a replacement controller/compressor tomorrow.

17:10 We're done for the day here, we pack up.

17:40 Arrive back at storage plus unload gear. Head back to hotel.

18:05 Back to hotel.

S.M.

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Read and Understood By

S.M. 10-30-17
Signed Date Signed Date

Wx.: Overcast, 50°F

URS: Steve Moellers, Mike Gutmann, Sean Connelly

NYSDEC: Mike Haggerty; Aaron Fischer, Steve Welsh arrived 09:50

Vehicles: rental Ford Explorer, Gutmann's personal Ford F-150 pickup

07:00 Start notebook, will go to Gas Station to get ice for samples (collected yesterday) and then to Storage Plus to get equipment.

07:30 Storage Plus is opening. We load up equipment.

08:00 On site at Spic & Span cleaners site. We start to open wells and set up equipment. Had to do a lot of vehicle jockeying around because new tenants of 315 Kingsland wanted to park their vehicles in former Spic & Span Cleaners Bldg. Also vehicles parked along street blocking access

Do Tailgate Safety Meeting & THA review

* Island Pump & Tank delivered a 15 gallon plastic drum of 7.5% H_2O_2 and a 5 gallon carboy of Emulse 3 citrus surfactant.

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TUESDAY

Read and Understood By

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PROJECT 10/31/17 former Spec & Span Cleaners

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Well	Depth To Water	Depth To DNAPL	Depth To Bottom	Bailer DNAPL Check
DEC-B6D	19.53'	None Detected	54.70'	Not attempted (NA
DEC-136	15.17'	None Detected	24.85'	
EW-04	~~26.67'~~ SPC 16.08'	None Detected	26.87'	
EW-06	14.61'	None Detected	27.00'	
DEC-92D	19.32'	None Detected	61.32'	
EW-03	16.47'	None Detected	26.09'	
EW-02	18.85'	None Detected	63.22'	
DEC-024	19.18'	None Detected	29.57'	
DEC-024D	19.15'	None Detected	55.62'	
DEC-024DR	18.83'	None Detected	54.98'	√

0900 SET UP WATERRA ON EW-04 & PUMP → SOME SAND IN CHECK VALVE / HDPE 5/8 TUBING → PULLED TUBING & CLEAN SAND PUMPED @ ~ 3/4 GAL/MIN FOR ~ 10 MIN & WELL IS DRY ~ 4 GALLONS PID IN 40 ML VIAL @ 1780 PPM AFTER 2 MIN

09:58 RESTARTED WATERRA IN EW-04. WENT DRY AFTER ~0.5 GAL. PURGED. 1180 PPM

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Read and Understood By

PID on headspace purge water samples

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PROJECT Former Spic & Span Cleaners Site

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Well	Depth To Water	Depth To DNAPL	Depth To Bottom	Baseline DNAPL Check
EW-05	19.08	None Detected	27.72	N/A
EW-01	19.17	None Detected	59.12'	↓

09:50 Aaron Fischer & Steve Walsh (NYSDEC) arrive on site

09:30 Started pumping surfactant solution (100 gal. Batch (85 gal. H_2O; 12.5 gal. 7% H_2O_2; 2.5 gal. Emulse 3 citrus sol.) into well EW-06. Water level in well was 14.60' btor at start.

09:54 ~10 gallons surfactant pumped into EW-06. Water level is 5.75' btor.

09:58 WL in EW-06 at 5.00' btor.

10:01 WL in EW-06 at 4.00' btor, ~15 gal. surfactant pumped into well.

10:05 WL in EW-06 at 3.00' btor. ~17 gal. surfactant into well.

10:08 WL in EW-06 at 2.00' btor. ~20 gal. surf. into EW-06.

10:14 WL in EW-06 is about 1" btor, turn off pumps. About 23 gallons total surfactant pumped into EW-06

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10:10 Took PID reading (1 ppm) and Draeger PCE (5ppm) chip reading at top of purge water collection drum to gauge vapors. Not significant (also breezy in work zone today

10:15 Started pumping with waterra pump at DEC-136 (~3/4 gal/minute). Pumping rate throttled off to ~1.5 L/minute.

(10:23)

10:28 Pumping rate w/ Waterra in DEC-136 is down to a few hundred milliliters/minute.

10:17 Started pumping surfactant solution (7 gallons in tank start) into EW-04

10:19 WL in EW-04 is 24.44' btor.

10:21 WL in EW-04 is 23.00' btor.

10:22 WL in EW-04 is 21.00' btor

10:24 WL in EW-04 is 16.00' btor, about 5 gallons surfactant pumped into well.

10:27 WL in EW-04 is 12.00' btor, about 7 gallons surfactant pumped into well.

10:31 WL in EW-04 is 8.00' btor, about 9 gallons surfactant pumped into well.

10:37 WL in EW-04 is 4.00' btor, about 12 gallons surfactant pumped into well.

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10:30 Shut down westerra at DEC-136 (essentially dry) → well produced about 3-4 gallons total.

10:45 WL in EW-04 is 1.00' btor, about 17 gallons surfactant pumped into well.

10:50 WL in EW-04 is about 1" from tor, shut down pumps. 19 gallons surfactant total pumped into EW-04.

10:52 Moved hoses to well EW-03, initial WL in well was 16.47' btor.

Tank started out 58 gallons

11:12 WL in EW-03 is 12.00' btor, 8 gallons surfactant pumped in EW-03.

11:40 WL in EW-03 is 8.85' btor, 21 gallons surfactant pumped into EW-03.

11:53 WL in EW-03 is 7.00' btor, 28 gallons surfactant pumped into EW-03.

12:00 WL in EW-03 is 5.00' btor, 33 gallons of surfactant pumped into EW-03.

12:01 Mike moved one of the hoses back into EW-06 and started pumping surfactant into it also. (One hose still pumping into EW-03).

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12:20 Mike tried hand pumping w/ steam tubing/foot valve in DEC-136 → only got ~ 1 gallon before well went dry.

(135 ppm PID headspace in purge water drum at DEC-136.

NOTE Water level in EW-03 started to drop when we only went to 1 hose pumping surfactant into well.
6.23' btoc @ 12.25'

12:40 Completed pumping first 100 gallon batch of surfactant solution into into EW-03, -04, & -06. Mike goes to Cobra Kitchen Ventilation to refill water tank for 2nd 100 gallon batch of surfactant solution.

13:00 Start mixing 2nd 100 gallon batch of surfactant solution (85 gal. H_2O; 12.5 gal. 7% H_2O_2; 2.5 gal. Emulse 3

13:30 Start pumping surfactant solution into EW-06 and EW-03 again.

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INITIAL WL in EW-03 is ~9.95' bgs, WL in EW-06 is about 5' bgs.

13:40 WL in EW-06 is about 1" btor, we move hose to EW-04 (about 10 gallons had been pumped into EW-03 & EW-06). WL in EW-03 came up to 7' btor.

13:46 WL in EW-03 came up to 5' btor, ~12 gallons pumped into EW-03, -04, & 06 at this time.

14:00 WL in tank is down to ~77 gallons, currently pumping into EW-03 and EW-04

14:08 WL in EW-03 is at 3.0' btor. About 30 gallons pumped into wells to this point. WL in EW-04 is about 3" btor, move hose to DEC-136.

14:26 Level in tank is ~58 gallons (42 gallons pumped). WL in EW-03 is a little below 2' btor. WL in DEC-136 is probably > 15' bgs.

14:30 Steve [redacted] Walsh and Aaron Fischer (NYSDEC) left site for the day.

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AM. M 10-31-17
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14:35 WL in DEC-136 came up to 6.7' btor. WL in EW-03 is 2.05' btor. About 50 gallons of surfactant pumped to this point.

14:40 WL in DEC-136 came up to top of riser, move hose back to EW-04.

14:50 Island Pump & Tank arrived on site to pick up drums (2) of purge water for disposal.

14:55 About 60 gallons of surfactant batch have been pumped into the wells.

15:05 WL in EW-04 is at top of riser, move the hose to EW-06. About 30 gallons of surfactant left to pump.

15:20 WL in EW-03 came up to 1' bgs, about 20 gallons of surfactant left to pump into wells.

15:35 About 10 gallons surfactant left to pump.

16:00 Finished pumping 2nd 100 gallon batch of surfactant into wells. We secure site wells for the day and prep to exchange equipment at storage area.

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Read and Understood By

M. [illegible] 10-31-17

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16:45 Head from storage area to Lombardy St. side to sample well DEC-93DR with QED Micropurge bladder pump, Horiba U-52 multimeter w/ flow cell, Lamotte 2020 turbidimeter (all Pine rentals) and new rental MP50 controller compressor unit from Eco-rental Solutions

19:15 Left Lombardy St. side (finishes connecting samplers at DEC-93DR). Return to hotel for the evening.

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Read and Understood By

M. M. Signed 10-31-17 Date _____ Signed _____ Date

Wx.: Overcast, 46°F, calm; slight breeze around 09:30

URS: Mike Gustmann, Steve Moeller, Sean Connelly

Vehicles: Rental Ford Explorer, Gustmann's personal Ford F-150 pick up

07:00 Left hotel to get ice at gas station.

07:30 Went to Storage Plus to get equipment.

08:00 On site at Spic & Span Cleaners SA.

* Ireland Pump & Tank delivers 2 x 15 gal. plastic drums H_2O_2 and 1 x 5 gal. carboy Emulse 3 citrus surfactant. Gustmann gets H_2O into poly tank at Cobra Kitchen Ventilation.

(DO Tailgate Safety Meeting & THA review)

08:30 Start mixing 1st batch of surfactant solution. Sean does round of water levels and DNAPL checks.

08:45 At EW-06, initial DTW is 14.70' btor. We use bailer to collect an initial sample from bottom of well EW-06.

(GRAB) * SAMPLE: EW-06 TIME: 08:45
1 x 40 ml. VOA vial (unpreserved)

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Read and Understood By:

WEDNESDAY

Signed — 11/1/17 Date

Signed — Date

DESC: Turbid, brown, sudsy, hard to get bubbles out

09:00 Started waterra pump in EW-06, appears to be DNAPL in purge drum, Mike collects another grab from end of waterra hose. (Pump In. Vial = PI)

PID reading on purge water was 170 ppm

* SAMPLE I.D.: EW-06 PI Time: 09:00
Desc.: same as previous sample on pg. 18
1 x 40 ml. VOA vial (unpres.)

09:09 Start pumping first 100 gallon surfactant mix into EW-03 and EW-04 (85 gallons H_2O; 12.5 gal. H_2O_2; 1 gal. Emulse 3 citrus solvent).

09:30 Have pumped about 20 gallons of surfactant into EW-03 and EW-04, WLs in both wells are still deep. Can see sudsy bubbles in bottom of EW-03.

Initial water levels:

No DNAPL detected

- EW-03 → 16.40' btoc 09:07
- EW-04 → 15.41' btoc 09:08
- EW-06 → 14.70' btoc 08:45

09:50 About 67 gallons surfactant sol. left in poly tank. WL in EW-04 is about 5' btoc, WL in EW-03 is still ~8' btoc.

10:15 About 48 gallons left in poly tank (52 total gallons pumped into EW-03 and EW-04).

* ~~Bump check on MiniRae 3000 PID (S/N: R19236)~~ was 95.6 ppm (with 100 ppm isobutylene in air cal. gas)

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Date

10:32 About 35 gallons of surfactant left in poly tank. WLs in EW-03 and EW-04 still at reasonable levels (like @ 09:50).

10:53 Courier from Hampton-Clarke came to pickup sampler from Lombardy St. well DEC-93DR (and MS/MSD) collected yesterday (see pg. 17).

11:00 About 17 gallons left in poly tank (83 gallons pumped into EW-03 and EW-04). WLs in both wells still at about 5' btor.

11:30 We've completed pumping the 1st 100 gallon batch of surfactant solution into wells EW-03 and EW-04. Mike goes to fill water in poly tank for second batch.

Could see bubbling at top of screen in EW-04

Suds at top of screen in EW-03

11:40 Start mixing second batch of surfactant solution (85 gal. H_2O; 12.5 gal. H_2O_2; 1 gallon Emulse 3 citrus surfactant).

11:50 Start pumping 2nd 100 gallon batch surfactant solution into wells EW-03 and EW-04. WLs in both wells started at about top of screens (I could see slots downhole).

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12:11 About 83 gallons surfactant solution mix left in poly tank (17 gallons pumped into EW-03 and EW-04).

12:30 Drager CMS readings over purge water drum:
PCE = <5 ppm
TCE = <5 ppm
VC = <0.3 ppm
up to 19 ppm on PID

Sheen/product apparent in turbid brown purge water (citrus odor)

12:45 About 60 gallons of surfactant left in poly tank (40 gallons pumped). WL about 5'-6' btoc in EW-03 and 8'-9' btoc in EW-04.

* Sample: EW-05 (grab sample from waterra tubing w/ foot valve - well bottom
Time: 13:00
1 x 40 mL VOA vial, unpreserved for 8260C VOCs
Desc.: fairly clear, slight yellowish tint

13:02 About 48 gallons of surfactant solution left in poly tank. WLs in EW-03 & EW-04 about the same as 12:45.

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* SAMPLE: DEC-136
TIME: 13:15
DESC: grab from bottom of well DEC-136 with bailer (PID reading on top of bailer was 380 ppm; Mike said it smelled like PCE; sample was turbid yellowish-brown with some soapy ~~foaming~~ at top of VOA vial)

1 x 40 mL glass VOA vial (unpres.) for 8260C VOC analysis

13:26 About 32 gallons left in poly tank (68 gallons of surfactant solution pumped into wells EW-03 and EW-04). WLs in wells about the same as at 12:45.

13:30 Mike & Sean used waterra tubing & foot valve to purge ~2.5 gallons out of DEC-136 (380 ppm headspace on bucket) before it went dry. Turbid yellowish-brown liquid with foamy white head on top.

13:48 About 18 gallons left in poly tank (82 gallons pumped into EW-03 & EW-04). WLs in both wells ~6-7' bgs.

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Read and Understood By

M. [illegible] 11-1-17
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Lombardy St./

PROJECT former Spic & Span Cleaners

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(by hand)

13:50 * Sean purged about another gallon from well DEC-136 with tubing & foot valve. (2795 ppm PID on bucket headspace)

14:11 Completed injection of 2nd 100 gallon batch of surfactant solution into EW-03 and EW-04.

15:00 Left Spic & Span site for Storage Plus to exchange equipment for Lombardy St. sampling

15:30 Left Storage Plus, got ice at gas station.

15:45 Arrived at Lombardy St. site to sample well DEC-93R.

* Test America came and picked up sample cooler from Mike Gutmann (all Spic & Span VOC samples collected since 10/30/17 → 11/1/17)

* Mike Maggerty (NYSDEC) was on site at Spic & Span site from ~13:30-14:50.

SAMPLE: DEC-093R & DEC-093R DUP
TIME: 16:45
3 x 40 ml. glass vial (HCl preserved) for sample & duplicate

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17:00 Move sampling gear about 100' west to well MW-30DR to sample it (adjacent well MW-30R was dry).

18:00 Collect sample at MW-30DR 3x40 mL VOA vials for 8260C VOC analyses

18:20 Leave Lombardy St. site to return to hotel.

18:40 Back at hotel.

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Read and Understood By

M. M. 11/1/17
Signed Date

Signed Date

Wx.: Overcast, 63°F, humid, calm

URS: Steve Mueller, Mike Gutmann, Sean Connelly

Vehicles: Rental Ford Explorer, Gutmann's personal F-150 pickup

07:00 Leave hotel, get gas for Explorer, buy 2 bags of ice to cool samples.

07:15 Go to storage area to get equipment.

08:00 Storage area did not open until exactly 08:00 today.

08:25 Arrive on site at former Spic & Span Cleaners site. Mike went to get drums (empty). Island Pump & Tank delivered three 15-gallon drums of 7% H_2O_2. We start opening well lids and setting up work zone. We do a Tailgate Safety Meeting & review THA.

09:00 Start mixing 1st 100 gallon batch of surfactant solution (8.5 gal. H_2O; 12.5 gal. H_2O_2; 1 gallon Emulse 3 citrus surfactant).

09:18 1st Batch of surfactant ready to inject.

EW-04: 15.30' btor initial (09:20); no DNAPL

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09:24 Starting injecting surfactant solution into well DEC-136 and EW-04.

* EW-06: 19.00' btor initial (09:27); no DNAPL detected

09:28 Start injecting surfactant solution into EW-06 (Eco-rental Solutions delivered another Peristaltic Pump to site, we now have 3 total on site).

* EW-03: 16.58' btor initial (09:28); no DNAPL detected

09:43 About 78 gallons surfactant left in poly tank (22 gallons pumped into DEC-136, EW-04, & EW-06).

NOTE Sean has been hand purging with tubing and foot valve from DEC-136, EW-04, and EW-03 (prior to surfactant injections). About 10 gallons total removed

10:01 DEC-136 → WL has risen to top of riser. Shut pump down (maybe 15 gallons pumped into DEC-136)

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10:03 Moved hose from DEC-136 → EW-04 (2 hoses in this well now). WLs in EW-04 & EW-06 are still >10' btor.

10:12 About 50 gallons left in poly tank (50 gallons pumped into DEC-136, EW-04, & EW-06).

* EW-03: 22.67' btor (10:14); no DNAPL detected.

10:19 WLs in EW-04 & EW-06 at about 8' btor; WL in DEC-136 at about 2' btor.

* EW-05: 19.00' btor initial (10:24); no DNAPL detected. Sean purged about 5 gallons from EW-05 with tubing & foot valve before it went dry.

SAMPLE: EW-03 grab sample from bottom of well with tubing & foot valve
TIME: 10:48
2 x 40ml. glass vial, unpres. for 8260C VOC analysis
probable bubbles in sample vial
DESC: Turbid brown liquid with white foamy bubbles at top

10:41 EW-04 WL came up to top of riser, shut down one of the hoses going into this well. It's WL is dropping with only 1 hose pumping into it. Mike moved the second hose to EW-06.

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Read and Understood By

M. [signature] 11-2-17
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10:45 About 18 gallons of surfactant solution left in poly tank to pump into EW-04 & EW-06.

11:00 Completed pumping 1st 100 gallon batch of surfactant solution into wells DEC-136, EW-04, and EW-06. Start mixing 2nd 100 gallon batch of surfactant solution (85 gal. H_2O; 12.5 gal. H_2O_2; 1 gallon Emulse 3 citrus surfactant)

11:09 * Sean recovered about 8 inches of dark brown DNAPL with bailer from EW-02. Also got another 2 inches.

11:20 2nd BATCH (100 gallon) of surfactant solution is mixed, start injecting it into: 1 hose into EW-04 and 2 hoses into EW-06. WLs in both wells >10' btor.

11:30 WL in EW-06 rose to top of riser, shut off pumps to EW-06.

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Read and Understood By

AM 11-2-17
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Moved the 2 hoses from EW-06 to EW-03.

11:45 About 60 gallons surfactant solution left in poly tank. Pumping into EW-03 (2 hoses) and EW-04 (1 hose). WL at about 7' btor in EW-04 & ~9' btor in EW-03. WL in EW-06 has dropped down to ~7'-8' btor.

11:56 About 40 gallons surfactant solution left in poly tank (60 gallons pumped into EW-03 and EW-04). WLs in both wells ~5' btor. WL in DSC-136 is about 8' btor (I can see bubbling at top of screen).

12:17 About 25 gallons surfactant solution remaining in poly tank. WL in EW-03 is ~5' btor, WL in EW-04 is ~3' btor.

12:46 2nd batch surfactant solution injection completed. Start mixing 3rd batch (BATCH #8) (85 gal. H_2O; 12.5 gallons 7% H_2O_2; 1 gallon Emulse 3 citrus surfactant).

Sample of surfactant solution to go to lab from this final batch (#8)

SAMPLE I.D.: SURF MIX-8
TIME: 13:13

Clear liquid, some entrained air bubbles due to surfactant

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Read and Understood By

3x40 mL glass vials, unpres.; instructions to call George Kisluk for analytical instructions

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13:05 Start pumping final batch of surfactant solution into wells EW-06 (1 hose) and EW-03 (2 hoses).

* SAMPLE I.D.: EW-05 — grab sample from bottom of well with tubing & foot valve
TIME: 13:07
2 x 40 ml. glass vials, unpres. for 8260C VOC analysis

13:22 WL in EW-03 came up to about 1' btor, so we moved 1 hose to DEC-136. Now pumping into DEC-136 (1 hose), EW-03 (1 hose), and EW-06 (1 hose). ~70 gallons remaining in poly tank to be injected.

13:28 WL in DEC-136 is about 1' btor, move the hose from DEC-136 → EW-04.

13:47 About 42 gallons left in poly tank. WL in EW-03 is ~3.5' btor, WL in EW-06 is ~2' btor, and WL in EW-04 is ~6' btor. WL in DEC-136 is ~4.5' btor.

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Read and Understood By

Signed	Date	Signed	Date
*	11-2-17		

2:13 pm SHUT OFF EW-06 4" FROM TOR

2:17 PLACED PUMP IN DEC-136 @ ~ 1/3 g/m WL = ~7' Below TOR

14:20 WL in DEC-136 is at top of riser, shut off pump. We're only pumping into EW-03 with 1 hose currently (only about 15 gallons of surfactant solution left in the poly tank).

14:33 Started a hose in EW-06 (now pumping into 2 wells, EW-03 & EW-06).

* Headspace on 55-gal. drum of purge water from EW-05 (about 10 gallons, fairly clear, no DNAPL, no sign of surfactant yet) → 44.6 ppm PID headspace on drum contents.

* Headspace on 55-gal. drum of purge water from DEC-136, EW-03, and DNAPL from EW-02 (about 10 gallons turbid brown liquid in drum, some sheen & surfactant bubbles) → 49.8 ppm PID.

Tank onsite to pick up these 2 drums

Sean did falling head tests on EW-04 and EW-03

15:45 We're done at the Spic & Span site for the day, we take equipment back to storage area.

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Read and Understood By

Signed 11-2-17 Date

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16:00 Leave storage area for Lombardy St. site to sample last well (DEC-170D).

16:11 Arrive at Lombardy St., a piece of construction equipment (large bin full of steel pieces) is over the top of well DEC-170D. Mike tries to get someone or something to move bin off well.

16:25 Mike has well DEC-170D accessible. We set up to sample well with QED micropurge bladder pump.

SAMPLE I.D: DEC-170D

TIME: 17:45

3x40ml glass vials (HCl pres.) for 8260C VOCs

DESC.: clear liquid

18:00 We leave Lombardy St. site to go back to hotel.

Arrive at hotel.

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Lombardy St. /

PROJECT former Spic & Span Cleaners

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Wx.: Mostly clear, 62° F, calm

URS: Steve Moeller, Mike Gutmann, Sean Connelly

Vehicles: rental Ford Explorer, Gutmann's Ford F-150 pickup

07:15 Leave hotel, go to gas station to get ice for sample cooling.

07:30 Arrive at Storage Plus to get equipment. Mike takes Sean to Spic & Span site since storage area is waiting until 08:00 to open today.

08:00 Storage Plus opens overhead door to permit access to storage areas.

08:30 I arrive at Spic & Span site, Mike & Sean have already opened wells and started purging some wells. (See separate sheets).

09:15 Mike & I went to Lombardy St. to meet Esland Pump & Tank to pickup purge water drum from sampling at that site this week.

10:17 Esland Pump & Tank arrives at Lombardy St. site to pick up 1x55-gallon drum.

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Signed

FRIDAY 11-3-17

Date

Read and Understood By

Date

(Federal Express courier came to Spic & Span site @ 10:10 to pickup sample cooler of 11/2/17 samples EW-03 EW-05)

Lombardy St./

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PROJECT Former Spic & Span Cleaners

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10:30 Back at Spic & Span Cleaners site. Test America Courier picked up samples. (in cooler on ice)

Sample I.D.: DEC-136
TIME: 10:37
2 x 40 ml. glass vials (unpres.) for 8260C VOC analysis
Desc.: Very Turbid, brown liquid, no visible bubbles

grab with bailer & tubing & foot valve from well bottom

also ↓

Sample I.D.: EW-03
TIME: 10:46
2 x 40 ml. glass vials (unpres.) for 8260C VOC analysis
Desc.: Turbid, brown liquid, surfactant bubbles in sample (headspace bubbles) vials

also ↓

Sample I.D.: EW-04
TIME: 10:52
2 x 40 ml. glass vials (unpres.) for 8260C VOC analysis
Desc.: Very turbid brown liquid, large surfactant bubble in sample vials

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Read and Understood By

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grab sample collected from bottom of well with tubing & foot valve

Sample I.D.: EW-06

TIME: 10:58

2 x 40 ml. glass vials (unpres.) for 8260C VOC analysis

Desc.: Turbid, brown, large surfactant bubbles in sample vials

10:53 Hampton-Clarke courier arrived and took Lombardy St. Samples. (in cooler on ice)

11:00 Island Pump & Tank on site to pick up 1 purge water drum (~22 gallons) for disposal.

11:30 Went back to Storage plus to offload equipment and reload equipment for return trip to Buffalo.

12:00 Left storage area for Buffalo. (Steve & Sean in Explorer)

19:15 Dropped Sean off at his appt.

19:30 I arrive at my home.

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Signed 11-3-17 Date

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Notebook No. _____

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- Copies of notes from seperate notebook

Date: 10/30/17

Time: 13:45

WELL DEC-136

- Post-Injection Drawdown "Falling Head" Measurements

- Measurements taken @ 1 minute increments @ TOR
- Start time 13:45

6.55'	7.61'
6.60'	7.65'
6.66'	7.67'
6.71'	7.71'
6.76'	7.75'
6.82'	7.79'
6.86'	7.83'
6.91'	7.89'
6.97'	7.92'
6.99'	7.97'
7.02'	8.02'
7.09'	8.05'
7.14'	
7.19'	
7.23'	
7.29'	
7.33'	
7.39'	
7.42'	
7.45'	
7.47'	
7.49'	
7.52'	
7.55'	

End time @ 14:20

Continued on Page

Signed _____ Date 11/6/17

Read and Understood By

Signed _____ Date _____

PROJECT Former Spic + Span Cleaners

Notebook No. _____ 37

Continued from Page _____

- Copies of notes from sepeto notebooks
- Measurements taken on 11/1/17

Well	Water level	DNAPL Level	Depth to Bottom	DNAPL Observed w/ Bailer
DEC-024DR	18.67'	None Detected	54.68'	None
DEC-024D	19.17'	None Detected	54.79'	None
DEC-024	21.13'	Solid Beep @ 19.23'	29.72'	None
EW-01	19.23'	None Detected	59.61'	None
EW-05	19.07'	None Detected	27.52'	None
DEC-136	15.08'	None Detected	26.71'	None
EW-02	18.87'	None Detected	62.00'	None
DEC-136D	19.61'	None Detected	54.92'	None
DEC-024DR	18.62	None DETECTED	54.68'	None
DEC-024D	19.16'	None DETECTED	54.79'	None
DEC-024	20.09'	Solid Beep @ 19.24'	29.72'	None
EW-01	19.21'	None Detected	59.61'	
EW-05	Pumping Well			
EW-02	18.88'	None DETECTED	62.00'	None
EW-03	10.45'	None DETECTED	26.00	None

MORNING ROUND (9:00)

AFTERNOON ROUND (14:10)

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Read and Understood By

Signed _____ Date 11/06/17

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PROJECT Former Spic + Span Cleaners

Notebook No.

Continued from Page 37

-Copies of notes from spic-it notebook
(Continued from page 32)

Well	Water Level	DNAPL Level	Depth to Bottom	DNAPL Check w/ Bailer
DEC-9BD	19.35'	None Detected	60.08'	None
EW-06	23.98'	None Detected	21.00'	None
EW-09	11.18'	None Detected	27.00'	None
DEC-13D	Pumping Well			→
DEC-13BD	19.58'	None Detected	54.92'	None

Continued on Page

Read and Understood By

Signed

11/7/17

Date

Signed

Date

- Copies of Notes from Superb Notebook

- Post Injection Drawdown "Falling Head" taken on TEW-06 on 11/1/17
- Measured from TOR @ 1 min/s increments

7.71'	5.95'
3.09'	6.03'
3.25'	6.14'
3.43'	6.29'
3.62'	6.37'
3.81'	6.47'
3.98'	6.59'
4.13'	6.67'
4.28'	6.79'
4.42'	6.90'
4.56'	
4.69'	
4.84'	
4.98'	
5.09'	
5.22'	
5.35'	
5.49'	
5.58'	
5.70'	
5.82'	

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Signed _____ Date 11/2/17

Read and Understood By

Signed _____ Date _____

Date: 11/1/17
Pre
~~Post~~ Injection Water Depth & DNAPL Check

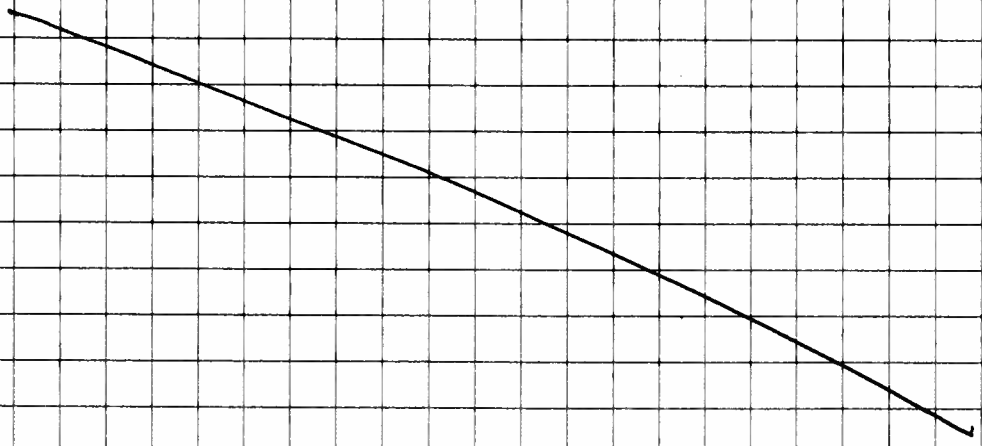
EW-01
Depth to water: 19.17'
No DNAPL Detected

DEC-024DR
Depth to water: 18.49
No DNAPL Detected

DEC-024D
Depth to water: 19.12'
No DNAPL Detected

DEC-024
Depth to water: 19.21'
No DNAPL Detected

EW-02
Depth to water: 18.85'
No DNAPL Detected
Bailer Check: 1st Pull = 9" DNAPL
2nd Pull: 9" DNAPL
3rd Pull = 2" DNAPL
4th Pull = 0.0" DNAPL



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Read and Understood By

Signed _____ Date 11/02/17

Signed _____ Date _____

- Copied Notes From separate notebook

DATE: 11/2/17

TIME: 8:45 AM

- Pre Injection Water level + DNAPL check

Well	Depth To Water	Depth To DNAPL	Depth to Bottom	DNAPL Chk w/ Bailer
DFC-024DD	18.61'	None Detected	54.68'	None
DFC-024D	19.15'	None Detected	54.79'	None
DFC-136	15.75'	None Detected	27.00'	None
DFC-024	19.22'	None Detected	29.72'	None
EW-01	19.39'	None Detected	59.61'	None
EW-02	18.85'	None Detected	62.00'	1st PLL 8" / 2nd PLL 2" / ?.? PLL 0.0"

- Post Injection "Falling Head" on EW-04

Date: 11/02/17

Time: 14:15

- Measured @ 1 minute movements

- starting time 14:18

3.00'	7.25'	9.23'	10.54'
3.91'	7.49'	9.39'	10.61'
4.34'	7.76'	9.52'	10.69'
4.83'	7.95'	9.70'	10.78'
5.27'	8.17'	9.84'	10.82'
5.68'	8.31'	9.98'	10.87'
6.02'	8.54'	10.13'	10.95'
6.41'	8.75'	10.27'	11.03'
6.76'	8.94'	10.37'	Ending Time 14:55
7.02'	9.07'	10.45'	

Continued on Page

Read and Understood By

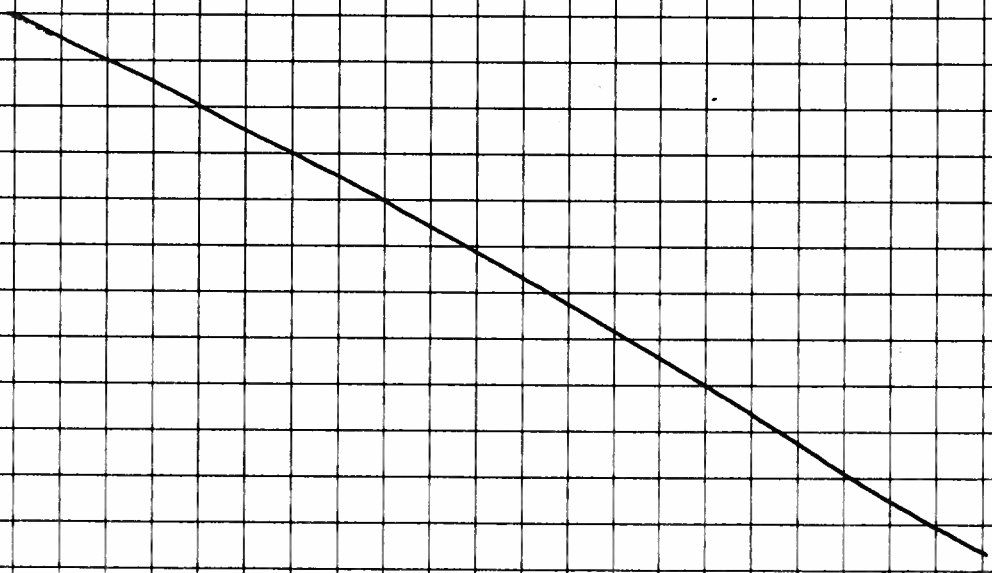
Signed — Date 11/7/17

Signed — Date

Copies of notes from a separate notebook

- Date: 11/02/17
- Post Injection Drawdown "Falling Head" on EW-03
- Starting Time 14:59
- Measurements taken at 1 minute increments

5.93'	8.82'	10.07'
6.27'	9.02'	10.17'
6.61'	9.18'	10.24'
6.85'	9.30'	10.31'
7.19'	9.39'	10.39'
7.37'	9.47'	10.49'
7.60'	9.55'	10.54'
7.82'	9.67'	10.63'
8.01'	9.75'	10.75'
8.17'	9.85'	10.84'
8.41'	9.93'	10.91'
8.61'	9.98'	10.98'



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L. T. [signature] — Signed
11/7/17 — Date
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Signed
Date

pics of Notes taken from seperate notebook 11/03/17

Pre pump Water Levels and DNAPL - Measured from TOR

- EW-06
- Water Level: 14.64'
- No DNAPL Detected
- Pumped out 2.5 gallons @ 8:08 AM

- DBC-136
  Water Level: 15.36'
  No DNAPL Detected
  Pumped out 3.0 gallons @ 8:14 AM

- EW-04
  Water Level: 14.97
  No DNAPL Detected
  Pumped 3.0 gallons @ 8:22 AM

- EW-03
  Water Level: 16.39'
  No DNAPL Detected
  Pumped 3.0 gallons thru drip @ 8:32 AM

- EW-05
  Water Level: 18.94
  No DNAPL Detected
  Pumped 3.0 gallons thru drip @ 8:49 AM
  Head space in drum @ 88.9 PPM @ 08:39 HRS

- Head space PID EW-05 @ 297.8 PPM 08:46 HRS

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PROJECT SPIC & SPAN DNAPL IRM

Notebook No. _____ 15

Continued from Page _____

0430 HMS DEPART HOME/E. AURORA I-190 CAR-1303

0730 HMS PICK UP CHAS Howland on PEARL ST. # 128 IN JOHNSON City

0735 - 1115 DRIVE TO BROOKLYN & CHECK IN @ HAMPTON INN ON VAN DAM

1130 - PICK UP EQUIPMENT @ STORAGE UNIT GENERATOR, PPE, TUBING ETC. . . .

1145 - 1215 PICK UP 3 55-gal drums @ Adelphia on Division St.

1215 - 1230 ARRIVE ON SITE → conduct TAILGATE SAFETY MTG & REVIEW of THA etc... sign off

1230 - 430 PUMPED on wells EW-02, EW-03, EW-04, EW-05 DEC-130 REMOVED +/- 140 gallons 3 drums; IDW & T PICK UP @ ~ 400 pm

430 - 500 OFFSITE TO STORAGE UNIT to drop off EQUIPMENT & HOTEL → check E-mails & OFFICE CHECK IN

430 - 440 CALLED MIKE MAGERTY @ NYSDEC ALBANY TO PROVIDE UPDATE OF TODAY'S WORK ACTIVITIES

Continued on Page

Read and Understood By

Signed _____ Date 1/8/2017

Signed _____ Date _____

12[30] SET UP ON EW-02 w/ DOUBLE STACK WHALE PUMP: 18.91 DTW 1' DNAPL AT BOTTOM START PUMPING PURE DNAPL ~ 1 gal EVIDENT DISCHARGE PURE PCE BRN TO LT BRN TOOK SAMPLE @ 1247 HRS ESTIMATE 1.75 (2) gallons OF PURE PHASE DNAPL REMOVED

12[50] EW-05 DTW = 19.07 NO DNAPL 24.5' BTB CLEAR DISCHARGE @ ~ 1 gpm w/ SINGLE WHALE TURBIDITY V. LOW NO SHEEN OR SURFACTANT (5) gal

1[10] EW-03 DTW = 16.82 DTB = 25.80 NO NAPL ON INTERFACE PROBE

1[14] EW-06 DTW = 18.05 DTB = 25.72 NO NAPL

1[18] EW-04 DTW = 15.33 DTB = 26.80

1[22] DEC-136 DTW = 15.66 DTB = 26.59

1[24] HAND CHECKED EW-03 4 gallons TO DRY LT BRN SL. TURBID 0.7 PPM HEADSPACE PID (4)

1[42] EW-06 SET UP WHALE 1/2 gal DNAPL EMULSION 1.1 PID ppm LT BRN PUMPED ~ 6 gallons @ 1 gal/min Then Dry (6)

1[45] BACK TO EW-05 w/ whale PUMPING @ ~ 1/2 gpm CLEAR TO V. low TURBIDITY 2.5 gallons (2.5)

1[50] HAND CHECKED EW-03 LT BRN SL TURBID DISCHARGE w/ some SURFACTANT/EMULSION 2.5 gallons (2.5)

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Continued on Page

Read and Understood By

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1[53] TURNED WHALE ON 2 GPM @ + 1 GPM SO ~ 2 GALLONS REMOVED TURBID SURFACTANT/EMULSION SOLUTION @ EW-06 (2)

1[55] BACK ON EW-04 W/ HAND CHECK TURBID SURFACTANT/ EMULSION SOLUTION 138.7 PPM ON PID OVER DISCHARGE 2.5 GM (2.5)

2[00] RAN PERC CARD W/ DRAGON CMS DOWNWIND OF DRUM DISCHARGE 5-500 PPM CARD < 5 PPM READING OK ✓

2[03] PUMPED / HAND CHECKED DEC-136 BRN SURFACTANT EMULSION (2.5) GALLONS

2[25] STOPPED WHALE PUMP ON EW-02 CLEAR DISCHARGE FILLED 2 55 GALLON DRUMS & MIXED W/ OTHER WELLS

2[26] HAND CHECKED EW-03 (2.5) GALLONS SURFACTANT/EMULSION MIXTURE SL. TURBID & SUDSY / SOAP ETC....

2[28] PUMPED ON EW-06 (2) MORE GALLONS W/ WHALE SUBMERSIBLE 3 GALLONS SURFACTANT/EMULSION MIX

2[40]-2[45] PUMPED AN/O (5) GALLONS FROM EW-02 1480 PPM ON PID DNAPL ~ 1/2 LITER @ START NO APPARENT SURFACTANT SOLUTION

2[45]-2[50] PUMPED AN/O (3) GAL FROM EW-05 CLEAR DISCHARGE V. / SLW TURBIDITY PID = 6.5 PPM

2[50]-2[55] PUMPED AN/O (1) GAL SURFACTANT/EMULSION MIX FROM EW-04 SL TURBID LT-DK BRN

2[55]-2[57] PUMPED AN/O (1) GAL FROM EW-06 W/ WHALE PUMP (21.5) CLEAR DISCHARGE

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PROJECT SPIC & SPAN IRM

Notebook No. _____

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3[30] PUMPED W/O 2.5 GAL FROM EW-05 clear

3[35] PUMPED W/O 1.5 GAL FROM DFC-134 MILKY THICK SUFFICIENT EMULSION > 15,000 ppm ON AID

3[40] EW-04 HAND CHECKED W/O 1.5 GAL

3[40] - 4[00] LOADED 3 drums OF WASTEWATER IDW JOE 2 FULL & 1 @ ~ 30 GAL = 140 GAL TOTAL

4[15] offsite to STORAGE unit

4[30] - 5[00] UNLOAD EQUIP. @ STORAGE unit & RETURN TO Hotel FOR OFFICE CK IN & EMAILS --> CALLED MIKE Haggerty @ 4[30] - 4[40]

(5.5)

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Read and Understood By

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0700 → CALLED PINE ENVIRO

0705 - 0740 PICK UP 5 drums @ Adelphia & DROP OFF 315 Kingsland Ave

0740 - 0810 PICK UP EQUIPMENT @ Storage Unit

0810 - 0830 ICE @ GAS STATION & Fill generator

0830 SET UP SITE AREA & CONDUCT DAILY TAILGATE & THA Forms

0830 - 834 SET UP AMP IN DEC-092 & TAKE WATER LEVELS AS LISTED BELOW WEATHER Sunny LT IN Breeze 45°F - 50°F

0834	DEC-092	19.29	DTW	NO	LNAPL	60.11	DTB	NO	DNAPL	
840	EW-06	19.77	DTW	NO	LNAPL	25.73	"	"	"	
844	DEC-136	15.~~48~~ 44	DTW	"	"	~~26.03~~	"	"	"	
850	EW-04	16.41	"	"	"	26.63	"	"	"	
853	EW-03	16.89								

0855 Begin pumping DEC-092D TOK 1 YOM4 HOC 0855 clear to SL TURBID WITH discharge w/ FAINT PETRO odor & color

PUMP RATE = +/- 2gpm - 1.75 gpm

	DEC-136	EW-04	EW-06	EW-03	EW-02	DEC-092D
0902	15.49	15.49	—	—	—	—
0903	—	—	19.70	—	—	—
0904	—	—	—	16.85	18.94	—
0905	15.49	15.38	19.75	16.85	18.94	—
0910	15.49	15.39	19.75	16.90	18.94	—
0915	15.49	15.40	19.76	16.91	18.95	—
0920	15.49	15.40	19.76	16.91	18.95	—
0925	15.49	15.40	19.76	16.91	18.95	—
0930	15.49	15.40	19.76	16.91	18.95	19.71
0950	DM~~15.49~~	15.40	19.77	16.92	18.95	19.71

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Read and Understood By

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PROJECT SPEC & SPAW IRM

Notebook No. _____

Continued from Page _____

0945 Pumped DEC 136 TOOK ENVIRON SAMPLE 0948 1 40 ml VIAL
LT BRN SURFACTANT EMULSION TURBID
DRY @ 0950 ~ 1 GPM LOOKS LIKE DNAPL EMULSION (5) 4 GAL

0953 STOPPED PUMP ON DEC-092D FILLED 1 55 GAL DRUM & 40 GAL IN #2 DRUM TOTAL (95) GAL FINAL DISCHARGE WAS XL CLEAR

0955 STARTED ~~PUMP WHALE~~ IN EW-03 HAND CHECKED W/ CHECK VALVE & TUBING. COLLECTED 1 40 ml VIAL FOR VOCS @ 0955 ~ (3.5) - 4 GALLONS ~ 10:01 AM

1005 MOVE TO EW-04 W/ TUBING & CHECK VALVE. COLLECTED 1 40 ml VIAL FOR VOCS W/ HAND CHECK 1005 PUMP (3) GAL.

1012 MOVE & SET UP 5/8 OD HDPE TUBING & CHECK VALVE @ EW-06 COLLECTED 1 40 ml VIAL FOR TCL VOCS @ 1015 HRS REMOVED ~ 2 GALLONS & DRY (2) TURBID SURFACTANT EMULSION

1017 MOVE TO EW-02 & SET UP WHALE PUMP & TURNED ON TO PUMP ~ 1.5 - 2 GPM. COLLECTED 2 40 ml VIALS FOR TCL VOC ANALYSIS; DNAPL ~ 1/2 LITER FILLED (40 ml VIAL & 2ND VIAL WAS MILKY TURBID

1020 MOVE TO DEC-136D DTW = 19.57 53.89 DTB
COLLECTED 1 40 ml VIAL FOR TCL VOCS 1030 HRS
CLEAR FEW GRAINS OF SEDIMENT IN VIAL NO APPARENT NAPL

1035 HAND CHECKED EW-03 ~ 1 GAL TO DRYNESS (1) TURBID TO SL. TURBID DISCHARGE

1035 DRUM @ EW-02 ~ 17 - 20 GALLONS

(14.5) (95)

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1038 HRS ⇒ RESUME PUMPING w/ whale @ DEC-136 MIXING LT BRN SURFACTANT EMULSION TO 1048 w/ 6-7 gallons WENT DRY @ 1048 (6)

1045 CONDUCTED PHOTOVAC GMS CHK SAMPLE AM TEST DOWNWIND OF DRUM @ DEC-136 w/ PGAC CARD 5-500 PPM RANGE CARD; READING WAS < 5 PPM

1100 SHUT OFF DEC-136D PUMPED ± (35) - 30 gallons

1115 SHUT OFF EW-02 (55) gallons pumped

1130 REMOVED whale PUMP FROM DEC-136D & DECONNED & PLACED in poly PLASTIC BAG

1130 P.ve DROPPED OFF NEW MINI RAE 3000 CALIBRATED w/ ISOBUTYLENE STD 100 PPM ADJUSTED SPAN SETTING to READ 100 PPM CAL GAS SN# 592-90X634

1140 HEADSPACE in 55 gal drum @ DEC-136 = 4.6 PPM

1145 SET UP ON EW-05 TO PUMP w/ whale PUMP SHALLOW SAND LAYER PUMPED (3) gallons

1150 - 1155 PUMPED DEC-136 (3-4) more GALLONS to dryness

1157 EW-05 DTW = 19.06 HEADSPACE PID MINI RAE 3000 = 15.7 PPM clear DISCHARGE V. low TURBIDITY PUMPED (4) GALLONS to dryness still clear

1205 - 1210 PUMPED APPX (2.5) GAL EW-03 HEADSPACE = 80.8 PPM FOAMY LT BRN TURBID BRN DISCHARGE FOAMY @ AND NEAR BOTTOM OF WATER COLUMN BEFORE dry (19) + (55)

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PROJECT SPSC & SPAN IDW

Notebook No. _____

Continued from Page _____

12[10] – 12[15] HAND CHECK PUMPING @ EW-04 PUMPED AW/O (4) GALLONS OF BAN SURFACTANT/EMULSION HEADSPACE = 217.8 PPM

12[15] – 12[20] EW-06 PUMPED AW/O (1.5) GAL HAND CHECK @ EW-06 BAN TWB-2 SURFACTANT EMULSION SUDSY & CREAMY 15.3 PPM PID

12[20] – 1225 PUMPED AW/O (3) GAL DEC-136 MILKY W. LT TAN DISCHARGE CLEARING TO VLT TAN LOW TURBID AFTER 3 MORE GAL. TO DRUM HEADSPACE PID = 20.8 PPM

12[25] – 12[35] PUMPED AW/O (4) GALLONS TO DISCHARGE WATER EW-05 HEADSPACE PID IN DRUM @ 107.2 PPM DRY

12[35] – 12[45] PERIOD OF RECHARGE

1[00] – 1[30] RECHARGE WELLS

1[30] – 1[40] PUMPED EW-05 (3.5) GALS CLEAR DISCHARGE

1[40] – 1[45] PUMPED DEC-136 ~ 3.5 GAL MILKY LT TAN THICKER EMULSION/SURFACTANT DISCHARGE PUMPED TO DRUM (3.5)

1[50] – 1[53] HAND CHECKED EW-03 BAN SURFACTANT EMULSION 50.1 PPM 1.5 – 1.75 GALLONS (1.5)

1[55] – 2[00] HAND CHECKED EW-05 ½ GAL SUDSY SURFACTANT EMULSION LT BAN – BAN (1/2)

2[09] – 2[05] HAND CHECKED EW-04 BAN SURFACTANT EMULSION & SUDSY W/ SAND LOOKS LIKE SOME MADE IT 4 GALLONS (4)

(1.5)

(2.5)

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$2^{30}-2^{33}$ PUMPED DEC-136 REMOVED A/O (3) GALLONS MILKY SURFACTANT LT TAN DISCHARGE

$2^{30}-2^{35}$ PUMPED EW-05 CLEAR DISCHARGE ~ (3.75) GALLONS

$2^{35}-2^{40}$ PUMPED (1) GALLON FROM EW-03 BRN SURFACTANT EMULSION APPEARS TO BE DECREASING SOME

$2^{40}-2^{41}$ PUMPED (1/2) GAL EW-04 BRN SURFACTANT EMULSION

$3^{00}-3^{03}$ PUMPED A/O 2.5-3 GAL FROM DEC-136 (3) LT TAN DISCHARGE MILKY COLOR

$3^{00}-3^{04}$ PUMPED A/O 2.5 GAL FROM EW-05 (3.5) CLEAR DISCHARGE

3^{15} SET WHALE PUMP IN EW-04 AFTER PUMPING (2.5) GALLONS W/ HAND CHECK TUBING BRN SURFACTANT EMULSION PUMPED A/O (2.5) GAL W/ WHALE $3^{15}-3^{21}$ HRS

3^{22} HAND CHECK PUMPED ~ 1 GALLON SUDSY SOAPY SURFACTANT FROM EW-06 (1) (12.5)

$3^{30}-3^{40}$ PUMPED A/O (2) GAL DEC-136 TO DRY LT TAN TO DIRTY MILK SURFACTANT/EMULSION

PUMPED (2.5) GAL FROM EW-04 BRN SURFACTANT EMULSION

PUMPED W/ WHALE (3) GAL FROM EW-05 XL CLEAR WATER

HAND CHECKED (1) GAL FROM EW-03 SUDSY BRN SURFACTANT/EMULSION (8.5)

$4^{00}-4^{20}$ CONDUCTED A/O ROUND OF PUMPING FROM DEC-136 (2.5 GAL) MILKY LT TAN DISCHARGE (2.5)

[67] TOTAL FROM SHALLOW STAND BY FOR TODAY

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Signed _____ Date 4/9/2017

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PROJECT SPIL & SPAN Drum

Notebook No. _____

Continued from Page _____

4:00 - 4:20 Pumped EW-05 dry (3.5) gallons of clear discharge out of tubing into drum

Pumped (2) gallons from EW-04 BRN surfactant solution looking more like groundwater but still turbid brown & odor of citrus surfactant

Hand checked (1/2) gallon from EW-03 → soapy/sand w/brown surfactant discharge

Hand checked EW-06 ~ 1/4 gallon of soapy surfactant discharge

4:20 - 4:30 SECURE 5 drums 4 @ 55 gal + 1 @ ~ 45 gal ~ 265 gal total today ~ 270

4:30 4:45 STORAGE unit to drop off supplies & equipment

4:50 - 5:00 back to basement in Hotel & called MTG Haggerty to discuss today's progress

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PROJECT SVE & SPH DPE

Notebook No. _____ 25

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11/10/17 SUNNY & cool 40°F N WIND 5–10 MPH

0700 LEAVE HOTEL & PICK UP 4 55 GAL DRUMS @ ADELPHIA

0745 ARRIVE @ STORAGE + COMPLETE CHAIN OF CUSTODY FOR SAMPLES ON 11/9 & 11/8

0800 STORAGE + OPERS & LOTO EQUIPMENT

0830 BEGIN PUMPING EW-04 DTW = 15.50 FT BTOR LT BRN SL TURBID SURFACTANT EMULSION LESS SOAPY THAN 11/9/2017 PUMPED (4.5) GALLONS. DISCHARGE ↑ WHEN 7.5 + TO W.T. 5 PPM ON PID

0837 SET UP DEC-136 15.57 DTOR LT TAN TO SL. TURB. DISCHARGE. DISCHARGE CLEARING AFTER ± 3 GALLONS 16.3 PPM ON PID (5.5) GALLONS SURFACTANT EMULSION DRY @ 0847

0845 SET UP EW-02 18.79 DTW @ TOR 47.8 PPM XL 47.8 PPM FOR ~ 5 GALLONS THEN APPROX. MATELY 1/2 GALLON DNAPL 1837 PID PUMPING ~ 2 GPM PERL ODOR 0935 STOP PUMPING. @ 57 GALLONS

0850 SET UP PUMP @ EW-05 XL DISCHARGE DTW BTOR = 19.10 PUMPED ~ (5) GALLONS XL CLEAR BEFORE DRY

0906 STARTED PUMPS @ DEC-136 & EW-04 EW-04 IS CLEAR DEC-136 IS SL. TURBID LESS SOAPY EW-04 DRY AFTER (2.5) GALLONS; DEC-136 (3) GALLONS

0910 HAND CHECKED EW-03 SOAPY SURFACTANT DISCHARGE 16.10 DTW BTOR SL. TURBID 18.3 PPM PID (3.5) GAL TO DRY

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Read and Understood By

Signed _____ Date 11/10/2017

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0920 HAND CHECK EW-06 DTW BROR = 19.65
1.5 gallons SOAPY SURFACTANT SL. TURBID & SUDSY
0.5 ppm ON PID (1.5)

0930 TURNED ON EW-04 PUMPED (2) gallons before DRY
BRN SURFACTANT EMULSION

0932 TURNED ON DEC-136 LT TAN EMULSION SL. TURBID
PUMPED (1) gal

0925-0930 EW-05 XL CLEAR WATER (3) gallons before
DRY

7.5

0940 HAND CHECKED EW-03 1.5 gallons SOAPY SURFACTANT
LT BRN SL. TURBID DISCHARGE (1.5)

0940-0945 2.5 gallons from EW-04 BRN TURBID water
w/ dense SOAPY surfactant BUT much less than
on 11/8/2017 (2.5)

0950-0953 DEC-136 3 gallons of LT TAN - MILKY SURFACTANT
discharge before DRY (3)

14.5

0957-1001 Pump EW-05 XL WATER discharge 3.5 gallons (3.5)

1020-1024 PUMPED W/O (2) gal LT TAN SURFACTANT EMULSION LESS
SOAPY & LESS TURBID DRY 78.7 ppm EW-03

Continued on Page

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Signed _____ Date _____

1025 Pump on EW-05 XL water discharge (2.5) gallons
1.8 PPM on PID

1030 - Pump on EW-04 V. clear < 50 NTU ESTIMATE
1034 V. little surfactant 5.5 PPM on PID (5) gallons

ISLAND PDT (IDE) ARRIVED

1042 Hand checked (1) gallon From EW-04 6.5 PPM on PID
less soapy surfactant discharge TURBID but less than on 11/9/2017 & LESS SOAPY

1045-1047 Pumped Anb (2.5) gal From EW-05 XL clear (11)
DAY

1048 Pump on EW-04 LT BRN water discharge much less soapy to only slightly + 4 gallons (4)

1052 Pumped via Hand check HDPE TUBING & FOOT VALVE (1) gal (1)
soapy surfactant LT BRN WATER EW-03 & EW-04 1/2 + 1/2

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11/14/17

* DEPART E. AURORA ~ 0430 HRS / CHECK IN @ FHI on VAN DAM ~ 1030 HRS

* 1045 PICK UP SUPPLIES @ STORAGE UNIT

1120 SET UP ON EW-02 w/ whale submersible pump @ 1-2 gpm ; DNAPL IN TUBING AND IT SHUTTING PUMP down due to density → pulled TUBING several times and then SET TUBING 5-10' from well BOTTOM ; pumped ~ 1 gallon of pure PHASE DNAPL TO clear TUBING Then pumped ~ 1 gpm off well BOTTOM continuously PID = 1182 PPM in DRUM

1210 (4) SET UP ON DEC-136 PID = 50.5 ppm discharge IS milky emulsion pumped 4 gallon DTW = 15.60 before pumping ; pumped dry w/ whole pump

1217 (6) SET UP on EW-04 DTW = 18.00' ; hand checked 6 gallons OF SOAPY emulsion/water 2.2 PPM on PID

1237-1239 (2) DEC-136 ; pumped A/O 2 gal milky emulsion

1245 (3.5) SET UP ON EW-05 ; DTW = 19.05' discharge IS XL clear 10.0 PPM on PID pumped ~3.5 gallons

1247-1249 (2) pumped A/O 2 gal from DEC-136 milky emulsion but NOT AS SOAPY

1255-1259 (3.5) Pumped A/O 3.5 gal from EW-04 → BROWN SOAPY emulsion ; 16.9 PPM on PID

1307-1310 (2) HAND checked w/ HDPE & check valve A/O 2 gal from EW-04 BROWN silty Groundwater w/ emulsion → some soap

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Signed	Date	Signed	Date
[signature]	11/14/17		

1325 - 1328 Pumped ~1 3 gal from DEC-136; milky discharge ~ 1 gal surfactant / gw mixture but not soapy
(3)

1250 STOPPED PUMP @ EW-03 PUMP SET @ BOTTOM ~ 1240
Some DNAPL ~ ~1 PINT; closed drum @ 1250
(57) 57 - 55 gal TOTAL

ESTIMATE 1.25 gallons DNAPL Removed Today EW-03

1300 Hand checked ½ gal EW-03

1328 - 1340 Pumped ~1 7 gallons from EW-04; Brn - SL. TURB'd & less surfactant
(7)

1400 - 1420 PUMPED ~1 5 gal from EW-04 BRN SL. TURB'd EW w/ TRACE - SOME surfactant solution
(5)

1440 - 1445 Pumped ~1 5 gal from EW-04 clearing SL. TURB'd & less surfactant
(5)

1430 Hand checked ~1 ½ gal from EW-06 → soapy surfactant solution w/ soapy appearance
(3) Hand checked EW-03 & EW-06 several times w/ ~ 1 quart each time → TOTAL ~ 1 gal / WELL soapy surfactant appearance

1500 - 1515 Pumped ~1 3 gal from DEC-136; milky surfactant solution
(3)

IP & T arrived @ 3:20 PM & had us sign monitors

Drum #1 newly full ~ 45 gal
Drum #2 57 gallons 57 gal

345 - 400 pm unload supplies @ storage unit
415 - 430 return to Hotel

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Signed _____ Date 11/14/17

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0700 Depart Hotel For Drums
Pick up 4 Drums @ Adelphia Drop off @
315 Kings Land 0745

0745 - 0820 Load up @ storage unit, GTS generator
& Alpine @ site

0820 - 0830 SETUP @ SITE

Weather = Sunny & cool 45°F Light NE
Breeze

0840 EW-02 SET UP DTW = 16.89 SET up whale
pump DNAPL mixed w/ water clear water amber DNAPL
1144 PPM on PID

0845 EW-03 DTW = 18.72

0855 SET up on DEC-136 pump malfunction

0910 set up on EW-04; 15.63 DTW
Collect 2 40 ml VOAs For TCL VOCs
Clear + v. lt tint Brn NAPL surfactant
5 gallons to Drum
(5)

0930 set up on EW-03 Hand cleaned 3 gal
Lt Brn Surfactant mix w/ EW last sample
Thru 11/14/17 2 40 ml VOA vials 0935
(3)

0940 - 0945 set up on DEC-136 pumped 5 gal
2 40 ml vials 0945 SC. milky
Emulsion w/ some + NAPL seen
5 gallons
(5)

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0945 MOVED PUMP AFTER DECON RINSE TO EW-04 & PUMPED 6 GALLONS (6)

0955 - 1002 HAND CHECKED 2.5 GAL FROM EW-06 (2.5)
COLLECTED 2 40 ml VIALS FOR TCL VOCs
BRN SURFACTANT TURBID SLN LESS SOAPY THAN ON 11/14/17

1005 PUMPED AND 4 GALLONS FROM EW-04 BEFORE DRY (4)
DISCHARGE IS SL. TURBID ~50-100 NTU
LITTLE SURFACTANT IN DISCHARGE

1015 STOPPED PUMP @ EW-04 XL CLEAR NO DNAPL 57 GALLONS

1020 - 1026 PUMPED AND 5 GAL FROM EW-04 CLEARING BEFORE DRY
DISCHARGE IS 50-100 NTU LITTLE SURFACTANT IN SLN

1040 MOVED PUMP TO DEC-136 STARTED PUMPING 2.5 GAL (2.5)
SL. MILKY WHITE DISCHARGE

1045 - 1051 STARTED PUMPING EW-04 XL CLEAR TURBIDITY < 10 NTU
PID = 2.4 PPM PUMPED AND 3.5 GAL (3.5)

1055 HAND CHECKED 2 GAL FROM EW-03 SOAPY SURFACTANT SLN (8.5)

1110 ~ 35 GALLONS IN DRUM SO FAR

1115 ~ HAND CHECKED 1/2 GAL FROM EW-06 SOAPY SURFACTANT SLN
BRN - LT BRN

1117 - 1128 PUMPED ON DEC-136 & EW-04 WITH SUBMERSIBLE WHALE
PUMPS ~ 1/2 - 1 GPM ESTIMATE 5 GALLONS FROM DEC-136 &
6 GALLONS FROM EW-04. EW-04 IS XL CLEAR NO SURFACTANT
OR SOAP. DEC-136 IS MILKY BUT LESS THAN EARLY THIS AM

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PROJECT SPIE & SPAN TAM

Notebook No. _____

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(3+3)

11⁴⁰ - 11⁵⁰ Pumped AW/O 6 gal from DEC-136 & EW-04 SL. milky DEC-136 EW-04 clear Ph'd 8.2 on DEC-136 7.1 on EW-04

12¹⁰ - 12¹⁷ Hand checked EW-03 & EW-06 1/2 gal each BRW TURBID surfactant S/N SOAPY

12²⁰ - Drum #2 Full 55 gal open Drum #3

(3x3)

12²⁴ - 12²⁶ Pumped AW/O 6 gal from DEC-136 & EW-04 EW-04 clear ; DEC-136 cloudy milky surfactant BUT NOT TOO SOAPY SLIGHTLY SOAPY only

12⁴² - 12⁴⁶ pumped AW/O 4 gal from DEC-136 & EW-04 EW-04 CLEAR ; DEC-136 clearing BUT STILL SLIGHTLY MILKY APPEARANCE & GETS MORE OPAQUE when almost DRY

10 gal in Drum #3

12⁵² - 1¹⁷ Hand check EW-03 & EW-06 SOAPY BRW medium TURBIDITY surfactant solution 4 gallons 2 + 2 SAME APPEARANCE

1¹⁹ - 1²³ Hand checked ~ 1.5 gal between EW-06 & EW-03 SOAPY TURBID SURFACTANT S/N BRW & SOAPY

1³⁰ - 1³⁸ Pumped AW/O 2.5 gal between EW-04 & DEC-136 DEC-136 IS CLEARER LESS MILKY & EW-04 IS CLEAR

7 gal in Drum

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2[00] - 2[10] Pumped w/o 5 gallons from DEC-136 & EW-02 BOTH discharge HOSES ARE FAIRLY clear, DEC-136 IS slightly TURBID & SOMEWHAT milky

2[10] - 2[14] Pumped w/o 1 gal From EW-06 & EW-03 ABOUT ½ gal each SOAPY surfactant SLN ~ TURBID BRN & citrus odor from SURFACTANT But less SOAPY Than yesterday & THIS morning

2[30] - 2[34] Pumped w/o 4 gallons from DEC-136 & EW-02. Discharge on BOTH HOSES ARE clear TO SL. cloudy TURBIDITY ~ < 100 NTU estimate

= ~ 28 gallons in Drum #3

LAB Courier called @ 2:57 PM gave directions to 315 Knowland Ave.

2[45] - 2[50] Pumped w/o 4 gallons from DEC-136 & EW-02. Discharge on BOTH hoses are generally clear to slightly cloudy Turbidity on EW-02 increased.

2[55] - 3[00] Hand checked EW-06 & EW-03 ½ gal each SOAPY surfactant solution brown less turbid

3[10] - 3[15] Pumped w/o 3 gallons from DEC-136 & EW-02. Discharge IS same - BOTH are clearing to slightly cloudy. Turbidity on EW-02 IS slightly milky

3[30] - 3[35] Pumped w/o 2-3 gallons from DEC-136 & EW-02 Discharge IS same. Pump seem to be somewhat clogged As discharge RATE IS decreased

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Read and Understood By

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Island Pump & Tank Arrive →

Continue pulled pumps & cut tubing into pieces & discarded in 55 gal drums.

1 55 gal drum From EW-02
1 57 gal drum From EW-03, EW-04, & DEC-136
1 35 gal drum From EW-03, EW-04, & DEC-136
1 55 gal drum of PPE & Tubing

3:40 - 4:10 Housekeeping & secure wells / Tools Equipment etc..

4:10 offsite to storage unit to unload equipment
BRIDGE on Greenpoint WA → TRAFFIC JAM

4:20 - 4:36 unload Equipment @ storage unit & depart do to heavy traffic Jam Everywhere

5:36 ARRIVE @ Bronx River Parkway Southbound
V. Heavy traffic

11:37 PM ARRIVE in E. Aurora, My Home.

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Signed Date

Notebook No. _____

PROJECT SPIE & SPIE TRM 60429463, TASK-3

Continued From Page _____

12/19/17

0900 - Picked up rental truck @ ENTERPRISE
1300 - Picked up PID, water level indicator and Tubing @ PINE
1330 - Departed Buffalo for Brooklyn NY

0945 - Arrived at hotel

1000 - unloaded equiptment into hotel

Continued on Page

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Signed Date Signed Date

Daniel Cybulski 12-19-17

12/20/17 Temp. 42°
weather: Cloudy / Rain

0600 - Loaded up equipment from hotel

0630 - Departed hotel for drum pick up

0800 - Arrived at the storage unit and loaded up equipment and supplies. (battery, generator, buckets, whale submersible pumps, and tubing.

0915 - Began setting up at EW-02 DTW - 18.45

On Site personnel	Affiliation	On @ 700	Off
DAVID COFIELD Jr	AECOM/URS		
JOE	Island pump & Tank	1340	1430

EW-03 DTW - 17.05

EW-06 DTW - 18.0

EW-04 DTW - 16.65

DEC-13C DTW -

0945 - Began pumping at EW-02 PID - 195 ppm
1.5 gallons of DNAPL Removed and 2 gallons water

1000 - Began pumping at DEC-13C PID - 3987 ppm
White cream Emulsion 5.0 gal.

1045 - Began pumping at EW-03 Hand check
PID - 118 ppm Emulsion/water 2.0 gal

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Read and Understood By

David Cofield 12-20-17 _____ _____
Signed Date Signed Date

PROJECT SOIC & SOAP IRM 60429963 TASK-3

Notebook No. _____

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12-20-17

1020 - Began pumping at EW-06 Hand check PID - 69.7 ppm 1 gal removed, 1 gal 11:00

1028 - Began pumping at EW-04 PID - 189 White cream / water. 5 gal

		GALLONS Removed	PID	Comments
1045 -	DEC-136	5.0 gal.	3645	milky EMULSION
	EW-03	3.2 gal	71.4	soap surfactant & water
	EW-06	1.5 gal	81.4	soap surfactant & water
	EW-04	1.0 gal	110.0	Slight milky & water
1115 -	DEC-136	1.5 gal.	2472	milky Emulsion
	EW-03	1.0 gal.	53.0	soapy Surfactant & GW
	EW-06	1.0 gal.	42.3	" " "
	EW-04	8.5 gal	76.1	Clear ground water
1145 -	DEC-136	1.5 gal	1941	milky Emulsion
	EW-03	1.0 gal	59.1	soapy surfactant/GW
	EW-06	1.0 gal	40.0	" " "
	EW-04	2.0 gal	44.6	Clear GW
1215 -	DEC-136	1.0 gal	2693	milky Emulsion
	EW-03	.5 gal	73.6	soapy surfactant/GW
	EW-06	1. gal	29.3	" " "
	EW-04	2.0 gal	37.4	Clear GW
1245	DEC-136	0.5 gal	2041	milky Emulsion
	EW-03	.5	42.9	soapy Surfactant/GW
	EW-06	.5 gal	48.2	" " "
	EW-04	2.5 gal	40.1	Clear GW

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Read and Understood By

David Confinelli 12-20-17

Signed Date Signed Date

12-20-17

	Gallons Removed	PID	Comments
1345 - DEC-136	6.5 gal	1784	milky Emulsion
EW-03	.5 "	12.3	soapy surfactant/GW
EW-06	.25 gal	26.4	" " "
EW-04	2.5 gal	26.4	Clear GW
1345 - DEC-136	1.0	2753	milky Emulsion
EW-03	.5	19.4	soapy surfactant/GW
EW-06	.5	30.1	" " "
EW-04	2.0 gal	28.3	Clear GW

1445 - Began shut down for the day

1445 - Departed off site for storage unit

- Sample collection data:

DEC-136	- TIME	1330
EW-03	"	1335
EW-06	"	1340
EW-04	"	1345

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Read and Understood By

Signed Date Signed Date

12/20/17

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
NYSDEC	Former Spic and Span Cleaners & Dyers, Inc.	60429463

Photo No.	Date:
1	11/1/17

Direction Photo Taken:

N/A

Description:

Pilot Test Surfactant Emulsion Recovery from EW-04

Photo No.	Date:
2	11/1/17

Direction Photo Taken:

North

Description:

Pilot Test

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
NYSDEC	Former Spic and Span Cleaners & Dyers, Inc.	60429463

Photo No.	Date:
3	11/1/17

Direction Photo Taken:

Northeast

Description:

Pilot Test - Setup

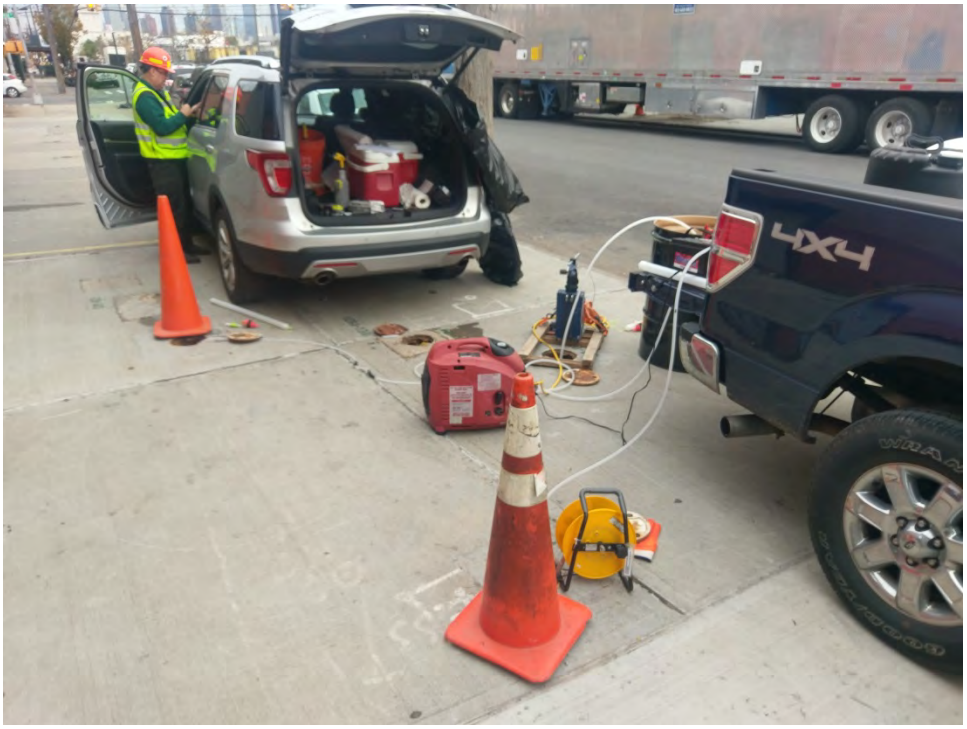


Photo No.	Date:
4	10/31/17

Direction Photo Taken:

West

Description:

Pilot Test Surfactant and Peroxide

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
NYSDEC	Former Spic and Span Cleaners & Dyers, Inc.	60429463

Photo No.	Date:
5	11/1/17

Direction Photo Taken:

East

Description:

Pilot Test Injection

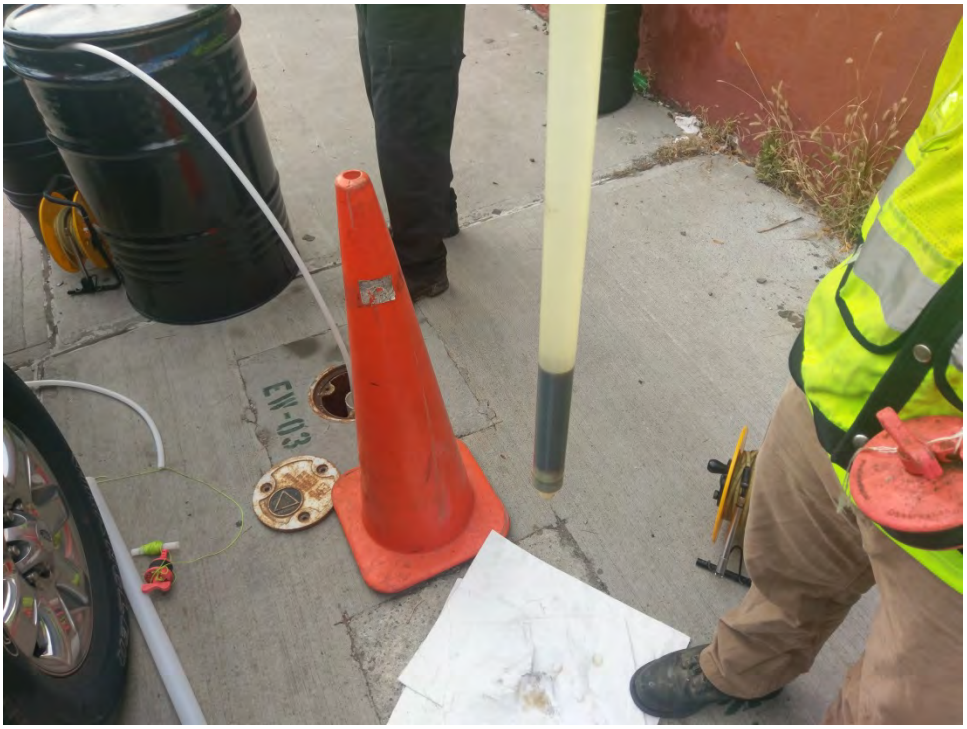
Photo No.	Date:
6	11/2/17

Direction Photo Taken:

Southwest

Description:

PCE DNAPL from EW-02



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
NYSDEC	Former Spic and Span Cleaners & Dyers, Inc.	60429463

Photo No.	Date:
7	11/2/17

Direction Photo Taken:

Southwest

Description:

PCE DNAPL from EW-02

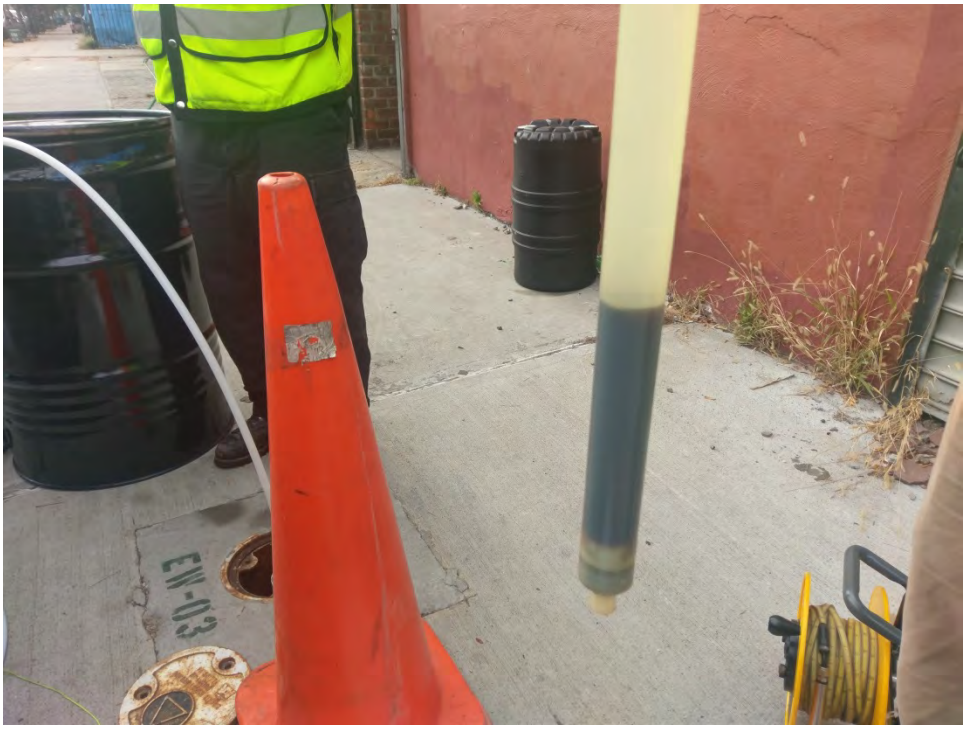


Photo No.	Date:
8	11/2/17

Direction Photo Taken:

Southwest

Description:

PCE DNAPL from EW-02

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
NYSDEC	Former Spic and Span Cleaners & Dyers, Inc.	60429463

Photo No.	Date:
9	10/30/17

Direction Photo Taken:

West

Description:

E-Mulse-3

Photo No.	Date:
10	10/31/17

Direction Photo Taken:

Southeast

Description:

Pilot Test Injection

APPENDIX B

SI PILOT STUDY WORK PLAN

URS

Memorandum

Date: September 12, 2017

To: Michael Haggerty, Project Manager - NYSDEC

From: Michael Gutmann & Jon Sundquist, URS Corporation – New York

Subject: **Contract D007622, WA#30.1**
Former Spic and Span Cleaners & Dyers, Inc. Site IRM (ID #224129)
Work Plan for the Use of Surfactants to Enhance DNAPL Recovery

A DNAPL source area has been identified under the sidewalk immediately east of 307-315 Kingsland Avenue (buildings that formerly housed Spic and Span operations). Figure 1 shows the site location. As part of an Interim Remedial Measure (IRM), URS has used bailers and a hydrolift pump to remove DNAPL from wells located in the DNAPL source area. To date, approximately 280 gallons of DNAPL have been removed from the area using these methods. However, the rate of DNAPL recovery has decreased over time.

In a previous memorandum dated February 1, 2017, URS recommended the Surfactant Enhanced Product Recovery (SEPR) technology proposed by EthicalChem for a field test in the DNAPL source area to determine if DNAPL recovery could be increased. This recommendation was accepted by the Department.

This memorandum has been prepared to describe the work to be performed for a small-scale field test of the surfactant to be conducted at the DNAPL source area.

Products: SEPR technology uses two reagents to mobilize DNAPL: a surfactant and hydrogen peroxide. The surfactant reduces surface tension between the DNAPL and the groundwater and promotes the formation of micelles that emulsifies the DNAPL, making it more mobile. The hydrogen peroxide is used not as an oxidizer, but as a reagent that dissociates to oxygen and water. The generation of oxygen gas in the subsurface promotes breakup of DNAPL and subsequent formation of micelles.

The surfactant injected will be E-Mulse-3 (formerly called VeruSOL-3) as manufactured by EthicalChem. E-Mulse-3 is a blend of non-ionic surfactants and a plant-based citrus solvent. VeruSOL-3 will be used in conjunction with hydrogen peroxide. Hydrogen peroxide will be supplied at a concentration of 7.9%. SDSs for the products are included in Attachment A.

Chemical Preparation and Dosage: Up to 1,000 gallons of solution consisting of E-Mulse-3, hydrogen peroxide and water will be injected during the field test. Based on the vendor's recommendations, E-Mulse-3 will be injected at a concentration of to 15 g/L and hydrogen peroxide will be injected at a concentration of 1%. Mixing proportions on the basis of 100 gallons of solution is provided in Table 1 below.

TABLE 1

Mixing Proportions for Each 100 gallons of Surfactant Solution	
E-Mulse-3	1.5 gallons (maximum)
Hydrogen Peroxide (7.9%)	12.5 gallons (maximum)
Water	86 gallons (minimum)
Total Surfactant Solution	100 gallons

Injection and Recovery Locations: E-Mulse-3 and hydrogen peroxide will be injected into well DEC-136 using a transfer pump at approximately 1 to 2 gallons per minute. Groundwater and emulsified DNAPL will be recovered in downgradient well EW-04 by pumping out the well contents using a peristaltic pump or Waterra hydrolift pump at the rate of 1 to 2 gallons per minute. In addition, nearby extraction wells EW-03 and EW-06 will be closely monitored for the presence of DNAPL. Based on field observations, these extraction wells may also be pumped or bailed for DNAPL recovery. Well locations are shown on Figure 2 and well construction diagrams are provided in Attachment B. Figures 3, 4 and 5 provide cross-section information showing the geologic conditions and suspected DNAPL distribution.

The solution will be injected at a rate of 1-2 gallons per minute over four daily events (200-250 gallons per event). Table 2 provides the sequence of events proposed for this pilot test.

Injection Schedule: The field test is scheduled to be implemented in October 2017.

Other Requirements: Water levels and DNAPL thickness will be measured and DNAPL will be removed from all wells involved in the field test prior to commencing the test. Downgradient wells will be monitored for DNAPL prior to and after each daily injection event. DNAPL will be removed from all downgradient wells showing significant DNAPL accumulation on a daily basis. All investigation derived waste will be picked up and transported offsite daily by Island Pump & Tank Corp.

Baseline sampling will be completed before injection, which would include the analysis for Target Compound List volatile organic compounds (VOCs) by Method 8260C. The laboratory will be instructed to analyze the DNAPL portion of the sample, if present. Representative samples of the extracted DNAPL/surfactant/groundwater emulsion will be collected daily for VOC analyses. Prior to analysis, samples of extracted DNAPL/surfactant/groundwater emulsion will be centrifuged by the laboratory to attempt to separate aqueous portion from the DNAPL in each sample. After centrifuging, the laboratory will determine the relative volume of DNAPL in each sample and analyze the DNAPL portion of the sample for VOCs by Method 8260C. If the centrifuge does not produce a separate DNAPL phase, the aqueous mixture will be analyzed for VOCs using Method 8260C.

Sample container, preservation and handling requirements are provided in Table 3 and 4. Samples will be collected in accordance with the applicable procedures in the URS *Generic Field Activities Plan (URS August 2015) and Health and Safety Plan (URS May 2017) for Work Assignments Under Standby Contract D007622*.

TABLES

TABLE 2
SURFACTANT ENHANCED DNAPL RECOVERY PILOT TEST
FORMER SPIC AND SPAN CLEANERS & DYERS, INC. SITE

WELL LOCATION	BASELINE (DAY 1)				DAY 2				DAY 3				DAY 4			
	INITIAL DNAPL OBSERVATION/ MEASUREMENT and REMOVAL	SAMPLE FOR 8260C VOC ANALYSIS	SURFACTANT INJECTION or PUMPING	END OF DAY DNAPL OBSERVATION/ MEASUREMENT and REMOVAL	INITIAL DNAPL OBSERVATION/ MEASUREMENT and REMOVAL	SURFACTANT INJECTION or PUMPING	END OF DAY DNAPL OBSERVATION/ MEASUREMENT and REMOVAL	SAMPLE FOR 8260C VOC ANALYSIS	INITIAL DNAPL OBSERVATION/ MEASUREMENT and REMOVAL	SURFACTANT INJECTION or PUMPING	END OF DAY DNAPL OBSERVATION/ MEASUREMENT and REMOVAL	SAMPLE FOR 8260C VOC ANALYSIS	INITIAL DNAPL OBSERVATION/ MEASUREMENT and REMOVAL	SURFACTANT INJECTION or PUMPING	END OF DAY DNAPL OBSERVATION/ MEASUREMENT and REMOVAL	SAMPLE FOR 8260C VOC ANALYSIS
DEC-136D	X			X	X		X		X		X		X		X	
DEC-136	X	X	INJECTION	X	X	INJECTION	X		X	INJECTION	X		X	INJECTION	X	X
EW-01	X			X											X	
EW-02	X			X											X	
EW-03	X			X	X		X		X		X		X		X	
EW-04	X	X		X	X	PUMP 1-2 GPM	X	X	X	PUMP 1-2 GPM	X	X	X	PUMP 1-2 GPM	X	X
EW-05	X			X	X		X		X		X		X		X	
EW-06	X	X		X	X	*	X	*	X	*	X	*	X	*	X	X
DEC-092	X			X											X	
DEC-024	X			X											X	
DEC-024D	X			X											X	
DEC-024DR	X			X											X	

Injection volume estimated at 200-250 gallons per day
Pumping rate from well estimated at 1 to 2 gallons per minute (GPM)
*Sample and/or pump out product if surfactant present, based on field observations
Samples for VOCs will be collected with peristaltic pump or bailer. Wells will not be purged. Objective of samples is to determine amount of surfactant enhanced DNAPL recovered.

Table 3

Sample Bottle, Volume, Preservation, and Holding Time Summary
FORMER SPIC AND SPAN CLEANERS AND DYERS, INC. SITE

MATRIX/ANALYSIS	Sample Prep Method [1]	Analytical Method [1]	Sample Bottles				Minimum Vol Rqd	Preservation [2]	Analysis [3]	Comment
			Mat'l	Size	Qty	Source				
DNAPL/Surfactant/Groundwater Emulsion										
Volatile Organics	SW 846 5030C	SW 846 8260C	Glass	40 mL	2 or 3	Lab	40 mL	None	7 days	Samples to be centrifuged for phase separation prior to analysis. Bottom layer to be analyzed.

(1) SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. USEPA SW-846. Complete through Update IV, March 2009.
(2) All samples for should be held on ice or at 4 degrees C.
(3) Holding time from day of collection.

Table 4

QA/QC Sample Quantity Summary
Former Spic and Span Cleaners & Dyers, Inc Site

MATRIX/ANALYSIS	Analytical Method	Laboratory	Field Sample Quantity	Laboratory Quality Control	Trip Blank	Estimated Total Analyses
DNAPL/Surfactant/Groundwater Emulsion						
Volatile Organics	SW 846 8260C	Test America	10	Batch	0	10

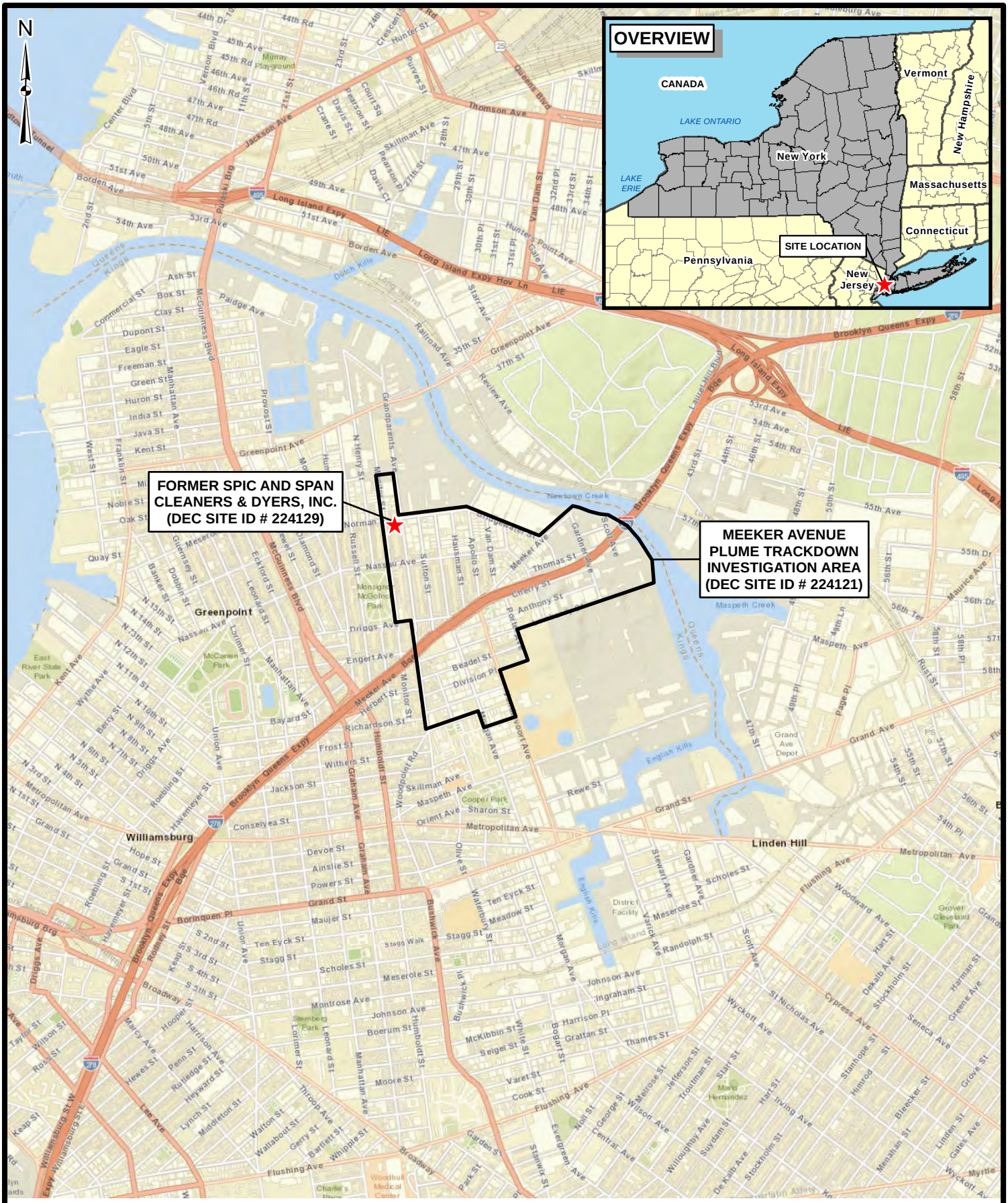
Notes

Laboratory will centrifuge samples prior to analysis for phase separation. Dense non-aqueous phase (i.e., bottom) layer (DNAPL) to be analyzed.

If DNAPL not present, aqueous portion to be analyzed.

Trip Blanks not required. Samples are expected to contain high concentrations of tetrachloroethene.

FIGURES

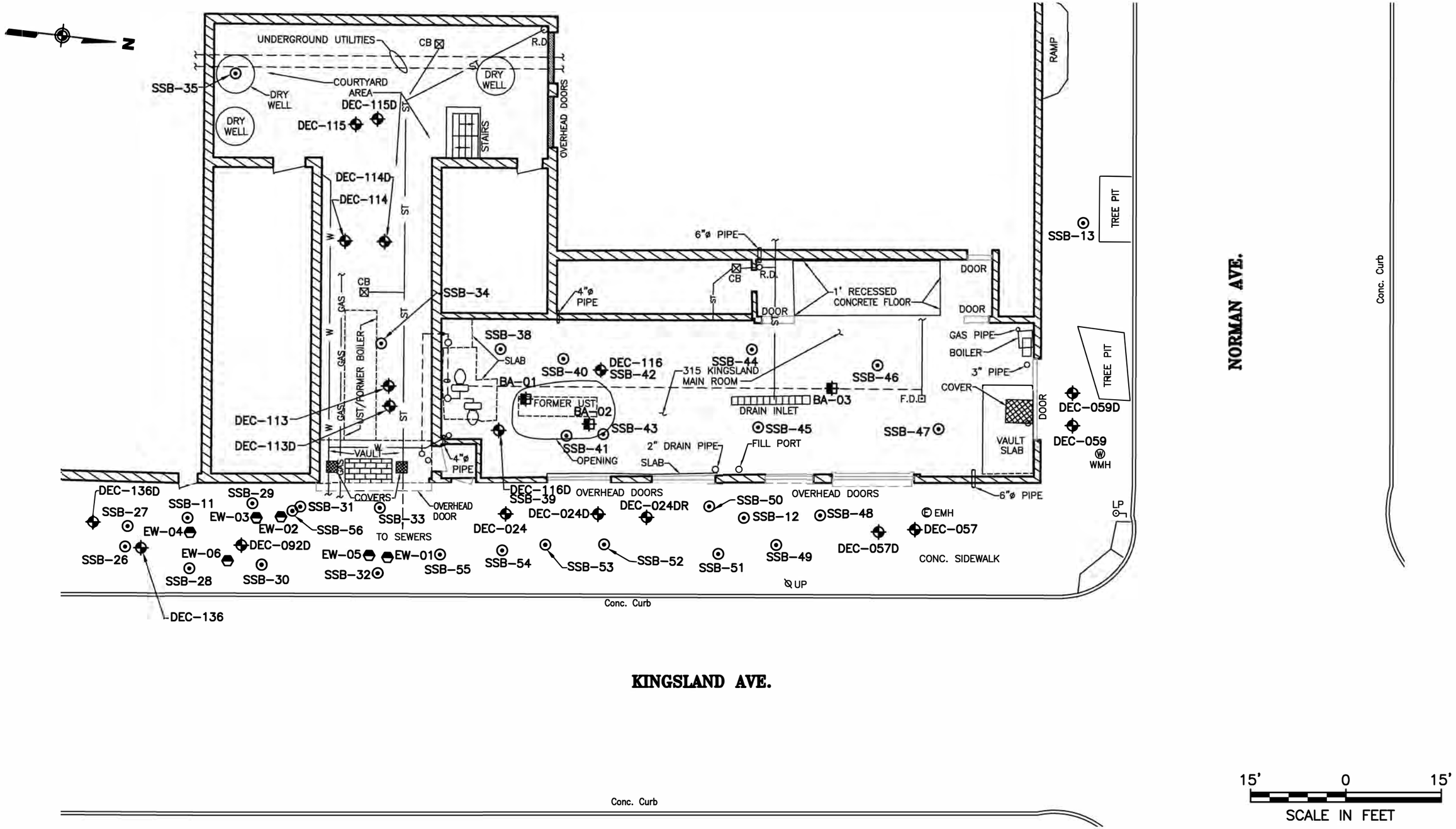


J:\Projects\11174989.00000\DB\GIS\SpicSpan-Report\Feasibility Study\02-01 Site Location.mxd 5/11/2017

URS

FORMER SPIC & SPAN CLEANERS & DYERS, INC. SITE
SURFACTANT ENHANCED DNAPL RECOVERY PILOT TEST
SITE LOCATION

FIGURE 1



LEGEND:

CB	CATCH BASIN	GAS	NATURAL GAS LINE
R.D.	ROOF DRAIN	W	WATER LINE
F.D.	FLOOR DRAIN	ST	STORM SEWER
UST	UNDERGROUND STORAGE TANK		UNKNOWN UNDERGROUND UTILITIES

SSB-40	SOIL BORING
DEC-116	NYSDEC MONITORING WELL
EW-01	NYSDEC EXTRACTION WELL
BA-01	BUCKET AUGER BORING

FORMER SPIC AND SPAN CLEANERS SITE MONITORING WELL AND SOIL BORING LOCATIONS

URS

FIGURE 2

J:\Projects\11176390\CAD\KINGLAND AVE\UST REPORT\JAN 2017\FIGURE 2.dwg 1/23/17 - 2 RAL

INSET MAP

SSB-47 DEC-057 DEC-057D SSB-46 SSB-48 BA-03 SSB-49 SSB-45 SSB-12 SSB-44 SSB-51 SSB-50 DEC-024DR SSB-43 DEC-024D BA-02 SSB-52 DEC-116 SSB-42 SSB-40 SSB-41 SSB-53 DEC-116D BA-01 SSB-54 SSB-38 DEC-024 DEC-115D SSB-39 SSB-55 DEC-113D EW-01 DEC-113 DEC-114D SSB-32 SSB-33 EW-05 SSB-34 SSB-56 DEC-115 DEC-114 SSB-31 EW-02 EW-03 SSB-30 SSB-29 EW-06 DEC-092D SSB-35 SSB-11 SSB-28 EW-04 DEC-136 SSB-27 SSB-26 DEC-136D SSB-25 DEC-063TC DEC-063 DEC-063D B B' A A' KINGSLAND AVE DEC-036 DEC-036D DEC-085 DEC-061 DEC-061D SSB-24 SSB-23 DEC-109 SSB-22 DEC-109D SSB-21 SSB-09 SSB-15 SSB-07 SSB-04 DEC-025 SSB-01 SSB-02 DEC-025D SSB-05 SSB-03 SSB-06 SSB-57A SSB-16 SSB-57 SSB-08 SSB-61 SSB-17 SSB-10 SSB-18 SSB-62 SSB-58 SSB-60 SSB-59 SSB-19 SSB-20

0 40 Feet

MW-043 MW-043D MW-047 MW-084R MW-086 DEC-067 DEC-067D MW-046D MW-046 MW-044D MW-044 MW-082 DEC-053D DEC-053 MW-087 MW-087D DEC-068 DEC-068D DEC-083 DEC-083D MW-045 MW-042 MW-042D MW-081 DEC-054D DEC-054 DEC-107D DEC-107 MW-085D MW-085 DEC-058 DEC-058D DEC-112 DEC-112D MW-083 MW-083D DEC-055D DEC-055 DEC-059 DEC-059D DEC-058TC NORMAN AVE BRIDGEWATER ST DEC-146 DEC-056 DEC-023 DEC-023D SSB-13 SSB-14 DEC-057 DEC-057D DEC-060D DEC-060 DEC-034D DEC-034 DEC-084D DEC-108 DEC-108D MW-095 DEC-037R DEC-037D DEC-037 DEC-117 DEC-036 DEC-036D DEC-062TC DEC-062D DEC-062 DEC-035TC DEC-035D DEC-035 DEC-085 DEC-137D DEC-137 DEC-061 DEC-061D DEC-110D DEC-110 MW-092 DEC-063TC DEC-063 DEC-063D DEC-109 DEC-109D DEC-025 DEC-025D DEC-001 DEC-001R DEC-001D DEC-003DD DEC-003D DEC-003 DEC-138D DEC-138 HAUSMAN ST APOLLO ST VAN DAM ST SEE INSET MAP DEC-086 DEC-087 DEC-087D N HENRY ST MONITOR ST DEC-038 DEC-069R DEC-069 DEC-069D DEC-070 DEC-070D MORGAN AVE DEC-139D DEC-139 DEC-149 DEC-150 SUTTON ST KINGSLAND AVE DEC-121 MW-014 DEC-152D DEC-152 DEC-002 NASSAU AVE

N

Legend

- ExxonMobil Monitoring Well
- NYSDEC Monitoring Well
- NYSDEC Extraction Well
- Soil Boring Location
- Cross-Section Location (A – A')

Source: ESRI World Imagery

150 0 150 Feet

FORMER SPIC & SPAN CLEANERS & DYERS, INC. SITE
SURFACTANT ENHANCED DNAPL RECOVERY PILOT TEST
CROSS-SECTION LOCATIONS

URS

FIGURE 3

J:\Projects\11174989.00000\DB\GIS\SpicSpan-Report\Feasibility Study\02-03 Cross-Section Locations.mxd 4/27/2017

WEST

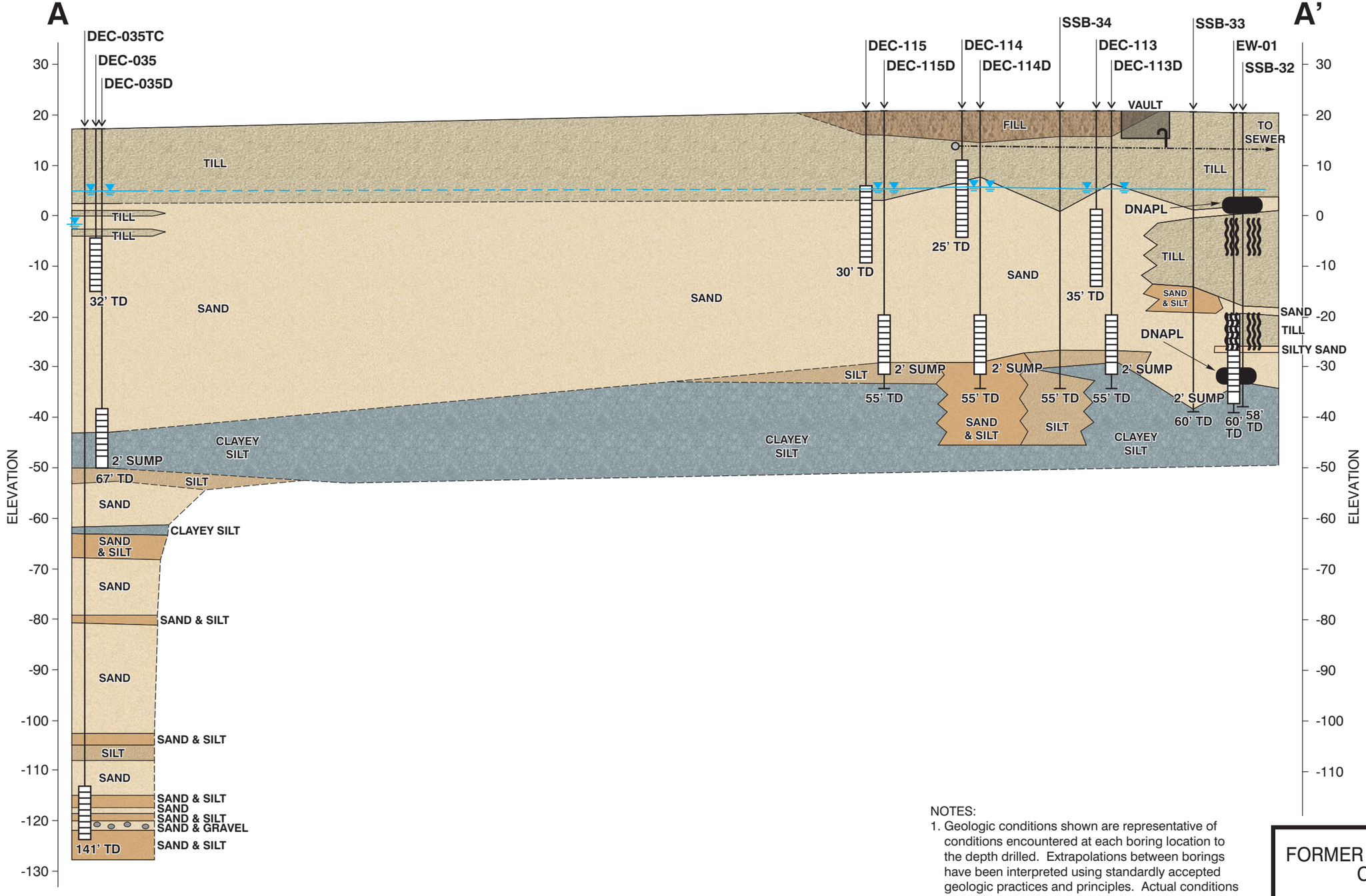
A

EAST

A’

Horizontal Scale: 1” = 20’
Vertical Scale: 1” = 20’

Revised: August 11, 2015



DEC-115D ← Monitoring Well Number

← Potentiometric Surface 07/15/2014

← Screened Interval of Monitoring Well

← Borehole Termination

55’ TD = Total Depth

- Fill
- Sand
- Silt
- Till
- Sand & Silt
- Sand & Gravel
- Silty Sand
- Clayey Silt
- Sand Stringers

NOTES:

1. Geologic conditions shown are representative of conditions encountered at each boring location to the depth drilled. Extrapolations between borings have been interpreted using standardly accepted geologic practices and principles. Actual conditions may vary between borings from those shown.
2. Elevations based on North American Vertical Datum, 1988.

FORMER SPIC & SPAN CLEANERS SITE
CROSS SECTION A - A’

URS

FIGURE 4

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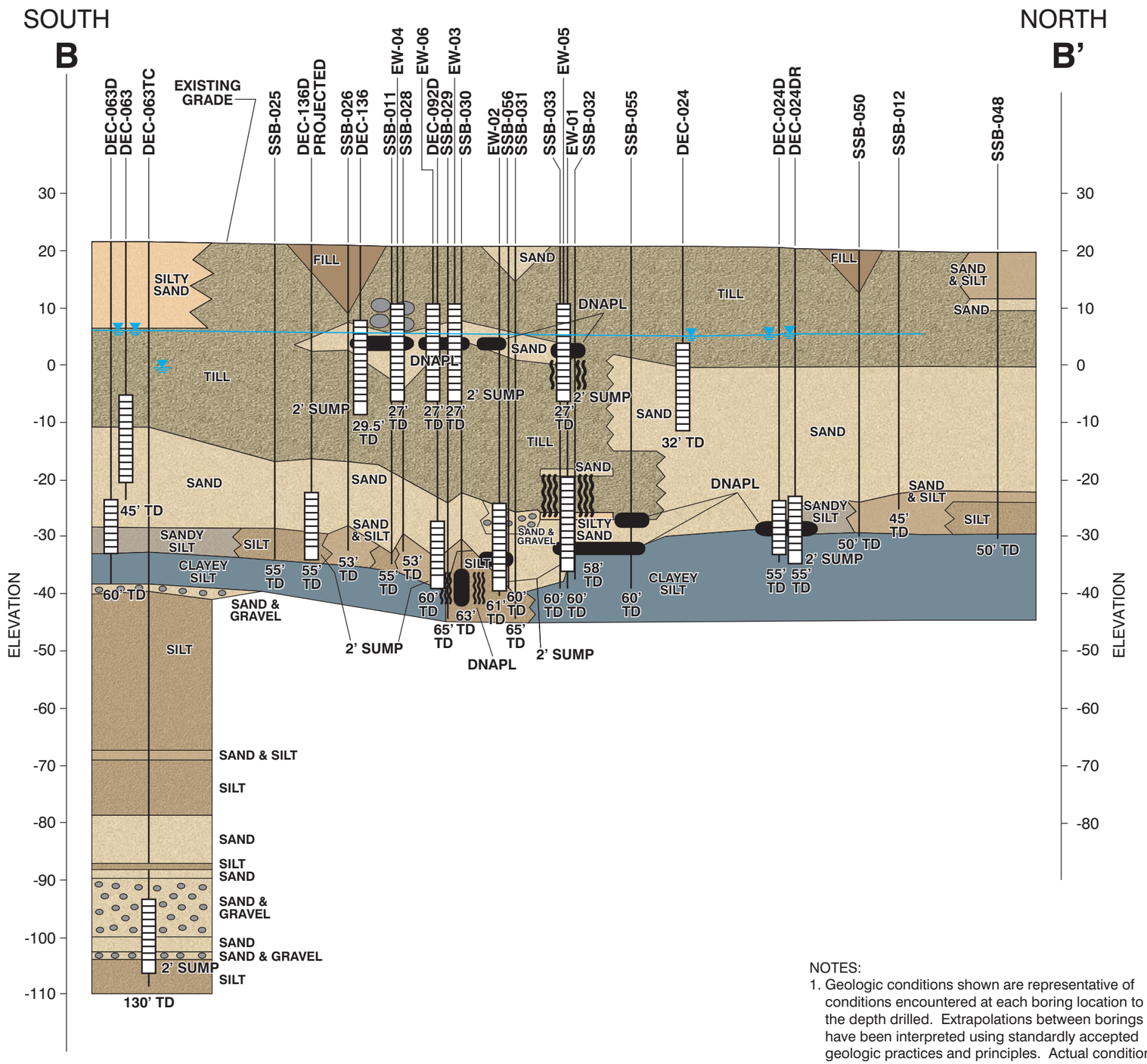
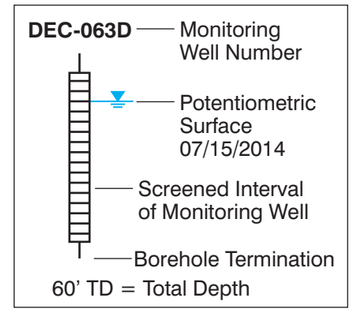


Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 20'

Revised: June 1, 2017



- Fill
- Sand
- Silt
- Till
- Sand & Silt
- Sand & Gravel
- Silty Sand
- Sandy Silt
- Clayey Silt
- Sand Stringers
- Cobbles

NOTES:
1. Geologic conditions shown are representative of conditions encountered at each boring location to the depth drilled. Extrapolations between borings have been interpreted using standardly accepted geologic practices and principles. Actual conditions may vary between borings from those shown.
2. Elevations based on North American Vertical Datum, 1988.

FORMER SPIC & SPAN CLEANERS' SITE
CROSS SECTION B - B'

URS

FIGURE 5

AG21004B-111176359-060117-GCM

ATTACHMENT A

Safety Data Sheets

Safety Data Sheet

TASMAN CHEMICALS
"Tasman trusted products"

Hazardous Substance, NON-Dangerous Goods

1. MATERIAL AND SUPPLY COMPANY IDENTIFICATION

Product name: HYDROGEN PEROXIDE 7.5%

Recommended use: Oxygen Bleach

Supplier: Tasman Chemicals Pty Ltd
ACN 005 072 659
Street Address: 1-7 Bell Grove
Braeside, VIC, 3195
Australia
Telephone: **+613 9587-6777**
Facsimile: **+613 9587-5255**

Emergency Telephone number: **Australia 1800 334 556**

2. HAZARDS IDENTIFICATION

This material is hazardous according to health criteria of Safe Work Australia.

Signal Word
Danger

Hazard Classifications
Acute Toxicity - Oral - Category 4
Acute Toxicity - Dermal - Category 4
Skin Corrosion/Irritation - Category 1B
Serious Eye Damage/Irritation - Category 1

Hazard Statements

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.

Prevention Precautionary Statements

P102	Keep out of reach of children.
P103	Read label before use.
P260	Do not breathe dust, fume, gas, mist, vapours or spray.
P264	Wash hands, face and all exposed skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective clothing, gloves, eye/face protection and suitable respirator.

Response Precautionary Statements

P101	If medical advice is needed, have product container or label at hand.
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P303+P361+P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse

	skin with water/shower.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/physician.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P330	Rinse mouth.
P363	Wash contaminated clothing before reuse.

Storage Precautionary Statement

P405 Store locked up.

Disposal Precautionary Statement

P501 Dispose of contents/container in accordance with local, regional, national and international regulations.

Poison Schedule: S6. Poison

DANGEROUS GOOD CLASSIFICATION

Not classified as Dangerous Goods by the criteria of the "Australian Code for the Transport of Dangerous Goods by Road & Rail" and the "New Zealand NZS5433: Transport of Dangerous Goods on Land".

3. COMPOSITION INFORMATION

CHEMICAL ENTITY	CAS NO	PROPORTION
Hydrogen peroxide (H_2O_2)	7722-84-1	1 - 10 % (w/v)
Ingredients determined to be non-hazardous		Balance

4. FIRST AID MEASURES

If poisoning occurs, contact a doctor or Poisons Information Centre (Phone Australia 131 126, New Zealand 0800 764 766).

Inhalation: Remove victim from exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. Seek medical advice if effects persist.

Skin Contact: This material, or a component of the material, can be absorbed through the skin with resultant toxic effects. If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. If swelling, redness, blistering or irritation occurs seek medical assistance. For gross contamination, immediately drench with water and remove clothing. Continue to flush skin and hair with plenty of water (and soap if material is insoluble). For skin burns, cover with a clean, dry dressing until medical help is available. If blistering occurs, do NOT break blisters. If swelling, redness, blistering, or irritation occurs seek medical assistance.

Eye contact: Immediately irrigate with copious quantities of water for 15 minutes. Eyelids to be held open. Remove clothing if contaminated and wash skin. Urgently seek medical assistance. Transport to hospital or medical centre. If in eyes wash out immediately with water. In all cases of eye contamination it is a sensible precaution to seek medical advice.

Ingestion: Rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water to drink. Never give anything by the mouth to an unconscious patient. If vomiting occurs give further water. Immediately call Poisons Centre or Doctor.

Notes to physician: Treat symptomatically.

5. FIRE FIGHTING MEASURES

Hazchem Code: Not applicable.

Suitable extinguishing media: If material is involved in a fire use water fog (or if unavailable fine water spray), alcohol resistant foam, standard foam, dry agent (carbon dioxide, dry chemical powder).

Specific hazards: Non-combustible material.

Fire fighting further advice: Not applicable.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILLS
Wear protective equipment to prevent skin and eye contamination. Avoid inhalation of vapours or dust. Wipe up with absorbent (clean rag or paper towels). Collect and seal in properly labelled containers or drums for disposal.

LARGE SPILLS
Clear area of all unprotected personnel. Slippery when spilt. Avoid accidents, clean up immediately. Wear protective equipment to prevent skin and eye contamination and the inhalation of vapours. Work up wind or increase ventilation. Contain - prevent run off into drains and waterways. Use absorbent (soil, sand or other inert material). Collect and seal in properly labelled containers or drums for disposal. If contamination of crops, sewers or waterways has occurred advise local emergency services.

Dangerous Goods – Initial Emergency Response Guide No: Not applicable

7. HANDLING AND STORAGE

Handling: Avoid eye contact and skin contact. Avoid inhalation of vapour, mist or aerosols.

Storage: Store in a cool, dry, well-ventilated place and out of direct sunlight. Store away from foodstuffs. Store away from incompatible materials described in Section 10. Store away from sources of heat and/or ignition. Store locked up. Keep container standing upright. Keep containers closed when not in use - check regularly for leaks.

This material is a Scheduled Poison Schedule 6 (Poison) and must be stored, maintained and used in accordance with the relevant regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National occupational exposure limits:

	TWA		STEL		NOTICES
	ppm	mg/m3	ppm	mg/m3	
Hydrogen peroxide	1	1.4	-	-	-

As published by Safe Work Australia.

TWA - The time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.

STEL (Short Term Exposure Limit) - the average airborne concentration over a 15 minute period which should not

be exceeded at any time during a normal eight-hour workday.

These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept too as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

If the directions for use on the product label are followed, exposure of individuals using the product should not exceed the above standard. The standard was created for workers who are routinely, potentially exposed during product manufacture.

Biological Limit Values: As per the "National Model Regulations for the Control of Workplace Hazardous Substances (Safe Work Australia)" the ingredients in this material do not have a Biological Limit Allocated.

Engineering Measures: Ensure ventilation is adequate to maintain air concentrations below Exposure Standards. Use only in well ventilated areas. Use with local exhaust ventilation or while wearing appropriate respirator.

Personal Protection Equipment: RUBBER BOOTS, OVERALLS, GLOVES, APRON, FACE SHIELD.

Wear rubber boots, overalls, gloves, apron, face shield.Available information suggests that gloves made from should be suitable for intermittent contact. However, due to variations in glove construction and local conditions, the user should make a final assessment. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storing or re-using.

Hygiene measures: Keep away from food, drink and animal feeding stuffs. When using do not eat, drink or smoke. Wash hands prior to eating, drinking or smoking. Avoid contact with clothing. Avoid eye contact and skin contact. Avoid inhalation of vapour, mist or aerosols. Ensure that eyewash stations and safety showers are close to the workstation location.

9. PHYSICAL AND CHEMICAL PROPERTIES

Material Family:	Aqueous Formulation
Base Units:	Litres
Form:	Clear Liquid
Colour:	Colourless
Odour:	Slightly Pungent , Irritating

Solubility:	Miscible with water
Specific Gravity (20 °C):	1.06 @ 20 deg C
Vapour Pressure (20 °C):	18 Torr @30°C
Flash Point (°C):	N App
Flammability Limits (%):	N App
Autoignition Temperature (°C):	N App
Melting Point/Range (°C):	-52
Boiling Point/Range (°C):	114
pH:	2 - 3

(Typical values only - consult specification sheet)
N Av = Not available, N App = Not applicable

10. STABILITY AND REACTIVITY

Chemical stability: This material is thermally stable when stored and used as directed.

Conditions to avoid: Elevated temperatures and sources of ignition.

Incompatible materials: Oxidising agents.

Hazardous decomposition products: Oxides of carbon and nitrogen, smoke and other toxic fumes.

Hazardous reactions: No known hazardous reactions.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Acute Effects

Inhalation: Material may be an irritant to mucous membranes and respiratory tract.

Skin contact: Harmful in contact with skin. Can be absorbed through the skin with resultant toxic effects. Contact with skin will result in severe irritation. Corrosive to skin - may cause skin burns.

Ingestion: Harmful if swallowed. Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain and chemical burns to the gastrointestinal tract.

Eye contact: A severe eye irritant. Corrosive to eyes: contact can cause corneal burns. Contamination of eyes can result in permanent injury.

Acute toxicity

Inhalation: This material has been classified as non-hazardous. Acute toxicity estimate (based on ingredients): >20 mg/L

LC50 (Rat): 2 mg/L/4H (Hydrogen Peroxide)

Skin contact: This material has been classified as a Category 4 Hazard. Acute toxicity estimate (based on ingredients): 1,000 - 2,000 mg/Kg

LD50 (Rat): 3000-5480 mg/kg (Hydrogen Peroxide)

Ingestion: This material has been classified as a Category 4 Hazard. Acute toxicity estimate (based on ingredients): 300 - 2,000 mg/Kg

LD50 (Rat): 75 mg/kg (Hydrogen Peroxide)

Corrosion/Irritancy: Eye: this material has been classified as a Category 1 Hazard (irreversible effects to eyes). Skin: this material has been classified as a Category 1B Hazard (irreversible effects to skin).

Sensitisation: Inhalation: this material has been classified as not a respiratory sensitiser. Skin: this material has been classified as not a skin sensitiser.

Aspiration hazard: This material has been classified as non-hazardous.

Specific target organ toxicity (single exposure): This material has been classified as non-hazardous.

Chronic Toxicity

Mutagenicity: This material has been classified as non-hazardous.

Carcinogenicity: This material has been classified as non-hazardous.

Reproductive toxicity (including via lactation): This material has been classified as non-hazardous.

Specific target organ toxicity (repeat exposure): This material has been classified as non-hazardous.

12. ECOLOGICAL INFORMATION

Avoid contaminating waterways.

Acute aquatic hazard: This material has been classified as non-hazardous. Acute toxicity estimate (based on ingredients): >100 mg/L

Long-term aquatic hazard: This material has been classified as non-hazardous. Non-rapidly or rapidly degradable substance for which there are adequate chronic toxicity data available OR in the absence of chronic toxicity data, Acute toxicity estimate (based on ingredients): >100 mg/L, where the substance is not rapidly degradable and/or BCF < 500 and/or log K_{ow} < 4.

Ecotoxicity: No information available.

Persistence and degradability: No information available.

Bioaccumulative potential: No information available.

Mobility: No information available.

13. DISPOSAL CONSIDERATIONS

Persons conducting disposal, recycling or reclamation activities should ensure that appropriate personal protection equipment is used, see "Section 8. Exposure Controls and Personal Protection" of this SDS.

If possible material and its container should be recycled. If material or container cannot be recycled, dispose in accordance with local, regional, national and international Regulations.

14. TRANSPORT INFORMATION

ROAD AND RAIL TRANSPORT
Not classified as Dangerous Goods by the criteria of the "Australian Code for the Transport of Dangerous Goods by Road & Rail" and the "New Zealand NZS5433: Transport of Dangerous Goods on Land".

MARINE TRANSPORT
Not classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea.

AIR TRANSPORT
Not classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air.

15. REGULATORY INFORMATION

This material/constituent(s) is covered by the following requirements:
- The Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) established under the Therapeutic Goods Act (Commonwealth).
- All components of this product are listed on or exempt from the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

Reason for issue: Format change

This information was prepared in good faith from the best information available at the time of issue. It is based on the present level of research and to this extent we believe it is accurate. However, no guarantee of accuracy is made or implied and since conditions of use are beyond our control, all information relevant to usage is offered without warranty. The manufacturer will not be held responsible for any unauthorised use of this information or for any modified or altered versions.

If you are an employer it is your duty to tell your employees, and any others that may be affected, of any hazards described in this sheet and of any precautions that should be taken.

Safety Data Sheets are updated frequently. Please ensure you have a current copy.

SAFETY DATA SHEET
VeruSOL®-3

Date Issued: January 8, 2015
Revision No: 2

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Manufacturer: Ethical Solutions, LLC
Address: 177 Governor's Hwy, South Windsor, CT 06074
Phone Number: (860) 757-3788

24 Hour EMERGENCY CONTACT: **ChemTel:** 1-800-255-3924

Product Name: VeruSOL-3®
Issue Date: January 8, 2015

Synonyms: VeruSOL®

Section 2: HAZARDS IDENTIFICATION

Emergency Overview

Appearance/Odor: Yellow to amber, slightly viscous with citrus odor.

Product is combustible.

Stability: Product is stable under normal conditions.

Slippery when spilled.

Potential Health Effects: See Section 11 for more information.

Likely Routes of Exposure: Eye contact, skin contact, inhalation.
Eye: Causes moderate to severe irritation.
Skin: May cause slight redness. Prolonged or repeated exposure may cause drying of the skin.
Inhalation: May cause nose, throat, and respiratory tract irritation, coughing, headache.
Ingestion: Not likely to be toxic, but may cause vomiting, headache, or other medical problems.
Medical Conditions Aggravated By Exposure: May irritate the skin of people with pre-existing skin conditions.

This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC, or NTP.

OSHA Regulator Status
This material is combustible, which is defined as having a flash point between 100°F (37.8°C) and 200°F (93.3°C)

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

	Percent by wt.	CAS
Citrus Terpenes	10-40	94266-47-4
Non-ionic Surfactant	10-40	N/A
Non-ionic Surfactant	10-40	N/A
Non-ionic Surfactant	10-40	N/A

Section 4: FIRST AID MEASURES

Eye Contact:
Flush with water for at least 15 minutes. If irritation persists, seek medical attention.

Skin Contact:

Wash affected area with copious amounts of soap and water for at least 15 minutes. Remove contaminated clothing. If irritation develops, seek medical attention.

Inhalation:
Move to fresh air immediately. If breathing is difficult or discomfort persists, seek medical attention.

Ingestion:
Rinse mouth with water. Dilute by drinking 1 or 2 glasses of water. Do not induce vomiting. Seek medical attention immediately. Do not administer anything by mouth to an unconscious person.

Notes to Medical Doctor:
Direct contact may be minimally irritating. Treatment is by dilution and is symptomatic and supportive.

Section 5: FIRE FIGHTING MEASURES

Flash Point (Method): N/A **Explosion Limits**: Upper: N/A Lower: N/A

Suitable Extinguishing Media:
Carbon dioxide, foam, or dry chemical. Caution: Carbon dioxide will displace air in confined spaces and may create an oxygen deficient atmosphere.

Protection of Firefighters:
Vapors may be irritating to eyes, skin and respiratory tract. Firefighters should wear self-contained breathing apparatus (SCBA) and full fire-fighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Use personal protection recommended in Section 8. Product is slippery when spilled. Isolate the hazard area. Deny entry to unnecessary and unprotected personnel.

Environmental Precautions: Keep out of drains, sewers, ditches, and waterways.

Methods for Containment: Dike spill area and cap leaking containers as necessary to prevent further spreading of spilled material. Absorb spilled liquid with suitable material.

Methods for Clean Up: Eliminate all ignition sources. Use equipment rated for use around combustible materials. Oil-soaked rags may spontaneously combust; place in appropriate disposal container.

Other Information: There are no special reporting requirements for spills of this material.

Section 7: HANDLING AND STORAGE

Handling
Keep away from heat, sparks, and flame. Open container slowly to release pressure caused by temperature variations. Do not allow this material to come in contact with eyes. Avoid prolonged contact with skin. Use in well-ventilated areas. Do not breathe vapors.As with any chemical, employees should thoroughly wash hands with soap and water after handling this material

Storage

Product may be packaged in phenolic-lined, steel containers or fluorinated plastic containers. Store in well-ventilated area. Storage temperature should not exceed flashpoint for extended periods of time. Keep container closed when not in use. Air should be excluded from partially-filled containers by displacing with nitrogen or carbon dioxide. Do not cut, drill, grind, or weld on or near this container; residual vapors may ignite.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Citrus Terpenes	8h TWA=30ppm (AIHA Standard)
Nonionic Surfactant	N/E (N/E - Not Established)
Nonionic Surfactant	N/E
Nonionic Surfactant	N/E

Engineering Controls:
Provide ventilation to minimize the release of vapors and mist into the work environment. Spills should be minimized or confined to prevent release from work area. Remove contaminated clothing immediately and wash before reuse. Keep away from sparks and flames.

Eye/Face Protection:
Wear chemical splash-type safety glasses or goggles. Use full face mask if severe splashing is expected during use.

Skin Protection:
Liquid proof neoprene gloves are recommended. Nitrile gloves are adequate. Wear boots, apron, or bodysuits as necessary.

Respiratory Protection:
Not normally required. If adequate ventilation is unavailable, use NIOSH approved air-purifying respirator with organic vapor cartridge or canister.

General Hygiene Considerations:
As with any chemical, wash hands thoroughly after handling. Have eyewash facilities immediately available.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Color: Yellow to amber
Physical State: Liquid
Specific Gravity: 0.972 to 0.984 @ 77ºF (25ºC)
Flash Point: 130°F (54.4°C)
Odor: Citrus odor.
Boiling Point: 212ºF (100ºC)
Vapor Pressure: <2mmHg @ 68°F (20°C)
Solubility in Water: Soluble.
Volatile Organic Compound (VOC) Content: <10 to 40% by volume.

Note: These specifications represent a typical sample of this product, but actual values may vary. Certificates of Analysis and Specification Sheets are available upon request.

Section 10: STABILITY AND REACTIVITY

Stability: Stable.

Conditions to Avoid: Keep away from heat, sparks, flames, and contamination.

Incompatible Materials: Strong oxidizing agents and strong acids, including acidic clays, peroxides, halogens, vinyl chloride, and iodine pentafluoride.

Hazardous Decomposition Products: Oxides of citrus terpenes, which can result from improper storage and handling, are known to cause skin sensitization.

Possibility of Hazardous Reactions: BHT, an antioxidant, has been added to prevent oxidation. Avoid long-term exposure to air. If storing partially-filled container, fill headspace with an inert gas such as nitrogen or carbon dioxide

Section 11: TOXICOLOGICAL INFORMATION

Acute Effects
Citrus terpenes have been shown to have low oral toxicity (LD50>5 g/kg) and low dermal toxicity (LD50> 5g/kg) when tested on rabbits. Citrus terpenes also showed low toxicity by inhalation (RD50>1 g/kg) when tested on mice. Product may be a skin and eye irritant. Inhalation may cause irritation of the nose, throat, and respiratory tract.

Chronic Effects
This product is not classified as a carcinogen by OSHA, IARC, or NTP. This product has not been shown to produce genetic changes when tested on bacterial or animal cells. This product does not contain known reproductive or

developmental toxins. Prolonged or repeated exposure can cause drying or dermatitis of skin. Improper storage and handling may lead to the formation of a possible skin sensitizer.

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: N/A

Persistence/Degradability: Product is expected to be readily biodegradable.

Bioaccumulation/Accumulation: No appreciable bioconcentration is expected in the environment.

Mobility in Environment: Citrus terpenes volatilize rapidly.

Section 13: DISPOSAL CONSIDERATIONS

Disposal:
Incinerate or dispose of in accordance with Local, State, and Federal Regulations. Taking regulations into consideration, waste may be incinerated or handled through EPA Spill Control Plan via landfill or dilution. Empty containers must be triple-rinsed prior to disposal. Oil soaked rags should bedisposed of properly to prevent spontaneous combustion.

Section 14: TRANSPORT INFORMATION

US DOT Shipping Classification
Proper Shipping Name: Terpene Hydrocarbons, N.O.S.
Hazard Class: 3
I**dentification No.:** UN2319
Packing Group: III
Label/Placard: Exception §173.150(f) applies.

TDG Status: Hazardous
IMO Status: Hazardous
IATA Status: Hazardous

The listed transportation classification does not address regulatory variations due to changes in package size, mode of shipment, or other regulatory descriptions.

Section 15: REGULATORY INFORMATION

Global Inventories
The components of this product are included in the following inventories:
USA (TSCA)
Canada (DSL)
Australia (AICS)
Korea (KECL)
Philippines (PICCS)

Proposition 65: California Safe Drinking Water and Toxic Enforcement Act of 1986
This product is not known to contain any chemicals currently listed as carcinogens or reproductive toxins under California Proposition 65 at levels which would be subject to the proposition.

Section 16: OTHER INFORMATION

NFPA 704: National Fire Protection Association
Health – 1 Fire – 2 Reactivity – 0

Legend
OSHA – United States Occupational Health and Safety Administration
IARC – International Agency for Research on Cancer

NTP – National Toxicology Program
NIOSH – National Institute for Occupational Safety and Health
EPA – United States Environmental Protection Agency

Caution: The user should conduct his/her own experiments and establish proper procedures and control before attempting use on critical parts.

The information contained herein is based on current knowledge and experience: no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information obtained by the user. No warranty is expressed or implied regarding the accuracy of this data, the results to be obtained from the use thereof, or that any such use will not infringe any patent. Users should make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials, the safety and health of employees and customers, and the protection of the environment. This information is furnished upon the condition the person receiving it shall determine the suitability for the particular purpose. This MSDS is to be used as a guideline for safe work practices and emergency response.

ATTACHMENT B

Well Construction Diagrams

DRILLING SUMMARY

Geologist: S. McCabe

Drilling Company:
Aquifer Drilling and Testing, Inc.

Driller: Jeremy Meyers

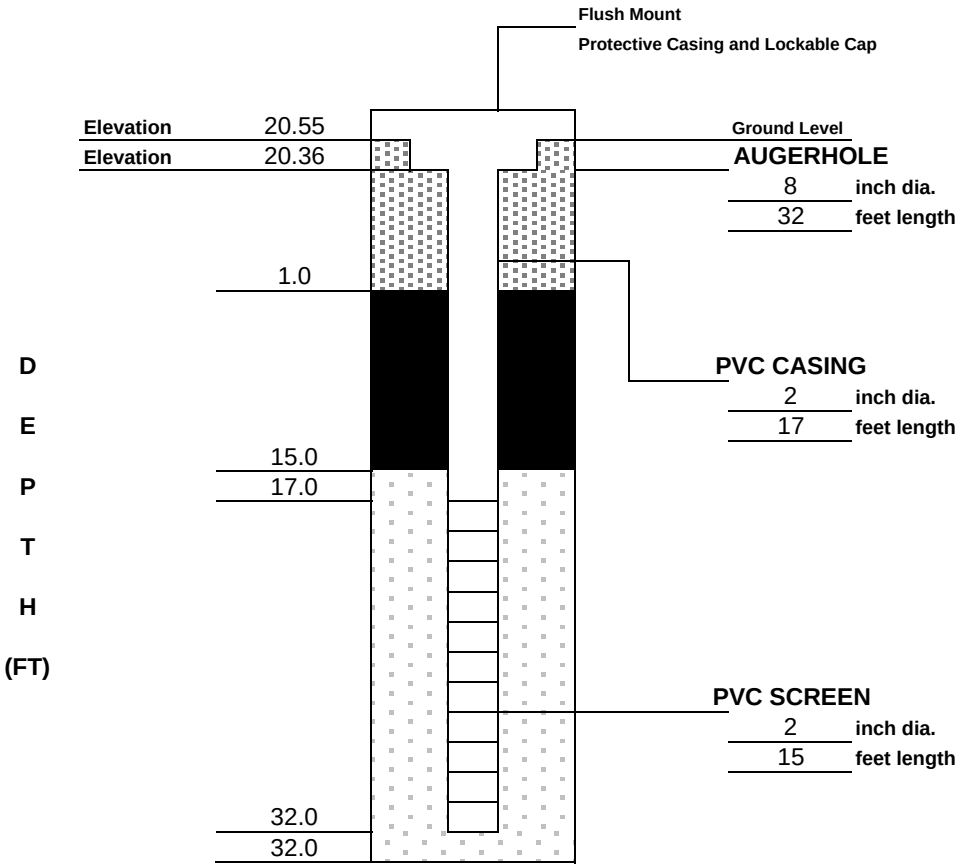
Rig Make/Model:
CME 55LC

Date:
12/7/2007

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.

WELL DESIGN



CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: Steel grade box	**Type:** 2" PVC	**Type:** #2 Sand **Setting:** 15.0-32.0'
Monitor: 2" PVC	**Slot Size:** .020"	***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 1.0-15.0'

COMMENTS:

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: NYSDEC	**Location : Meeker Avenue Site**	**Project No.: 11174989.00002**
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number: DEC-024**

DRILLING SUMMARY

Geologist:
S. McCabe

Drilling Company:
Aquifer Drilling and Testing, Inc.

Driller:
Jeremy Meyers

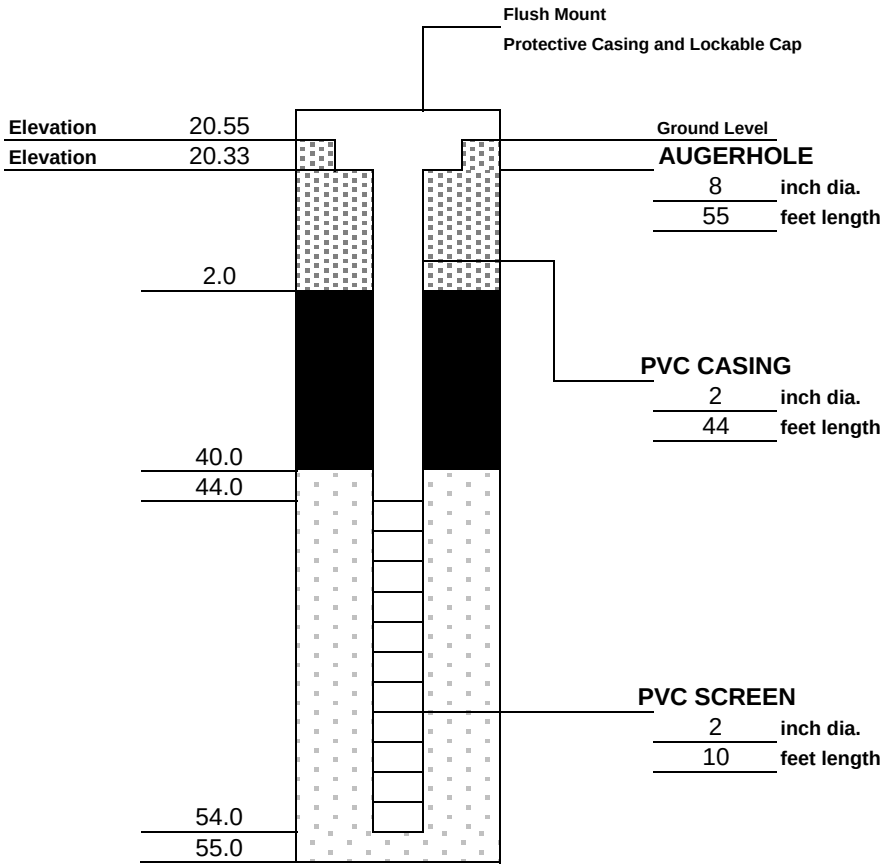
Rig Make/Model:
CME-55 LC

Date:
5/14/2008

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.

DEPTH (FT)



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: Steel grade box	**Type:** 2" PVC	**Type:** #2 Sand **Setting:** 40.0-55.0'
Monitor: 2" PVC	**Slot Size:** .020"	***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 2.0-40.0'

COMMENTS:

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: NYSDEC	**Location : Meeker Avenue Site**	**Project No.: 11174989.00002**
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number: DEC-024D**

DRILLING SUMMARY

Geologist:
S. McCabe

Drilling Company:
Aquifer Drilling and Testing, Inc.

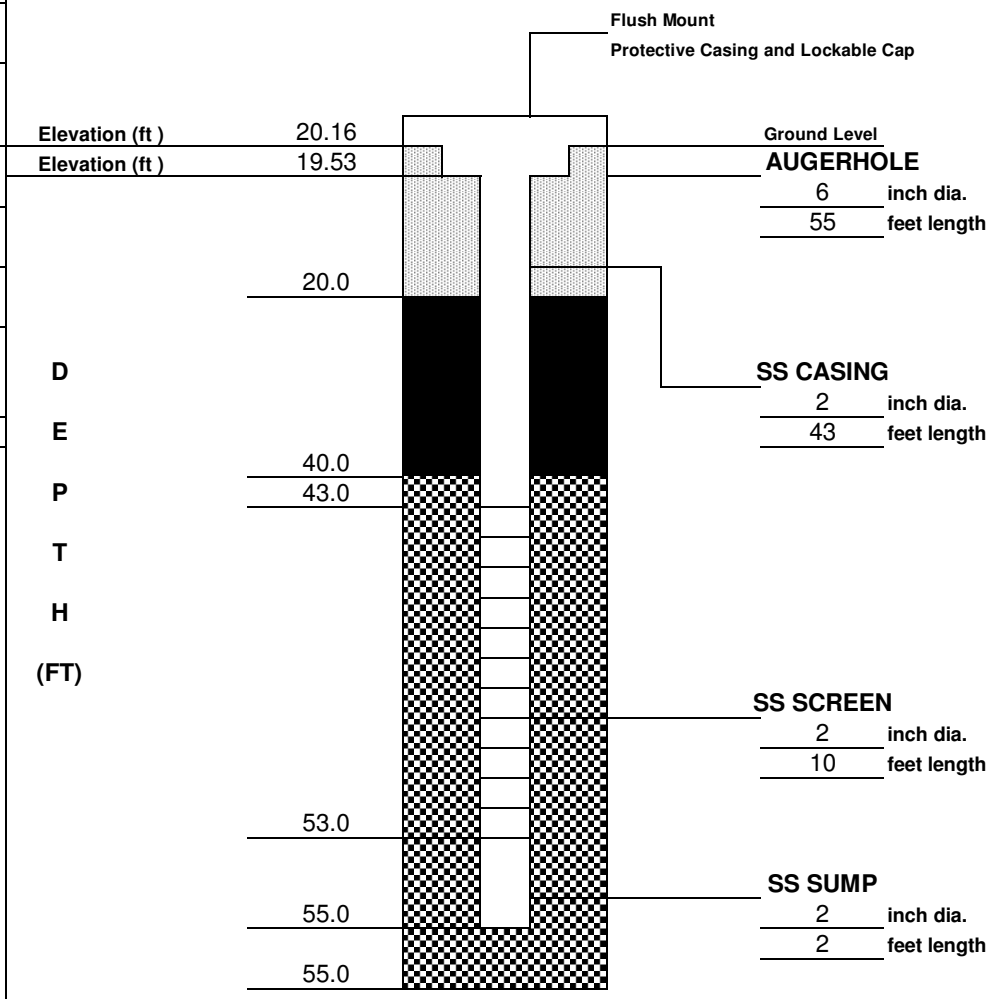
Driller:
Chris Stratton

Rig Make/Model:
AMS 17-C Sonic

Date:
6/19/2009

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: Steel grade box	**Type:** 2" Type 304 Stainless Steel	**Type:** #2 Sand **Setting:** 40.0-55.0'
Monitor: 2" Type 304 Stainless Steel	**Slot Size:** .020"	***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 20.0-40.0'

COMMENTS:

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: NYSDEC	**Location : Meeker Avenue Site**	**Project No.: 11174989.00002**
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number: DEC-024DR**

DRILLING SUMMARY

Geologist:
S. McCabe

Drilling Company:
Aquifer Drilling and Testing, Inc.

Driller:
J. McGill

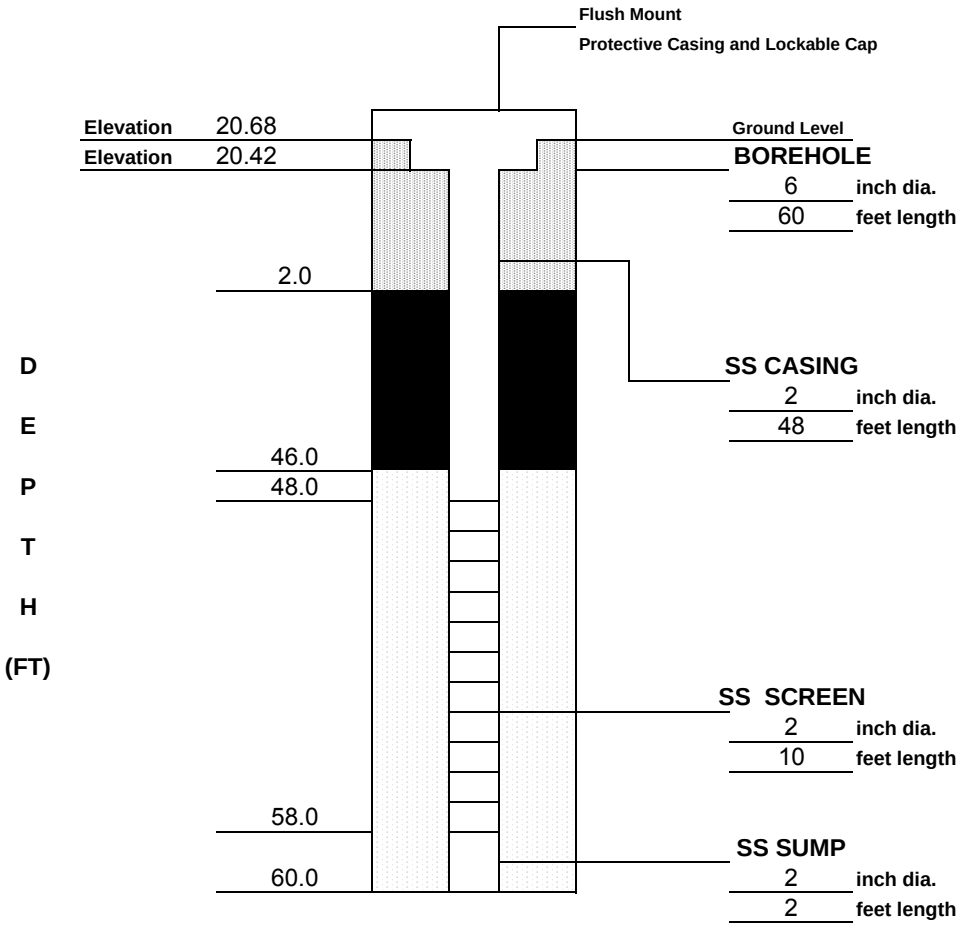
Rig Make/Model:
AMS 17-C Sonic

Date:
7/10/2012

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.

WELL DESIGN



CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 46.0-60.0 ft
Monitor: 2" Stainless Steel	**Slot Size:** 0.010" Continuous Wrap	***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 2.0-46.0 ft

COMMENTS:

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: NYSDEC	**Meeker Avenue Site Characterization**	**Project No.: 11176465.00002**
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number: DEC-092D**

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

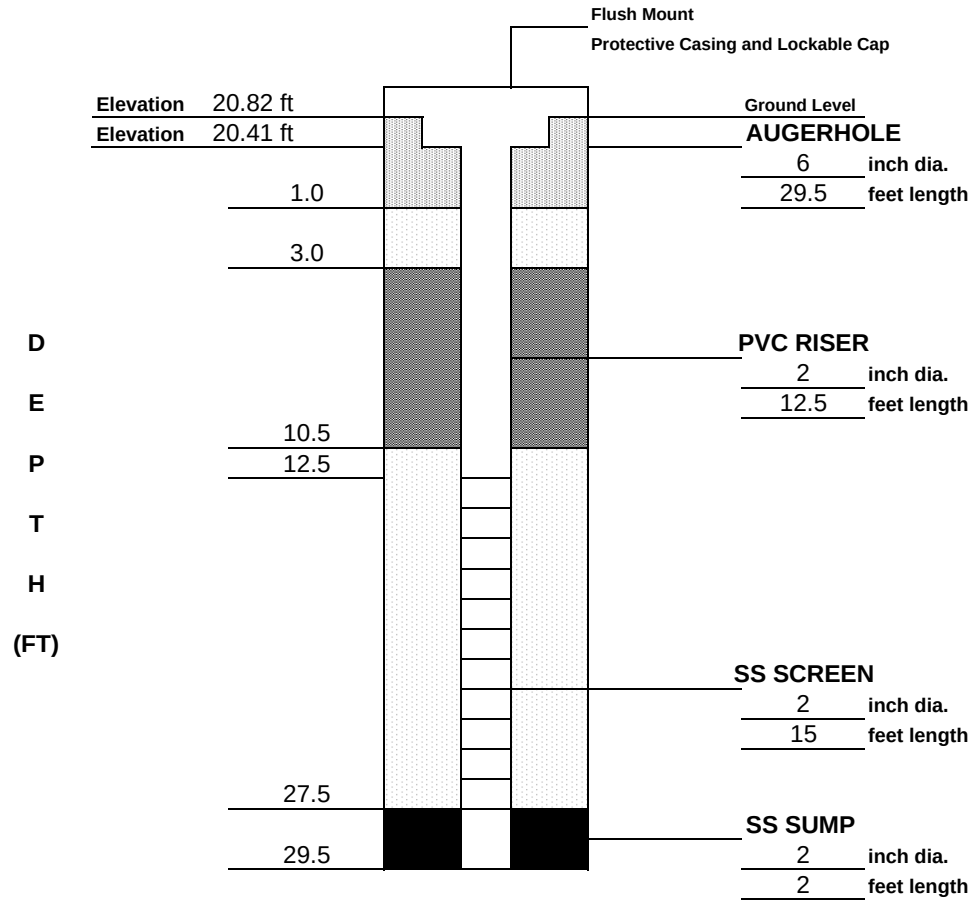
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
2/2/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log DEC-136D for Lithologic Description



WELL DESIGN

CASING MATERIAL		*SCREEN MATERIAL*		*FILTER MATERIAL*		
Surface:	8" Flush mount steel grade box	**Type:**	2" Stainless Steel	**Type:** #1 Sand	**Setting:**	1.0-3.0 ft 10.5-27.5 ft
Riser:	2" Sch 40 PVC	**Slot Size:**	0.010" - Continuous wrap	***SEAL MATERIAL***		
				Type: Bentonite Chips	**Setting:**	3.0-10.5 ft
				Type: Bentonite Pellets	**Setting:**	27.5-29.5 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** DEC-136

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

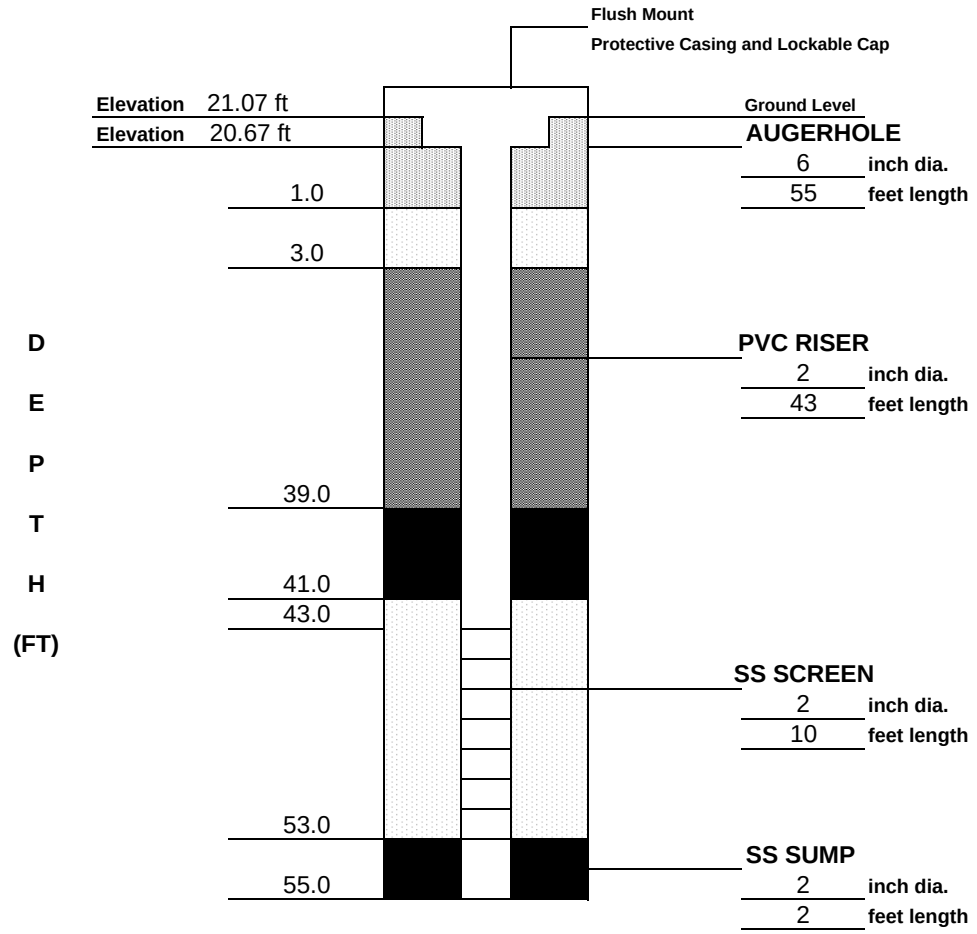
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
1/22/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See DEC-136D Boring Log for Lithologic Description



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 43.0-53.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	*SEAL MATERIAL*
		Type: Bentonite Grout **Setting:** 3.0-39.0 ft
		Type: Bentonite Pellets **Setting:** 39.0-41.0 ft, 53.0-55.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Grout
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** DEC-136D

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

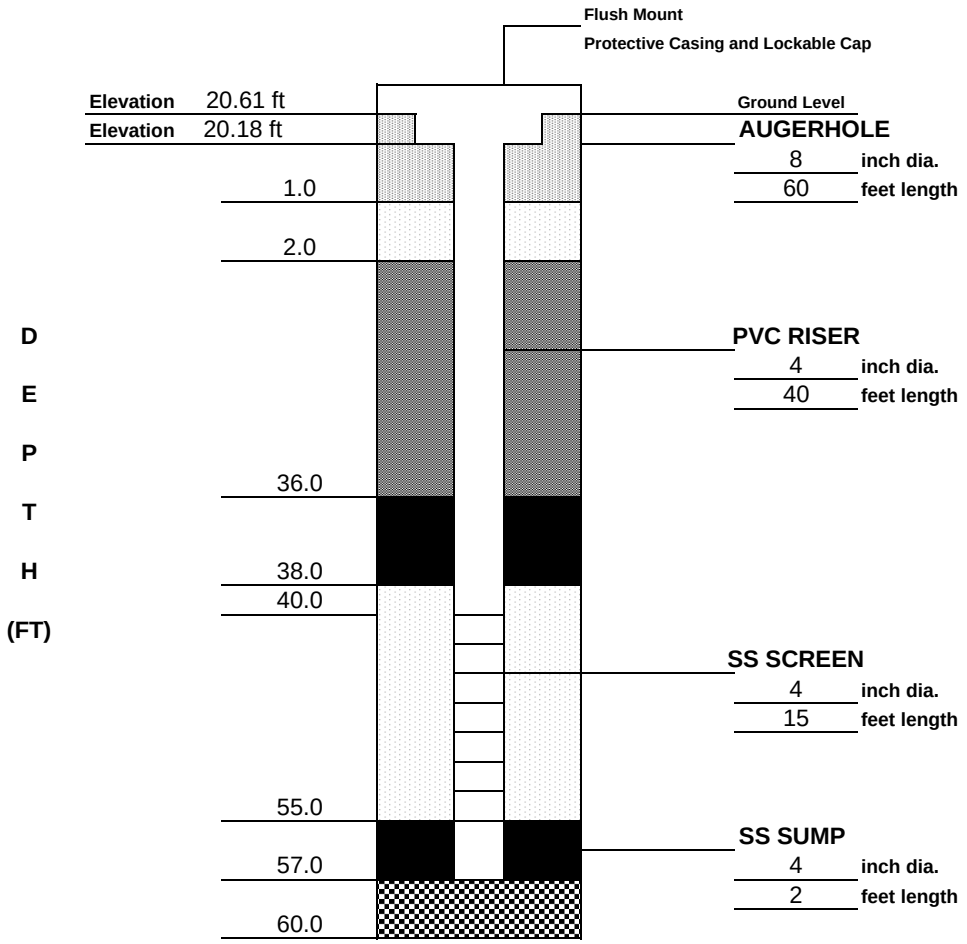
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
2/3/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log EW-01 for Lithologic Description



WELL DESIGN

CASING MATERIAL		*SCREEN MATERIAL*		*FILTER MATERIAL*		
Surface:	8" Flush mount steel grade box	**Type:**	4" Stainless Steel	**Type:** #3 Sand	**Setting:**	1.0-2.0 ft 38.0-55.0 ft
Riser:	4" Sch 40 PVC	**Slot Size:**	0.020" - Continuous wrap	***SEAL MATERIAL***		
				Type: Bentonite Grout	**Setting:**	2.0-36.0 ft
				Type: Bentonite Pellets	**Setting:**	36.0-38.0 ft 55.0-57.0 ft
				Type: Bentonite Chips	**Setting:**	57.0-60.0 ft

COMMENTS:

Borehole drilled to 57 ft below ground surface (bgs). Backfilled with bentonite chips from 60 to 57 ft bgs.

LEGEND

- Concrete
- Bentonite Grout
- Bentonite Pellets
- Bentonite Chips
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** EW-01

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

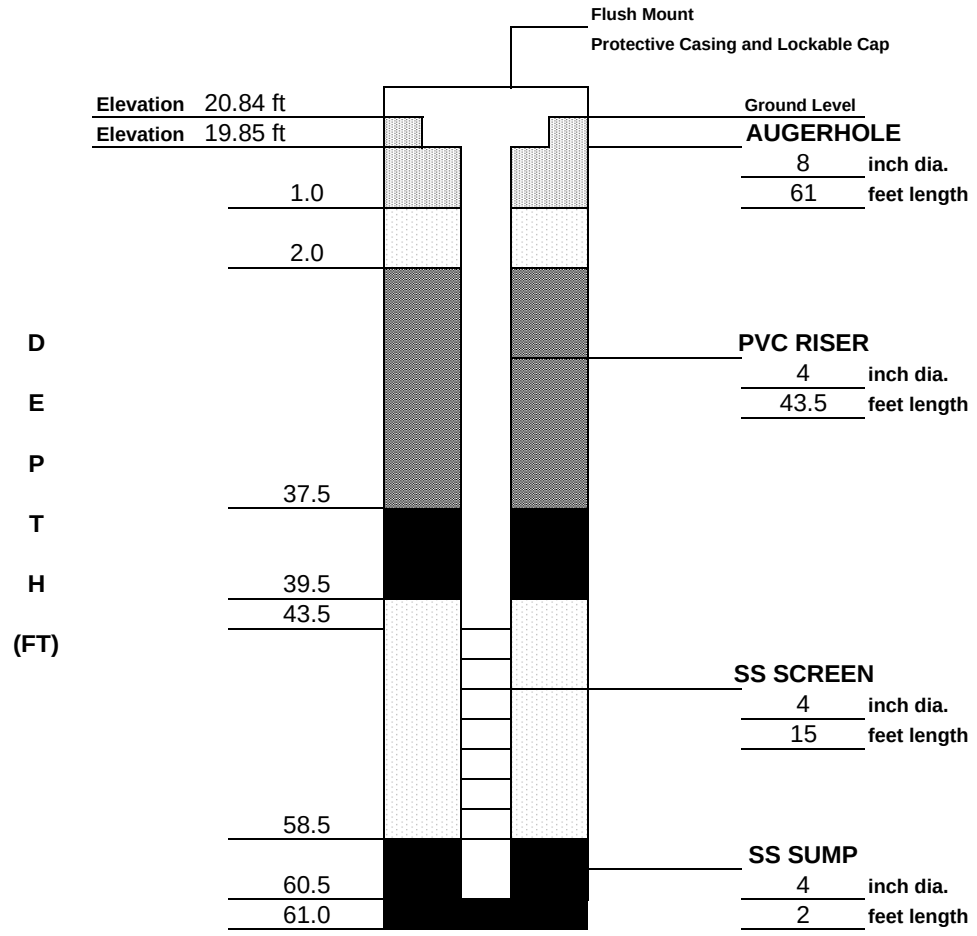
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
2/4/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log EW-02 for Lithologic Description



WELL DESIGN

CASING MATERIAL		*SCREEN MATERIAL*		*FILTER MATERIAL*		
Surface:	8" Flush mount steel grade box	**Type:**	4" Stainless Steel	**Type:** #3 Sand	**Setting:**	1.0-2.0 ft 39.5-58.5 ft
Riser:	4" Sch 40 PVC	**Slot Size:**	0.020" - Continuous wrap	***SEAL MATERIAL***		
				Type: Bentonite Grout	**Setting:**	2.0-37.5 ft
				Type: Bentonite Pellets	**Setting:**	37.5-39.5 ft 58.5-61.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Grout
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** EW-02

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

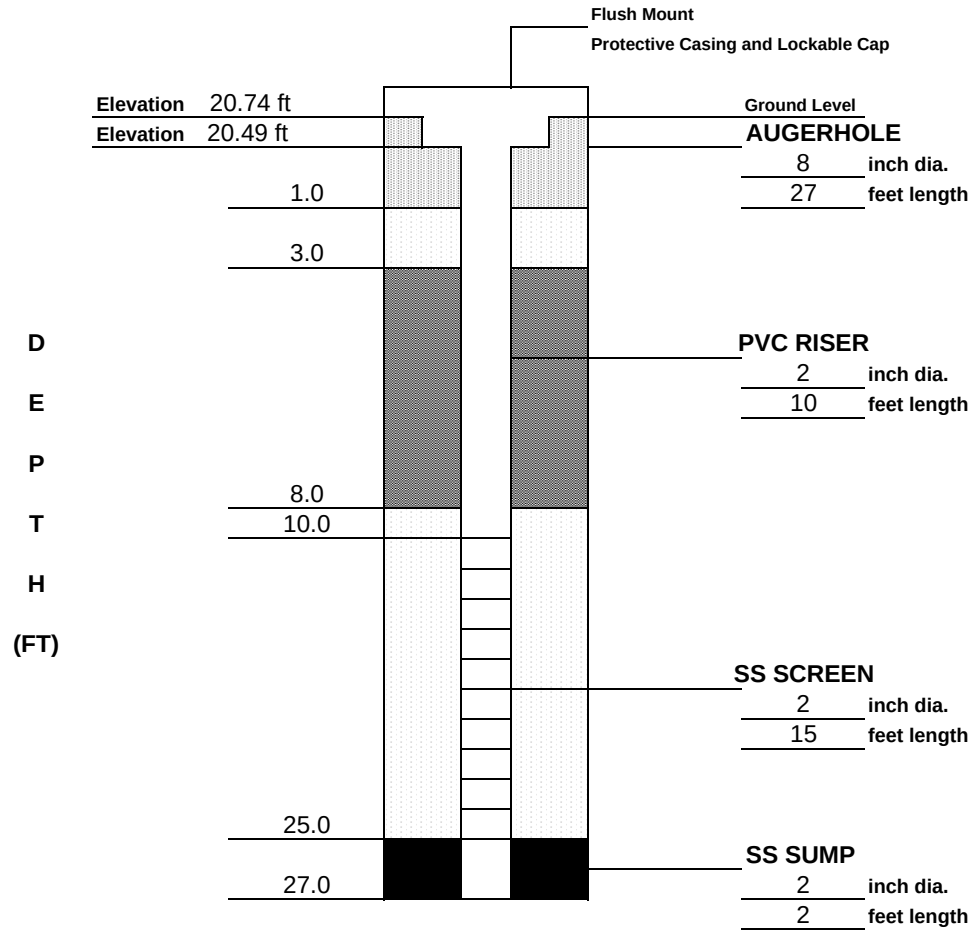
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/11/2006

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-03

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

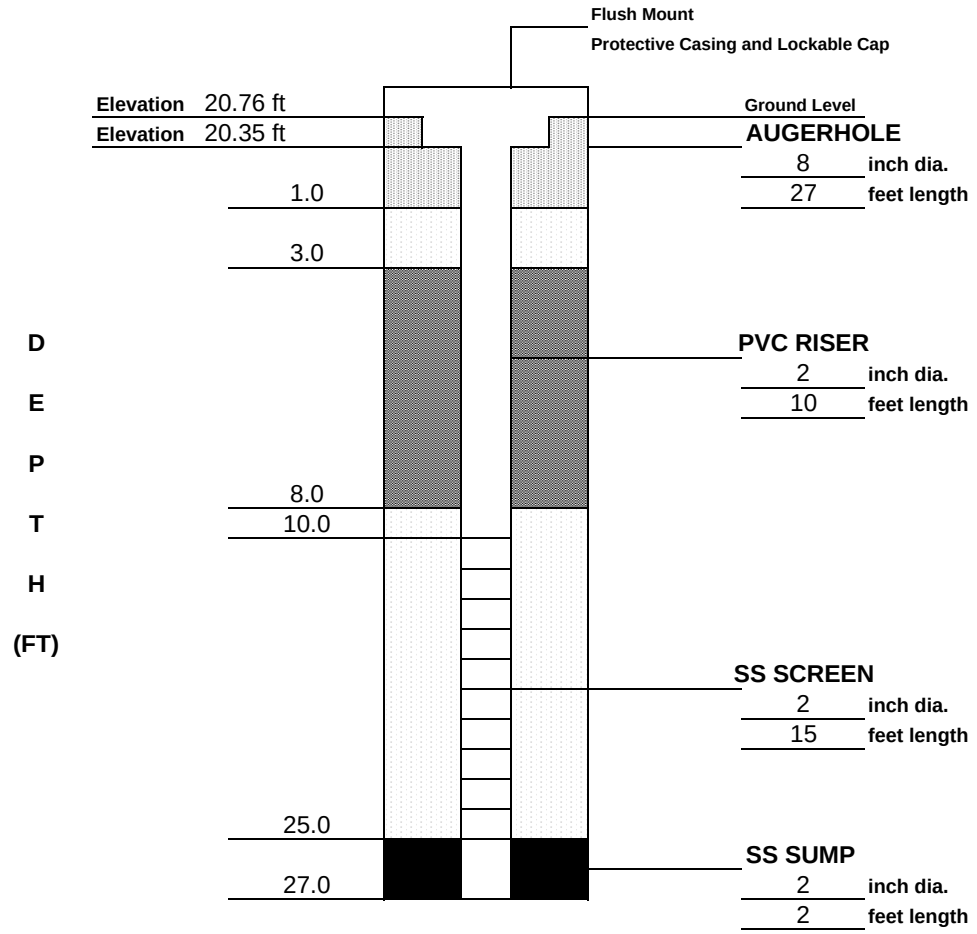
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/11/2016

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-04

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

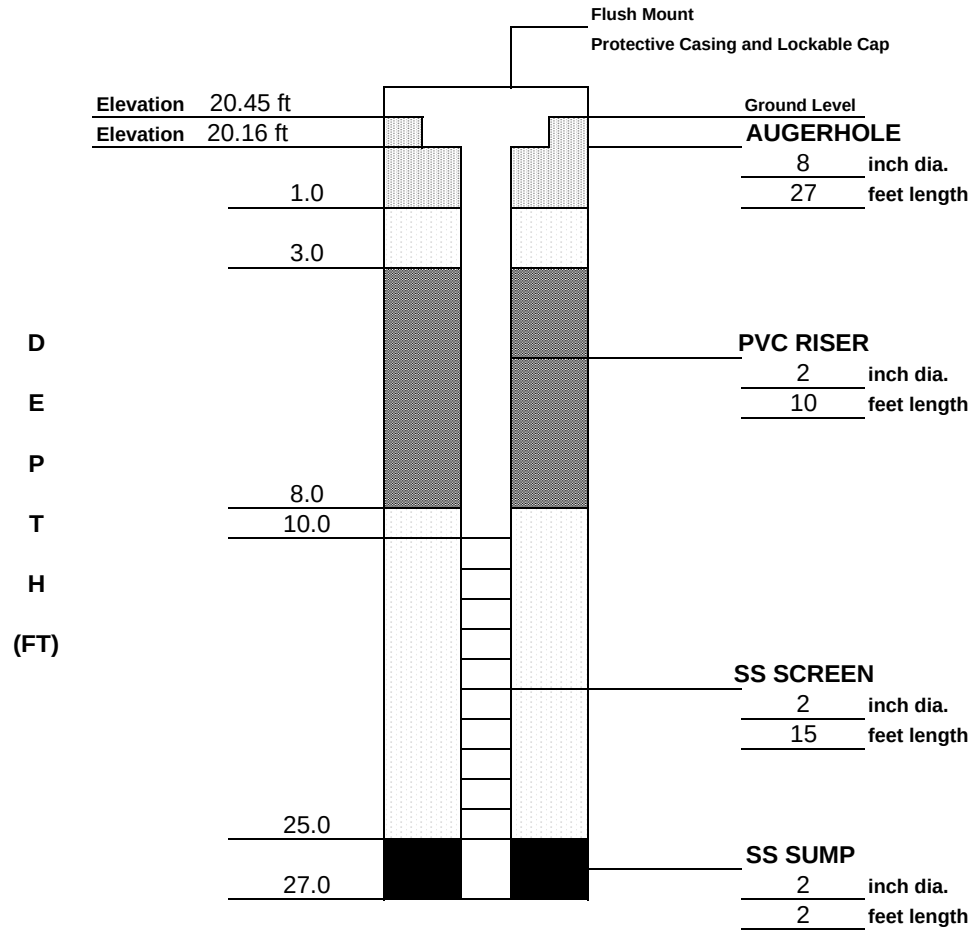
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/10/2016

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-05

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

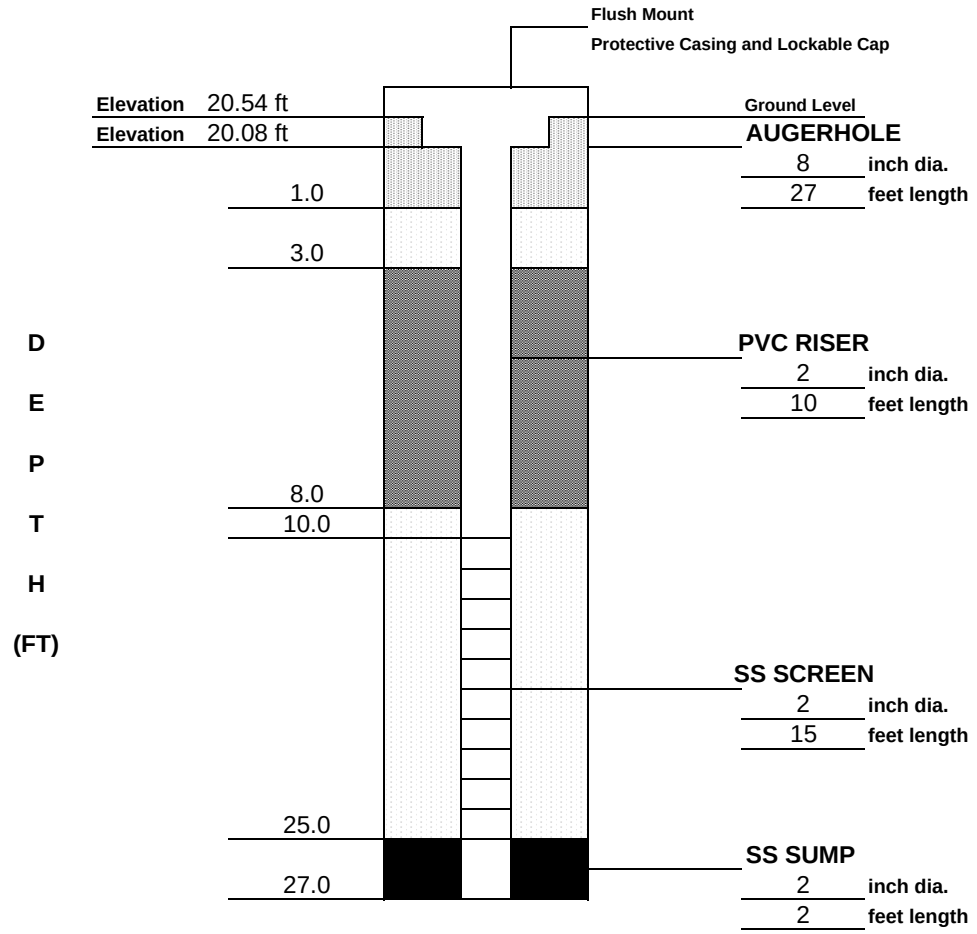
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/10/2016

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-06

APPENDIX C

BORING LOGS AND MONITORING WELL LOGS

URS Corporation

TEST BORING LOG

BORING NO. : DEC-024

PROJECT/PROJECT LOCATION: Meeker Avenue Plume Trackdown

SHEET: 1 OF 2

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359

BORING CONTRACTOR: Aquifer Drilling & Testing Inc.

NORTHING: 204298.6856 **EASTING:** 1000312.2401

GROUNDWATER: Encountered at 21.0' bgs.

GROUND ELEVATION: 20.55

	CAS.	SAMPLER	CORE	TUBE
TYPE	HSA	Split Spoon		
DIA.	4.25 "	2-inch		
WT.		140 lbs.		
FALL		30 - inches		

DATE	TIME	LEVEL	TYPE

* POCKET PENETROMETER READING

DATE STARTED: 12/6/2007

DATE FINISHED: 12/7/2007

DRILLER: Jeremy Meyers

GEOLOGIST: S. McCabe

REVIEWED BY: Tim Burmeier

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0					Reddish Brown		Concrete			Vactron cleared boring 0-5.0'
							Fill: Sand, trace asphalt	ML		
							Clayey SILT, trace sand, gravel, and cobbles.			
-5		1	4/7/7/10	58		Stiff			0	Moist
		2	7/33/ 50/4	88		Hard			0	
		3	8/10/10/16	67		Very Stiff			0.6	
-10		4	11/ 50/3	33	Grey	Hard			0	
-15		5	8/11/12/13	58		Very Stiff			0	
		6	8/10/12/20	71					0	
-20		7	4/6/19/20	100					1421	
		8	9/5/4/5	50	Black Brown	Loose	Fine to medium SAND, trace gravel	SP	172	Wet Petroleum staining and odor 21.0-21.3' bgs
		9	3/4/5/4	100					4493	
-25										

COMMENTS: Boring advanced with track-mounted CME-55LC using equipped with 4.25 -inch hollow stem augers.
Sampled for VOCs 19.0-21.0' and 23.0-25.0' bgs.

URS Corporation

TEST BORING LOG

BORING NO. : DEC-024

PROJECT: Meeker Avenue Plume Trackdown

SHEET: 2 OF 2

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
-30		10	4/3/4/6	100					491	
-35							Boring Completed at 32.0' bgs.			
-40										
-45										
-50										
-55										

COMMENTS: Boring advanced with track-mounted CME-55LC using equipped with 4.25 -inch hollow stem augers.
Sampled for VOCs 19.0-21.0' and 23.0-25.0' bgs.

DRILLING SUMMARY

Geologist: S. McCabe

Drilling Company:
Aquifer Drilling and Testing, Inc.

Driller: Jeremy Meyers

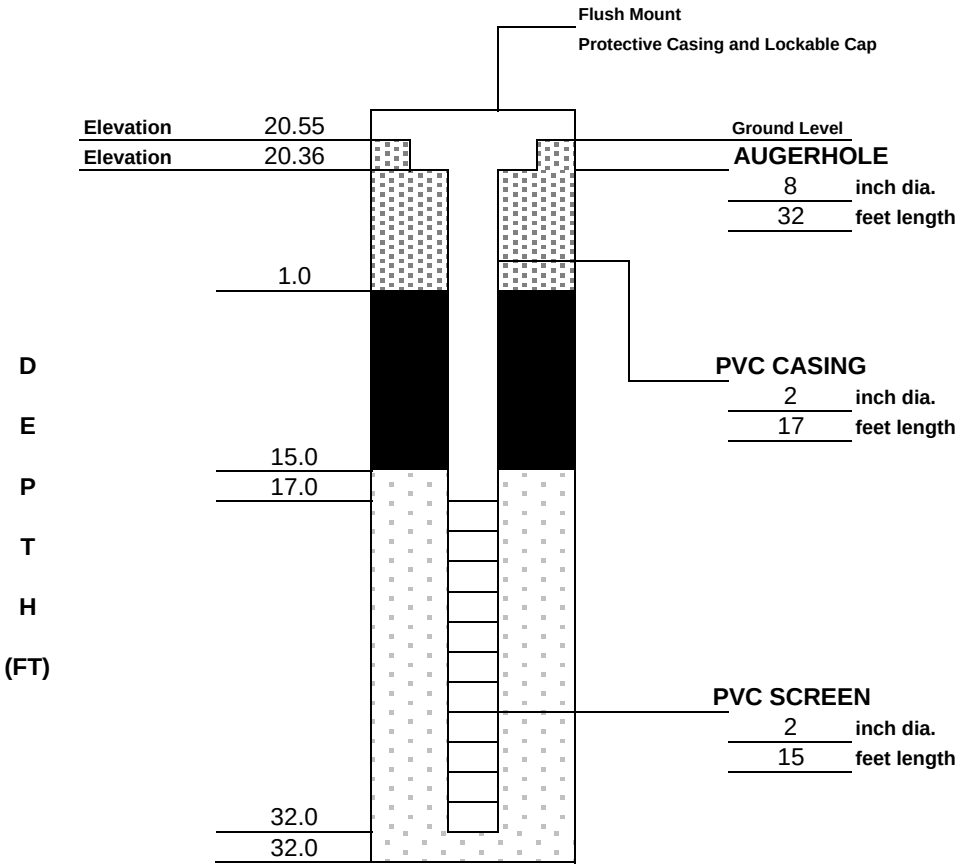
Rig Make/Model:
CME 55LC

Date:
12/7/2007

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.

WELL DESIGN



CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: Steel grade box	**Type:** 2" PVC	**Type:** #2 Sand **Setting:** 15.0-32.0'
Monitor: 2" PVC	**Slot Size:** .020"	***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 1.0-15.0'

COMMENTS:

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: NYSDEC	**Location : Meeker Avenue Site**	**Project No.: 11174989.00002**
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number: DEC-024**

URS Corporation

TEST BORING LOG

BORING NO. : DEC-024D

PROJECT/PROJECT LOCATION: Meeker Avenue Plume Trackdown

SHEET: 1 OF 2

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359

BORING CONTRACTOR: Aquifer Drilling & Testing Inc.

NORTHING: 204298.609 **EASTING:** 10000311.943

GROUNDWATER: Encountered at 35.0'

GROUND ELEVATION: 20.55

DATE	TIME	LEVEL	TYPE		CAS.	SAMPLER	CORE	TUBE
				TYPE	HSA	Split Spoon		
				DIA.	4 1/4"	2-inch		
				WT.		140 lbs.		
				FALL		30 - inches		
				* POCKET PENETROMETER READING				

DATE STARTED: 5/5/08

DATE FINISHED: 5/12/08

DRILLER: Jeremy Meyers

GEOLOGIST: S. McCabe

REVIEWED BY: Tim Burmeier

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0							See DEC-024 Boring Log for Lithologic Description From 0-35.0 feet bgs			Vactron cleared boring 0-5.0'
-5										
-10										
-15										
-20										
-25										

COMMENTS: Boring advanced with truck-mounted CME-55 LC using 4- 1/4-inch hollow stem augers.

URS Corporation

TEST BORING LOG

BORING NO. : DEC-024D

PROJECT: Meeker Avenue Plume Trackdown

SHEET: 2 OF 2

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
-30										
-35		1	13/15/15/20	100	Brown	Dense	Fine to medium SAND, trace gravel	SP	0.0	Wet
		2	12/17/17/15	100					0.0	
-40		3	50/3	100		Very Dense			0.0	
		4	20/56/23/13	75					0.0	
-45		5	52/27/21/23	75		Dense			0.0	Strong solvent odor
		6	21/39/41/53	100		Very Dense			4376	
-50		7	22/23/24 50/2	75		Hard	Clayey SILT, trace sand	ML	5430	Moist
		8	17/21/28/37	75					400	
-55							Boring Completed at 55.0' bgs.			

COMMENTS: Boring advanced with truck-mounted CME-55 LC using 4- 1/4-inch hollow stem augers.

DRILLING SUMMARY

Geologist:
S. McCabe

Drilling Company:
Aquifer Drilling and Testing, Inc.

Driller:
Jeremy Meyers

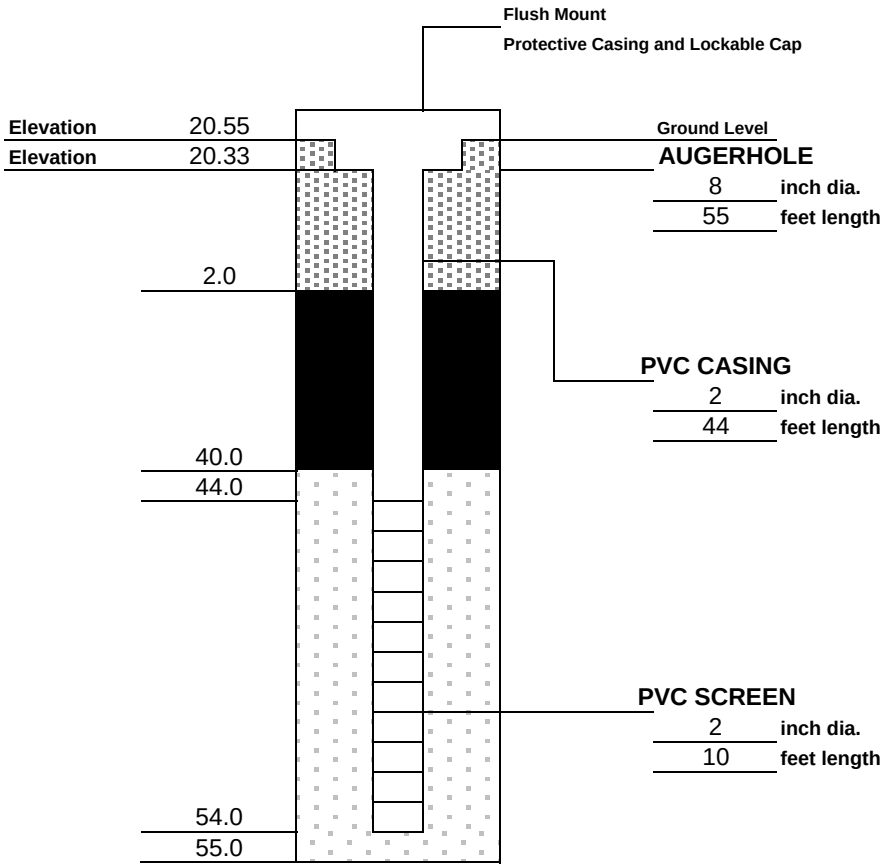
Rig Make/Model:
CME-55 LC

Date:
5/14/2008

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.

DEPTH (FT)



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: Steel grade box	**Type:** 2" PVC	**Type:** #2 Sand **Setting:** 40.0-55.0'
Monitor: 2" PVC	**Slot Size:** .020"	***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 2.0-40.0'

COMMENTS:

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: NYSDEC	**Location : Meeker Avenue Site**	**Project No.: 11174989.00002**
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number: DEC-024D**

URS Corporation

TEST BORING LOG

BORING NO. : DEC-024DR

PROJECT/PROJECT LOCATION: Meeker Avenue Plume Trackdown

SHEET: 1 OF 2

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359

BORING CONTRACTOR: Aquifer Drilling & Testing Inc.

NORTHING: 204320.8853 **EASTING:** 1000309.9175

GROUNDWATER:

DATE	TIME	LEVEL	TYPE	TYPE	CAS.	SAMPLER	CORE	TUBE
					Casing	Split Spoon		
				DIA.	5-inch	2-inch		
				WT.		140 lbs.		
				FALL		30 - inches		
				* POCKET PENETROMETER READING				

GROUND ELEVATION: 20.16 feet

DATE STARTED: 6/19/09

DATE FINISHED: 6/19/09

DRILLER: C. Stratton

GEOLOGIST: S. McCabe

REVIEWED BY: Tim Burmeier

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0							Concrete See DEC-024 and DEC-024D Boring Logs for Lithologic Description for 0-40.0 feet bgs.			Vactron cleared boring 0-5.0'
-5										
-10										
-15										
-20										
-25										

COMMENTS: Boring advanced with track-mounted AMS 17-C Sonic drill rig using 3-inch sampler and 5-inch OD casing.
Soil sample collected 45.0-46.0 feet bgs for TCL VOC plus TICs analysis.

URS *Corporation*

TEST BORING LOG

BORING NO. : DEC-024DR

PROJECT: Meeker Avenue Plume Trackdown

SHEET: 2 OF 2

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
-30										
-35										
-40		1		100	Brown		Fine to medium SAND, trace silt	SP	234 8.9 17.2 19.1 17.3	Wet
-45		2		100			Fine sandy SILT, few 2-3" thick fine to medium sand lenses	SM/ML	1000 2469 2.0 21 891	
-50		3		100			Clayey SILT	ML	219 919 612 121 134	Moist
-55							Boring Completed at 55.0' bgs.			

COMMENTS: Boring advanced with track-mounted AMS 17-C Sonic drill rig using 3-inch sampler and 5-inch OD casing.
Soil sample collected 45.0-46.0 feet bgs for TCL VOC plus TICs analysis.

DRILLING SUMMARY

Geologist:
S. McCabe

Drilling Company:
Aquifer Drilling and Testing, Inc.

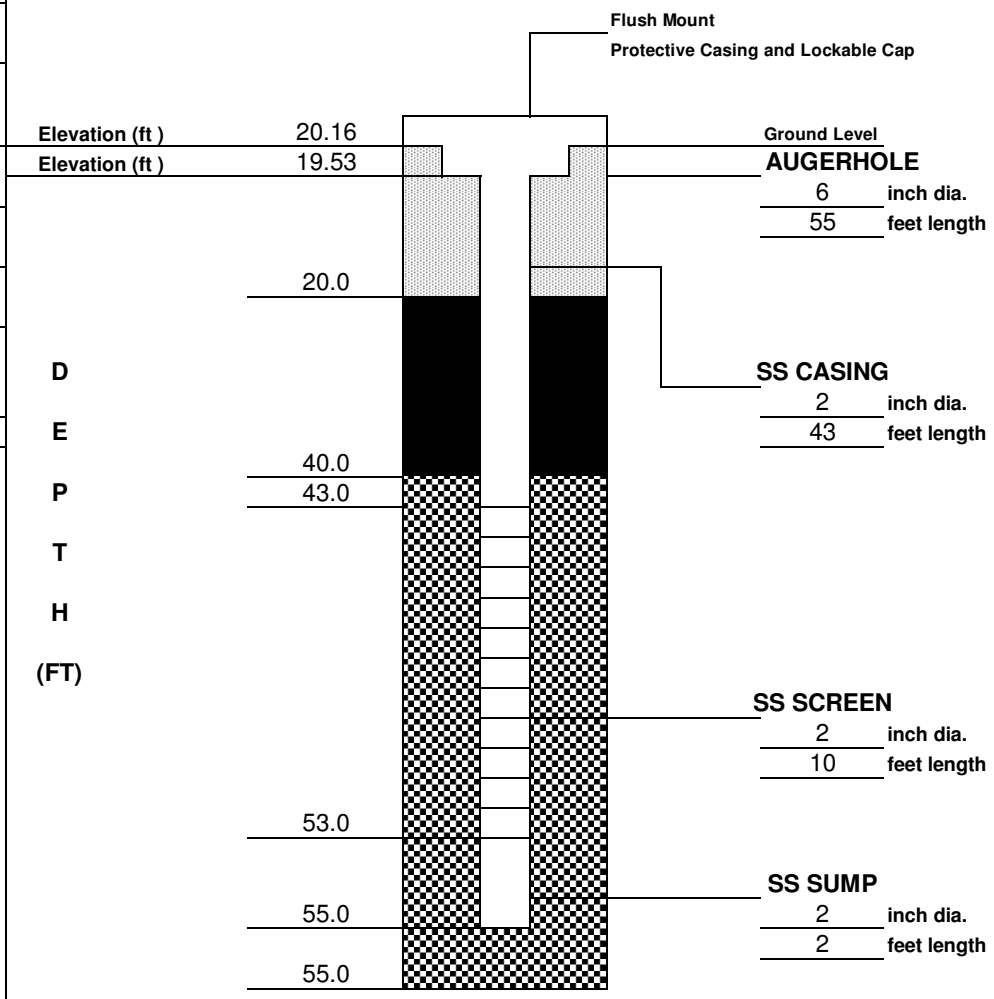
Driller:
Chris Stratton

Rig Make/Model:
AMS 17-C Sonic

Date:
6/19/2009

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: Steel grade box	**Type:** 2" Type 304 Stainless Steel	**Type:** #2 Sand **Setting:** 40.0-55.0'
Monitor: 2" Type 304 Stainless Steel	**Slot Size:** .020"	***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 20.0-40.0'

COMMENTS:

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: NYSDEC	**Location : Meeker Avenue Site**	**Project No.: 11174989.00002**
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number: DEC-024DR**

URS Corporation

TEST BORING LOG

BORING NO. : DEC-092D

PROJECT/PROJECT LOCATION: Meeker Avenue - Site Characterization Phase VII

SHEET: 1 **OF** 3

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176465.00002

BORING CONTRACTOR: Aquifer Drilling & Testing Inc.

NORTHING: 204258.195 **EASTING:** 1000322.224

GROUNDWATER:

GROUND ELEVATION: 20.68

DATE	TIME	LEVEL	TYPE	TYPE	CAS.	SAMPLER	CORE	TUBE
				DIA.	5"		3"	
				WT.				
				FALL				
				* POCKET PENETROMETER READING				

DATE STARTED: 7/9/12

DATE FINISHED: 7/10/12

DRILLER: J. McGill

GEOLOGIST: S. McCabe

REVIEWED BY: T. Burmeier

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0					Brown		CONCRETE		0.0	Vactron cleared to 5 ft bgs.
							Clayey SILT, trace fine to coarse sand, fine to coarse gravel, and cobbles	ML	0.0	
									0.0	
									0.0	
									0.0	
-5		1		100					0.0	Moist
									0.0	
									0.0	
									0.0	
									0.0	
-10		2		82	Gray		Fine sandy SILT, trace medium to coarse sand, fine gravel, and clay		0.0	
									1.3	
									2.1	
									4.1	
-15					Brown		Fine SAND	SP	981	Wet, solvent odor
									3912	
		3		92	Gray		Fine sandy SILT, trace medium to coarse sand, fine gravel, and clay	ML	49.1	Moist
									75	
-20									11.3	
									2.3	
		4		92					1.1	
-25									1.3	

COMMENTS: Boring hand cleared to 5 feet bgs then advanced with track-mounted AMS 17-C Sonic drill rig using a 3-inch sampler and 5-inch OD casing.

Collected soil samples from 16-17, 19-20, 42-43, 53.5-54.5, and 58-59 ft bgs for TCL VOCs plus TICs analysis.

URS Corporation

TEST BORING LOG

BORING NO. : DEC-092D

PROJECT: Meeker Avenue - Site Characterization Phase VII | **SHEET: 2 OF 3**

CLIENT: New York State Department of Environmental Conservation | **JOB NO. :11176465.00002**

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
		5		20						
-30		6		100					3.4 0.0 0.9 0.2 1.1	
-35		7		100					0.0 0.0 0.0 0.0	
-40		8		60			~0.5" sand lense at 39 and 39.6 ft bgs		0.0 0.0 0.0	
					Brown		Fine to medium SAND	SW		Wet
-45		9		60					0.0 0.0 0.0	
-50		10		94					297 476 1037 3637	
-55		11		100			Interbedded SILT and fine SAND DNAPL in sand lenses	SM/ML	>9999 1394 479 123	

COMMENTS: Boring hand cleared to 5 feet bgs then advanced with track-mounted AMS 17-C Sonic drill rig using a 3-inch sampler and 5-inch OD casing.

Collected soil samples from 16-17, 19-20, 42-43, 53.5-54.5, and 58-59 ft bgs for TCL VOCs plus TICs analysis.

URS *Corporation*

TEST BORING LOG

BORING NO. : DEC-092D

PROJECT: Meeker Avenue - Site Characterization Phase VII

SHEET: 3 OF 3

CLIENT: New York State Department of Environmental Conservation

JOB NO. :11176465.00002

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
-60					Gray		Clayey SILT, varved 0.5-1" clay lenses	ML	219 172	
							Boring completed at 60 ft bgs.			
-65										
-70										
-75										
-80										
-85										
-90										

COMMENTS: Boring hand cleared to 5 feet bgs then advanced with track-mounted AMS 17-C Sonic drill rig using a 3-inch sampler and 5-inch OD casing.

Collected soil samples from 16-17, 19-20, 42-43, 53.5-54.5, and 58-59 ft bgs for TCL VOCs plus TICs analysis.

DRILLING SUMMARY

Geologist:
S. McCabe

Drilling Company:
Aquifer Drilling and Testing, Inc.

Driller:
J. McGill

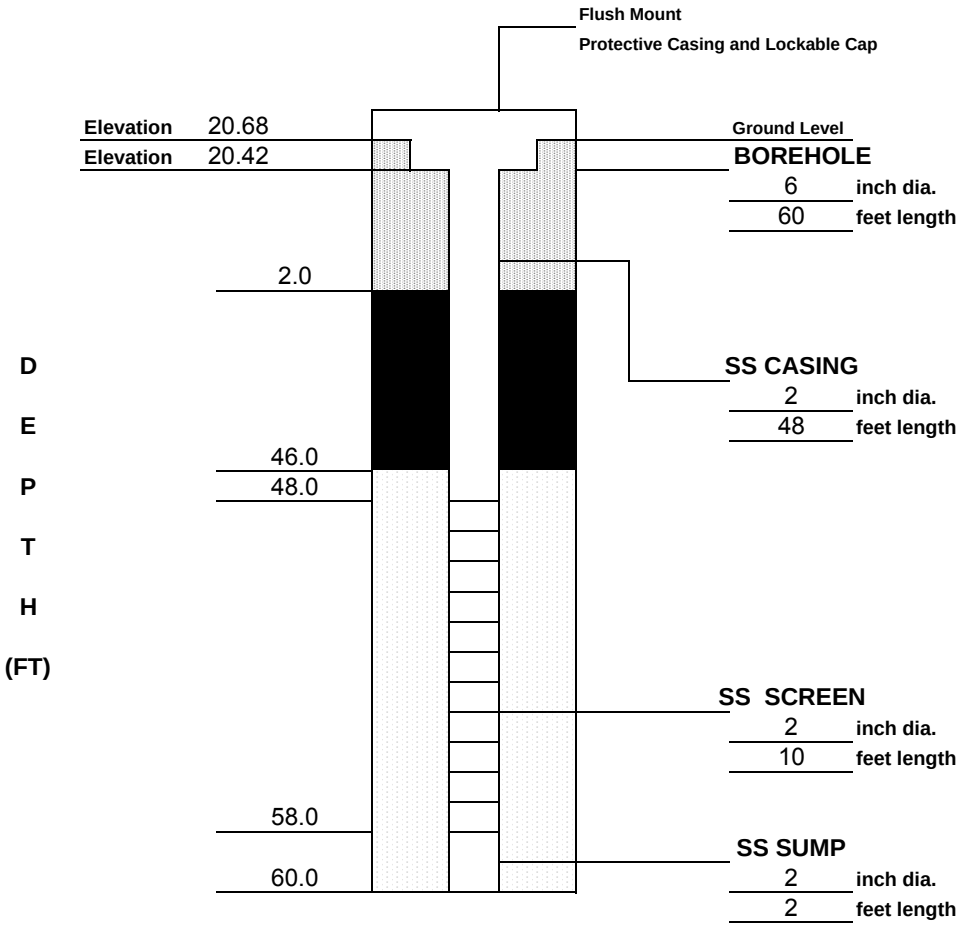
Rig Make/Model:
AMS 17-C Sonic

Date:
7/10/2012

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.

WELL DESIGN



CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 46.0-60.0 ft
Monitor: 2" Stainless Steel	**Slot Size:** 0.010" Continuous Wrap	***SEAL MATERIAL*** **Type:** Bentonite **Setting:** 2.0-46.0 ft

COMMENTS:

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: NYSDEC	**Meeker Avenue Site Characterization**	**Project No.: 11176465.00002**
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number: DEC-092D**

URS Corporation

TEST BORING LOG

BORING NO. : DEC-136D

PROJECT/PROJECT LOCATION: Spic & Span Cleaners and Dyers Site - Pilot Study

SHEET: 1 **OF** 2

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359.00005

BORING CONTRACTOR: Glacier Drilling LLC

NORTHING: 204234.594 **EASTING:** 1000321.521

GROUNDWATER: 17 ft bgs

GROUND ELEVATION: 21.07 ft

DATE	TIME	LEVEL	TYPE	TYPE	CAS.	SAMPLER	CORE	TUBE
				DIA.				
				WT.				
				FALL				
				* POCKET PENETROMETER READING				

DATE STARTED: 01/21/15

DATE FINISHED: 02/05/15

DRILLER: M. Schock

GEOLOGIST: J. Boyd

REVIEWED BY: T. Burmeier

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0					Lt Gry / Lt Brown		CONCRETE	Concrete	0.0	Boring hand cleared to 5 ft bgs.
							FILL: fine to medium sandy silt, trace clay, gravel, and cobbles	Fill	0.0	
									0.0	
									0.0	
									0.0	
-5		1		100	Brown		SILT, some fine to medium sand and fine to medium gravel, trace clay and cobbles	ML	0.3	Moist
									2.4	
									6.8	
									8.7	
									7.2	
-10		2		100	Yellowish Brown				15.0	
									10.6	
									8.5	
					Gray to Brown				10.1	
									55.6	
-15		3		100					6.7	
							Fine to medium SAND	SW	8.1	Wet
									2.0	
									0.8	
									0.1	
-20		4		100			SILT, some fine to medium sand and fine to medium gravel, trace clay and cobbles	ML	0.2	
									0.2	
									0.2	
									0.4	
-25									0.2	
									0.2	

COMMENTS: Boring hand cleared to 5 ft bgs then advanced with track-mounted Geoprobe 8140 LS Sonic drill rig.
Collected soil samples from 19.5 to 20 and 54.5 to 55 ft bgs for TCL VOCs plus TICs analysis.

URS Corporation

TEST BORING LOG

BORING NO. : DEC-136D

PROJECT: Spic & Span Cleaners and Dyers - Pilot Study

SHEET: 2 OF 2

CLIENT: New York State Department of Environmental Conservation

JOB NO. :11176359.00005

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
		5		100					0.2	
									0.2	
									0.2	
-30									0.2	
		6		100	Gray				1.4	
									0.4	
									7.9	
									0.8	
-35									0.7	
									0.2	
									0.2	
					Dk Brn		Fine to medium SAND, some silt several 1" layers of sandy silt with trace fine gravel from 37.7 to 38.5'	SW	0.2	
		7		100	Lt Brown				0.2	
-40									0.2	
									0.2	
									0.2	
									0.2	
									0.4	
-45									0.2	
		8		100	Brown				0.1	
									0.1	
									0.1	
									0.1	
-50									0.2	
									0.2	
							SILT, trace fine sand	ML	0.2	
		9		100					0.2	
							several 1 to 2" layers of dark brown silty clay from 53.5 to 54.5'		0.2	
-55									38.8	
							Boring completed at 55 ft bgs.			

COMMENTS: Boring hand cleared to 5 ft bgs then advanced with track-mounted Geoprobe 8140 LS Sonic drill rig.
Collected soil samples from 19.5 to 20 and 54.5 to 55 ft bgs for TCL VOCs plus TICs analysis.

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

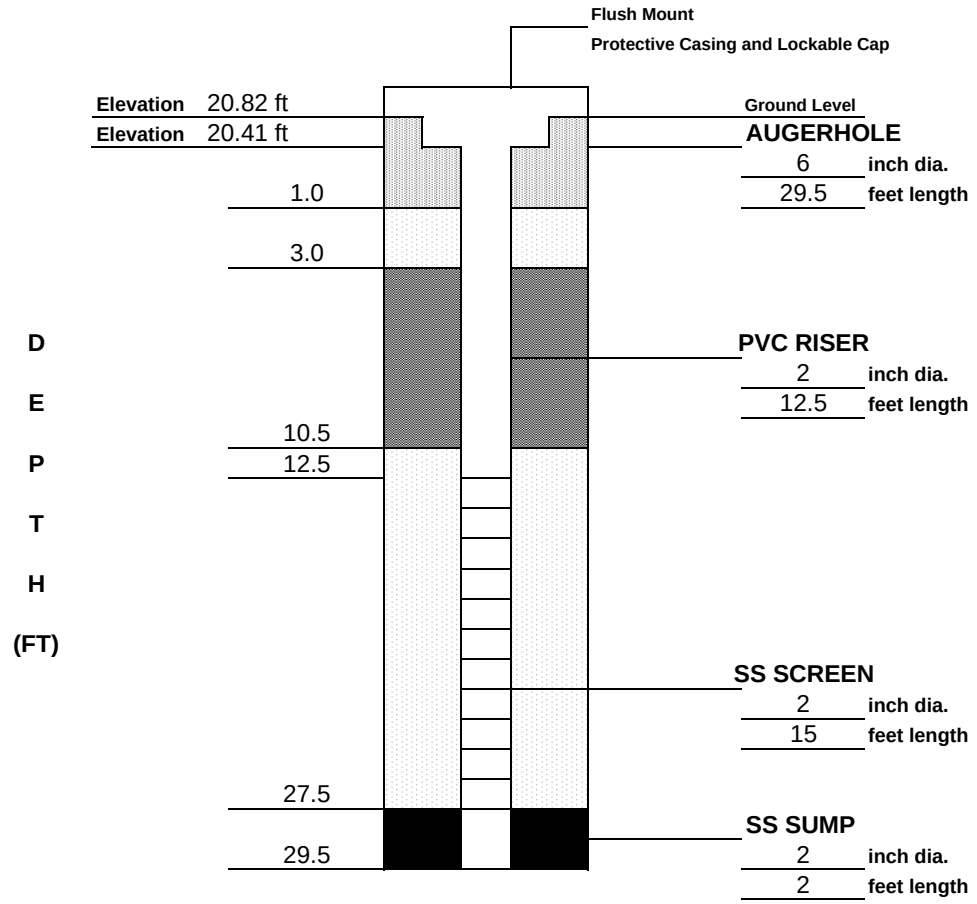
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
2/2/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log DEC-136D for Lithologic Description



WELL DESIGN

CASING MATERIAL		*SCREEN MATERIAL*		*FILTER MATERIAL*		
Surface:	8" Flush mount steel grade box	**Type:**	2" Stainless Steel	**Type:** #1 Sand	**Setting:**	1.0-3.0 ft 10.5-27.5 ft
Riser:	2" Sch 40 PVC	**Slot Size:**	0.010" - Continuous wrap	***SEAL MATERIAL***		
				Type: Bentonite Chips	**Setting:**	3.0-10.5 ft
				Type: Bentonite Pellets	**Setting:**	27.5-29.5 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** DEC-136

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

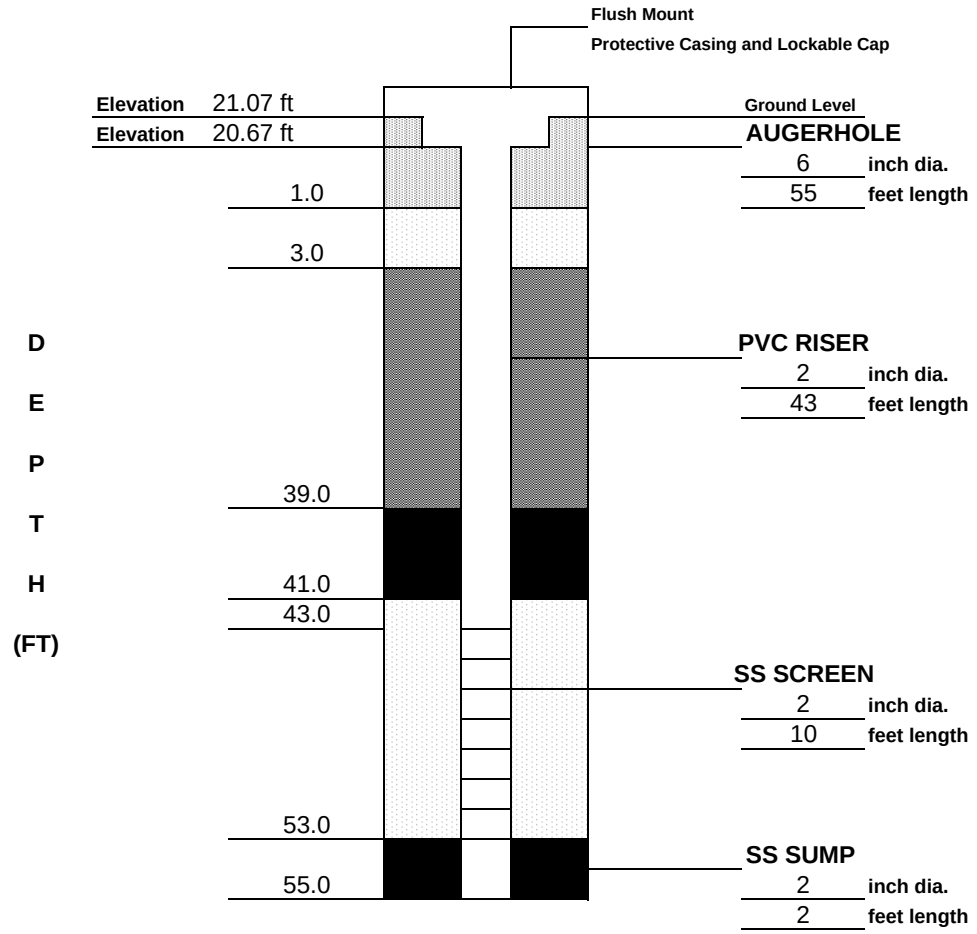
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
1/22/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See DEC-136D Boring Log for Lithologic Description



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 43.0-53.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	*SEAL MATERIAL*
		Type: Bentonite Grout **Setting:** 3.0-39.0 ft
		Type: Bentonite Pellets **Setting:** 39.0-41.0 ft, 53.0-55.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Grout
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** DEC-136D

URS Corporation

TEST BORING LOG

BORING NO. : EW-01

PROJECT/PROJECT LOCATION: Spic & Span Cleaners and Dyers Site - Pilot Study

SHEET: 1 **OF** 3

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359.00005

BORING CONTRACTOR: Glacier Drilling LLC

NORTHING: 204281.258 **EASTING:** 1000321.225

GROUNDWATER: 19 ft bgs

GROUND ELEVATION: 20.61 ft

DATE	TIME	LEVEL	TYPE	TYPE	CAS.	SAMPLER	CORE	TUBE
				DIA.				
				WT.				
				FALL				
				* POCKET PENETROMETER READING				

DATE STARTED: 02/03/15

DATE FINISHED: 02/03/15

DRILLER: M. Schock

GEOLOGIST: J. Boyd

REVIEWED BY: T. Burmeier

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0					Lt Gry		CONCRETE	Concrete	0.0	Boring hand cleared to 5 ft bgs.
					Dk Brn		Fine to coarse SAND and fine to medium GRAVEL, some silt	SW/GW	3.3	Moist
					Lt Brown			ML	1.5	
							SILT, some fine to medium sand, trace clay and cobbles		1.5	
-5									1.5	
					Brown		trace to some fine to coarse sand and fine to medium gravel		0.6	
									9.8	
		1		100	Brown to Gray				189	Petroleum-like odor
					Yellowish Brown				1.1	
-10									1.0	
									1.3	
		2		100	Gray				1.4	
									0.4	
									0.3	
-15									0.3	
									161	
									162	
									499	
									186	
-20		3		100	Yellowish Brown		Fine to medium SAND	SW	2,440	Wet Moderate solvent-like odor
									1,744	
							Fine to medium SAND and SILT, some fine to medium gravel	SW/ML	556	Slight solvent-like odor
									311	
					Gray		SILT, some fine to medium sand and fine to medium gravel	ML	181	
-25									91.0	
									1.8	

COMMENTS: Boring hand cleared to 5 ft bgs then advanced with track-mounted Geoprobe 8140 LS Sonic drill rig.
Collected soil sample from 7 to 7.5 ft bgs for TCL VOCs plus TICs analysis.

URS Corporation

TEST BORING LOG

BORING NO. : EW-01

PROJECT: Spic & Span Cleaners and Dyers - Pilot Study

SHEET: 2 OF 3

CLIENT: New York State Department of Environmental Conservation

JOB NO. :11176359.00005

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
-30		4		100					13.6	
									3.9	
									2.2	
									5.2	
									1.3	
									1.0	
									1.0	
									1.2	
-35									1.8	
							Fine to medium SAND and SILT	SW/ML	14.9	
							Fine to medium SAND, some silt, trace fine gravel	SW	2,245	Strong solvent-like odor
-40		5		30						
-45									2,169	solvent-like odor
							Fine to medium SAND and SILT, trace fine to medium gravel	SW/ML	7,846	
		6		100	Brown				1,396	
							Fine to medium SAND, trace fine gravel	SW	1,849	
-50									1,480	
									15,000	
		7		100					1,611	
									1,300	
									1,750	
-55									15,000	
							SILT	ML	3,111	
							1/2" clay layers at 56 and 57.8'		1,732	
		8		100					1,345	

COMMENTS: Boring hand cleared to 5 ft bgs then advanced with track-mounted Geoprobe 8140 LS Sonic drill rig.
Collected soil sample from 7 to 7.5 ft bgs for TCL VOCs plus TICs analysis.

URS Corporation

TEST BORING LOG

BORING NO. : EW-01

PROJECT: Spic & Span Cleaners and Dyers - Pilot Study

SHEET: 3 OF 3

CLIENT: New York State Department of Environmental Conservation

JOB NO. :11176359.00005

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
-60							trace fine sand		966 15,000 242	
							Boring completed at 60 ft bgs.			
-65										
-70										
-75										
-80										
-85										
-90										

COMMENTS: Boring hand cleared to 5 ft bgs then advanced with track-mounted Geoprobe 8140 LS Sonic drill rig.
Collected soil sample from 7 to 7.5 ft bgs for TCL VOCs plus TICs analysis.

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

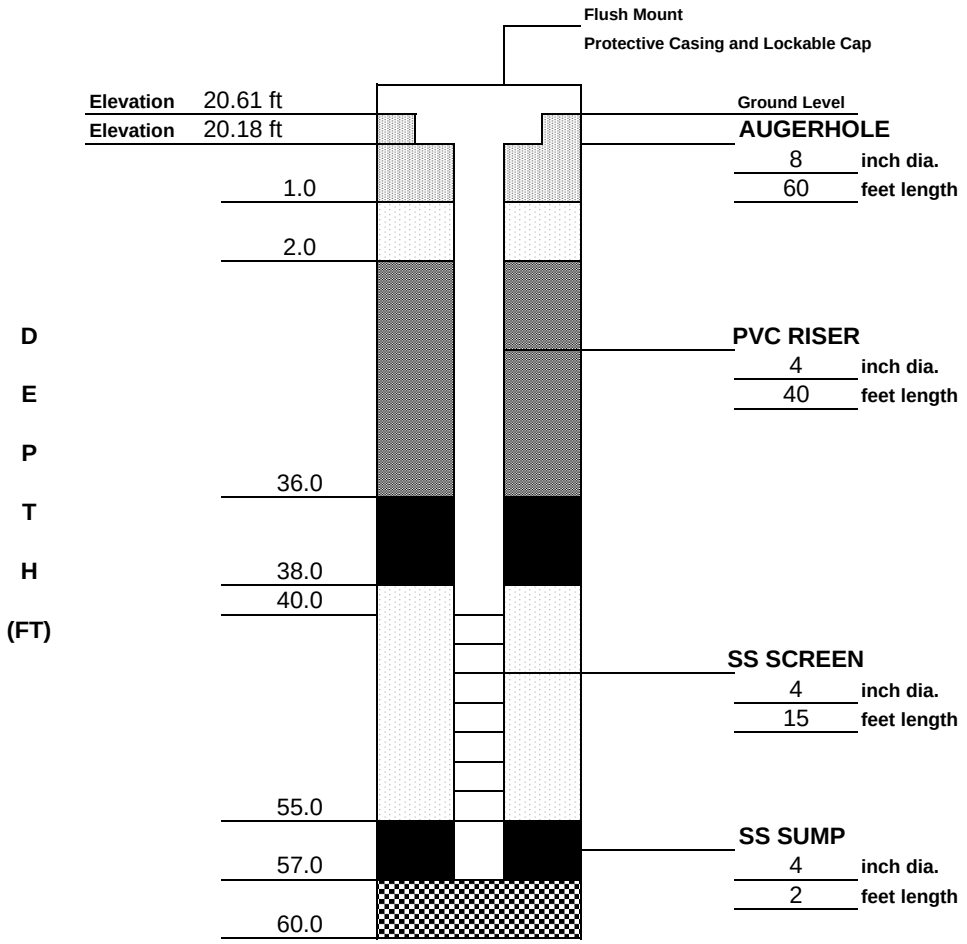
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
2/3/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log EW-01 for Lithologic Description



WELL DESIGN

CASING MATERIAL		*SCREEN MATERIAL*		*FILTER MATERIAL*		
Surface:	8" Flush mount steel grade box	**Type:**	4" Stainless Steel	**Type:** #3 Sand	**Setting:**	1.0-2.0 ft 38.0-55.0 ft
Riser:	4" Sch 40 PVC	**Slot Size:**	0.020" - Continuous wrap	***SEAL MATERIAL***		
				Type: Bentonite Grout	**Setting:**	2.0-36.0 ft
				Type: Bentonite Pellets	**Setting:**	36.0-38.0 ft 55.0-57.0 ft
				Type: Bentonite Chips	**Setting:**	57.0-60.0 ft

COMMENTS:

Borehole drilled to 57 ft below ground surface (bgs). Backfilled with bentonite chips from 60 to 57 ft bgs.

LEGEND

- Concrete
- Bentonite Grout
- Bentonite Pellets
- Bentonite Chips
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** EW-01

URS Corporation

TEST BORING LOG

BORING NO. : EW-02

PROJECT/PROJECT LOCATION: Spic & Span Cleaners and Dyers Site - Pilot Study

SHEET: 1 **OF** 3

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359.00005

BORING CONTRACTOR: Glacier Drilling LLC

NORTHING: 204263.811 **EASTING:** 1000317.024

GROUNDWATER: 19.6 ft bgs

GROUND ELEVATION: 20.84 ft

DATE	TIME	LEVEL	TYPE	TYPE	CAS.	SAMPLER	CORE	TUBE
				DIA.				
				WT.				
				FALL				
				* POCKET PENETROMETER READING				

DATE STARTED: 02/04/15

DATE FINISHED: 02/05/15

DRILLER: M. Schock

GEOLOGIST: J. Boyd

REVIEWED BY: T. Burmeier

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0					Lt Gray		Concrete	Concrete	0.0	Boring hand cleared to 5 ft bgs.
					Red		FILL: brick and concrete	Fill	0.0	
									0.0	
					Brown		Fine to medium Sandy SILT, some fine to coarse gravel, trace cobbles	ML	0.0	
-5									0.0	
		1		100			SILT, some to trace fine to medium sand and fine to medium gravel, trace clay		3.1	Moist
					Yellowish Brown Mottling				1.0	Chemical odor
		2		100			~1" gray silty sand layer from 9.8 to 9.85'		71.8	
									188	
-10									102	
		3		100	Gray				42.3	
									6.7	
									0.3	
									0.1	
-15									0.8	
		4		100	Brown		Fine to medium SAND, trace fine to medium gravel	SW	2,137	Strong solvent-like odor
									2,450	
					Yellowish Brown		SILT, some fine to medium sand and fine to medium gravel	ML	5,854	
									10,650	
									12,460	
-20					Gray				15,000	Wet
									15,000	
									1,004	
									843	
									777	
									167	
-25		5		80					244	

COMMENTS: Boring hand cleared to 5 ft bgs then advanced with track-mounted Geoprobe 8140 LS Sonic drill rig.
Collected soil sample from 57 to 57.5 ft bgs for TCL VOCs plus TICs analysis.

URS Corporation

TEST BORING LOG

BORING NO. : EW-02

PROJECT: Spic & Span Cleaners and Dyers - Pilot Study

SHEET: 2 OF 3

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 11176359.00005

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
-30									185	
									90.3	
									60.1	
									23.4	
									0.2	
									11.2	
									1.0	
									0.8	
-35		6		80					0.5	
									5.9	
									7.7	
									9.2	
									6.9	
-40									3.5	
									1.5	
									1.6	
									0.3	
									1.6	
									1.4	
-45		7		100					0.5	
					Brown		Fine to medium SAND, trace silt and fine gravel	SW	0.8	
									1.7	
									2.2	
									1.7	
-50									453	Solvent-like odor
									1,711	
									2,816	
									15,000	
									15,000	
-55		8		100					15,000	
							Fine SAND, trace silt	SP	15,000	
									15,000	
							SILT, trace very fine sand	ML	15,000	Strong

COMMENTS: Boring hand cleared to 5 ft bgs then advanced with track-mounted Geoprobe 8140 LS Sonic drill rig.
Collected soil sample from 57 to 57.5 ft bgs for TCL VOCs plus TICs analysis.

URS Corporation

TEST BORING LOG

BORING NO. : EW-02

PROJECT: Spic & Span Cleaners and Dyers - Pilot Study

SHEET: 3 OF 3

CLIENT: New York State Department of Environmental Conservation

JOB NO. :11176359.00005

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC % / RQD %	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
-60							dark brown silty clay lens from 59.5 to 59.7'		15,000 15,000	solvent-like odor
							Boring completed at 60 ft bgs.			
-65										
-70										
-75										
-80										
-85										
-90										

COMMENTS: Boring hand cleared to 5 ft bgs then advanced with track-mounted Geoprobe 8140 LS Sonic drill rig.
Collected soil sample from 57 to 57.5 ft bgs for TCL VOCs plus TICs analysis.

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

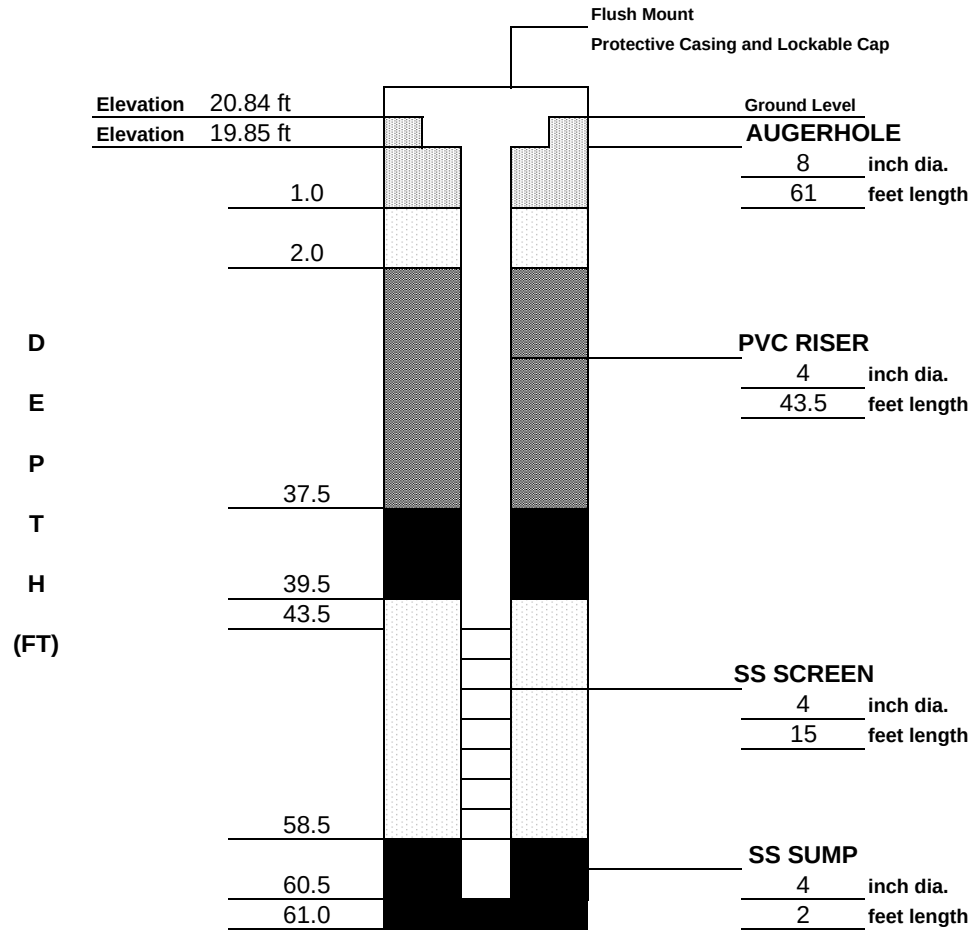
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
2/4/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log EW-02 for Lithologic Description



WELL DESIGN

CASING MATERIAL		*SCREEN MATERIAL*		*FILTER MATERIAL*		
Surface:	8" Flush mount steel grade box	**Type:**	4" Stainless Steel	**Type:** #3 Sand	**Setting:**	1.0-2.0 ft 39.5-58.5 ft
Riser:	4" Sch 40 PVC	**Slot Size:**	0.020" - Continuous wrap	***SEAL MATERIAL***		
				Type: Bentonite Grout	**Setting:**	2.0-37.5 ft
				Type: Bentonite Pellets	**Setting:**	37.5-39.5 ft 58.5-61.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Grout
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** EW-02

URS Corporation

TEST BORING LOG

BORING NO. : EW-03

PROJECT/PROJECT LOCATION: Meeker Avenue - Spic & Span

SHEET: 1 **OF** 1

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 60429463

BORING CONTRACTOR: Cascade Drilling

NORTHING: 204260.0821 **EASTING:** 1000317.6875

GROUNDWATER: 18.5' bgs

	CAS.	SAMPLER	CORE	TUBE
DATE				
TIME				
LEVEL				
TYPE				
TYPE				
DIA.				
WT.				
FALL				

* POCKET PENETROMETER READING

GROUND ELEVATION: 20.74

DATE STARTED: 11/9/2016

DATE FINISHED: 11/11/2016

DRILLER: M. Schock

GEOLOGIST: J. Christopher

REVIEWED BY: K. McGovern

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0							Concrete sidewalk			Dry, No Odor, No Staining
					Brown		FILL: Asphalt and soil	SM/ ML	0.00	Moist
		1		100			Medium tight fine to medium SAND and SILT, little fine to medium Gravel		0.00	
-5							Boulder, no recovery (dust)	N/A		
		2		100	Brown Grey		Medium tight fine SAND and SILT, some fine to coarse Gravel, trace small cobbles	SM/ ML	0.00	
-10							Desiccated, pulverized, BOULDER and COBBLES, some fine Sand and Silt	N/A	4.20	
		3		80					21.75	
									6.20	
							Medium tight fine to medium SAND, some Silt	SW	4.20	
-15									0.35	Slight Odor
		4		100	Brown				250.50	Wet, Strong Odor
									10000+	
									4326	
					Brown Grey				925.7	Moist
-20					Grey		SILT and SAND with Gravel	SM/ ML	84.70	Wet, Slight Odor
		5		87					139.1	
									83.3	
									81.40	
-25									114.20	
									122.90	
							End of Boring at 27' bgs.			

COMMENTS: Precleared by hand to 5.5' bgs

Collected samples at 16-16.5' and 18.5-19' bgs for TCL VOCs

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

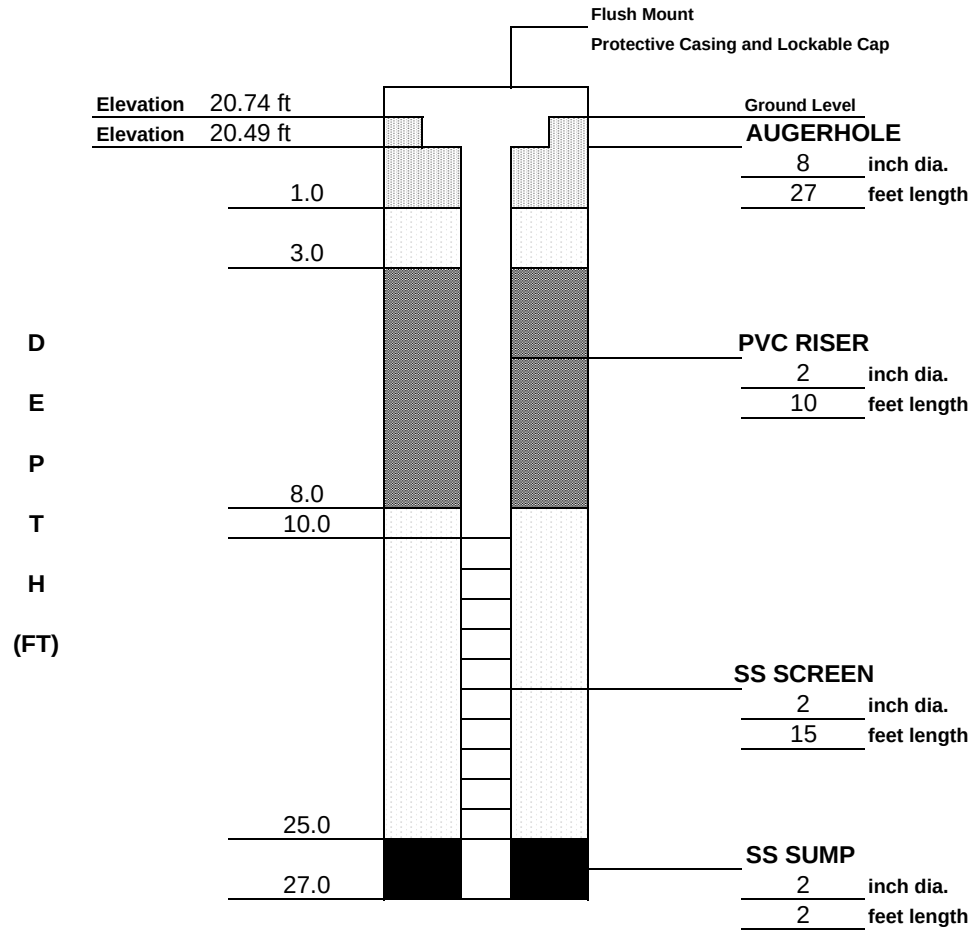
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/11/2006

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-03

URS Corporation

TEST BORING LOG

BORING NO. : EW-04

PROJECT/PROJECT LOCATION: Meeker Avenue - Spic & Span

SHEET: 1 **OF** 1

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 60429463

BORING CONTRACTOR: Cascade Drilling

NORTHING: 204249.9472 **EASTING:** 1000321.2558

GROUNDWATER: 18.5' bgs

	CAS.	SAMPLER	CORE	TUBE
DATE				
TIME				
LEVEL				
TYPE				
TYPE				
DIA.				
WT.				
FALL				

* POCKET PENETROMETER READING

GROUND ELEVATION: 20.76

DATE STARTED: 11/9/2016

DATE FINISHED: 11/11/2016

DRILLER: M. Schock

GEOLOGIST: J. Christopher

REVIEWED BY: K. McGovern

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0							Concrete sidewalk			Dry, No Odor, No Staining
							FILL: Asphalt and Soil	SW	0.00	Moist
		1		100			Medium tight fine to medium SAND, some Silt, little fine to medium Gravel		0.00	
							Some small to medium Cobbles		0.00	
-5							Medium tight fine SAND and SILT, some fine to coarse Gravel, little small Cobbles	SM/ ML	0.00	Dry
								GW	0.50	
		2		100			Pulverized GRAVEL and COBBLES	SM/ ML	1.50	
							Medium tight fine SAND and SILT, some fine to coarse Gravel, little small Cobbles		4.25	
-10									0.05	
									10.45	
		3		100	Brown		Loose fine to medium SAND	SW	8.65	
									35.65	
									18.00	
-15									21.40	
									394.7	
		4		100					4614	
									10000+	
							Loose, desiccated, coarse GRAVEL and small COBBLES	GP	287.4	
-20							Loose fine to medium SAND	SW		Wet
		5		100					5214	
									10000+	
									3816	
									1017	
-25					Grey		Medium tight, fine SAND, some Silt and fine to coarse Gravel	SP	382.4	
							End of Boring at 27' bgs		107.9	

COMMENTS: Precleared by hand to 5.5' bgs

Collected samples at 16-16.5', 18-18.5' and 24.5-25' bgs for TCL VOCs

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

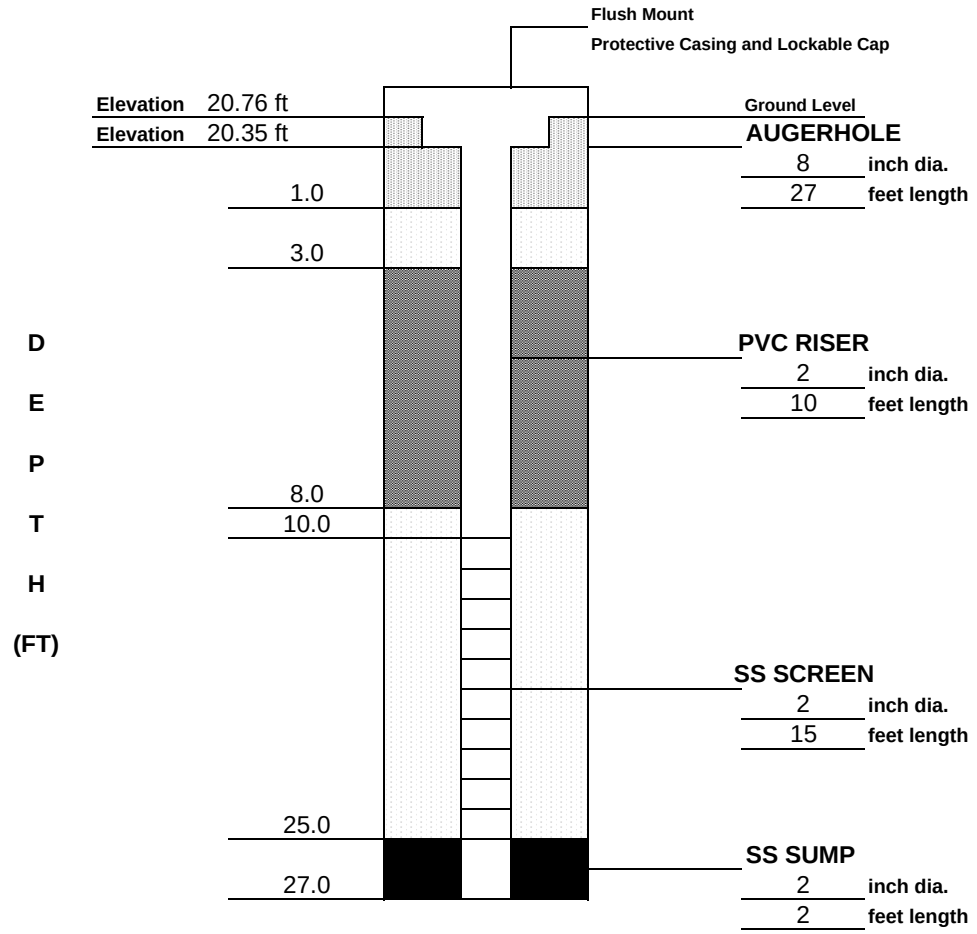
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/11/2016

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: **NYSDEC**	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** **60429463**
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** **EW-04**

URS Corporation

TEST BORING LOG

BORING NO. : EW-05

PROJECT/PROJECT LOCATION: Meeker Avenue - Spic & Span

SHEET: 1 **OF** 1

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 60429463

BORING CONTRACTOR: Cascade Drilling

NORTHING: 204278.37 **EASTING:** 1000321.3616

GROUNDWATER: 18.5' bgs

	CAS.	SAMPLER	CORE	TUBE
DATE / TIME / LEVEL / TYPE				
TYPE				
DIA.				
WT.				
FALL				

* POCKET PENETROMETER READING

GROUND ELEVATION: 20.45

DATE STARTED: 11/9/2016

DATE FINISHED: 11/10/2016

DRILLER: M. Schock

GEOLOGIST: J. Christopher

REVIEWED BY: K. McGovern

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0							Reinforced concrete sidewalk			Dry, No Odor, No Staining
					Brown		FILL: Asphalt and Soil	SM/ ML	0.00	Moist
		1		100			Medium tight fine to medium SAND and SILT, some fine to coarse Gravel, little small to large Cobbles		0.00	
-5					Red Brown		Little fine to coarse Gravel, trace small Cobbles		0.00	Slight Odor
		2		100					0.10	
									5.25	
							Medium tight fine SAND, some Silt, little coarse Gravel		4.75	Strong Odor
					Red to Dark Brown			SP	1240	Slight Odor
-10							Medium tight fine to medium SAND, some Silt and fine to coarse Gravel	SW	18.95	No Odor
								GW	0.25	Dry
		3		100			Loose fine to coarse GRAVEL and COBBLES, little fine Sand		0.45	
									1.65	
							Medium tight fine SAND and SILT, some fine to coarse Gravel, trace small Cobbles	SM/ ML	16.25	Moist
-15									6.35	
									7.95	
		4		100	Red Brown		Medium tight fine to medium SAND, some Silt, little fine to medium Gravel	SW	9.00	Odor
					Dark Grey		Loose medium SAND	SP	133.55	Wet, Strong Odor
-20									1863	
									3024	
							Medium tight fine SAND and SILT, some fine to medium Gravel, little medium Sand		3208	
					Red Brown			SM/ ML	378.3	Moist, Slight Odor
		5		100	Brown Grey		Trace small Cobbles, no Gravel		377.8	
-25									26.35	
									18.75	
									7.65	
							End of Boring at 27' bgs		9.55	

COMMENTS: Precleared by hand to 5.5' bgs
Collected sample at 20-21' bgs for TCL VOCs

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

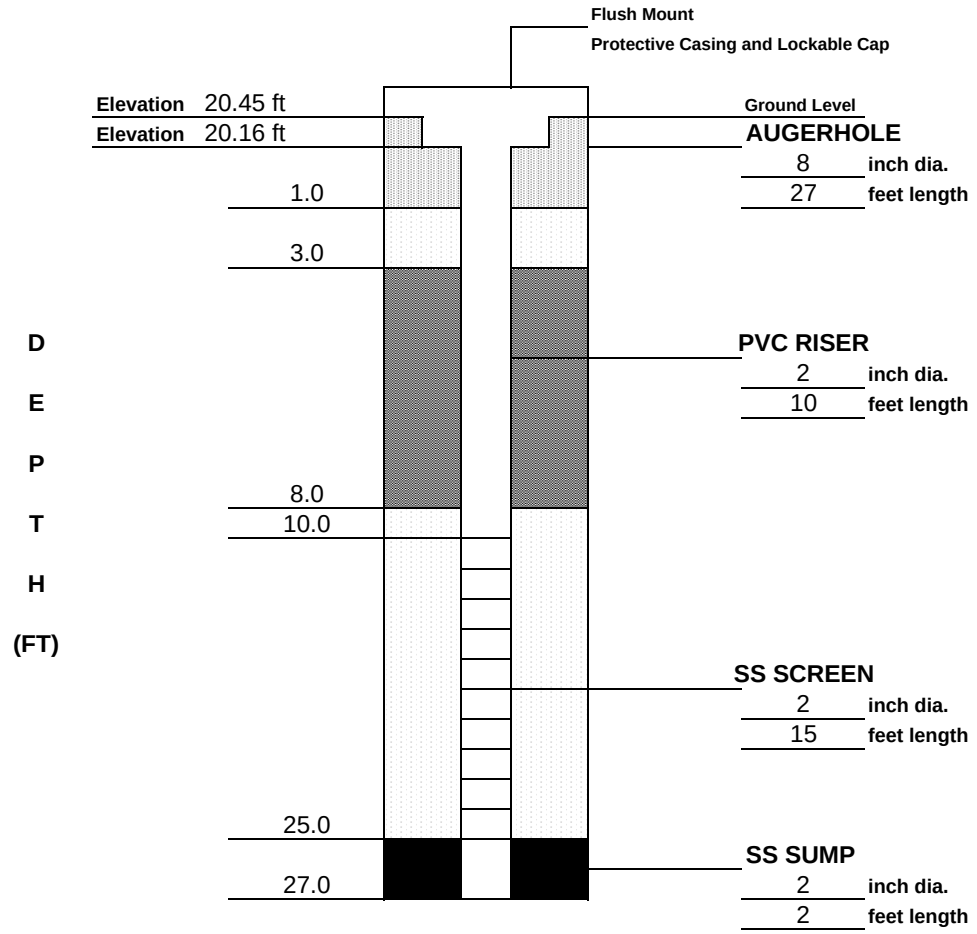
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/10/2016

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-05

URS Corporation

TEST BORING LOG

BORING NO. : EW-06

PROJECT/PROJECT LOCATION: Meeker Avenue - Spic & Span

SHEET: 1 **OF** 1

CLIENT: New York State Department of Environmental Conservation

JOB NO. : 60429463

BORING CONTRACTOR: Cascade Drilling

NORTHING: 204256.3676 **EASTING:** 1000324.9092

GROUNDWATER: 18.5' bgs

	CAS.	SAMPLER	CORE	TUBE
DIA.				
WT.				
FALL				

GROUND ELEVATION: 20.54

DATE STARTED: 11/9/2016

DATE FINISHED: 11/10/2016

DRILLER: M. Schock

GEOLOGIST: J.Christopher

REVIEWED BY: K. McGovern

DATE	TIME	LEVEL	TYPE	TYPE

* POCKET PENETROMETER READING

DEPTH FEET	STRATA	SAMPLE NO.	SAMPLE BLOW COUNT	REC% / RQD%	COLOR	SOIL CONSISTENCY / ROCK HARDNESS	MATERIAL DESCRIPTION	USCS	PID	REMARKS
0							Concrete Sidewalk			Dry, No Staining, No Odor Moist
					Brown		FILL: Asphalt and Soil	SW	0.00	
		1		100			Medium tight fine to medium SAND, some Silt and fine to coarse Gravel		0.00	
-5							Some small to large Cobbles		0.00	
					Orange Brown		Medium tight fine SAND and SILT, some fine to coarse Gravel, trace small Cobbles	SM/ ML	0.00	
		2		100					0.00	
					Grey Brown				0.00	
							Loose fine to coarse GRAVEL and COBBLES		0.10	
-10								GW		
							Medium tight fine SAND and SILT, some fine to coarse Gravel	SM/ ML	0.00	Dry Slight Odor
		3		100					0.00	Moist
									0.10	Orange Lense
									0.35	
					Orange Brown		Loose fine to medium SAND	SW	2.25	Strong Odor
-15									70.25	
		4		100					32.55	
					Brown Grey		Medium tight fine SAND, some Silt and fine to medium Gravel	SP	436.1	Slight Odor
									10000+	
-20									198.4	
									81.45	
		5		100					845.1	
									392.7	
									84.10	
-25									0.75	
									3.55	
							End of Boring at 27' bgs			

COMMENTS: Precleared by hand to 5.25' bgs
Collected sample at 16.5-17' bgs for TCL VOCs

BORING NO. : EW-06

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

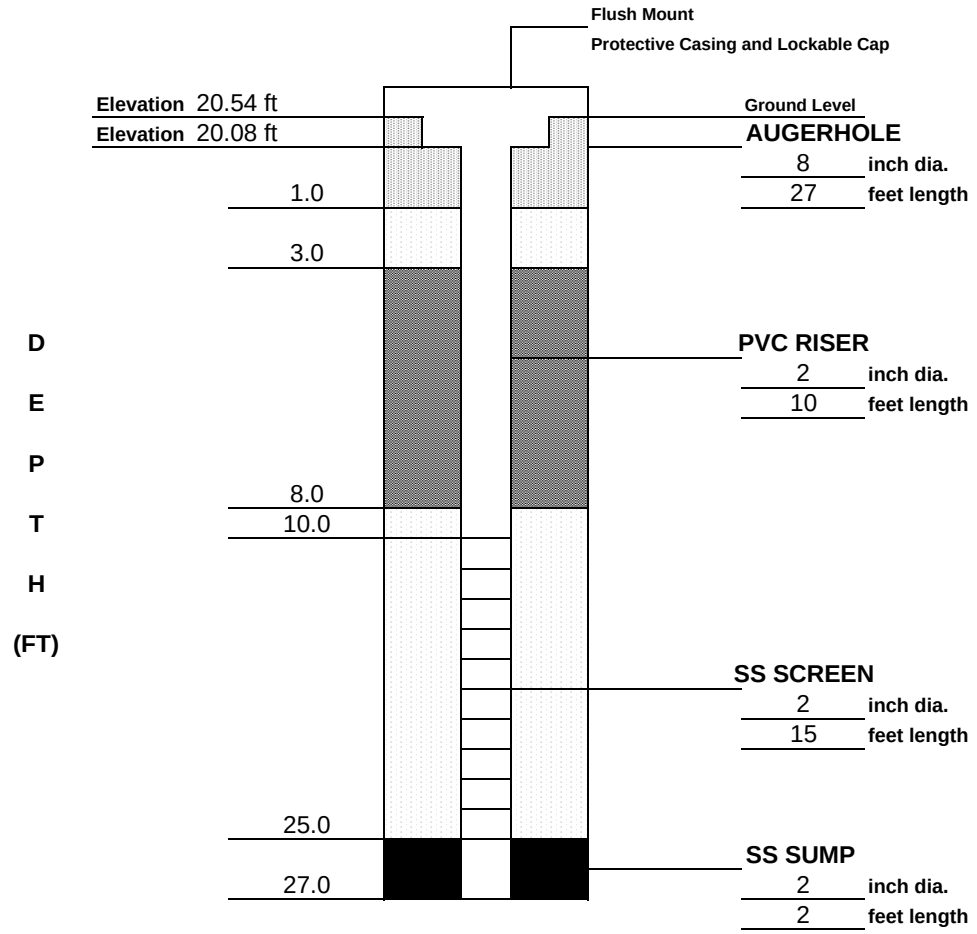
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/10/2016

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: **NYSDEC**	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** **60429463**
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** **EW-06**

APPENDIX D

FALLING HEAD HYDRAULIC CONDUCTIVITY TESTS

SECTION 1:

SUMMARY OF RESULTS, AQTESOLV INPUT DATA, AND FIELD DATA

Spic & Span Cleaners and Dyers Site - Slug Tests
Well Construction Details

Well ID	Formation	Screen Length		Radii			Aquifer Thickness	Depth from Aquifer Top	
		Total	Submerged	Screen (*)	Casing			to Top of Screen	to Bottom of Screen
					Actual	Equivalent			
		L_e	$L_{e\text{-}sub}$	r_w	r_c	$r_{c\text{-}eq}$ (**)	H	d	L_w
		[ft]	[ft]	[in]	[in]	[in]	[ft]	[ft]	[ft]
EW-03	Overburden	15.0	8.27	4.00	2.00	2.76	10.27	-6.73	8.27
EW-04	Overburden	15.0	9.28	4.00	2.00	2.76	11.28	-5.72	9.28
EW-06	Overburden	15.0	7.13	4.00	2.00	2.76	9.13	-7.87	7.13
DEC-136	Overburden	15.0	11.64	3.00	2.00	2.35	13.64	-3.36	11.64

Notes:

(*) - sand pack (overburden wells)

(**) - $r_{c\text{-}eq} = [(1 - n)\, r_c^2 + n\, r_w^2]^{1/2}$ if $L_{e\text{-}sub} < L_e$

$r_{c\text{-}eq} = r_c$ if $L_{e\text{-}sub} = L_e$

NM - not measured

N/A - not applicable

Assumptions:

(1) AQTESOLV ver. 3.50 was used for slug test analyses.
(2) Sandpack porosity of 0.3 was used for wells that were not fully submerged during testing.
(3) Bouwer and Rice (1976) solution was used for unconfined aquifers.
(4) Formulas and parameters used for this slug test analysis can be found in:
Bouwer, H., 1989. The Bouwer and Rice slug test--an update, Ground Water, vol. 27, no. 3, pp. 304-309.
(5) Used depth to water to determine aquifer thickness.

Summary of Results
Spic Span Cleaners and Dyers Site
Slug Tests

Well ID	Hydraulic Conductivity [cm/sec]
	FH
EW-03	3.31E-05
EW-04	5.28E-05
EW-06	2.08E-05
DEC-136	8.75E-06

FH - Falling Head test

Note:
-For all graphs, normalized head is defined as H(t)/Ho, where H(t) is the displacement measured at time t and Ho is the initial displacement at time t=0.

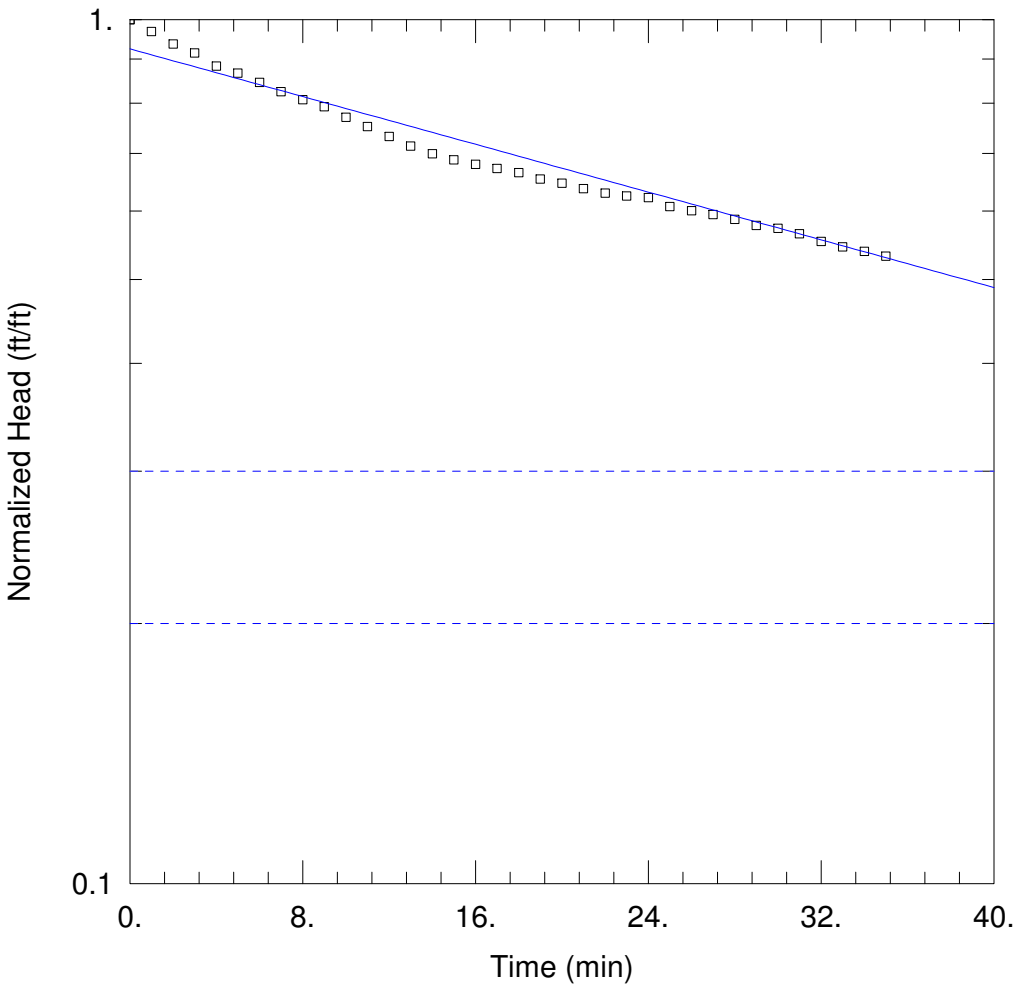
(See attached reference, *The Bouwer and Rice Slug Test - An Update*)

Spic & Span Cleaners and Dyers Site - Slug Tests
Useability of Data

Well ID	Remarks
	FH
EW-03	OK
EW-04	OK
EW-06	OK
DEC-136	OK

SECTION 2:

SLUG TEST DATA AND AQTESOLV CALCULATION REPORTS



WELL TEST ANALYSIS

Data Set: C:\Users\rob.murphy\Desktop\Spic and Span Slug Tests\EW-03.aqt
Date: 12/19/17 Time: 10:40:17

PROJECT INFORMATION

Company: AECOM
Client: NYSDEC
Test Well: EW-03
Test Date: 11/02/17

AQUIFER DATA

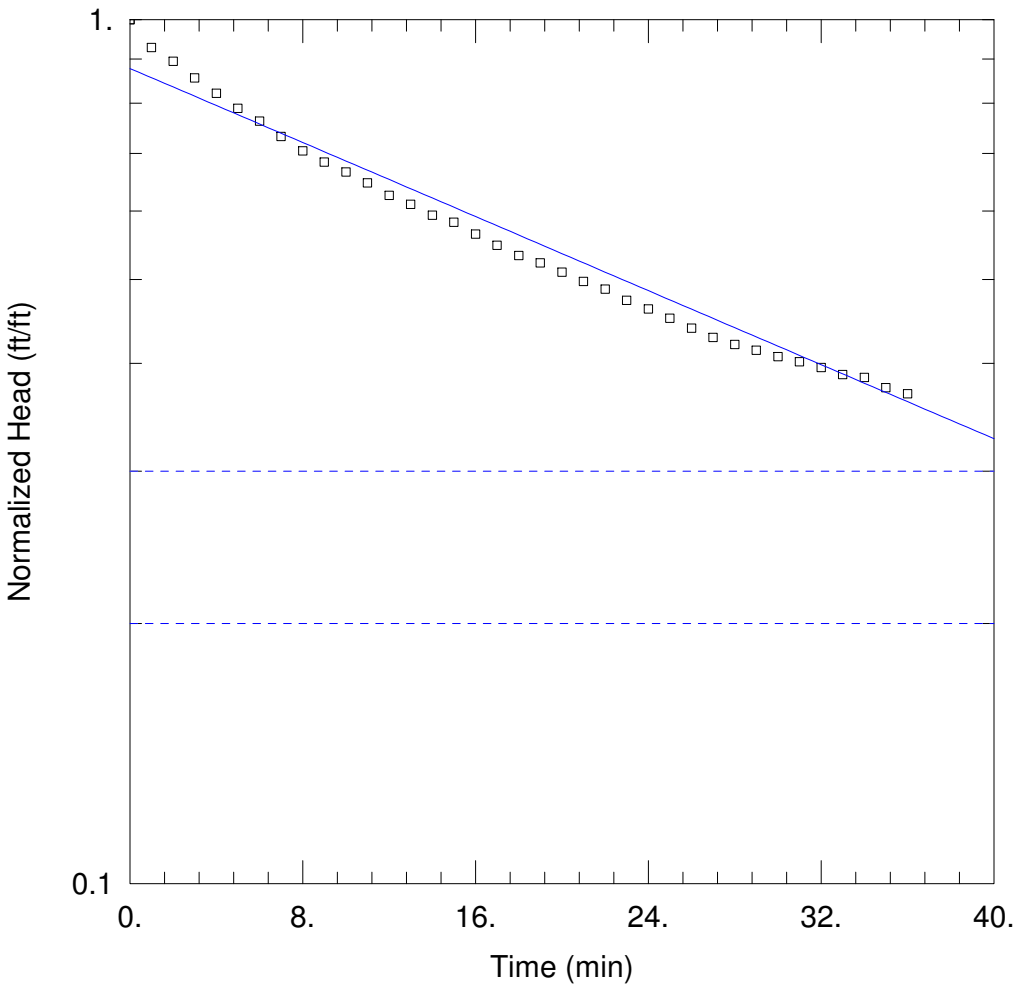
Saturated Thickness: 10.27 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EW-03)

Initial Displacement: 1. ft
Total Well Penetration Depth: 8.27 ft
Casing Radius: 0.167 ft
Static Water Column Height: 10.27 ft
Screen Length: 15. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.307E-5 cm/sec
y0 = 0.9247 ft



WELL TEST ANALYSIS

Data Set: C:\Users\rob.murphy\Desktop\Spic and Span Slug Tests\EW-04.aqt
Date: 12/19/17 Time: 10:48:30

PROJECT INFORMATION

Company: AECOM
Client: NYSDEC
Test Well: EW-04
Test Date: 11/02/17

AQUIFER DATA

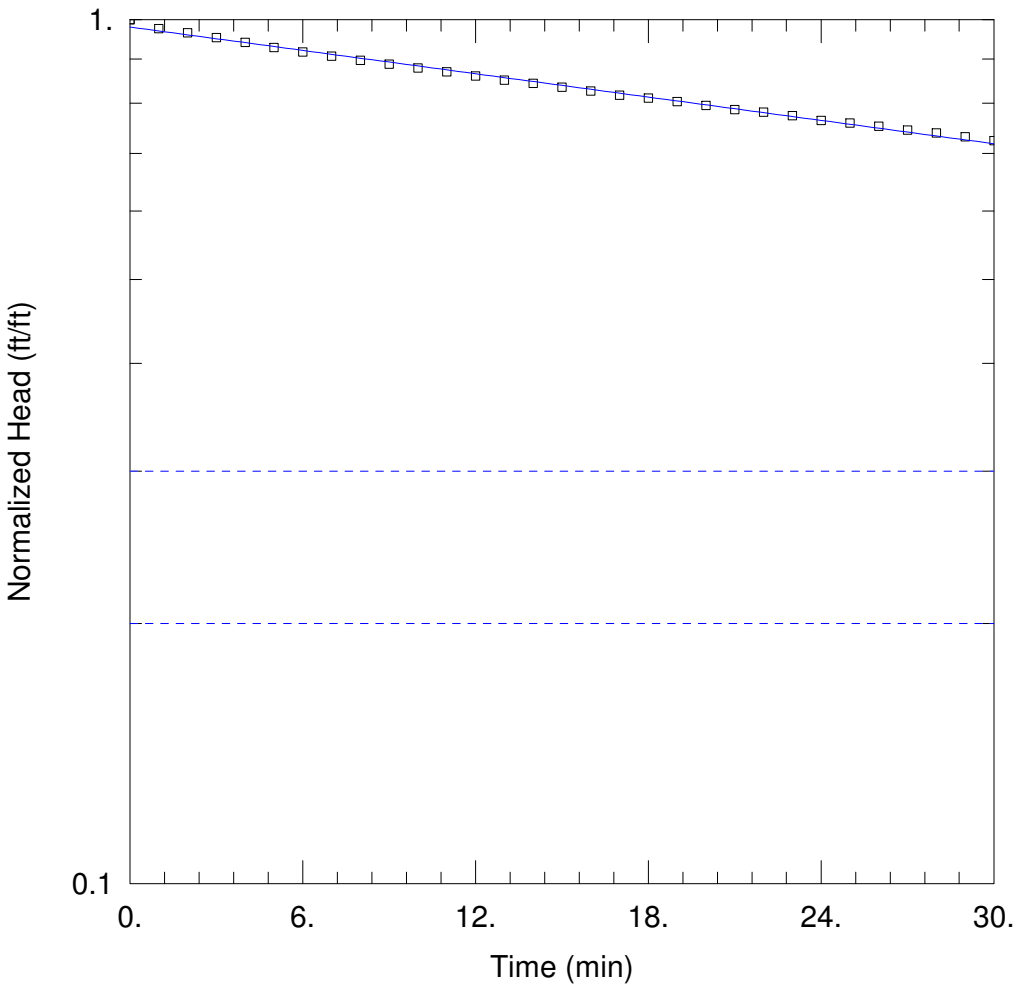
Saturated Thickness: 11.28 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EW-04)

Initial Displacement: 1. ft
Total Well Penetration Depth: 9.28 ft
Casing Radius: 0.167 ft
Static Water Column Height: 11.28 ft
Screen Length: 15. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.277E-5 cm/sec
y0 = 0.8777 ft



WELL TEST ANALYSIS

Data Set: C:\Users\rob.murphy\Desktop\Spic and Span Slug Tests\EW-06.aqt
Date: 12/19/17 Time: 10:52:33

PROJECT INFORMATION

Company: AECOM
Client: NYSDEC
Test Well: EW-06
Test Date: 11/01/17

AQUIFER DATA

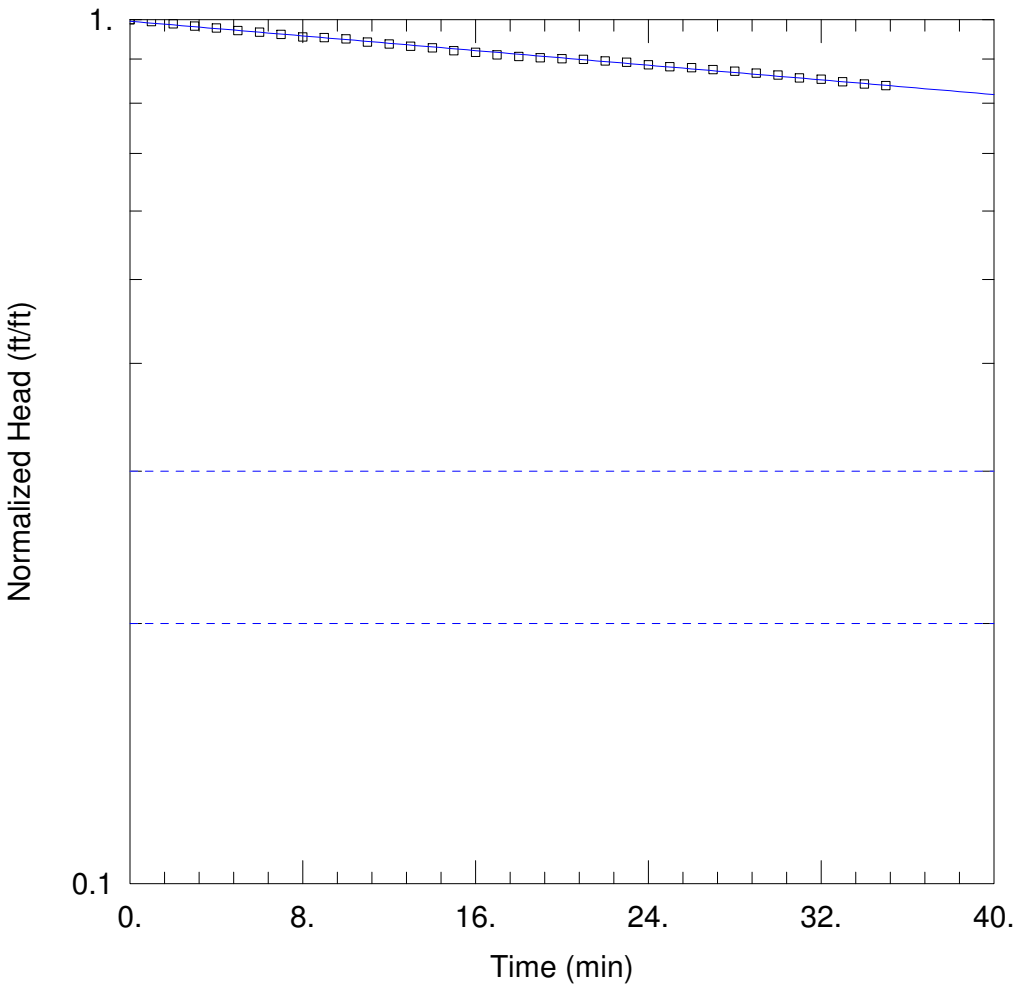
Saturated Thickness: 9.13 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EW-06)

Initial Displacement: 1. ft
Total Well Penetration Depth: 7.13 ft
Casing Radius: 0.167 ft
Static Water Column Height: 9.13 ft
Screen Length: 15. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.076E-5 cm/sec
y0 = 0.9801 ft



WELL TEST ANALYSIS

Data Set: C:\Users\rob.murphy\Desktop\Spic and Span Slug Tests\DEC-136.aqt
Date: 12/19/17 Time: 10:58:13

PROJECT INFORMATION

Company: AECOM
Client: NYSDEC
Test Well: DEC-136
Test Date: 10/30/17

AQUIFER DATA

Saturated Thickness: 13.64 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (DEC-136)

Initial Displacement: 1. ft
Total Well Penetration Depth: 11.64 ft
Casing Radius: 0.167 ft
Static Water Column Height: 13.64 ft
Screen Length: 15. ft
Wellbore Radius: 0.25 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 8.749E-6 cm/sec
y0 = 0.9953 ft

SECTION 3:

MONITORING WELL DETAILS
AND
FIELD NOTES

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

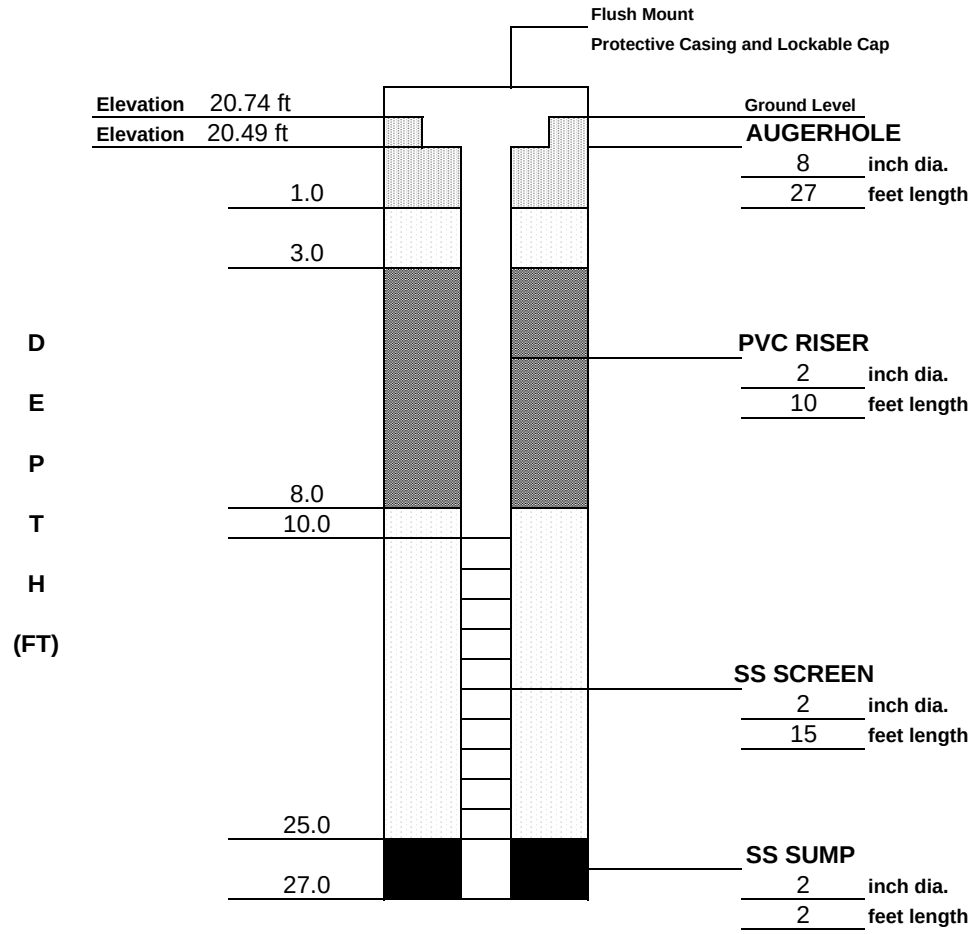
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/11/2006

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-03

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

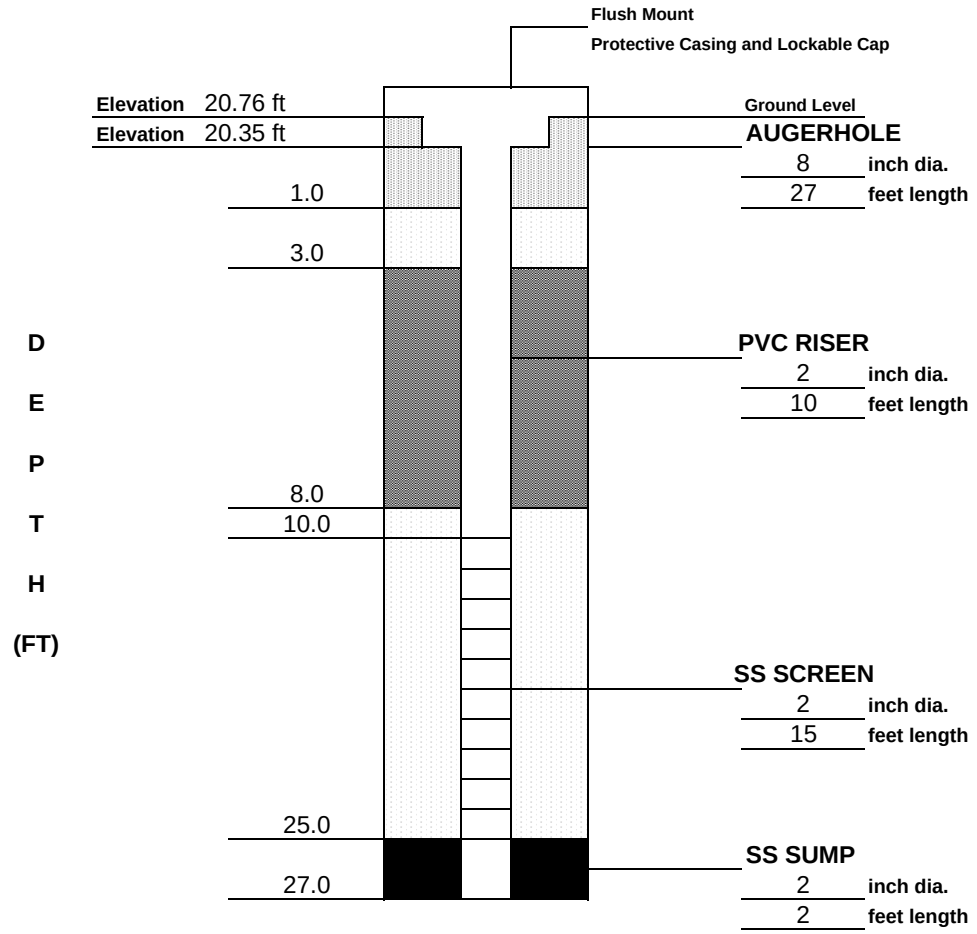
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/11/2016

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-04

DRILLING SUMMARY

Geologist:
James Christopher

Drilling Company:
Glacier Drilling

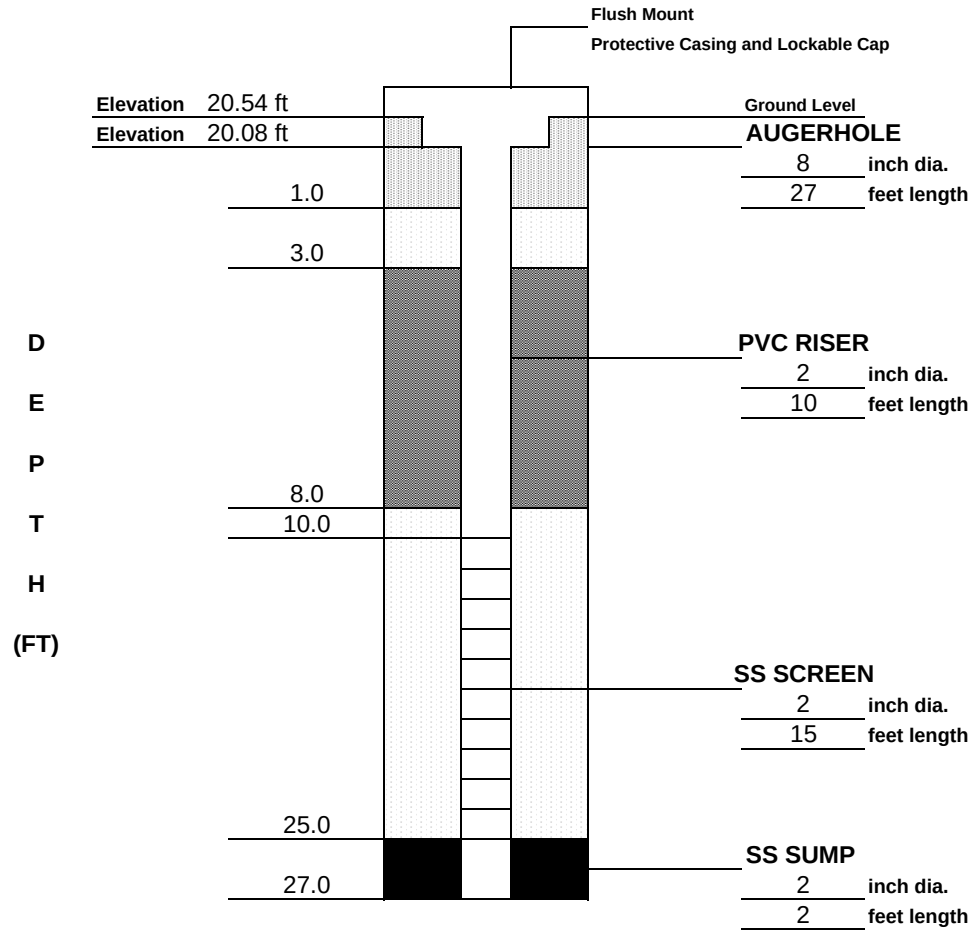
Driller:
Mark Schock

Rig Make/Model:
Geoprobe® 8140 LS Roto Sonic

Date:
11/10/2016

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description.



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*FILTER MATERIAL*
Surface: 8" Flush mount steel grade box	**Type:** 2" Stainless Steel	**Type:** #1 Sand **Setting:** 1.0-3.0 ft, 8.0-25.0 ft
Riser: 2" Sch 40 PVC	**Slot Size:** 0.010" - Continuous wrap	***SEAL MATERIAL***
		Type: Bentonite Chips **Setting:** 3.0-8.0 ft
		Type: Bentonite Pellets **Setting:** 25.0-27.0 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site**	**Project No.:** 60429463
URS Corporation	**EXTRACTION WELL CONSTRUCTION DETAILS**	**Well Number:** EW-06

DRILLING SUMMARY

Geologist:
J. Boyd

Drilling Company:
Glacier Drilling

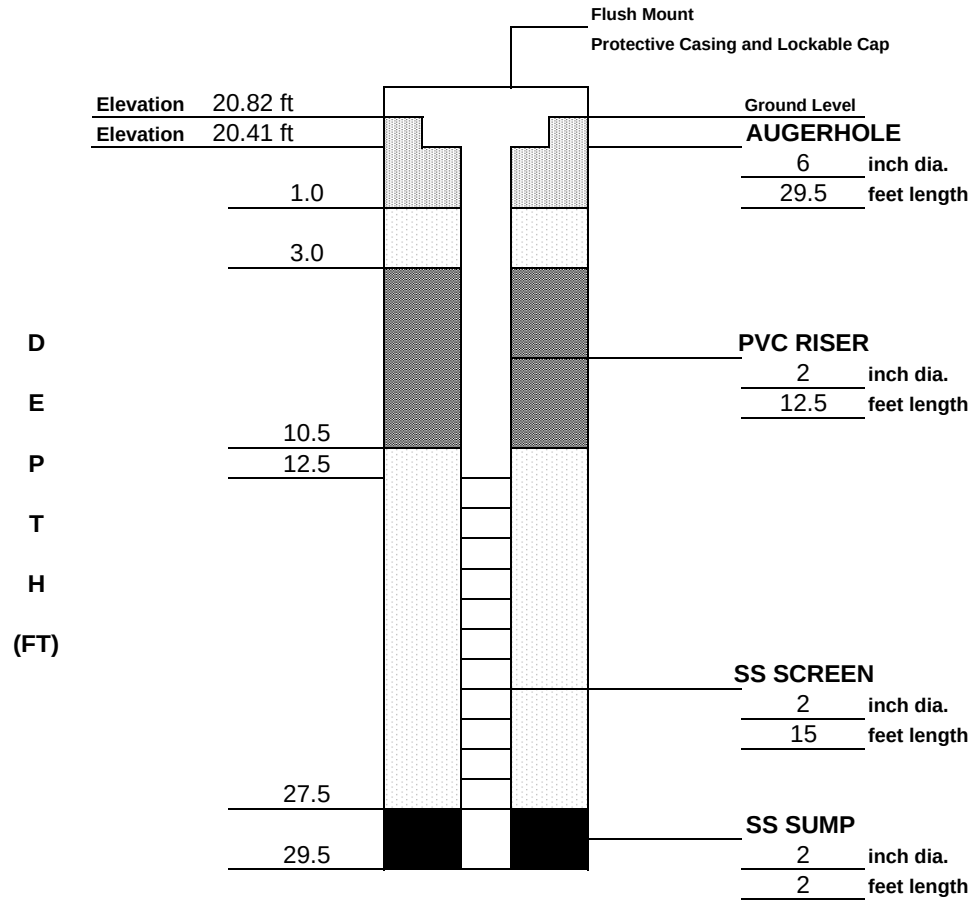
Driller:
M. Schock

Rig Make/Model:
8140 LS Sonic Rig

Date:
2/2/2015

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log DEC-136D for Lithologic Description



WELL DESIGN

CASING MATERIAL		*SCREEN MATERIAL*		*FILTER MATERIAL*		
Surface:	8" Flush mount steel grade box	**Type:**	2" Stainless Steel	**Type:** #1 Sand	**Setting:**	1.0-3.0 ft 10.5-27.5 ft
Riser:	2" Sch 40 PVC	**Slot Size:**	0.010" - Continuous wrap	***SEAL MATERIAL***		
				Type: Bentonite Chips	**Setting:**	3.0-10.5 ft
				Type: Bentonite Pellets	**Setting:**	27.5-29.5 ft

COMMENTS:

LEGEND

- Concrete
- Bentonite Chips
- Bentonite Pellets
- Silica Sandpack

Client: NYSDEC	**Former Spic & Span Cleaners and Dyers Site - Pilot Study**	**Project No.:** 11176359.00005
URS Corporation	**MONITORING WELL CONSTRUCTION DETAILS**	**Well Number:** DEC-136

(All depths BTOR)

PROJECT former Spic & Span Cleaners

Notebook No. — 3

Continued from Page 2

Well	DEPTH TO WATER (or LNAPL)	~~DEPTH~~ ~~TO~~ Thickness DNAPL	DEPTH TO BOTTOM	BAILER DNAPL Check
DEC-24DR	18.64' (no LNAPL)	~1"	53.58'	
DEC-24R	19.18' (no LNAPL)	none detected	53.67'	
DEC-24 (petroleum odor)	17.81 (no LNAPL	none detected	49.30'	
EW-01	19.21	~ 1.0"	56.40	
EW-05	19.21	none detected	27.49	
EW-06	17.87	None	25.69	- Took 2 40mL vial samples
EW-04	15.72	NONE	26.92	- Took 2 40mL vial samples
DEC-136	15.86	NONA TRACE	26.65	SL. PCE ODOR TRACE @ BOTTOM ~ 1085 Hrs
~~EW-03~~ SPC		TOOK ENVIRO STAMPER OUT OF BAILER SHEEN ON	2 40 m/. VIALS WATER	TOOK 2 40ml vials SHEEN ON STAMPER PCE ODOR
EW-03	16.73	None	25.79	No DNAPL, No Sheen PID: 5.0PPM
DEC-B920	19.33	None	60.63	No DNAPL PID: 3.2PPM

Continued on Page

Read and Understood By

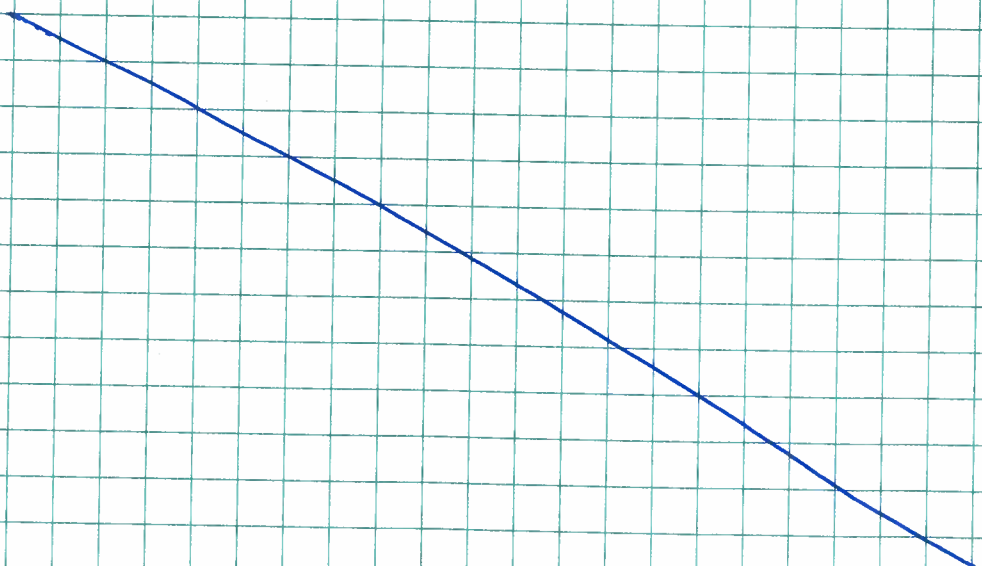
Signed — Date — Signed — Date

10/30/17

Copies of notes from a seperate notebook

- Date: 11/02/17
- Post Injection Drawdown "Falling Head" on EW-03
- Starting Time 14:59
- Measurements taken at 1 minute increments

5.93'	8.82'	10.07'
6.27'	9.02'	10.17'
6.61'	9.18'	10.24'
6.85'	9.30'	10.31'
7.19'	9.39'	10.39'
7.37'	9.47'	10.49'
7.60'	9.55'	10.54'
7.82'	9.67'	10.63'
8.01'	9.75'	10.75'
8.17'	9.85'	10.84'
8.41'	9.93'	10.91'
8.61'	9.98'	10.98'



Continued on Page

Signed _____ Date 11/7/17

Read and Understood By

Signed _____ Date _____

- Copied Notes from separate notebook
DATE: 11/2/17
TIME: 8:45 AM

- Pre Injection Water level + DNAPL check

Well	Depth To Water	Depth To DNAPL	Depth to Bottom	DNAPL Cld w/ Bailer
DFC-024DD	18.61'	None Detected	54.68'	None
DFC-024D	19.15'	None Detected	54.79'	None
DFC-136	15.75'	None Detected	27.00'	None
DFC-024	19.22'	None Detected	29.72'	None
EW-01	19.39'	None Detected	59.61'	None
EW-02	18.85'	None Detected	62.00'	1st Pull 8" / 2nd Pull 2" / 3rd Pull 0.0"

- Post Injection "Falling Head" on EW-04
Date: 11/02/17
Time: 14:15

- Measure 1 minute increments
- starting time 14:18

3.00'	7.25'	9.23'	10.54'
3.91'	7.49'	9.39'	10.61'
4.34'	7.76'	9.52'	10.69'
4.83'	7.95'	9.70'	10.78'
5.27'	8.17'	9.84'	10.82'
5.68'	8.31'	9.98'	10.87'
6.02'	8.54'	10.13'	10.95'
6.41'	8.75'	10.27'	11.03'
6.76'	8.94'	10.37'	Ending Time 14:55
7.02'	9.07'	10.45'	

Continued on Page

Read and Understood By

Signed _____ Date 11/7/17

Signed _____ Date _____

- Copies of Notes from Sparks Notebook

- Post Injection Drawdown "Falling Head" taken on TEW-06 on 11/1/17

- Measured from TOR @ 1 min increments

2.71'	5.95'
3.09'	6.03'
3.25'	6.14'
3.43'	6.29'
3.62'	6.37'
3.81'	6.47'
3.98'	6.59'
4.13'	6.67'
4.28'	6.79'
4.42'	6.90'
4.56'	
4.69'	
4.84'	
4.98'	
5.09'	
5.22'	
5.35'	
5.49'	
5.58'	
5.70'	
5.82'	

Continued on Page 40

Read and Understood By

Signed _____ Date 11/2/17

Signed _____ Date _____

PROJECT Former Spic + Span Cleaners

Notebook No. _____

Continued from Page _____

- Copies of notes from seperate notebook

Date: 10/30/17
Time: 13:45

WELL DEC-136

- Post-Injection Drawdown "Falling Head" Measurements

• Measurements taken @ 1 minute increments @ TOR
• Start time 13:45

6.55'	7.61'
6.60'	7.65'
6.66'	7.67'
6.71'	7.71'
6.76'	7.75'
6.82'	7.79'
6.86'	7.83'
6.91'	7.89'
6.97'	7.92'
6.99'	7.97'
7.02'	8.02'
7.04'	8.05'
7.14'	
7.19'	
7.23'	
7.29'	
7.33'	
7.39'	
7.42'	
7.45'	
7.47'	
7.49'	
7.52'	
7.55'	

End time @ 14:20

Continued on Page

Signed _____ Date 11/6/17

Read and Understood By

Signed _____ Date _____

SECTION 4:

REFERENCES

The Bouwer and Rice Slug Test — An Update[a]

by Herman Bouwer[b]

ABSTRACT

The Bouwer and Rice slug test was developed to measure aquifer hydraulic conductivity around boreholes (production, monitoring, or test wells). The wells can be partially penetrating and partially screened, perforated, or otherwise open. The slug test can be based on quickly withdrawing a volume of water from the well and measuring the subsequent rate of rise of the water level in the well, or by adding a slug of water and measuring the subsequent rate of fall of the water level in the well. While originally developed for unconfined aquifers, the method can also be used for confined or stratified aquifers if the top of the screen or perforated section is some distance below the upper confining layer. Anomalies ("double straight line effect") sometimes observed in the measured rate of rise of the water level in the well are attributed to drainage of a gravel pack or developed zone around the well following lowering of the water level. The effect of this drainage can be eliminated by ignoring the early data points and using the second straight line portion in the data plot for calculation of hydraulic conductivity. The method is applicable to any diameter and depth of the borehole, provided that the dimensions of the system are covered by the ranges for which the geometry factor R_e has been worked out. The smaller the diameter of the hole, however, the more vulnerable the results will be to aquifer heterogeneities and to inaccuracies in estimating effective well diameters. Computer programs for rapid processing of the field data have been developed.

INTRODUCTION

The slug test developed by Bouwer and Rice (1976) permits the measurement of saturated hydraulic conductivity (K) of aquifer materials with a single well. The method consists of quickly lowering or raising the water level in a well or borehole from equilibrium and measuring its subsequent rate of rise or fall, respectively. The method was designed to measure K of the aquifer around the screen or otherwise open portion of the well for fully or partially penetrating wells in unconfined aquifers. Because of its simplicity, the Bouwer and Rice slug test has become a frequently used tool in ground-water investigations. This paper addresses some of the experiences obtained with the method, including the validity of falling level tests, use of the method in confined aquifers, effect of draining gravel packs on the rise of the water level, effect of hole diameter, and computer processing of field data.

METHODOLOGY

Geometry and symbols of a slug-tested well are shown in Figure 1. The rate of flow of ground water into the well when the water level in the well is a distance y lower than the static ground-water table around the well is calculated with the Thiem equation as

$$Q = 2\pi K L_e \frac{y}{\ln(R_e/r_w)} \qquad (1)$$

where Q = volume rate of flow into well;
K = hydraulic conductivity of aquifer around well;
L_e = length of screened, perforated, or otherwise open section of well; y = vertical difference between water level inside well and static water table outside

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[a]Contribution of the U.S. Department of Agriculture, Agricultural Research Service.

[b]Laboratory Director, U.S. Water Conservation Laboratory, Phoenix, Arizona 85040.

Received December 1986, revised August 1988, accepted September 1988.

Discussion open until November 1, 1989.

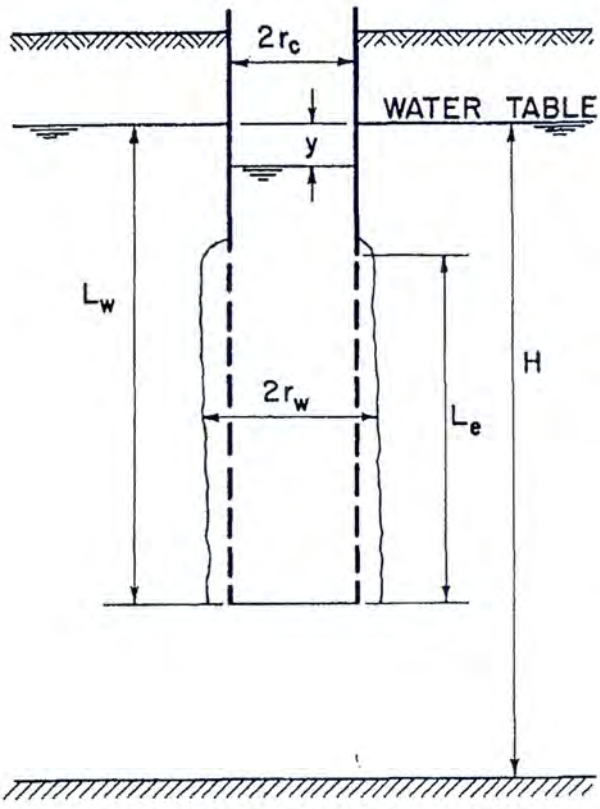


Fig. 1. Geometry and symbols for slug test on partially penetrating, partially screened well in unconfined aquifer with gravel pack and/or developed zone around screen.

well; R_e = effective radial distance over which y is dissipated; and r_w = radial distance of undisturbed portion of aquifer from centerline.

Values of R_e were determined with an electrical resistance network analog for different values of r_w, L_e, L_w, and H (see Figure 1 for meaning of geometry symbols). The value of r_w is the radius of the screened or open section of the well plus the thickness of a sand or gravel pack and/or of the developed zone around the well. Thus, r_w is the radial distance from the center of the well to normal K of the aquifer. Because the thickness of the developed zone is almost never known, the tendency is to ignore it and take only gravel or sand packs into account.

The rate of rise dy/dt of the water level in the well after the water level has been quickly lowered some distance is

$$\frac{dy}{dt} = -\frac{Q}{\pi r_c^2} \qquad (2)$$

where r_c is the radius of the casing or other section of the well where the rise of the water level is measured. If the water level rises in the screened or open section of the well with a gravel pack around it, the thickness and porosity of the gravel envelope should be taken into account when calculating the equivalent value of r_c for the rising water level. This calculation is based on the total free-water surface area in the well and sand or gravel pack, calculated as $\pi r_c^2 + \pi(r_w^2 - r_c^2)n$, where n is the porosity, and $r_w - r_c$ is the thickness of the envelope. The equivalent radius of a circle giving this total area is then calculated as $[(1-n)r_c^2 + nr_w^2]^{1/2}$. For example, if the radius of the screen or perforated casing is 20 cm and there is 8 cm gravel pack with a porosity of 30 percent, r_c should be taken as 25.9 cm, while r_w is 28 cm.

Solving equation (2) for Q, equating the resulting expression to equation (1), integrating, and solving for K yields

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t} \qquad (3)$$

where y_0 = y at time zero; and y_t = y at time t.

The results of the analog analyses to evaluate R_e for various system geometries were expressed in terms of the dimensionless ratio $\ln(R_e/r_w)$. The data could be fitted into two equations, one for the case where $L_w < H$, and one where $L_w = H$. The resulting equations were, respectively,

$$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{A + B\ln[(H-L_w)/r_w]}{L_e/r_w} \right]^{-1} \qquad (4)$$

and

$$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w} \right]^{-1} \qquad (5)$$

where A, B, and C are dimensionless numbers plotted in Figure 2 as a function of L_e/r_w.

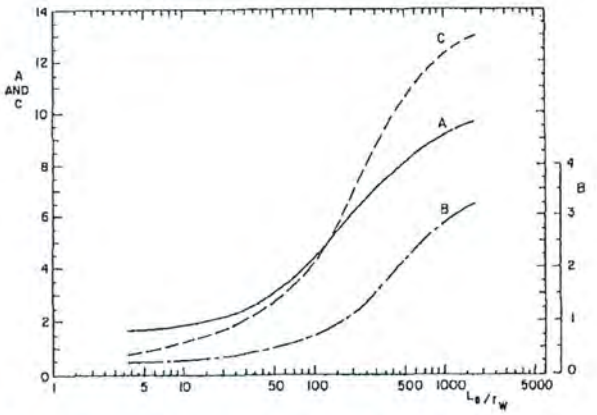


Fig. 2. Dimensionless parameters A, B, and C as a function of L_e/r_w for calculation of $\ln(R_e/r_w)$.

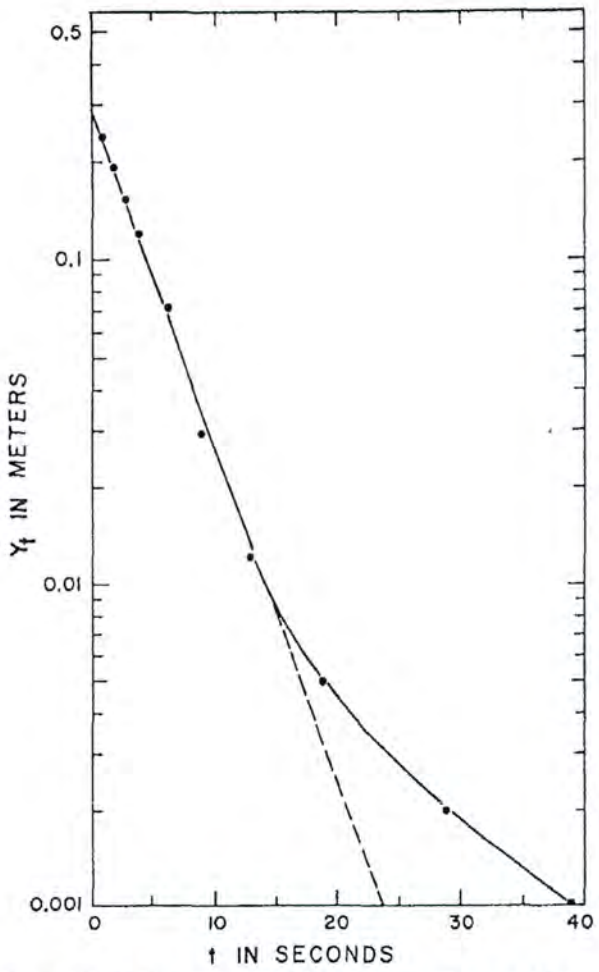


Fig. 3. Graph of log y_t versus t for slug test on well in Salt River Bed, 27th Avenue, Phoenix, Arizona.

Because y and t are the only variables in equation (3), a plot of ln y_t versus t must show a straight line. Thus, instead of calculating K on the basis of two measurements of y and t (y_0 at t = 0 and y_t at t), a number of y and t measurements can be taken and $[\ln(y_0/y_t)]/t$ determined as the slope of the best-fitting line through the y versus t points on semilogarithmic paper (Figure 3). The straight line through the data points can also be used to select two values of y, namely, y_0 and y_t, along with the time interval t between them for substitution into equation (3). Because drawdown of the ground-water table around the well becomes increasingly significant as the test progresses, the points as in Figure 3 begin to deviate from the straight line for large t and small y. Thus, only the straight line portion of the data points should be used to evaluate $[\ln(y_0/y_t)]/t$ for calculation of K with equation (3).

The slug test can be used on production wells, test wells, observation wells, and monitoring wells. Objectives for the measurements include characterization of aquifer hydraulic conductivity for modeling, ground-water recharge studies, and ground-water pollution studies. The method is particularly useful in ground-water contamination studies because the slug test can be carried out on the same wells used for ground-water quality monitoring. Also, combining the resulting values of hydraulic conductivity with the porosity of the aquifer and slopes of the ground-water table or piezometric surface permits the prediction of pore-water velocities and, hence, the rate of movement of pollution plumes and transport of contaminants. The slug test can also be useful in determining vertical distribution of hydraulic conductivities in an aquifer system and other spatial variability of hydraulic conductivity in studies of macrodispersion and movement of contaminants.

Over the years, a number of questions and comments about the slug test have been received. These questions and comments are addressed in the following sections.

DOUBLE STRAIGHT LINE EFFECT

Users of the slug test have observed that when plotting log y_t versus t as in Figure 3, they sometimes get a double straight line as shown schematically in Figure 4. The first part (AB) is straight and steep, whereas the next part (BC) is straight and less steep. Then, at point C, the points begin their expected deviation from the straight line as

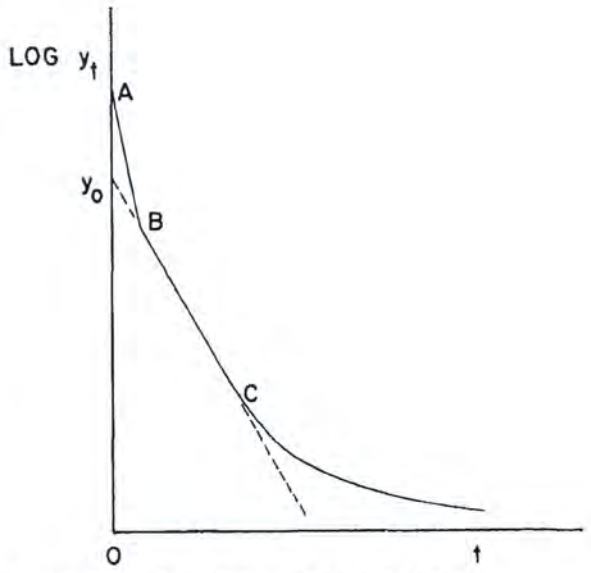


Fig. 4. Schematic of double straight line effect.

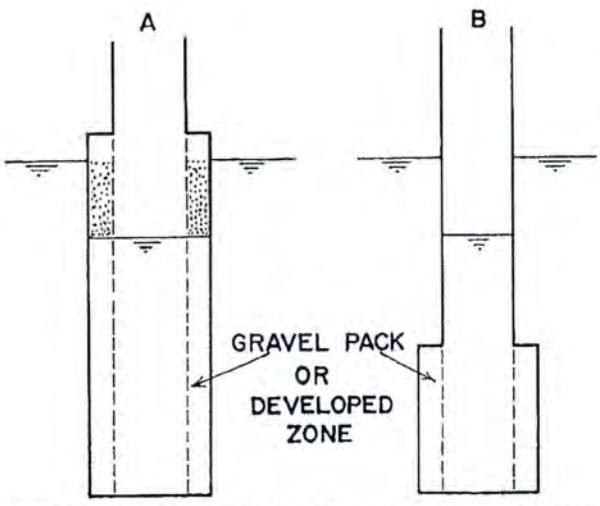


Fig. 5. Slug test for borehole with ground-water level below (A), and above (B) top of screen or perforated section.

the drawdown around the hole becomes significant relative to y_t. The first straight line portion in Figure 4 is probably due to a highly permeable zone around the well (gravel pack or developed zone), which quickly sends water into the well immediately after the water level in the well has been lowered (Figure 5A). Then, when the water level in the permeable zone around the well has drained to the water level in the well itself, the flow into the well slows down and the points begin to form a second, less steep, straight line (BC in Figure 4). This second straight line is more indicative of the flow from the undisturbed aquifer into the well. Hence, segment BC should be used in calculating K of the aquifer with equation (3). In the original 1976 article, gravel envelopes or developed zones were assumed to drain at the same rate as the water level in the borehole when it is lowered for the slug test, i.e., essentially instantaneously. However, some gravel packs or developed zones apparently are not permeable enough to give such instantaneous drainage.

If the ground-water table is above the screened or open section of the borehole, and the water level in the hole is not lowered so far that it drops below the top of the open section (Figure 5B), the gravel envelope or developed zone around the open section cannot drain. The inflow into the hole then is immediately controlled by the aquifer, and the double straight line effect should not occur. If it still occurs, it could indicate leakage around the casing or grouting above the gravel pack.

Where the double straight line is due to a gravel pack around the well, the effective well radius r_w should be taken as the radial distance from the center of the well to the outer surface of the gravel pack. Where the double straight line is due to a naturally developed zone around the well, r_w is harder to evaluate and an "intelligent" estimate must be made. It may also be possible to estimate r_w from the value of y at point B in Figure 4. Considering the volume of water in the well between y_A and y_B in Figure 4 to be due to the drainage of the gravel pack or developed zone, and knowing or estimating the drainable porosity of the gravel pack or developed zone, the radial extent of this zone can be calculated for evaluation of r_w. Capillary fringe effects do not have to be considered, since the capillary fringe was also present in the pack or in the developed zone before the water level was lowered. Because the rising water level in the hole during the slug test will also fill up the drained pore space of the gravel pack or developed zone, the value of r_c in the equation for calculation of K should be adjusted to take this effect into account, as discussed earlier in this article.

Conceivably, a well could have a gravel pack surrounded by a less permeable developed zone before the original aquifer material is reached. This could lead to a triple straight line effect, with an intermediate straight line portion at point B, or a curved transition zone at B if the hydraulic conductivity of the developed zone gradually decreases until K of the original aquifer material is reached. By the same token, portion AB in Figure 4 could also be curved if the hydraulic conductivity of the gravel pack or developed zone immediately around the well decreases with radial distance from the well.

FALLING WATER LEVEL TEST

The slug test was developed for a rising water level in the borehole, as obtained by quick removal of a certain volume or slug of water. This can be achieved by bailing, (quick) pumping, or by immersing a section of pipe filled with sand or other ballast and closed with caps on both ends, or other submersible object, in the borehole, letting the water level in the borehole return to equilibrium, and quickly removing the submerged object. The question is often raised: can the method also be used when a volume of water is quickly added to the hole and the subsequent rate of fall of the water level in the hole is measured for calculation of K? The answer is yes, provided that the equilibrium water level is above the screened or open section of the borehole (Figures 1 and 5B). In this

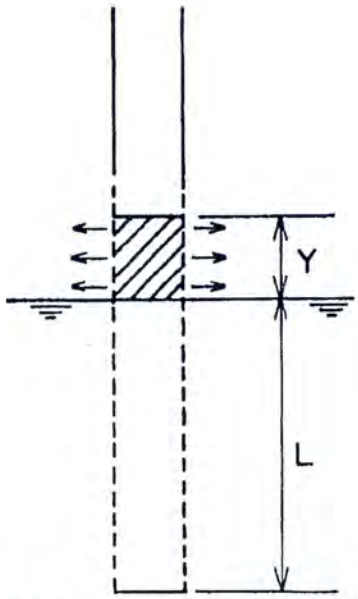


Fig. 6. Schematic of addition of water (hatched section) to borehole with equilibrium water level below top of screen or perforated section, with outflow of water into vadose zone (horizontal arrows).

case, the outflow from the well due to the falling water level occurs only through the screened or open section of the well, and the flow system in the aquifer is a true reverse of the flow system for the rising water level after a slug of water has been removed (ignoring, of course, eventual rises and drawdowns of the ground-water table immediately around the borehole if the aquifer is unconfined). Thus, equations (3), (4), and (5) are also applicable to the addition of a slug of water and measuring the subsequent rate of fall of the water level in the borehole for calculation of K of the aquifer around the hole.

If the equilibrium water level in the borehole is below the top of the screen or open section (Figure 6), and water is added (hatched section in Figure 6), the subsequent flow of water into the aquifer due to the falling water level not only takes place through the screen or perforations below the original water table, but also through the vadose zone above the original water table (arrows in Figure 6). This increases the rate of fall of the water level in the borehole beyond that caused by inflow into the aquifer and leads to an overestimation of K. The greater the ratio of y/L (Figure 6) in this case, the more the slug test will overestimate K if the measurement is based on adding water to the hole and measuring the subsequent rate of fall of the water level.

APPLICATION OF SLUG TEST TO CONFINED AQUIFERS

Theoretically, the slug test (Bouwer and Rice, 1976) applies to aquifers where the upper boundary is a plane source (rising water-level test) or sink (falling water-level test), as in an unconfined aquifer. However, because most of the head difference y between the static water table and the water level in the well is dissipated in the vicinity of the well around the screen or perforated section, the method should also be applicable to situations where the upper boundary of the aquifer is an impermeable or semipermeable plane, i.e., an impermeable or semipermeable upper confining layer. Thus the slug test should also give reasonable values for K in confined, semiconfined, or stratified aquifers. Theoretically, the larger the distance between the top of the screened or open section of the well and the upper confining layer (like $L_w - L_c$ in Figure 1), the more accurate the resulting values of K will be. In actuality, however, source boundaries of ground water flowing into the well in response to lowering the water level are hard to define because of elastic deformation of aquifer material and confining and interbedded fine-textured layers, and because of leakage through semiconfining layers.

EFFECT OF WELL DIAMETER

Theoretically, the Bouwer and Rice slug test applies to any diameter of the borehole. Practically, the hole dimensions should be selected so that the geometry parameters are covered by Figure 2. The larger r_w and L_e (Figure 1), the larger the portion of the aquifer on which K is determined. For layered aquifers, smaller values of L_e may sometimes be preferable because they give more resolution and more information about the vertical distribution of K when the slug test is carried out at different depths. Very small hole diameters (for example 2 in. or 5 cm) should still give accurate values for K, but the values apply to only a small region around the well and, hence, are more sensitive to spatial variability. Also, inaccuracies in the estimates of the thickness of gravel envelopes and developed zones have a greater effect on the calculated values of K where r_c is small than where r_c is large.

PROCESSING OF y VERSUS t MEASUREMENTS

To calculate $1/t \ln(y_0/y_t)$ for the appropriate straight line portion of curves as in Figure 3 or 4, two values of y on the straight line and their

corresponding values of t are read from the graph. The natural logarithm of the ratio y_0/y_t is then taken and divided by the difference between the two values of t. For example, Figure 3 shows that at y is 0.28 m and 0.001 m, t is 0 and 24 seconds, respectively. This yields
$1/t \ln(y_0/y_t) = 1/24 \ln(0.28/0.001) = 0.23$ m/sec.
If $1/t \ln(y_0/y_t)$ is calculated from the slope of the curve, the number of log cycles on the vertical scale between the two points is divided by the time increment and multiplied by 2.3 to convert to natural logarithm. For example, Figure 3 shows that the straight line from $y_0 = 0.28$ m to $y_t = 0.001$ m covers 2.4 log cycles. The time increment between the two points is again 24 seconds, yielding $1/t \ln(y_0/y_t) = 2.3 \times 2.4/24 = 0.23$ m/sec, which is the same as calculated earlier. Because of different coordinate scales in plots of log y versus t, the value of $1/t \ln(y_0/y_t)$ cannot be taken as the actual slope of the straight line portion!

ESTIMATING RATE OF RISE OR FALL OF WATER LEVEL IN WELL

If the water level in a slug-tested well rises or falls at a relatively slow rate, simple water-level measuring devices and a stop watch may be all that is needed to do the test. Fast-moving water levels, however, require the use of a pressure transducer and a fast-acting x-y plotter. To get some idea about the rate of water-level movement that can be expected in a slug-tested well and what equipment to use, equation (3) can be solved for t and $\ln(y_0/y_t)$ can be taken as ln 10 to calculate the time $t_{90\%}$ required for the water level in the well to rise or fall 90% of the initial lowering or raising, respectively, of the water level in the well. This yields the equation

$$t_{90\%} = 1.15 \frac{r_c^2}{KL_e} \ln \frac{R_e}{r_w} \qquad (6)$$

where K must be taken as the estimated or expected value of K of the aquifer. Equation (6) yields values of t that are 22 times greater than the t values calculated by the $t_{90\%}$ equation in the original article (Bouwer and Rice, 1976), where $\ln(y_0/y_t)$ was erroneously taken as ln 0.9, thus yielding the time required for only 10% of the water-level rise or fall to occur.

COMPUTER PROGRAMS

Where the Bouwer and Rice slug test is routinely used, time for calculating K with equation (3) is saved by developing a computer program in which values of L_e/r_w are stored for direct calculation of $\ln(R_e/r_w)$ and K from the field data. Such programs have been developed by several users (see, for example, Pandit and Miner, 1986; and Kemblowski and Klein, 1988). Also, a number of users have designed forms for easy and systematic recording of field data.

REFERENCES

Bouwer, H. and R. C. Rice. 1976. A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells. Water Resources Research. v. 12, pp. 423-428.

Kemblowski, M. W. and C. L. Klein. 1988. An automated numerical evaluation of slug test data. Ground Water. v. 26, pp. 435-438.

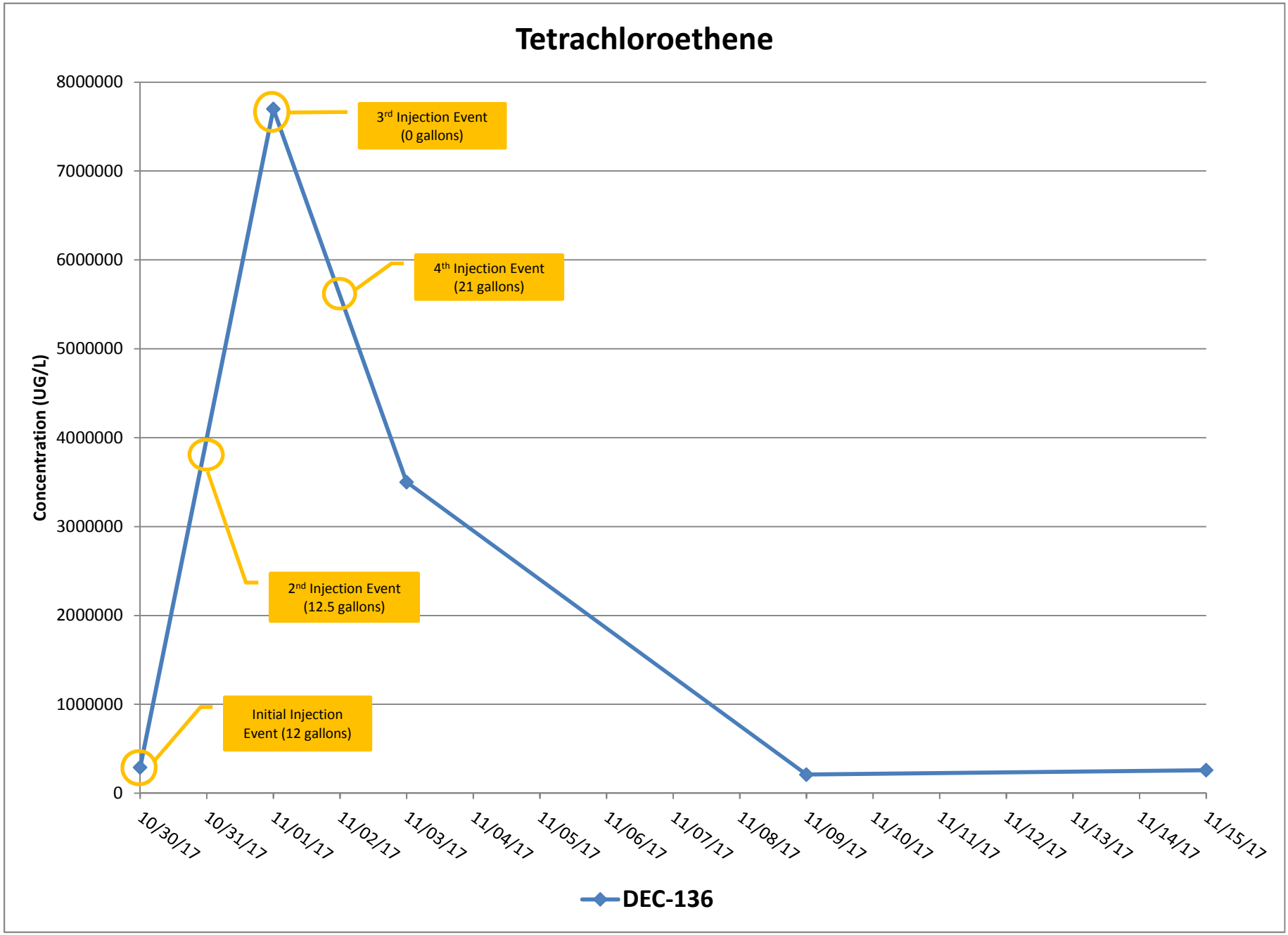
Pandit, N. S. and R. F. Miner. 1986. Interpretation of slug test data. Ground Water. v. 24, pp. 743-749.

* * * * *

Herman Bouwer received B.S. and M.S. degrees in 1949 and 1952 in Drainage, Reclamation, and Irrigation from the National Agricultural University at Wageningen, The Netherlands, and a Ph.D. degree in 1955 in Soil and Water Management from Cornell University, New York. He was associated with the Agricultural Engineering Department of Auburn University, Alabama, from 1955 to 1959, before joining the U.S. Water Conservation Laboratory in Phoenix, Arizona, where he became Director in 1972. In 1970, he also was appointed Adjunct Professor at Arizona State University in Tempe where he taught Ground-Water Hydrology in the Geology and Civil Engineering Departments. He is also an Adjunct Professor at the University of Arizona in Tucson.

APPENDIX E

TETRACHLOROETHENE CONCENTRATION GRAPHS



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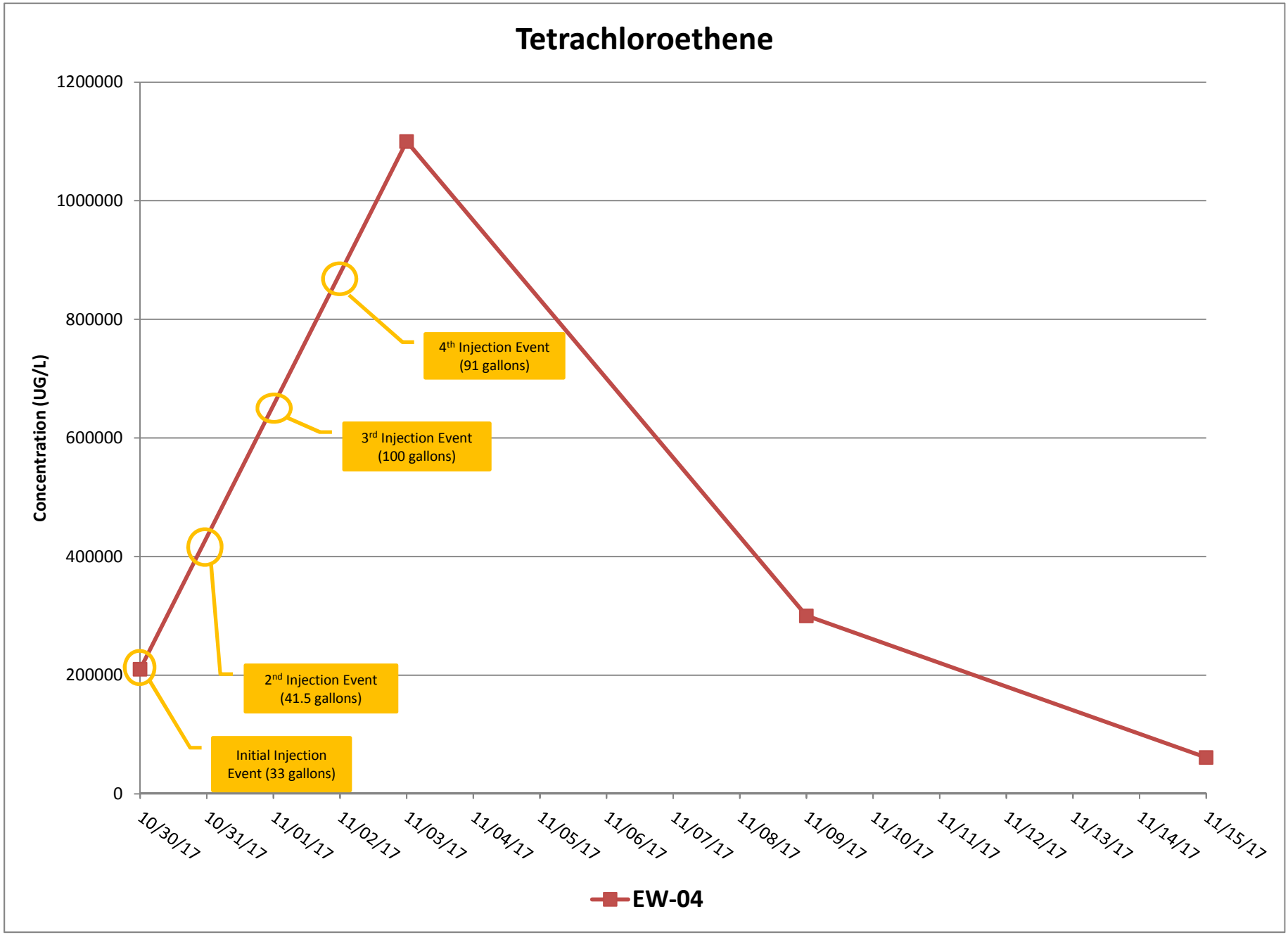

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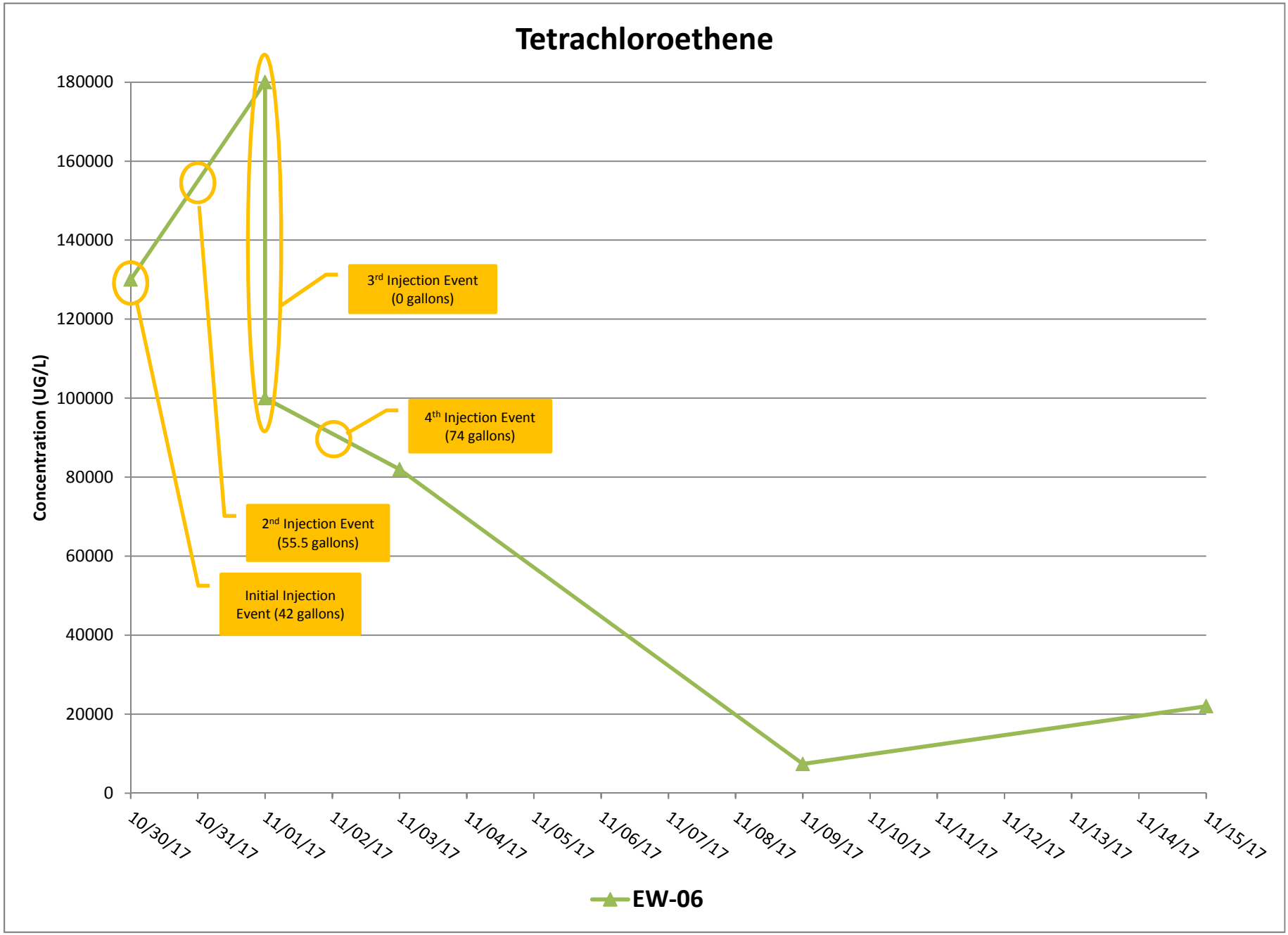

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APPENDIX F

WASTE DISPOSAL DOCUMENTS

2958904
756107-17

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NYR000217638	2	800-457-7362	009987442 FLE

GENERATOR

5. Generator's Name and Mailing Address
NEWYORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 800 457-7362

Generator's Site Address (if different than mailing address)
FORMER SPIC & SPAN IRM SITE 224129
316 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name
ISLAND PUMP & TANK CORP.
U.S. EPA ID Number
NYR000191728

7. Transporter 2 Company Name
REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number
PAD982661391

8. Designated Facility Name and Site Address
NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-6340
U.S. EPA ID Number
RID040098352

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHLYENE) 9, PGIII RQ(F002)	2	DM	400	P	F002	D	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(T) 760576-1 ERG#171
2 X 55 Dm(H)
38993 PC
PLATE: 2248182 DECAL: 411315

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Michael Cartwright AS AGENT OF NYSDEC
Signature:
Month 10 Day 31 Year 17

TRANSPORTER INTL

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JOSEPH E. SISCO
Signature:
Month 10 Day 31 Year 17

Transporter 2 Printed/Typed Name: GEORGE OBENG
Signature: George Y. Obeng
Month 11 Day 06 Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Anna Pickering
Signature:
Month 11 Day 13 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

2958904

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: NYR000217638

22. Page: 2

23. Manifest Tracking Number: 009987442 FLE

24. Generator's Name: Newyork State Department

25. Transporter 3 Company Name: Clean Venture INC

U.S. EPA ID Number: NJ0000027193

26. Transporter ____ Company Name

U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

GENERATOR

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter Acknowledgment of Receipt of Materials

Printed/Typed Name: Anthony Barbato

Signature

Month: 11 Day: 13 Year: 17

34. Transporter Acknowledgment of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spic & Span

Manifest: 009957442FLE Page: 1 of 1

a	b	c	d	
				This is a wastewater stream.
X				This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Wastes (TOC>10%)
	D001*	Ignitable Wastes(TOC<10%)
	D002*	Corrosive Wastes
	D003	Reactive Sulfides based on 261.23(a)(5)
	D003*	Explosives based on 261.23(a) (6),(7),(8)
	D003	Unexploded
	D003*	Other Reactive based on 261.23(a) (1)
	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
	D003	Reactive Cyanides based on 261.23 (a) (5)
	D004*	Arsenic
	D005*	Barium
	D006*	Cadmium
	D006*	Cadmium Containing Batteries
	D007*	Chromium
	D008*	Lead
	D008*	Lead Acid Batteries
	D009*	High Mercury-Organic
	D009*	High Mercury-Inorganic
	D009*	Low Mercury
	D009*	Mercury Wastewater
	D010*	Selenium
	D011*	Silver
	D012*	Endrin
	D013*	Lindane
	D014*	Methoxychlor
	D015*	Toxaphene
	D016*	2,4-D
	D017*	2,4,5-TP (Silvex)
	D018*	Benzene
	D019*	Carbon Tetrachloride
	D020*	Chlordane
	D021*	Chlorobenzene
	D022*	Chloroform
	D023*	o-Cresol
	D024*	m-Cresol
	D025*	p-Cresol
	D026*	Cresol (Total)
	D027*	p-Dichlorobenzene
	D028*	1,2-Dichloroethane
	D029*	1,1-Dichloroethylene
	D030*	2,4-Dinitrotoluene
	D031*	Heptachlor
	D032*	Hexachlorobenzene
	D033*	Hexachlorobutadiene
	D034*	Hexachloroethane
	D035*	Methyl ethyl ketone
	D036*	Nitrobenzene
	D037*	Pentachlorophenol
	D038*	Pyridine
	D039*	Tetrachloroethylene
	D040*	Trichloroethylene
	D041*	2,4,5-Trichlorophenol
	D042*	2,4,6-Trichlorophenol
	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	F001	Spent Halogenated Solvents
X	F002	Spent Halogenated Solvents
	F003	Spent Non-halogenated Solvents
	F004	Spent Non-halogenated Solvents
	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

	Acetone
	Benzene
	n-Butyl alcohol
	Carbon disulfide
	Carbon tetrachloride
	Chlorobenzene
	o-Cresol
	m-Cresol
	p-Cresol
	Cresol
	Cyclohexanone
	o-Dichlorobenzene
	Ethyl acetate
	Ethyl benzene
	Ethyl ether
	Isobutyl alcohol
	Methanol
	Methylene chloride
	Methyl ethyl Ketone
	Methyl isobutyl ketone
	Nitrobenzene
	Pyridine
X	Tetrachloroethylene
	Toluene
	1,1,1-Trichloroethane
	1,1,2-Trichloroethane
	1,1,2-Trichloro-1,2,2-trifluoroethane
	Trichloroethylene
	Trichloromonofluoromethene
	Xylenes
	2-Nitropropene
	2-Ethoxyethanol

	F006	Electroplating WWT sludge
	F035	Wood preserving wastewater
	F037	Petroleum refinery primary oil/water separation sludge
	F038	Petroleum refinery secondary oil/water separation sludge
	F039	Multi-source Leachate
	K048	Dissolved air flotation float
	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

- Yes
- No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: X _____ DATE: 10/31/2017

LDR00.xls

10/00

2958904
756106-17

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NYRG0002176 36	2	800-457-7362	009987443 FLE

GENERATOR

5. Generator's Name and Mailing Address
NEWYORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 800 457-7362

Generator's Site Address (if different than mailing address)
FORMER SPIC & SPAN IRM SITE 224128
315 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name
ISLAND PUMP & TANK CORP.
U.S. EPA ID Number
NYRD001917226

7. Transporter 2 Company Name
REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number
PAD982661381

8. Designated Facility Name and Site Address
NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-8340
U.S. EPA ID Number
RIDO40088352

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHLYENE) 9, PGIII RQ(F002)	1	DM	240	P	F002	~~F039~~ B	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(T) 780576-1 ERG#171
1X55 DM(H)
35993 PC
PLATE: 2248182 DECAL: 411315

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
K Michael Gutmann	As Agent of NYSDEC	11	1	17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
JOSEPH G. SISCO		11	01	17
Transporter 2 Printed/Typed Name	Signature	Month	Day	Year
GEORGE OBENG	George Y. Obeng	11	06	17

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name	Signature	Month	Day	Year
Gina Pickering	Gina Pickering	11	13	17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

2958904

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: NYR000217638

22. Page: 2

23. Manifest Tracking Number: 009987443FLE

24. Generator's Name: NEW YORK State Department.

25. Transporter 3 Company Name: Clean Venture Inc

U.S. EPA ID Number: NJ0000027193

26. Transporter _____ Company Name

U.S. EPA ID Number

GENERATOR

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter Acknowledgment of Receipt of Materials
Printed/Typed Name: Anthony Batista Signature: [signature] Month: 11 Day: 13 Year: 17

34. Transporter Acknowledgment of Receipt of Materials
Printed/Typed Name Signature Month Day Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spic & Span

Manifest: 009987443 FLE Page: 1 of 1

[ ] a [ ] b [ ] c [ ] d — This is a wastewater stream.

[ ] a [X] b [ ] c [ ] d — This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

[ ] SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Wastes (TOC>10%)
	D001*	Ignitable Wastes(TOC<10%)
	D002*	Corrosive Wastes
	D003	Reactive Sulfides based on 261.23(a)(5)
	D003*	Explosives based on 261.23(a) (6),(7),(8)
	D003	Unexploded
	D003*	Other Reactive based on 261.23(a) (1)
	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
	D003	Reactive Cyanides based on 261.23 (a) (5)
	D004*	Arsenic
	D005*	Barium
	D006*	Cadmium
	D006*	Cadmium Containing Batteries
	D007*	Chromium
	D008*	Lead
	D008*	Lead Acid Batteries
	D009*	High Mercury-Organic
	D009*	High Mercury-Inorganic
	D009*	Low Mercury
	D009*	Mercury Wastewater
	D010*	Selenium
	D011*	Silver
	D012*	Endrin
	D013*	Lindane
	D014*	Methoxychlor
	D015*	Toxaphene
	D016*	2,4-D
	D017*	2,4,5-TP (Silvex)
	D018*	Benzene
	D019*	Carbon Tetrachloride
	D020*	Chlordane
	D021*	Chlorobenzene
	D022*	Chloroform
	D023*	o-Cresol
	D024*	m-Cresol
	D025*	p-Cresol
	D026*	Cresol (Total)
	D027*	p-Dichlorobenzene
	D028*	1,2-Dichloroethane
	D029*	1,1-Dichloroethylene
	D030*	2,4-Dinitrotoluene
	D031*	Heptachlor
	D032*	Hexachlorobenzene
	D033*	Hexachlorobutadiene
	D034*	Hexachloroethane
	D035*	Methyl ethyl ketone
	D036*	Nitrobenzene
	D037*	Pentachlorophenol
	D038*	Pyridine
	D039*	Tetrachloroethylene
	D040*	Trichloroethylene
	D041*	2,4,5-Trichlorophenol
	D042*	2,4,6-Trichlorophenol
	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	F001	Spent Halogenated Solvents
X	F002	Spent Halogenated Solvents
	F003	Spent Non-halogenated Solvents
	F004	Spent Non-halogenated Solvents
	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

	Acetone
	Benzene
	n-Butyl alcohol
	Carbon disulfide
	Carbon tetrachloride
	Chlorobenzene
	o-Cresol
	m-Cresol
	p-Cresol
	Cresol
	Cyclohexanone
	o-Dichlorobenzene
	Ethyl acetate
	Ethyl benzene
	Ethyl ether
	Isobutyl alcohol
	Methanol
	Methylene chloride
	Methyl ethyl Ketone
	Methyl isobutyl ketone
	Nitrobenzene
	Pyridine
X	Tetrachloroethylene
	Toluene
	1,1,1-Trichloroethane
	1,1,2-Trichloroethane
	1,1,2-Trichloro-1,2,2-trifluoroethane
	Trichloroethylene
	Trichloromonofluoromethene
	Xylenes
	2-Nitropropene
	2-Ethoxyethanol

	F006	Electroplating WWT sludge
	F035	Wood preserving wastewater
	F037	Petroleum refinery primary oil/water separation sludge
	F038	Petroleum refinery secondary oil/water separation sludge
	F039	Multi-source Leachate
	K048	Dissolved air flotation float
	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

[ ] Yes
[ ] No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: [signature] DATE: 11/1/17

2958904
756087-17

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	N Y R 0 0 0 2 1 7 6 3 8	2	800-457-7362	009987444 FLE

GENERATOR

5. Generator's Name and Mailing Address
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 8 0 0 4 6 7 - 7 3 6 2

Generator's Site Address (if different than mailing address)
FORMER SFIC & SPAN IRM SITE 224129
315 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name
ISLAND PUMP & TANK CORP.
U.S. EPA ID Number
N Y R 0 0 0 1 9 1 7 2 6

7. Transporter 2 Company Name
REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number
P A D 9 8 2 6 6 1 3 8 1

8. Designated Facility Name and Site Address
NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-6340
U.S. EPA ID Number
R I D 0 4 0 0 9 8 3 5 2

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHYLENE) 9, PGIII RQ(F002)	2	DM	300	P	F002	B	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(T) 760576-1 ERG#171
2 x 55 DM (H)
38993 PC N.Y.
PLATE: 2248182 DECAL: 411315

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: K Michael Gronsaw
Signature: [signature] for NYSDEC
Month: 11 Day: 2 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Joseph G. Sisco
Signature: [signature]
Month: 11 Day: 02 Year: 17

Transporter 2 Printed/Typed Name: GEORGE OBENG
Signature: George Y. Obeng
Month: 11 Day: 06 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Gina Pickering
Signature: [signature]
Month: 11 Day: 13 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

2958904

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: NYR000217638

22. Page: 2

23. Manifest Tracking Number: 009987444 FLE

24. Generator's Name: NEW YORK State Department.

25. Transporter 3 Company Name: Clean Venture Inc

U.S. EPA ID Number: NJ0000027193

26. Transporter _____ Company Name

U.S. EPA ID Number

GENERATOR

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials

Printed/Typed Name: Anthony Barston | Signature | Month: 11 | Day: 13 | Year: 17

34. Transporter _____ Acknowledgment of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spic & Span

Manifest: 009987444PLE Page: 1 of 1

a	b	c	d

This is a wastewater stream.

a	b	c	d

This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

☐ SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Wastes (TOC>10%)
	D001*	Ignitable Wastes(TOC<10%)
	D002*	Corrosive Wastes
	D003	Reactive Sulfides based on 261.23(a)(5)
	D003*	Explosives based on 261.23(a) (6),(7),(8)
	D003	Unexploded
	D003*	Other Reactive based on 261.23(a) (1)
	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
	D003	Reactive Cyanides based on 261.23 (a) (5)
	D004*	Arsenic
	D005*	Barium
	D006*	Cadmium
	D006*	Cadmium Containing Batteries
	D007*	Chromium
	D008*	Lead
	D008*	Lead Acid Batteries
	D009*	High Mercury-Organic
	D009*	High Mercury-Inorganic
	D009*	Low Mercury
	D009*	Mercury Wastewater
	D010*	Selenium
	D011*	Silver
	D012*	Endrin
	D013*	Lindane
	D014*	Methoxychlor
	D015*	Toxaphene
	D016*	2,4-D
	D017*	2,4,5-TP (Silvex)
	D018*	Benzene
	D019*	Carbon Tetrachloride
	D020*	Chlordane
	D021*	Chlorobenzene
	D022*	Chloroform
	D023*	o-Cresol
	D024*	m-Cresol
	D025*	p-Cresol
	D026*	Cresol (Total)
	D027*	p-Dichlorobenzene
	D028*	1,2-Dichloroethane
	D029*	1,1-Dichloroethylene
	D030*	2,4-Dinitrotoluene
	D031*	Heptachlor
	D032*	Hexachlorobenzene
	D033*	Hexachlorobutadiene
	D034*	Hexachloroethane
	D035*	Methyl ethyl ketone
	D036*	Nitrobenzene
	D037*	Pentachlorophenol
	D038*	Pyridine
	D039*	Tetrachloroethylene
	D040*	Trichloroethylene
	D041*	2,4,5-Trichlorophenol
	D042*	2,4,6-Trichlorophenol
	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	F001	Spent Halogenated Solvents
X	F002	Spent Halogenated Solvents
	F003	Spent Non-halogenated Solvents
	F004	Spent Non-halogenated Solvents
	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

	Acetone
	Benzene
	n-Butyl alcohol
	Carbon disulfide
	Carbon tetrachloride
	Chlorobenzene
	o-Cresol
	m-Cresol
	p-Cresol
	Cresol
	Cyclohexanone
	o-Dichlorobenzene
	Ethyl acetate
	Ethyl benzene
	Ethyl ether
	Isobutyl alcohol
	Methanol
	Methylene chloride
	Methyl ethyl Ketone
	Methyl isobutyl ketone
	Nitrobenzene
	Pyridine
X	Tetrachloroethylene
	Toluene
	1,1,1-Trichloroethane
	1,1,2-Trichloroethane
	1,1,2-Trichloro-1,2,2-trifluoroethane
	Trichloroethylene
	Trichloromonofluoromethene
	Xylenes
	2-Nitropropene
	2-Ethoxyethanol

	F006	Electroplating WWT sludge
	F035	Wood preserving wastewater
	F037	Petroleum refinery primary oil/water separation sludge
	F038	Petroleum refinery secondary oil/water separation sludge
	F039	Multi-source Leachate
	K048	Dissolved air flotation float
	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

☐ Yes
☐ No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: X [signature] DATE: 11/2/17

LDR00.xls

10/00

530189

2958904

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NYR000217638	8	800-457-7362	009987445 FLE

GENERATOR

5. Generator's Name and Mailing Address
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 800 457-7362

Generator's Site Address (if different than mailing address)
FORMER SPIC & SPAN IRM SITE 224128
315 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name
ISLAND PUMP & TANK CORP.
U.S. EPA ID Number
NYR000191726

7. Transporter 2 Company Name
REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number
PAD982661361

8. Designated Facility Name and Site Address
NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-6343
U.S. EPA ID Number
RID040098352

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S. (TETRACHLOROETHLYENE) 9, PGIII RQ(F002)	1	DM	180	P	F002	B	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(T) 760578-1 ERG#171
1X55 DM (4)
38993 PC
PLATE: 224818Z DECAL: 411315

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Michael Gutmann
Signature: [signature] AGENT OF NYSDEC
Month: 11 Day: 13 Year: 17

TRANSPORTER INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Joseph E. Sisco
Signature: [signature]
Month: 11 Day: 03 Year: 17

Transporter 2 Printed/Typed Name: GEORGE OBENG
Signature: George Y. Obeng
Month: 11 Day: 06 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Ona McKean
Signature: [signature]
Month: 11 Day: 13 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number	22. Page	23. Manifest Tracking Number
NYR000217638	2	009987445FLE

24. Generator's Name: NEW YORK State Department.

25. Transporter 3 Company Name: Clean Venture Inc — U.S. EPA ID Number: NJ0000027193

26. Transporter _____ Company Name — U.S. EPA ID Number:

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name: Anthony Burston — Signature: [signature] — Month: 11 Day: 13 Year: 17

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spicer Spec

Manifest: 009987445FLE

Page: 1 of 1

a b c d
[ ] [ ] [ ] [ ] This is a wastewater stream.

a b c d
[ ] [ ] [ ] [X] This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

[ ] SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	D001	Ignitable Wastes (TOC>10%)
[ ]	D001*	Ignitable Wastes(TOC<10%)
[ ]	D002*	Corrosive Wastes
[ ]	D003	Reactive Sulfides based on 261.23(a)(5)
[ ]	D003*	Explosives based on 261.23(a) (6),(7),(8)
[ ]	D003	Unexploded
[ ]	D003*	Other Reactive based on 261.23(a) (1)
[ ]	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
[ ]	D003	Reactive Cyanides based on 261.23 (a) (5)
[ ]	D004*	Arsenic
[ ]	D005*	Barium
[ ]	D006*	Cadmium
[ ]	D006*	Cadmium Containing Batteries
[ ]	D007*	Chromium
[ ]	D008*	Lead
[ ]	D008*	Lead Acid Batteries
[ ]	D009*	High Mercury-Organic
[ ]	D009*	High Mercury-Inorganic
[ ]	D009*	Low Mercury
[ ]	D009*	Mercury Wastewater
[ ]	D010*	Selenium
[ ]	D011*	Silver
[ ]	D012*	Endrin
[ ]	D013*	Lindane
[ ]	D014*	Methoxychlor
[ ]	D015*	Toxaphene
[ ]	D016*	2,4-D
[ ]	D017*	2,4,5-TP (Silvex)
[ ]	D018*	Benzene
[ ]	D019*	Carbon Tetrachloride
[ ]	D020*	Chlordane
[ ]	D021*	Chlorobenzene
[ ]	D022*	Chloroform
[ ]	D023*	o-Cresol
[ ]	D024*	m-Cresol
[ ]	D025*	p-Cresol
[ ]	D026*	Cresol (Total)
[ ]	D027*	p-Dichlorobenzene
[ ]	D028*	1,2-Dichloroethane
[ ]	D029*	1,1-Dichloroethylene
[ ]	D030*	2,4-Dinitrotoluene
[ ]	D031*	Heptachlor
[ ]	D032*	Hexachlorobenzene
[ ]	D033*	Hexachlorobutadiene
[ ]	D034*	Hexachloroethane
[ ]	D035*	Methyl ethyl ketone
[ ]	D036*	Nitrobenzene
[ ]	D037*	Pentachlorophenol
[ ]	D038*	Pyridine
[ ]	D039*	Tetrachloroethylene
[ ]	D040*	Trichloroethylene
[ ]	D041*	2,4,5-Trichlorophenol
[ ]	D042*	2,4,6-Trichlorophenol
[ ]	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	F001	Spent Halogenated Solvents
[X]	F002	Spent Halogenated Solvents
[ ]	F003	Spent Non-halogenated Solvents
[ ]	F004	Spent Non-halogenated Solvents
[ ]	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

[ ]	Acetone
[ ]	Benzene
[ ]	n-Butyl alcohol
[ ]	Carbon disulfide
[ ]	Carbon tetrachloride
[ ]	Chlorobenzene
[ ]	o-Cresol
[ ]	m-Cresol
[ ]	p-Cresol
[ ]	Cresol
[ ]	Cyclohexanone
[ ]	o-Dichlorobenzene
[ ]	Ethyl acetate
[ ]	Ethyl benzene
[ ]	Ethyl ether
[ ]	Isobutyl alcohol
[ ]	Methanol
[ ]	Methylene chloride
[ ]	Methyl ethyl Ketone
[ ]	Methyl isobutyl ketone
[ ]	Nitrobenzene
[ ]	Pyridine
[X]	Tetrachloroethylene
[ ]	Toluene
[ ]	1,1,1-Trichloroethane
[ ]	1,1,2-Trichloroethane
[ ]	1,1,2-Trichloro-1,2,2-trifluoroethane
[ ]	Trichloroethylene
[ ]	Trichloromonofluoromethene
[ ]	Xylenes
[ ]	2-Nitropropene
[ ]	2-Ethoxyethanol

[ ]	F006	Electroplating WWT sludge
[ ]	F035	Wood preserving wastewater
[ ]	F037	Petroleum refinery primary oil/water separation sludge
[ ]	F038	Petroleum refinery secondary oil/water separation sludge
[ ]	F039	Multi-source Leachate
[ ]	K048	Dissolved air flotation float
[ ]	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

[ ] Yes
[ ] No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: [signature] DATE: 11/3/17

2973228
764097-17

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NYR000217638
2. Page 1 of: 2
3. Emergency Response Phone: 800-457-7362
4. Manifest Tracking Number: 009987452 FLE

5. Generator's Name and Mailing Address
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 800 457-7362

Generator's Site Address (if different than mailing address)
FORMER SPIC & SPAN IRM SITE 224129
315 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name: ISLAND PUMP & TANK CORP.
U.S. EPA ID Number: NYR000191726

7. Transporter 2 Company Name: REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number: PAD982661361

8. Designated Facility Name and Site Address
NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-8340
U.S. EPA ID Number: RIDO40098352

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHLYENE) 9, PGIII RQ(F002)	3	DM	1200	P	F002	B	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(1) 760576-1 ERG#171
3X55 DM(H)
38993 PC N.Y. PLATE: XBT K51 DECAL: 411331

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: MICHAEL GATTMAN
Signature: AS AGENT OF NYSDEC
Month: 11 Day: 8 Year: 17

INTL
16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER
17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: JOSEPH E. SISCO
Signature:
Month: 11 Day: 08 Year: 17
Transporter 2 Printed/Typed Name: GEORGE OBENG
Signature: George Y. Obeng
Month: 11 Day: 09 Year: 17

DESIGNATED FACILITY
18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H141 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Beth Arnold
Signature: Beth Arnold
Month: 11 Day: 13 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

2973228

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: NJR000217638

22. Page: 2

23. Manifest Tracking Number: 009987452FLE

24. Generator's Name: NJ State Dept.

25. Transporter 2 Company Name: ST Transportation Co Inc — U.S. EPA ID Number: NJD076799776

26. Transporter ____ Company Name — U.S. EPA ID Number:

27a. HM	27b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

GENERATOR

TRANSPORTER

33. Transporter 2 Acknowledgment of Receipt of Materials

Printed/Typed Name: [illegible] Signature: [signature] Month: 11 Day: 13 Year: 17

34. Transporter ____ Acknowledgment of Receipt of Materials

Printed/Typed Name: Signature: Month: Day: Year:

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spec & Spec

Manifest: 009918245AFLE Page: 1 of 1

a	b	c	d

This is a wastewater stream.

a	b	c	d
X			

This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

N | | | | SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Wastes (TOC>10%)
	D001*	Ignitable Wastes(TOC<10%)
	D002*	Corrosive Wastes
	D003	Reactive Sulfides based on 261.23(a)(5)
	D003*	Explosives based on 261.23(a) (6),(7),(8)
	D003	Unexploded
	D003*	Other Reactive based on 261.23(a) (1)
	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
	D003	Reactive Cyanides based on 261.23 (a) (5)
	D004*	Arsenic
	D005*	Barium
	D006*	Cadmium
	D006*	Cadmium Containing Batteries
	D007*	Chromium
	D008*	Lead
	D008*	Lead Acid Batteries
	D009*	High Mercury-Organic
	D009*	High Mercury-Inorganic
	D009*	Low Mercury
	D009*	Mercury Wastewater
	D010*	Selenium
	D011*	Silver
	D012*	Endrin
	D013*	Lindane
	D014*	Methoxychlor
	D015*	Toxaphene
	D016*	2,4-D
	D017*	2,4,5-TP (Silvex)
	D018*	Benzene
	D019*	Carbon Tetrachloride
	D020*	Chlordane
	D021*	Chlorobenzene
	D022*	Chloroform
	D023*	o-Cresol
	D024*	m-Cresol
	D025*	p-Cresol
	D026*	Cresol (Total)
	D027*	p-Dichlorobenzene
	D028*	1,2-Dichloroethane
	D029*	1,1-Dichloroethylene
	D030*	2,4-Dinitrotoluene
	D031*	Heptachlor
	D032*	Hexachlorobenzene
	D033*	Hexachlorobutadiene
	D034*	Hexachloroethane
	D035*	Methyl ethyl ketone
	D036*	Nitrobenzene
	D037*	Pentachlorophenol
	D038*	Pyridine
	D039*	Tetrachloroethylene
	D040*	Trichloroethylene
	D041*	2,4,5-Trichlorophenol
	D042*	2,4,6-Trichlorophenol
	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	F001	Spent Halogenated Solvents
X	F002	Spent Halogenated Solvents
	F003	Spent Non-halogenated Solvents
	F004	Spent Non-halogenated Solvents
	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

	Acetone
	Benzene
	n-Butyl alcohol
	Carbon disulfide
	Carbon tetrachloride
	Chlorobenzene
	o-Cresol
	m-Cresol
	p-Cresol
	Cresol
	Cyclohexanone
	o-Dichlorobenzene
	Ethyl acetate
	Ethyl benzene
	Ethyl ether
	Isobutyl alcohol
	Methanol
	Methylene chloride
	Methyl ethyl Ketone
	Methyl Isobutyl ketone
	Nitrobenzene
	Pyridine
X	Tetrachloroethylene
	Toluene
	1,1,1-Trichloroethane
	1,1,2-Trichloroethane
	1,1,2-Trichloro-1,2,2-trifluoroethane
	Trichloroethylene
	Trichloromonofluoromethene
	Xylenes
	2-Nitropropene
	2-Ethoxyethanol

	F006	Electroplating WWT sludge
	F035	Wood preserving wastewater
	F037	Petroleum refinery primary oil/water separation sludge
	F038	Petroleum refinery secondary oil/water separation sludge
	F039	Multi-source Leachate
	K048	Dissolved air flotation float
	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

X	Yes
	No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: _____ DATE: 11/8/17

530189

2978834
780721-17

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number NYS000217688	2. Page 1 of 2	3. Emergency Response Phone 800-457-7362	4. Manifest Tracking Number 009987453 FLE

GENERATOR

5. Generator's Name and Mailing Address
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 800 457-7362

Generator's Site Address (if different than mailing address)
FORMER SMC & SPAN FM SITE 224128
315 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name
ISLAND PUMP & TANK CORP.
U.S. EPA ID Number
NYR000131728

7. Transporter 2 Company Name
REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number
PAD982661381

8. Designated Facility Name and Site Address
NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-6340
U.S. EPA ID Number
RID010098352

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. UN3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHYLENE) 9, PGIII RQ(F002)	5	DM	2,000 ~~225~~	P	F002	B	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(T) 760576-1 ERG#171

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: J. Michael Quinlan
Signature: [signature] AS AGENT OF NYSDEC
Month: 11 Day: 9 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Ashley Rut
Signature: [signature]
Month: 11 Day: 9 Year: 17

Transporter 2 Printed/Typed Name: Jorge Ramirez
Signature: Jorge Ramirez
Month: 11 Day: 16 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1. H141	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Beth Arnold
Signature: Beth Arnold
Month: 11 Day: 20 Year: 17

EPA Form 8700-22 (Rev. 3-05). Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

2976834

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: NYR000217638

22. Page: 2

23. Manifest Tracking Number: 009987453FLE

24. Generator's Name: New York State Department of Environmental Co

25. Transporter 2 Company Name: SJ TRANSPORTATION CO.INC — U.S. EPA ID Number: NJD071629976

26. Transporter _____ Company Name — U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter 2 Acknowledgment of Receipt of Materials
Printed/Typed Name: [signature] Signature: [signature] Month Day Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name Signature Month Day Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

GENERATOR

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spice & Spen

Manifest: 009987453FLE Page: 1 of 1

a	b	c	d	
				This is a wastewater stream.

a	b	c	d	
X				This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

[N] SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Wastes (TOC>10%)
	D001*	Ignitable Wastes(TOC<10%)
	D002*	Corrosive Wastes
	D003	Reactive Sulfides based on 261.23(a)(5)
	D003*	Explosives based on 261.23(a) (6),(7),(8)
	D003	Unexploded
	D003*	Other Reactive based on 261.23(a) (1)
	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
	D003	Reactive Cyanides based on 261.23 (a) (5)
	D004*	Arsenic
	D005*	Barium
	D006*	Cadmium
	D006*	Cadmium Containing Batteries
	D007*	Chromium
	D008*	Lead
	D008*	Lead Acid Batteries
	D009*	High Mercury-Organic
	D009*	High Mercury-Inorganic
	D009*	Low Mercury
	D009*	Mercury Wastewater
	D010*	Selenium
	D011*	Silver
	D012*	Endrin
	D013*	Lindane
	D014*	Methoxychlor
	D015*	Toxaphene
	D016*	2,4-D
	D017*	2,4,5-TP (Silvex)
	D018*	Benzene
	D019*	Carbon Tetrachloride
	D020*	Chlordane
	D021*	Chlorobenzene
	D022*	Chloroform
	D023*	o-Cresol
	D024*	m-Cresol
	D025*	p-Cresol
	D026*	Cresol (Total)
	D027*	p-Dichlorobenzene
	D028*	1,2-Dichloroethane
	D029*	1,1-Dichloroethylene
	D030*	2,4-Dinitrotoluene
	D031*	Heptachlor
	D032*	Hexachlorobenzene
	D033*	Hexachlorobutadiene
	D034*	Hexachloroethane
	D035*	Methyl ethyl ketone
	D036*	Nitrobenzene
	D037*	Pentachlorophenol
	D038*	Pyridine
	D039*	Tetrachloroethylene
	D040*	Trichloroethylene
	D041*	2,4,5-Trichlorophenol
	D042*	2,4,6-Trichlorophenol
	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	F001	Spent Halogenated Solvents
X	F002	Spent Halogenated Solvents
	F003	Spent Non-halogenated Solvents
	F004	Spent Non-halogenated Solvents
	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

	Acetone
	Benzene
	n-Butyl alcohol
	Carbon disulfide
	Carbon tetrachloride
	Chlorobenzene
	o-Cresol
	m-Cresol
	p-Cresol
	Cresol
	Cyclohexanone
	o-Dichlorobenzene
	Ethyl acetate
	Ethyl benzene
	Ethyl ether
	Isobutyl alcohol
	Methanol
	Methylene chloride
	Methyl ethyl Ketone
	Methyl isobutyl ketone
	Nitrobenzene
	Pyridine
X	Tetrachloroethylene
	Toluene
	1,1,1-Trichloroethane
	1,1,2-Trichloroethane
	1,1,2-Trichloro-1,2,2-trifluoroethane
	Trichloroethylene
	Trichloromonofluoromethene
	Xylenes
	2-Nitropropene
	2-Ethoxyethanol

	F006	Electroplating WWT sludge
	F035	Wood preserving wastewater
	F037	Petroleum refinery primary oil/water separation sludge
	F038	Petroleum refinery secondary oil/water separation sludge
	F039	Multi-source Leachate
	K048	Dissolved air flotation float
	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

X	Yes
	No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: _____ DATE: 11/9/17

530189

29768334
780215-17

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NYR000217035

2. Page 1 of: 2

3. Emergency Response Phone: 800-[illegible]

4. Manifest Tracking Number: 009987454 FLE

GENERATOR

5. Generator's Name and Mailing Address:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233

Generator's Site Address (if different than mailing address):
FORMER SPIC & SPAN DRY SITE 224[illegible]
315 KINGSLAND AVENUE
BROOKLYN NY 11222

Generator's Phone: 800 462-7362

6. Transporter 1 Company Name: ISLAND PUMP & TANK CORP.
U.S. EPA ID Number: NYR000191726

7. Transporter 2 Company Name: REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number: PAD982661391

8. Designated Facility Name and Site Address:
NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-6340
U.S. EPA ID Number: RID040098362

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHLYENE) 9, PGIII RQ(F002)	2	DM	800	P	F002	B	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(T) 7005 8-1 ERG#171

38993 PC N.Y.

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: [illegible] | Signature: [illegible] As Agent of NYSDEC | Month 11 | Day 10 | Year 17

INTL

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Joseph E. Sisco | Signature: [illegible] | Month 11 | Day 10 | Year 17

Transporter 2 Printed/Typed Name: Jorge Ramirez | Signature: [illegible] | Month 11 | Day 16 | Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Beth Arnold | Signature: Beth Arnold | Month 11 | Day 20 | Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

29768354

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: NJR000271638 | 22. Page: 2 | 23. Manifest Tracking Number: 009987454 FLE

24. Generator's Name: New York State Department of Environmental Co

25. Transporter 3 Company Name: SJ TRANSPORTATION CO.INC | U.S. EPA ID Number: NJD071629976

26. Transporter _____ Company Name | U.S. EPA ID Number

GENERATOR

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter 3 Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spice Spec

Manifest: 009987454 FLE Page: 1 of 1

a b c d
[ ] [ ] [ ] [ ] This is a wastewater stream.

a b c d
[ ] [X] [ ] [ ] This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

[X] SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	D001	Ignitable Wastes (TOC>10%)
[ ]	D001*	Ignitable Wastes(TOC<10%)
[ ]	D002*	Corrosive Wastes
[ ]	D003	Reactive Sulfides based on 261.23(a)(5)
[ ]	D003*	Explosives based on 261.23(a) (6),(7),(8)
[ ]	D003	Unexploded
[ ]	D003*	Other Reactive based on 261.23(a) (1)
[ ]	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
[ ]	D003	Reactive Cyanides based on 261.23 (a) (5)
[ ]	D004*	Arsenic
[ ]	D005*	Barium
[ ]	D006*	Cadmium
[ ]	D006*	Cadmium Containing Batteries
[ ]	D007*	Chromium
[ ]	D008*	Lead
[ ]	D008*	Lead Acid Batteries
[ ]	D009*	High Mercury-Organic
[ ]	D009*	High Mercury-Inorganic
[ ]	D009*	Low Mercury
[ ]	D009*	Mercury Wastewater
[ ]	D010*	Selenium
[ ]	D011*	Silver
[ ]	D012*	Endrin
[ ]	D013*	Lindane
[ ]	D014*	Methoxychlor
[ ]	D015*	Toxaphene
[ ]	D016*	2,4-D
[ ]	D017*	2,4,5-TP (Silvex)
[ ]	D018*	Benzene
[ ]	D019*	Carbon Tetrachloride
[ ]	D020*	Chlordane
[ ]	D021*	Chlorobenzene
[ ]	D022*	Chloroform
[ ]	D023*	o-Cresol
[ ]	D024*	m-Cresol
[ ]	D025*	p-Cresol
[ ]	D026*	Cresol (Total)
[ ]	D027*	p-Dichlorobenzene
[ ]	D028*	1,2-Dichloroethane
[ ]	D029*	1,1-Dichloroethylene
[ ]	D030*	2,4-Dinitrotoluene
[ ]	D031*	Heptachlor
[ ]	D032*	Hexachlorobenzene
[ ]	D033*	Hexachlorobutadiene
[ ]	D034*	Hexachloroethane
[ ]	D035*	Methyl ethyl ketone
[ ]	D036*	Nitrobenzene
[ ]	D037*	Pentachlorophenol
[ ]	D038*	Pyridine
[ ]	D039*	Tetrachloroethylene
[ ]	D040*	Trichloroethylene
[ ]	D041*	2,4,5-Trichlorophenol
[ ]	D042*	2,4,6-Trichlorophenol
[ ]	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	F001	Spent Halogenated Solvents
[X]	F002	Spent Halogenated Solvents
[ ]	F003	Spent Non-halogenated Solvents
[ ]	F004	Spent Non-halogenated Solvents
[ ]	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

[ ]	Acetone
[ ]	Benzene
[ ]	n-Butyl alcohol
[ ]	Carbon disulfide
[ ]	Carbon tetrachloride
[ ]	Chlorobenzene
[ ]	o-Cresol
[ ]	m-Cresol
[ ]	p-Cresol
[ ]	Cresol
[ ]	Cyclohexanone
[ ]	o-Dichlorobenzene
[ ]	Ethyl acetate
[ ]	Ethyl benzene
[ ]	Ethyl ether
[ ]	Isobutyl alcohol
[ ]	Methanol
[ ]	Methylene chloride
[ ]	Methyl ethyl Ketone
[ ]	Methyl isobutyl ketone
[ ]	Nitrobenzene
[ ]	Pyridine
[X]	Tetrachloroethylene
[ ]	Toluene
[ ]	1,1,1-Trichloroethane
[ ]	1,1,2-Trichloroethane
[ ]	1,1,2-Trichloro-1,2,2-trifluoroethane
[ ]	Trichloroethylene
[ ]	Trichloromonofluoromethene
[ ]	Xylenes
[ ]	2-Nitropropene
[ ]	2-Ethoxyethanol

[ ]	F006	Electroplating WWT sludge
[ ]	F035	Wood preserving wastewater
[ ]	F037	Petroleum refinery primary oil/water separation sludge
[ ]	F038	Petroleum refinery secondary oil/water separation sludge
[ ]	F039	Multi-source Leachate
[ ]	K048	Dissolved air flotation float
[ ]	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

[X] Yes
[ ] No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: _____ DATE: 11/10/2017

538189 780713-17 2976834

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	NYR000217638	2	800-457-7362	009987486 FLE

GENERATOR

5. Generator's Name and Mailing Address
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 800 457-7362

Generator's Site Address (if different than mailing address)
FORMER SPIC & SPAN IRM SITE 224129
215 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name
ISLAND PUMP & TANK CORP.
U.S. EPA ID Number
NYR000 [illegible]726

7. Transporter 2 Company Name
REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP) LLC
U.S. EPA ID Number
PAD982866891

8. Designated Facility Name and Site Address
NORTHLAND ENVIRONMENTAL
375 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-6340
U.S. EPA ID Number
RIDO40098352

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHYLENE) 9, PGIII RQ(F002)	2 A	DM	400 H0	P B	F002	B	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(T) 780578-1 ERG#171

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Michael Gutman
Signature: [signature] AS Agent OF NYSDEC
Month: 11 Day: 14 Year: 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: [illegible]
Signature: [signature]
Month: 11 Day: 14 Year: 17

Transporter 2 Printed/Typed Name: Jorge Ramirez
Signature: [signature]
Month: 11 Day: 16 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Beth Arnold
Signature: Beth Arnold
Month: 11 Day: 20 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

2776834

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: NJK000217638 | 22. Page: 2 | 23. Manifest Tracking Number: 009987486FLE

GENERATOR

24. Generator's Name

25. Transporter 3 Company Name: SJ TRANSPORTATION CO.INC | U.S. EPA ID Number: NJD071629976

26. Transporter _____ Company Name | U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter 3 Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month 11 Day 10 Year 2017

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spec d Spon

Manifest: 005982486PLE Page: 1 of 1

a b c d
[ ] [ ] [ ] [ ] This is a wastewater stream.

a b c d
[ ] [ ] [ ] [X] This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

[ ] SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	D001	Ignitable Wastes (TOC>10%)
[ ]	D001*	Ignitable Wastes(TOC<10%)
[ ]	D002*	Corrosive Wastes
[ ]	D003	Reactive Sulfides based on 261.23(a)(5)
[ ]	D003*	Explosives based on 261.23(a) (6),(7),(8)
[ ]	D003	Unexploded
[ ]	D003*	Other Reactive based on 261.23(a) (1)
[ ]	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
[ ]	D003	Reactive Cyanides based on 261.23 (a) (5)
[ ]	D004*	Arsenic
[ ]	D005*	Barium
[ ]	D006*	Cadmium
[ ]	D006*	Cadmium Containing Batteries
[ ]	D007*	Chromium
[ ]	D008*	Lead
[ ]	D008*	Lead Acid Batteries
[ ]	D009*	High Mercury-Organic
[ ]	D009*	High Mercury-Inorganic
[ ]	D009*	Low Mercury
[ ]	D009*	Mercury Wastewater
[ ]	D010*	Selenium
[ ]	D011*	Silver
[ ]	D012*	Endrin
[ ]	D013*	Lindane
[ ]	D014*	Methoxychlor
[ ]	D015*	Toxaphene
[ ]	D016*	2,4-D
[ ]	D017*	2,4,5-TP (Silvex)
[ ]	D018*	Benzene
[ ]	D019*	Carbon Tetrachloride
[ ]	D020*	Chlordane
[ ]	D021*	Chlorobenzene
[ ]	D022*	Chloroform
[ ]	D023*	o-Cresol
[ ]	D024*	m-Cresol
[ ]	D025*	p-Cresol
[ ]	D026*	Cresol (Total)
[ ]	D027*	p-Dichlorobenzene
[ ]	D028*	1,2-Dichloroethane
[ ]	D029*	1,1-Dichloroethylene
[ ]	D030*	2,4-Dinitrotoluene
[ ]	D031*	Heptachlor
[ ]	D032*	Hexachlorobenzene
[ ]	D033*	Hexachlorobutadiene
[ ]	D034*	Hexachloroethane
[ ]	D035*	Methyl ethyl ketone
[ ]	D036*	Nitrobenzene
[ ]	D037*	Pentachlorophenol
[ ]	D038*	Pyridine
[ ]	D039*	Tetrachloroethylene
[ ]	D040*	Trichloroethylene
[ ]	D041*	2,4,5-Trichlorophenol
[ ]	D042*	2,4,6-Trichlorophenol
[ ]	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	F001	Spent Halogenated Solvents
[X]	F002	Spent Halogenated Solvents
[ ]	F003	Spent Non-halogenated Solvents
[ ]	F004	Spent Non-halogenated Solvents
[ ]	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

[ ]	Acetone
[ ]	Benzene
[ ]	n-Butyl alcohol
[ ]	Carbon disulfide
[ ]	Carbon tetrachloride
[ ]	Chlorobenzene
[ ]	o-Cresol
[ ]	m-Cresol
[ ]	p-Cresol
[ ]	Cresol
[ ]	Cyclohexanone
[ ]	o-Dichlorobenzene
[ ]	Ethyl acetate
[ ]	Ethyl benzene
[ ]	Ethyl ether
[ ]	Isobutyl alcohol
[ ]	Methanol
[ ]	Methylene chloride
[ ]	Methyl ethyl Ketone
[ ]	Methyl isobutyl ketone
[ ]	Nitrobenzene
[ ]	Pyridine
[X]	Tetrachloroethylene
[ ]	Toluene
[ ]	1,1,1-Trichloroethane
[ ]	1,1,2-Trichloroethane
[ ]	1,1,2-Trichloro-1,2,2-trifluoroethane
[ ]	Trichloroethylene
[ ]	Trichloromonofluoromethene
[ ]	Xylenes
[ ]	2-Nitropropene
[ ]	2-Ethoxyethanol

[ ]	F006	Electroplating WWT sludge
[ ]	F035	Wood preserving wastewater
[ ]	F037	Petroleum refinery primary oil/water separation sludge
[ ]	F038	Petroleum refinery secondary oil/water separation sludge
[ ]	F039	Multi-source Leachate
[ ]	K048	Dissolved air flotation float
[ ]	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

[ ] Yes
[ ] No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: [signature] DATE: 10/14/17

536189

2976834
750893-17

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NYR000217688
2. Page 1 of: 2
3. Emergency Response Phone: 800-457-7362
4. Manifest Tracking Number: 009987487 FLE

GENERATOR

5. Generator's Name and Mailing Address: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 800 457-7362

Generator's Site Address (if different than mailing address): FORMER SPIC & SPAN FIRM SITE 224126
315 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name: ISLAND PUMP & TANK CORP.
U.S. EPA ID Number: NYR000217268

7. Transporter 2 Company Name: REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number: PAD982866138

8. Designated Facility Name and Site Address: NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-6340
U.S. EPA ID Number: RID040098352

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHLYENE) 9, PGIII RQ(F002)	3	DM	1100	P	F002	B	
	2. NON-DOT / NON-RCRA REGULATED TURBINE MATERIALS & MISC DEBRIS	1	DM	250	P	BUG		
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1) T) 760576-1 ERG#171
2) 916704-00
3) 8993 PC

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Michael Gutman
Signature: AS AGENT OF NYSDEC
Month: 11 Day: 15 Year: 17

INTL

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JOSEPH G. SISCO
Signature:
Month: 11 Day: 15 Year: 17

Transporter 2 Printed/Typed Name: Jorge Ramirez
Signature:
Month: 11 Day: 16 Year: 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141	H141		

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Beth Arnold
Signature: Beth Arnold
Month: 11 Day: 20 Year: 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

29768834

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: NJR000217638 | 22. Page: 2 | 23. Manifest Tracking Number: 009987487FLE

24. Generator's Name: New York State Department of Environmental Co.

25. Transporter 3 Company Name: SJ TRANSPORTATION CO.INC | U.S. EPA ID Number: NJD071629576

26. Transporter _____ Company Name | U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter 3 Acknowledgment of Receipt of Materials
Printed/Typed Name: [illegible] | Signature: [illegible] | Month: 11 | Day: 04 | Year: 15

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spicd Spec

Manifest: 009918748 7FLE Page: 1 of 1

a	b	c	d	
				This is a wastewater stream.
X				This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

N | | | SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Wastes (TOC>10%)
	D001*	Ignitable Wastes(TOC<10%)
	D002*	Corrosive Wastes
	D003	Reactive Sulfides based on 261.23(a)(5)
	D003*	Explosives based on 261.23(a) (6),(7),(8)
	D003	Unexploded
	D003*	Other Reactive based on 261.23(a) (1)
	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
	D003	Reactive Cyanides based on 261.23 (a) (5)
	D004*	Arsenic
	D005*	Barium
	D006*	Cadmium
	D006*	Cadmium Containing Batteries
	D007*	Chromium
	D008*	Lead
	D008*	Lead Acid Batteries
	D009*	High Mercury-Organic
	D009*	High Mercury-Inorganic
	D009*	Low Mercury
	D009*	Mercury Wastewater
	D010*	Selenium
	D011*	Silver
	D012*	Endrin
	D013*	Lindane
	D014*	Methoxychlor
	D015*	Toxaphene
	D016*	2,4-D
	D017*	2,4,5-TP (Silvex)
	D018*	Benzene
	D019*	Carbon Tetrachloride
	D020*	Chlordane
	D021*	Chlorobenzene
	D022*	Chloroform
	D023*	o-Cresol
	D024*	m-Cresol
	D025*	p-Cresol
	D026*	Cresol (Total)
	D027*	p-Dichlorobenzene
	D028*	1,2-Dichloroethane
	D029*	1,1-Dichloroethylene
	D030*	2,4-Dinitrotoluene
	D031*	Heptachlor
	D032*	Hexachlorobenzene
	D033*	Hexachlorobutadiene
	D034*	Hexachloroethane
	D035*	Methyl ethyl ketone
	D036*	Nitrobenzene
	D037*	Pentachlorophenol
	D038*	Pyridine
	D039*	Tetrachloroethylene
	D040*	Trichloroethylene
	D041*	2,4,5-Trichlorophenol
	D042*	2,4,6-Trichlorophenol
	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
	F001	Spent Halogenated Solvents
X	F002	Spent Halogenated Solvents
	F003	Spent Non-halogenated Solvents
	F004	Spent Non-halogenated Solvents
	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

	Acetone
	Benzene
	n-Butyl alcohol
	Carbon disulfide
	Carbon tetrachloride
	Chlorobenzene
	o-Cresol
	m-Cresol
	p-Cresol
	Cresol
	Cyclohexanone
	o-Dichlorobenzene
	Ethyl acetate
	Ethyl benzene
	Ethyl ether
	Isobutyl alcohol
	Methanol
	Methylene chloride
	Methyl ethyl Ketone
	Methyl isobutyl ketone
	Nitrobenzene
	Pyridine
X	Tetrachloroethylene
	Toluene
	1,1,1-Trichloroethane
	1,1,2-Trichloroethane
	1,1,2-Trichloro-1,2,2-trifluoroethane
	Trichloroethylene
	Trichloromonofluoromethene
	Xylenes
	2-Nitropropene
	2-Ethoxyethanol

		F006 Electroplating WWT sludge
		F035 Wood preserving wastewater
		F037 Petroleum refinery primary oil/water separation sludge
		F038 Petroleum refinery secondary oil/water separation sludge
		F039 Multi-source Leachate
		K048 Dissolved air flotation float
		K049 Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

	Yes
	No

If YES, *attach a completed UTS/UHC form to this document*

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: X [signature] DATE: 11/15/17

30085 YS
829262-17

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NYR000217838	2	800-457-7362	009987508 FLE

GENERATOR

5. Generator's Name and Mailing Address
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CO
625 BROADWAY
ALBANY NY 12233
Generator's Phone: 800 457-7362

Generator's Site Address (if different than mailing address)
FORMER SPIC & SPAN FRM SITE 224129
316 KINGSLAND AVENUE
BROOKLYN NY 11222

6. Transporter 1 Company Name
ISLAND PUMP & TANK CORP
U.S. EPA ID Number
NYR000191728

7. Transporter 2 Company Name
REPUBLIC ENVIRONMENTAL SYSTEMS (TRANSPORTATION GROUP), LLC
U.S. EPA ID Number
PAD982861381

8. Designated Facility Name and Site Address
NORTHLAND ENVIRONMENTAL
275 ALLENS AVENUE
PROVIDENCE RI 02905
Facility's Phone: 401 781-6340
U.S. EPA ID Number
RID040098352

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3032, HAZARDOUS WASTE, LIQUID, N.O.S., (TETRACHLOROETHYLENE), 9, PGIII RQ(F002)	2	DM	750	P	F002	B	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1)(T) 760578-1 ERG#171
2X55 DM(E)
38993 PC N.Y. PLATE: XBT K51 DECAL: 411331

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: [illegible] Signature: DAVID COFIELD Month 12 Day 20 Year 17

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JOSEPH E. SISCO Signature: [signature] Month 12 Day 20 Year 17

Transporter 2 Printed/Typed Name: GEORGE OBENG Signature: [signature] Month 12 Day 21 Year 17

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Beth Arnold Signature: Beth Arnold Month 12 Day 22 Year 17

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

3003545

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number	22. Page	23. Manifest Tracking Number
NYR000217638	2	009987508FLE

24. Generator's Name: New York State Department of Environmental Co.

25. Transporter 3 Company Name: SJ TRANSPORTATION CO.INC — U.S. EPA ID Number: NJD071629976

26. Transporter ____ Company Name — U.S. EPA ID Number:

GENERATOR

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter 3 Acknowledgment of Receipt of Materials
Printed/Typed Name: [illegible] Signature: [illegible] Month: 11 Day: 7 Year: 17

34. Transporter ____ Acknowledgment of Receipt of Materials
Printed/Typed Name: Signature: Month: Day: Year:

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

SUBPART CC AND LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name: Former Spec & Spec

Manifest: 005918750 8FLE Page: 1 of 1

[ ] a [ ] b [ ] c [ ] d — This is a wastewater stream.

[ ] a [ ] b [ ] c [X] d — This is a non-wastewater stream.

NOTE: BOXES CORRESPOND TO MANIFEST LINE ITEM

The waste(s) described above, does not meet the applicable treatment standards in 40 CFR 268 Subpart D.

[N] SUBPART CC: INDICATE WHETHER WASTES ON THE MANIFEST ARE REGULATED UNDER SUBPART CC FOR CONTAINING VOC'S IN CONCENTRATION LEVELS EQUAL TO OR GREATER THAN 500 PPMW BY ENTERING A "Y" FOR "YES" OR A "N" FOR "NO" AS APPROPRIATE

A. CHARACTERISTIC WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	D001	Ignitable Wastes (TOC>10%)
[ ]	D001*	Ignitable Wastes(TOC<10%)
[ ]	D002*	Corrosive Wastes
[ ]	D003	Reactive Sulfides based on 261.23(a)(5)
[ ]	D003*	Explosives based on 261.23(a) (6),(7),(8)
[ ]	D003	Unexploded
[ ]	D003*	Other Reactive based on 261.23(a) (1)
[ ]	D003*	Water Reactive based on 261.23(a) (2),(3),(4)
[ ]	D003	Reactive Cyanides based on 261.23 (a) (5)
[ ]	D004*	Arsenic
[ ]	D005*	Barium
[ ]	D006*	Cadmium
[ ]	D006*	Cadmium Containing Batteries
[ ]	D007*	Chromium
[ ]	D008*	Lead
[ ]	D008*	Lead Acid Batteries
[ ]	D009*	High Mercury-Organic
[ ]	D009*	High Mercury-Inorganic
[ ]	D009*	Low Mercury
[ ]	D009*	Mercury Wastewater
[ ]	D010*	Selenium
[ ]	D011*	Silver
[ ]	D012*	Endrin
[ ]	D013*	Lindane
[ ]	D014*	Methoxychlor
[ ]	D015*	Toxaphene
[ ]	D016*	2,4-D
[ ]	D017*	2,4,5-TP (Silvex)
[ ]	D018*	Benzene
[ ]	D019*	Carbon Tetrachloride
[ ]	D020*	Chlordane
[ ]	D021*	Chlorobenzene
[ ]	D022*	Chloroform
[ ]	D023*	o-Cresol
[ ]	D024*	m-Cresol
[ ]	D025*	p-Cresol
[ ]	D026*	Cresol (Total)
[ ]	D027*	p-Dichlorobenzene
[ ]	D028*	1,2-Dichloroethane
[ ]	D029*	1,1-Dichloroethylene
[ ]	D030*	2,4-Dinitrotoluene
[ ]	D031*	Heptachlor
[ ]	D032*	Hexachlorobenzene
[ ]	D033*	Hexachlorobutadiene
[ ]	D034*	Hexachloroethane
[ ]	D035*	Methyl ethyl ketone
[ ]	D036*	Nitrobenzene
[ ]	D037*	Pentachlorophenol
[ ]	D038*	Pyridine
[ ]	D039*	Tetrachloroethylene
[ ]	D040*	Trichloroethylene
[ ]	D041*	2,4,5-Trichlorophenol
[ ]	D042*	2,4,6-Trichlorophenol
[ ]	D043*	Vinyl chloride

B. LISTED WASTE

MLI	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	F001	Spent Halogenated Solvents
[X]	F002	Spent Halogenated Solvents
[ ]	F003	Spent Non-halogenated Solvents
[ ]	F004	Spent Non-halogenated Solvents
[ ]	F005	Spent Non-halogenated Solvents

CHECK REGULATED CONSTITUENTS FOR LISTED WASTES IDENTIFIED ABOVE (F001-F005):

[ ]	Acetone
[ ]	Benzene
[ ]	n-Butyl alcohol
[ ]	Carbon disulfide
[ ]	Carbon tetrachloride
[ ]	Chlorobenzene
[ ]	o-Cresol
[ ]	m-Cresol
[ ]	p-Cresol
[ ]	Cresol
[ ]	Cyclohexanone
[ ]	o-Dichlorobenzene
[ ]	Ethyl acetate
[ ]	Ethyl benzene
[ ]	Ethyl ether
[ ]	Isobutyl alcohol
[ ]	Methanol
[ ]	Methylene chloride
[ ]	Methyl ethyl Ketone
[ ]	Methyl isobutyl ketone
[ ]	Nitrobenzene
[ ]	Pyridine
[X]	Tetrachloroethylene
[ ]	Toluene
[ ]	1,1,1-Trichloroethane
[ ]	1,1,2-Trichloroethane
[ ]	1,1,2-Trichloro-1,2,2-trifluoroethane
[ ]	Trichloroethylene
[ ]	Trichloromonofluoromethene
[ ]	Xylenes
[ ]	2-Nitropropane
[ ]	2-Ethoxyethanol

[ ]	F006	Electroplating WWT sludge
[ ]	F035	Wood preserving wastewater
[ ]	F037	Petroleum refinery primary oil/water separation sludge
[ ]	F038	Petroleum refinery secondary oil/water separation sludge
[ ]	F039	Multi-source Leachate
[ ]	K048	Dissolved air flotation float
[ ]	K049	Slop oil emulsion solids

Does the waste identified by an asterisk (*) contain any Underlying Hazardous Constituents per 268.7 (a)(1)?

[X] Yes

[ ] No

If YES, "attach a completed UTS/UHC form to this document"

D. OTHER WASTES

Enter waste codes/subcategory, if applicable, in the table below for codes not found above:

MLI	WASTE CODES/SUBCATEGORY	TREATABILITY GROUP	TREATMENT STANDARD

SIGNATURE: [signature] DATE: 12/20/17