RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON
CALVERTON COMMUNITY CENTER
CALVERTON, NEW YORK
THURSDAY, AUGUST 4, 2005

The fifteenth meeting of the RAB began at approximately 7:00 pm. Meeting attendees included representatives from the Navy (Joe Kaminski, Jim Colter, and Bob Ingram), New York State Department of Environmental Conservation (NYSDEC) (Henry Wilkie and Larry Rosenmann), Suffolk County Department of Health Services (SCDHS) (Sy Robbins), and Restoration Advisory Board (RAB) community members (Ann Miloski, Sid Bail, Bill Gunther, Vincent Racaniello, and Lou Cork). The RAB's technical advisor from SCA Associates (Frank Anastasi) and several people from the community were also in attendance.

WELCOME AND AGENDA REVIEW

The Navy representative, Mr. Joe Kaminski, Naval Air Systems Command, welcomed everyone to the RAB. Mr. Kaminski reiterated the retirement announcement of Stan Farkas from the April 2005 RAB meeting. Mr. Kaminski also announced that this would likely be his last RAB meeting and that Mr. Jim Colter, Engineering Field Activity Northeast, would be taking over his duties as the DoD Co-Chair. Mr. Kaminski explained that this change is a result of the Navy's reorganization in which the Commander, Naval Installations (CNI) is now the owner of all Navy shore installations including what is left of the former Calverton facility.

Mr. Bill Gunther asked if Mr. Kaminski's departure would effect the budget. Mr. Kaminski responded that there is a budget for the cost of the facility manager but that Mr. Colter's funding for the environmental work at Calverton comes from a separate account.

REVIEW AND APPROVAL OF MINUTES

Mr. Colter inquired if the RAB members received the minutes from the April 7, 2005 meeting, which were distributed in May 2005, and asked if there were any comments. Mr. Sy Robbins (SCDHS) said that he did not receive those minutes and that it might be due to the moving of their offices. Mr. Colter said that a copy of the April 7 meeting minutes would be forwarded to Mr. Robbins when the minutes of this meeting are distributed. There were no other comments on the minutes. Mr. Gunther motioned to approve the April 2005 RAB minutes. Mr. Colter noted the approval of the April 2005 minutes.

GENERAL PROGRAM STATUS

Mr. Colter, provided a brief overview of the work accomplished since the last RAB meeting. Mr. Colter then reviewed the agenda for this meeting and noted that since Ms. Jody Magilson, Tetra Tech NUS, Inc. (TtNUS), was unable to make it to the meeting,Mr. Dave Brayack would be presenting the Site 2 - Fire Training Area soils data and Engineering Evaluation/Cost Analysis in Ms. Magilson's absence. The agenda for the meeting is included as Attachment 1.

The meeting was then turned over to Mr. Stavros Patselas (Tetra Tech EC) to discuss the work being accomplished at IR Site 7 – Fuel Depot.

SITE 7 FUEL DEPOT AREA – REMEDIATION SYSTEM PILOT STUDY RESULTS

Mr. Stavros Patselas from Tetra Tech EC provided an update on the Site 7 - Fuel Depot Area Remediation System Pilot Study Results (Attachment 2). Mr. Patselas noted that the three-month pilot study was started on March 31, 2005 and completed on July 1, 2005. Mr. Patselas proceeded to discuss the air sparging/soil vapor extraction (AS/SVE) system construction and operation. As part of this discussion, Mr. Patselas described that high density polyethylene (HDPE) piping was used for the air sparging portion of the project and that PVC piping was used for the soil vapor extraction portion. In addition, a 40 feet by 60 feet fabric structure was constructed with overhead doors on both ends. Outside of this structure is a heat exchanger used to cool the forced air stream since they come out of the treatment building in excess of 200 degrees Fahrenheit.

Mr. Robbins asked if the higher temperatures would tend to better volatilize the VOC contaminants? Mr. Patselas responded that the heat exchanger (or air cooler) was used to reduce the air temperature so that high density polyethylene piping could be used for treatment system construction especially near the air sparge blowers. Without cooling the vapors, steel piping would have to be used, which is significantly more expensive than HDPE.

Sy Robbins noted the use of a moisture separator and asked a follow up question of whether or not the moisture separator was picking up much moisture. Mr. Patselas responded that in the beginning of the pilot study there was quite a bit of moisture being brought through the system partly due to seasonally high water table at the end of March. For this reason two liquid-phase granular activated carbon (LGAC) drums are installed in series to treat accumulated condensation pumped from the moisture separator. A condensate pump automatically operates based on specific tank level settings. When a certain water level is reached, the pump turns on and sends the water through the LGAC vessels for treatment and then temporary drum containment. Sampling for VOCs is conducted before and after the water passes through the LGAC vessels to ensure that the contaminants are removed.

Mr. Patselas went on to describe the safety considerations that were included in the system's design. He indicated that during the pilot study, there was only one unplanned shutdown and that it resulted from a power outage in the area. He noted that this system has a battery backup in case of a power outage and in this case, the system alarm activated the plant's autodialer and contacted TtEC's lead site engineer as intended.

Mr. Patselas went on to discuss ozone system that is being used in tandem with the AS/SVE system. He noted that approximately 5 pounds of ozone were injected per day at 6 injection locations and that the injections are automatic. Mr. Rosenmann (NYSDEC) inquired if ozone was injected everywhere at the site. Mr. Patselas responded that ozone was injected in two areas at the site, one in the site center at the eastern end of a buried concrete slab and one in the southwest corner of the site. He went on to say that ozone is effectively used when VOCs are located in "hard-to-reach" areas such as under the concrete slab. At this location, the ozone treatment has been observed to be effective.

RAB member, Mr. Sid Bail, asked what kind of motor was used and what the type of fuel. Mr. Patselas responded that it is an electrical motor and that synthetic oil is used.

Mr. Robbins asked what permits were required for operation, and in particular whether an Article 12 permit for hazardous waste discharge was required for the water? Mr. Patselas indicated that he did not believe a permit was necessary since the effluent water from the LGAC vessels was sampled and was always confirmed non-detect for VOCs. Furthermore, the influent concentrations were also very low. However, Mr. Patselas said that he would check into it further.

Mr. Robbins asked if the ozone injections would have an effect on the microbiology. Mr. Patselas replied that the ozone does affect the microbiology, and as such ozone injections were limited to the higher Freon- and petroleum-concentrated areas.

Mr. Robbins also inquired about the quantity of VOCs removed. Mr. Patselas replied that based on initial estimates using carbon consumption and a 15% adsorption capacity of 30,000 pound of carbon, approximately 4,500 pounds of total VOCs were removed during the pilot test. Mr. Patselas also reminded that 4,500 pounds removed was based on the amount of carbon spent and not based on calculations using actual groundwater and vapor concentrations. However, Tetra Tech EC was still working on the removal calculations for total VOCs and individual contaminants based on groundwater and vapor concentrations.

Mr. Patselas went on to discuss the status of the operation and plans for expanding the system to full-scale operation. The expansion plans include the addition of four SVE wells, sixteen AS wells, eight ozone injection points, and ozone augmentation. The additional ozone points will be located in the areas with higher Freon concentrations. The construction is planned to start this fall and full scale system operation is scheduled to start in March 2006.

Mr. Gunther asked if the system had operated as expected and whether the system is currently operating. Mr. Patselas responded that the system had operated as planned and that the system was shutdown on July 1, 2005. The system could be turned back on after the pilot study results were evaluated. However, the vapor phase carbon would have to be changed out first.

Mr. Cork (RAB Member) asked if it was cost effective for the system to be shutdown. Mr. Patselas replied that the expansion design is currently being prepared and that the system is not designed to operate during the winter months.

Mr. Rosenmann indicated that the volume of the VOCs removed seemed high and asked if the amount of VOCs removed was higher than expected. Mr. Patselas replied that there was an initial spike of VOCs that was higher than anticipated. Mr. Patselas also reminded that 4,500 pounds removed was based on the amount of carbon spent and not based on calculations using actual groundwater and vapor concentrations.

Mr. Anastasi asked how the VOC calculations were done. Mr. Patselas responded that the calculations were based on the amount of spent vapor phase carbon and an assumed adsorption rate of 15%.

Mr. Anastasi inquired whether the carbon was spent. Mr. Patselas replied that the carbon was confirmed spent based on weekly vapor monitoring that tracked carbon saturation and from the analysis of the spent carbon waste characterization sample.

Mr. Racaniello (RAB Member) asked how long the system was down for carbon changeout. Mr. Patselas replied that the system was down for two days while carbon in all four vessels was replaced. A carbon change out was scheduled when both primary and spare vessels were spent. Mr. Racaniello also asked if it was known what contaminants broke through first. Mr. Patselas responded that he did not have that information yet, but would provide it.

Mr. Robbins asked if the contaminant was mainly jet fuel. Mr. Patselas concurred that the contaminants of concern are BTEX, naphthalene, and freon.

Mr. Racaniello asked if there were significant changes seen in the data. Mr. Patselas indicated that changes did occur during the study, but that they were still evaluating the data and that a report would be submitted with the information.

Mr. Gunther inquired if the Regulators/RAB would be reviewing the report. Mr. Colter replied that he is anticipating receipt of the rough draft report later this month and that the draft final report will be issued soon after for the Regulators/RAB to review.

At this point, there were no more questions or comments regarding the work at Site 7 so the meeting was turned over to Mr. Dave Brayack (Tetra Tech NUS) who gave a presentation on the work being conducted at Site 6a, 10b, and the off-site Southern Area.

Site 6A/Southern Area – RFI Results, Preliminary CMS

Mr. Brayack from Tetra Tech NUS, Inc. provided the RCRA Facility Investigation results and Preliminary Corrective Measures Study (CMS) progress on the Site 6A (Fuel Calibration Area) and Southern Area, which is included as Attachment 3. Mr. Brayack noted that the primary concern for during this phase of the investigation was whether contaminated groundwater in the Southern Area is migrating offsite into or underneath the Peconic River. Mr. Brayack then provided a review of the field program by area.

Mr. Cork asked if the size of the plume has decreased. Mr. Brayack replied that there has not been any obvious change in the plume.

Mr. Brayack then discussed the locations of the vertical profile borings (VPBs). It was noted that all wells identified in the work plan have been installed except for one, which was to be installed in a dense swampy area. Access to that area is very difficult and would require cutting a good bit of vegetation and possibly add fill to portions of the wetland. TtNUS has been talking to the state regarding this location. At this time, the data is being evaluated to determine whether this well is truly required.

Mr. Gunther inquired on the importance of the well location. Mr. Brayack replied that the well location would in the center line of the contamination flow. Mr. Gunther then asked what depth is the contamination. Mr. Brayack replied that based on upgradient well data, the contamination is between 70 – 90 feet (ft) below ground surface.

Ms. Miloski (RAB Member) indicated that this well should be installed

Mr. Robins asked if an artificial flow pattern due to the lake influence was taken into consideration. Mr. Brayack responded that at Site 6A, groundwater flow lines are fairly well established and simple. Because of the Pond in the Southern Area, there appears to a localized effect as suggested.

Mr. Brayack went on to discuss the results for the site. The majority of the data was clean. At Site 6A, contamination was confirmed in the shallow and intermediate depth groundwater above the first silty clay layer (at 50 to 60 feet below ground surface). At the offsite Pistol Range Area, contamination was found at 70 to 90 ft. below ground level. In the Pistol Range Area and Peconic River, the first substantial silty clay unit is not encountered until a depth of approximately 130 feet below ground surface.

However, at Site 6A, the deep vertical profile boring data and the fixed well/piezometer data did not agree. In particular, several low level detections of VOCs were observed in the deeper VPBs samples, but were not detected in the permanent wells. Mr. Brayack indicated that the deep detections may have resulted from shallow contaminated groundwater migrating downward along the augers and affecting the water quality in the vertical profile boring samples. In particular, it was noted that from the shallow/intermediate-depth groundwater (which is contaminated) to the deep groundwater, there was a 5- to 10-foot downward vertical gradient. With this gradient as a driving force and a temporary conduit formed during the vertical profile borings, the contamination at depth could be false positives.

A RAB member suggested that this concept should be detailed in the data report. Mr. Brayack agreed.

Mr. Robins asked what kind of vertical gradient is at the Pistol Range. Mr. Brayack replied that there is slight upward gradient, above the clay unit.

Mr. Gunther asked how deep the contaminants would have to be to go under the river. Mr. Brayack replied that the contaminants would have to be at least 150 feet below ground surface and maybe deeper. 150 feet was the deepest level evaluated for vertical gradients and since no chemistry was discovered at that depth, deeper data points were not deemed to be necessary.

Mr. Robins asked is there different media further away from the site. Mr. Brayack replied that based on the boring data, it is pretty much all sand.

Mr. Racaniello asked if contamination was found at depth and whether the same contaminants were found. Mr. Brayack replied that contaminants were not found at depth but that the contaminants found throughout the sites are similar.

Mr. Robins asked if all the VPBs were drilled through floating free product. Mr. Brayack indicated that one of the borings was through an area with free product. Mr. Robins indicated that the free product could have caused the findings at depth.

Ms. Miloski commented that the fourth contaminated area looks larger (near the Peconic River) then the other three. Mr. Brayack replied that the fourth area is larger.

Mr. Rosenmann asked if there was any idea of the dimensions of the contamination. Mr. Brayack responded that the contamination from Site 6A is not continuous. Mr. Rosemann then asked whether there was borings throughout the area and have you considered the possibility that some of the contamination resulted from spills in the drainage ditch. Mr. Brayack replied, borings were done through the area and it is possible that some of the contamination was from the drainage ditch. The borings between the second and third area had no contamination.

Mr. Robins asked if the contaminants above the first silty clay layer will go to the river. Mr. Brayack replied there is an upward gradient flow towards the river and that groundwater flow is to the river from both the north and south.

Mr. Rosemann inquired if the deeper wells have been tested. Mr. Brayack replied there are 150-foot deep piezometers/wells that were tested and found to be clean.

Mr. Anastasi asked if it would be possible to have three separated figures in the report for shallow, intermediate, and deep wells. Mr. Brayack replied that it has been done in the past, but comments were received to show all the wells together.

Mr. Gunther asked if it is possible to sample all the locations again. Mr. Brayack replied that except for the two locations in the middle of a soccer field (105D1 and 105D2) the well/piezometer locations could be resampled. The two wells are in the process of being removed.

Mr. Brayack went on to discuss the results from the Pistol Range. The vertical profile boring data confirmed the presence of contamination in the 70-to 90-foot range. Also, the well data confirmed the presence of 1,1-DCA at PZ-122 and PZ-123. The vertical profile boring data also indicated the possible presence of low level contamination at depths greater than silty clay unit at a depth of approximately 130 to 150 feet. Piezometers (wells) installed at these locations did not find evidence of the deeper contamination.

In an overview for Site 6A and Southern Area, there are four areas of concern for the groundwater, consisting of shallow (solvent/petroleum) contamination at Site 6A, shallow (petroleum) contamination at the Engine Test House, intermediate-depth (solvent) contamination near the Engine House, and intermediate-depth (solvent) contamination near the Peconic River. With the exception of the shallow petroleum contamination at the Engine Test House, the other areas of contamination are probably related and may connect.

Mr. Anastasi asked what the flow direction was. Mr. Brayack replied, the shallow and intermediate-depth groundwater flows in a southwestern direction. At Site 6A, the deeper groundwater appears to flow the east and northeast.

Mr. Anastasi expressed a concern with the deeper groundwater flow and asked if contaminants were present in deep down-gradient points. Mr. Brayack replied that down gradient well point data is limited, but that there is no good evidence of contamination in the deep groundwater. All of the permanent monitoring wells at depth were clean.

Mr. Rosemann inquired on the direction of the groundwater flows between the zones (clay units). Mr. Brayack replied that at the shallow and intermediate-depth groundwater the flow is southeast. For the deep groundwater, Zone 1 (90 to 120 feet below ground surface) and Zone 3 (greater than 300 feet below ground surface) flow is east/northeast. Flow direction in Zone 2 (180 to 280 feet below ground surface) was not apparent.

Mr. Rosemann also inquired on the submittal of the draft RFI Report. Mr. Brayack responded that the report is currently being finalized and will be sent out for review.

Mr. Brayack noted that the goals are to comply with the New York groundwater/surface water standards and reviewed the possible remedies for Sites 6A/Southern Area.

Site 2 Fire Training Area – Soils Data and EE/CA

Mr. Brayack provided the Engineering Evaluation/Cost Analysis (EE/CA) for Site 2 – Fire Training Area, which is included as Attachment 4. Mr. Brayack presented a brief history of the site, objectives, field activities, and results. In general, an interim remedy to address shallow petroleum-contaminated soils is being evaluated. Deeper contaminated soils and groundwater would not be addressed by the EE/CA.

Mr. Robbins asked if any VOCs were left at the site. Mr. Brayack replied that some VOCs remained at the site, but that operation of the air sparging/soil vapor extraction (AS/SVE) system appears to have addressed the majority of the VOCs.

Mr. Robbins asked if the combination of excavation and remediation was being considered. Mr. Brayack replied that it is possible to first remove the shallow contaminated soils and then perform a corrective measure study for the deeper soils. The shallow petroleum-contaminated soils was targeted because of its depth relative to potential receptors, its continuing impact on groundwater, and because it presence likely inhibited the operation of the AS/SVE system. Mr. Colter added that a removal action for all of the contaminated soils is also being considered.

Mr. Rosemann asked if there is groundwater contamination at the site. Mr. Colter replied that there have been stray hits of Freon, but noted that the groundwater data needs to be updated.

Parcel D (Sites 1 and 9) EBST

Mr. Colter provided an update on Parcel D, that consists of Sites 1 – Northeast Pond Disposal Area and Site 9 - ECM. Currently a Statement of Basis of Groundwater is being prepared. One year of monitoring for Site 1 has found no signs of groundwater contamination and therefore the Parcel is suitable for transfer. Mr. Colter noted that it will be approximately one year from now before the transfer is complete.

Mr. Colter also noted that the Farmhouse has been determined to be suitable for transfer and that EFA Northeast's real estate department now has the lead and will be working with the New York State DEC to transfer this parcel.

Closing Remarks

Bill Gunther requested that the Navy work closely with their TAPP consultant, Frank Anastasi, to ensure that the contamination at Site 6a found at depth in the past but not found in this latest field effort is truly a result of the drilling technique as presented in tonight's meeting. Mr. Gunther then asked each community RAB member if they had any closing remarks.

Frank Anastasi added to Mr. Gunther's statement that due to the discovery that groundwater at depth flows differently than shallow groundwater, if the contamination detected at depth is not a result of the drilling technique used, then there would be data gaps in the deep groundwater.

Ann Miloski reiterated her request that the Navy collect the sample upgradient of the Peconic River which, to date, has not been collected due to access issues.

Frank Anastasi replied to Mrs. Miloski's statement by saying that due to the extensive damage that would be caused trying to collect this sample, it might not be a good idea to pursue seeing as how the collection of this sample at that location really wouldn't add to our knowledge of contaminant flow in that area due to the extensive amount of data already collected around it.

No other RAB members had closing remarks.

The next RAB meeting was announced for Thursday, November 3, 2005 and would probably be held at the same location.

The meeting was adjourned at approximately 9:15 p.m.

Attachment 1
Agenda

Agenda

Restoration Advisory Board
Naval Weapons Industrial Reserve Plant Calverton

August 4, 2005
Calverton Community Center, Calverton NY
7:00 p.m.

Welcome and Agenda Review
Joe Kaminski
Naval Air Systems Command

Review and Approval of Minutes
All Members

General Program Status
Jim Colter
Engineering Field Activity, Northeast

Site 7 Fuel Depot Area - Remediation System Pilot Results
Stavros Patselas
Tetra Tech EC

Site 6A/Southern Area - RFI Results, Preliminary CMS
Dave Brayack
Tetra Tech NUS

Site 2 Fire Training Area - Soils Data and EECA
Jody Magilson
Tetra Tech NUS

Parcel D (Sites 1 and 9) EBST
Jim Colter
Engineering Field Activity, Northeast

Closing Remarks
Joe Kaminski
Naval Air Systems Command

Presenters will be available after the program for questions.

Attachment 2
Site 7 Fuel Depot Area
Remediation System Pilot Results

NAVFAC
Naval Facilities Engineering Command

Groundwater Remediation Project

Naval Weapons Industrial Reserve Plant
Calverton, NY
Site 7: Former Fuel Depot

Restoration Advisory Board Meeting
August 4, 2005

SGS

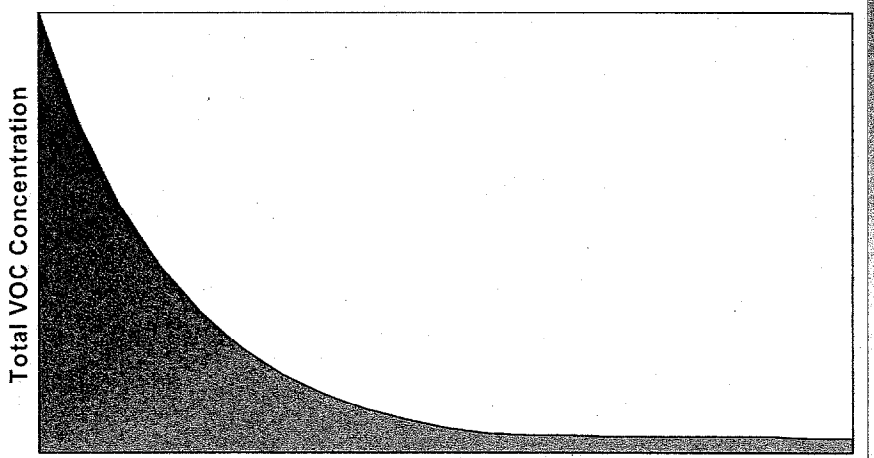
TETRA TECH EC, INC.

Zip

OVERVIEW

- Contaminants of Concern:
  - BTEX, Naphthalene, Freon
- Goal:
  - Mass removal of groundwater contaminants
  - Operate & Maintain treatment system 2-4 years

Total VOC Concentrations Over Time



NAVFAC

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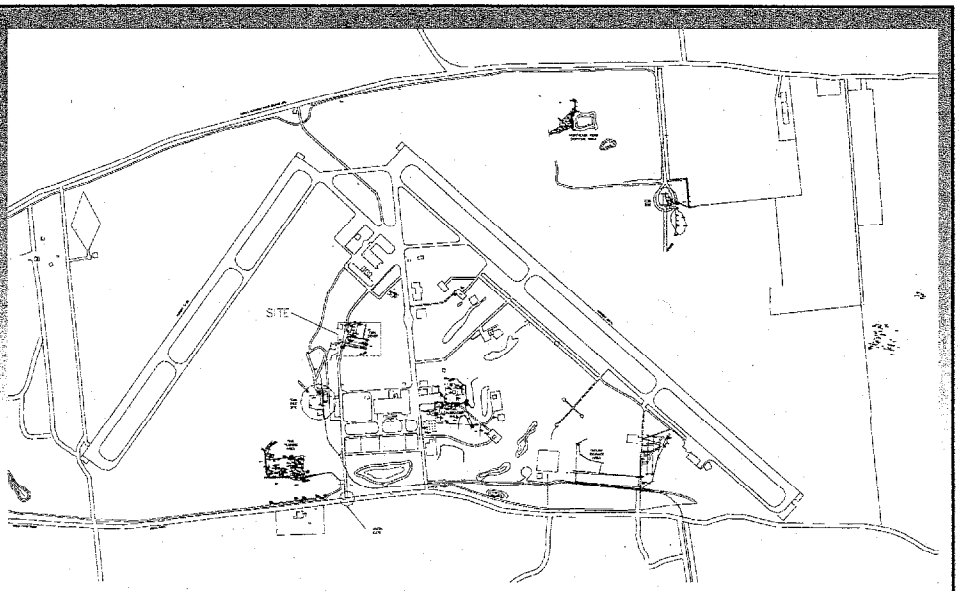

Area Map

NAVFAC

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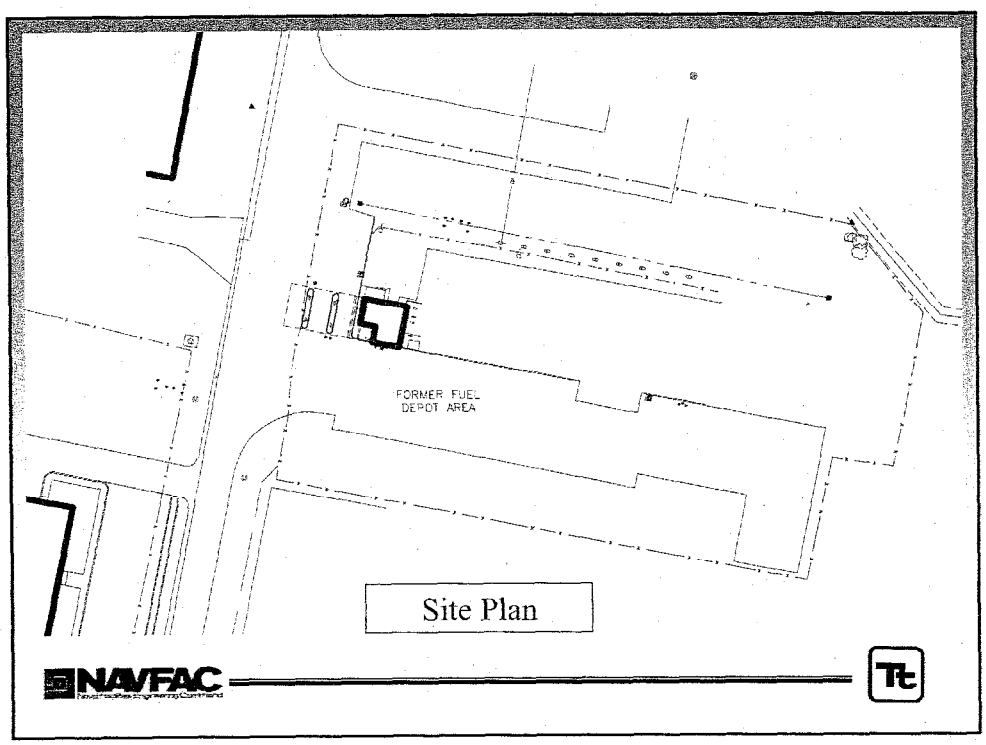
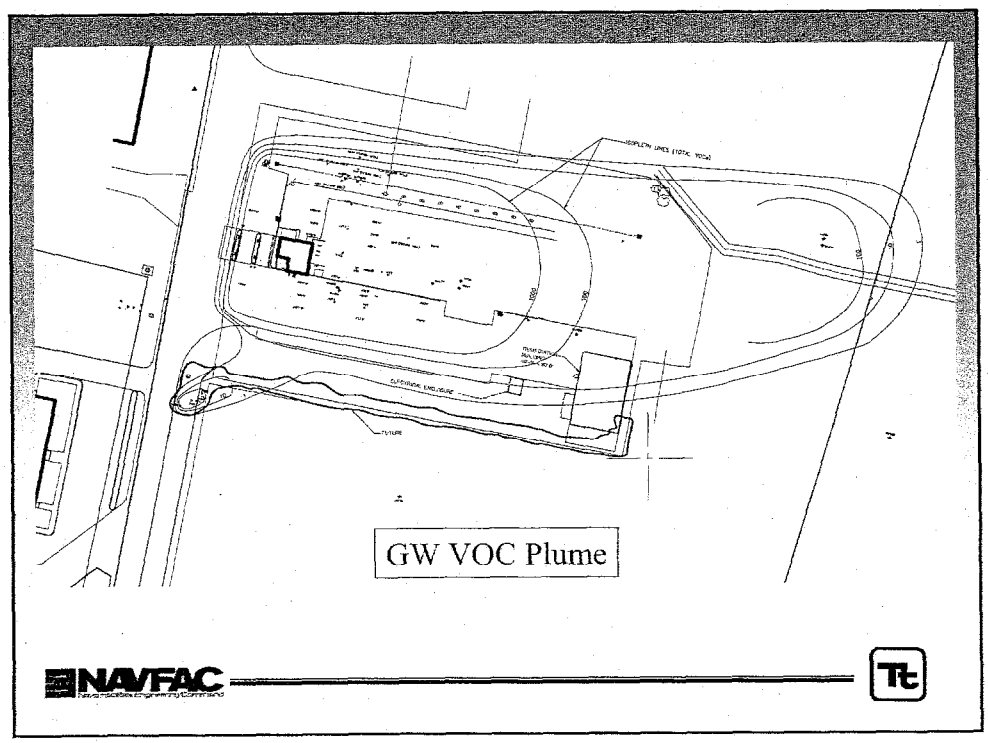
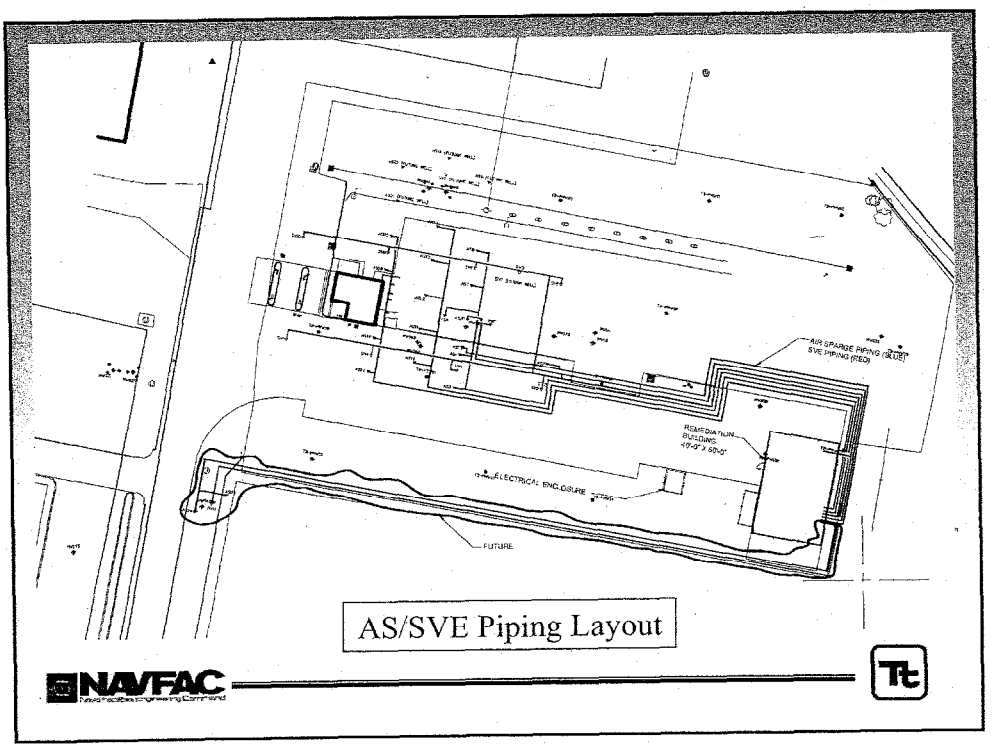

FORMER FUEL
DEPOT AREA
Site Plan
NAVFAC


GW VOC Plume
NAVFAC



AS/SVE Piping Layout

NAVFAC

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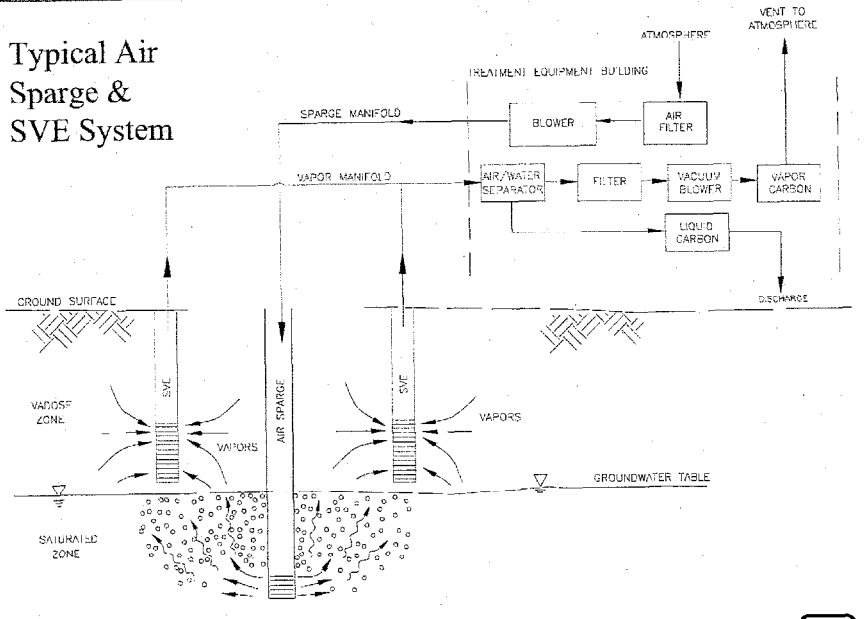
Typical Air Sparge & SVE System



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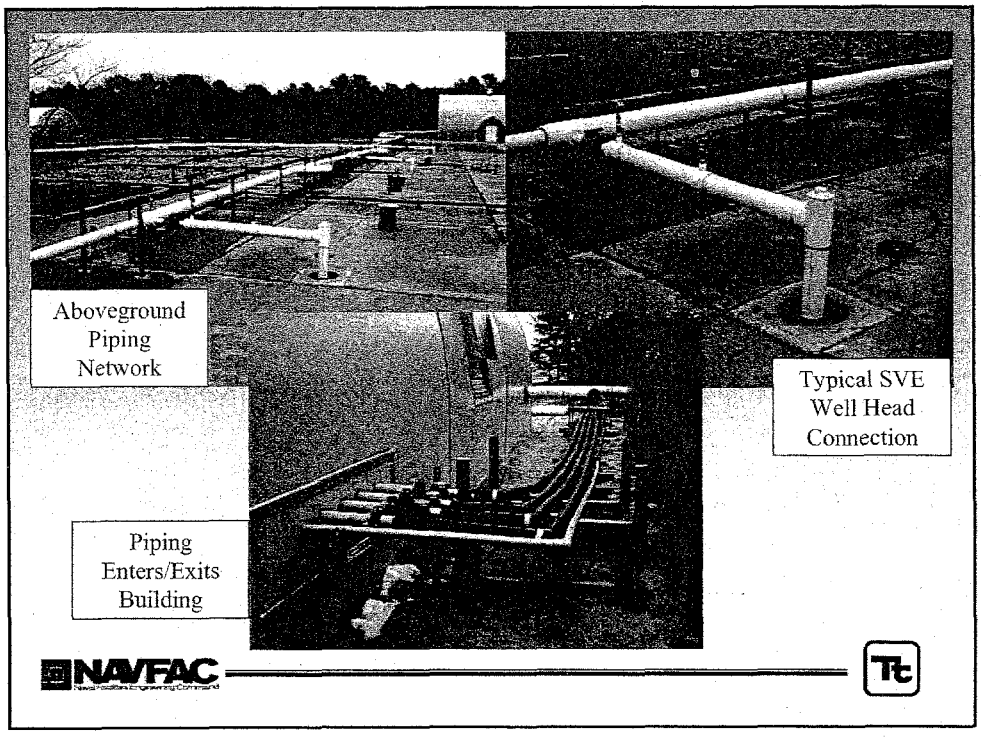
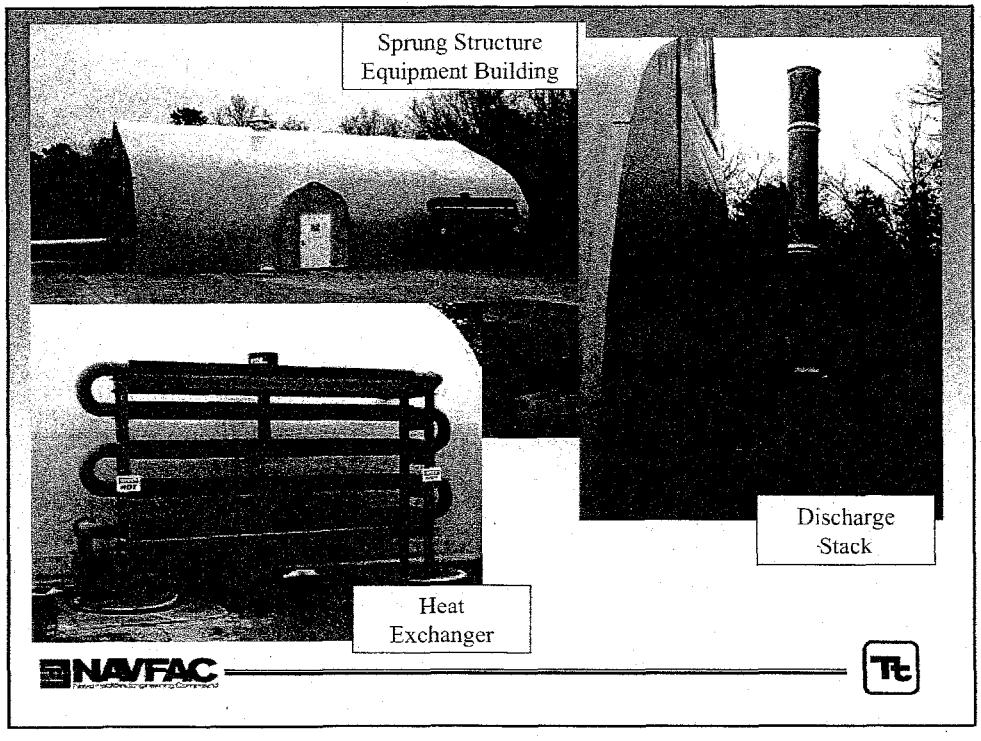
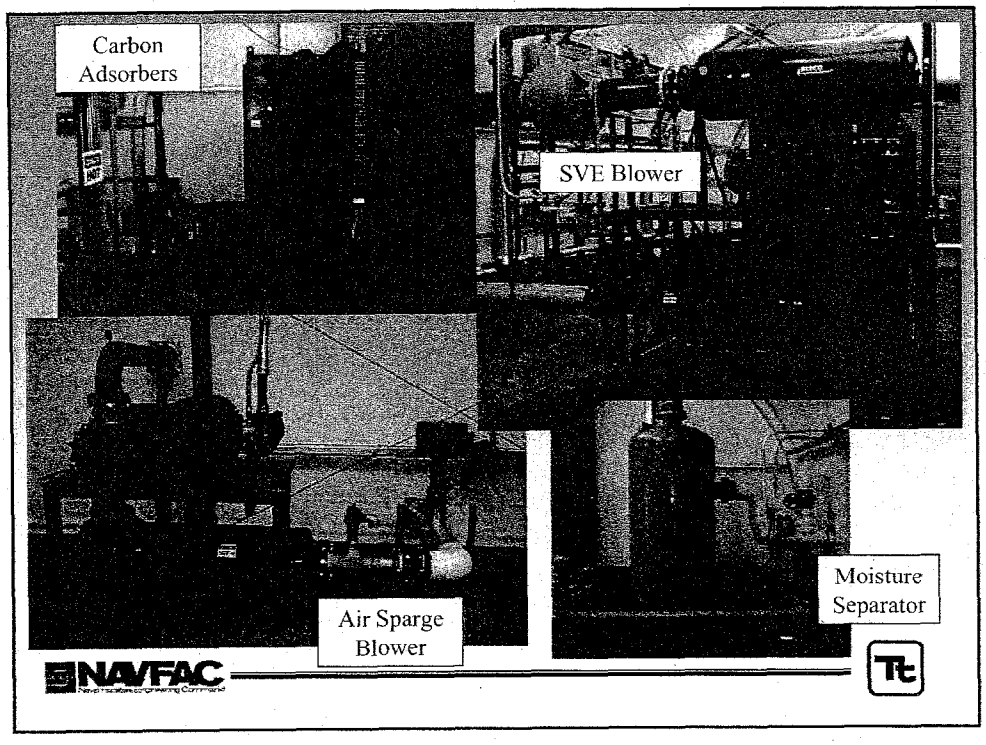
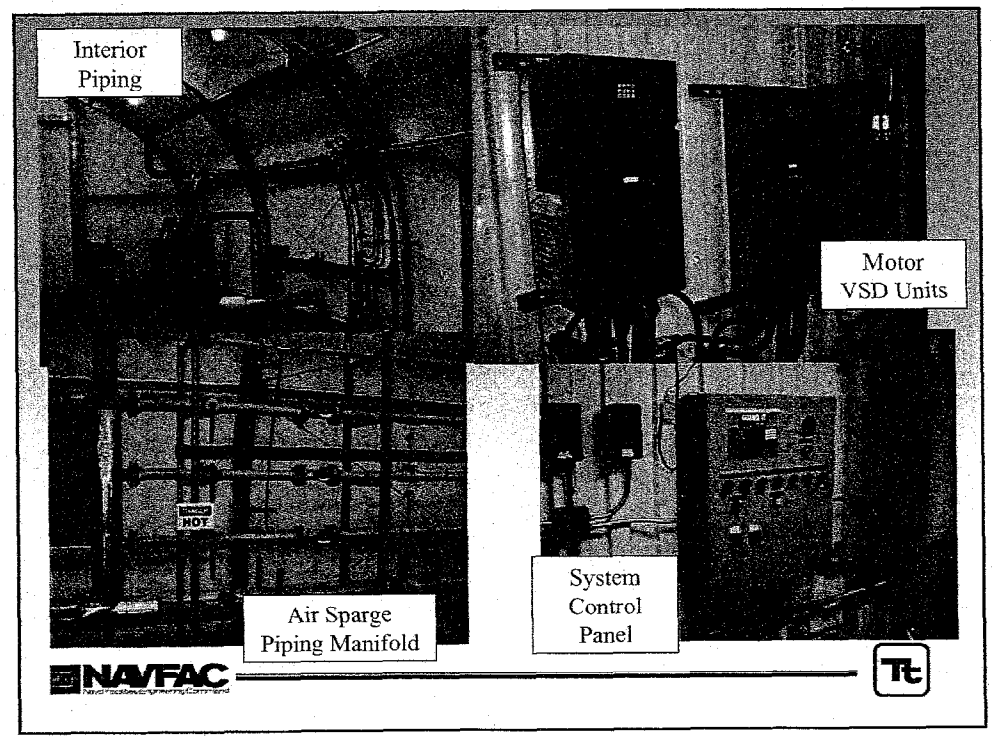

Aboveground Piping Network
Typical SVE Well Head Connection
Piping Enters/Exits Building
NAVFAC
Tt


Sprung Structure Equipment Building
Discharge Stack
Heat Exchanger
NAVFAC
Tt


Carbon Adsorbers
SVE Blower
Air Sparge Blower
Moisture Separator
NAVFAC


Interior Piping
Motor VSD Units
System Control Panel
Air Sparge Piping Manifold
NAVFAC

Safety Considerations

- Instrumentation
  - Monitor key operating parameters
  - Automatic shut-down
  - Requires manual restart only
  - Telemonitoring
    - Remote system monitoring via PC
    - Alarm conditions communicated to designated personnel via autodialer
    - Troubleshooting operational issues before arriving at the site

NAVFAC Tt

Ozone System Description

- Installed by mobilizing a portable self-contained trailer to the site
- Produces approximately five pounds of ozone per day
- Injects the ozone automatically and continuously into any one of six points
- Produces variable injection pressures and adjustable time intervals
- Ozone creates a low temperature combustion which oxidizes the contaminant
- The byproducts are water and carbon dioxide (CO_2)

NAVFAC Tt

Ozone System Benefits

- Capable of eliminating dissolved groundwater contaminants in-situ
- Can remove contaminants that are trapped in hard to reach places
- Works effectively as a supplement to AS/SVE systems
- Can be added to the AS air stream to increase effectiveness

NAVFAC

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Operation & Maintenance

- Pilot Test Schedule
  - Started on March 31, 2005
  - Trained technician(s) visited site 1-2 times per week normally
  - Groundwater and vapor samples collected monthly
  - Additional engineering support used as needed
  - Ended on July 1, 2005

NAVFAC

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Pilot Study Monitoring

What was measured

- Changes in organic vapor concentrations
- Changes in soil gas concentrations
- Changes in dissolved oxygen concentrations of groundwater
- Varying groundwater levels elevations
- Changes in dissolved contaminant concentrations of groundwater
- Equipment performance parameters

NAVFAC

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Pilot Study Monitoring cont.

How measurements collected

- Calibrated field instruments
- Analyses by Certified Laboratories (ALS and Air Toxics)
- Equipment Gauges and Meters

NAVFAC

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Pilot Study Data

Soil Vapor Extraction Wells

- 40 inches of water vacuum pressure
- 100 cubic feet per minute (cfm) flow rate
- 80 feet radius of influence

Air Sparge Wells

- 8 pounds per square inch injection pressure
- 15 cfm flow rate
- 25 feet radius of influence in east – west direction
- 40 feet radius of influence in north – south direction

NAVFAC Tt

Pilot Study Data cont.

- Plate count and dissolved oxygen readings show significant microbial activity
- 4,500 pounds of total volatile organic compounds removed based on 15% sorption capacity of 30,000 pounds of spent carbon

NAVFAC Tt

Status

- Where we are right now
  - Three month continuous pilot testing is completed
  - Data collected using field instruments and lab testing is being evaluated
  - Substantial reductions in contaminant concentrations have been realized in targeted portions of the site
  - Pilot test report is being prepared for submittal
  - System expansion being designed for entire site and anticipated to include
    - Additional four SVE wells
    - Additional sixteen AS wells
    - Additional eight ozone injection points
    - Additional ozone augmentation

NAVFAC Tt

Wrap-up

Questions?

NAVFAC Tt

Attachment 3
Site 6A/Southern Area
RFI Results, Preliminary CMS

Site 6A - Fuel Calibration Area and Southern Area

Naval Weapons Industrial Reserve Plant (NWIRP) Calverton

RCRA Facility Investigation Results and Preliminary Corrective Measures Study Progress

August 4, 2005

Objectives

- Determine extent of deep groundwater contamination at Site 6A - Fuel Calibration Area.
- Delineate extent of groundwater plume in the Pistol Range Area.
- Determine whether contaminated groundwater is migrating underneath or into Peconic River.
- Verify southwestern extent of groundwater contamination.

Field Program

Site 6A - Fuel Calibration Area

- Installed 3 vertical profile borings (VPBs) to depths of 280 to 350 feet.
- Collected 51 groundwater samples from VPBs.
- Installed 12 wells to depths of 100 to 318 feet.
- Collected 17 groundwater samples from wells.
- Analyzed samples for Volatile Organic Compounds (VOCs).
- Collected geological and hydrogeological data.

Field Program (Continued)

Pistol Range Area

- Installed 3 VPBs to depths of 150 to 190 feet.
- Collected 26 groundwater samples from VPBs.
- Installed 3 wells to depths of 148 to 150 feet. Collected 3 groundwater samples from wells.
- Analyzed samples for VOCs.
- Collected geological and hydrogeological data.

Field Program (Continued)

Peconic River Area

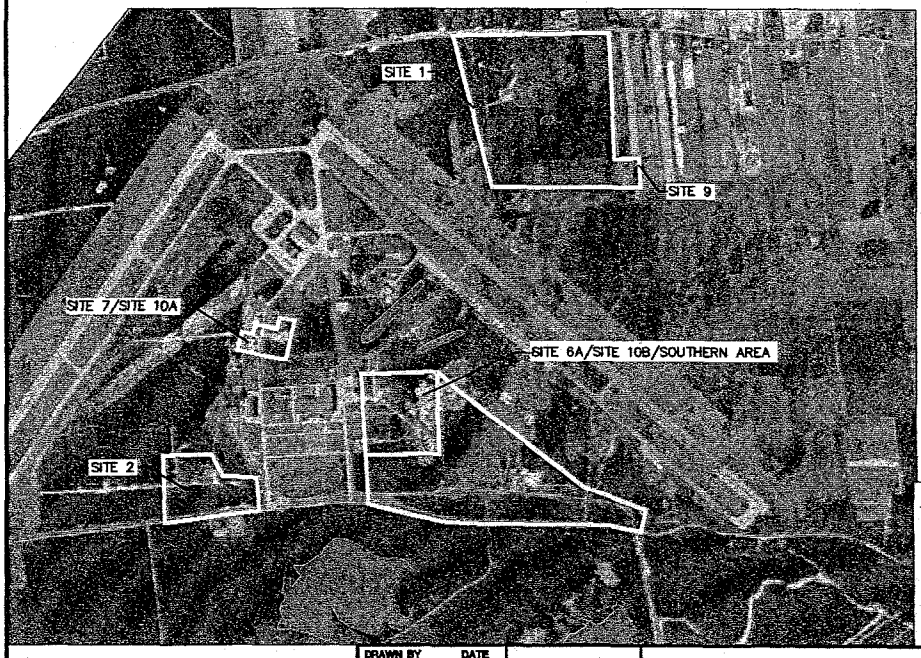
- Installed 4 VPBs to depths of 70 to 150 feet.
- Collected 24 groundwater samples from VPBs.
- Installed 9 wells to depths of 14 to 140 feet.
- Collected groundwater samples from 6 wells.
- Collected 2 surface water samples.
- Analyzed samples for VOCs.
- Collected geological and hydrogeological data.

Field Program (Continued)

Swan Pond Area

- Installed one VPB to 70 feet.
- Collected 4 groundwater samples from VPB.
- Analyzed samples for VOCs.
- Collected geological data.

ACAD: 1610CM13.dwg 07/28/05 DM PIT



N

LEGEND

RETAINED PARCEL

POND

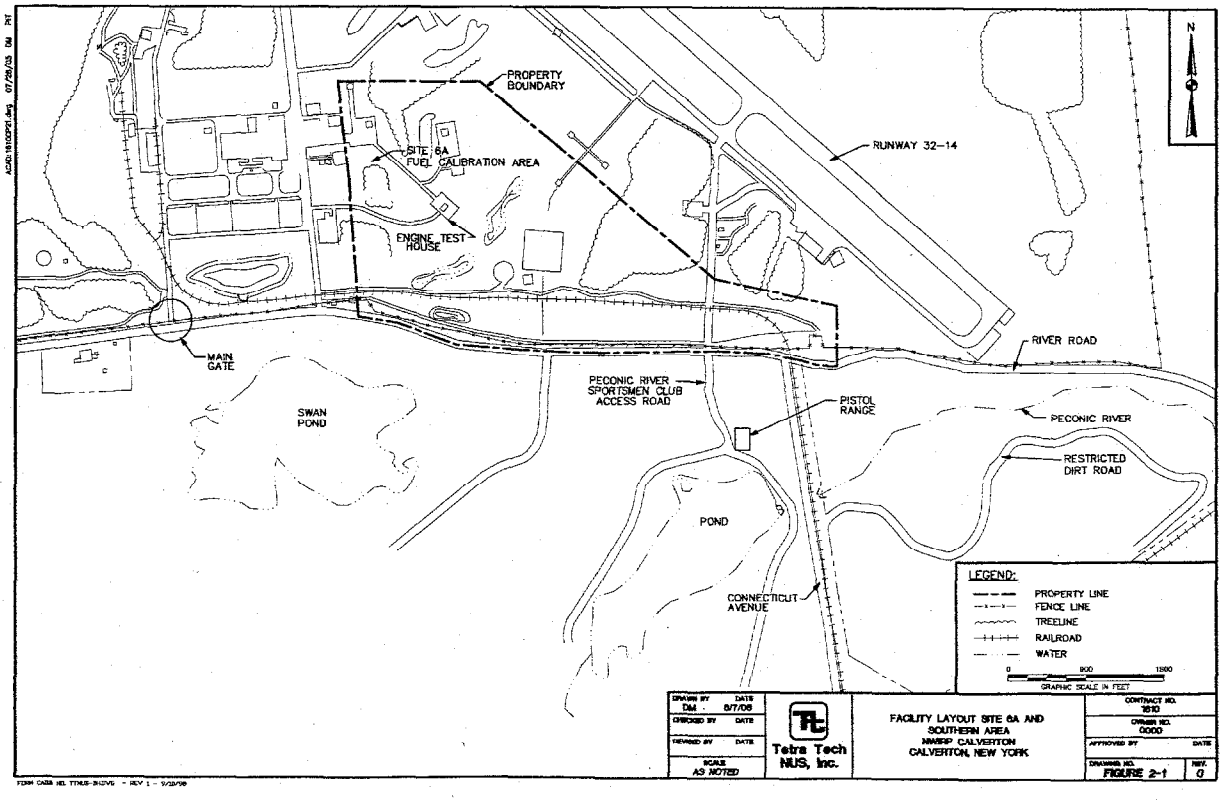
0 2000 4000

GRAPHIC SCALE IN FEET

DRAWN BY DM	DATE 6/24/05	Tetra Tech NUS, Inc.	SITE LOCATION MAP NWIRP CALVERTON CALVERTON, NEW YORK
CHECKED BY	DATE		CONTRACT NO. 1610
REVISED BY	DATE		OWNER NO. 0000
SCALE AS NOTED			APPROVED BY DATE
			DRAWING NO. FIGURE 1-2 REV. 0

FORM CADD NO. TTNUS-AH3WG - REV 1 -9/10/98

ACAD:1610CM14.dwg 07/28/05 DM PIT



N

LEGEND:

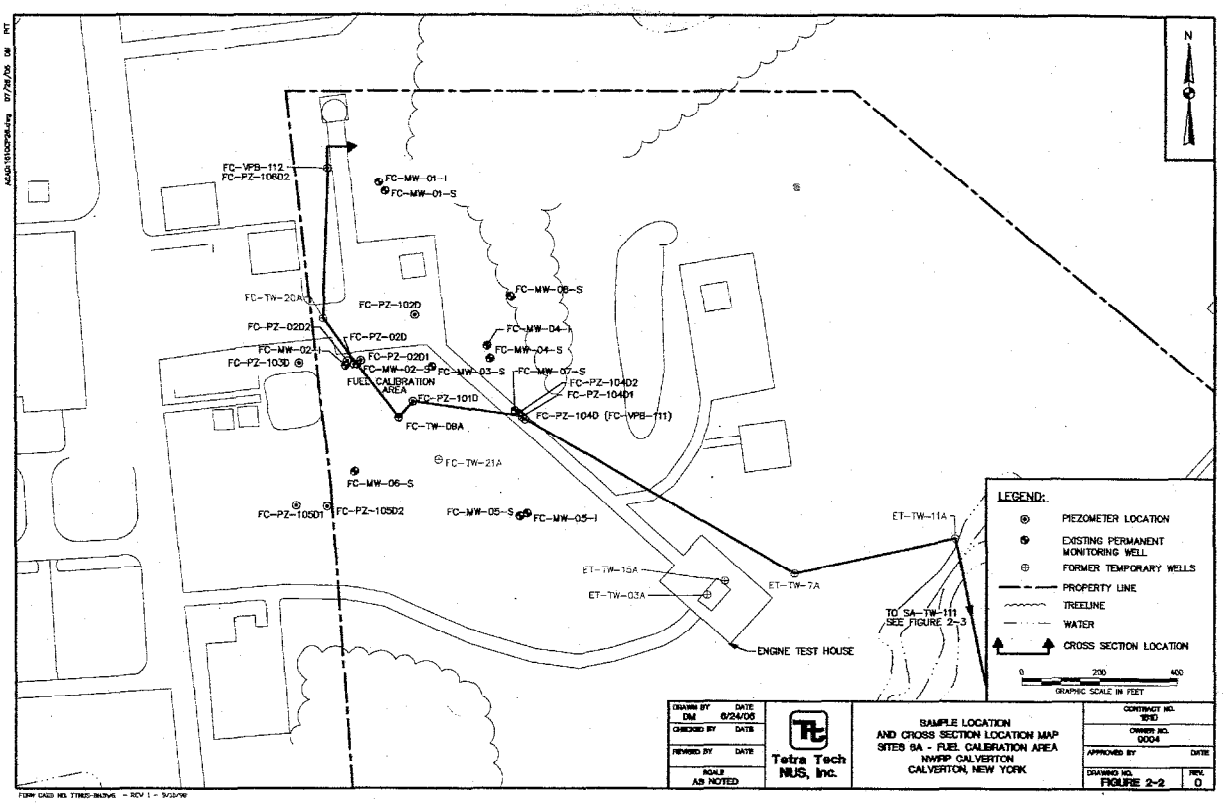
PROPERTY LINE
FENCE LINE
TREELINE
RAILROAD
WATER

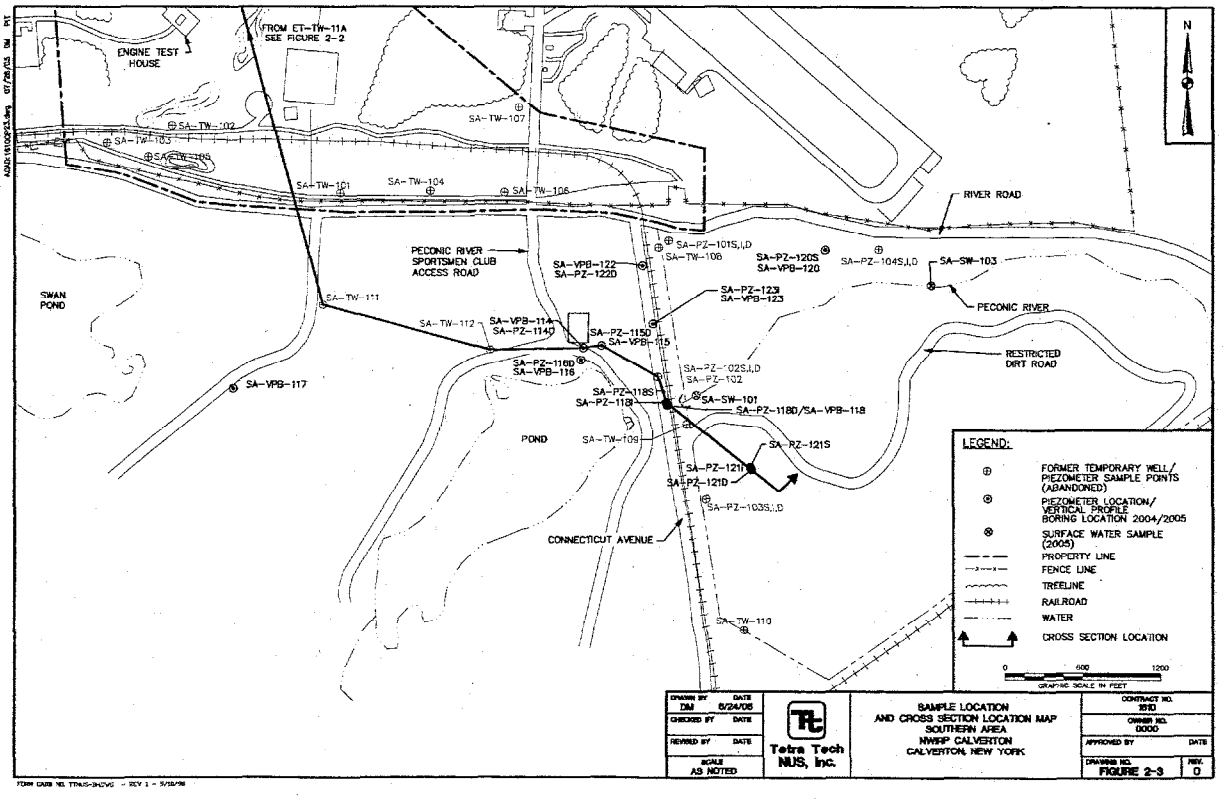
0 900 1800

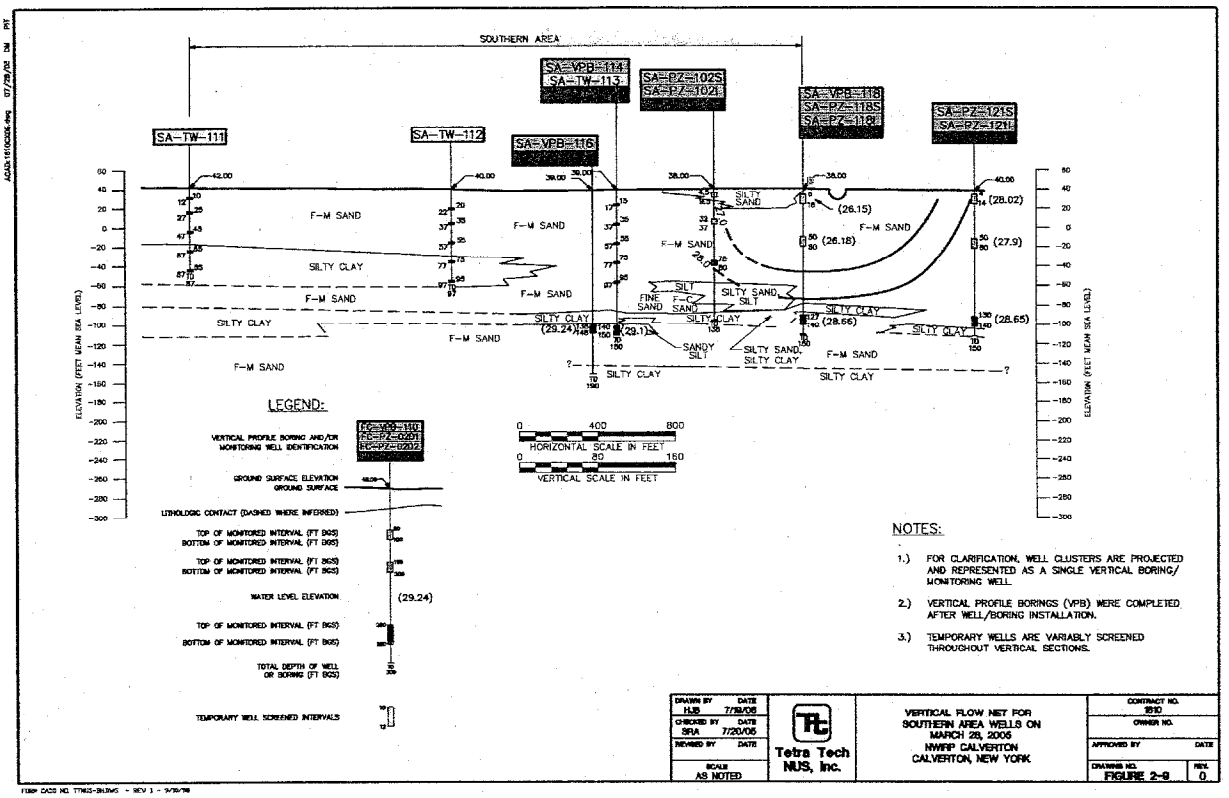
GRAPHIC SCALE IN FEET

DRAWN BY DM	DATE 8/7/05	Tetra Tech NUS, Inc.	FACILITY LAYOUT SITE 6A AND SOUTHERN AREA NWIRP CALVERTON CALVERTON, NEW YORK
CHECKED BY	DATE		CONTRACT NO. 1610
REVISED BY	DATE		OWNER NO. 0000
SCALE AS NOTED			APPROVED BY DATE
			DRAWING NO. FIGURE 2-1 REV. 0

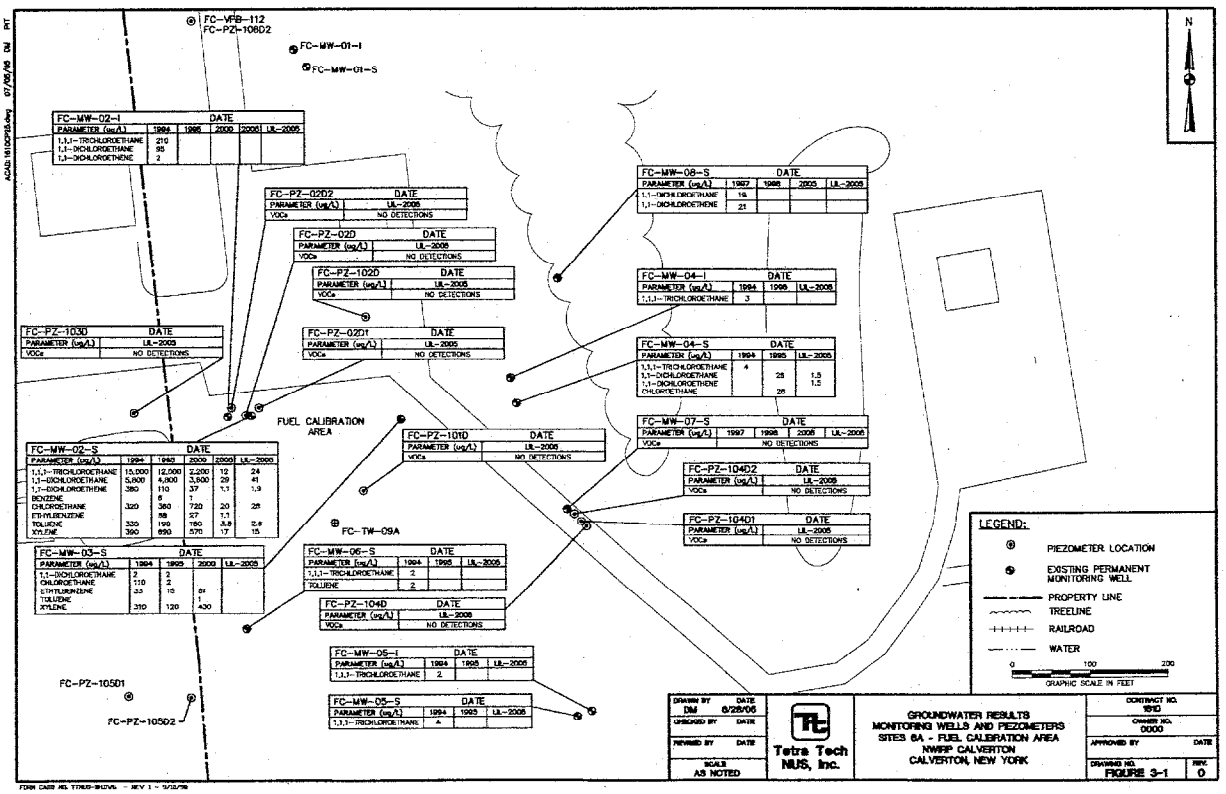
FORM CADD NO. TTNUS-3H2WG - REV 1 - 9/10/98


FC-VPB-112
FC-PZ-106D2
FC-MW-01-I
FC-MW-01-S
FC-TW-2CA
FC-PZ-102D
FC-PZ-02D2
FC-PZ-02D
FC-MW-02-I
FC-PZ-103D
FC-PZ-02D1
FC-MW-02-S
FUEL CALIBRATION AREA
FC-MW-03-S
FC-MW-08-S
FC-MW-04-I
FC-MW-04-S
FC-MW-07-S
FC-PZ-104D2
FC-PZ-104D1
FC-PZ-101D
FC-PZ-104D (FC-VPB-111)
FC-TW-08A
FC-TW-21A
FC-MW-06-S
FC-PZ-105D1
FC-PZ-105D2
FC-MW-05-S
FC-MW-05-I
ET-TW-11A
ET-TW-13A
ET-TW-03A
ET-TW-7A
TO SA-TW-111 SEE FIGURE 2-3
ENGINE TEST HOUSE
N
LEGEND:
PIEZOMETER LOCATION
EXISTING PERMANENT MONITORING WELL
FORMER TEMPORARY WELLS
PROPERTY LINE
TREELINE
WATER
CROSS SECTION LOCATION
0
200
400
GRAPHIC SCALE IN FEET
DRAWN BY DM DATE 6/24/05
CHECKED BY
REVISED BY
SCALE AS NOTED
Tetra Tech NUS, Inc.
SAMPLE LOCATION AND CROSS SECTION LOCATION MAP
SITES 9A - FUEL CALIBRATION AREA
NWIRP CALVERTON
CALVERTON, NEW YORK
CONTRACT NO. 1910
OWNER NO. 0004
APPROVED BY
DATE
DRAWING NO. FIGURE 2-2
REV. 0

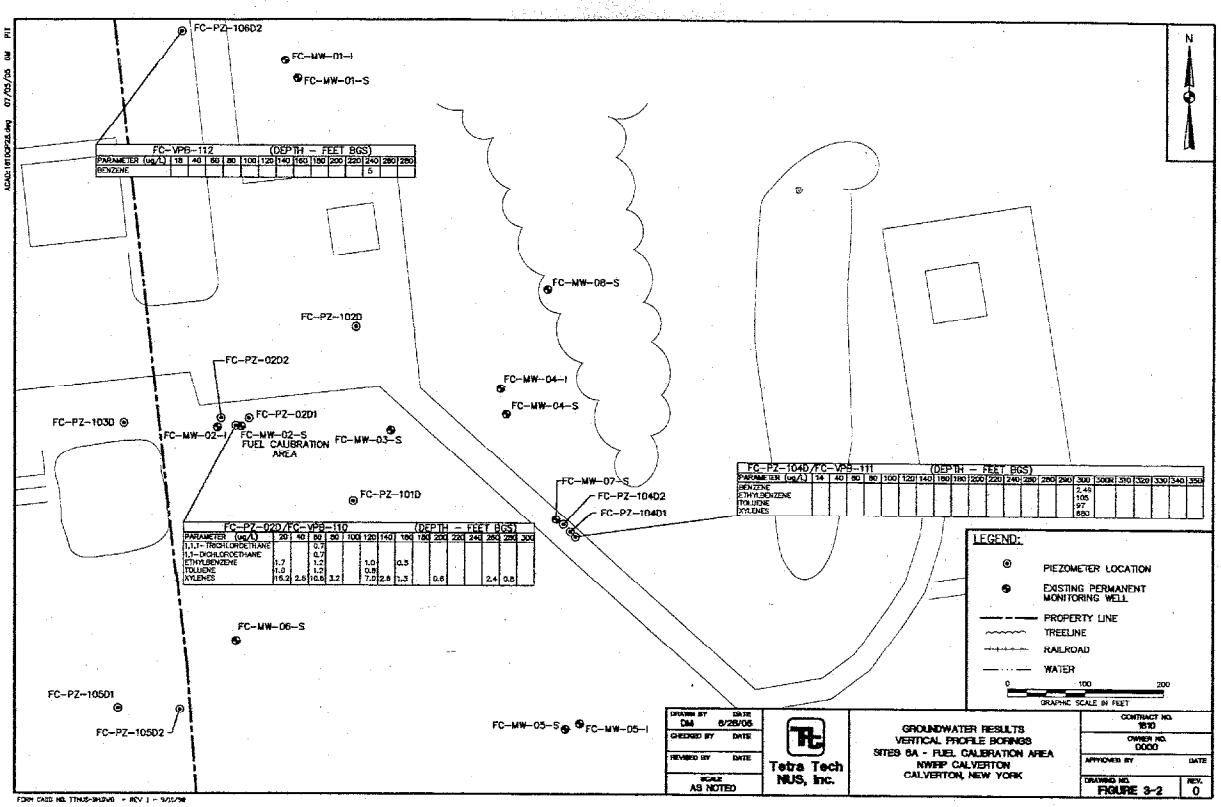

FROM ET-TW-11A SEE FIGURE 2-2
ENGINE TEST HOUSE
SA-TW-102
SA-TW-103
SA-TW-105
SA-TW-107
SA-TW-101
SA-TW-104
SA-TW-106
RIVER ROAD
PECONIC RIVER SPORTSMEN CLUB ACCESS ROAD
SA-PZ-101S,I,D
SA-TW-108
SA-PZ-120S
SA-VPB-120
SA-PZ-104S,I,D
SA-SW-103
SA-VPB-122
SA-PZ-122D
SA-PZ-123I
SA-VPB-123
PECONIC RIVER
SWAN POND
SA-TW-111
SA-TW-112
SA-VPB-114
SA-PZ-114D
SA-PZ-115D
SA-VPB-115
RESTRICTED DIRT ROAD
SA-PZ-116D
SA-VPB-116
SA-PZ-102S,I,D
SA-PZ-102
SA-VPB-117
SA-PZ-118S
SA-PZ-118I
SA-SW-101
SA-PZ-118D/SA-VPB-118
POND
SA-TW-109
SA-RZ-121S
SA-PZ-121I
SA-PZ-121D
SA-PZ-103S,I,D
CONNECTICUT AVENUE
SA-TW-110
N
LEGEND:
FORMER TEMPORARY WELL/ PIEZOMETER SAMPLE POINTS (ABANDONED)
PIEZOMETER LOCATION/ VERTICAL PROFILE BORING LOCATION 2004/2005
SURFACE WATER SAMPLE (2005)
PROPERTY LINE
FENCE LINE
TREELINE
RAILROAD
WATER
CROSS SECTION LOCATION
0
600
1200
GRAPHIC SCALE IN FEET
DRAWN BY DM DATE 6/24/05
CHECKED BY
REVISED BY
SCALE AS NOTED
Tetra Tech NUS, Inc.
SAMPLE LOCATION AND CROSS SECTION LOCATION MAP
SOUTHERN AREA
NWIRP CALVERTON
CALVERTON, NEW YORK
CONTRACT NO. 1910
OWNER NO. 0000
APPROVED BY
DATE
DRAWING NO. FIGURE 2-3
REV. 0

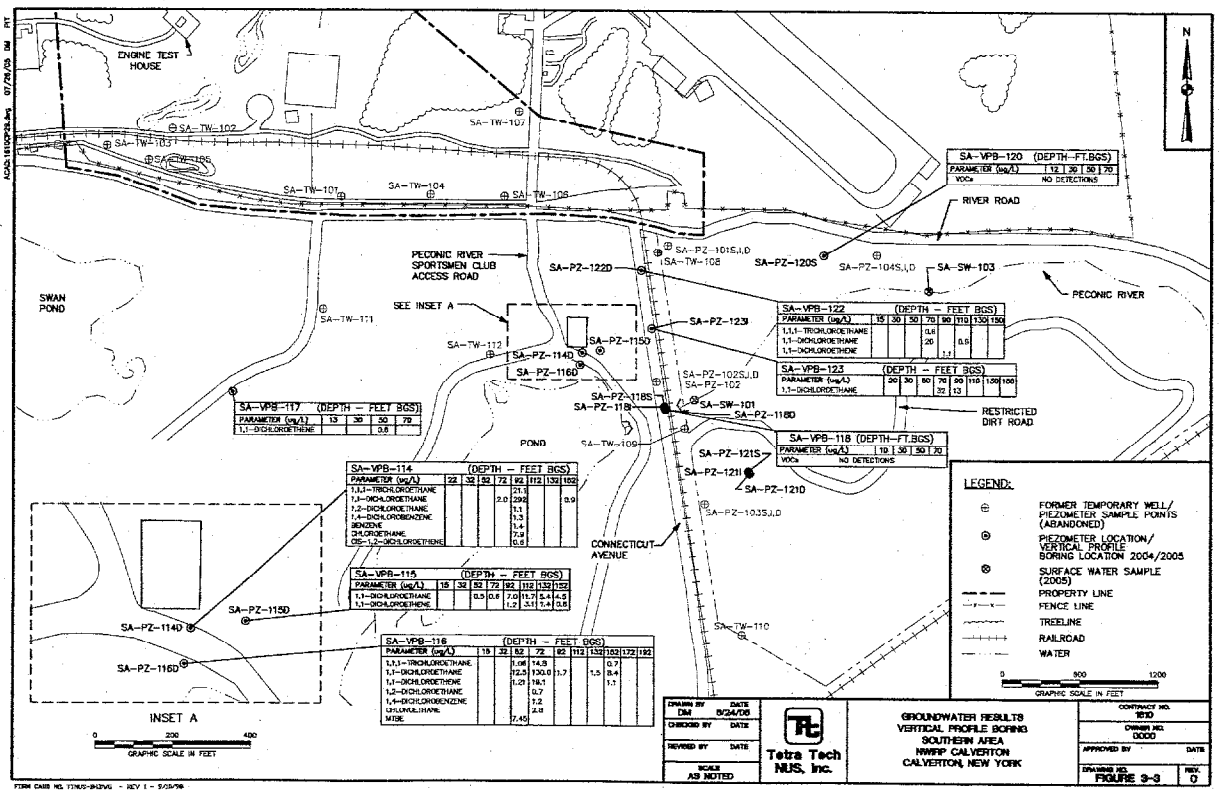


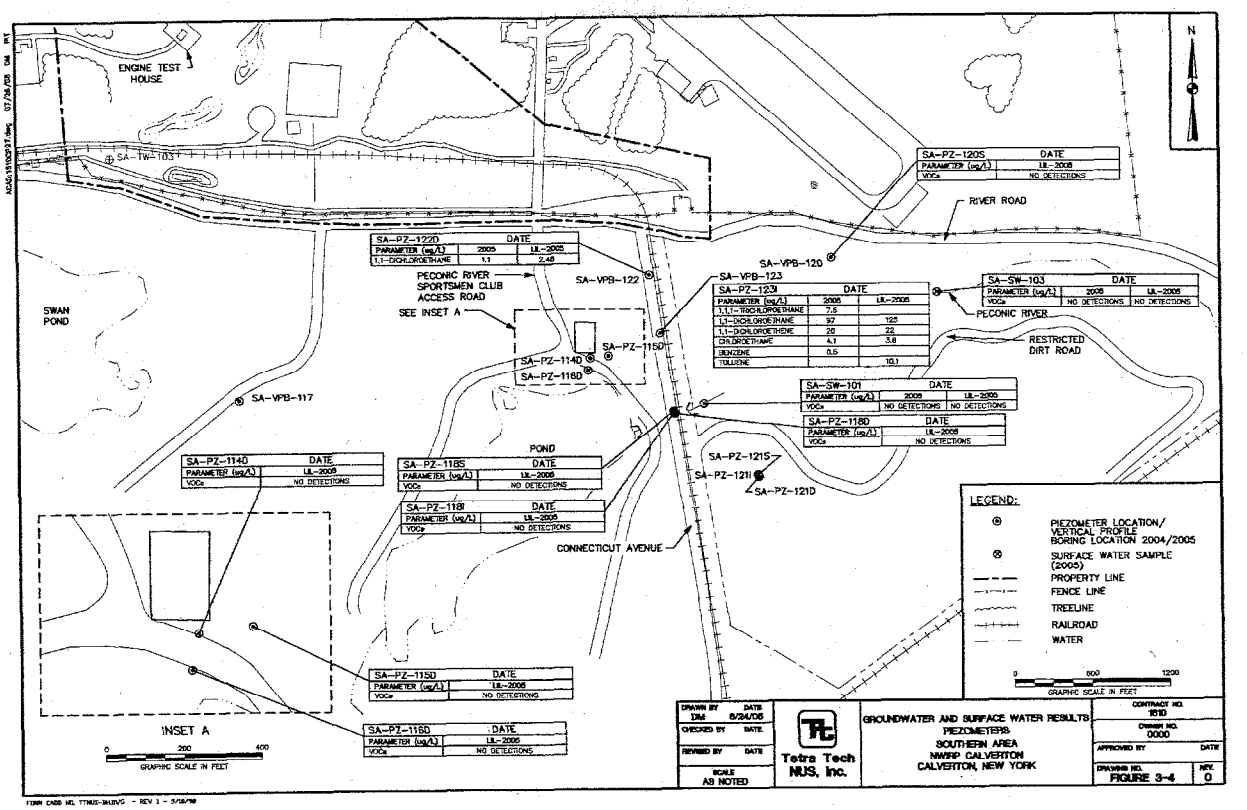
DRAWN BY HJB 7/18/06	Tetra Tech NUS, Inc.	VERTICAL FLOW NET FOR SOUTHERN AREA WELLS ON MARCH 28, 2006 NWIRP CALVERTON CALVERTON, NEW YORK	CONTRACT NO. 1910
CHECKED BY SRA 7/20/06			OWNER NO.
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-9 REV. 0

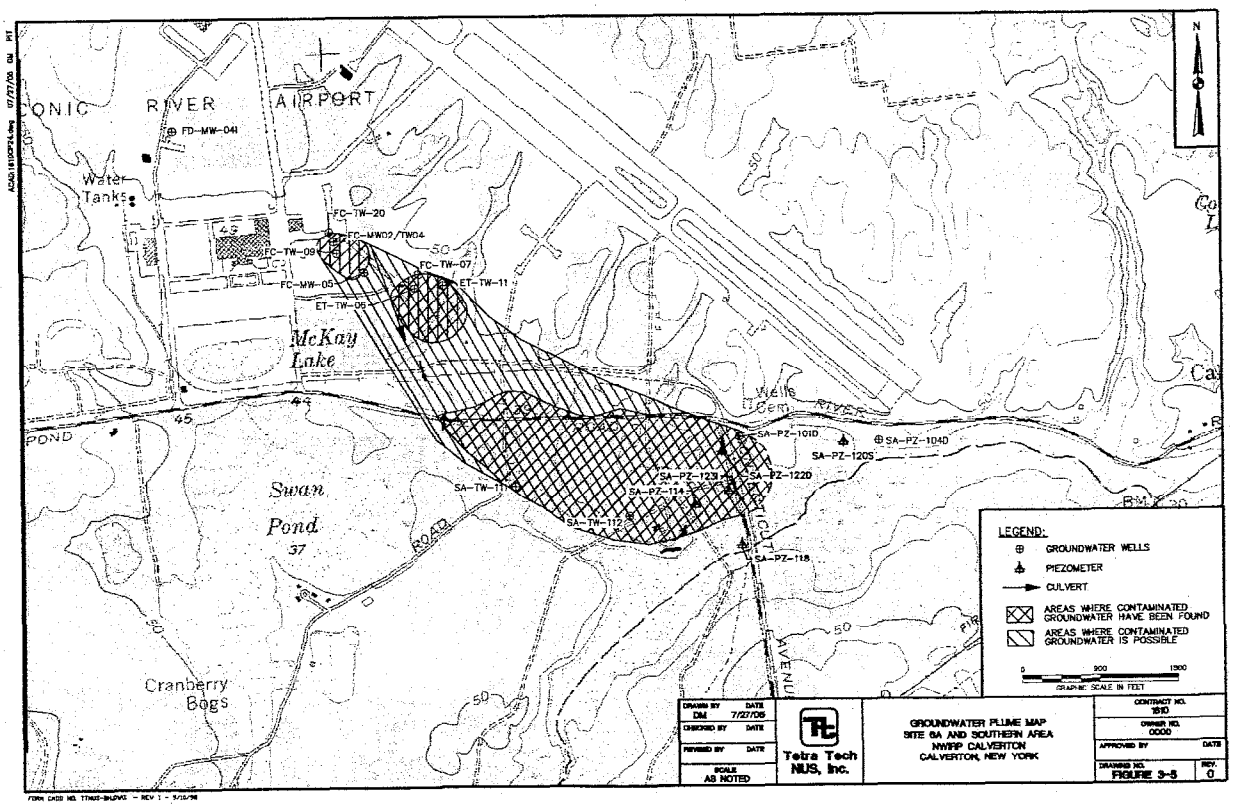


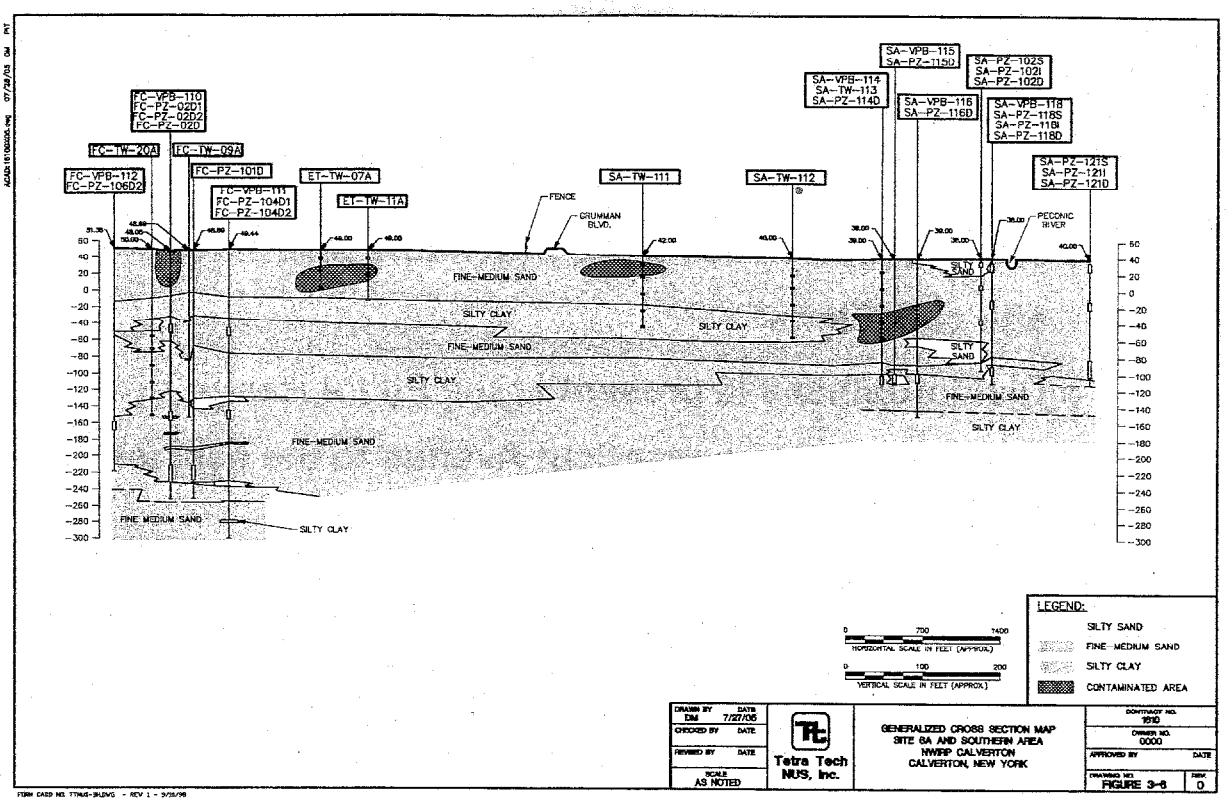
DRAWN BY DM 6/28/06	Tetra Tech NUS, Inc.	GROUNDWATER RESULTS MONITORING WELLS AND PIEZOMETERS SITES 6A - FUEL CALIBRATION AREA NWIRP CALVERTON CALVERTON, NEW YORK	CONTRACT NO. 1910
CHECKED BY			OWNER NO. 0000
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 REV. 0


FC-PZ-106D2
FC-MW-01-I
FC-MW-01-S
FC-VPB-112 (DEPTH - FEET BGS)
PARAMETER (ug/L) 18 40 60 80 100 120 140 160 180 200 220 240 260 280
BENZENE 5
FC-MW-08-S
FC-PZ-102D
FC-PZ-02D2
FC-MW-04-I
FC-MW-04-S
FC-PZ-103D
FC-PZ-02D1
FC-MW-02-I
FC-MW-02-S
FUEL CALIBRATION AREA
FC-MW-03-S
FC-PZ-101D
FC-MW-07-S
FC-PZ-104D2
FC-PZ-104D1
FC-PZ-102D/FC-VPB-110 (DEPTH - FEET BGS)
PARAMETER (ug/L) 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
1,1,1-TRICHLOROETHANE 0.7
1,1-DICHLOROETHANE 0.7
ETHYLBENZENE 1.7 1.2
TOLUENE 1.0 1.2 1.0 0.5
XYLENES 16.3 2.5 10.8 3.2 7.0 2.8 1.3 0.8 2.4 0.8
FC-PZ-104D/FC-VPB-111 (DEPTH - FEET BGS)
PARAMETER (ug/L) 14 40 60 80 100 120 140 160 180 200 220 240 260 280 290 300 300N 310 320 330 340 350
BENZENE 2.4
ETHYLBENZENE 105
TOLUENE 97
XYLENES 880
FC-MW-06-S
FC-PZ-105D1
FC-PZ-105D2
FC-MW-05-S
FC-MW-05-I
N
LEGEND:
PIEZOMETER LOCATION
EXISTING PERMANENT MONITORING WELL
PROPERTY LINE
TREELINE
RAILROAD
WATER
0 100 200
GRAPHIC SCALE IN FEET
DRAWN BY DM DATE 8/25/05
CHECKED BY DATE
REVISED BY DATE
SCALE AS NOTED
Tetra Tech NUS, Inc.
GROUNDWATER RESULTS
VERTICAL PROFILE BORINGS
SITES 8A - FUEL CALIBRATION AREA
NWIRP CALVERTON
CALVERTON, NEW YORK
CONTRACT NO. 1810
OWNER NO. 0000
APPROVED BY DATE
DRAWING NO. FIGURE 3-2
REV. 0


ENGINE TEST HOUSE
SA-TW-102
SA-TW-103
SA-TW-106
SA-TW-107
SA-TW-101
SA-TW-104
SA-TW-105
SA-VPB-120 (DEPTH-FT.BGS)
PARAMETER (ug/L) 12 30 50 70
VOCs NO DETECTIONS
RIVER ROAD
PECONIC RIVER SPORTSMEN CLUB ACCESS ROAD
SA-PZ-101S,I,D
SA-TW-108
SA-PZ-122D
SA-PZ-120S
SA-PZ-104S,I,D
SA-SW-103
PECONIC RIVER
SWAN POND
SA-TW-111
SEE INSET A
SA-TW-112
SA-PZ-114D
SA-PZ-115D
SA-PZ-116D
SA-PZ-123
SA-VPB-122 (DEPTH - FEET BGS)
PARAMETER (ug/L) 15 30 50 70 90 110 130 150
1,1,1-TRICHLOROETHANE 0.6
1,1-DICHLOROETHANE 20 0.9
1,1-DICHLOROETHENE 1.1
SA-PZ-123D
SA-VPB-123 (DEPTH - FEET BGS)
PARAMETER (ug/L) 20 30 50 70 90 110 130 150
1,1-DICHLOROETHANE 32 13
SA-PZ-102SJ,D
SA-PZ-102
SA-PZ-118S
SA-PZ-118D
SA-SW-101
SA-PZ-118D
RESTRICTED DIRT ROAD
SA-VPB-117 (DEPTH - FEET BGS)
PARAMETER (ug/L) 13 30 50 70
1,1-DICHLOROETHENE 0.8
POND
SA-TW-109
SA-VPB-118 (DEPTH-FT.BGS)
PARAMETER (ug/L) 10 30 50 70
VOCs NO DETECTIONS
SA-PZ-121S
SA-PZ-121I
SA-PZ-121D
SA-VPB-114 (DEPTH - FEET BGS)
PARAMETER (ug/L) 22 32 52 72 92 112 132 152
1,1,1-TRICHLOROETHANE 21.5
1,1-DICHLOROETHANE 2.0 292 8.9
1,2-DICHLOROETHANE 1.1
1,4-DICHLOROBENZENE 1.3
BENZENE 1.4
CHLOROETHANE 7.9
CIS-1,2-DICHLOROETHENE 0.6
CONNECTICUT AVENUE
SA-PZ-103SJ,D
SA-VPB-115 (DEPTH - FEET BGS)
PARAMETER (ug/L) 15 32 52 72 92 112 132 152
1,1-DICHLOROETHANE 0.5 0.6 7.0 11.7 5.4 4.5
1,1-DICHLOROETHENE 1.2 3.1 1.4 0.8
SA-TW-110
SA-VPB-116 (DEPTH - FEET BGS)
PARAMETER (ug/L) 19 32 52 72 92 112 132 152 172 192
1,1,1-TRICHLOROETHANE 1.06 14.9 0.7
1,1-DICHLOROETHANE 12.5 130.0 11.7 1.5 8.4
1,1-DICHLOROETHENE 1.21 19.1 1.1
1,2-DICHLOROETHANE 0.7
1,4-DICHLOROBENZENE 1.2
CHLOROETHANE 2.0
MTBE 7.45
INSET A
0 200 400
GRAPHIC SCALE IN FEET
N
LEGEND:
FORMER TEMPORARY WELL/ PIEZOMETER SAMPLE POINTS (ABANDONED)
PIEZOMETER LOCATION/ VERTICAL PROFILE BORING LOCATION 2004/2005
SURFACE WATER SAMPLE (2005)
PROPERTY LINE
FENCE LINE
TREELINE
RAILROAD
WATER
0 600 1200
GRAPHIC SCALE IN FEET
DRAWN BY DM DATE 8/24/05
CHECKED BY DATE
REVISED BY DATE
SCALE AS NOTED
Tetra Tech NUS, Inc.
GROUNDWATER RESULTS
VERTICAL PROFILE BORING
SOUTHERN AREA
NWIRP CALVERTON
CALVERTON, NEW YORK
CONTRACT NO. 1810
OWNER NO. 0000
APPROVED BY DATE
DRAWING NO. FIGURE 3-3
REV. 0


ENGINE TEST HOUSE
SA-TW-103
SA-PZ-120S
DATE
PARAMETER (ug/L)
LIL-2005
VOCs
NO DETECTIONS
RIVER ROAD
SA-PZ-122D
DATE
PARAMETER (ug/L)
2005
LIL-2005
1,1-DICHLOROETHANE
1.1
2.46
PECONIC RIVER SPORTSMEN CLUB ACCESS ROAD
SA-VPB-122
SA-VPB-120
SA-PZ-123
DATE
PARAMETER (ug/L)
2005
LIL-2005
1,1,1-TRICHLOROETHANE
7.8
1,1-DICHLOROETHANE
97
125
1,1-DICHLOROETHENE
20
22
CIS-1,2-DICHLOROETHENE
4.1
3.8
BENZENE
0.5
TOLUENE
10.1
SA-SW-103
DATE
PARAMETER (ug/L)
2005
LIL-2005
VOCs
NO DETECTIONS
NO DETECTIONS
PECONIC RIVER
SEE INSET A
SWAN POND
SA-PZ-114D
SA-PZ-115D
SA-PZ-118D
RESTRICTED DIRT ROAD
SA-SW-101
DATE
PARAMETER (ug/L)
2005
LIL-2005
VOCs
NO DETECTIONS
NO DETECTIONS
SA-VPB-117
SA-PZ-118D
DATE
PARAMETER (ug/L)
LIL-2005
VOCs
NO DETECTIONS
SA-PZ-114D
DATE
PARAMETER (ug/L)
LIL-2005
VOCs
NO DETECTIONS
POND
SA-PZ-118S
DATE
PARAMETER (ug/L)
LIL-2005
VOCs
NO DETECTIONS
SA-PZ-121S
SA-PZ-121I
SA-PZ-121D
SA-PZ-118I
DATE
PARAMETER (ug/L)
LIL-2005
VOCs
NO DETECTIONS
CONNECTICUT AVENUE
LEGEND:
PIEZOMETER LOCATION/ VERTICAL PROFILE BORING LOCATION 2004/2005
SURFACE WATER SAMPLE (2005)
PROPERTY LINE
FENCE LINE
TREELINE
RAILROAD
WATER
0
600
1200
GRAPHIC SCALE IN FEET
INSET A
SA-PZ-115D
DATE
PARAMETER (ug/L)
LIL-2005
VOCs
NO DETECTIONS
SA-PZ-116D
DATE
PARAMETER (ug/L)
LIL-2005
VOCs
NO DETECTIONS
0
200
400
GRAPHIC SCALE IN FEET
N
DRAWN BY DM DATE 5/24/05
CHECKED BY DATE
REVISED BY DATE
SCALE AS NOTED
Tetra Tech NUS, Inc.
GROUNDWATER AND SURFACE WATER RESULTS
PIEZOMETERS
SOUTHERN AREA
NWIRP CALVERTON
CALVERTON, NEW YORK
CONTRACT NO. 1610
OWNER NO. 0000
APPROVED BY DATE
DRAWING NO. FIGURE 3-4
REV. 0


RIVER
AIRPORT
FD-MW-04I
Water Tanks
FC-TW-20
FC-MW02/TW04
FC-TW-09
FC-TW-07
FC-MW-05
ET-TW-11
ET-TW-06
McKay Lake
POND
45
Swan Pond
37
ROAD
Cranberry Bogs
SA-PZ-101D
SA-PZ-104D
SA-PZ-120S
SA-PZ-123
SA-PZ-122D
SA-PZ-114
SA-TW-111
SA-TW-112
SA-PZ-118
AVENUE
LEGEND:
GROUNDWATER WELLS
PIEZOMETER
CULVERT
AREAS WHERE CONTAMINATED GROUNDWATER HAVE BEEN FOUND
AREAS WHERE CONTAMINATED GROUNDWATER IS POSSIBLE
0
900
1800
GRAPHIC SCALE IN FEET
N
DRAWN BY DM DATE 7/27/05
CHECKED BY DATE
REVISED BY DATE
SCALE AS NOTED
Tetra Tech NUS, Inc.
GROUNDWATER PLUME MAP
SITE 6A AND SOUTHERN AREA
NWIRP CALVERTON
CALVERTON, NEW YORK
CONTRACT NO. 1610
OWNER NO. 0000
APPROVED BY DATE
DRAWING NO. FIGURE 3-5
REV. 0



Data Summary

Site 6A - Fuel Calibration Area

- Chlorinated solvents and fuels remain at Site 6A - Fuel Calibration Area, but at much lower concentrations.
- Horizontal extent of contamination is limited.
- A clay unit at a depth of approximately 60 feet limits the vertical depth of contamination.

Summary (Continued)

- Previous Site 6A findings of contamination at depth were a result of sampling procedure and unique site conditions.
- Dichloroethane is present at the Pistol Range Area and extents to Connecticut Avenue to the east and north to at least River Road.
- A clay unit at a depth of approximately 60 feet (north) and 130 feet (south) limit the vertical depth of contamination.

Summary (Continued)

- Groundwater to a depth of at least 130 feet flows into the Peconic River.
- Groundwater contamination in the southwest is bounded.

Corrective Measures Study (CMS)

Source Areas

- Site 6A - Fuel Calibration Area
- Site 10B - Engine Test House

Southern Area

CMS - Objectives

- Protect Human Health and the Environment.
- Comply with Federal and State Standards.

CMS - Goals

- Comply with New York State Groundwater Protection Standards.
- Comply with New York State Surface Water Protection Standards for Peconic River.
- Standards are generally 5 ug/l for VOCs, benzene is 1 ug/l.
- Groundwater standards may not be achieved throughout area for a period of time.

CMS - Elements

<u>Potential Source Area Remedies</u>

- Natural Attenuation With Monitoring
- Groundwater Extraction and Treatment With Free Product Recovery
- In-situ Air Sparging/Bioventing
- In-situ Chemical Oxidation

Potential Southern Area Remedies

- Natural Attenuation With Monitoring
- Groundwater Extraction and Treatment
- In-situ Air Sparging
- Enhanced In-situ Anaerobic Biodegradation

Attachment 4
Site 2 Fire Training Area
Soils Data and EE/CA

Site 2 - Fire Training Area

Naval Weapons Industrial Reserve Plant (NWIRP) Calverton

Engineering Evaluation/Cost Analysis (EE/CA)

August 4, 2005

History

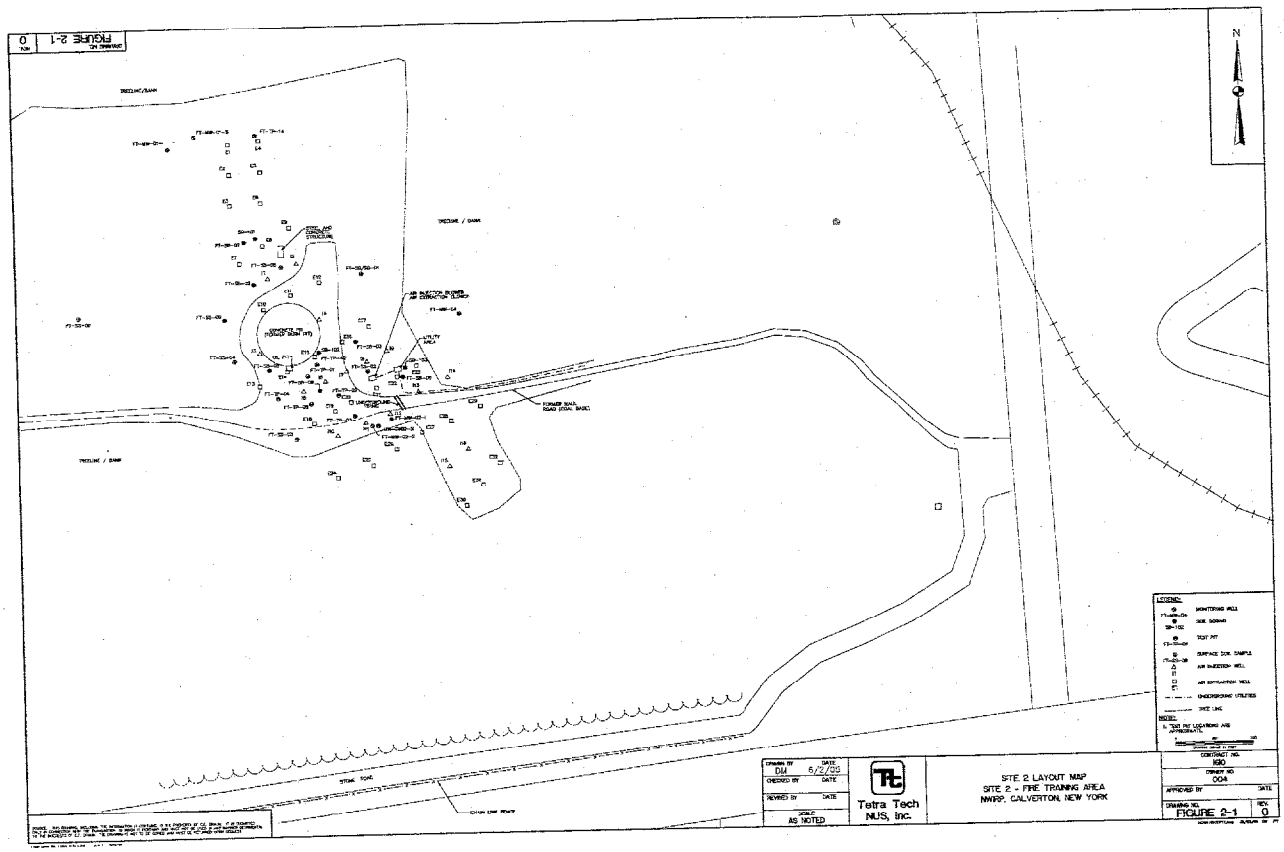
- Fire training activities were conducted through mid 1990s.
- Activities resulted in release of petroleum and solvents to the soil and groundwater.
- Free product recovery was conducted from mid 1980's to mid 1990's. Approximately 2400 pounds of free product recovered.

History (Continued)

- An air sparging/soil vapor extraction pilot test was conducted from 1995 to 2000. Test removed/ destroyed approximately 30,000 pounds of petroleum. Operation became inefficient and was discontinued.
- 1998 EE/CA recommended continuing free product removal. By 2000, quantity of free product at the site was insufficient to allow effective recovery.

History (Continued)

- Early 2000 soil testing found shallow petroleum contamination that appeared to act as a continuing source of groundwater contamination.
- Deep petroleum contamination is present near the water table in a smear zone.



Objectives

- Better define the nature and extent of petroleum-contaminated soil at Site 2.
- Determine the presence of other contaminants in site soils.
- Identify and evaluate removal options for shallow-petroleum contaminated soil at Site 2.

Field Activities

- Installed 38 soil borings to depths of 8 to 20 feet
- Collected continuous soil cores for visual and field instrument classification.
- Collected 5 surface soil samples for total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), metals, polynuclear aromatic hydrocarbons (PAHs).
- Collected 29 subsurface soil samples for TPH, PCBs, metals, (PAHs).