

Memorandum For: Bill Gunther, Community Co-Chair
Calverton NWIRP Restoration Advisory Board

From: Frank S. Anastasi, PG 
RAB Technical Advisor

Date: December 12, 2008

Subject: Review of October 2008 Reports: Data Summary Report for
Sites 6A, 10B, and Southern Area; Work Plan for Ground
Water Investigation and Monitoring (2009-2010) at Sites 2, 6A,
10B and Southern Area

Introduction and Background

The Engineering Field Activity Northeast of the Naval Facilities Engineering Command retained SCA Associates in September 2002 to provide Technical Assistance to its Restoration Advisory Board (RAB) for the closed Calverton Naval Weapons Industrial Reserve Plant (NWIRP) in Calverton, New York. Since then, we have reviewed and evaluated investigations and cleanup plans related to Sites 2, 6A and 10B, and the Southern Area/Peconic River that were conducted through mid-2008, offered recommendations for further study, and helped the RAB understand technical details about the studies and their results at RAB meetings.

The Navy's contractor Tetra Tech NUS, Inc. prepared a Data Summary Report and Work Plan for investigations in October 2008 to document the results of August 2008 sampling and subsequent plans for additional study. The goal of the Navy's recent work has been to establish an adequate ground water monitoring program to provide the data needed for selecting a remedial option for these sites.

Background

SCA Associates prepared a December 2006 review memorandum on Sites 6A and 10B, the source areas for the ground water contaminant plume, where previous industrial activities related to aircraft engine testing and maintenance and releases of chemicals occurred. In April, 2007, we prepared a similar memorandum focused on ground water investigations conducted in the Fall of 2006 in the Off-Site Southern Area (OSSA), located southeast of Sites 6A and 10B. In June and July, 2008, we prepared review memoranda for subsequent ground water data and investigation results and plans for remediation at Site 2. The reader is referred to those documents for background information on the history of operations at these sites, the nature and extent of contamination, and potential remedial actions. Maps of this portion of the Calverton NWRIP prepared by Tetra Tech are attached.

Summary of Hydrogeology of the Study Area

The Calverton NWIRP is underlain by approximately 1,300 feet of unconsolidated sediments. The Upper Glacial Formation is at or near the surface, and consists mainly of fine to coarse-grained sands, with some silty strata and some pebbles. The Magothy Formation underlies the Upper Glacial, and ranges from silty clay strata to coarse sands and gravels.

Both formations are important regional aquifers. At Calverton, these two formations appear to be hydraulically connected and function as a single, unconfined aquifer. Ground water beneath Sites 2, 6A, 10B, and the Southern Area flows to the southeast toward the Peconic River.

Ground Water Investigations

Ground Water, Surface Water and Sediment Sampling

Wells at Sites 6A, 10B and the Southern Area were sampled in July-August 2008. Thirty-eight monitor wells were sampled in this phase of investigation. Twelve wells were at Site 6A; 3 wells at 10B; and 23 wells at the Southern Area. The samples were collected using U.S. EPA-approved "low-flow" procedures, and they were analyzed for volatile organic compounds (VOCs). Ground water elevations were also determined for each well.

Six ground water samples were collected from four water supply wells located at the Peconic River Sportsmen's Club. Four surface water and four sediment samples were collected from the Peconic River. These additional samples were analyzed for VOCs also.

Quality Assurance/Quality Control (QA/QC) samples were prepared and analyzed for VOCs also.

Analytical Results

VOCs were detected in samples from four wells at Site 6A; in one well at Site 10B; in 14 wells in the Southern Area; and in three of the private wells at the Sportsmen's Club. They were not detected in surface water or in sediment samples. The results are summarized on Figures 4-1, 4-2 and 4-3 from the report (attached).

The concentrations of VOCs met or exceeded New York State Department of Health (NYSDOH) maximum contaminant levels (MCLs) in one well at Site 6A; in six wells at the Southern Area; and in one of the Sportsmen's Club wells. Those VOCs and their maximum concentrations are listed below (MCLs are 5 ug/L for all listed VOCs).

• 1,1,1-trichloroethane	94 ug/L	SA-MW-127I
• 1,1-dichloroethane	470 ug/L	SA-MW-127I
• 1,1-dichloroethene	27 ug/L	SA-MW-127I
• 1,4-dichlorobenzene	13 ug/L	SA-MW-127I
• chloroethane	63 ug/L	SA-MW-127I

These data for Sites 6A and 10B are very consistent with the most recent data, except that in August 2008 well FC-MW-02S no longer contained VOCs over MCLs. Farther down-gradient from the source areas, however, significantly higher levels of ground water contamination are present in the Southern Area.

The highest observed levels of the VOCs exceeding MCLs are six to almost 100 times the MCL there (e.g., 470 ug/L of 1,1-dichloroethane (DCA) compared to an MCL of 5 ug/L). The area with the highest observed levels of VOCs is centered generally around wells SA-MW-127 and SA-MW-128, primarily in the intermediate-depth zone. Data from Suffolk County for samples collected in June 2008 show levels of DCA up to 1090 ug/L in that area, also greatest in the intermediate depth level (location GB-2 at 35 to 40 feet depth).

Figures 4-4, 4-5, and 4-6 from the report (attached) depict this distribution of VOCs in the Southern Area ground water in a plan view and in cross-section. Note the small oval 1,000 ug/L VOCs contour is centered at the Suffolk County GB-2 location.

August 2008 data confirm the presence of VOCs at the downgradient edge of the plume, adjacent to the Peconic River. Chloromethane was found at 3 ug/L in SA-PZ-118I (50 to 60 feet depth), and DCE and DCA were found at 4 and 17 ug/L, respectively, in SA-PZ-118S (6 to 16 feet depth). DCA was found at 4 ug/L at SA-PZ-124 (1 to 6 feet depth). DCA was reported at 38 ug/L, and DCE at 7 ug/L, at that location in 2006, the only other time PZ-124 has been sampled.

Ground Water Investigation Work Plan

The Work Plan presents plans for further investigation indicated by the results obtained to date (reviewed above). The objectives of the proposed work are to identify data gaps in the existing monitor well network and fill the gaps by installing new wells where needed, and instituting a regular ground water monitoring program. The Work Plan states that the objective of the proposed monitoring program include evaluating natural attenuation and potential risks posed by the contamination.

Direct Push Technology (DPT) will be used first to obtain discrete ground water samples at nine "temporary well" locations within the plume. These points lie between Site 10B and the northern portion of the Southern Area. The plan calls for collecting three ground water samples (generally at 15, 30 and 45 feet depth) at each of the nine locations. All samples will be analyzed for VOCs. Results of this sampling will guide selection and depths for a new "permanent" well cluster to be installed in this area.

Planned temporary sample locations are indicated by green dots labeled "SA-TW-301", etc., on Figure 3-1 in the report (attached); permanent wells are indicated by orange, scored circles labeled "SA-MW-130".

In addition, two new monitor well clusters will be installed on the Peconic River Sportsmen's Club ((indicated by the orange-colored "SA-MW-131" and "SA-MW-132" labels on the figure. These well clusters will include shallow, intermediate, and deep wells.

An annual monitoring program is proposed to be conducted for two years at 56 monitor wells plus supply wells at the Sportsmen's Club. All samples will be analyzed for VOCs. For Site 2, 13 wells will be sampled; for Site 6A, 12 wells; 10B, 3 wells; and for the Southern Area, 23 monitor wells (annually) and the water supply wells at the Sportsmen's Club (quarterly) will be sampled (samples from select wells will also be analyzed for methane, ethane and ethane as indicators of "natural attenuation", i.e., reductive dechlorination of the VOCs).

Surface water and sediment samples (four of each) from the Peconic River will be collected on a semiannual basis and analyzed for VOCs. [The plan states that additional samples could be collected if "seeps or overload flow are observed entering the river from the north".]

Comments and Opinions

- Although the ground water data collected at Sites 6A and 10B indicates relatively minor contamination, it still appears prudent for the Navy to follow through with its plans to conduct a soil removal action there to remove the residual contamination present in the shallow soil (including a small quantity of free-phase petroleum).
- While the recent ground water data collected by Suffolk County is somewhat incorporated in this report by the inclusion of the 1,000 ug/L "hot spot" on Figure 4-4, presentation of the county data together with the Navy data would have been helpful.
- The results of the investigations conducted to date indicate that the potential for significant risks exist. Relatively high levels of contaminants are present beyond the Calverton NWIRP property in ground water that is used as a drinking water source locally. Additionally, it appears that the contaminated ground water discharges into

the Peconic River. Two additional years of monitoring would enhance the degree of confidence of these findings, but it would not likely to alter them.

- As discussed in the November 6, 2008 RAB meeting, the community members are increasingly uncomfortable with the knowledge that high levels of VOCs (i.e., up to about 100 times the MCL) are present in off-site ground water. Concerns were raised about the possibility that a “slug” of highly-contaminated ground water could be headed toward discharging into the Peconic River. Given these concerns, some members of the RAB suggested that the Navy consider implementing some kind of remedial action to address the off-site ground water contamination in the near future, rather than waiting for two years of additional data to be collected.
- It may be prudent to develop a conceptual model of potential exposures along the lines of a risk assessment in the near future. That would ensure that adequate data are generated by the long-term monitoring program to enable risks to be evaluated thoroughly. Applying a focused, risk-assessment approach early on could help expedite selection of an appropriate final remedy for the on- and off-site ground water contamination down-gradient from Sites 6A and 10B and in the Southern Area.

I trust you and the RAB will find this memorandum helpful. I will be at the next RAB meeting, scheduled for March 5, 2009 at Calverton, where the Navy should have at least preliminary data from the planned additional ground water investigations. Until then, if you have any questions or require any additional information feel free to contact me at (301) 309-0061 or by email.

cc: Lora Fly, Navy



FC-MW035		1994	1995	2000	Jan 2008	Aug 2008
1,1-Dichloroethane		2	2	-	-	-
Chloroethane		110	2	-	-	-
Ethylbenzene		33	15	81	-	-
Toluene		-	-	-	-	-
Xylenes (total)		310	120	430	-	-

FC-MW011		Jan 2008	Aug 2008
VOCs		-	-

FC-MW015		Jan 2008	Aug 2008
VOCs		-	-

FC-MW055		1997	1998	2005	2008
1,1-Dichloroethane		19	-	-	-
1,1-Dichloroethane		21	-	-	-

FC-MW025		1994	1995	2000	2005	Jan 2008	Jan 2008 (Duplicate)	Aug 2008	Aug 2008 (Duplicate)
1,1,1-Trichloroethane		15200	12000	2200	12	2 J	-	-	-
1,1-Dichloroethane		5800	4800	3500	29	6	5	3	-
1,1-Dichloroethane		380	110	37	1.1	0.7 J	-	-	-
2-Butanone		-	-	-	-	-	-	1 J	-
Acetone		-	-	-	-	-	-	32	28
Benzene		6	1	-	-	-	-	-	-
Chloroethane		320	360	720	20	4 J	4 J	3	J
Ethylbenzene		-	58	27	1.1	0.4 J	0.5 J	-	-
Methylcyclohexane		164	164	164	1 J	1 J	0.4 J	-	-
Toluene		330	190	180	3.8	3 J	3 J	0.5 J	0.5 J
Xylenes (total)		390	690	570	17	9 J	10 J	0.4 J	0.4 J

FC-MW041		1994	1995	2008	Jan 2008	Aug 2008
1,1,1-Trichloroethane		3	-	-	0.4 J	-
Freon-113		-	-	-	-	-

FC-MW045		1994	1995	2005	2008	Jan 2008	Aug 2008
1,1,1-Trichloroethane		4	-	-	-	-	-
1,1-Dichloroethane		-	25	1.5	-	-	-
1,1-Dichloroethane		-	-	1.5	-	-	-
Chloroethane		-	28	-	-	-	-

FC-MW021		1994	Jan 2008	Aug 2008
1,1,1-Trichloroethane		210	-	-
1,1-Dichloroethane		92	0.7 J	-
1,1-Dichloroethane		-	-	1 J
Freon-113		-	-	-

FC-MW075		1997	1998	2005	Jan 2008	Aug 2008
Chloroethane		-	-	-	0.6 J	1 J

FC-MW051		1994	1995	Jan 2008	Aug 2008
1,1,1-Trichloroethane		2	-	-	-
1,1-Dichloroethane		-	-	0.8 J	-
Chloroethane		-	-	0.8 J	-
Freon-113		-	-	-	1 J

FC-MW065		1994	1995	Jan 2008	Aug 2008
1,1,1-Trichloroethane		2	-	-	-
Tetrachloroethane		-	-	12	0.9 J
Toluene		-	-	-	-

FC-MW055		1994	1995	Jan 2008	Aug 2008
1,1,1-Trichloroethane		4	-	-	0.1 J
1,1-Dichloroethane		-	-	-	4
Chloroethane		-	-	-	5

ET-MW035		Jan 2008	Jan 2008 (Duplicate)	Aug 2008	Aug 2008 (Duplicate)
VOCs		-	-	-	-

ET-MW025		Jan 2008	Aug 2008
1,1,1-Trichloroethane		3 J	0.4 J

ET-MW015		Jan 2008	Aug 2008
VOCs		-	-

LEGEND

- MONITORING WELL LOCATION
- PROPERTY LINE
- FENCE
- TREELINE
- RAILROAD
- WATER

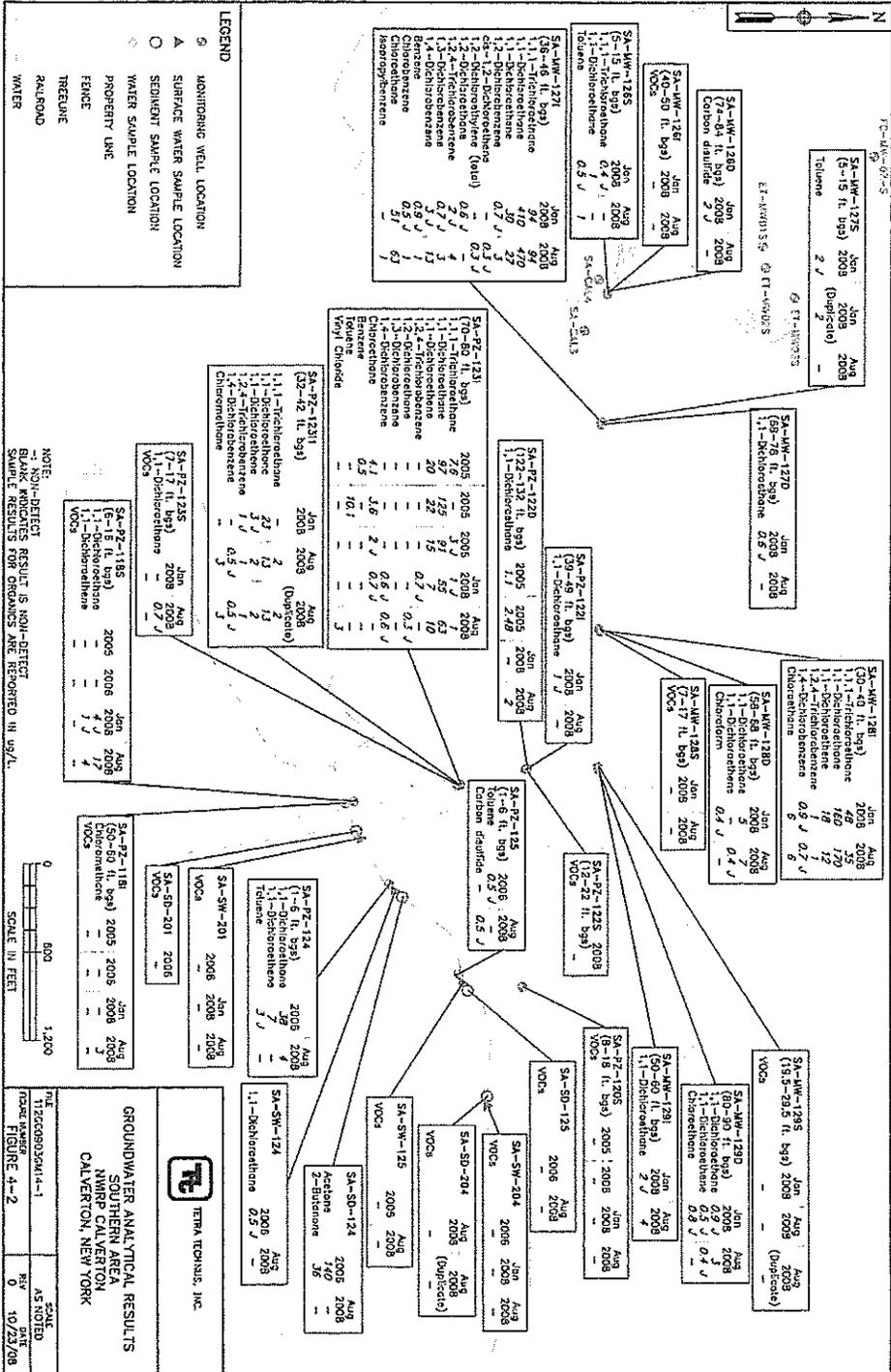
SCALE IN FEET

NOTE:
 ND: NON-DETECT
 NA: NOT ANALYZED
 1. BLANK INDICATES RESULT IS NON-DETECT
 2. SAMPLE RESULTS FOR ORGANICS ARE REPORTED IN ug/L.

TETRA TECHNICS, INC.

GROUNDWATER ANALYTICAL RESULTS
 SITES 6A - FUEL CALIBRATION AREA AND
 SITE 10B - ENGINE TEST HOUSE
 NWRP CALVERTON
 CALVERTON, NEW YORK

FILE 112G000036M15	SCALE AS NOTED
FIGURE NUMBER FIGURE 4-1	REV DATE 0 10/23/08





CA-PRSC-03	Jan 2008	June 2008	Aug 2008
VOCs	-	-	-

CA-PRSC-04	Jan 2008	June 2008	Aug 2008
VOCs	-	-	-

CA-PRSC-02-01	Jan 2008	Jan 2008 (Duplicate)	June 2008	Aug 2008
1,1-Dichloroethane	12	12	7	13
1,1-Dichloroethene	-	0.5 J	4	4
1,2-Dichloroethane	0.5 J	0.6 J	0.6 J	-
1,2-Dichloroethene (total)	2 J	1 J	2 J	1 J
cis-1,2-Dichloroethene	2 J	1 J	2	1 J
Trichloroethane	0.8 J	0.8 J	0.7 J	0.6 J
Vinyl Chloride	-	-	1 J	-

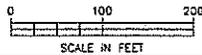
CA-PRSC-02-02	Jan 2008	June 2008	Aug 2008
1,2-Dichloroethane	-	-	0.8 J
Isopropylbenzene	2 J	-	1 J

CA-PRSC-01	Jan 2008	June 2008	Aug 2008
VOCs	-	-	-

CA-PRSC-02-03	Jan 2008	June 2008	June 2008 (Duplicate)	Aug 2008
Chloromethane	0.8 J	-	-	-
Isopropylbenzene	-	-	0.4 J	1
Methyl tert-butyl ether	0.7 J	-	-	-

LEGEND	
○	WATER SAMPLE LOCATION
---	PROPERTY LINE
---	FENCE
---	TREELINE
---	RAILROAD
---	WATER

NOTE:
 -J=NON-DETECT
 BLANK INDICATES RESULT IS NON-DETECT
 SAMPLE RESULTS FOR ORGANICS ARE REPORTED IN µg/L

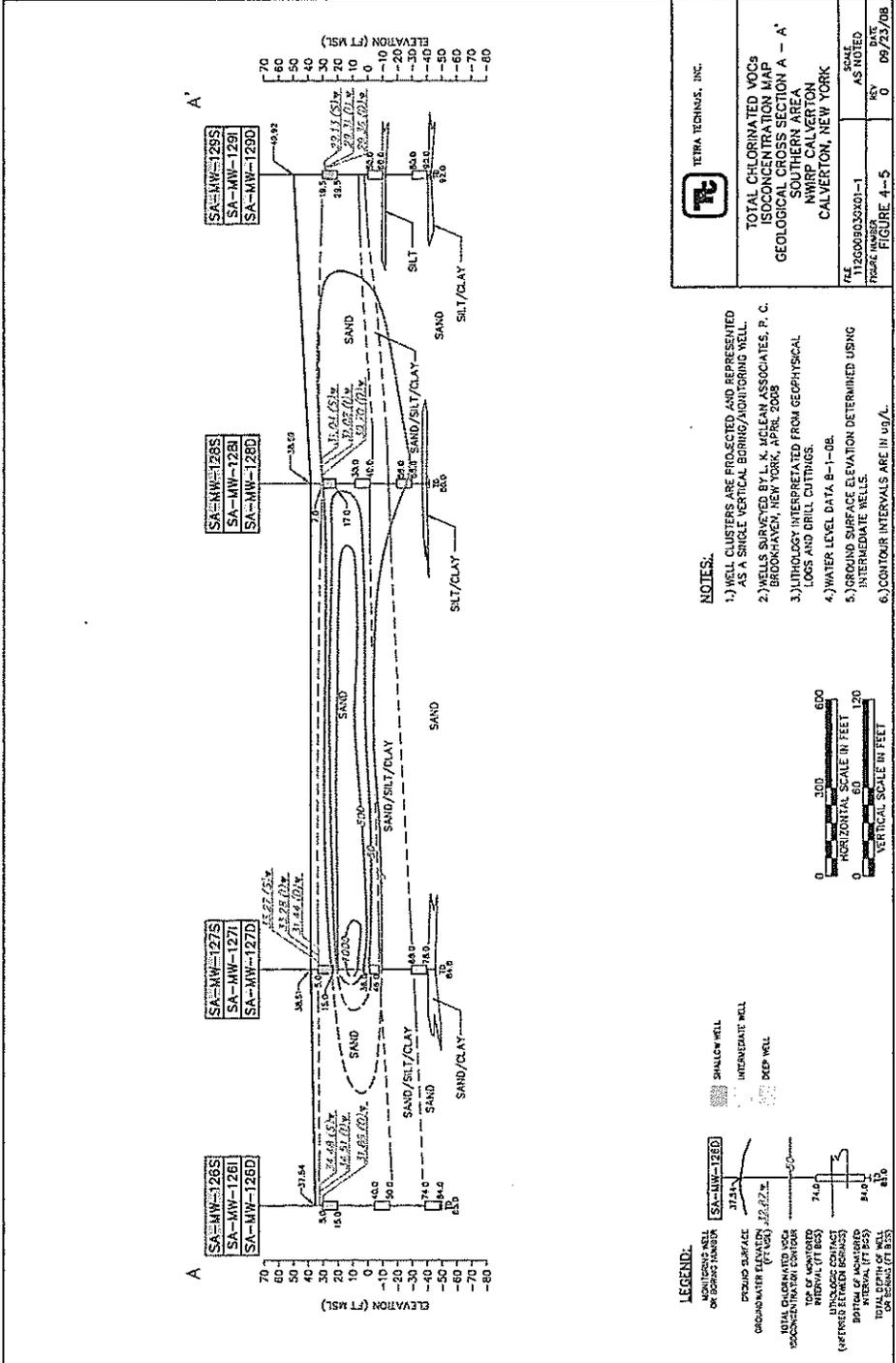


TETRA TECHNUS, INC.

GROUNDWATER ANALYTICAL RESULTS
 SOUTHERN AREA
 PECONIC RIVER SPORTSMEN CLUB
 NWIRP CALVERTON
 CALVERTON, NEW YORK

FILE
 112G00903GM14-2
 FIGURE NUMBER
 FIGURE 4-3

SCALE
 AS NOTED
 REV DATE
 0 10/28/08



TETRA TECH, INC.

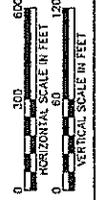
TOTAL CHLORINATED VOCs
ISDCONCENTRATION MAP
GEOLOGICAL CROSS SECTION A - A'
SOUTHERN AREA
NHWRP CALVERTON
CALVERTON, NEW YORK

FILE	112600903200-1	SCALE	AS NOTED
PROJECT NUMBER	FIGURE 4--5	REV	0
DATE	09/23/08		

- NOTES:**
- 1.) WELL CLUSTERS ARE PROJECTED AND REPRESENTED AS A SINGLE VERTICAL BURNING/AIRBORNING YIELD.
 - 2.) WELLS SURVEYED BY L. K. McLEAN ASSOCIATES, P. C. BROOKHAVEN, NEW YORK, APRIL 2008
 - 3.) LITHOLOGY INTERPRETED FROM GEOPHYSICAL LOGS AND DRILL CUTTINGS.
 - 4.) WATER LEVEL DATA B-1-08.
 - 5.) GROUND SURFACE ELEVATION DETERMINED USING INTERMEDIATE WELLS.
 - 6.) CONTOUR INTERVALS ARE IN ug/L.

LEGEND:

- MONITORING WELL OR BOREHOLE NUMBER
- SHALLOW WELL
- INTERMEDIATE WELL
- DEEP WELL
- GROUND SURFACE
- GROUNDWATER ELEVATION (FT MSL)
- TOTAL CHLORINATED VOCs ISDCONCENTRATION CONTOUR
- TOP OF MONITORED ZONE (FT MSL)
- MONITORING POINTS (FEET FROM BOREHOLE)
- BOTTOM OF MONITORED ZONE (FT MSL)
- TOTAL DEPTH OF WELL (FT)
- TOTAL DEPTH OF BOREHOLE (FT)





FC-1W-01-1
 FC-1W-01-5
 FC-1W-03-5
 FC-1W-02-100
 FC-1W-02-5
 FC-1W-07-5
 FC-1W-03-5
 FC-1W-03-5

ET-1W-01-5
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- LEGEND**
- ⊙ MONITORING WELL LOCATION
 - ⊙ TEMPORARY MONITORING WELL LOCATION
 - ⊙ NEW MONITORING WELL LOCATION
 - ⊙ WATER SAMPLE LOCATION
 - ⊙ SURFACE WATER SAMPLE LOCATION
 - ⊙ SEDIMENT SAMPLE LOCATION
 - PROPERTY LINE
 - FENCE
 - TREDLINE
 - RAILROAD
 - WATER



TTI TERA TECHNIQUE, INC.

TEMPORARY AND NEW
 MONITORING WELL LOCATION MAP
 SITE 6A, SITE 10B AND SOUTHERN AREA
 NWMP CALVERTON
 CALVERTON, NEW YORK

FILE 1120009032M19	SCALE
DATE 10/17/08	AS NOTED
REV 0	DATE