IN-SITU CHEMICAL OXIDATION PILOT TEST REPORT

CPB SITE
BLOCK 15950, LOT 29
EDGEMERE, NY
NYSDEC SPILL PROGRAM CASE # 0207599

TRC JOB NUMBER: 159807

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1.0 INTRODUCTION

This report summarizes the In-Situ Chemical Oxidation (ISCO) Pilot Test conducted in August 2008 at the CPB property (Site) located in Edgemere, Queens County, New York. The report presents the results obtained during preparation, implementation, and post injection monitoring of the ISCO pilot test.

1.1 Background

The CPB site (Site) is located between Far Rockaway Boulevard and the Rockaway Freeway (near Beach 32nd Street) in Edgemere, New York. Figure 1 provides a Site Location Map, and Figure 2 presents the site plan. The Site is located approximately 580 feet south west of the Norton Basin of the Jamaica Bay and approximately 2,100 feet (0.4 miles) north of the Atlantic Ocean. The property is currently vacant, approximately 1.3 acres in size and has been designated on local tax maps as Block 15950, Lot 29.

Previous investigations indicated that a structure was formerly located on the Site, along the western portion of the property. The structure's was reportedly used as a garage and plumbing supply house. Soil and ground water investigations uncovered evidence of a release of petroleum hydrocarbon products (heating oil) on site, and New York State Department of Environmental Conservation (NYSDEC) assigned Spill Number 02-07599 to the property.

Between June and November 2004, Anson Environmental, Ltd. (Anson) of Huntington, New York conducted soil remedial excavation activities at the Site to address the petroleum impacts. During the soil excavation, two fuel oil underground storage tanks (USTs), 1,500 and 300 gallons in capacity, were uncovered and removed. The excavation limits were determined based on field/visual observations of soil staining and petroleum odor. The excavation proceeded to a depth of approximately 8 feet below grade. On approximately June 14, 2004, a greenish colored soil with a solvent odor was first observed during the excavation. This solvent impacted soil was stockpiled separately, for subsequent characterization and off-site disposal. Sampling of this green stained soil showed that it contained trichloroethylene (TCE). The extent of excavation was approximately 11,000 square feet. Further details of the excavation are contained in the 2004 Closure Report prepared by Anson.

Additional soil and ground water investigations conducted by Anson identified an area elevated contaminant concentration near the southwestern property boundary, in the vicinity of soil boring B47. Laboratory analysis of ground water samples collected in that area detected TCE at concentrations exceeding NYSDEC ground water cleanup standards.

In September 2007, Anson submitted a Corrective Action Plan Addendum – Ground Water Remediation Work Plan (CAP Addendum) to the NYSDEC. The September 2007 CAP Addendum proposed addressing ground water impacts using a combination of *in-situ* chemical oxidation (ISCO) and enhanced in-situ bioremediation (EISB). Activated percarbonate was proposed for chemical oxidation. Specifically, RegenOx was proposed for the ISCO program, and Hydrogen Release Compound (HRC) was proposed for the EISB program. The plan called for three consecutive rounds of ISCO injection through 16 injection points, and one follow up EISB injection.

In February 2008, TRC Environmental Corp. (TRC) was retained to characterize the lithology and delineate the extent of the ground water contamination near the area of elevated concentrations and to assist in the development and implementation of a pilot test of the RegenOx ISCO program proposed in the 2007 CAP Addendum. An ISCO Pilot Test Work Plan was generated by TRC, submitted and subsequently approved by the NYSDEC in June of 2008.

1.2 Site Geology

During soil boring advancement and collection of continuous soil samples at location MW-4s/i, the Site geology was characterized to a depth of 90 feet. Additional lithologic information was collected at locations MW-1i and MW-3i. Figure 3 provides a hydrogeologic cross section for the Site which depicts the lithologic units identified and the depth that ground water was encountered.

Fill material was encountered from surface to approximately 5 to 8 feet below grade. This fill material consisted of poorly sorted brown fine to coarse sand and gravel with varying portions of wood, metal and concrete debris.

The fill material is underlain by fine grey sand with small amounts of coarse sand. This sand layer was loose and water bearing. Thickness of this layer ranged from approximately five to ten feet.

At approximately eighteen feet below grade, a 1 to 3 foot layer of grey to black soft silt and clay was observed. This silty clay unit contained small amounts of fibrous organic material (peat) within thin (0.25 inch) laminations. Trace amounts of shell fragments were also found within this silty clay layer at the MW-1i location.

The silty clay unit is underlain by light brown to green unconsolidated fine to coarse sands and rounded gravels to twenty-one feet. Silt and clay content within the sand increased with depth from approximately thirty feet to a second clay unit, encountered around thirty seven feet.

The lower clay unit was encountered across the Site at a depth of thirty seven feet. The clay unit consists of dark grey soft clay with occasional trace amounts of interbedded sand or silt and trace amounts of shell fragments. Thickness of this layer on Site is approximately seventeen feet, as observed at MW-4s.

Brown to gray, fine to medium sand was encountered under the lower clay unit at a depth of approximately 54 feet below grade. The sand layer was observed to be loose to medium dense. The sand was encountered from 54 feet to 90 feet below grade, where the boring was terminated. The thickness of this layer cannot be approximated as the unit was still encountered when the boring was terminated.

1.3 ISCO Pilot Test

TRC prepared and submitted to NYSDEC an ISCO Pilot Test Work Plan (Work plan) dated June 2008. The Workplan Described:

- The investigative activities conducted in April and May 2008, to evaluate the ground water quality and hydrogeologic conditions at the Site;
- The proposed ISCO Pilot Test field procedures and activities;
- The post injection ground water monitoring program; and
- Remedial Schedule

The objectives of the ISCO pilot test included:

- Evaluation of the oxidant (RegenOx) dosage and loading rates; and
- Evaluation of hydraulic control over the treatment area during injection and the performance of a push-pull ISCO injection approach.

NYSDEC approved the Work Plan and remedial schedule in a correspondence dated July 3, 2008.

In addition, TRC submitted to the US Environmental protection Agency (USEPA) for review and approval of an ISCO injection pilot test application under the NPDES-UIC program. The USEPA approved the permit-by-rule application for the ISCO pilot test injection in a correspondence dated August 5, 2008.

The pilot test program included the following tasks:

- Installation of two shallow piezometers PZ-1 and PZ-2 and intermediate piezometer PZ-3 for ground water monitoring;
- A tidal study;
- A short-term pumping test to assess sustainable pumping rates during the ISCO injection program;
- ISCO injection; and
- A soil and ground water monitoring program

Table 1 provides a time line for the completion of pilot test activities.

2.0 PILOT TEST FIELD PROGRAM

2.1 Piezometer Installation

On July 28, 2008, TRC mobilized to the site to oversee the installation of three piezometers for ground water quality and hydraulic response monitoring before, during and after the pilot test. Land, Air, Water Environmental Services, Inc. (LAWES), from

Center Moriches, NY installed piezometers PZ-1, PZ-2 and PZ-3 in the pilot test area between July 28 and 29, 2008. Figure 2 presents the layout of the newly installed piezometers, and Figure 4 presents a layout of the pilot test area.

Piezometers PZ-1 and PZ-2 were installed in the shallow overburden formation to a depth of approximately 13 feet below surface grade, where the uppermost clay layer was encountered. Split spoon samples were collected and used to visually evaluate the soil types in the boring, and the completion depth of the piezometers. The piezometers were installed using a hollow stem auger drill rig. Both wells were screened from approximately 3 to 13 feet below grade with 2-inch diameter, 0.010 slot screen, and were finished with a stick-up type protective casing.

Piezometer PZ-3 was installed to a depth of approximately 38 feet below grade. The well was installed with double casing to mitigate the potential for cross contamination between the upper and intermediate overburden zones. The outer 4-inch PVC casing was installed using a hollow stem auger to a depth of approximately 24 feet, and was terminated within the upper confining clay layer. The annulus of the outer casing was grouted using cement/bentonite and allowed to cure for 24 hours. Piezometer PZ-3 was completed with an inner 2-inch diameter PVC riser and well screen installed through the outer casing using the mud rotary drilling technique.

The piezometers were surveyed along with all other existing on-site monitoring wells using a New York State licensed surveyor.

The three piezometers were developed by purging the wells until the discharged water was visually clear of sediment. Approximately 50 gallons of development water were generated from both PZ-1 and PZ-2, and 100 gallons were generated during the PZ-3 development. The development water was containerized in 55 gallon drums.

The well construction logs are presented in Appendix A, along with the soil boring logs generated during the well installation. Table 2 presents a summary of the on-site monitoring constructions.

2.2 Tidal Study

After the piezometers were allowed to stabilize for two weeks and pre-injection ground water samples were collected, a 120-hour tidal study was initiated at the site. The tidal study was conducted to assess the potential tidal influence of both the Jamaica Bay and the Atlantic Ocean on the local ground water level and flow patterns at the site. Weather data was collected from the nearby John F. Kennedy Air Port station to assist in the evaluation of the ground water flow regime during this program.

The study was conducted by placing water level measuring data loggers in MW-1s, PZ-1, and PZ-2 to monitor the shallow overburden water-bearing zone, and MW-1i and PZ-3 to monitor the intermediate overburden water-bearing zone. The data loggers were Level Troll models manufactured by In-Situ Inc., which are pressure transducers that measure and record the height of the water column above the sensor. The level loggers were placed close to the bottom of the wells, and set to record ground water levels at one minute intervals. Prior to the initiation of the test, the internal clocks of the level loggers were synchronized to ensure that data readings were collected at the same time. The level loggers remained in the wells until the completion of the pilot test.

2.3 Short-Term Pumping Tests

Short term pumping tests were conducted on monitoring wells MW-4s and MW-4i on August 19, 2008. The pumping tests were conducted to assess:

- The hydraulic relationship between the upper and intermediate overburden ground water zones;
- Sustainable pumping rates for ground water control during the pilot test;
- Equipment and tank sizes for use during the pilot test; and

The pumping tests were conducted for approximately one hour each. Flow totalizers were used to monitor and record the volume of water extracted from each well. Ground water extracted during the short-term pumping tests was collected in an on-site 10,000-gallon holding tank mobilized to the site for use during the field program.

The duration of the pumping tests was shortened due to interruptions of equipment operations on August 18, 2008.

Ground water extraction rates greater than 4.6 gpm were estimated to be sustainable in the short term. Ground water extraction from MW-4s was observed to have no impact on ground water levels in piezometer PZ-3. Accordingly, ground water levels in the intermediate overburden water-bearing unit in the immediate vicinity of the pumping well did not decline due to pumping and water level drawdown in the shallow overburden water-bearing unit. Likewise, pumping from the intermediate well MW-4i also did not result in a decline in ground water levels in nearby shallow piezometers PZ-1 or PZ-2. While ground water levels in intermediate well MW-4i were declining due to the short-term pumping test at MW-4i, ground water levels at shallow piezometers PZ-1 and PZ-2 were recovering following the short-term pumping test at the shallow well MW-4s. No delay in the recovery was noted, indicating that extraction from the intermediate zone would not influence ground water levels in the shallow zone. Figure 5a and Figure 5b display the ground water level responses during the pumping tests.

Data from the pumping test were analyzed to estimate the hydraulic conductivity of the shallow and intermediate zones. Analysis was conducted using the ISOAQX hydrogologic ground water program, by HydraLogic, Inc. The pump tests were analyzed using draw down curve fitting and Theissian techniques. Analysis on two shallow pumping tests was conducted assuming unconfined conditions, and analysis on the intermediate zone was conducted assuming confining conditions. Calculated hydraulic conductivity values for the shallow zone ranged from 43.9 ft/day to 97 ft/day, with an average value of approximately 65 ft/day. The results from the analysis of the intermediate zone pumping test indicated a range of hydraulic conductivities between 3.6

and 9.4 ft/day, assuming a saturated aquifer thickness of 20 feet. Appendix F presents graphs and summary tables of the pumping test results.

2.4 ISCO Injection Program

2.4.1 Oxidant Selection

The RegenOx oxidation product, manufactured by Regenesis Bioremediation Products of San Clemente, CA, was used for the ISCO pilot test. RegenOx consists of two separate complexes, an oxidant complex and an activator complex. The oxidant portion of RegenOx is a sodium percarbonate/catalytic formulation, whereas the activator complex is a composition of ferrous salt embedded in a micro-scale catalyst gel. Appendix B includes the RegenOx Material Safety Data Sheets (MSDS). RegenOx has a very high activity and is capable of treating a broad range of contaminants in both soil and ground water. Research conducted by Regenesis indicates that the compound can remain active in the subsurface for an extended duration contingent on the contaminant types and concentrations, soil and natural oxidant demand, and other sinks (*i.e.*, competing chemical demands from constituents present within the aquifer).

2.4.2 Ground Water Extraction and RegenOx Solution Preparation

The ISCO pilot test injection program began on August 19, 2008. Extracted ground water from monitoring wells MW-4s and MW-4i was used to prepare an approximately 4% RegenOx solution. Ground water extraction at wells MW-4s and MW-4i was maintained throughout the ISCO injection test, with more water being extracted from wells MW-4s and MW-4i than injected at the ISCO injection points, to establish hydraulic control within the shallow and intermediate water-bearing units in the immediate vicinity of the injection locations. The water used in the injection process was pumped from MW-4s and MW-4i prior to and during the pilot test. Development and purge water from the treatment area wells was also used as mixing water to supplement the ISCO feed water. Approximately 500 gallons of purge and development water was pumped into the holding tank. Approximately 1,500 gallons of excess water remained in the holding tank following the completion of the injection program was characterized and disposed off-site.

The extracted ground water was pumped into an on-site 10,000-gallon steel holding tank before being conveyed into a mixing tank, where ground water was mixed with the RegenOx Part A and B compounds to form a 4% solution by weight. Only the weight of the RegenOx Part A compound was considered for the dosing calculations, as per recommendations from the manufacturer. From the mixing tank, the RegenOx solution was pumped into two injection points, located equidistant from piezometer PZ-1.

A two inch submersible Monsoon pump was placed in each well MW-4s and MW-4i approximately six inches from the bottom of the well. A flow totalizer was placed after the pumps at each extraction well, as well as in between the holding tank and the mixing tank. The holding tank totalizer was used to track the injection solution volume and to determine the RegenOx dosage. Ground water extraction began each day before injection, and continued for approximately one-half hour after injection was completed. Extraction flow rates varied between 1.5 and 4.6 gpm.

RegenOx was mixed with the extracted ground water in a batch mode. Twelve batches of RegenOx dosed ground water were prepared and injected into the subsurface during the pilot test. The batches ranged in volume from 650 gallons to 150 gallons. Typically, multiple batches were mixed for each 5 foot injection interval. The batch volumes were measured using a digital totalizer placed at the effluent port of the holding tank. The mass of RegenOx Part A and B was determined using a mixing ratio of 4% RegenOx Part A by mass. The solution was mixed by circulating water in the mixing tank with a mixing pump. Mixing continued during the injection process for each batch until the volume in the mixing tank was below the influent port of the mixing pump.

During the pilot test, one batch (Batch 9) was mixed with approximately 6% Part A by mass. This resulted in a subsequent batch (Batch 12) having a lower RegenOx concentration (approximately 1%). All other batches were mixed to 4% within a level of accuracy of ±0.4%.

The following table presents a summary of the batch volumes and concentrations. Detailed field data sheets for the mixing batches are presented in Appendix C.

Batch	Interval	Gallons	Buckets of Part A (30 lbs/bucket)	Weight A (lbs)	% RegenOx
1	33-38	500	5.6	168	4.0%
2	33-38	150	1.5	45	3.6%
3	28-33	449	4.5	135	3.6%
4	28-33	200	2	60	3.6%
5	23-28	650	7	210	3.9%
6	18-23	600	6.5	195	3.9%
7	18-23	250	3	90	4.3%
8	13-18	250	3	90	4.3%
9	13-18	254	4	120	5.7%
10	13-18	330	4	120	4.4%
11	8-13	330	4	120	4.4%
12	8-13	326	1	30	1.1%
Total		4,289	46.1	1,383	3.9% (Average)

2.4.3 ISCO Injection

ISCO injection was conducted at two injection points simultaneously. Injection points IP-1 and IP-2 were installed to a depth of 38 feet below grade using a track mounted direct push drill rig (Geoprobe© 66DT).

The injection points were located within a distance of approximately 8 feet from existing monitoring/extraction well MW-4s. Injection proceeded from the bottom up in 5-foot intervals from a depth of approximately 38 feet to 10 feet above grade. Figure 4 depicts the locations of the injection points and relations to the extraction and monitoring wells/piezometers.

The injection proceeded through the drilling rods. A sacrificial plastic tip was placed at the bottom orifice of the drill rods. Before the injection began, the rods were extracted 2 feet to allow the sacrificial tips to fall out, leaving an open rod.

During the pilot test, injection point IP-1 was offset twice a few feet from the initial location due to running sand conditions and clogging of the drill rods. “Day lighting” from the annular space of the injection fluid was occasionally observed when injecting at shallow depths at the relocated injection point IP-1.

Injection was conducted in six discrete 5-foot intervals covering a total length of 30 feet at each injection point. As described above, individual RegenOx solution batches were prepared for each interval. The injection volume was calculated based on the results of laboratory bench scale tests of Total Oxidant Demand conducted on soil samples collected from the treatment area, as described in the *ISCO Pilot Test Work Plan*, submitted to the NYSDEC in June 2008. Because the concentration of RegenOx in solution was maintained near 4% throughout the test, the volume of solution projected for each interval varied for different soil types consistent with the estimated Total Oxidant Demand obtained from the bench scale testing. A large volume of injection solution was injected between depth intervals 13 and 23 feet, where clay with a high organic content has been encountered at the site.

A total of 4,289 gallons of RegenOx solution was injected within the treatment area during the pilot test. Approximately 1,383 lbs of oxidant (Part A) was mixed into solution, along with approximately 1,383 lbs of activator compound (Part B). The injection rate was much higher in the intermediate zone, which had an average injection rate of approximately 9 gpm. The shallow zone injection rate was significantly lower, with a maximum sustained injection rate of approximately 4.5 gpm, per injection point. The injection logs for IP-1 and IP-2 are presented in Appendix C. Injection points were grouted and sealed upon completion.

2.5 Pilot Test Monitoring Program

Table 3 summarizes the soil and ground water monitoring program.

2.5.1 Soil Sampling

On August 19, 2008, TRC advanced soil borings PTSB-1 and PTSB-2 in the pilot test area. The boring locations are displayed on Figure 4, and the boring logs are presented in Appendix 1.

On September 3, 2008, TRC advanced post-injection borings PTSB-3 and PTSB-4. The post injection borings were generally co-located with the pre-injection borings (with a maximum off-set of less than two feet).

Two soil samples were collected from each boring. Except for pre-injection test boring PTSB-1, the soil samples were collected at the interface of the shallow clay with the intermediate sand (the clay sample from the bottom of the shallow clay unit and the sand sample from the top of the intermediate sand). The depth to the interface of the bottom of the shallow clay and the top of the intermediate sand varied between approximately 13.5 feet and 25 feet below grade.

At pre-injection boring PTSB-1, the clay sample (PTSB-1-1) was collected above an intervening sand lens within the clay unit at a depth of approximately 18 to 18.5 feet below grade. The sand sample at this boring, PTSB-1-2, was collected from the approximately 9-inch thick intervening sand lens within the clay. This sand lens was not encountered in the corresponding post injection PTSB-3, which had a thicker clay unit. The interface of the shallow clay and intermediate sand at post injection boring PTSB-3 was encountered at a depth of approximately 25 feet below grade due to the relatively larger thickness of the shallow clay unit.

While the lithology of pre-injection boring PTSB-2 and corresponding post injection boring PTSB-4 were marginally different, the pre- and post-injection samples from these borings were collected at comparable depths. The pre-injection clay and sand samples (PTSB-2-1 and PTSB-2-2) were collected from depth intervals of approximately 15.5-16 feet and 16-16.5 feet below grade, respectively. The post injection clay and sand samples (PTSB-4-1 and PTSB-4-2) were collected from depth intervals of approximately 13-13.5 feet and 13.5-14 feet below grade, respectively. No intervening sand lenses were encountered at either the pre- or post injection borings.

The soil samples were analyzed for VOCs and total organic carbon (TOC). The clay samples were also submitted for geotechnical analysis for Atterberg Limits.

2.5.2 Ground Water Monitoring

The pilot test ground water monitoring program encompassed collecting ground water samples from wells MW-4s and MW-4i, and from the new piezometers, PZ-1, PZ-2 and PZ-3 for laboratory analysis. Baseline ground water samples were collected from these five wells/piezometers on August 13, 2008. Post injection samples were collected on August 27, September 3 and September 17, 2008, corresponding to one week, two weeks and one month after the ISCO injection.

Ground water samples were collected using the volume averaging technique during all sampling events. Samples were analyzed for priority pollutant volatile organic compounds (VOCs).

3.0 GROUND WATER HYDRAULIC ASSESSMENT

3.1 Tidal Study Results

In-Situ Inc. Level Loggers were placed in MW-1i, MW-1s, PZ-1, PZ-2 and PZ-3 on August 13, 2008.

Figure 6 presents a summary of water level hydrographs obtained during the tidal study.

Based on water level measurements, only intermediate wells MW-1i and PZ-3, exhibited a minor response to tidal fluctuations in nearby surface water. The maximum water level change at MW-1i due to tidal fluctuations was estimated to be approximately 0.1 foot. The maximum water level change in PZ-3 due to tidal influence was approximately 0.35 feet. The period of the tidal fluctuations was the same in both PZ-3 and MW-1i, indicating that the tidal fluctuation is coming from the same water body (i.e. Jamaica Bay or the Atlantic Ocean).

Water levels at all other on-site wells/piezometers monitored during the study exhibited no response to tidal fluctuations. The data further indicates that the shallow overburden water-bearing unit is not hydraulically connected to the Jamaica Bay or the Atlantic Ocean.

A review of water levels indicates that water level changes due to tidal fluctuations did not result in any pronounced changes in ground water flow patterns/directions in either the shallow or intermediate overburden water-bearing units or between/across the two units. The effects of the tidal fluctuations observed in the intermediate zone are anticipated to result in a northerly or southerly shift in the overall ground water flow direction, but not a complete reversal of flow.

Precipitation occurred during the tidal study resulted in water level changes both within the shallow and intermediate overburden water-bearing units. A more pronounced, localized response to rainfall was observed at intermediate well MW-1i than at other monitoring locations. Water level changes due to precipitation apparently had some temporary effects on the vertical ground water potential/pattern. The hydrographs indicate that the two consecutive rainfall events cumulatively resulted in a local reversal of the vertical ground water flow patterns/gradients from upward to downward.

3.2 Hydraulic Connection Between the Shallow and Intermediate Units

The results of the short-term pumping tests indicate that ground water extraction from the shallow zone was observed to have no impact on ground water levels in the intermediate unit. Likewise, pumping from the intermediate zone also does not seem to influence ground water levels in the shallow unit. Accordingly, the shallow and the intermediate units may have a direct hydraulic connection within the ISCO test area due to the presence of the confining organic clay unit.

3.3 Ground water Elevations and Flow Patterns

Ground water elevation contour maps were developed using water elevation data collected on July 30 and September 3, 2008. Separate ground water contour maps were generated for the shallow and intermediate zone monitoring wells and piezometers. Figures 7 and 8 present the shallow and intermediate contour maps, respectively. The contour maps depict the ground water elevation in reference to the NAVD 88 elevation datum.

Ground water elevations in the shallow zone ranged from approximately 1.5 to 2.3 feet above mean sea level. In both contour maps, the general ground water flow direction is to the north west, towards Jamaica Bay. The average hydraulic gradient ranged from approximately 0.0034 feet/foot in the July 2008 map and approximately 0.0025 feet per foot in the September 2008 map. The shallow zone water bearing unit is considered unconfined. Local surface water pathways and recharge zones, like the drainage swale along the western property boundary may effect the local ground water flow directions. Precipitation events during the tidal study were seen to raise the ground water elevation in the shallow zone.

Ground water elevations in the intermediate zone ranged from approximately 1.31 to 1.43 feet above mean sea level. In both contour maps, the general ground water flow direction is towards the west. The July 30, 2008 contour maps show a south western component to the ground water flow. The average hydraulic gradient for both events was approximately 0.0008. During the tidal study, ground water elevations in monitoring well MW-1i was observed to fluctuate by approximately 0.1 feet through the course of a tidal cycle. This fluctuation in MW-1i would not greatly alter the ground water flow direction, but rather impart a south westerly flow in the water bearing unit. The intermediate zone ground water is considered to be confined due to the presence of the organic clay unit between the two zones. Additionally, the difference in ground water elevations, gradient and flow direction would indicate that the two zones do not share a local direct hydraulic connection.

Temporary and localized changes in local ground water flow patterns may be observed following sustained precipitation (contingent on rain intensity and duration). The magnitude of these changes is influenced by variability of soil hydrogeologic conditions (lithology, hydraulic characteristics, and presence of subsurface preferential pathways) and proximity to regional and local discharge zones (*i.e.,* Bay, Ocean, and local stormwater ditches and channels).

3.4 Hydraulic Control during ISCO Pilot Test Injection

A hydraulic deficit was maintained within the ISCO injection area with more ground water being extracted from wells MW-4s and MW-4i than injected at the ISCO injection points, to maintain hydraulic control within the shallow and intermediate water-bearing units in the immediate vicinity of the injection locations. Ground water level depression due to pumping was observed during the pilot test. Ground water extraction, in particular from MW-4s, induced an inward gradient from PZ-1 and PZ-2, which demonstrates hydraulic control within the treatment area. Ground water levels in PZ-3 remained unchanged during the test, indicating that the water from the intermediate zone was not pushed beyond the treatment area during the test. This is further supported by contaminant and geochemical parameter behaviors at PZ-3 through the post injection monitoring period as demonstrated in Section 4.2 below. Figure 9 depicts the ground water elevations during the pilot test.

4.0 ISCO PILOT TEST MONITORING RESULTS

4.1 Soil Sampling Results

Soil sample results are presented in Table 4.

4.1.1 Geotechnical Analysis

Geotechnical analysis conducted on pre- and corresponding post-injection clay samples PTSB-1-1 and PTSB-3-1, collected from different depth intervals within the shallow clay unit, indicate that there is a difference in the clay content and type between the two samples. The shallower sample PTSB-1-1 was classified as clayey silt, whereas the deeper sample PTSB-3-1 was classified as silty clay. The Atterberg limits analysis for these samples shows that PTSB-3-1 has a higher plasticity index and a lower liquidity index than PTSB-1-1. Additionally, laboratory analysis indicates that the TOC content in the pre-injection shallower sample PTSB-1-1 (19,500 ppm) is lower than that for the post injection deeper clay sample PTSB-3-1 (38,900 ppm). Accordingly, the lower portion of the shallow clay unit at this location is characterized with higher organic and clay content and plasticity than those for the upper portion.

Geotechnical analysis on clay samples PTSB-2-1 and PTSB-4-1 collected from the other pre- and post injection soil borings, respectively indicates that both clay samples were the same soil type. Both clay samples were classified as clayey silts. Atterberg limit analysis on the pre-injection PTSB-2-1 and post injection PTSB-4-1 clay samples did not indicate a loss of plasticity in the clay. The liquid limit and plasticity index results were higher in the post injection sample than those obtained for the pre-injection sample, indicating that the soil plasticity characteristics may not be affected ISCO injection.

4.1.2 Total Organic Carbon

The TOC content in pre-injection clay samples ranged between 19,500 ppm and 34,300 ppm, which corresponded to a Fraction Organic Carbon (f_{oc}) of approximately 2% and 3.4%. The TOC content in pre-injection sand samples varied between not detectable and 1,070 ppm (which corresponds to f_{oc} of 0.1%).

The TOC content in post-injection clay samples ranged between 1,750 ppm and 38,900 ppm, which corresponded to f_{oc} of approximately 0.18% and 3.9%. The TOC content in post-injection sand samples was not detectable.

A comparison of the results for both clay and sand samples from pre- and post injection borings PTSB-2 and PTSB-4, respectively, indicates that ISCO injection locally reduced the TOC content, and that some of the oxidant was consumed for oxidation of the natural organic matter within the soil at this location. The reduction of TOC content usually results in a reduction of soil sorption capacity for contaminants.

However, based on the results of clay sample from post injection boring PTSB-3-1, the TOC at that location might have not experienced the same level of TOC reduction.

4.1.3 Chemical Laboratory Results

Chemical laboratory analysis of pre-injection soil samples PTSB-1-1 (clay) and PTSB-1-2 (sand) detected CVOC at trace levels only. However, the corresponding post-injection samples PTSB-3-1 (clay) and PTSB-3-2 (sand) had much higher COVC concentrations. This difference in CVOC concentrations may be due to the difference in sample depths and the corresponding difference in soil characteristics (*i.e.*, lithology and TOC) within a very short distance. These CVOC results suggest a locally variable contaminant distribution within the clay unit and immediately underlying sand with higher CVOC concentrations within the lower portion of the clay unit than in the upper portion in this area. The higher CVOC concentration may be related to the higher TOC content and corresponding higher contaminant sorption capacity in deep sample PTSB-3-1 than those in the shallower clayey silt sample in PTSB-1-1. This significant variability in soil characteristics and response (TOC content and CVOC concentrations) made it difficult to assess the potential oxidation effect on the soil quality near the clay-intermediate sand interface at this location.

Chemical laboratory analysis of soil samples from the location of pre-injection boring PTSB-2 and post injection boring PTSB-4 shows a significant reduction in CVOC concentrations in post injection soil samples. TCE concentrations in the clay samples were reduced from 3.78 mg/kg pre-injection (PTSB-2-1) to 0.0114 mg/kg post injection (PTSB-4-1). This decrease in CVOC concentrations was also accompanied with a large reduction in the TOC content as indicated above. The decrease in both CVOC and TOC concentrations indicates that the oxidant reached this area and was active during the pilot test. These results further indicate that the extent of influence of ISCO injection within the intermediate unit extended to a distance between 15 and 20 feet.

Overall, CVOC concentrations in the sand sample from the area of post-injection boring PTSB-4-2 were lower than those in the pre-injection sample PTSB-2-2. Total CVOC concentrations were reduced from approximately 21.4 mg/kg to 4 mg/kg. However, the TCE concentration increased in the post-injection sand sample, from 0.23 to 2.57 mg/kg. This increase may be related to desorption of TCE (and the reduction of sorption capacity as manifested by the reduction of TOC content) from the overlying clay unit.

4.2 Ground Water Geochemical Parameters

Ground water geochemical parameters were measured and recorded during the pilot test sampling activities. Ground water purge forms from the sampling events are provided in Appendix D. Graphs of specific geochemical parameters are presented as Figure 10. Changes in several geochemical parameters throughout the monitoring period are discussed below.

pH Measurements

Measurements of pH at the monitoring points showed little change between the baseline (pre-injection) sampling and the first post-injection sampling events. The second post-injection sampling event showed increases in pH ranging from 1.43 to 3.94 standard units (s.u.). The pH increase is attributed to alkaline conditions induced by the carbonate and iron content in the oxidant and the activator, respectively. Measurements in the third post injection sampling event indicate pH returned to near baseline conditions. The decline of pH levels is attributed to the precipitation of carbonate and iron and dissipation of oxidation capacity.

Salinity

Salinity measurements remained nearly constant throughout the sampling period, with the exception of PZ-1. Measurements from PZ-1 show a sharp increase in salinity from a pre-injection level of approximately 0% to a post injection maximum of 1.22% in the first post-injection sampling event likely due to an increase of chloride from the degradation and reductive dechlorination of CVOC. Salinity levels returned to near baseline conditions in the third post-injection sampling event.

Dissolved Oxygen

Concentrations of dissolved oxygen (DO) generally increased in the first post-injection sampling event. Monitoring points PZ-2 and PZ-3 showed a mild increase in DO after injection; however, the other monitoring points exhibited a DO increase of 3 to 6 mg/L. During the second post-injection sampling event, DO levels in all monitoring points decreased below the baseline levels to approximately 1 mg/L. This sudden decrease in DO levels is indicative of the development of reducing conditions likely due to consumption of oxygen by the carbonate and increased microbial activities. The results of the third post-injection sampling event indicated that DO levels returned to near pre-injection levels. The changes in DO levels suggest chemical oxidation remained active for at least one to two weeks.

Oxidation/Reduction Potential

Oxidation/Reduction Potential (ORP) levels for the first post injection sampling event were higher than baseline levels in MW-4s, MW-4i and PZ-1 event. After the first post-injection sampling event, ORP levels dropped or returned to pre-injection levels in MW-4s, MW-4i, PZ-1 and PZ-2. Through the monitoring period, ORP readings only reach positive levels in MW-4s for one sampling event. Generally, lower ORP levels were obtained in the shallow unit than in the intermediate unit. The post injection decline of ORP levels indicates that oxidizing conditions persisted in the treatment area for a period between one to two weeks followed by the development of reducing conditions.

Temperature

Temperature readings during the post-injection sampling events remained relatively stable. An increase in temperature at all monitoring points, with the exception of PZ-3 was observed during the third post-injection sampling event, potentially due to weather conditions on the sampling day. No significant increase in temperature was observed as a result of ISCO injection, which is indicative of absence of strong exothermic reactions associated with the use of activated percarbonate.

4.3 Ground Water Analytical Results

Table 5 presents the results for the ground water samples.

Chlorinated VOCs (CVOC), including tetrachloroethylene (PCE), trichloroethylene (TCE), cis-1,2-dichloroethylene (c-DCE), trans-1,2-dichloroethylene (t-DCE), vinyl chloride (VC), 1,1-dichloroethylene, (1,1-DCE), 1,1-dichloroethane (1,1-DCA), and chloroform were detected in the ground water samples. Concentrations of TCE and its breakdown daughter products c-DCE and VC were substantially higher than those for other CVOC. Petroleum related VOC including benzene, toluene, ethylbenzene, and xylenes (BTEX) were also detected in several ground water samples, however their concentrations were significantly lower than those for COVC, and were not the focus of this pilot test.

The highest concentration of total COVC was detected in monitoring well MW-4i. TCE concentrations in this MW-4i increased between the May 3, 2008 sampling event and the pre-injection, baseline sampling event form 97,300 μg/L to 302,000 μg/L. This increase occurred before ISCO injection, and as such is not considered to be related to the pilot test.

With the exception of PZ-3, COVC concentrations increased in all monitoring points one week after the ISCO. The increase in COVC concentrations, in particular TCE concentrations, is most likely a result of residual contaminant dissolution and contaminant desorption from the soil to the ground water. Available literature[1,2] indicates that the increase in dissolved phase contaminant concentrations after ISCO has been attributed to the reduction in the fraction of organic carbon (f_{oc}) from the oxidation process. The f_{oc} for a soil is directly proportional to the partitioning of organic contaminants to the soil surface through the relationships:

$$C_a = C_s \text{ x } K_d$$
$$K_d = f_{oc} \text{ x } K_{oc}$$

Where:

C_a = Adsorbed Phase Concentration
C_s = Dissolved Phase Concentration
K_d = Partition Coefficient
K_{oc} = Contaminant Specific Organic Carbon Partition Coefficient

The above equations show that a decrease in the f_{oc} will drive contaminants into the dissolved phase from sorbed and residual phase. Literature also suggests that increase in pH may also adjust the partitioning of contaminants from the adsorbed phase to the dissolved phase. An increase in pH was observed during the second post-injection sampling event. Thus, such pH adjustment may be responsible for the continued local increase of dissolved TCE concentrations. The combined effect of the above processes serves as an equivalent chemical-surfactant effect that avails more contaminant mass into the dissolved phase. In most remediation scenarios the slow desorption of contaminants from the soil surface is the limiting process for contaminant remediation. The equivalent chemical-surfactant effect, by increasing the dissolved phase concentrations, avails more contaminant mass for oxidation and degradation, thereby expediting the contaminant desorption rate and subsequent degradation.

The increase of TCE concentrations observed one week after injection was followed by a decrease in TCE concentrations, especially in monitoring points closest to the injection

[1] Principals of Chemical Oxidation Technology for the Remediation of Groundwater and Soil, March 2007
[2] Technical and Regulatory Guidance for In-Situ Chemical Oxidation of Contaminated Soil and Ground Water" ITRC 2001

points. The increase of TCE concentrations coincided with or followed by a substantial increase of c-DCE and vinyl chloride concentrations likely due to reductive dechlorination of TCE as a result of the reducing conditions that developed rapidly following the dissipation of oxidation capacity. This response indicates that chemical oxidation was active within the treatment area for a period of one to two weeks. An assessment on molar basis indicates the increase of c-DCE concentrations was roughly equivalent to the decrease in TCE concentrations at these locations.

For piezometers distant from the injection points (*i.e.*, PZ-2 and PZ-3), a different behavior was observed contingent on the distance from the injection points and the relative hydraulic alignment (*i.e.*, downgradient or side-gradient) of the area of elevated contaminant concentration. Concentrations of c-DCE and vinyl chloride in piezometer PZ-2 initially increased but then decreased to levels below those obtained during the pre-injection sampling event, while TCE concentrations marginally increased.

Ground water samples collected from PZ-3 did not follow the same trends as in the other monitoring points. The one-week post injection sampling event indicated a sharp decline in CVOC concentrations in PZ-3 after the pilot test, with concentrations of TCE, c-DCE and vinyl chloride all dropping at least by 30%. The second post-injection sampling event showed an increase in all COVC concentrations, with TCE and c-DCE increasing to concentrations above the baseline level. This initial decline of CVOC concentrations is attributed to the active ground water extraction at MW-4i and drawing downgradient water beyond the treatment zone (with lower CVOC concentrations) towards the extraction well. The subsequent increase of CVOC concentrations is attributed to the cessation of ground water extraction and corresponding recovery of natural ground water flow conditions and release of ground water levels with higher CVOC concentrations. The third post-injection sampling event showed a decrease in TCE concentrations and an increase in c-DCE and vinyl chloride. The reduction of TCE concentrations and the associated increase in c-DCE is likely indicative of reductive dechlorination due to the rapidly developed reducing conditions and active biological degradation. An assessment on molar basis indicates the increase of c-DCE concentrations was equivalent to the decrease in TCE concentrations at PZ-3.

The results generally indicate that reductive dechlorination of TCE is likely to be complete and continues through vinyl chloride without stalling at c-DCE level. This observation is demonstrated by the increase and subsequent decrease of vinyl chloride or substantial decline of c-DCE concentrations.

Table 5 presents the ground water sampling results and Figure 11 presents graphs of CVOC molar concentrations versus time for each monitoring point. Appendix E presents graphs of contaminant concentrations, in μg/L, for each well with respect to time.

4.4 ISCO Rate Constant

An estimate of a rate constant for the ISCO program was developed using data from the pilot test, at the request of the NYSDEC. A control volume encompassing the treatment area wells (MW-4s, MW-4i, PZ-1 and PZ-2) was assumed to allow for the estimation of dissolved and adsorbed phase mass. The control volume area was set at 30 feet by 20 feet, and extended from the surface to the top of the lower clay unit, defining the bottom of the intermediate zone. Contaminant mass estimates were developed by using total VOC isoconcentration maps within the control volume. Additionally, the adsorbed phase mass in the upper clay unit was estimated using results from soil samples collected within the clay. An overall estimate of 64.5 lbs of VOCs was developed using data obtained before the pilot test. Appendix G presents the contaminant mass calculations.

The contaminant mass reduction in the dissolved phase due to ISCO was estimated using the drop in contaminant mass observed between the first and second post injection sampling events. A rate of contaminant reduction was determined by assuming that the dissolved phase reduction continued at a steady pace over the 10 day assumed ISCO activity period at the same rate observed between the first and second post injection sampling events on August 27 and September 3, 2008. An estimated total of approximately 1.6 lbs of VOCs was destroyed in the dissolved phase (shallow and intermediate zone). The increase in dissolved phase mass observed in the first post injection sampling event was assumed to be the result of a release in contaminant mass from the upper clay unit in the beginning of the test. The release in contaminant mass from the upper clay unit was assumed to be a result of the destruction of organic carbon in the clay, as observed in the PTSB-2-1 and PTSB-4-1 samples.

The ratio of TOC and VOC mass destruction in the upper clay unit was estimated using two techniques. The initial attempt to quantify both the VOC and TOC destruction in the clay unit involved relating the released VOC mass from the clay unit (increase in dissolved phase mass observed in the first post injection sampling event) to the change in f_{oc} needed to free the related VOC mass. It was estimated that approximately 2.9 lbs (1.32 kg) of VOC was released from the adsorbed phase. The octanol water partition coefficient for TCE was used to estimate the drop in f_{oc}. The calculation estimated an overall destruction of approximately 67 lbs of organic carbon in the clay unit. A relationship between the destruction of organic clay to VOC compounds was assumed to be 3 lbs of organic clay to 1 lb of VOC. With this assumption, 22 lbs of VOCs were destroyed within the clay, resulting in an overall VOC reduction due to oxidation at approximately 24 lbs.

The second method used to estimate the destruction of VOCs within the clay unit was conducted using pre and post injection soil sample results from PTSB-2-1 and PTSB-4-1. The destruction of organic carbon content and VOC mass in the clay was observed using the pre and post test soil sample results, and a relationship between VOC and TOC destruction was developed based on these soil sample results. It was estimated that VOC mass destroyed in the clay unit was 0.45% of the total oxidized mass, indicating that the affinity of the oxidant to the natural organic content was higher than to the VOCs. It was also assumed that due to the limited hydraulic conductivity of the clay unit, the distribution of the oxidant was not complete. Contact efficiencies ranging from 10% to 40% were assumed to develop the rate constant. VOCs mass destruction estimates based on this calculation method ranged from 6.5 to 21 lbs.

The overall VOC destruction estimates from both methods are comparable, indicating that approximately 20 lbs of contaminant mass was destroyed in the treatment zone over the 10 days of ISCO activity. A VOC destruction rate ranging between 0.65 and 2 lbs/day was determined based on the calculations described above. The VOC destruction rate was divided by the estimated contaminant mass within the treatment zone (65 lbs) to develop a reaction rate constant. Rate constants between 0.010 and 0.033 days^{-1} were estimated, resulting in a half life range of 21 to 69 days for the control volume/treatment area.

These mass reduction rates only consider the contaminant mass removal due to ISCO. Evidence of biological degradation of contaminant mass was observed in the post injection pilot test ground water sampling results, indicating that an overall contaminant destruction rate would be higher than what was estimated solely for ISCO.

5.0 SUMMARY OF FINDINGS

- Consistent with the approved Workplan and permit by-rule, a total of approximately 4,289 gallons of RegenOx solution was injected within the treatment area during the pilot test. Approximately 1,383 lbs of oxidant (Part A) was mixed into solution, along with approximately 1,383 lbs of activator compound (Part B).

- The injection of activated percarbonate reduced the total CVOC mass within the treatment area. This was likely due to a combination of oxidation and reductive dechlorination due to biological degradation. The ISCO pilot test destroyed an estimated mass of 20 lbs of VOCs.

- ISCO was successful in oxidizing adsorbed phase contaminants as evidenced in the PTSB-2-1 and PTSB-4-1 soil sample results. Variability in subsurface geology likely resulted in a decrease in oxidant contact efficiency.

- The ISCO process effectively transferred adsorbed and residual contaminant mass into the dissolved phase, availing the CVOC for oxidation and degradation.

- ISCO reduced the total dissolved phase CVOC concentrations.

- The amount of RegenOx compound injected, while near the solubility limit and consistent with Total Oxidant Demand (based on bench scale testing results), was insufficient to fully oxidize and degrade all the contaminant mass within the treatment area. This limitation is likely attributed to the high oxidant demand of the geologic formation. The large oxidant demand is associated with the large sorbed and residual contaminant mass and TOC content, as well as the presence of other oxidizable chemicals (*e.g.*, residual petroleum and metals that consumed the oxidant) within the treatment area.

- ISCO reduced the soil TOC content and corresponding soil sorption capacity for contaminants. The high TOC content in the shallow clay unit resulted in the consumption of oxidant for oxidation of natural organic matter. The heterogeneity of soils on-site affected ISCO effectiveness and efficiency.

- ISCO remained active for a period of approximately one to two weeks. Strong reducing conditions rapidly developed within the treatment area following the dissipation of oxidation capacity. In-situ biodegradation and reductive dechlorination due to the amenable reducing conditions appear to be effective and efficient in degrading CVOC contaminant mass both within along the fringes of the CVOC elevated concentration area. The high TOC content and amenable geochemical conditions (near neutral pH and low ORP levels) within the water-beating units appear to enhance the reductive dechlorination process.

- Hydraulic control and capture of both shallow and intermediate ground water was established during the pilot test. Ground water extraction effectively induced an inward hydraulic gradient during the pilot test.

- The shallow and intermediate water-bearing units are not directly hydraulically connected within the treatment area likely due to the presence of the confining clay layer.

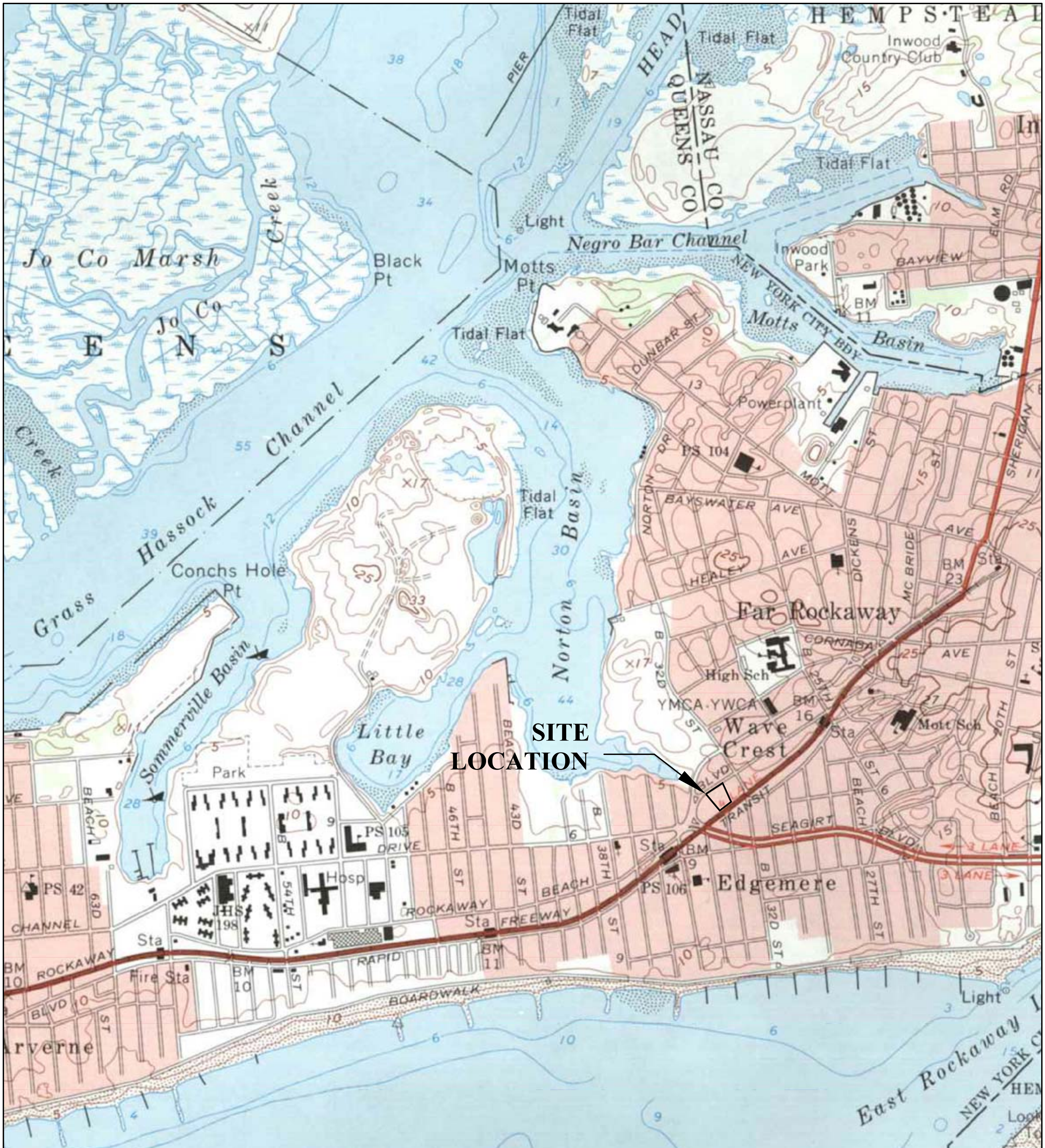
- Tidal fluctuations in nearby surface water bodies have no effect on ground water within the shallow unit at the site. Tidal fluctuations of 0.1 to 0.35 feet were observed in the intermediate zone. The tidal fluctuations in the intermediate wells occurred simultaneously. It is anticipated that the tidal fluctuations change the north/south ground water flow component, however the major ground water flow direction is anticipated to be from west to east in the intermediate zone, based on obtained data.

- The occasional and limited "day-lighting" of oxidant observed during ISCO injection within the shallow unit is characteristic of a locally limited absorption/uptake capacity for large quantities of fluids.

- The mass of total CVOC that was degraded due to ISCO was estimated to vary between 20 and 50 lbs contingent on the sorbed, dissolved and residual contaminant mass

The efficacy of chemical oxidation using activated percarbonate is limited by the high oxidant demand of eth geologic formation. The pilot test results indicate that the combination of ISCO and enhanced in-situ biological degradation (EISB) presents the most effective remedial option. Therefore, the design plan to be submitted to the NYSDEC on November 21, 2008, in accordance with the approved schedule, will include a combined oxidation and biological remediation scheme.

FIGURES



0 1,500 FT.
APPROXIMATE SCALE

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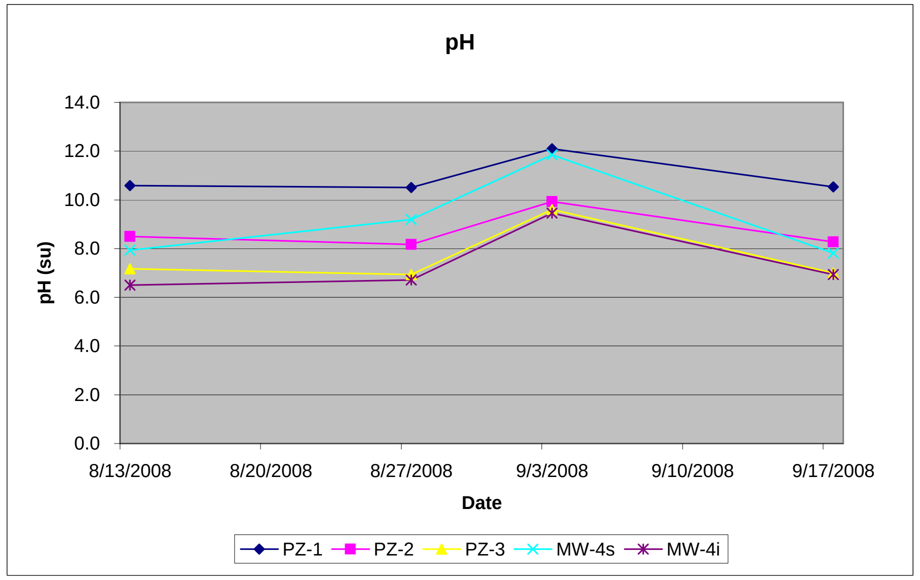
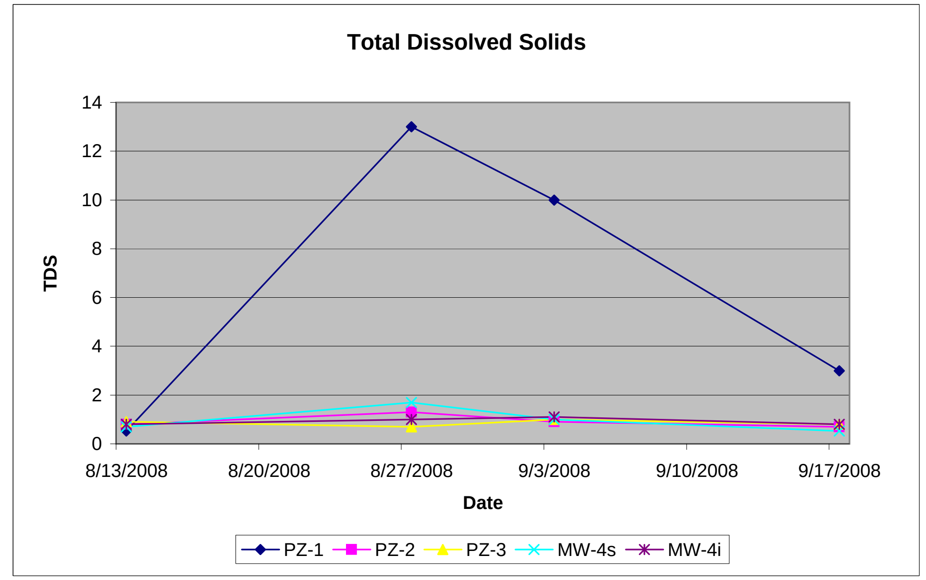
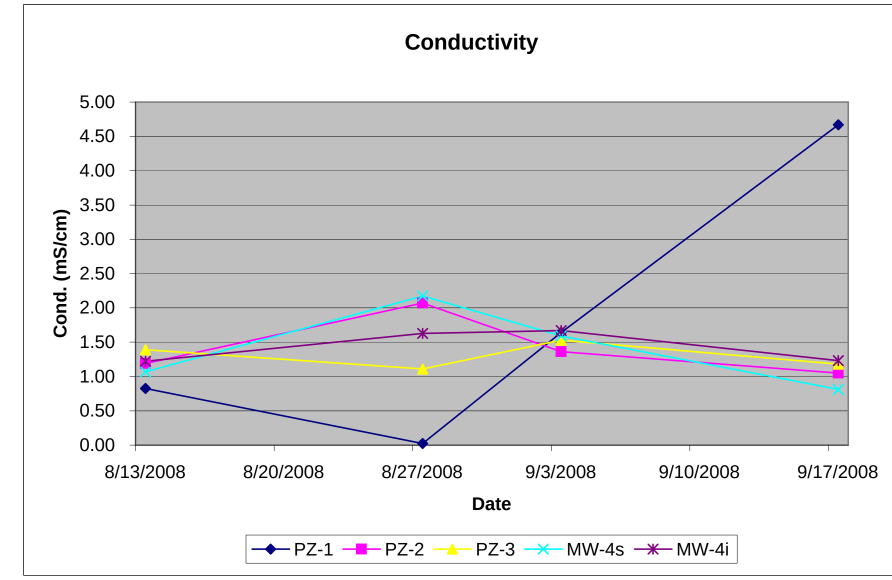
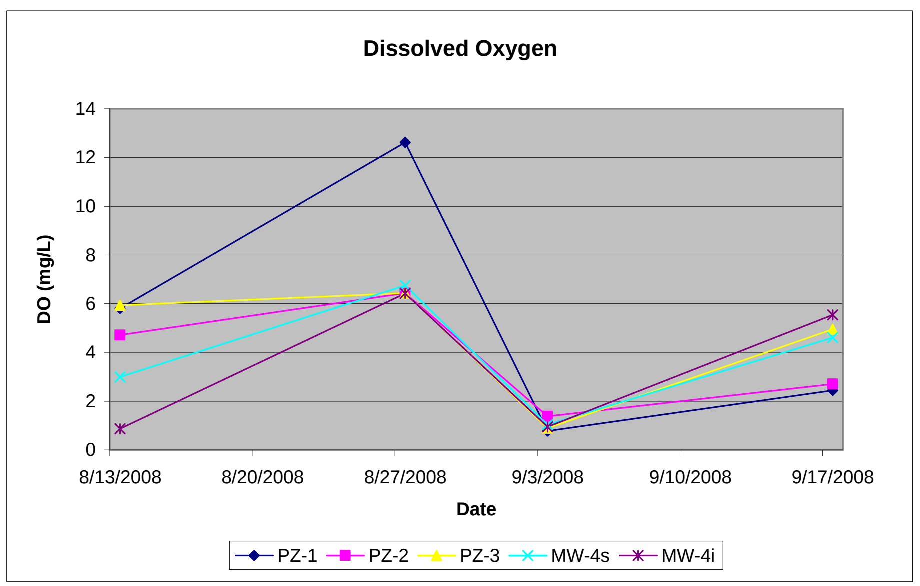
57 East Willow Street
Millburn, New Jersey 07041

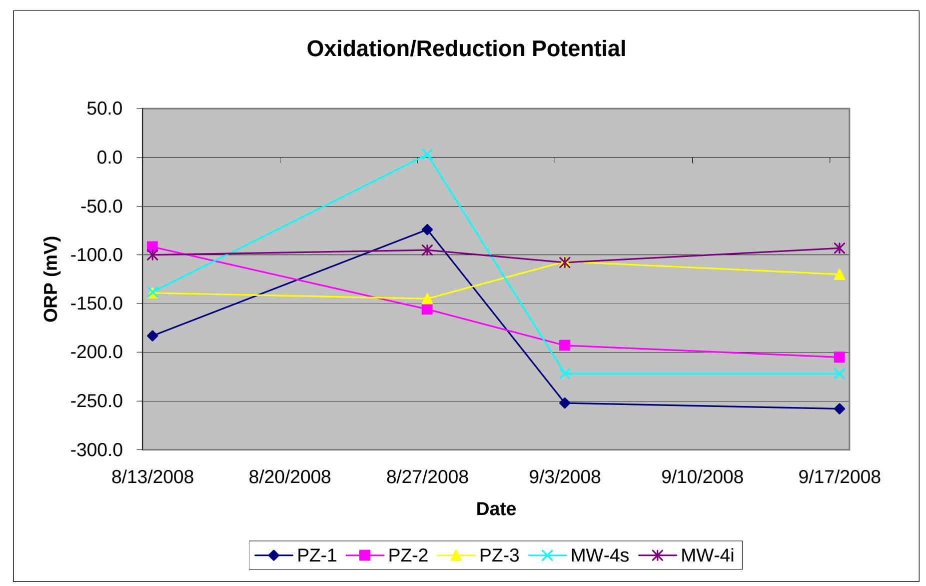
SITE LOCATION PLAN		
CPB – EDGEMERE, NEW YORK		
JOB NO.: 159807		
HN	DATE: OCTOBER 15, 2008	FIGURE: 1

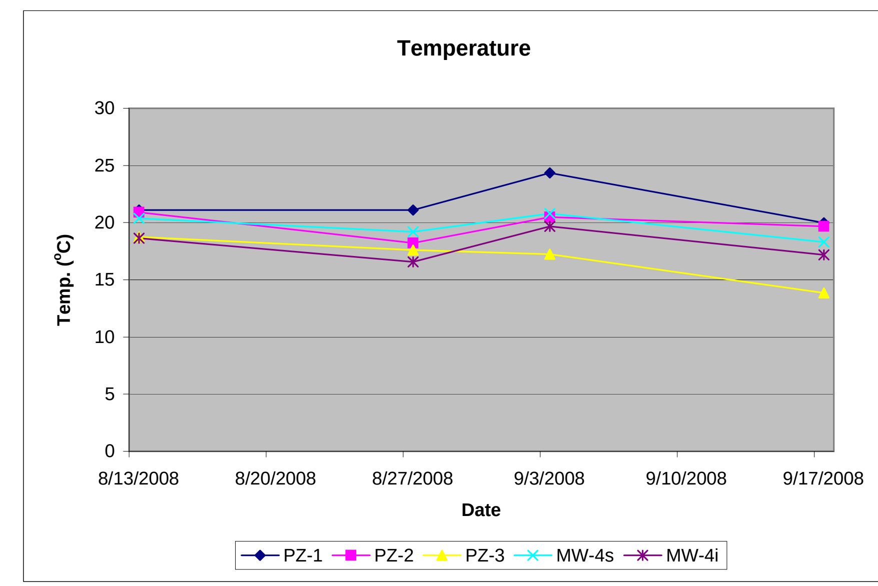












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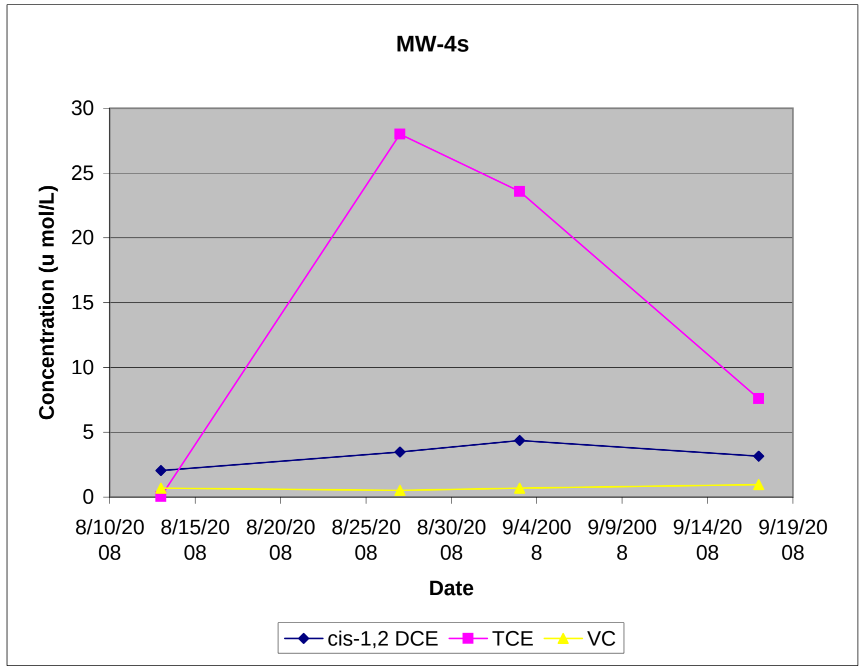
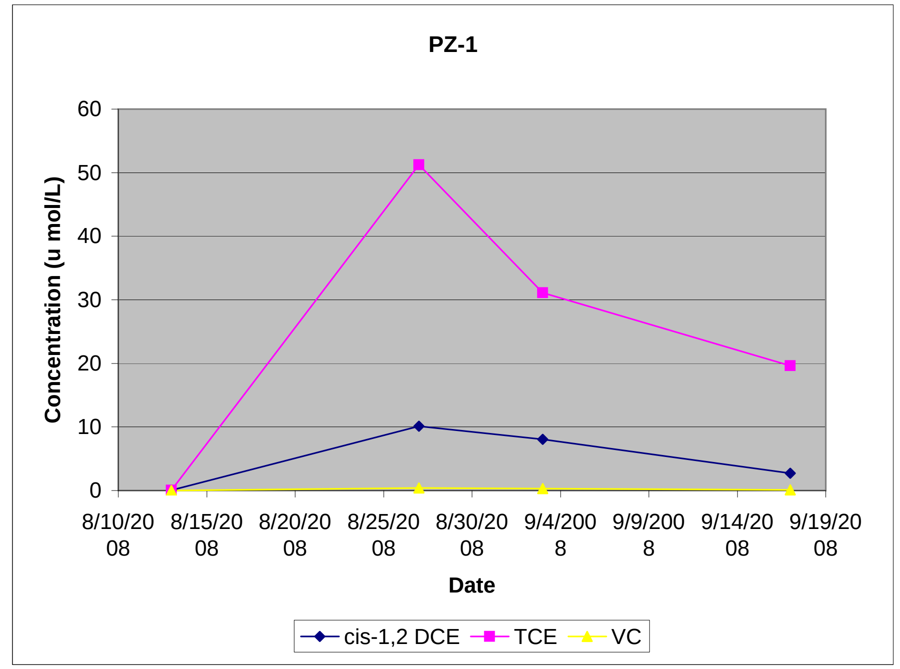
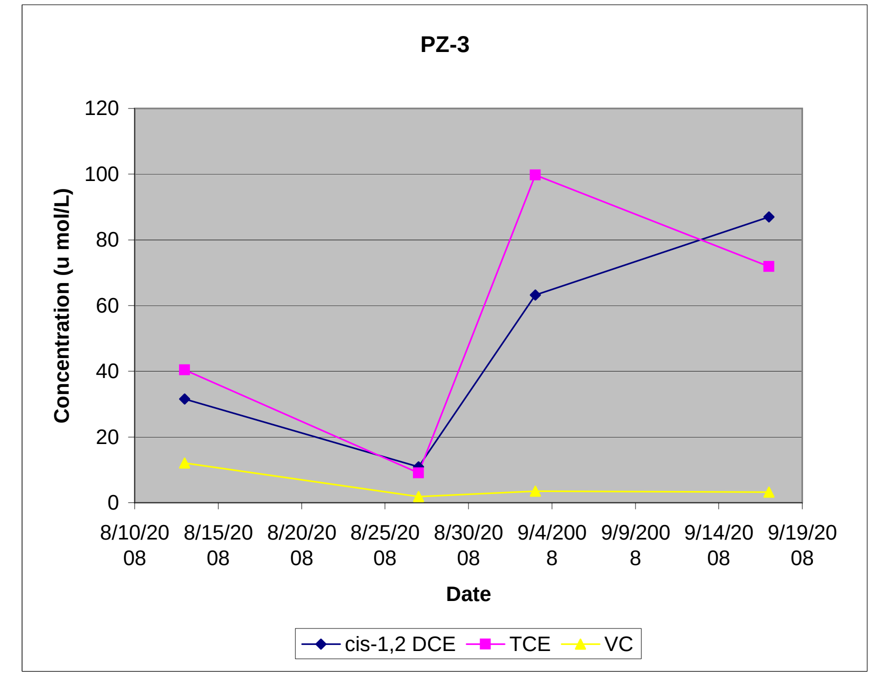
ISCO PILOT TEST GROUND WATER
FIELD GEOCHEMICAL MEASUREMENTS

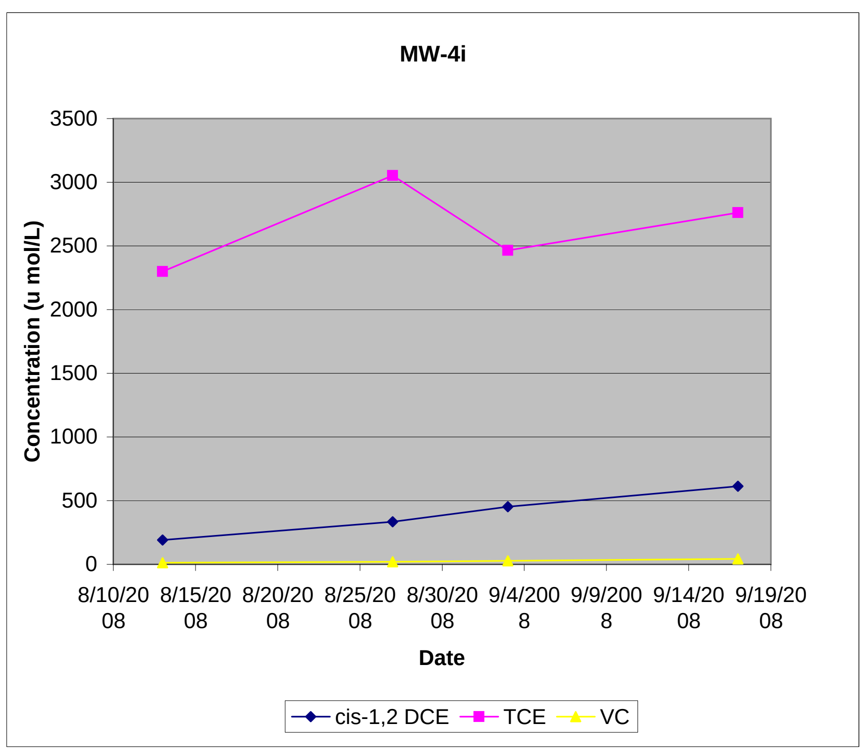
CPB SITE - EDGEMERE, NY
PROJECT NUMBER 159807

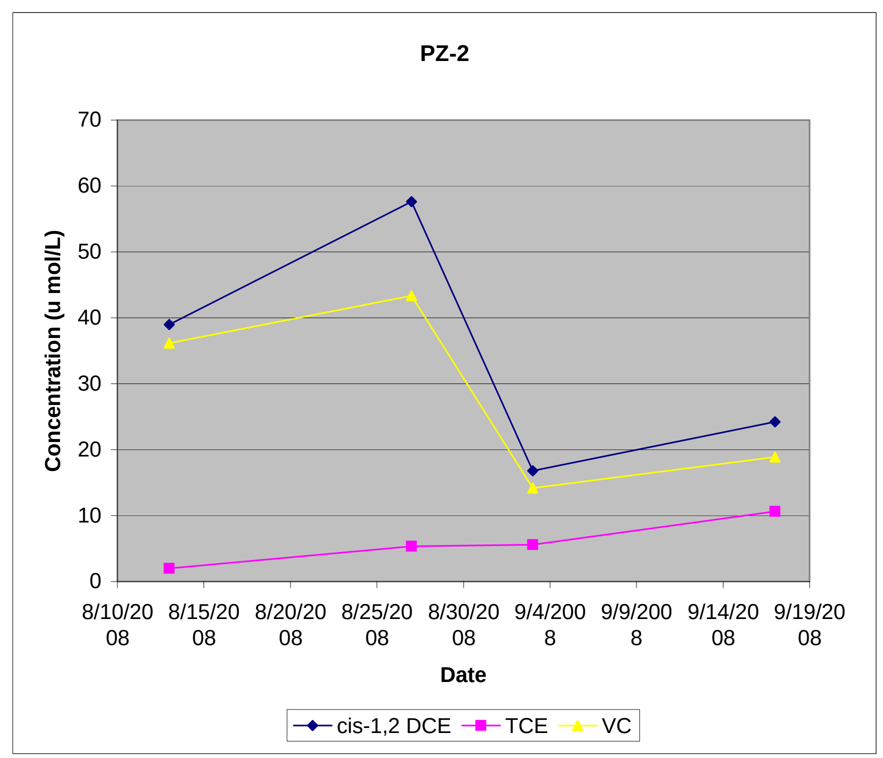
OCTOBER 2008	FIGURE: 10











Molecular Weight of Contaminants

TCE:	131.4	g/mol
cis-1,2-DCE:	97	g/mol
Vinyl Chloride:	62.5	g/mol

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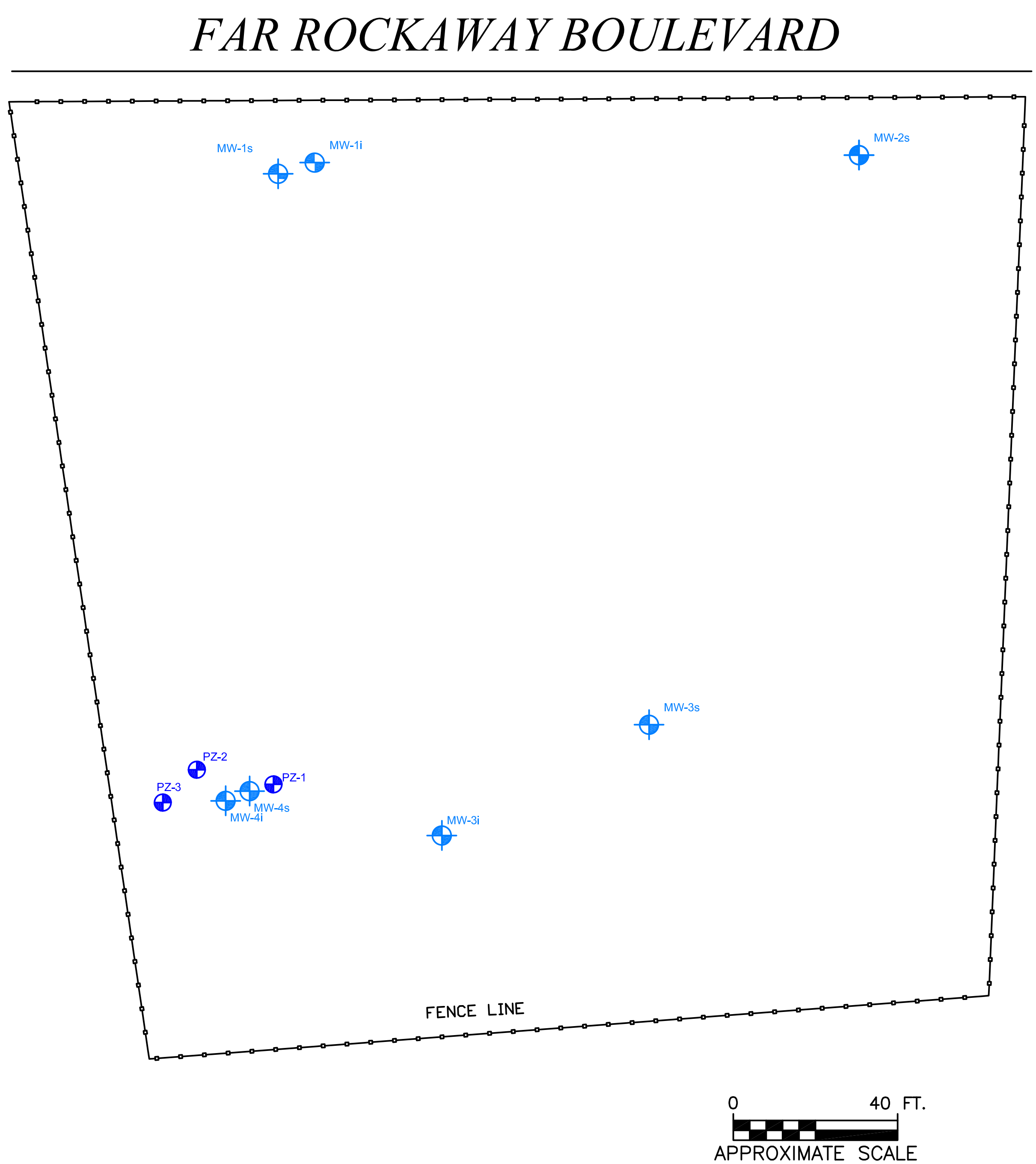
ISCO PILOT TEST GROUND WATER ANALYTICAL RESULTS (MICRO MOLES PER LITER)

CPB SITE - EDGEMERE, NY
PROJECT NUMBER 159807

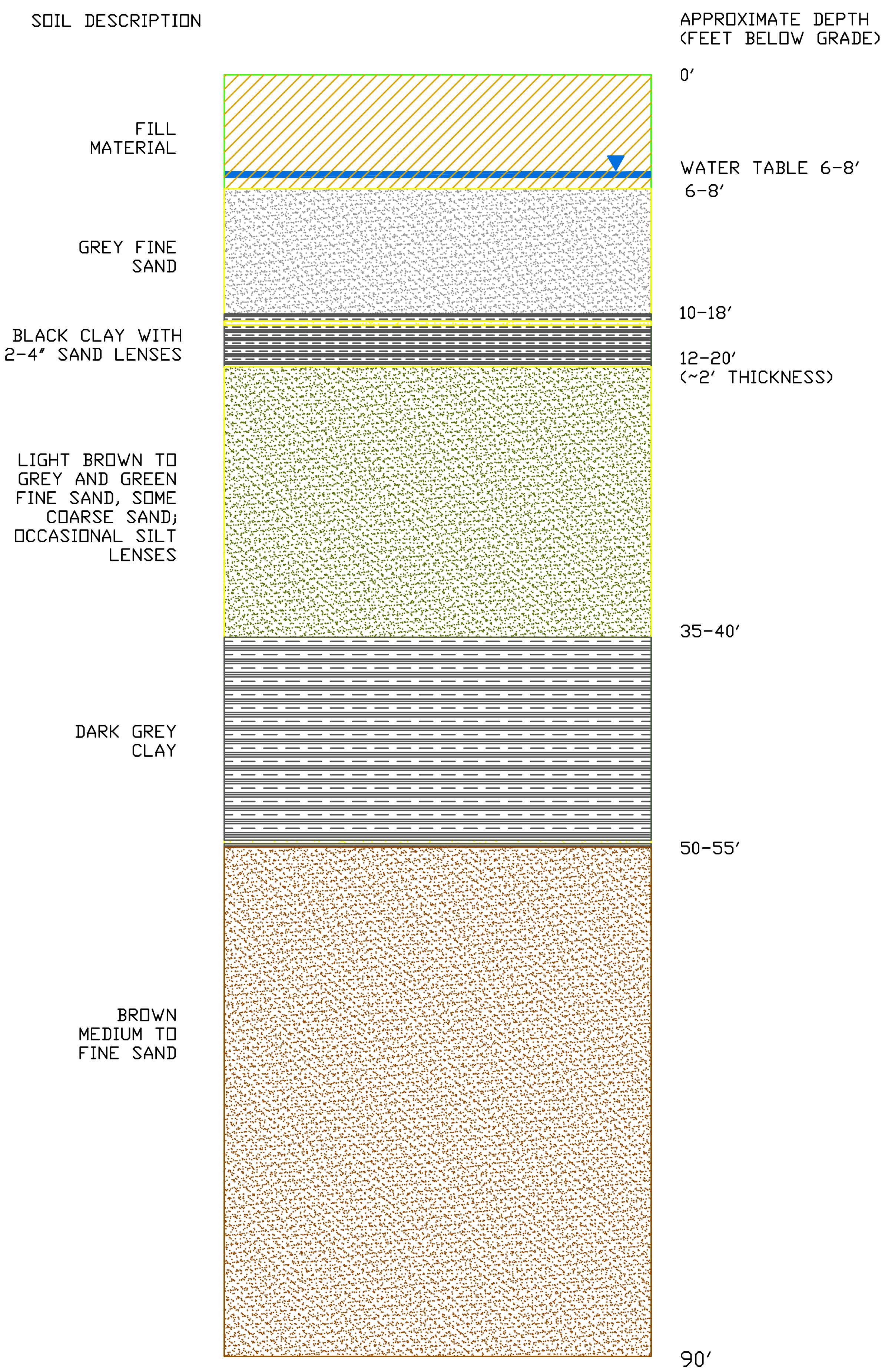
OCTOBER 2008 | **FIGURE: 11**



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - MAY 5, 2008 AND UPDATED ON SEPTEMBER 3, 2008.

TRC ENVIRONMENTAL CORP. 57 East Willow Street Millburn, New Jersey 07041		
SITE PLAN MONITORING WELL AND PIEZOMETER LOCATIONS		
CPB – EDGEMERE, NEW YORK		
JOB NO.: 158963		
HN	DATE: OCTOBER 15, 2008	FIGURE: 2

STRATIGRAPHIC COLUMN
BLOCK 1599, LOT 29



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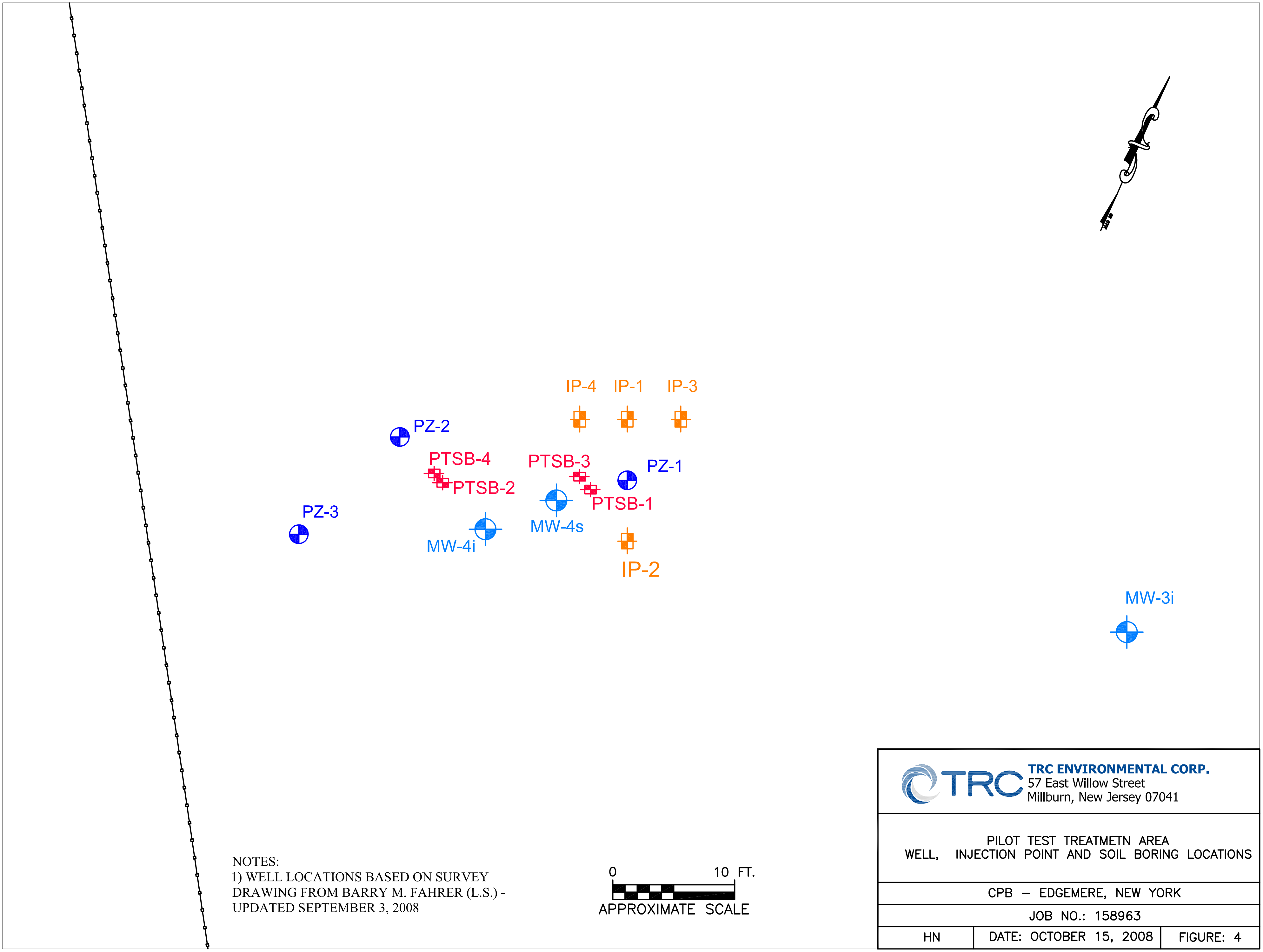
STRATIGRAPHIC COLUMN BLOCK 1599, LOT 29		
CPB – EDGEMERE, NEW YORK		
JOB NO.: 158963		
HN	DATE: APRIL 18, 2008	FIGURE: 3



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

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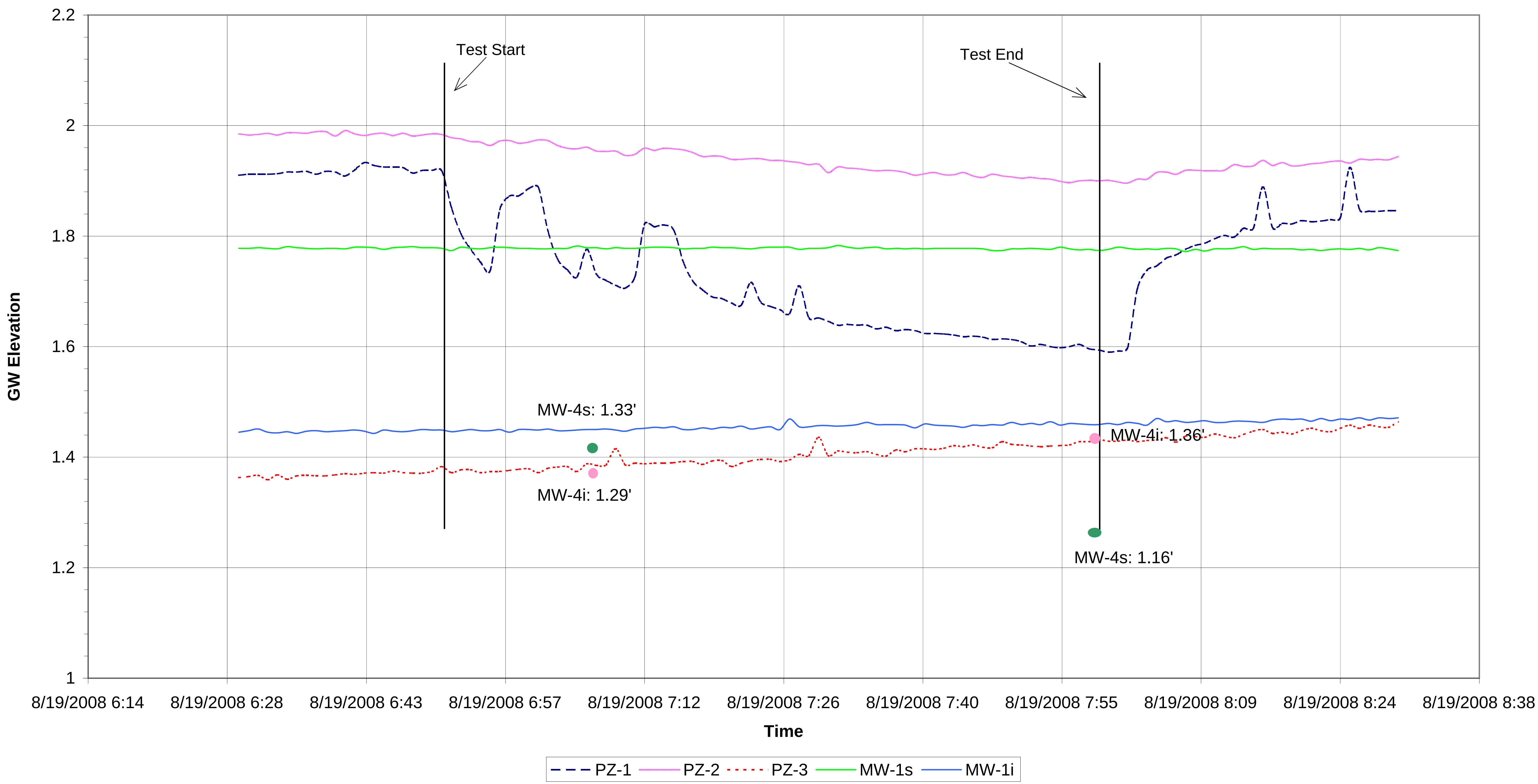
PILOT TEST TREATMETN AREA
WELL, INJECTION POINT AND SOIL BORING LOCATIONS

CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 4

Figure 5a
Pump Test @ MW-4s 2gpm



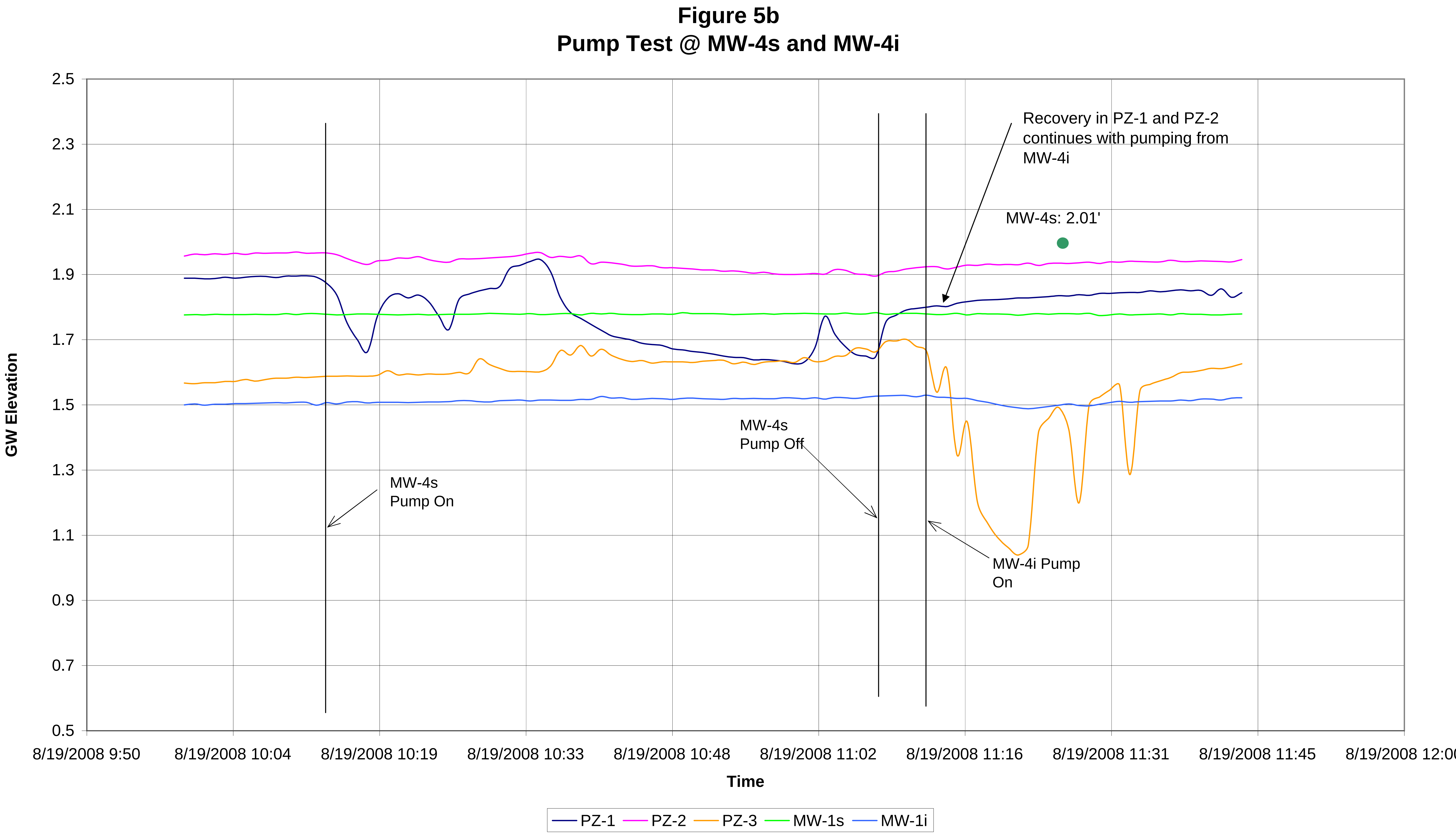
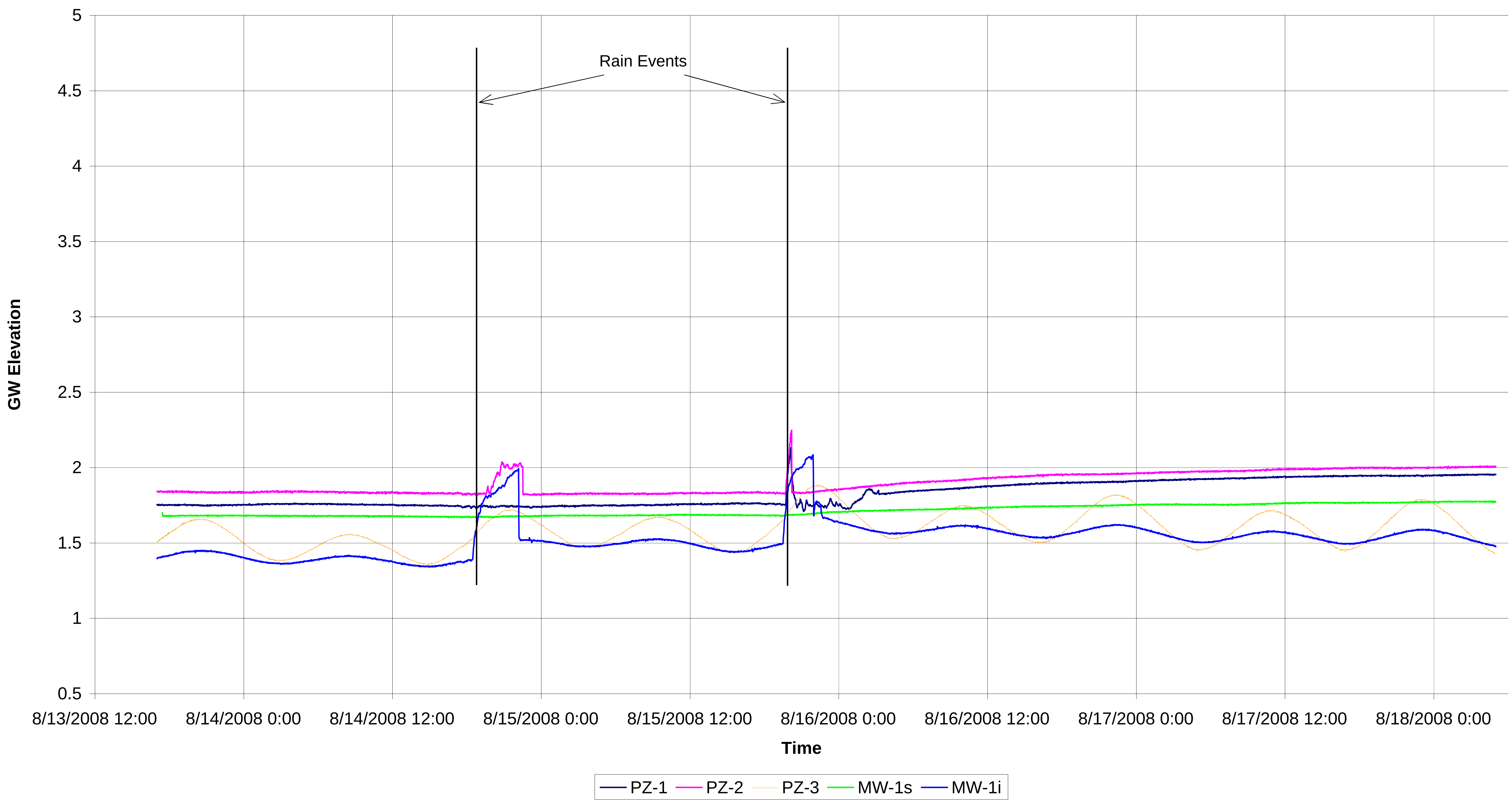
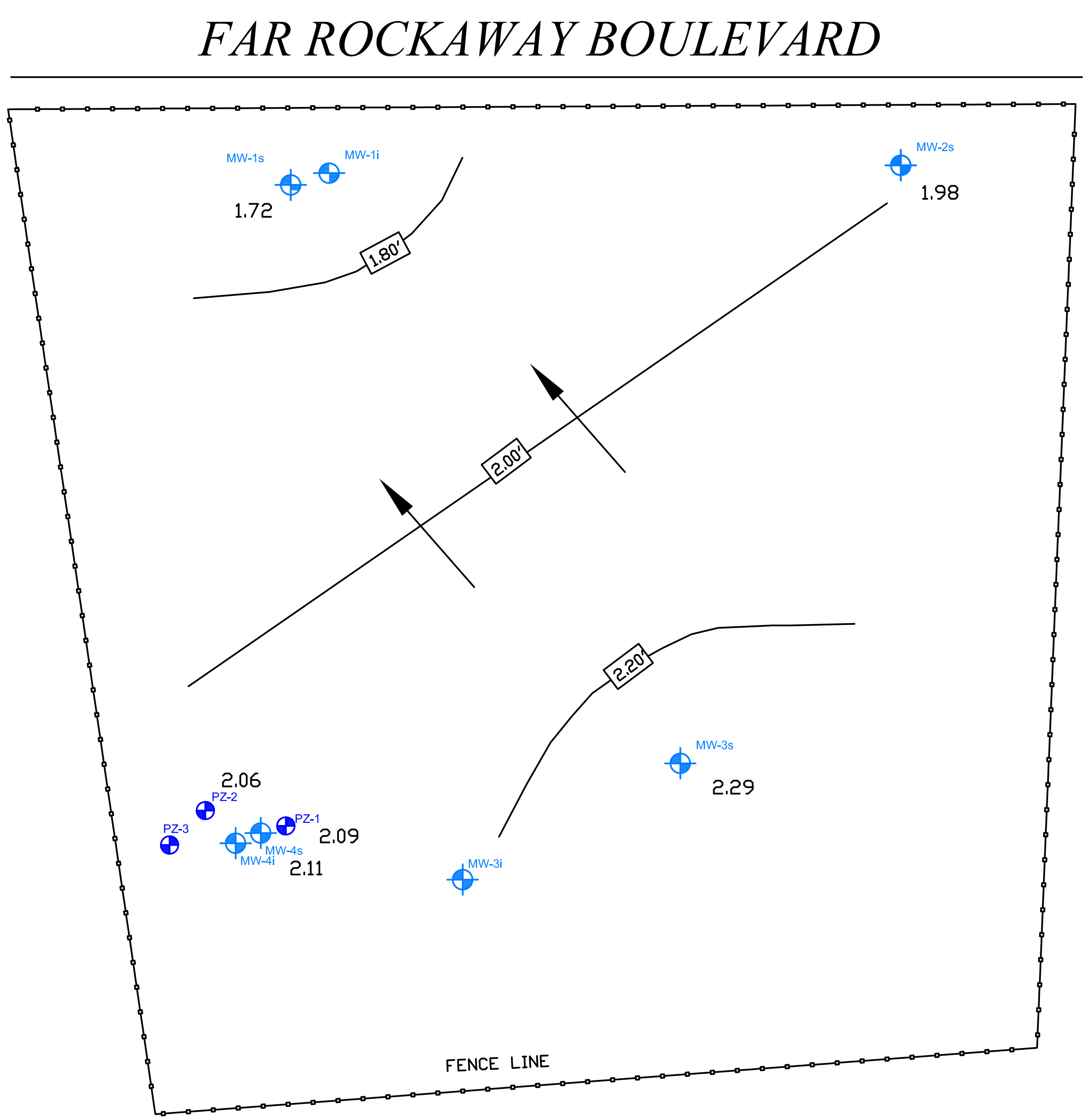


Figure 5b
Pump Test @ MW-4s and MW-4i
2.5
2.3
2.1
1.9
1.7
1.5
1.3
1.1
0.9
0.7
0.5
GW Elevation
Recovery in PZ-1 and PZ-2 continues with pumping from MW-4i
MW-4s: 2.01'
MW-4s Pump Off
MW-4s Pump On
MW-4i Pump On
8/19/2008 9:50
8/19/2008 10:04
8/19/2008 10:19
8/19/2008 10:33
8/19/2008 10:48
8/19/2008 11:02
8/19/2008 11:16
8/19/2008 11:31
8/19/2008 11:45
8/19/2008 12:00
Time
PZ-1
PZ-2
PZ-3
MW-1s
MW-1i

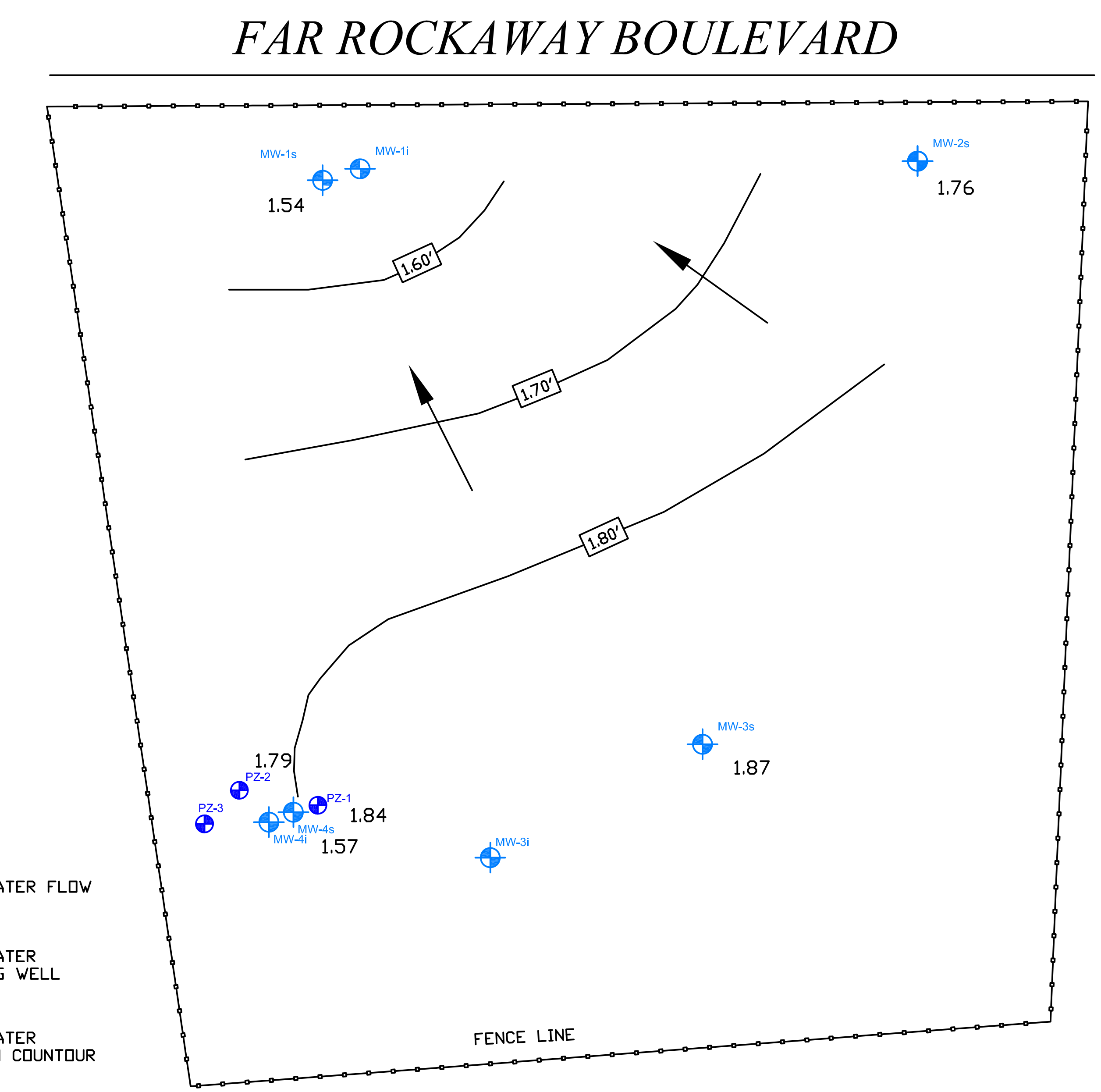
Figure 6
Tidal Study Ground Water Elevations

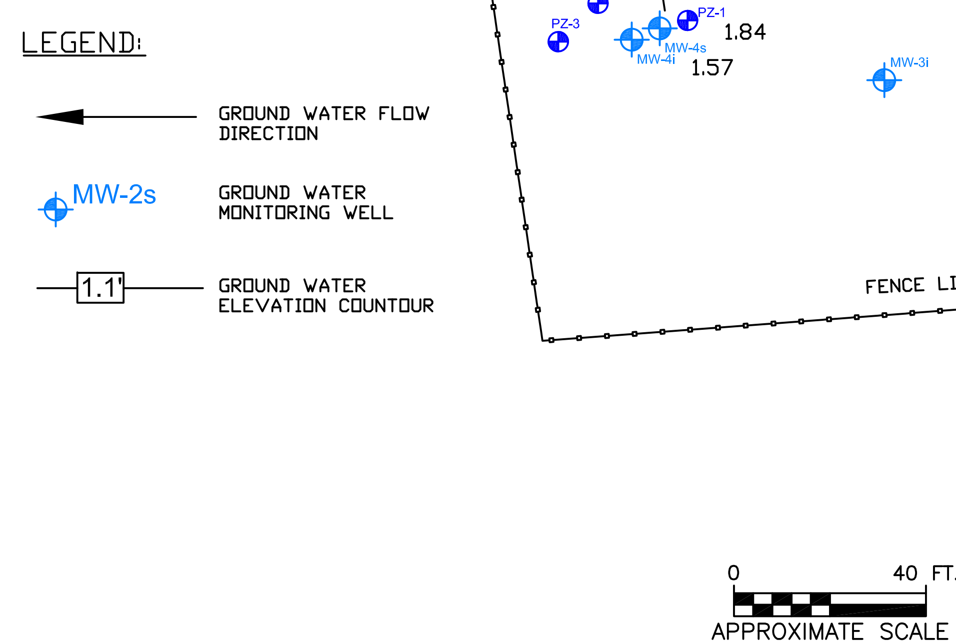


7/30/08 SHALLOW GROUND WATER ELEVATIONS CONTOURS AND FLOW DIRECTION



9/03/08 SHALLOW GROUND WATER ELEVATIONS CONTOURS AND FLOW DIRECTION





NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - MAY 5, 2008 AND UPDATED ON SEPTEMBER 3, 2008.
2) ALL ELEVATIONS SHOWN REFER TO NAVD 88.

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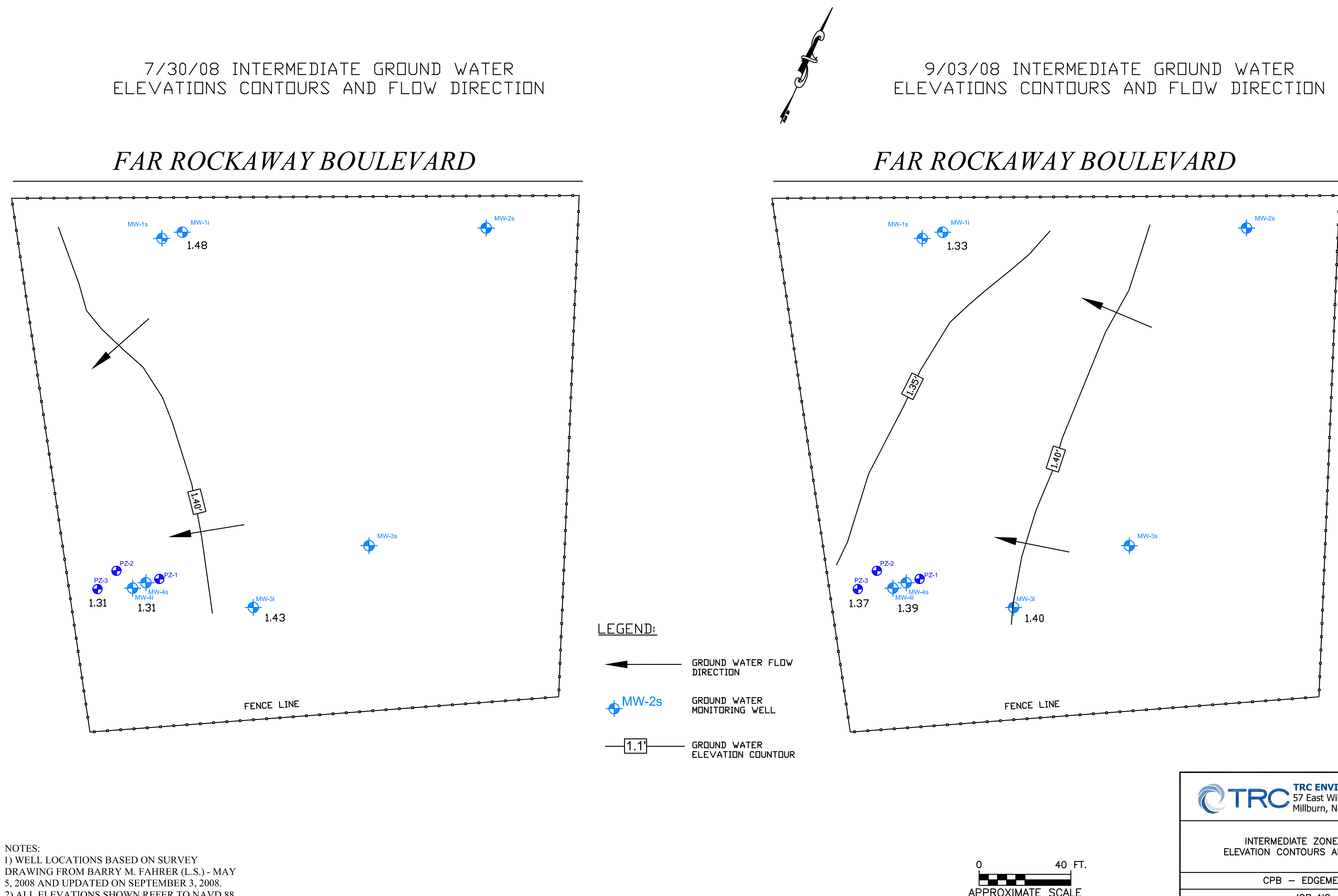
SHALLOW ZONE GROUND WATER
ELEVATION CONTOURS AND FLOW DIRECTIONS

CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 7



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - MAY 5, 2008 AND UPDATED ON SEPTEMBER 3, 2008.
2) ALL ELEVATIONS SHOWN REFER TO NAVD 88.

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Millburn, New Jersey 07041

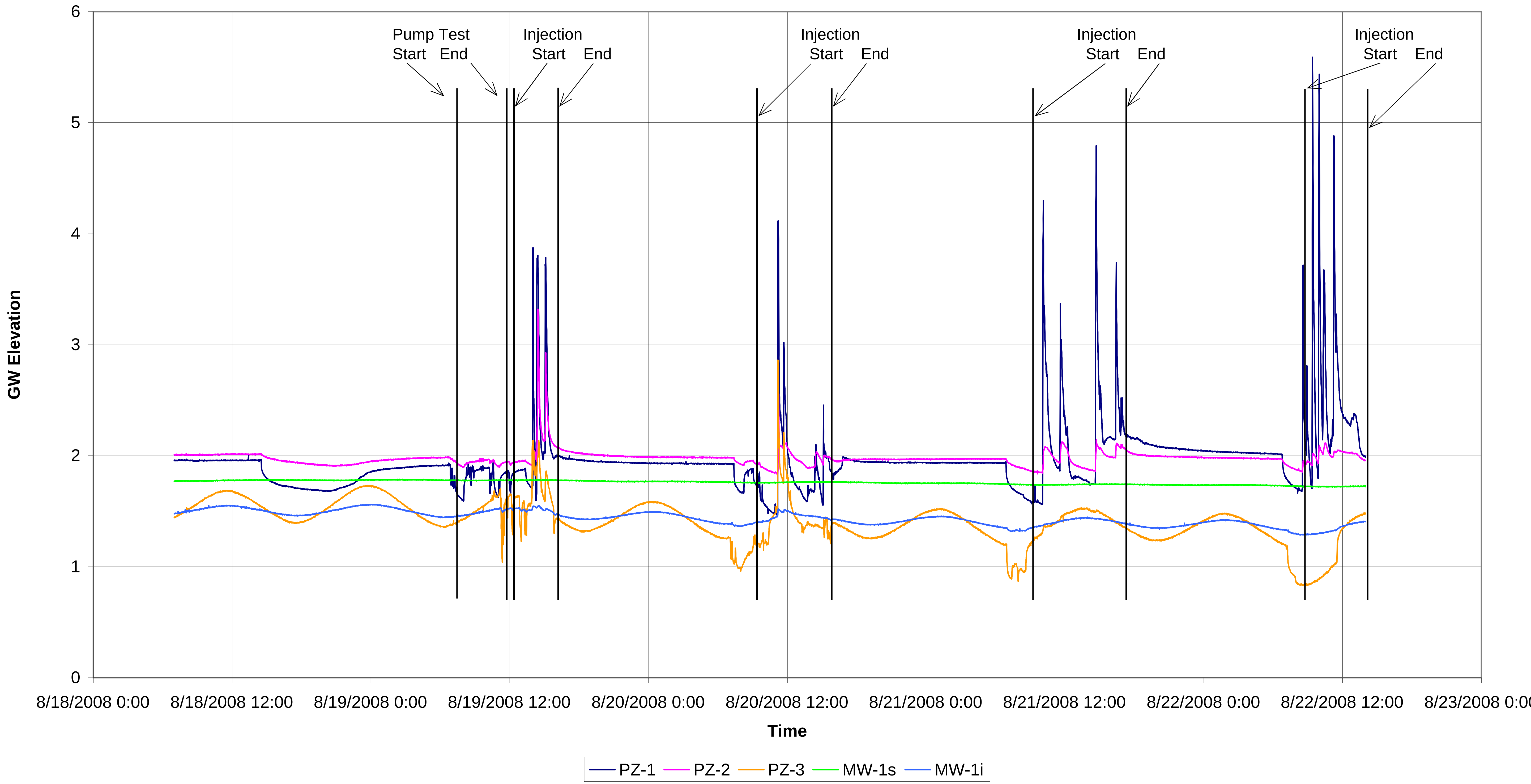
INTERMEDIATE ZONE GROUND WATER ELEVATION CONTOURS AND FLOW DIRECTIONS

CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN | DATE: OCTOBER 15, 2008 | FIGURE: 8

Figure 9
Pilot Test Ground Water Elevations



TABLES

TABLE I
***IN-SITU* CHEMICAL OXIDATION (ISCO) PILOT TEST**
FIELD EVENT SCHEDULE
CPB SITE
EDGEMERE, NY

Project Task	Field Dates	NYSDEC Required Completion Date
Installation of Pilot Test Piezometers	7/29 - 7/30/08	8/1/2008
Pre-Injection Sampling	8/13/2008	8/15/08*
Pilot Test Injecitons	8/19 - 8/22/08	8/22/2008
Post Injection Sampling Round 1	8/27/2008	8/29/2008
Post Injection Sampling Round 2	9/3/2008	9/5/2008
Post Injection Sampling Round 3	9/17/2008	9/19/2008

Note:
* - Completion date changed with NYSDEC Approval

Table II
Summary of Well Construction Details
CPB - Edgemere, New York

Well Designation	Date Installed	Measuring Point Elevation (TOC) (ft.msl)	Depth to Water	Ground Water Elevation (ft. msl)	Casing Type/ Diameter (in)	Total Depth (feet below surface)	Screened or Open Interval (feet below surface)	Hydrogeologic Zone Monitored
On-Site Monitoring Wells								
PZ-1	07/29/08	12.43	10.59	1.84	PVC/2	16.01	3 - 13	Shallow Overburden
PZ-2	07/29/08	12.33	10.54	1.79	PVC/2	15.90	3 - 13	Shallow Overburden
PZ-3	07/30/08	12.29	10.92	1.37	PVC/2*	41.30	28 - 38	Deep Overburden
MW-1s	UNK	11.43	9.89	1.54	PVC/4	17.89	UNK	Shallow Overburden
MW-1i	04/21/08	12.33	11	1.33	PVC/2	38.51	21 - 36	Deep Overburden
MW-2	UNK	9.33	7.57	1.76	PVC/4	14.88	UNK	Shallow Overburden
MW-3s	UNK	11.99	10.12	1.87	PVC/4	14.67	UNK	Shallow Overburden
MW-3i	04/21/08	10.4	9.00	1.4	PVC/2	37.93	21 - 36	Deep Overburden
MW-4s	04/16/08	11.38	9.81	1.57	PVC/2	20.14	3 -18	Shallow Overburden
MW-4i	04/29/08	12.57	11.18	1.39	PVC/2*	42.27	27 - 40	Deep Overburden

Notes:

*MW-4i and PZ-3 have 4" PVC outer casing from 0 to 20 fbgs.
ft. msl = feet above mean sea level.
UNK = unknown, work completed prior to TRC project oversight
Depth to water measurements taken on 9/3/08

TABLE III
SAMPLE SUMMARY SHEET
ISCO PILOT TEST REPORT
CPB SITE - EDGEMERE, NY

Sample Name	Date Collected	Matrix	Depth	Analysis	Notes
MW-4s	8/13/2008	GW	--	VOC	Pre-Injection GW Sample
	8/27/2008	GW	--	VOC	1st Post-Injection GW Sample
	9/3/2008	GW	--	VOC	2nd Post-Injection GW Sample
	9/17/2008	GW	--	VOC	3rd Post-Injection GW Sample
MW-4i	8/13/2008	GW	--	VOC	Pre-Injection GW Sample
	8/27/2008	GW	--	VOC	1st Post-Injection GW Sample
	9/3/2008	GW	--	VOC	2nd Post-Injection GW Sample
	9/17/2008	GW	--	VOC	3rd Post-Injection GW Sample
PZ-1	8/13/2008	GW	--	VOC	Pre-Injection GW Sample
	8/27/2008	GW	--	VOC	1st Post-Injection GW Sample
	9/3/2008	GW	--	VOC	2nd Post-Injection GW Sample
	9/17/2008	GW	--	VOC	3rd Post-Injection GW Sample
PZ-2	8/13/2008	GW	--	VOC	Pre-Injection GW Sample
	8/27/2008	GW	--	VOC	1st Post-Injection GW Sample
	9/3/2008	GW	--	VOC	2nd Post-Injection GW Sample
	9/17/2008	GW	--	VOC	3rd Post-Injection GW Sample
PZ-3	8/13/2008	GW	--	VOC	Pre-Injection GW Sample
	8/27/2008	GW	--	VOC	1st Post-Injection GW Sample
	9/3/2008	GW	--	VOC	2nd Post-Injection GW Sample
	9/17/2008	GW	--	VOC	3rd Post-Injection GW Sample
PTSB-1-1	8/19/2008	Soil	18 - 18.5'	VOC, TOC, ATTERBERG LIMITS	Pre-Injection Clay Sample
PTSB-1-2	8/19/2008	Soil	20 - 20.5'	VOC, TOC	Pre-Inejection Sand Sample
PTSB-2-1	8/19/2008	Soil	15.5 - 16'	VOC, TOC, ATTERBERG LIMITS	Pre-Injection Clay Sample
PTSB-2-2	8/19/2008	Soil	16 - 16.5'	VOC, TOC	Pre-Inejection Sand Sample
PTSB-3-1	9/3/2008	Soil	24.5 - 25'	VOC, TOC, ATTERBERG LIMITS	Post-Injection Clay Sample
PTSB-3-2	9/3/2008	Soil	25 - 25.5'	VOC, TOC	Post-Inejection Sand Sample
PTSB-4-1	9/3/2008	Soil	13 - 13.5'	VOC, TOC, ATTERBERG LIMITS	Post-Injection Clay Sample
PTSB-4-2	9/3/2008	Soil	13.5 - 14'	VOC, TOC	Post-Inejection Sand Sample

Table IV
ISCO PILOT TEST
Volatile Organic Compounds in Soil
CPB Site - Edgemere, NY

			TRC Sample No.:	PTSB-1-1	PTSB-1-2	PTSB-2-1	PTSB-2-2	PTSB-3-1	PTSB-3-2	PTSB-4-1	PTSB-4-2
			Date Sampled:	8/19/2008	8/19/2008	8/19/2008	8/19/2008	9/3/2008	9/3/2008	9/3/2008	9/3/2008
			Lab Sample No.:	J98518-1	J98518-2	J98518-3	J98518-4	J99531-8	J99531-9	J99531-10	J99531-11
			Depth:	18 - 18.5	20 - 20.5	15.5 - 16	16 - 16.5	24.5 - 25	25 - 25.5	13 - 13.5	13.5 - 14
			Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
VOCs (mg/kg)	**CAS No.**	**Abbrv.**	***RSCO***								
Acrolein	107-02-8	Acrolein	--	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	107-13-1	Acryl	--	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	71-43-2	Benzene	*0.06*	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	75-27-4	BDCM	--	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	75-25-2	Bromoform	--	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	74-83-9	BM	--	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	56-23-5	CT	*0.6*	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	108-90-7	CB	*1.7*	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	75-00-3	CE	*1.9*	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	110-75-8	2-CVE	--	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	67-66-3	Chloroform	*0.3*	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	74-87-3	CM	--	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	124-48-1	DBCM	--	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	95-50-1	1,2-DCB	--	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	541-73-1	1,3-DCB	--	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	106-46-7	1,4-DCB	--	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	75-71-8	DCDFM	--	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	75-34-3	1,1-DCA	*0.2*	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	107-06-2	1,2-DCA	*0.1*	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	75-35-4	1,1-DCE	*0.4*	ND	ND	ND	ND	ND	ND	0.0027 J	ND
cis-1,2-Dichloroethylene	156-59-2	c-1,2-DCE	--	1.12	0.0384 J	134	19.7	188	0.0499	0.103	1.18
trans-1,2-Dichloroethylene	156-60-5	t-1,2-DCE	*0.3*	ND	ND	**2.83**	**0.318** J	**0.747** J	ND	0.0153	ND
1,2-Dichloropropane	78-87-5	1,2-DCP	--	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	10061-01-5	c-1,3-DCP	--	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	10061-02-6	t-1,3-DCP	--	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	100-41-4	EB	*5.5*	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	75-09-2	MC	*0.1*	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	1,1,2,2-PCA	*0.6*	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	127-18-4	PCE	*1.4*	ND	ND	ND	ND	ND	0.0053 J	ND	ND
Toluene	108-88-3	Toluene	*1.5*	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	71-55-6	1,1,1-TCA	*0.8*	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	79-00-5	1,1,2-TCA	*6*	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (TCE)	79-01-6	TCE	*0.7*	0.177 J	0.181 J	**3.78**	0.235 J	**26.7**	**9.18**	0.0114	**2.57**
Trichlorofluoromethane	75-69-4	TCFM	--	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	75-01-4	VC	*0.2*	0.134 J	ND	**5.89**	**1.15**	**3.67**	0.0013 J	**0.357**	**0.238** J
Xylenes (total)	1330-20-7	Xylene	*1.2*	ND	ND	ND	ND	ND	ND	ND	ND
Total Targeted VOCs				1.431	0.2194	146.5	21.403	219.117	9.2365	0.4894	3.988
Total TICs			*500*	7.34 J	ND	ND	ND	ND	ND	0.0408 J	ND
Total VOCs				8.771	0.2194	146.5	21.403	219.117	9.2365	0.5302	3.988
General Chemistry (ppm)		**Abbrv.**									
Total Organic Carbon		TOC		19500	<1100	34300	4070	38900	<1100	1750	<1200
Fraction Organic Carbon (%)		F_{OC}		1.95%	<0.11%	3.43%	0.41%	3.89%	<0.11%	0.18%	<0.12%
Geotehnical Analysis	**CAS No.**	**Abbrv.**									
Plastic Limit (%)		PL		33%	NA	47%	NA	40%	NA	47%	NA
Liquid Limit (%)		LL		50%	NA	75%	NA	99%	NA	90%	NA
Plasticity Index (%)		PI		17%	NA	28%	NA	58%	NA	43%	NA

ND = Not Detected.
GWQS = NJDEP's Ground Water Quality Standard.
Bold indicates concentration above GWQS.

Table V
ISCO Pilot Test
Volatile Organic Compounds - Ground Water
CPB Site - Edgemere, NY

			TRC Sample No.:	MW-4i		MW-4i		MW-4i		MW-4i		MW-4i		MW-4s		MW-4s		MW-4s		MW-4s		MW-4s	
			Date Sampled:	5/3/2008		8/13/2008		8/27/2008		9/3/2008		9/17/2008		5/3/2008		8/13/2008		8/27/2008		9/3/2008		9/17/2008	
			Lab Sample No.:	J89872-9		J98136-5		J99218-5		J99531-5		JA863-5		J89872-7		J98136-4		J99218-4		J99531-4		JA863-4	
			Laboratory:	Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest	
VOCs (µg/L)	**CAS No.**	**Abbrv.**	***GWQS***																				
Acrolein	107-02-8	Acrolein	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Acrylonitrile	107-13-1	Acryl	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Benzene	71-43-2	Benzene	*1*	ND		ND		**2.5**	J	ND		ND		0.77	J	1	J	ND		ND		0.51	J
Bromodichloromethane	75-27-4	BDCM	--	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromoform	75-25-2	Bromoform	--	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Bromomethane	74-83-9	BM	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Carbon tetrachloride	56-23-5	CT	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chlorobenzene	108-90-7	CB	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chloroethane	75-00-3	CE	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Chloroethyl vinyl ether	110-75-8	2-CVE	--	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chloroform	67-66-3	Chloroform	*7*	ND		ND		ND		ND		ND		0.33	J	ND		ND		ND		ND	
Chloromethane	74-87-3	CM	--	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane	124-48-1	DBCM	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	95-50-1	1,2-DCB	*3*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	541-73-1	1,3-DCB	*3*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	106-46-7	1,4-DCB	*3*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dichlorodifluoromethane	75-71-8	DCDFM	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	75-34-3	1,1-DCA	*5*	ND		ND		**10.2**		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethane	107-06-2	1,2-DCA	*0.6*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethylene	75-35-4	1,1-DCE	*5*	ND		ND		**43**		ND		ND		1		1		ND		ND		2.2	
cis-1,2-Dichloroethylene	156-59-2	c-1,2-DCE	*5*	**10,700**		**18,500**		**32,500**	a	**43,900**	a	**59,400**		**417**		**198**		**338**		**424**		**307**	a
trans-1,2-Dichloroethylene	156-60-5	t-1,2-DCE	*5*	ND		ND		**212**		**230**		ND		2.3		2.2		4.5	J	4.1	J	3.7	
1,2-Dichloropropane	78-87-5	1,2-DCP	*1*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	10061-01-5	c-1,3-DCP	*Total = 1*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
trans-1,3-Dichloropropene	10061-02-6	t-1,3-DCP		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Ethylbenzene	100-41-4	EB	*5*	ND		ND		**9.7**	J	ND		ND		**6.6**		**8.2**		**5.6**		3.8	J	**5.2**	
Methylene chloride	75-09-2	MC	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	79-34-5	1,1,2,2-PCA	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Tetrachloroethylene (PCE)	127-18-4	PCE	*5*	**206**	J	ND		**407**		**327**		ND		ND		ND		**10.2**		**6.5**		2.8	
Toluene	108-88-3	Toluene	*5*	ND		ND		**24.9**		ND		ND		1.3		0.8	J	1.1	J	ND		0.63	J
1,1,1-Trichloroethane	71-55-6	1,1,1-TCA	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	79-00-5	1,1,2-TCA	*1*	ND		ND		**42.2**		ND		ND		ND		ND		ND		ND		ND	
Trichloroethylene (TCE)	79-01-6	TCE	*5*	**97,300**		**302,000**		**401,000**	a	**324,000**	a	**363,000**	a	**88**		**8.1**		**3,680**	a	**3,100**	a	**1,000**	a
Trichlorofluoromethane	75-69-4	TCFM	*5*	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Vinyl chloride	75-01-4	VC	*2*	**489**	J	**751**	J	**1,190**		**1,670**		**2,610**		**47.7**		**43.2**		**32.8**		**43.8**		**59.6**	
Xylenes (total)	1330-20-7	Xylene	*5*	ND		ND		**46.3**		ND		ND		**12.7**		**13.1**		**5.7**		4.7	J	**6.7**	
Total Targeted VOCs				108,695		321,251		435,488		370,127		425,010		578		275		4,078		3,587		1388.34	
Total TICs			*500*	50		ND		303	J	ND		ND		ND	J	173	J	264	J	281	J	137.6	J
Total VOCs				108,745		321,251		435,791		370,127		425,010		578		448		4,342		3,868		1525.94	

ND = Not Detected
J = Estimated Concentration
a = Results from Run #2
GWQS = NYSDEC's Ground Water Quality Standard.
Bold indicates concentration above GWQS.

Table V
ISCO Pilot Test
Volatile Organic Compounds - Ground Water
CPB Site - Edgemere, NY

VOCs (µg/L)	CAS No.	Abbrv.	GWQS	PZ-1	PZ-1	PZ-1	PZ-1	PZ-2	PZ-2	PZ-2	PZ-2	PZ-3	PZ-3	PZ-3	PZ-3
			TRC Sample No.:	PZ-1	PZ-1	PZ-1	PZ-1	PZ-2	PZ-2	PZ-2	PZ-2	PZ-3	PZ-3	PZ-3	PZ-3
			Date Sampled:	8/13/2008	8/27/2008	9/3/2008	9/17/2008	8/13/2008	8/27/2008	9/3/2008	9/17/2008	8/13/2008	8/27/2008	9/3/2008	9/17/2008
			Lab Sample No.:	J98136-1	J99218-3	J99531-1	JA863-1	J98136-2	J99218-2	J99531-2	JA863-2	J98136-3	J99218-1	J99531-3	JA863-3
			Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Acrolein	107-02-8	Acrolein	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	107-13-1	Acryl	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	71-43-2	Benzene	1	0.59 J	ND	0.89 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	75-27-4	BDCM	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	75-25-2	Bromoform	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	74-83-9	BM	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	56-23-5	CT	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	108-90-7	CB	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	75-00-3	CE	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	110-75-8	2-CVE	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	67-66-3	Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	74-87-3	CM	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	124-48-1	DBCM	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	95-50-1	1,2-DCB	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	541-73-1	1,3-DCB	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	106-46-7	1,4-DCB	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	75-71-8	DCDFM	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	75-34-3	1,1-DCA	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	107-06-2	1,2-DCA	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	75-35-4	1,1-DCE	5	ND	ND	ND	ND	**24.9**	**38.4**	**33.8**	**36.3**	**9** J	ND	**11.1**	ND
cis-1,2-Dichloroethylene	156-59-2	c-1,2-DCE	5	3.8	**981**	**781**	**262**	**3,780**	**5,590** a	**1,630**	**2,350** a	**3,060** a	**1060**	**6130** a	**8440**
trans-1,2-Dichloroethylene	156-60-5	t-1,2-DCE	5	1.2	ND	**6.3**	**5.7** J	**48.7**	**52.5**	**11.2**	**11.7**	**25.1**	**17**	**32.1**	**41.1** J
1,2-Dichloropropane	78-87-5	1,2-DCP	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	10061-01-5	c-1,3-DCP	Total = 1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	10061-02-6	t-1,3-DCP		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	100-41-4	EB	5	**9.2**	**7.7** J	**12.6**	**10.8**	**6.7** J	4.6 J	**8.3** J	**8.3** J	ND	ND	ND	ND
Methylene chloride	75-09-2	MC	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	79-34-5	1,1,2,2-PCA	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	127-18-4	PCE	5	ND	ND	ND	3.5 J	ND	ND	ND	ND	ND	ND	**11.2**	ND
Toluene	108-88-3	Toluene	5	0.65 J	ND	1.2 J	ND	**5.7** J	4.9 J	**5.4** J	**6.8** J	2.3 J	ND	ND	ND
1,1,1-Trichloroethane	71-55-6	1,1,1-TCA	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	79-00-5	1,1,2-TCA	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (TCE)	79-01-6	TCE	5	**6.1**	**6,730** a	**4,090** a	**2580** a	**260**	**703**	**732**	**1,400**	**5310**	**1190**	**13100** a	**9450**
Trichlorofluoromethane	75-69-4	TCFM	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	75-01-4	VC	2	0.91 J	**24.4**	**19.7**	**7** J	**2,260**	**2,710** a	**885**	**1,180**	**753**	**113**	**219**	**201**
Xylenes (total)	1330-20-7	Xylene	5	**15.2**	**5.7**	**17.4**	**14.9**	**30.9**	**18.5**	**37.9**	**37**	**10**	ND	ND	ND
Total Targeted VOCs				37.65	7748.8	4929.09	2883.9	6416.9	9121.9	3343.6	5030.1	9169.4	2380	19503.4	18132.1
Total TICs			500	215 J	170 J	**512** J	ND	ND	175 J	**585** J	ND	ND	ND	ND	ND
Total VOCs				252.65	7918.8	5441.09	2883.9	6416.9	9296.9	3928.6	5030.1	9169.4	2380	19503.4	18132.1

ND = Not Detected
J = Estimated Concentration
a = Results from Run #2
GWQS = NYSDEC's Ground Water Quality Standard.
Bold indicates concentration above GWQS.

Table V
ISCO Pilot Test
Volatile Organic Compounds - Ground Water
CPB Site - Edgemere, NY

			TRC Sample No.:	FB		FB		FB		FB		TB		TB		TB		TB	
			Date Sampled:	8/13/2008		8/27/2008		9/3/2008		9/17/2008		8/13/2008		8/27/2008		9/3/2008		9/17/2008	
			Lab Sample No.:	J98136-7		J99218-7		J99531-6		JA863-6		J98136-6		J99218-8		J99531-7		JA863-7	
			Laboratory:	Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest	
VOCs (µg/L)	**CAS No.**	**Abbrv.**	***GWQS***																
Acrolein	107-02-8	Acrolein	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Acrylonitrile	107-13-1	Acryl	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Benzene	71-43-2	Benzene	*1*	ND		ND		ND		ND		ND		ND		ND		ND	
Bromodichloromethane	75-27-4	BDCM	--	ND		ND		ND		ND		ND		ND		ND		ND	
Bromoform	75-25-2	Bromoform	--	ND		ND		ND		ND		ND		ND		ND		ND	
Bromomethane	74-83-9	BM	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Carbon tetrachloride	56-23-5	CT	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Chlorobenzene	108-90-7	CB	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Chloroethane	75-00-3	CE	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
2-Chloroethyl vinyl ether	110-75-8	2-CVE	--	ND		ND		ND		ND		ND		ND		ND		ND	
Chloroform	67-66-3	Chloroform	*7*	ND		ND		ND		ND		ND		ND		ND		ND	
Chloromethane	74-87-3	CM	--	ND		ND		ND		ND		ND		ND		ND		ND	
Dibromochloromethane	124-48-1	DBCM	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	95-50-1	1,2-DCB	*3*	ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	541-73-1	1,3-DCB	*3*	ND		ND		ND		ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	106-46-7	1,4-DCB	*3*	ND		ND		ND		ND		ND		ND		ND		ND	
Dichlorodifluoromethane	75-71-8	DCDFM	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethane	75-34-3	1,1-DCA	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloroethane	107-06-2	1,2-DCA	*0.6*	ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethylene	75-35-4	1,1-DCE	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
cis-1,2-Dichloroethylene	156-59-2	c-1,2-DCE	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
trans-1,2-Dichloroethylene	156-60-5	t-1,2-DCE	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichloropropane	78-87-5	1,2-DCP	*1*	ND		ND		ND		ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	10061-01-5	c-1,3-DCP	*Total = 1*	ND		ND		ND		ND		ND		ND		ND		ND	
trans-1,3-Dichloropropene	10061-02-6	t-1,3-DCP		ND		ND		ND		ND		ND		ND		ND		ND	
Ethylbenzene	100-41-4	EB	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Methylene chloride	75-09-2	MC	*5*	0.79	J	ND		ND		ND		ND		1	J	0.8	J	ND	
1,1,2,2-Tetrachloroethane	79-34-5	1,1,2,2-PCA	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Tetrachloroethylene (PCE)	127-18-4	PCE	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Toluene	108-88-3	Toluene	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
1,1,1-Trichloroethane	71-55-6	1,1,1-TCA	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	79-00-5	1,1,2-TCA	*1*	ND		ND		ND		ND		ND		ND		ND		ND	
Trichloroethylene (TCE)	79-01-6	TCE	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Trichlorofluoromethane	75-69-4	TCFM	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Vinyl chloride	75-01-4	VC	*2*	ND		ND		ND		ND		ND		ND		ND		ND	
Xylenes (total)	1330-20-7	Xylene	*5*	ND		ND		ND		ND		ND		ND		ND		ND	
Total Targeted VOCs				0.79		ND		ND		ND		ND		1	J	0.8	J	ND	
Total TICs			*500*	ND		ND		ND		ND		ND		ND		ND		ND	
Total VOCs				0.79		ND		ND		ND		ND		ND		ND		ND	

ND = Not Detected
J = Estimated Concentration
a = Results from Run #2
GWQS = NYSDEC's Ground Water Quality Standard.
Bold indicates concentration above GWQS.

APPENDIX A
BORING AND MONITORING WELL CONSTRUCITON LOGS

TRC

57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006

WELL LOG

WELL NUMBER
PZ-1

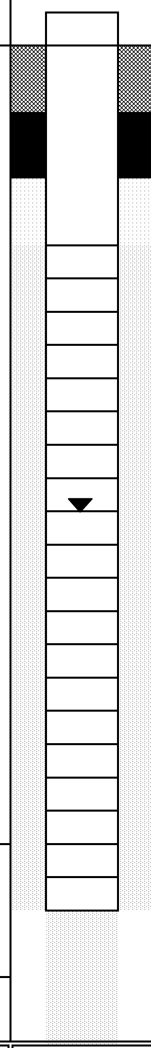
WELL PERMIT NUMBER

PROJECT NAME: CPB
LOCATION: Edgemere, New York

PROJECT NO.: 159807
CONTRACTOR: Land Air Water Environmental Services (LAWES)

START DATE: **07/29/08**
FINISH DATE: **07/29/08**
DRILLER: **C. Pedersen**
LOGGED BY: **D. Avudzega**

SAMPLER TYPE/DIA.: split spoon/2"
DEPTH TO BEDROCK: Not Encountered
TOTAL DEPTH DRILLED: 16 feet
TYPE OF WELL: Piezometer
DRILLING METHOD: Hollow Stem Auger
BIT TYPE: Auger bit



DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0							3' stickup above ground surface.
1							Augered from surface to 12' bsg.
2							
3							Soil Characterized with cuttings: 0 to 12' - f-m SAND with concrete fragments
4							
5							
6							
7							
8							9' - Soil cuttings grading to wet
9							
10							
11							
12	3	24	1.1			SW	12 to 13' - Gray fine to medium SAND, wet, loose.
13	4		18.2				
	4		27.9			CL	13 to 14' - Dark gray CLAY, medium stiff.
14	3		53.4				
	3	24	NA			CL	14 to 14.7' - Dark gray CLAY, medium stiff.
15	4		NA			SW	14.7 to 14.9' - Dark gray fine to medium SAND, wet, loose.

CASING TYPE/DIAMETER (IN.)
INNER: 2 OUTER: NA

STATIC WATER LEVEL: 10.34 feet below surface
DEPTH WATER ENCOUNTERED: 9.00 feet below surface

SCREENED OR OPEN INTERVAL: 3 - 13
(FEET BELOW SURFACE)

MEASURING POINT ELEVATION: 12.43 ft., msl
GROUND SURFACE ELEVATION: ______ ft., msl

TRC RAVIV ASSOCIATES, INC. 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	WELL LOG	WELL NUMBER **PZ-1**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
	6					CL	14.9 to 15.25' - Dark gray CLAY, medium stiff.
	5		NA			SW	15.25 to 15.5' - Dark gray fine to medium SAND, wet, loose.
16						CL	15.5 to 16' - Dark gray CLAY, medium stiff.

End of Boring 16 Feet.

Well Construction Details

+3 to 3.0 ft. below surface - 2" diameter PVC riser
3 to 13.01 ft. below surface - 2" diameter 0.01 slot PVC screen
0 to 1 ft. below surface - cement grout
1 to 2 ft. below surface - bentonite slurry
2 to 3 ft. below surface -No. 1 gravel
2 to 16 ft. below surface - No. 1 sand
Total well depth is 13 feet
Well completed with protective concrete pad and stick-up protective casing.

TRC

57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006

WELL LOG

WELL NUMBER
PZ-2

WELL PERMIT NUMBER

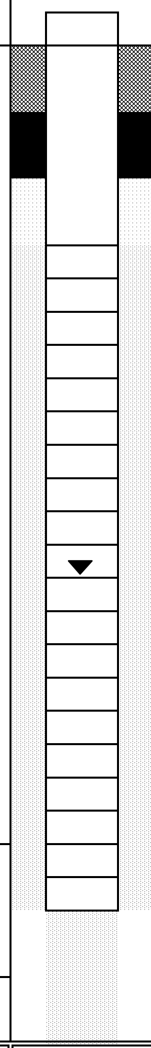
PROJECT NAME: CPB **LOCATION:** Edgemere, New York

PROJECT NO.: 159807 **CONTRACTOR:** Land Air Water Environmental Services (LAWES)

START DATE: **07/29/08**
FINISH DATE: **07/29/08**
DRILLER: **C. Pedersen**
LOGGED BY: **D. Avudzega**

SAMPLER TYPE/DIA.: split spoon/2" **TYPE OF WELL:** Piezometer
DEPTH TO BEDROCK: Not Encountered **DRILLING METHOD:** Hollow Stem Auger
TOTAL DEPTH DRILLED: 16 feet **BIT TYPE:** Auger bit

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0							3' stickup above ground surface.
1							
2							
3							Augered from surface to 12' bsg.
4							
5							Soil Characterized with cuttings: 0 to 12' - f-m SAND with concrete fragments
6							
7							
8							8' - Soil cuttings grade to wet
9							
10							
11							
12	2	24	4.9				
13	3		82.4			SW	12 to 13' - Gray fine to medium SAND, wet, loose.
	2		27.3			CL	13 to 14' - Dark gray CLAY, medium stiff.
14	2		192				
	2	24	120			CL	Dark gray CLAY, medium stiff.
15	2		224				



CASING TYPE/DIAMETER (IN.)

INNER: 2 OUTER: NA

STATIC WATER LEVEL: 10.27 feet below surface

DEPTH WATER ENCOUNTERED: 8.00 feet below surface

SCREENED OR OPEN INTERVAL: 3 - 13
(FEET BELOW SURFACE)

MEASURING POINT ELEVATION: 12.33 ft., msl

GROUND SURFACE ELEVATION: ft., msl

TRC RAVIV ASSOCIATES, INC. 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	WELL LOG	WELL NUMBER PZ-2

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
	1		99.7			CL	Dark gray CLAY, medium stiff.
16	2		97.4				

End of Boring 16 Feet.

Well Construction Details

+3 to 3.0 ft. below surface - 2" diameter PVC riser
3 to 13.01 ft. below surface - 2" diameter 0.01 slot PVC screen
0 to 1 ft. below surface - cement grout
1 to 2 ft. below surface - bentonite slurry
2 to 3 ft. below surface -No. 1 gravel
2 to 16 ft. below surface - No. 1 sand
Total well depth is 13 feet
Well completed with protective concrete pad and stick-up protective casing.

TRC 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	WELL LOG	WELL NUMBER **PZ-3** WELL PERMIT NUMBER

PROJECT NAME: CPB **LOCATION:** Edgemere, New York

PROJECT NO.: 159807 **CONTRACTOR:** Land Air Water Environmental Services (LAWES)

SAMPLER TYPE/DIA.: cuttings / split spoon/2" **TYPE OF WELL:** Piezometer

DEPTH TO BEDROCK: Not Encountered **DRILLING METHOD:** Hollow Stem Auger

TOTAL DEPTH DRILLED: 38 feet **BIT TYPE:** Auger bit

START DATE: **07/29/08**
FINISH DATE: **07/30/08**
DRILLER: **C. Perdersen**
LOGGED BY: **D. Avudzega**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0							3' stickup above ground surface
1							Augered from surface to 22' bsg.
2							Soil Characterized with cuttings:
3							0 to 212' - Brown f-m SAND, moist
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

CASING TYPE/DIAMETER (IN.)
INNER: 2 OUTER: 4

STATIC WATER LEVEL: 10.98 feet below surface
DEPTH WATER ENCOUNTERED: NA feet below surface

SCREENED OR OPEN INTERVAL: 28 - 38
(FEET BELOW SURFACE)

MEASURING POINT ELEVATION: 12.29 ft., msl
GROUND SURFACE ELEVATION: ft., msl

TRC RAVIV ASSOCIATES, INC.	WELL LOG	WELL NUMBER PZ-3
57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006		

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	WELL DIAGRAM	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
16							
17							
18							
19							
20							
21							
22							
	2		81.2			CL	22 to 22.75' - Dark gray to black CLAY, medium stiff.
23	2	24	177				
	1		220			SW	22.75 to 23.25' - Black f. SAND, loose, wet
24	2		159				23.25 to 24' - Dark gray to black fine SAND, wet, loose.
	2		597				
25	3	18	1992			CL	24 to 25.5' - Dark gray to black CLAY, medium stiff.
	3		3192				
26	2		141				
	3		214			OH	26 to 26.5' - Dark gray to black CLAY, roots, medium stiff.
27	3	24	268			SC	26.5 to 27' - Dark gray to black sandy CLAY.
	4		2047			OH	27 to 27.8' - Dark gray to black CLAY, roots.
28	3					SC	27.8 to 27.9' - Dark gray to black sandy CLAY.
						OH	27.9 to 28' - Dark gray to black CLAY, roots.
29							
30							Used mud rotary drilling technique to drill from 24 to 28'
31							
32							
33							
34							
35							
36							
37							
38							

End of Boring 38 Feet.

Well Construction Details

0 to 24 ft. below surface - 4" diameter PVC outer casing
+3 to 28 ft. below surface - 2" diameter PVC riser
28 to 38 ft. below surface - 2" diameter 0.01 slot PVC screen
0 to 1 ft. below surface - cement
1 to 24 ft. below surface - grout between outer casing and riser
23 to 26 ft. below surface - bentonite seal
26 to 38 ft. below surface - No. 1 gravel
Total well depth is 38 feet.
Well completed with protective concrete pad and stick-up protective casing.

TRC Environmental Corporation 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	SOIL BORING LOG	BORING NUMBER **PTSB-1**

PROJECT NAME:	CPB - Edgemere	**LOCATION:**	Edgemere, NY
PROJECT NO.:	159807	**CONTRACTOR:**	LAW Environmental
SAMPLER TYPE/DIA.:	Macrocore/2"	**DEPTH TO WATER:**	8.5 feet
BORING METHOD:	Direct Push	**TOTAL DEPTH DRILLED:**	25 feet

DATE DRILLED: **08/19/08**

DRILLER:

LOGGED BY: **H. Nichols**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0						Unpaved.
			0			0' - 4' FILL (light brown to brown medium to fine sand with brick fragments and fine gravel)
1						
2						
3		48				
4			0			
						4' - 5' CONCRETE FRAGMENTS with dark brown medium to fine sand, trace silt
5						
6						
7						7'0 - 7'3" WOOD fragments
8		36				7'6" - 8'3" Gray coarse to medium SAND, with gravel
					▼	8'2" - 8'5" CONCRETE rubble
9			69.7			8'5" - 10' Fine SAND, some staining, wet, petroleum odor
10						
11						
12						
13		21				
			5.6			13' - 15' Gray fine SAND
14			5.6			
			5.6			
15			5.6			

TRC Environmental Corporation 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	SOIL BORING LOG	BORING NUMBER **PTSB-1**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
			2.9			15' - 17.5' Light gray fine SAND
16			2.9			
			2.9			
17			2.9			
			2.9			
18		56	3	PTSB-1-1 (18')		17.5 - 19.75' Gray medium stiff CLAY
			3			
19			3			
			3			
20			3			19.75' - 20' Gray fine SAND
			350	PTSB-1-2 (20')		20' - 20.25' Gray to light brown fine SAND
21						20.25' - 24.8' Gray CLAY some black staining
22			30			
		60				
23						
			615			
24						
25			30			24.8 ' -25' Light gray fine SAND
						End of Boring

TRC Environmental Corporation
57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006

SOIL BORING LOG

BORING NUMBER **PTSB-2**

PROJECT NAME: CPB - Edgemere **LOCATION:** Edgemere, NY

PROJECT NO.: 159807 **CONTRACTOR:** LAW Environmental

DATE DRILLED: **08/19/08**

SAMPLER TYPE/DIA.: Macrocore/2" **DEPTH TO WATER:** 8.5 feet

DRILLER:

BORING METHOD: Direct Push **TOTAL DEPTH DRILLED:** 25 feet

LOGGED BY: **H. Nichols**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0						Unpaved.
1						0' - 5' FILL (brown medium to fine sand with brick fragments and gravel)
2						
3		30				
4						
5						
6						
7						
8		30	17.7			7.5' - 8.5' Asphalt millings, medium brown sand with fine gravel
			1		▼	
9			6			8.5' - 9.5' Light brown medium to coarse SAND, little fine gravel, wet
			25			
10			15			9.5' - 10' Dark gray soft CLAY, little medium sand, some black staining
11						
12						
13		12				
14						
			2			14' - 14.5' Gray fine SAND
15			2			14.5' - 15' SAA, grades to little fine gravel

TRC Environmental Corporation 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	SOIL BORING LOG	BORING NUMBER **PTSB-2**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
			3.6			15' - 16' Gray CLAY, soft, trace roots
16			3.6	PTSB-2-1(15.5')		
			12.7	PTSB-2-2 (16')		16' - 17' Light brown fine to medium SAND
17			12.7			
		48	2.5			17' - 19' Gray soft CLAY (grades from soft to medium stiff)
18			2.5			
			2.5			
19			2.5			
20						
			124			20' - 25' Gray medium stiff CLAY
21			124			
			110			
22			110			
		60	110			
23			79			
			79			
24			79			
			16			
25			16			
						End of Boring

TRC Environmental Corporation

57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006

SOIL BORING LOG

BORING NUMBER

PTSB-3

PROJECT NAME: CPB - Edgemere **LOCATION:** Edgemere, NY

PROJECT NO.: 159807 **CONTRACTOR:** LAW Environmental

DATE DRILLED: **09/03/08**

SAMPLER TYPE/DIA.: Macrocore/2" **DEPTH TO WATER:** 7.5 feet

DRILLER:

BORING METHOD: Direct Push **TOTAL DEPTH DRILLED:** 30 feet

LOGGED BY: **H. Nichols**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0						Unpaved.
			0			0' - 2' Light brown medium to fine SAND with fill material (concrete and brick)
1			0.8			
2			8.8			
		24	119			
3						
4						
5						5.0 - 7.5' Light Brown medium to fine sand, with fill material (concrete and brick), moist
6						
7					▼	
8		24	18.5			7.5 - 10' Light Gray medium to fine SAND, wet
9						
10						10' - 15' Light Gray fine to medium - fine SAND, trace gravel (rounded), saturated
11			24			
12			128			
13		60				
			28			
14						
15			92			

TRC Environmental Corporation 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	SOIL BORING LOG	BORING NUMBER **PTSB-3**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
						15' - 19.5' Light gray fine to medium - fine SAND trace rounded gravel, dense, wet
16			23			
17			58			
		60				
18						
			157			
19						
20			159			19.5' - 20' Light gray CLAY with sand, soft, wet
21			9999			20.5' - 25' Light gray grading to dark gray CLAY, some black staining, petroleum odor, soft to medium stiff
22						
		54				
23						
			1618			
24						
			1325	PTSB-3-1(24.5')		
25						
				PTSB-3-2(25')		Light gray medium to fine SAND, little coarse white rounded gravel
26						
27						
28						
29						
30						
						End of Boring

TRC Environmental Corporation 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	SOIL BORING LOG	BORING NUMBER **PTSB-4**

PROJECT NAME: CPB - Edgemere **LOCATION:** Edgemere, NY

PROJECT NO.: 159807 **CONTRACTOR:** LAW Environmental

DATE DRILLED: **09/03/08**

SAMPLER TYPE/DIA.: Macrocore/2" **DEPTH TO WATER:** 9 feet

DRILLER:

BORING METHOD: Direct Push **TOTAL DEPTH DRILLED:** 20 feet

LOGGED BY: **H. Nichols**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0						Unpaved.
1		36	0			0' - 5' FILL material (light brown sand with asphalt, brick and concrete fragments)
2			9			
3						
4			1.5			
5						
6		30				5' - 8' FILL and concrete fragments
7			0.5			
8						
9			64.1		▼	8' - 9' Light brown fine SAND with gravel, moist
10			177			9' - 10' Light gray fine SAND with black staining and petroleum odor, wet
11		40	7			10' - 13' Gray fine SAND, wet
12						
13						
14			0	PTSB-4-1(13')		13' - 13.5' Dark gray soft CLAY
			70.4	PTSB-4-2(13.5')		13.5' - 15' Light gray fine SAND
15						

TRC Environmental Corporation 57 E. Willow Street, Millburn, NJ 07041 (973) 564-6006	SOIL BORING LOG	BORING NUMBER **PTSB-4**

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (INCHES)	PID (ppm)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
						15' - 19.5' Light gray fine SAND, some fine gravel, wet
16						
			351			
17						
18		60				
			697			
19						
20			761			19.5' - 20' Thin layer of gray soft CLAYthen to gray fine SAND
						End of Boring

<u>APPENDIX B</u>
REGENOX ™ MSDS SHEETS

Regen OX – Part A (Oxidizer Complex)

Material Safety Data Sheet (MSDS)

Last Revised: October 1, 2007

Section 1 – Supplier Information and Material Identification

Supplier:

REGENESIS
1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description:	A mixture of sodium percarbonate [$2Na_2CO_3 \cdot 3H_2O_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.
Chemical Family:	Inorganic Chemicals
Trade Name:	Regen Ox – Part A (Oxidizer Complex)
Product Use:	Used to remediate contaminated soil and groundwater (environmental applications)

Section 2 – Chemical Information/Other Designations

CAS No.	Chemical	Percentage
15630-89-4	Sodium Percarbonate	60 -100 %
5968-11-6	Sodium Carbonate Monohydrate	10 – 30 %
7699-11-6	Silicic Acid	< 1 %
63231-67-4	Silica Gel	< 1 %

Section 3 – Physical Data

Form:	Powder
Color:	White
Odor:	Odorless
Melting Point:	NA
Boiling Point:	NA

Section 3 – Physical Data (cont)

Flammability/Flash Point:	NA
Vapor Pressure:	NA
Bulk Density:	0.9 – 1.2 g/cm^3
Solubility:	Min 14.5g/100g water @ 20 ºC
Viscosity:	NA
pH (3% solution):	≈ 10.5
Decomposition Temperature:	Self-accelerating decomposition with oxygen release starts at 50 ºC.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions
Conditions to Avoid/Incompatibility:	Acids, bases, salts of heavy metals, reducing agents, and flammable substances
Hazardous Decomposition Products:	Oxygen. Contamination with many substances will cause decomposition. The rate of decomposition increases with increasing temperature and may be very vigorous with rapid generation of oxygen and steam.

Section 5 – Regulations

TSCA Inventory Listed: Yes

CERCLA Hazardous Substance (40 CFR Part 302)

Listed Substance: *No*

Unlisted Substance: *Yes*

SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know

Extremely Hazardous Substance:	No
WHMIS Classification:	C, D2B
Canadian Domestic Substance List:	Appears

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage: Oxidizer. Store in a cool, well ventilated area away from all sources of ignition and out of the direct sunlight. Store in a dry location away from heat and in temperatures less than 40 °C.

Keep away from incompatible materials and keep lids tightly closed. Do not store in improperly labeled containers.

Protect from moisture. Do not store near combustible materials. Keep containers well sealed.

Store separately from reducing materials. Avoid contamination which may lead to decomposition.

Handling: Avoid contact with eyes, skin and clothing. Use with adequate ventilation.

Do not swallow. Avoid breathing vapors, mists or dust. Do not eat, drink or smoke in the work area.

Label containers and keep them tightly closed when not in use.

Wash hands thoroughly after handling.

Personal Protective Equipment (PPE)

Engineering Controls: General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Avoid creating dust or mists. Maintain adequate ventilation at all times. Do not use in confined areas. Keep levels below recommended exposure limits. To determine actual exposure limits, monitoring should be performed on a routine basis.

Respiratory Protection: For many conditions, no respiratory protection is necessary; however, in dusty or unknown conditions or when exposures exceed limit values a NIOSH approved respirator should be used.

Hand Protection: Wear chemical resistant gloves (neoprene, rubber, or PVC).

Section 6 – Protective Measures, Storage and Handling (cont)

Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Chemical resistant gloves (neoprene, PVC or rubber) and protective clothing should be worn during use.
Other:	Eye wash station.
Protection Against Fire & Explosion:	Product is non-explosive. In case of fire, evacuate all non-essential personnel, wear protective clothing and a self-contained breathing apparatus, stay upwind of fire, and use water to spray cool fire-exposed containers.

Section 7 – Hazards Identification

Potential Health Effects	
Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes slight irritation.
Ingestion:	May be harmful if swallowed (vomiting and diarrhea).

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage:	Eliminate all ignition sources. Evacuate unprotected personnel and never exceed any occupational exposure limit. Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.
Extinguishing Media:	Water
First Aid	
Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. **Do Not** induce vomiting.

Section 8 – Measures in Case of Accidents and Fire (cont)

Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water.

Section 9 – Accidental Release Measures

Precautions:	
Cleanup Methods:	Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.

Section 10 – Information on Toxicology

Toxicity Data	
LD50 Oral (rat):	2,400 mg/kg
LD50 Dermal (rabbit):	Min 2,000 mg/kg
LD50 Inhalation (rat):	Min 4,580 mg/kg

Section 11 – Information on Ecology

Ecology Data	
Ecotoxicological Information:	NA

Section 12 – Disposal Considerations

Waste Disposal Method	
Waste Treatment:	Dispose of in an approved waste facility operated by an authorized contactor in compliance with local regulations.
Package (Pail) Treatment:	The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T. Shipping Name:	Oxidizing Solid, N.O.S. [A mixture of sodium percarbonate [$2Na_2CO_3 \cdot 3H2O_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.]
UN Number:	1479
Hazard Class:	5.1
Labels:	5.1 (Oxidizer)
Packaging Group:	III

Section 14 – Other Information

HMIS® Rating	Health – 1 (slight)	Reactivity – 1 (slight)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat

HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

Regen OX – Part B (Activator Complex)

Material Safety Data Sheet (MSDS)

Last Revised: November 7, 2005

Section 1 – Supplier Information and Material Identification

Supplier:

REGENESIS

1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description:	A mixture of sodium silicate solution, silica gel and ferrous sulfate
Chemical Family:	Inorganic Chemicals
Trade Name:	Regen Ox – Part B (Activator Complex)
Product Use:	Used for environmental remediation of contaminated soils and groundwater

Section 2 – Chemical Information/Other Designations

CAS No.	Chemical
1344-09-8	Silicic Acid, Sodium Salt, Sodium Silicate
63231-67-4	Silica Gel
7720-78-7	Ferrous Sulfate
7732-18-5	Water

Section 3 – Physical Data

Form:	Liquid
Color:	Blue/Green
Odor:	Odorless
Melting Point:	NA
Boiling Point:	NA
Flammability/Flash Point:	NA
Vapor Pressure:	NA

Section 3 – Physical Data (cont)

Specific Gravity	1.39 g/cm^3
Solubility:	Miscible
Viscosity:	NA
pH (3% solution):	11
Hazardous Decomposition Products:	Oxides of carbon and silicon may be formed when heated to decomposition.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions.
Conditions to Avoid:	None.
Incompatibility:	Avoid hydrogen fluoride, fluorine, oxygen difluoride, chlorine trifluoride, strong acids, strong bases, oxidizers, aluminum, fiberglass, copper, brass, zinc, and galvanized containers.

Section 5 – Regulations

TSCA Inventory Listed: Yes

CERCLA Hazardous Substance (40 CFR Part 302)

Listed Substance: *No*

Unlisted Substance: *Yes*

SARA, Title III, Sections 302/303 (40 CFR Part 355) – Emergency Planning and Notification

Extremely Hazardous Substance: No

SARA, Title III, Sections 311/312 (40 CFR Part 370) – Hazardous Chemical Reporting: Community Right-To-Know

Hazard Category: Acute

SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know

Extremely Hazardous Substance: No

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage:	Keep in a tightly closed container (steel or plastic) and store in a cool, well ventilated area away from all incompatible materials (acids, reactive metals, and ammonium salts). Store in a dry location away from heat and in temperatures less than 24 ?C. Do not store in aluminum, fiberglass, copper, brass, zinc or galvanized containers.
Handling:	Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Use with adequate ventilation. Do not use product if it is brownish-yellow in color.

Personal Protective Equipment (PPE)

Engineering Controls:	General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Safety shower and eyewash station should be within direct access.
Respiratory Protection:	Use NIOSH-approved dust and mist respirator where spray mist exists. Respirators should be used in accordance with 29 CFR 1910.134.
Hand Protection:	Wear chemical resistant gloves.
Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Gloves and protective clothing should be worn during use.
Other:	
Protection Against Fire & Explosion:	Product is non-explosive and non-combustible.

Section 7 – Hazards Identification

Potential Health Effects	
Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes irritation. Symptoms include redness, itching and pain.
Ingestion:	May cause irritation to mouth, esophagus, and stomach.

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage (small):	Mop up and neutralize liquid, then discharge to sewer in accordance with local, state and federal regulations.
After Spillage/Leakage (large):	Keep unnecessary personnel away; isolate hazard area and do not allow entrance into the affected area. Do not touch or walk through spilled material. Stop leak if possible without risking injury. Prevent runoff from entering into storm sewers and ditches that lead to natural waterways. Isolate the material if at all possible. Sand or earth may be used to contain the spill. If containment is not possible, neutralize the contaminated area and flush with large quantities of water.
Extinguishing Media:	Material is compatible with all extinguishing media.
Further Information:	
First Aid	
Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Give artificial respiration if individual is not breathing. If breathing is difficult, give oxygen. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. **DO NOT** induce vomiting.
Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water. Remove contaminated clothing and shoes.

Section 9 – Accidental Release Measures

Precautions:	
PPE:	Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots (see Section 6).
Environmental Hazards:	Sinks and mixes with water. High pH of this material may be harmful to aquatic life. Only water will evaporate from a spill of this material.
Cleanup Methods:	Pick-up and place in an appropriate container for reclamation or disposal. US regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

Section 10 – Information on Toxicology

Toxicity Data	
Sodium Silicate:	When tested for primary eye irritation potential according to OECD Guidelines, Section 405, a similar sodium silicate solution produced corneal, iridal and conjunctival irritation. Some eye irritation was still present 14 days after treatment, although the average primary irritation score has declined from 29.7 after 1 day to 4.0 after 14 days. When tested for primary skin irritation potential, a similar sodium silicate solution produced irritation with a primary irritation index of 3 to abraded skin and 0 to intact skin. Human experience confirms that irritation occurs when sodium silicates get on clothes at the collar, cuffs, or other areas where abrasion may exist. The acute oral toxicity of this product has not been tested.
Ferrous Sulfate:	LD50 Oral (rat): 319 mg/kg not a suspected carcinogen.

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information:	Based on 100% solid sodium silicate, a 96 hour median tolerance for fish of 2,320 mg/l; a 96 hour median tolerance for water fleas of 247 mg/L; a 96 hour median tolerance for snail eggs of 632 mg/L; and a 96 hour median tolerance for Amphipoda of 160 mg/L.

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment:	Neutralize and landfill solids in an approved waste facility operated by an authorized contactor in compliance with local regulations.
Package (Pail) Treatment:	The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T.	This product is not regulated as a hazardous material so there are no restrictions.

Section 14 – Other Information

HMIS® Rating	Health – 2 (moderate)	Reactivity – 0 (none)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat
	Contact – 1 (slight)	

HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

APPENDIX C

PILOT TEST INJECTION AND BATHC MIXING LOGS

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 1

Injection Interval: 38' - 33'

Date: 8/19/2008 Totalizer Reading Before Mixing: 0

Time: 10:45 Totalizer Reading After Mixing:

TRC Personnel: B. Ross, H. Nichols Volume (Gallons): 500

RegenOx Dosage (%): 4%

RegenOx Part A: 5.60 Buckets 168.00 lbs

RegenOx Part B: 5.60 Buckets 168.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 2

Injection Interval: 38 - 33'

Date: 8/19/2008

Time: 14:35

TRC Personnel: B. Ross, H. Nichols

Totalizer Reading Before Mixing: 500.2

Totalizer Reading After Mixing: 650.8

Volume (Gallons): 150.6

RegenOx Dosage (%): 4%

RegenOx Part A: 1.50 Buckets 45.00 lbs

RegenOx Part B: 1.50 Buckets 45.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 3

Injection Interval: 33 - 28'

Date: 8/20/2008

Time: 8:20

TRC Personnel: B. Ross

Totalizer Reading Before Mixing: 650.8

Totalizer Reading After Mixing: 1100

Volume (Gallons): 449.2

RegenOx Dosage (%): 4%

RegenOx Part A: 4.50 Buckets 135.00 lbs

RegenOx Part B: 4.50 Buckets 135.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 4

Injection Interval: 33 - 28'

Date: 8/20/2008 Totalizer Reading Before Mixing: 1100

Time: 11:30 Totalizer Reading After Mixing: 1300

TRC Personnel: B. Ross Volume (Gallons): 200

RegenOx Dosage (%): 4%

RegenOx Part A: 2.00 Buckets 60.00 lbs

RegenOx Part B: 2.00 Buckets 60.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 5

Injection Interval: 28 - 23'

Date: 8/20/2008

Time: 13:21

TRC Personnel: B. Ross

Totalizer Reading Before Mixing: 1300

Totalizer Reading After Mixing: 1950

Volume (Gallons): 650

RegenOx Dosage (%): 4%

RegenOx Part A: 7.00 Buckets 210.00 lbs

RegenOx Part B: 7.00 Buckets 210.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 6

Injection Interval: 23 - 18'

Date: 8/21/2008

Time: 9:19

TRC Personnel: B. Ross

Totalizer Reading Before Mixing: 1950

Totalizer Reading After Mixing: 2550

Volume (Gallons): 600

RegenOx Dosage (%): 4%

RegenOx Part A: 6.50 Buckets 195.00 lbs

RegenOx Part B: 6.50 Buckets 195.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 7

Injection Interval: 23 - 18'

Date: 8/21/2008

Time: 11:30

TRC Personnel: B. Ross

Totalizer Reading Before Mixing: 2550

Totalizer Reading After Mixing: 2800

Volume (Gallons): 250

RegenOx Dosage (%): 4%

RegenOx Part A: 3.00 Buckets 90.00 lbs

RegenOx Part B: 3.00 Buckets 90.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 8

Injection Interval: 18' - 13'

Date: 8/21/2008 — Totalizer Reading Before Mixing: 2800

Time: 14:00 — Totalizer Reading After Mixing: 3050

TRC Personnel: B. Ross — Volume (Gallons): 250

RegenOx Dosage (%): 4%

RegenOx Part A: 3.00 Buckets 90.00 lbs

RegenOx Part B: 3.00 Buckets 90.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 9

Injection Interval: 18 - 13'

Date: 8/21/2008

Time: 15:25

TRC Personnel: B. Ross

Totalizer Reading Before Mixing: 3050

Totalizer Reading After Mixing: 3304

Volume (Gallons): 254

RegenOx Dosage (%): 4%

RegenOx Part A: 4.00 Buckets 120.00 lbs

RegenOx Part B: 4.00 Buckets 120.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 10

Injection Interval: 18' - 13'

Date: 8/22/2008

Totalizer Reading Before Mixing: 3304

Time: 7:50

Totalizer Reading After Mixing: 3634

TRC Personnel: H. Nichols

Volume (Gallons): 330

RegenOx Dosage (%): 4%

RegenOx Part A: 4.00 Buckets 120.00 lbs

RegenOx Part B: 3.00 Buckets 90.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 11

Injection Interval: 13' - 8'

Date: 8/22/2008

Time: 9:30

TRC Personnel: H. Nichols

Totalizer Reading Before Mixing: 3364

Totalizer Reading After Mixing: 3694

Volume (Gallons): 330

RegenOx Dosage (%): 4%

RegenOx Part A: 4.00 Buckets 120.00 lbs

RegenOx Part B: 3.00 Buckets 90.00 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

CPB - EDGEMERE
REGENOX BATCH MIXING FORM
ISCO PILOT TEST - AUGUST 2008
EDGEMERE, NEW YORK

Batch Number: 12

Injection Interval: 13' - 8'

Date: 8/22/2008

Time: 10:40

TRC Personnel: H. Nichols

Totalizer Reading Before Mixing: 3964

Totalizer Reading After Mixing: 4290

Volume (Gallons): 326

RegenOx Dosage (%): 4%

RegenOx Part A: 1 Buckets 30 lbs

RegenOx Part B: 3 Buckets 90 lbs

Examples:

Volume (Gallons):	1,000	750	500	250	100	50	4,137
Water Weight (lbs):	8,340	6,255	4,170	2,085	834	417	34,503
RegenOx Part A (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	5.6	2.8	1	0.6	46.0
RegenOx Part B (lbs):	334	250	167	83	33	17	1,380
# of Buckets:	11	8.3	6	2.8	1	0.6	46.0

Note:
Weight of Water: 8.34 lbs/gal
RegenOx Weight: 30 lbs/bucket

ISCO Injection Program - CPB Site

IP: 1 & 2

Project Name:	CPB	Drill Start:	10:35	Injection Start Time	8/19/08 11:56 AM
Project Number:	159807	Drill Stop:	10:55	Injection Stop Time	8/20/08 2:45 PM
Date Drilled:	08/19/08	Depth Drilled:	28'	LAWES Injection Personnel	Scott
Injection Date:	08/19/08 - 08/20/08			TRC Personnel	B. Ross, H. Nichols

RegenOx Concentration: 4% RegenOx (Part A)

Injection Zone (~8 feet to 38 feet bsg)
Strategy: Inject RegenOx/Ground Water solution
RegenOx Injection Rate: 22 lbs/foot - 65.2 gal/foot (8-14' and 20-40'); 30 lbs/foot - 88 gal/foot (14-20')

Injection Interval (5 foot intervals)	Time	Solution Injection Volume (gal)	Proposed Injection Volume (gal)	Notes
38 - 33	11:56	50	650	Stopped after ~ 50g. Formation was not taking. Resumed injection after raising the injection rods 2 feet closer to grade to a depth of 36'
	12:20			Lunch Break
	13:20			Attempting flush of IP-1 and IP-2. IP-2 cleared IP-1 still clogged due to runup into injection rods.
	13:55	100		IP-1 Cleared
	14:20	350		Injecting remainder of batch 1
	14:30			Finished injecting batch 1. 500g
	14:31	150		Mixing batch 2, 150 gallons.
	15:00			Injecting batch 2
	15:08			Interval finished
33 - 28	9:13	450	650	Injecting batch 3 at 32' depth
	9:26			Stopped to lift up rods
	9:58			Setting depth to 30' and tremmying to clear injection rods
	10:55			Resume injection of Batch 3
	11:15			Mixing batch 4
	11:45	200		Injecting batch 4
28 - 23	13:48	500	650	Start injection of batch 5 at 25' depth.
	14:25			Material coming out around rod at IP-1 so injection of remaining solution continues only at IP-2
	14:45	150		Injected remaining 150g for this interval into IP-2 only.

ISCO Injection Program - CPB Site

IP: 1 & 2

Project Name:	CPB	Drill Start:	9:19	Injection Start Time	8/21/08 9:40 AM
Project Number:	159807	Drill Stop:	10:55	Injection Stop Time	8/21/08 4:40 PM
Date Drilled:	08/19/08, 08/21/08	Depth Drilled:	38, 23	LAWES Injection Personnel	Scott
Injection Date:	08/21/08			TRC Personnel	B. Ross

RegenOx Concentration: 4% RegenOx (Part A)

Injection Zone (~8 feet to 38 feet bsg)
Strategy: Inject RegenOx/Ground Water solution
RegenOx Injection Rate: 22 lbs/foot - 65.2 gal/foot (8-14' and 20-40'); 30 lbs/foot - 88 gal/foot (14-20')

Injection Interval (5 foot intervals)	Time	Solution Injection Volume (gal)	Proposed Injection Volume (gal)	Notes
				IP-1 closed and grouted. Offest 3' and drilled replacement to 23'.
23 - 18	9:40	300	743	Injection of half of batch 6 at 20' depth. 300g
	10:50	300		Injection started of the rest of batch 6. 300g
	11:30			Material coming out from IP-3 location at end of 300g.
	11:40	250		IP-3 injecton valve partially closed to prevent more daylighting around IP-1 rods. Batch 7 injection started. 250g
	12:03			Material staying in ground and not coming out around IP-3 rods.
18 - 13	14:10	250	834	Injection of batch 8 at 18' depth, bubbling around IP-1. IP-1 valve 90% closed.
	16:00	254		Injecting batch 9 at 16' depth. 254g.

ISCO Injection Program - CPB Site

IP: 1 & 2

Project Name:	CPB	Drill Start:	-	Injection Start Time	8/22/08 8:29 AM
Project Number:	159807	Drill Stop:	-	Injection Stop Time	8/22/08 2:12 PM
Date Drilled:	08/19/08, 08/22/08	Depth Drilled:	38, 15	LAWES Injection Personnel	Scott
Injection Date:	08/22/08			TRC Personnel	H. Nichols

RegenOx Concentration: 4% RegenOx (Part A)

Injection Zone (~8 feet to 38 feet bsg)
Strategy: Inject RegenOx/Ground Water solution
RegenOx Injection Rate: 22 lbs/foot - 65.2 gal/foot (8-14' and 20-40'); 30 lbs/foot - 88 gal/foot (14-20')

Injection Interval (5 foot intervals)	Time	Solution Injection Volume (gal)	Proposed Injection Volume (gal)	Notes
				IP-1 closed and grouted. Offest 3' and drilled second replacement to 15'.
18 - 13	8:29		834	Continued from 08/21/08 (330g remaining to finish interval)
	9:27	330		Injected batch 10. Completed 18 - 13 injection interval
13 - 8	10:00	330	652	Batch 11 completed, some surface leakage at IP-1, patched surface with bentonite throttled down injection manifold at IP-1 valve so it was 1/4 open. Approximately 10gal of material leaked to the surface
	10:35			Batch 11 injection completed
	10:55	326		Injecting batch 12.
	11:00			Some surface leakage at IP-1 < 1gal of material. Paused injection, reaming out IP-2 and reinforcing at IP-1 with bentonite patch
	11:15			Injection resumes at IP-2, but surface leakage continues at IP-4
	11:30			Attempt to allow material to gravity feed into injection points. Some surface leakage was still observed. Paused injection and GW extraction to allow treatment area to stabalize.
	12:34			Ground water extraction resumes at MW-4s only. Attempt gravivty feed into both IP-1 and IP-1.
	12:57			Resume pumping into IP-1 and IP-1, approx. 100 gallons remaining, proceeding at low flow rate
	13:55			Injection going too slow. Closing IP-4 injection valve and only injecting to IP-2.
	14:12			Injection of Batch 12 complete. Remaining 50g was injected only into IP-2. Some surface leakage again near IP-1. No surfacing near IP-2.

<u>APPENDIX D</u>
GROUND WATER SAMPLING LOGS

Table
Ground Water Sampling Measurements and Calculations

SAMPLING DATE: 08/13/08 **Weather:** Mostly Sunny, AM upper 70s, PM upper 80s

Site Name/Location: CPB - Edgemere, Edgemere, NY **revised: 08/08**

PRE-PURGE INFORMATION									
Well No. or Name	Time	Total Depth (ft)	Depth To Water (ft)	Water Column (ft)	Multi-plier	Est. Purge Vol.(gal)	PID (ppm)	Depth to Prod. (ft)	Prod. Thick. (ft)
PZ-1	10:27	18.0	11.55	6.45	1.00	6.5	NM	ND	ND
PZ-2	10:23	18.0	10.41	7.59	1.00	7.6	NM	ND	ND
PZ-3	11:29	41.0	10.04	30.96	3.00	92.9	NM	ND	ND
MW-4s	11:38	20.0	9.41	10.59	1.00	10.6	NM	ND	ND
MW-4i	12:15	24.0	11.24	12.76	3.00	38.3	NM	ND	ND

PRE-PURGE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
11.0	0.81	Error	0.25	20.18	0	0.52	-190.0
7.9	1.01	155	7.64	21.22	0	0.6	-153.0
9.3	0.86	67	1.22	20.61	0	0.55	-9.0
NM	NM	NM	NM	NM	NM	NM	NM
6.8	1.22	43	7.33	17.5	0.1	0.8	-145.0

PURGING INFORMATION								
Well No. or Name	Pump Intake Depth (ft)	Time Pump On	Time Pump Off	Flow Rate per Volume (gpm)		Total Purge Vol. (gal)	Pump Type	Water Conditions (During Purging)
				1st & 2nd	3rd			
PZ-1	10:27	10:27	10:39				Grundfos	Dark green, strong odor
PZ-2	10:23	10:23	10:39				Grundfos	Green, turbid, strong odor
PZ-3	11:30	11:30	11:38				Grundfos	Very slightly turbid, no odor
MW-4s	11:40	11:40	11:48				Grundfos	Dark gray, strong odor
MW-4i	12:15	12:15	12:28				Grundfos	Gray, slightly turbid, strong odor

POST-PURGE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
10.4	0.81	37	0.97	18.97	0	0.52	-209.0
8.7	1.22	437	3.44	21.1	0.1	0.8	-98.0
7.2	1.48	24	3.6	15.75	0.1	1	-182.0
7.0	1.33	38	0	17.22	0.1	0.8	-233.0
6.6	1.41	81	0	15.45	0.1	0.9	-166.0

SAMPLING INFORMATION					
Well No. or Name	80% Recov. (ft)	Depth To Water (ft)	Sample Time	Sample Method*	Comments/Water Condition at Time of Sample
PZ-1	12.84	11.60	11:05	Grundfos	Clear
PZ-2	11.93	10.55	10:55	Grundfos	Slightly green tint, slightly turbid, odor
PZ-3	16.23	11.13	11:55	Grundfos	Slightly green, no odor
MW-4s	11.53	9.41	12:00	Grundfos	
MW-4i	13.79	11.31	12:45	Grundfos	Brown/gray, slightly turbid, organic solvents odor

POST-SAMPLE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
10.6	0.82	195	5.81	21.11	0	0.53	-183.0
8.5	1.19	162	4.72	20.91	0.1	0.8	-92.0
7.2	1.39	101	5.94	18.75	0.1	0.9	-139.0
7.9	1.07	87	2.99	20.37	0	0.7	-138.0
6.5	1.22	59	0.87	18.64	0.1	0.8	-100.0

Total depth includes stick-up height, if applicable.
Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.
80% recovery is calculated by subtracting 80% of the water column height from the total depth [Total Depth - (0.80 x Water Column)].
PID lamp is 10.6 eV, unless otherwise noted.
Analytical Methods (EPA): Temp (170.1); pH (150.1); Cond (120.1); DO (360.1)
K_{25} = conductivity corrected to 25°C.
*Sample method: bailer, submersible pump, peristaltic, etc.

NJDEP Certification No. 07734

Reviewed & Approved by: ______________________

Laboratory Manager or Designated Supervisor

TRC Meter Numbers			Rental Meter
pH: -	Cond: -	D.O.: -	Name: Horiba U-22
ORP: -			Serial No.:

Table
Ground Water Sampling Measurements and Calculations

SAMPLING DATE: 08/27/08 **Weather:** Mostly Sunny, AM upper 60s, PM upper 70s **Site Name/Location:** CPB - Edgemere, Edgemere, NY **revised: 08/08**

PRE-PURGE INFORMATION									
Well No. or Name	Time	Total Depth (ft)	Depth To Water (ft)	Water Column (ft)	Multi-plier	Est. Purge Vol.(gal)	PID (ppm)	Depth to Prod. (ft)	Prod. Thick. (ft)
PZ-1	08:09	16.0	10.54	5.48	0.49	2.7	110	ND	--
PZ-2	08:07	15.9	10.45	5.45	0.49	2.7	17.5	ND	--
PZ-3	08:05	41.3	10.90	30.36	0.49	14.9	0.6	ND	--
MW-4s	08:11	20.1	9.43	10.64	0.49	5.2	115	ND	--
MW-4i	08:12	43.2	11.19	31.96	0.49	15.7	4310	ND	--

PRE-PURGE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
10.8	1.40	98	17.76	21.63	0.84	9	-54
6.8	1.04	46	5.22	18.93	0.05	0.7	-128
6.5	1.00	16	5.43	14.42	0.04	0.6	-154
8.8	2.22	125	5.67	18.77	0.11	1.4	-74
6.7	1.49	34	7.02	17.06	7.07	1	57

PURGING INFORMATION									
Well No. or Name	Pump Intake Depth (ft)	Time Pump On	Time Pump Off	Flow Rate per Volume (gpm)		Total Purge Vol. (gal)	Pump Type	Water Conditions (During Purging)
				1st & 2nd	3rd			
PZ-1	12	09:24	09:29	0.7	0.7	3.5	Monsoon	Dark brown, odor
PZ-2	12	09:07	09:10	1.1	1.1	3.5	Monsoon	Green/brown, odor
PZ-3	15	08:50	09:02	1.2	1.2	15	Monsoon	V. slight green tint, no odor
MW-4s	11	10:09	10:15	1	1	5.5	Monsoon	Dark brown, odor
MW-4i	13	10:27	10:47	1	1	20	Monsoon	Light brown, odor

POST-PURGE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
10.6	2.00	43	14.52	21.25	1.2	12	-167
7.8	1.43	36	4.79	18.21	0.07	0.9	-215
6.4	1.51	4	3.82	13.22	0.07	1	-113
8.9	3.27	41	5.62	17.67	0.16	2.1	-90
6.8	1.86	18	7.85	14.46	0.09	1.2	-174

SAMPLING INFORMATION					
Well No. or Name	80% Recov. (ft)	Depth To Water (ft)	Sample Time	Sample Method*	Comments/Water Condition at Time of Sample
PZ-1	11.64	10.57	09:57	Bailer	Dark brown, odor
PZ-2	11.54	10.46	09:50	Bailer	Light brown
PZ-3	16.97	10.97	09:40	Bailer	Clear
MW-4s	11.56	9.45	10:40	Bailer	Dark brown, odor
MW-4i	17.58	11.39	10:55	Bailer	Clear

POST-SAMPLE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
10.5	0.02	42	12.62	21.09	1.22	13	-74
8.2	2.07	54	6.43	18.21	0.1	1.3	-156
6.9	1.11	17	6.44	17.59	0.05	0.7	-145
9.2	2.17	127	6.75	19.2	0.3	1.7	3
6.7	1.63	34	6.42	16.56	0.08	1	-95

Total depth includes stick-up height, if applicable.
Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.
80% recovery is calculated by subtracting 80% of the water column height from the total depth [Total Depth - (0.80 x Water Column)].
PID lamp is 10.6 eV, unless otherwise noted.
Analytical Methods (EPA): Temp (170.1); pH (150.1); Cond (120.1); DO (360.1)
K_{25} = conductivity corrected to 25°C.
*Sample method: bailer, submersible pump, peristaltic, etc.

NJDEP Certification No. 07734

Reviewed & Approved by: ______________________
Laboratory Manager or Designated Supervisor

TRC Meter Numbers			Rental Meter
pH: -	Cond: -	D.O.: -	Name: Horiba U-22
ORP: -			Serial No.: 606015

Table
Ground Water Sampling Measurements and Calculations

SAMPLING DATE: 09/03/08 **Weather:** Mostly Sunny, AM upper 70s, PM 80s

Site Name/Location: CPB - Edgemere, Edgemere, NY **revised: 08/08**

PRE-PURGE INFORMATION									
Well No. or Name	Time	Total Depth (ft)	Depth To Water (ft)	Water Column (ft)	Multi-plier	Est. Purge Vol.(gal)	PID (ppm)	Depth to Prod. (ft)	Prod. Thick. (ft)
PZ-1	09:31	16.0	10.59	5.43	0.49	2.7	NM	ND	--
PZ-2	09:29	15.9	10.54	5.36	0.49	2.6	NM	ND	--
PZ-3	09:26	41.3	10.92	30.35	0.49	14.9	NM	ND	--
MW-4s	09:33	20.1	9.81	10.27	0.49	5.0	NM	ND	--
MW-4i	09:38	43.2	11.18	32.03	0.49	15.7	NM	ND	--

PRE-PURGE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
12.62	9100	333	0.7	22.9	0.50	5.7	-327
9.31	1350	107	1.9	20.9	0.06	0.9	-182
9.84	881	33	11.2	20.1	0.04	0.6	-156
11.03	2060	80	1.7	20.9	0.10	1.3	-173
10.63	1580	22	0.2	17.9	0.07	1.0	-142

PURGING INFORMATION								
Well No. or Name	Pump Intake Depth (ft)	Time Pump On	Time Pump Off	Flow Rate per Volume (gpm)		Total Purge Vol. (gal)	Pump Type	Water Conditions (During Purging)
				1st & 2nd	3rd			
PZ-1	13	11:10	10:15	1	1	5	Monsoon	Dark brown, odor
PZ-2	13	10:33	10:33	0.9	0.9	3.5	Monsoon	Greenish brown, odor
PZ-3	13	09:53	10:02	1.67	1.67	15	Monsoon	V. slight green tint, slight odor
MW-4s	12	11:58	12:03	1	1	5	Monsoon	Greenish brown, odor
MW-4i	13	12:20	12:35	1	1	16	Monsoon	Very light brown, odor

POST-PURGE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
13.34	1470	107	0.0	21.5	0.86	9.0	-365
10.69	1600	46	0.2	19.7	0.07	1.0	-253
9.81	1590	6	0.5	15.1	0.07	1.0	-124
11.80	2970	50	10.2	19.4	0.15	1.9	-204
9.98	1840	11	1.0	16.3	0.09	1.2	-112

SAMPLING INFORMATION					
Well No. or Name	80% Recov. (ft)	Depth To Water (ft)	Sample Time	Sample Method*	Comments/Water Condition at Time of Sample
PZ-1	11.68	10.66	11:30	Bailer	Dark brown, odor/Efferversence with HCl in vial
PZ-2	11.61	10.54	10:45	Bailer	Greenish brown, odor
PZ-3	16.99	10.89	10:15	Bailer	Clear
MW-4s	11.86	9.60	12:15	Bailer	Light greenish brown, odor
MW-4i	17.59	11.06	12:50	Bailer	Clear, slight odor

POST-SAMPLE							
pH (su)	Field Cond. (mS/cm)	Turbidity (NTU)	DO (ppm)	Temp. (°C)	Salinity	TDS	ORP (mV)
12.10	1640	95	0.8	24.4	0.96	10.0	-252
9.93	1360	131	1.4	20.5	0.06	0.9	-193
9.60	1530	10	0.9	17.2	0.07	1.0	-107
11.84	1590	120	1.0	20.8	0.07	1.0	-222
9.46	1670	22	1.0	19.7	0.08	1.1	-108

Total depth includes stick-up height, if applicable.
Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.
80% recovery is calculated by subtracting 80% of the water column height from the total depth [Total Depth - (0.80 x Water Column)].
PID lamp is 10.6 eV, unless otherwise noted.
Analytical Methods (EPA): Temp (170.1); pH (150.1); Cond (120.1); DO (360.1)
K25 = conductivity corrected to 250C.
*Sample method: bailer, submersible pump, peristaltic, etc.

NJDEP Certification No. 07734

Reviewed & Approved by: ______________________

Laboratory Manager or Designated Supervisor

TRC Meter Numbers			Rental Meter
pH: -	Cond: -	D.O.: -	Name: Horiba U-22
ORP: -			Serial No.: 01048

Field Form - Regular Purging

Date: 09/17/08 TRC Personnel: B. Ross, M. MacDonald Weather:

Site Name/Location: CPB - Edgemere, Far Rockaway, NY revised 08/08 BR

PRE-PURGE INFORMATION									
Well No. or Name	Time	Total Depth (ft)	Depth To Water (ft)	Water Column (ft)	Multi-plier	Est. Purge Vol.(gal)	PID (ppm)	Depth to Prod. (ft)	Prod. Thick. (ft)
PZ-1	07:35	16	9.71	6.3	0.49	3	95	--	--
PZ-2	08:13	15	9.65	5.4	0.49	3	122	--	--
PZ-3	09:45	41	10.60	30.0	0.49	15	ND	--	--
MW-4s	10:50	20	8.61	11.4	0.49	6	38	--	--
MW-4i	11:45	42	11.00	31.0	0.49	15	196	--	--

PRE-PURGE								
pH (su)	Field Cond (uS/cm)	Turbidity (NTU)	D.O. (mg/L)	Temp. (^{o}C)	Salinity	TDS	ORP (mV)	ini.
10.68	6.83	59.0	3.24	19.06	0.4	4.3	-325	BR
8.13	1.04	69.8	4.86	18.86	0.0	0.7	-260	BR
8.04	1.20	55.8	8.42	14.08	0.1	0.8	-181	MM
9.27	1.20	51.8	3.71	17.53	0.1	1.1	-244	BR
8.95	1.32	Error	7.87	14.35	0.1	0.9	-154	MM

PURGING INFORMATION								
Well No. or Name	Pump Intake Depth (ft)	Time Pump On	Time Pump Off	Flow Rate per Volume (gpm) 1st & 2nd	3rd	Total Purge Vol. (gal)	Pump Type	Water Conditions (During Purging)
PZ-1	12	7:50	08:00	0.5		5	Monsoon	Brown, strong petroleum odor
PZ-2	12	08:15	08:25	0.5		5	Monsoon	Light Brown, petro odor, sheen
PZ-3	39	10:00	10:30	0.5		15	Monsoon	Clear, slight petro odor
MW-4s	12	11:00	11:10	0.5		5	Monsoon	Brown / Lt. Brown, petro odor
MW-4i	40	11:25	11:40	0.5		15	Monsoon	

POST-PURGE								
pH (su)	Field Cond (uS/cm)	Turbidity (NTU)	D.O. (mg/L)	Temp. (^{o}C)	Salinity	TDS	ORP (mV)	ini.
10.72	6.62	42.2	2.50	18.99	0.4	4.2	-313	BR
8.12	1.11	29.8	1.78	19.30	0.1	0.7	-202	BR
7.32	1.28	14.0	5.27	14.22	0.1	0.8	-143	BR
9.49	1.87	43.8	8.26	17.57	0.1	1.2	-220	BR
7.64	1.52	90.2	6.63	13.86	0.1	1.0	-139	BR

SAMPLING INFORMATION					
Well No. or Name	80% Recov. (ft)	Depth To Water (ft)	Sample Time	Sample Method*	Comments/Water Condition at Time of Sample
PZ-1			08:25	Bailer	Brown, strong petroleum odor
PZ-2			08:34	Bailer	Lt. Brown, slight sheen, petro odor, tiny black particles
PZ-3			10:40	Bailer	Clear, slight petro odor
MW-4s			11:15	Bailer	Dark Gray, many tiny particles, petro odor
MW-4i			12:10	Bailer	

POST-SAMPLE								
pH (su)	Field Cond (uS/cm)	Turbidity (NTU)	D.O. (mg/L)	Temp. (^{o}C)	Salinity	TDS	ORP (mV)	ini.
10.53	4.67	202.0	2.44	19.97	0.2	3.0	-258	BR
8.27	1.05	131.0	2.70	19.67	0.0	0.7	-205	BR
7.00	1.18	11.5	4.95	13.86	0.0	0.8	-120	BR
7.81	0.81	155.0	4.61	18.31	0.0	0.5	-222	BR
6.94	1.23	121.0	5.54	17.18	0.1	0.8	-93	BR

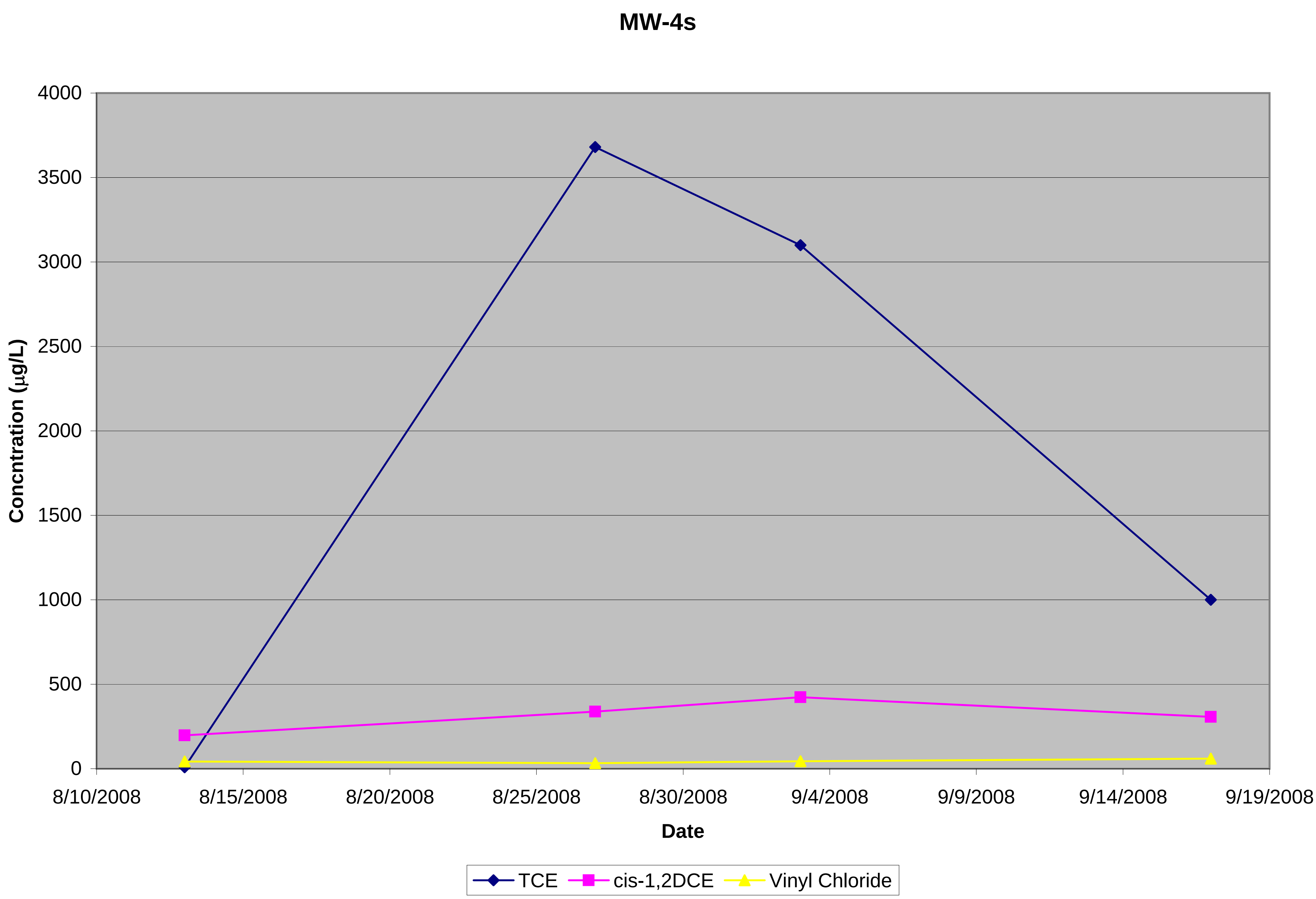
NJDEP Certification No. 07734

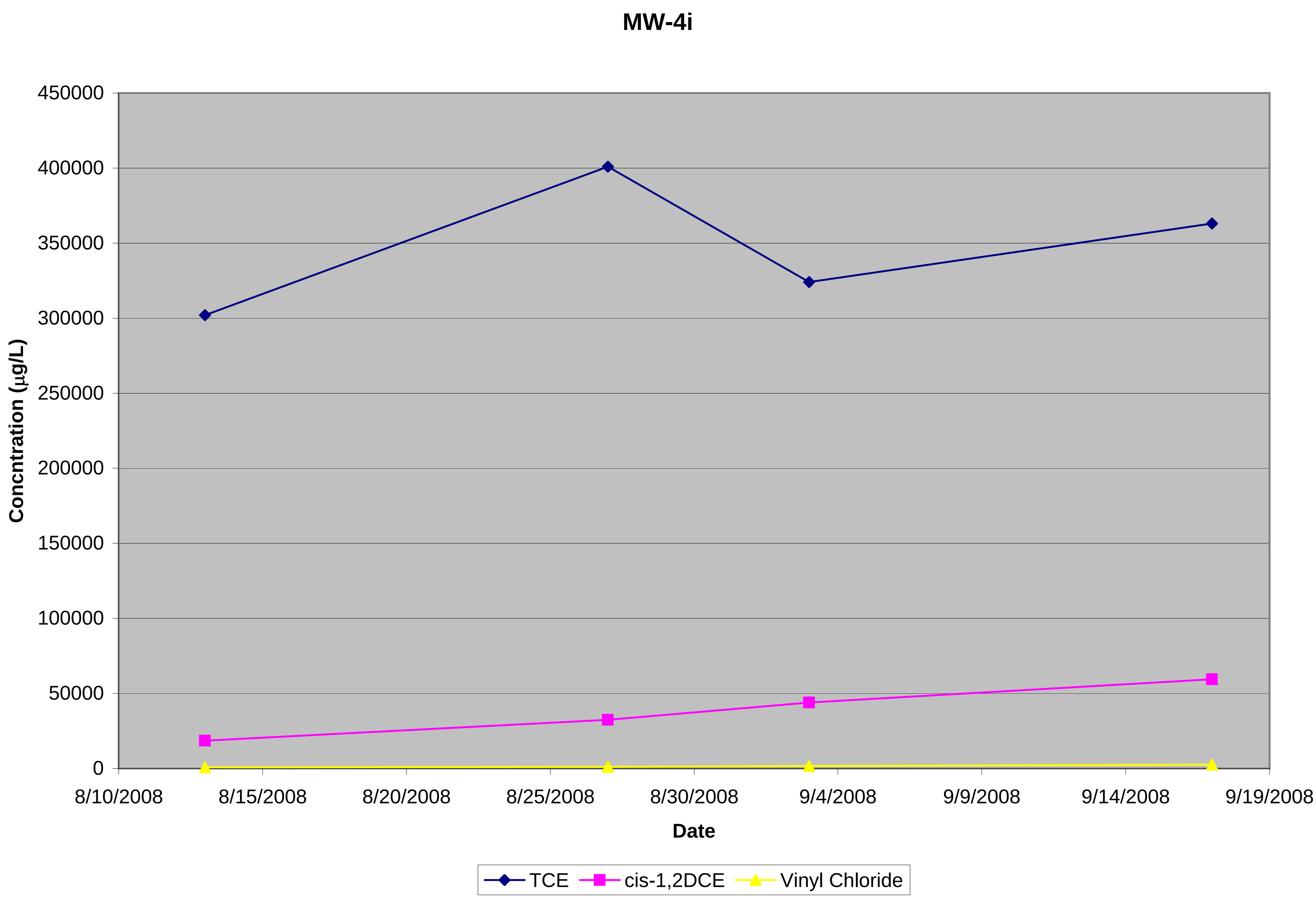
Total depth includes stick-up height.
Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.
80% recovery is calculated by subtracting 80% of the water column height from the total depth [Total Depth - (0.80 x Water Column)].
PID lamp is 10.6 eV, unless otherwise noted.
*Sample method: bailer, submersible pump, peristaltic, etc.

TRC Meter Numbers			Rental Meter
pH: --	Cond: --	D.O.: --	Name: Horiba U-22
ORP: --			Serial No.:

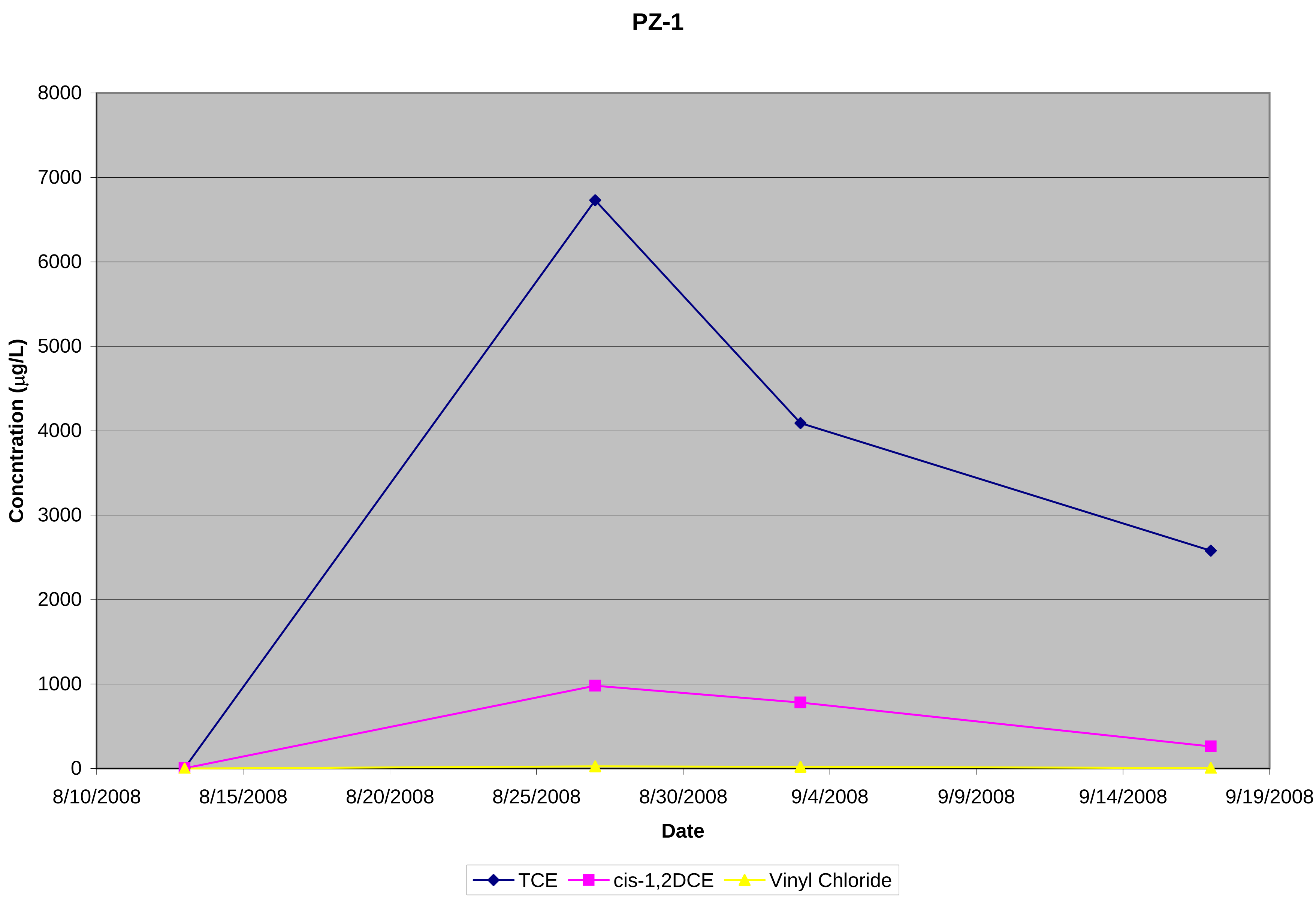
TRC Job No. 159807

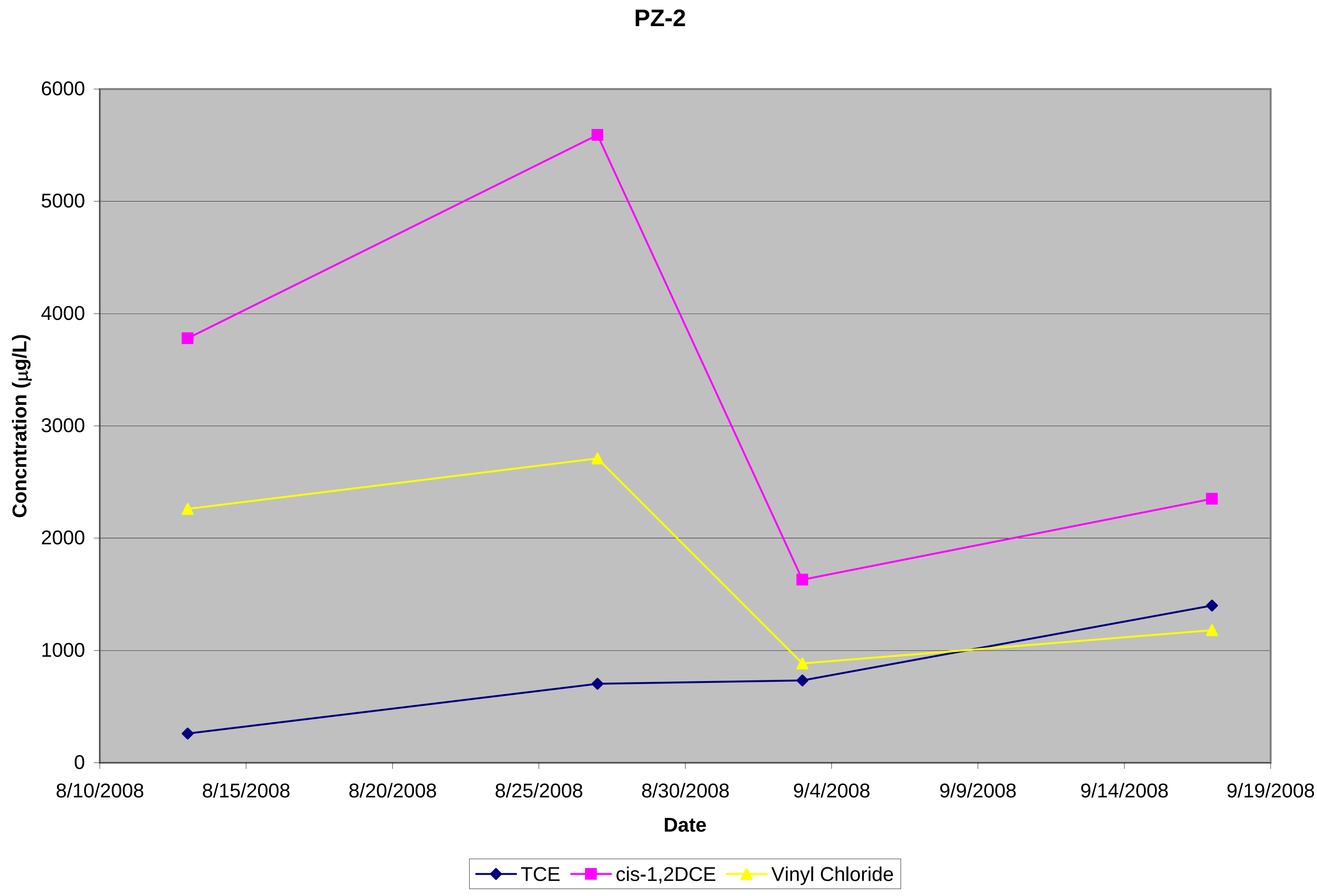
APPENDIX E
GROUND WATER SAMPLE RESULT GRAPHS
(μg/L)


MW-4s
Concntration (µg/L)
4000
3500
3000
2500
2000
1500
1000
500
0
8/10/2008
8/15/2008
8/20/2008
8/25/2008
8/30/2008
9/4/2008
9/9/2008
9/14/2008
9/19/2008
Date
TCE
cis-1,2DCE
Vinyl Chloride

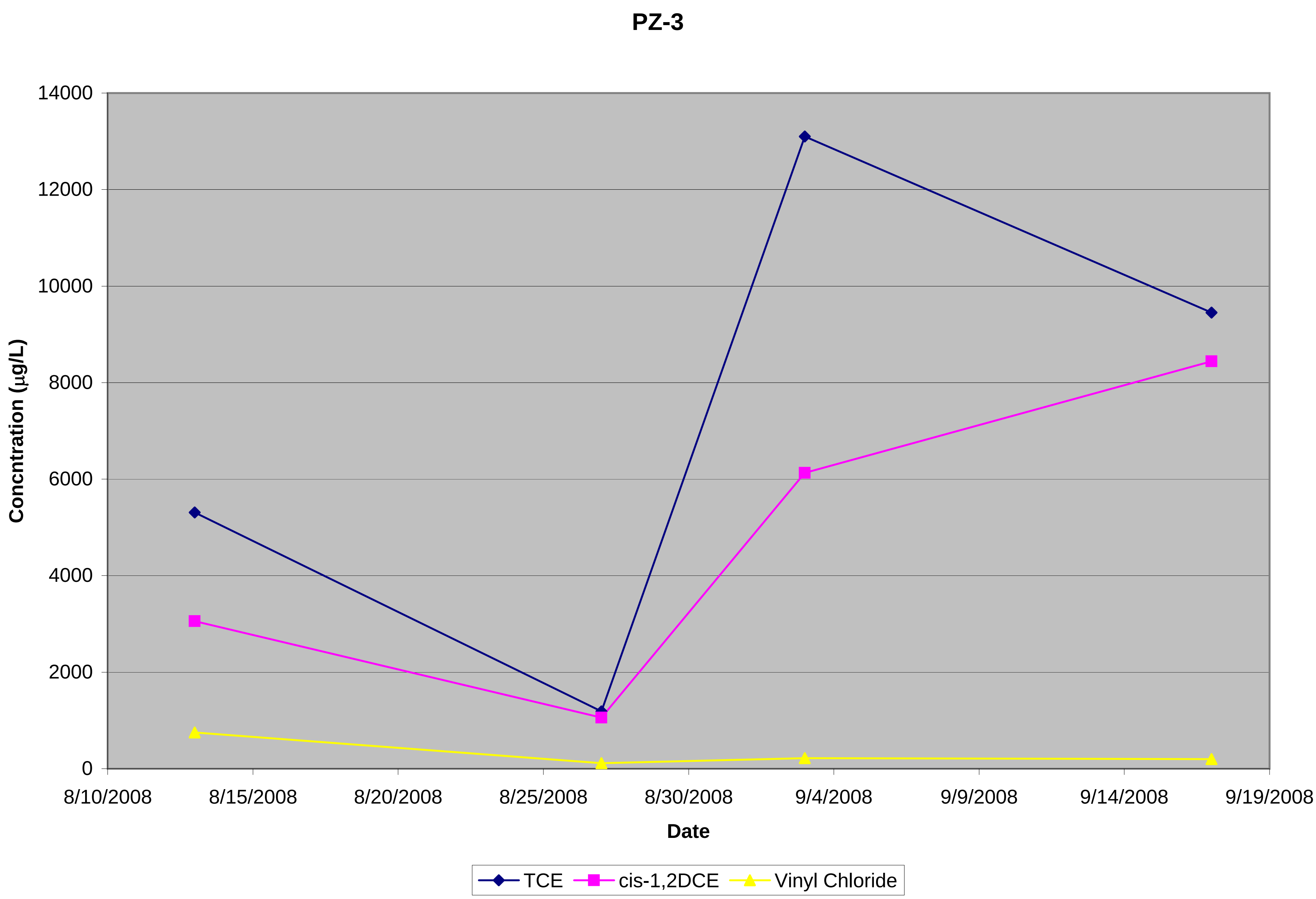


MW-4i
Concntration (µg/L)
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
8/10/2008
8/15/2008
8/20/2008
8/25/2008
8/30/2008
9/4/2008
9/9/2008
9/14/2008
9/19/2008
Date
TCE
cis-1,2DCE
Vinyl Chloride


PZ-1
8000
7000
6000
5000
4000
3000
2000
1000
0
Concntration (µg/L)
8/10/2008
8/15/2008
8/20/2008
8/25/2008
8/30/2008
9/4/2008
9/9/2008
9/14/2008
9/19/2008
Date
TCE
cis-1,2DCE
Vinyl Chloride



PZ-2
Concntration (µg/L)
6000
5000
4000
3000
2000
1000
0
8/10/2008
8/15/2008
8/20/2008
8/25/2008
8/30/2008
9/4/2008
9/9/2008
9/14/2008
9/19/2008
Date
TCE
cis-1,2DCE
Vinyl Chloride



PZ-3
14000
12000
10000
8000
6000
4000
2000
0
Concntration (μg/L)
8/10/2008
8/15/2008
8/20/2008
8/25/2008
8/30/2008
9/4/2008
9/9/2008
9/14/2008
9/19/2008
Date
TCE
cis-1,2DCE
Vinyl Chloride

APPENDIX F
PUMP TEST ANALYSIS AND RESULTS

Summary of Pump Test Results
Confined and Unconfined Semi-Log Drawdown Curve Fitting
CPB Site - Edgemere, NY

Pumping Well: **MW-4s**
Aquifer Thickness: 5.7 ft
Analysis Method: Unconfinded Semi-Log Drawdown Analysis, using Jacob WT Corrections

Observation Point	Pump Test #	Flow Rate (gpm)	Transmissivity (ft^2/day)	K (ft/day)	Storativity
PZ-1	1	2	273.34	48.0	4.95E-02
PZ-1	2	2	169.47	29.7	8.67E-02
PZ-2	1	2	553.16	97.0	6.53E-02
PZ-2	2	2	506.71	88.9	6.83E-02
			Averages:	66	6.75E-02

Analysis Method: Theissian Unconfined Model

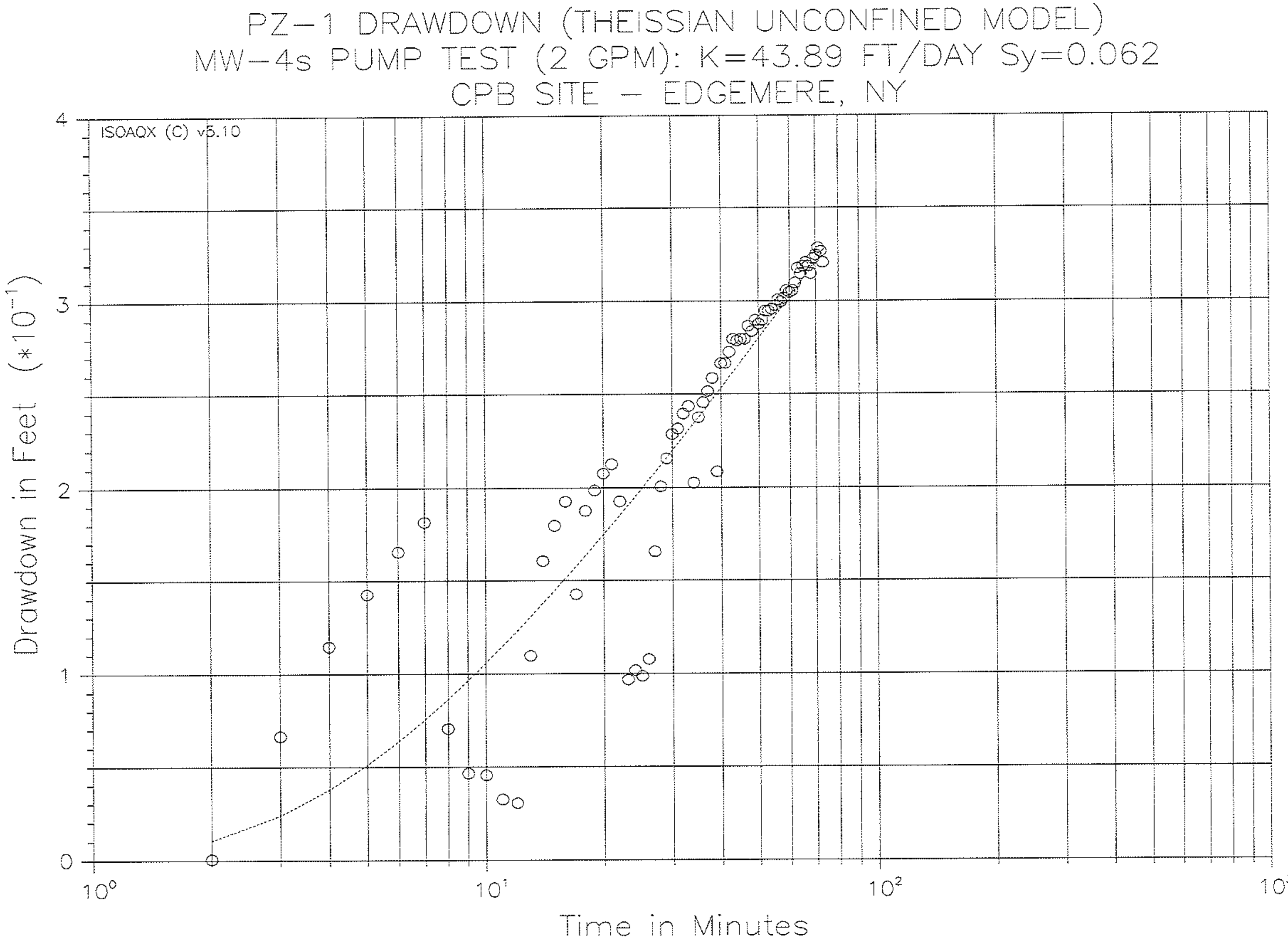
Observation Point	Pump Test #	Flow Rate (gpm)	K (ft/day)	Storativity
PZ-1	1	2	43.9	6.20E-02
PZ-1	2	2	56.9	7.70E-02
PZ-2	1	2	86.6	8.30E-02
PZ-2	2	2	68.5	1.00E-01
		Average:	64.0	8.05E-02

Pumping Well: **MW-4i**
Aquifer Thickness: 20 ft
Analysis Method: Confinded Semi-Log Drawdown Analysis

Observation Point	Pump Test #	Flow Rate (gpm)	Transmissivity (ft^2/day)	K (ft/day)	Storativity
PZ-3	1	5	188.05	9.4	2.95E-03

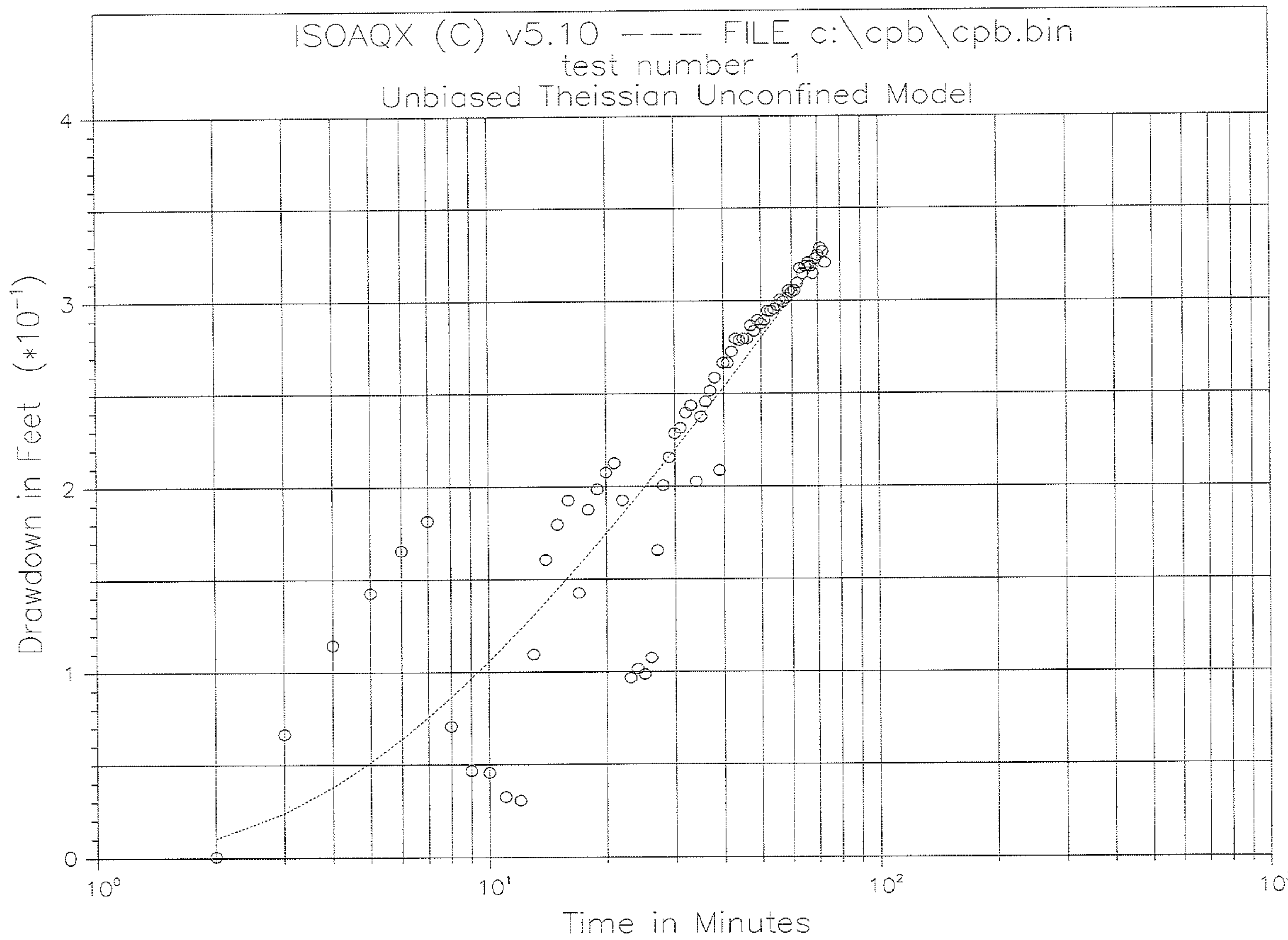
Analysis Method: Theissian Confined Model

Observation Point	Pump Test #	Flow Rate (gpm)	Transmissivity (ft^2/day)	K (ft/day)	Storativity
PZ-3	1	5	71.74	3.6	4.35E-03

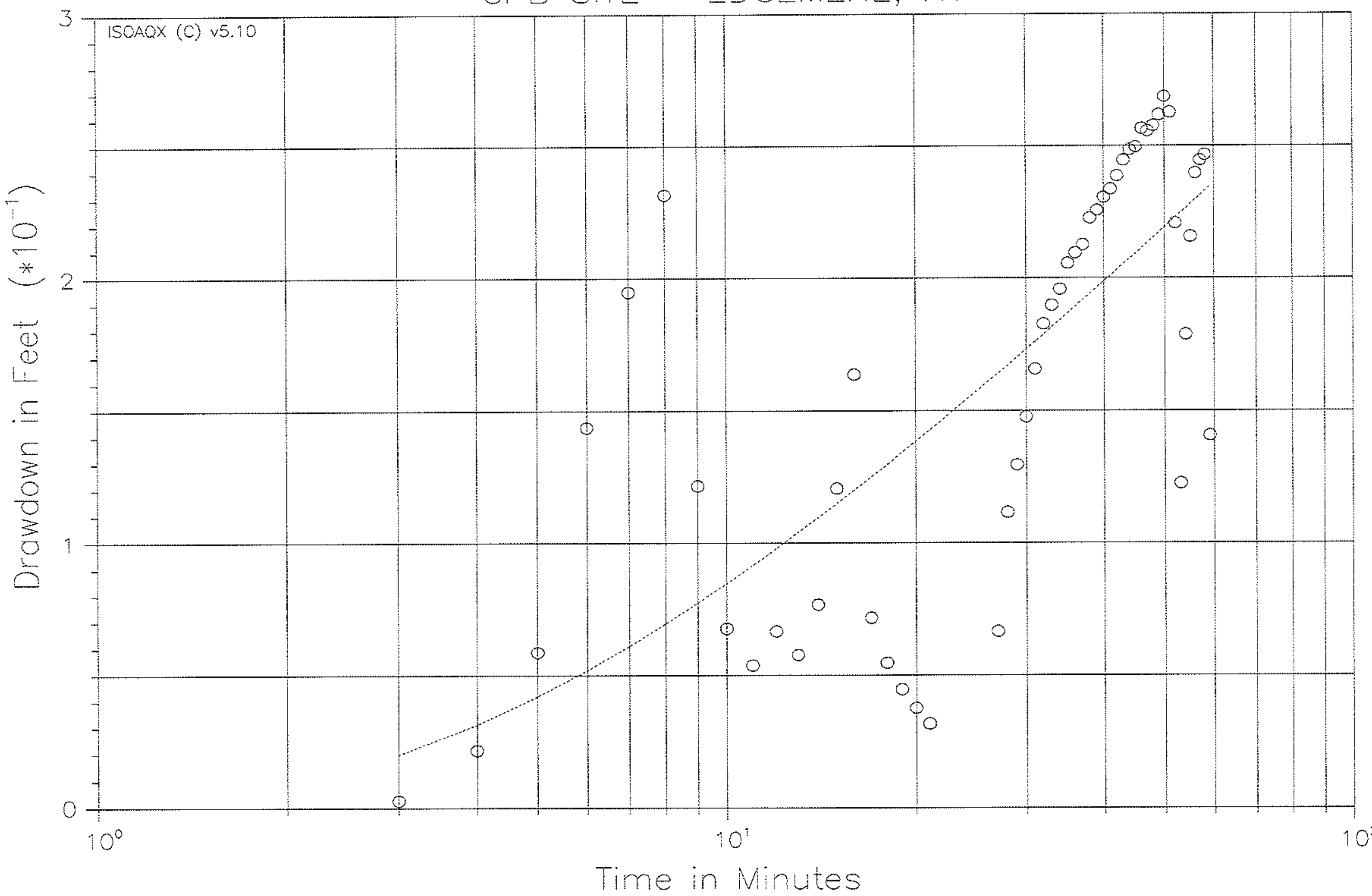


PZ-1 DRAWDOWN (THEISSIAN UNCONFINED MODEL)
MW-4s PUMP TEST (2 GPM): K=43.89 FT/DAY Sy=0.062
CPB SITE - EDGEMERE, NY
ISOAQX (C) v5.10
Drawdown in Feet (*10^{-1})
0
1
2
3
4
10^0
10^1
10^2
10^3
Time in Minutes

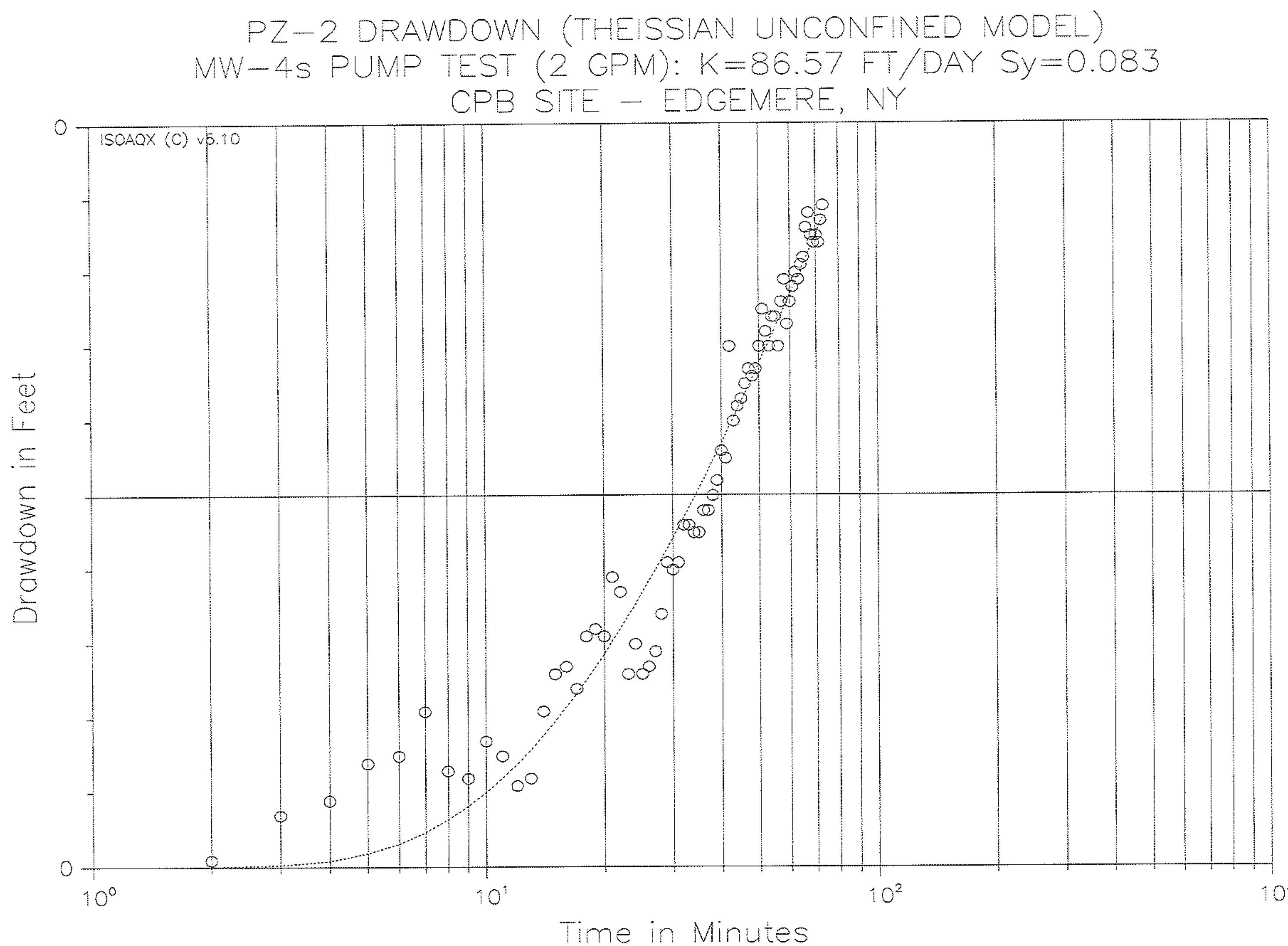
```
------------------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  1
------------------------------------------------------------------------
unbiased Theissian Unconfined Model:
Jacob's water-table data correction:                           was used
continuous data sampling:                          skip-factor not used
solution iteration passes =  7 // elapsed time  =       0.02  min
using closure tolerance setting                 =       1.000E-03
root mean squared error (ft)                    =       3.847E-02
hydraulic conductivity (ft/day)                 =      43.89
specific yield (dimensionless)                  =       6.204E-02
------------------------------------------------------------------------
```


ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin
test number 1
Unbiased Theissian Unconfined Model
Drawdown in Feet (*10^{-1})
0
1
2
3
4
10^{0}
10^{1}
10^{2}
10^{3}
Time in Minutes

PZ-1 DRAWDOWN (THEISSIAN UNCONFINED MODEL)
MW-4s PUMP TEST 2 (2 GPM): K=56.91 FT/DAY Sy=0.077
CPB SITE - EDGEMERE, NY

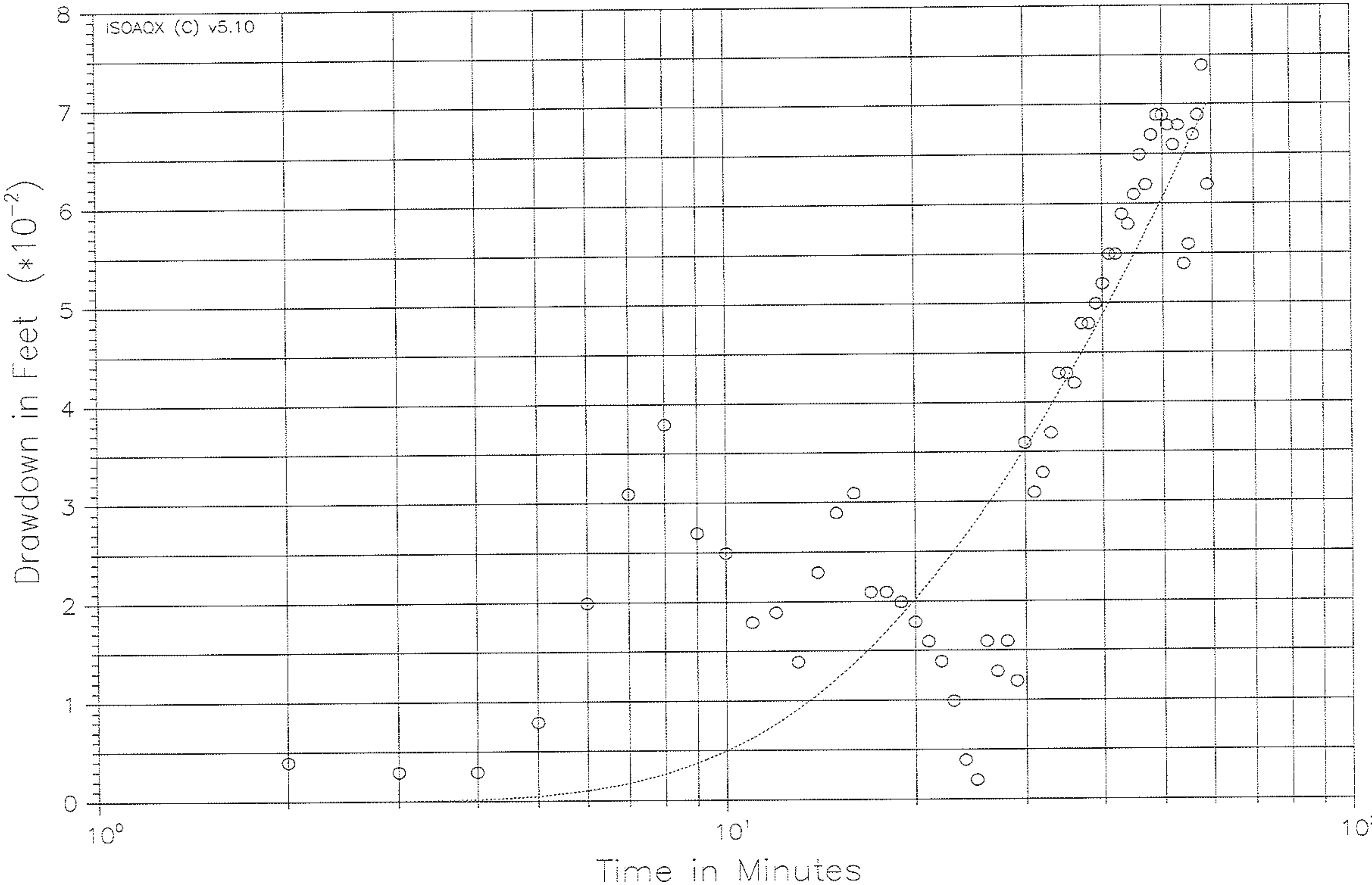


```
-----------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  2
-----------------------------------------------------------------
unbiased Theissian Unconfined Model:
Jacob's water-table data correction:                     was used
continuous data sampling:                       skip-factor not used
solution iteration passes =  7 // elapsed time  =       0.02  min
using closure tolerance setting                 =       1.000E-03
root mean squared error (ft)                    =       5.443E-02
hydraulic conductivity (ft/day)                 =      56.91
specific yield (dimensionless)                  =       7.662E-02
-----------------------------------------------------------------
```


PZ-2 DRAWDOWN (THEISSIAN UNCONFINED MODEL)
MW-4s PUMP TEST (2 GPM): K=86.57 FT/DAY Sy=0.083
CPB SITE - EDGEMERE, NY
ISOAQX (C) v5.10
0
0
Drawdown in Feet
10^0
10^1
10^2
10^3
Time in Minutes

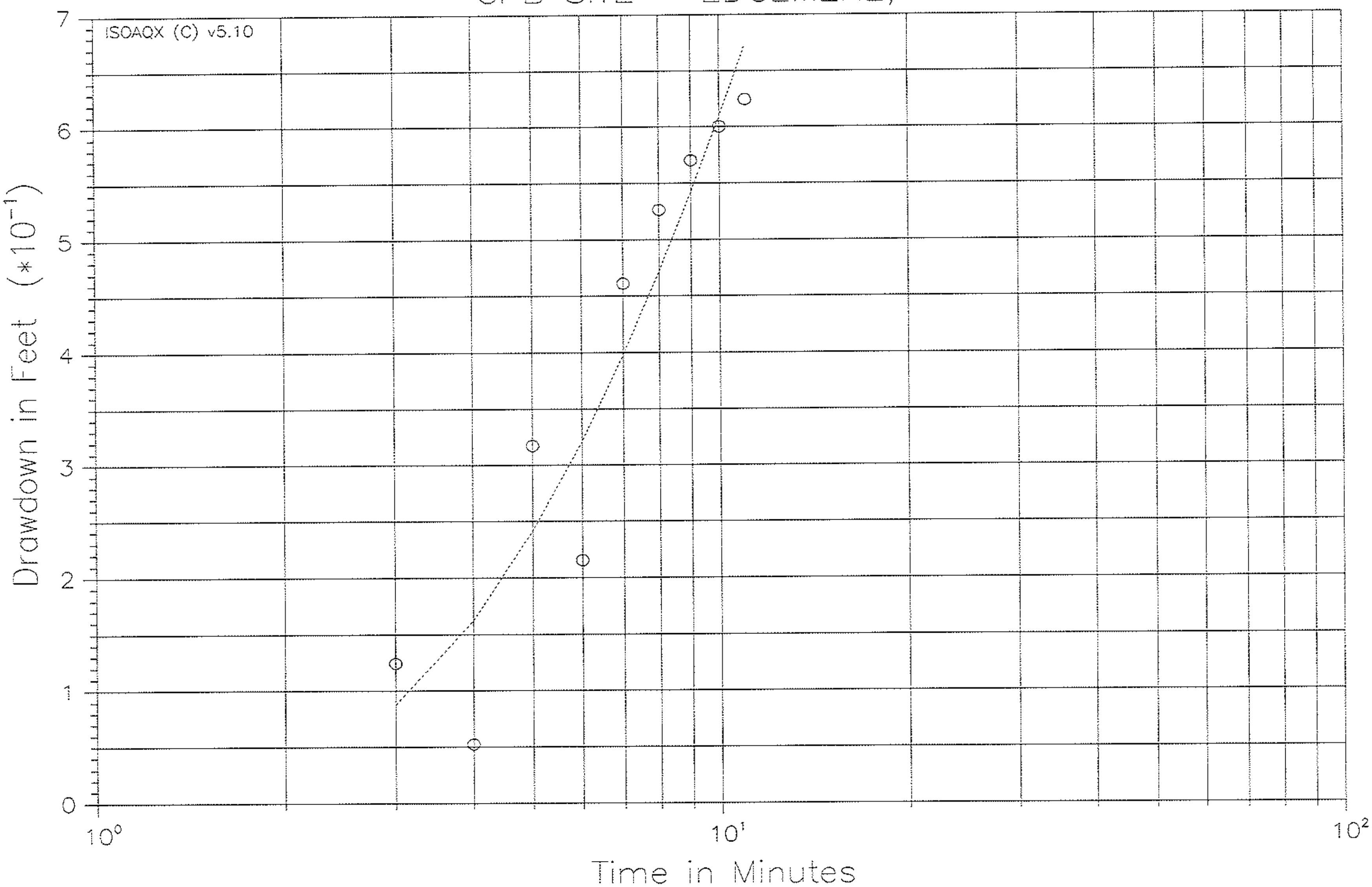
```
----------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  3
----------------------------------------------------------------
unbiased Theissian Unconfined Model:
Jacob's water-table data correction:                    was used
continuous data sampling:                    skip-factor not used
solution iteration passes =  7 // elapsed time  =      0.02  min
using closure tolerance setting                 =      1.000E-03
root mean squared error (ft)                    =      5.291E-03
hydraulic conductivity (ft/day)                 =     86.57
specific yield (dimensionless)                  =      8.316E-02
----------------------------------------------------------------
```

PZ-2 DRAWDOWN (THEISSIAN UNCONFINED MODEL)
MW-4s PUMP TEST 2 (2 GPM): K=68.45 FT/DAY Sy=0.10
CPB SITE - EDGEMERE, NY



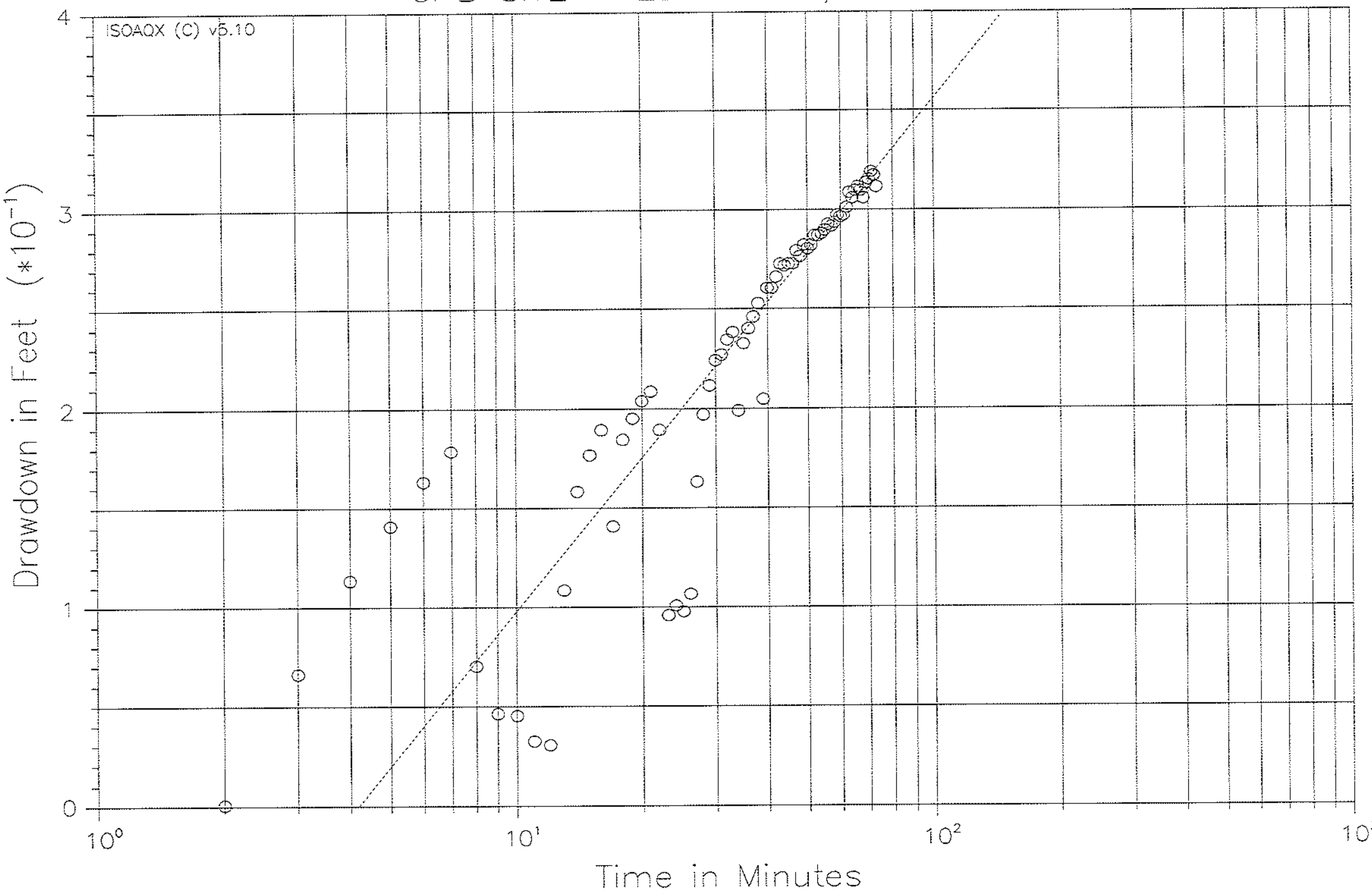
```
-----------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  4
-----------------------------------------------------------------
unbiased Theissian Unconfined Model:
Jacob's water-table data correction:                    was used
continuous data sampling:                     skip-factor not used
solution iteration passes = 13 // elapsed time  =     0.04  min
using closure tolerance setting                 =     1.000E-03
root mean squared error (ft)                    =     1.192E-02
hydraulic conductivity (ft/day)                 =    68.45
specific yield (dimensionless)                  =     1.005E-01
-----------------------------------------------------------------
```

PZ-3 DRAWDOWN (THEISSIAN CONFINED MODEL)
MW-4i PUMP TEST (5 GPM): T=71.84 FT2/DAY S=4.35e-3 b=20ft
CPB SITE - EDGEMERE, NY



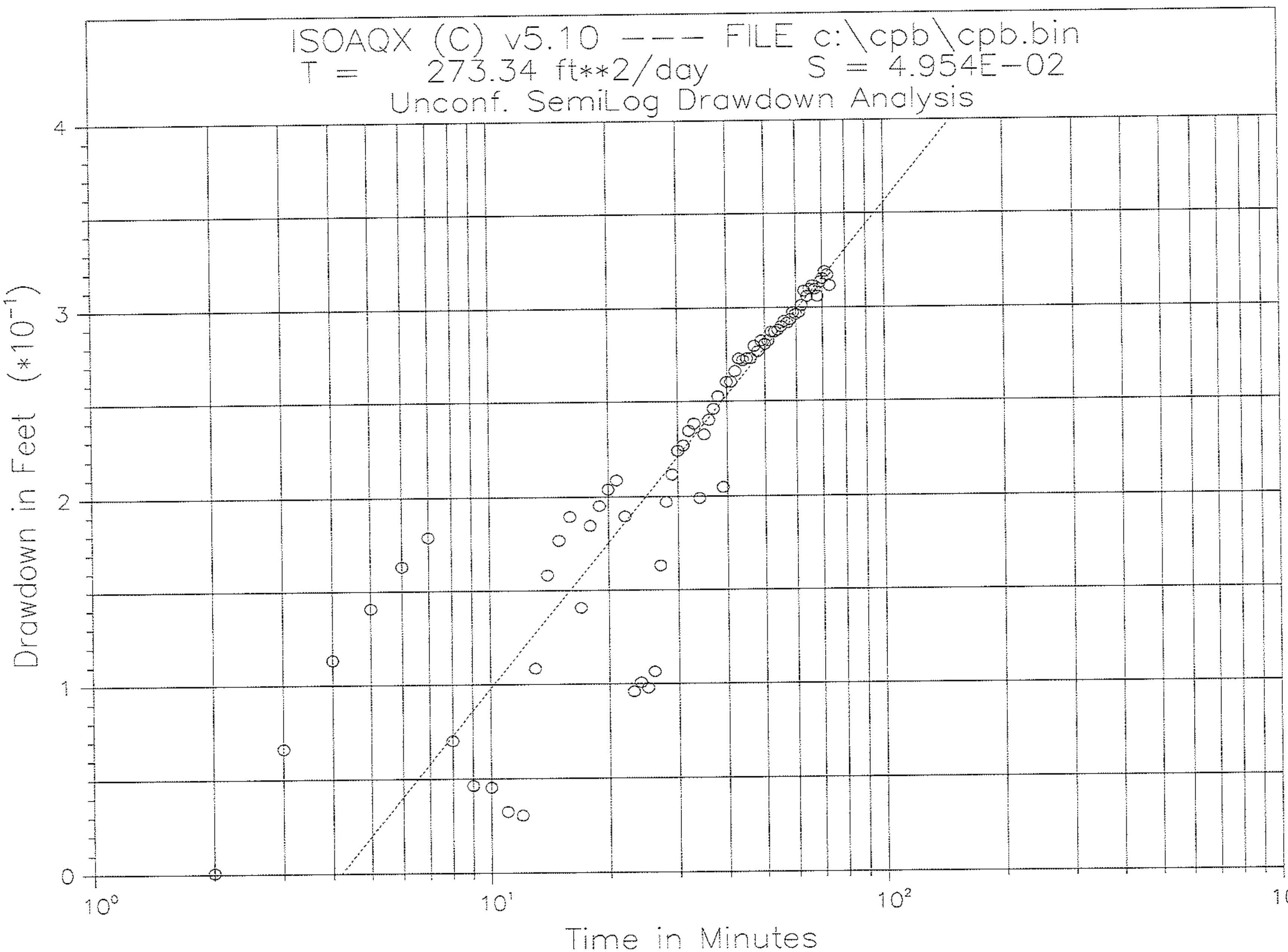
```
-----------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  5
-----------------------------------------------------------------
unbiased Theissian Full-Penetration Model:
continuous data sampling:                    skip-factor not used
solution iteration passes =  6 // elapsed time  =      0.02  min
using closure tolerance setting                 =      1.000E-03
root mean squared error (ft)                    =      6.707E-02
transmissivity (ft**2/day)                      =     71.84
storativity (dimensionless)                     =      4.350E-03
-----------------------------------------------------------------
```

MW-4s PUMP TEST 1 (2 GPM)
PZ-1 DRAWDOWN (T=273.34 FT2/DAY; S=4.954e-2)
CPB SITE - EDGEMERE, NEW YORK



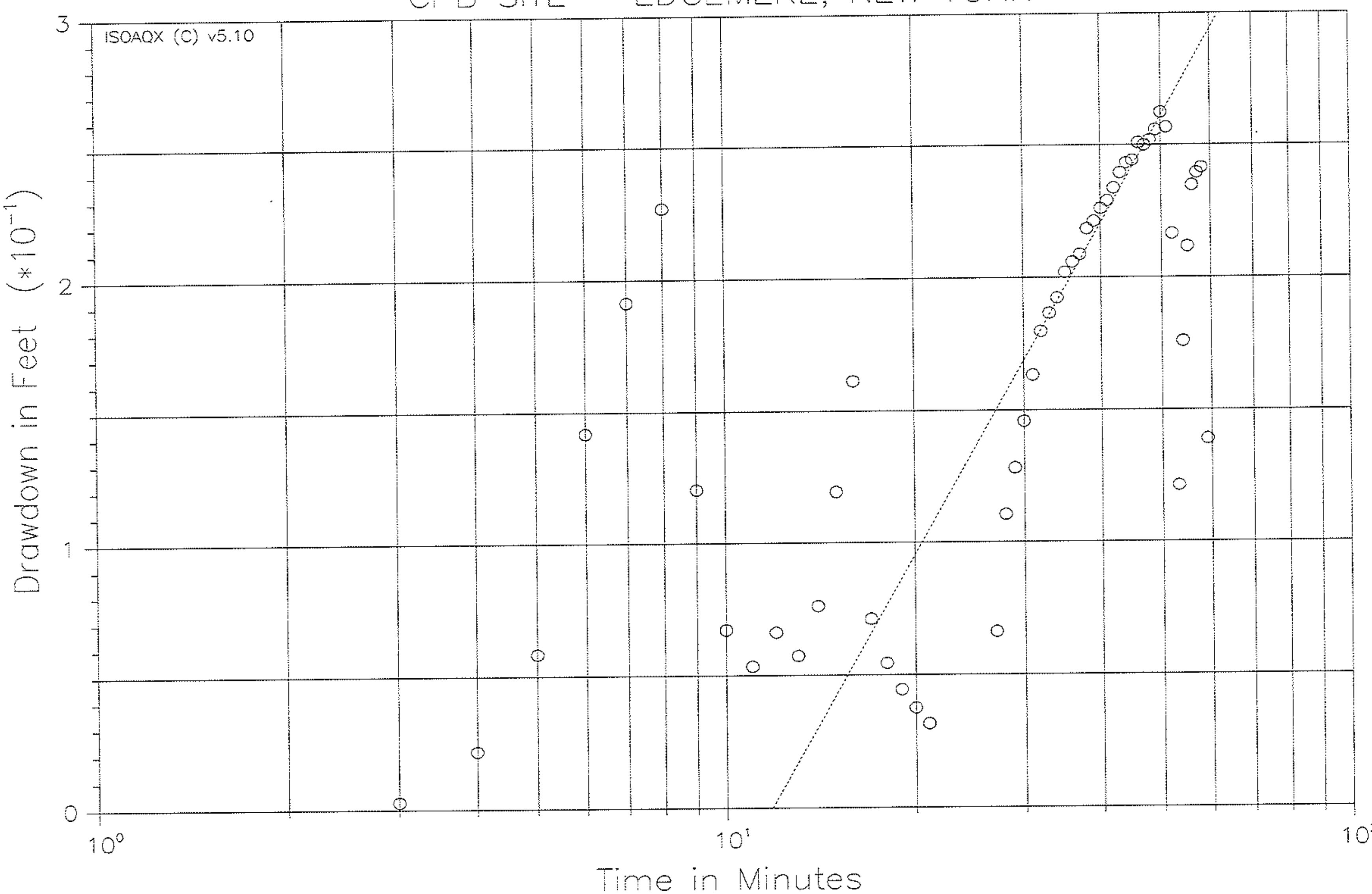
```
---------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  1
---------------------------------------------------------------
SemiLog Drawdown Analysis: (unconfined)
Jacob's water-table data correction:                  was used
root mean squared error (ft)                  =      4.491E-02
storativity (dimensionless)                   =      4.954E-02
transmissivity (ft**2/day)                    =    273.34
zero-drawdown time t0 (min.)                  =      4.183E+00
---------------------------------------------------------------
```

PZ-1-1

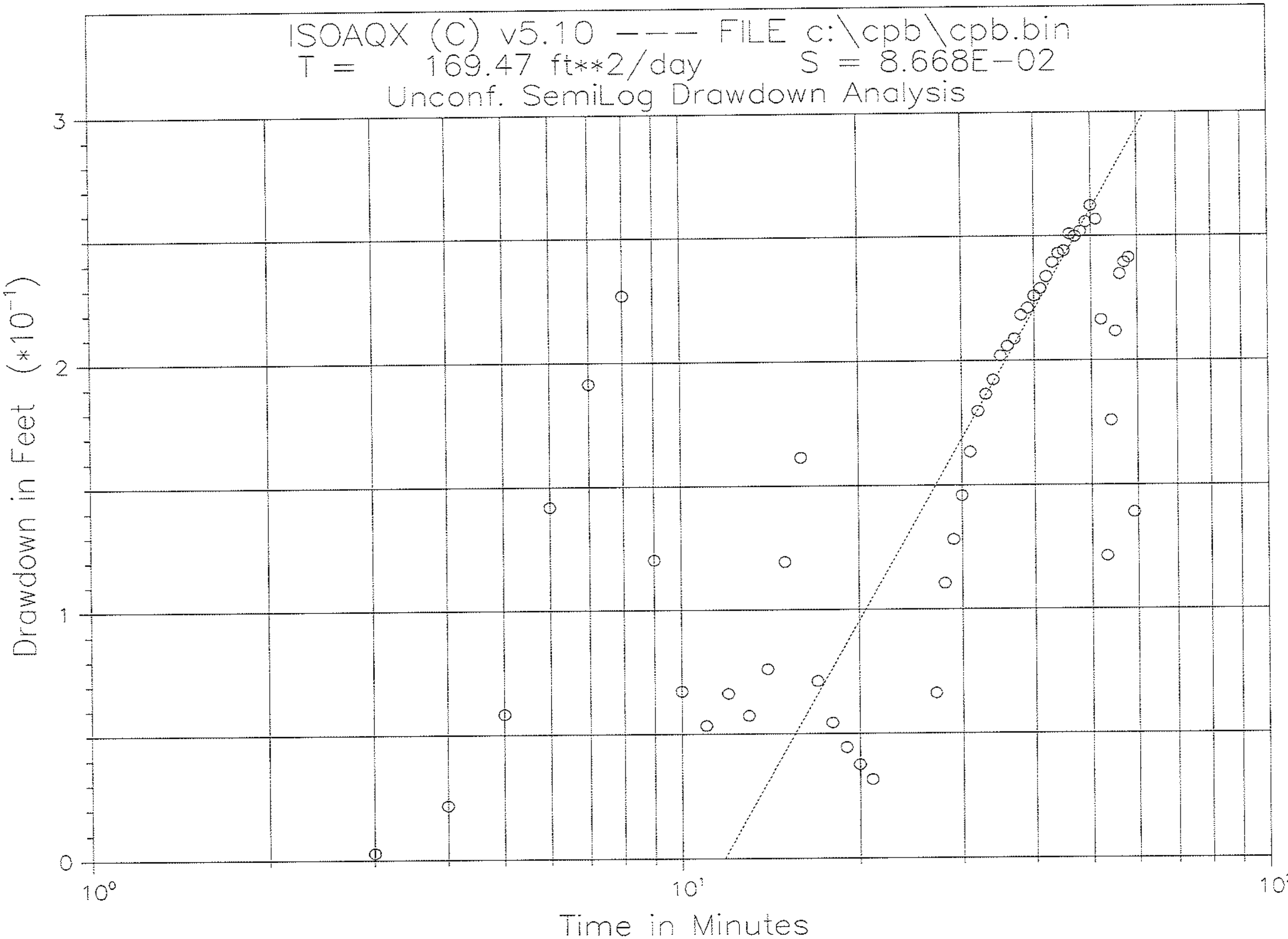


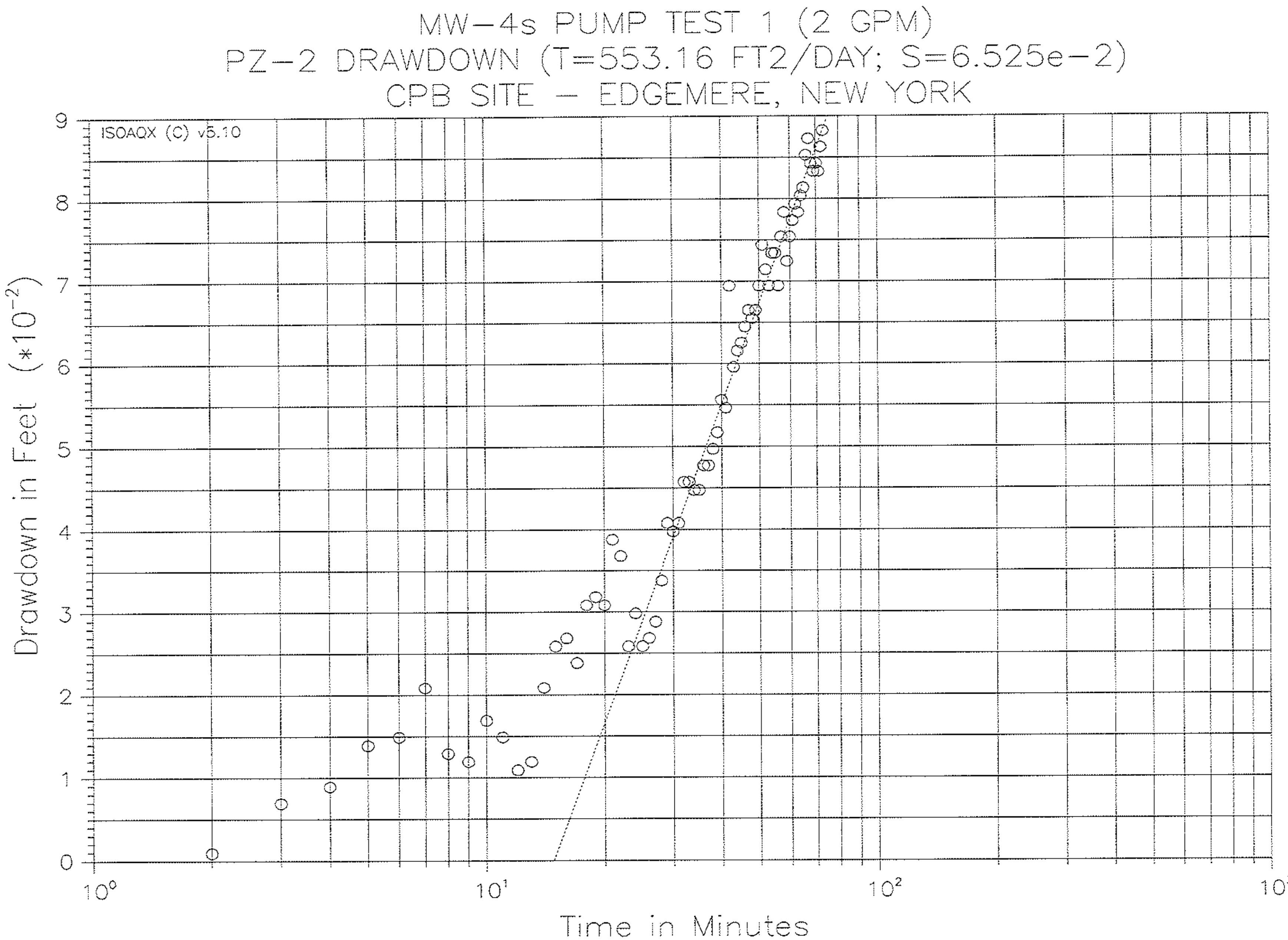
ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin
T = 273.34 ft**2/day S = 4.954E-02
Unconf. SemiLog Drawdown Analysis
Drawdown in Feet (*10^-1)
0
1
2
3
4
10^0
10^1
10^2
10^3
Time in Minutes

MW—4s PUMP TEST 2 (2 GPM)
PZ—1 DRAWDOWN (T=169.47 FT2/DAY; S=8.668e—2)
CPB SITE — EDGEMERE, NEW YORK

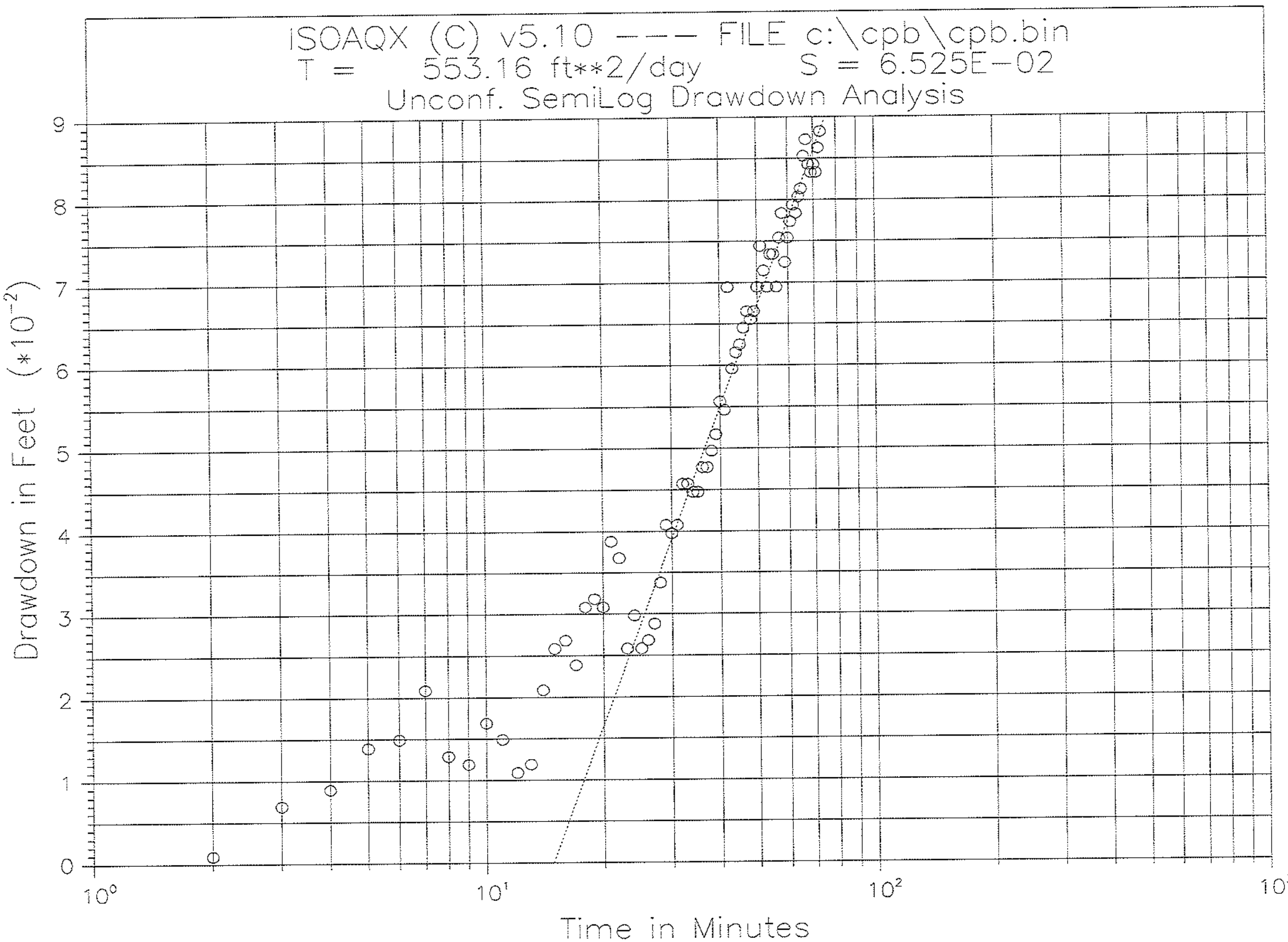


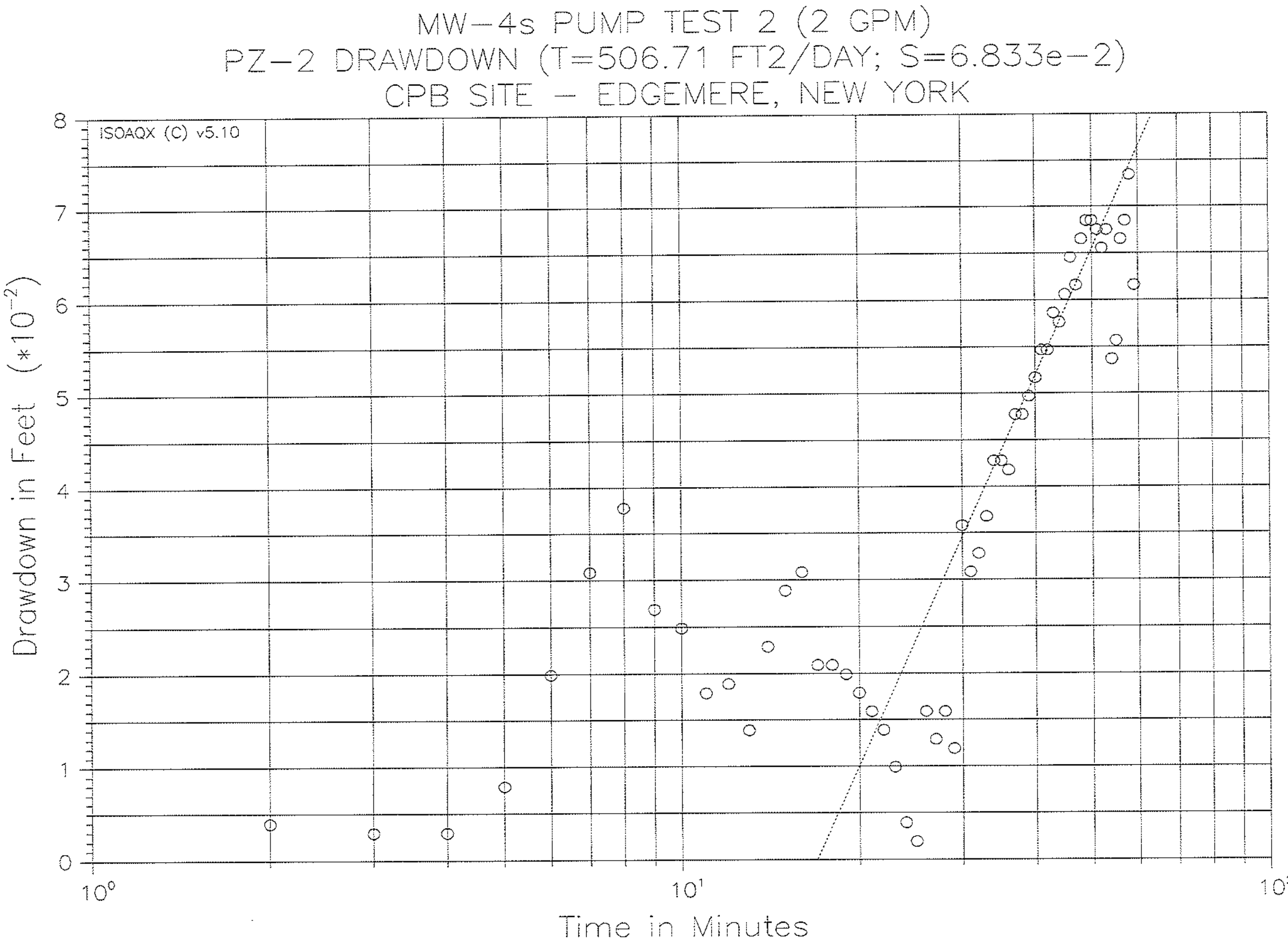
```
-----------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  2
-----------------------------------------------------------------
SemiLog Drawdown Analysis: (unconfined)
Jacob's water-table data correction:                     was used
root mean squared error (ft)                  =        1.033E-01
storativity (dimensionless)                   =        8.668E-02
transmissivity (ft**2/day)                    =      169.47
zero-drawdown time t0 (min.)                  =        1.181E+01
-----------------------------------------------------------------
```


ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin
T = 169.47 ft**2/day S = 8.668E-02
Unconf. SemiLog Drawdown Analysis
Drawdown in Feet (*10⁻¹)
0
1
2
3
10⁰
10¹
10²
Time in Minutes

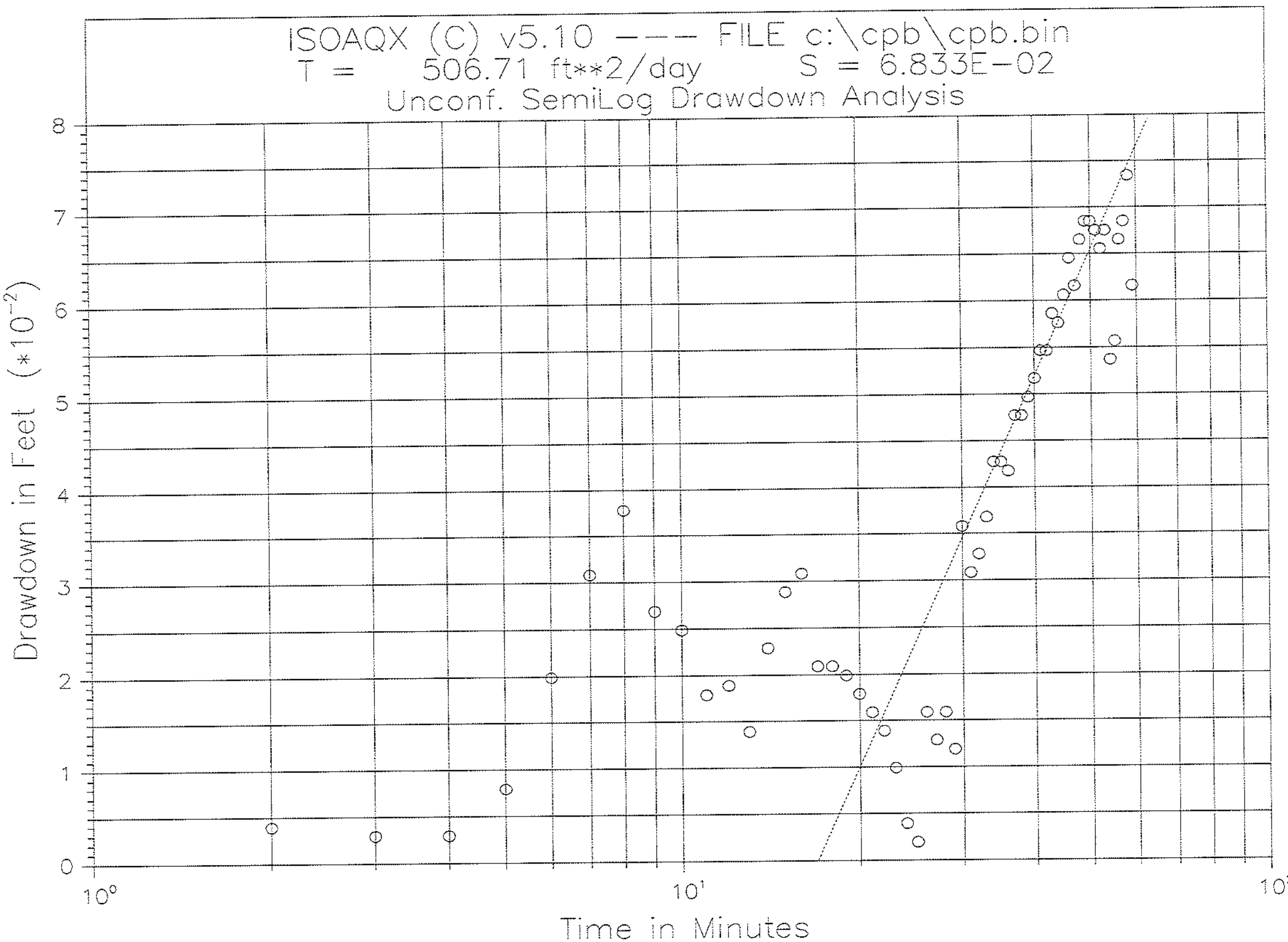

MW-4s PUMP TEST 1 (2 GPM)
PZ-2 DRAWDOWN (T=553.16 FT2/DAY; S=6.525e-2)
CPB SITE - EDGEMERE, NEW YORK
ISOAQX (C) v5.10
Drawdown in Feet (*10^-2)
Time in Minutes
0
1
2
3
4
5
6
7
8
9
10^0
10^1
10^2
10^3

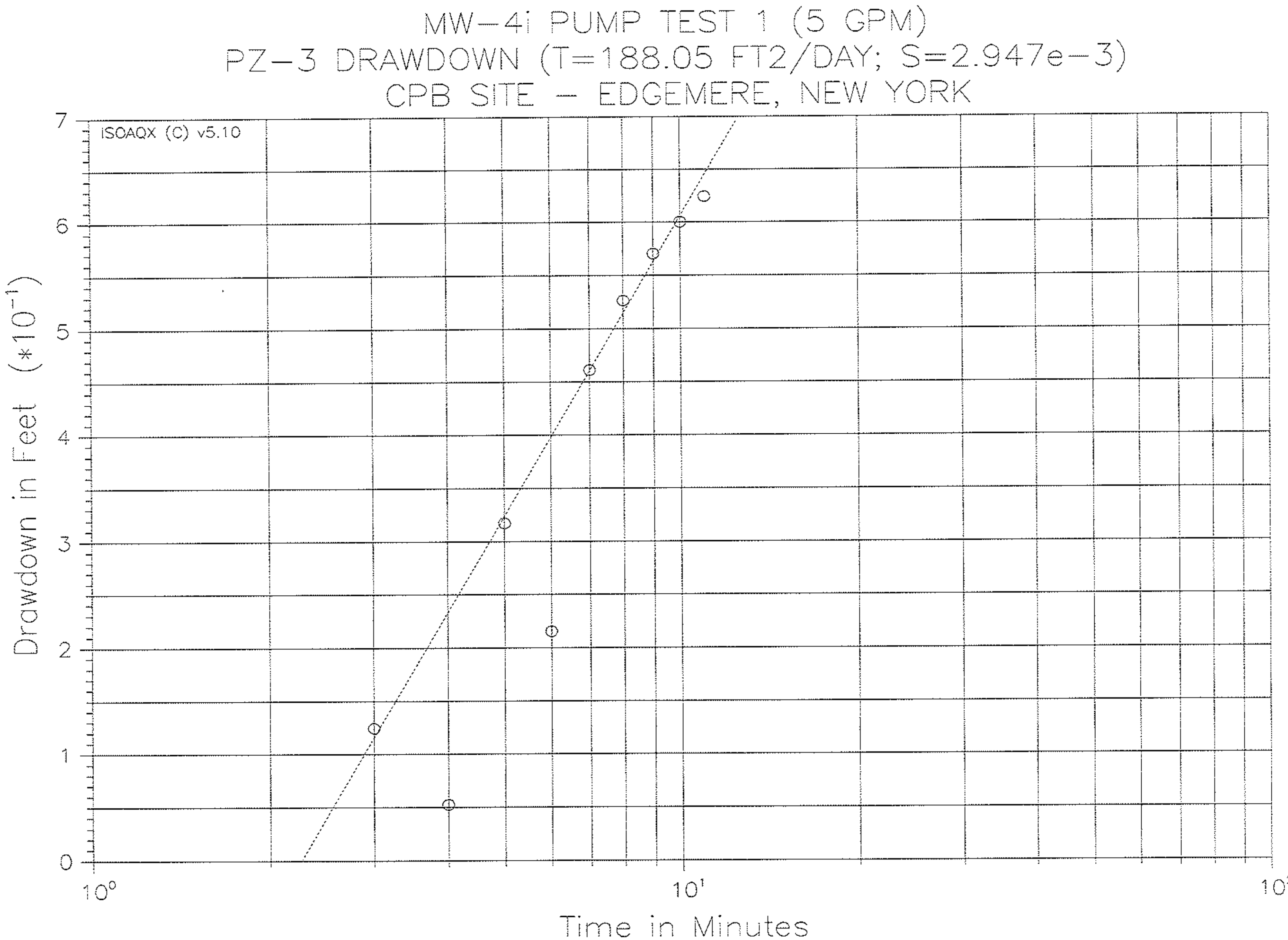
```
--------------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  3
--------------------------------------------------------------------
SemiLog Drawdown Analysis: (unconfined)
Jacob's water-table data correction:                        was used
root mean squared error (ft)                    =         2.715E-02
storativity (dimensionless)                     =         6.525E-02
transmissivity (ft**2/day)                      =       553.16
zero-drawdown time t0 (min.)                    =         1.482E+01
--------------------------------------------------------------------
```


ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin
T = 553.16 ft**2/day S = 6.525E-02
Unconf. SemiLog Drawdown Analysis
Drawdown in Feet (*10^-2)
0
1
2
3
4
5
6
7
8
9
10^0
10^1
10^2
10^3
Time in Minutes


MW-4s PUMP TEST 2 (2 GPM)
PZ-2 DRAWDOWN (T=506.71 FT2/DAY; S=6.833e-2)
CPB SITE - EDGEMERE, NEW YORK
ISOAQX (C) v5.10
Drawdown in Feet (*10^{-2})
0
1
2
3
4
5
6
7
8
10^0
10^1
10^2
Time in Minutes

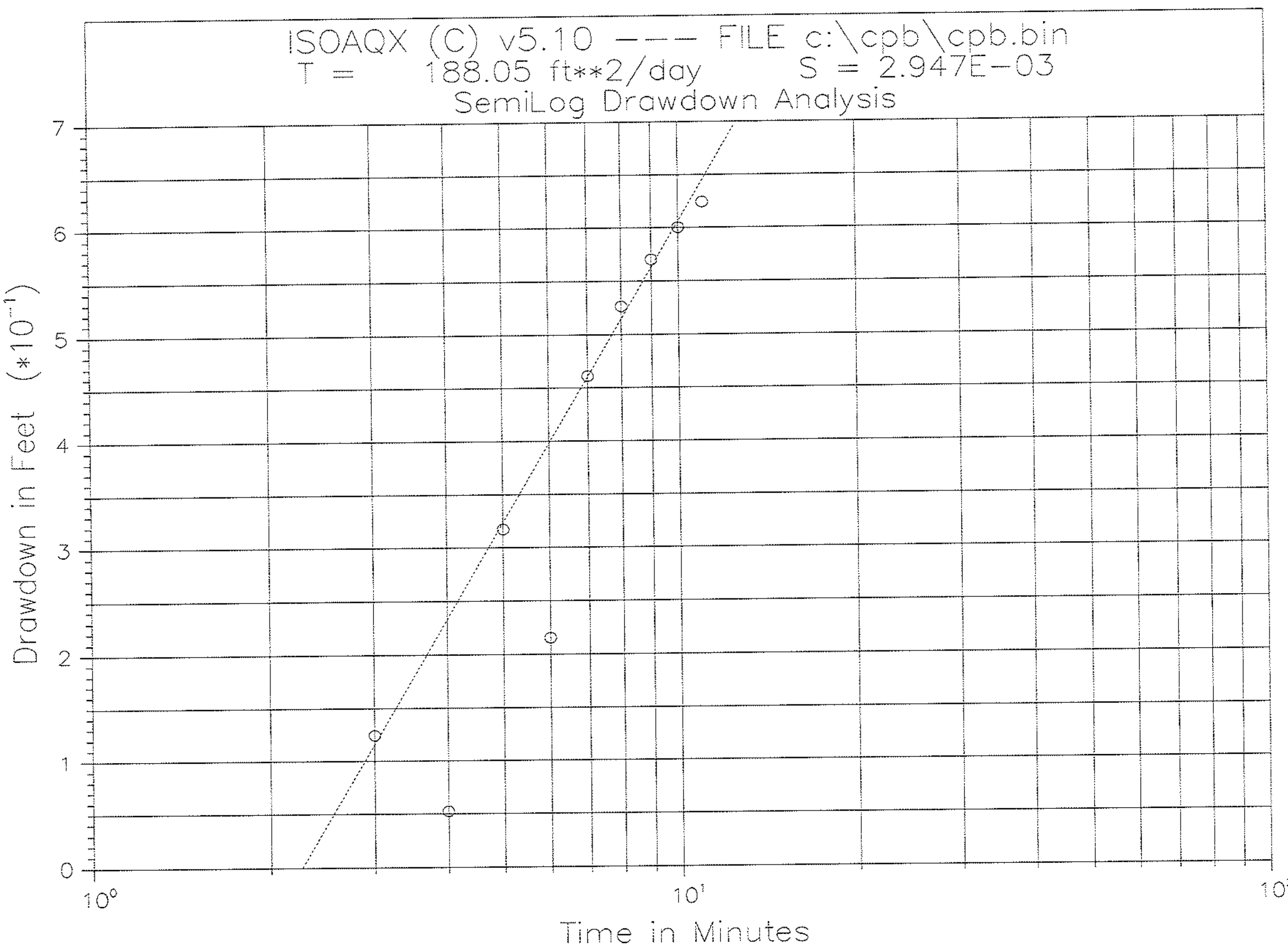
```
-----------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  4
-----------------------------------------------------------------
SemiLog Drawdown Analysis: (unconfined)
Jacob's water-table data correction:                    was used
root mean squared error (ft)                  =        3.814E-02
storativity (dimensionless)                   =        6.833E-02
transmissivity (ft**2/day)                    =      506.71
zero-drawdown time t0 (min.)                  =        1.695E+01
-----------------------------------------------------------------
```


ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin
T = 506.71 ft**2/day S = 6.833E-02
Unconf. SemiLog Drawdown Analysis
Drawdown in Feet (*10^-2)
0
1
2
3
4
5
6
7
8
10^0
10^1
10^2
Time in Minutes



MW-4i PUMP TEST 1 (5 GPM)
PZ-3 DRAWDOWN (T=188.05 FT2/DAY; S=2.947e-3)
CPB SITE - EDGEMERE, NEW YORK
ISOAQX (C) v5.10
Drawdown in Feet (*10^-1)
0
1
2
3
4
5
6
7
10^0
10^1
10^2
Time in Minutes

```
------------------------------------------------------------------
      ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin (modified)
test # comb:  5
------------------------------------------------------------------
SemiLog Drawdown Analysis:
root mean squared error (ft)                         =     8.554E-02
storativity (dimensionless)                          =     2.947E-03
transmissivity (ft**2/day)                           =   188.05
zero-drawdown time t0 (min.)                         =     2.261E+00
------------------------------------------------------------------
```

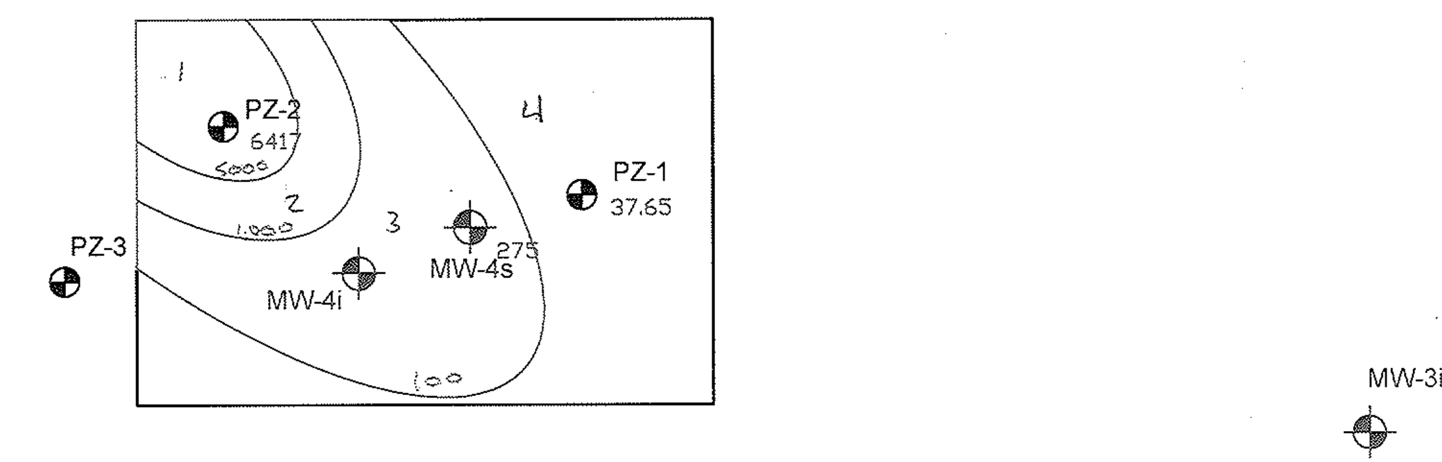

ISOAQX (C) v5.10 --- FILE c:\cpb\cpb.bin
T = 188.05 ft**2/day S = 2.947E-03
SemiLog Drawdown Analysis
Drawdown in Feet (*10⁻¹)
0
1
2
3
4
5
6
7
10⁰
10¹
10²
Time in Minutes

APPENDIX G
CONTAMINANT MASS ESTIMATES

Shallow Pre-Injection Samples 8/13

TOTAL VOCs

Area		Co	Thickness
1 -	59.4 ft²	6417 µg/L	6'
2 -	117.6 - 59.4 = 58.3	2,500	6'
3	326.7 - 117.6 = 209.	500	6'
4	600 - 326.7 = 273.3	50	6'



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

0 10 FT.
APPROXIMATE SCALE

TRC ENVIRONMENTAL CORP.
57 East Willow Street
Millburn, New Jersey 07041

PILOT TEST TREATMETN AREA
WELL, INJECTION POINT AND SOIL BORING LOCATIONS

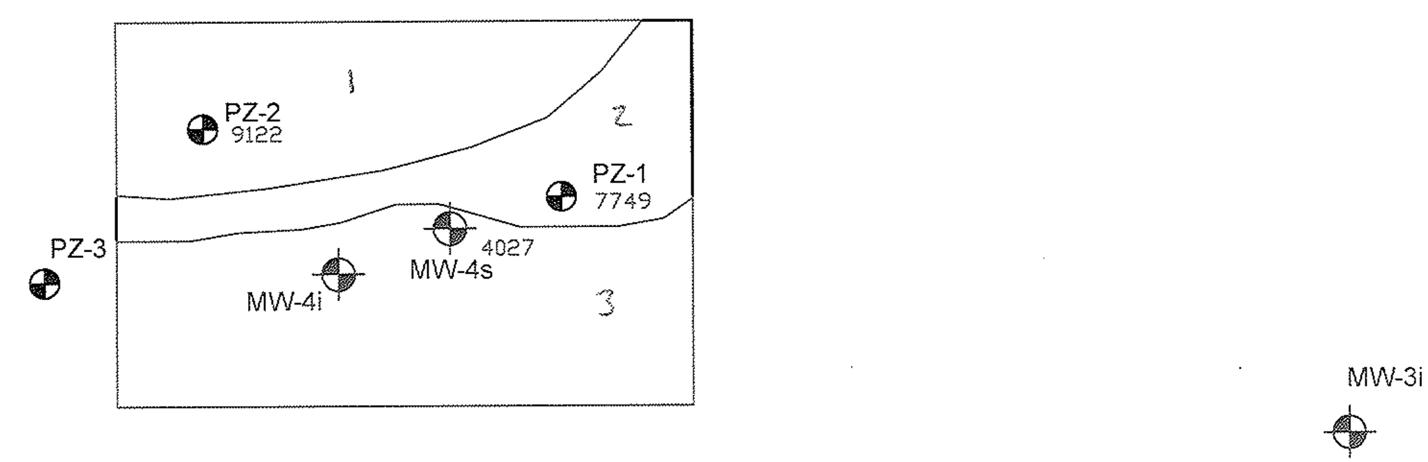
CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 4

Post - Injection Sample 1 (8/27/08)
Shallow

Area		Co	Thickness
1	189.25 ft^2	9122	6'
2	127.05	7749	6'
3	283.7	4027	6'



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

0 10 FT.
APPROXIMATE SCALE

TRC ENVIRONMENTAL CORP.
57 East Willow Street
Millburn, New Jersey 07041

PILOT TEST TREATMETN AREA
WELL, INJECTION POINT AND SOIL BORING LOCATIONS

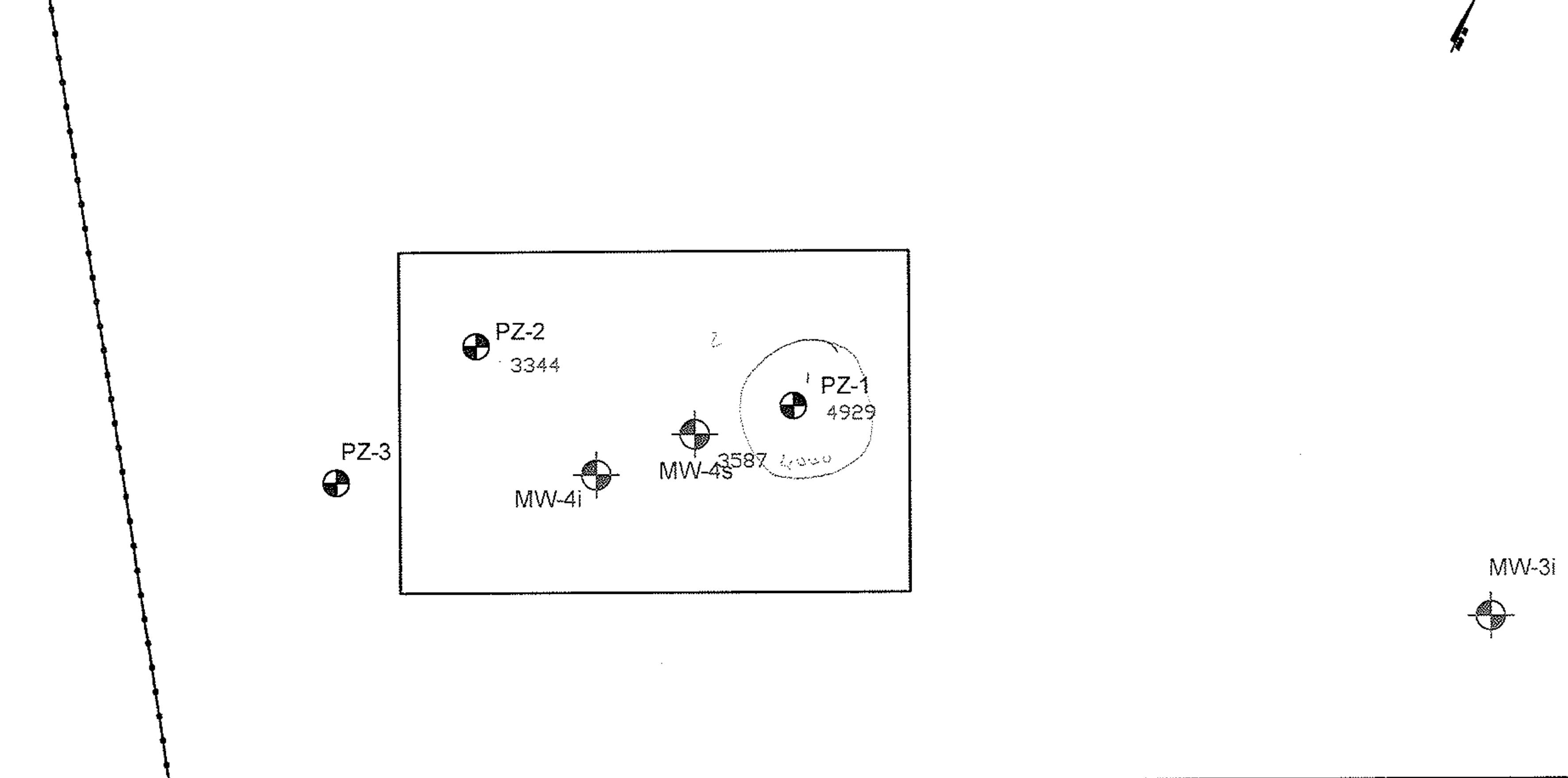
CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 4

SHALLOW POST TEST 2 (9/3/08)

Area		Co	Thickness
1	37.5'	5000	6'
2	600-37.5'	3500	6'



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

0 10 FT.
APPROXIMATE SCALE

TRC ENVIRONMENTAL CORP.
57 East Willow Street
Millburn, New Jersey 07041

PILOT TEST TREATMETN AREA
WELL, INJECTION POINT AND SOIL BORING LOCATIONS

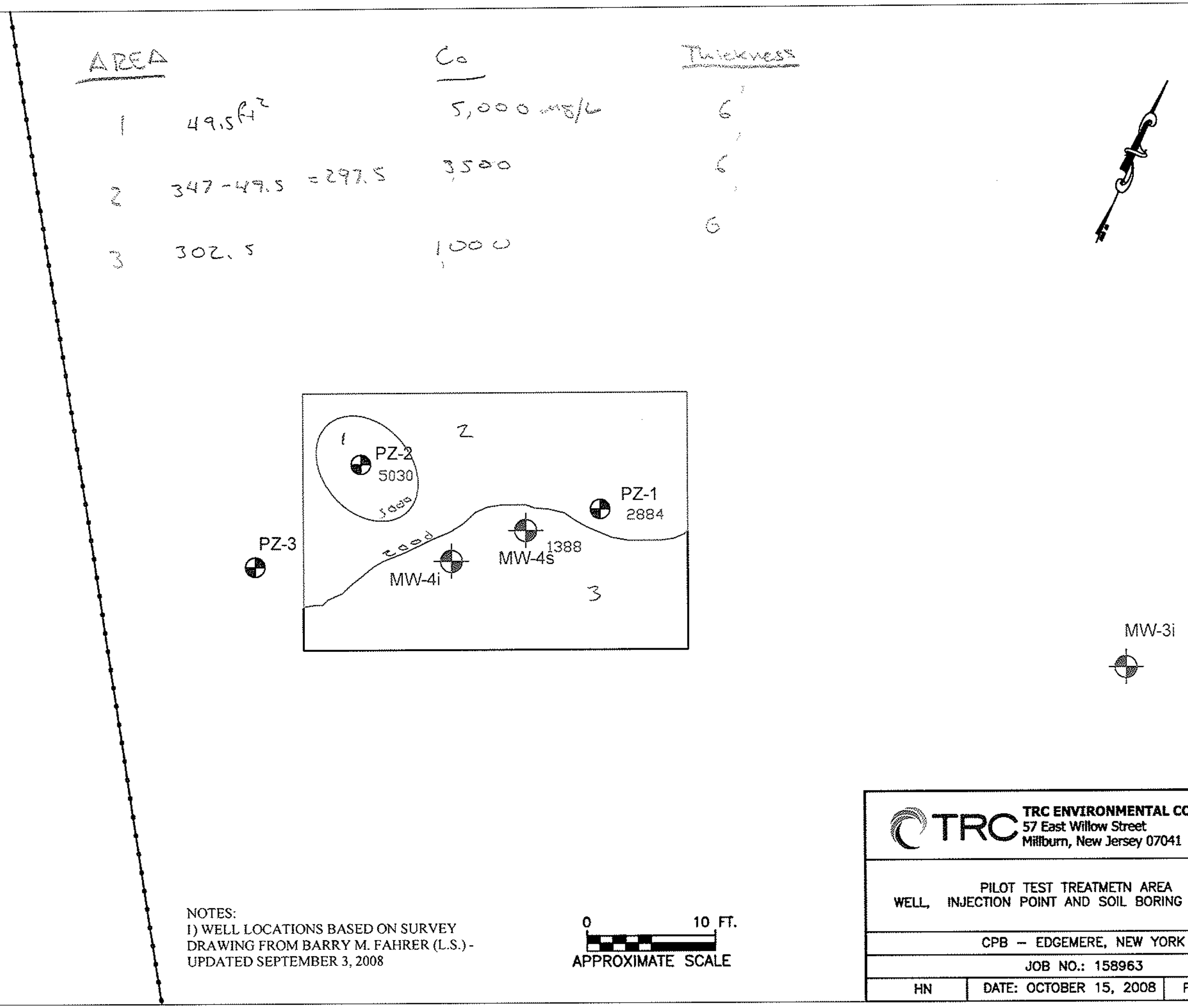
CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 4

SHALLOW Post Injection 3 (9/17/08)

AREA		Co	Thickness
1	49.5 ft²	5,000 mg/L	6'
2	347 - 49.5 = 297.5	3500	6'
3	302.5	1000	6



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

TRC ENVIRONMENTAL CORP.
57 East Willow Street
Millburn, New Jersey 07041

PILOT TEST TREATMETN AREA
WELL, INJECTION POINT AND SOIL BORING LOCATIONS

CPB — EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 4

TOTAL VOCs

Pre Injection Samples 8/15/08

(Intermediate Zone)

may need to redo this one

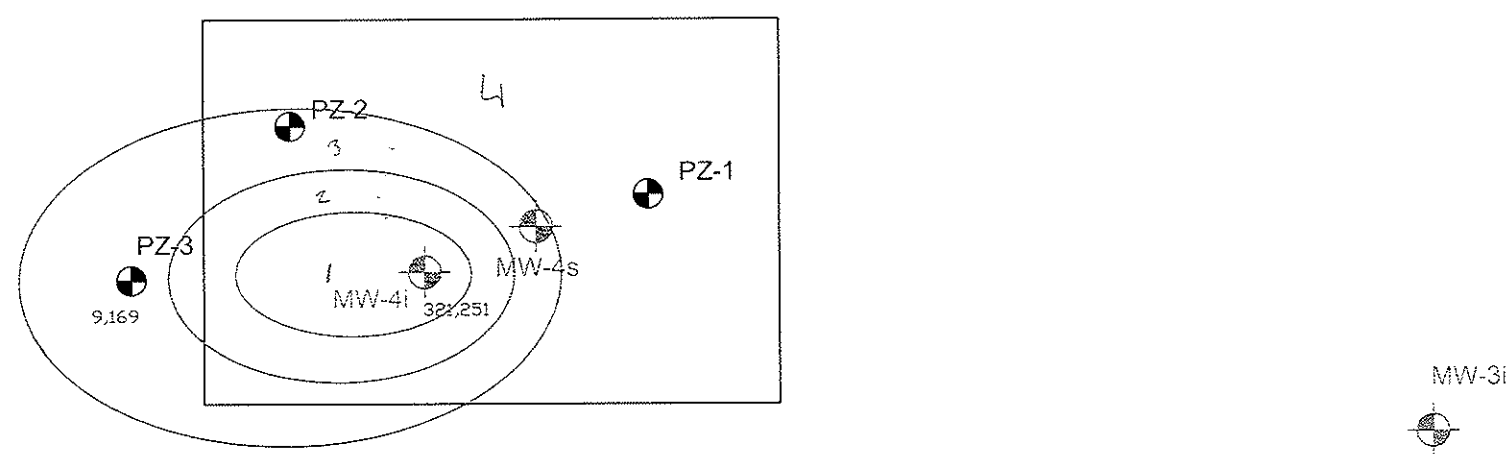
Area

1 62.44

2 148.3 - 62.44

3 249.7 - 148.3

4 600 - 249.7



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

0 10 FT.
APPROXIMATE SCALE

TRC
TRC ENVIRONMENTAL CORP.
57 East Willow Street
Millburn, New Jersey 07041

PILOT TEST TREATMETN AREA
WELL, INJECTION POINT AND SOIL BORING LOCATIONS

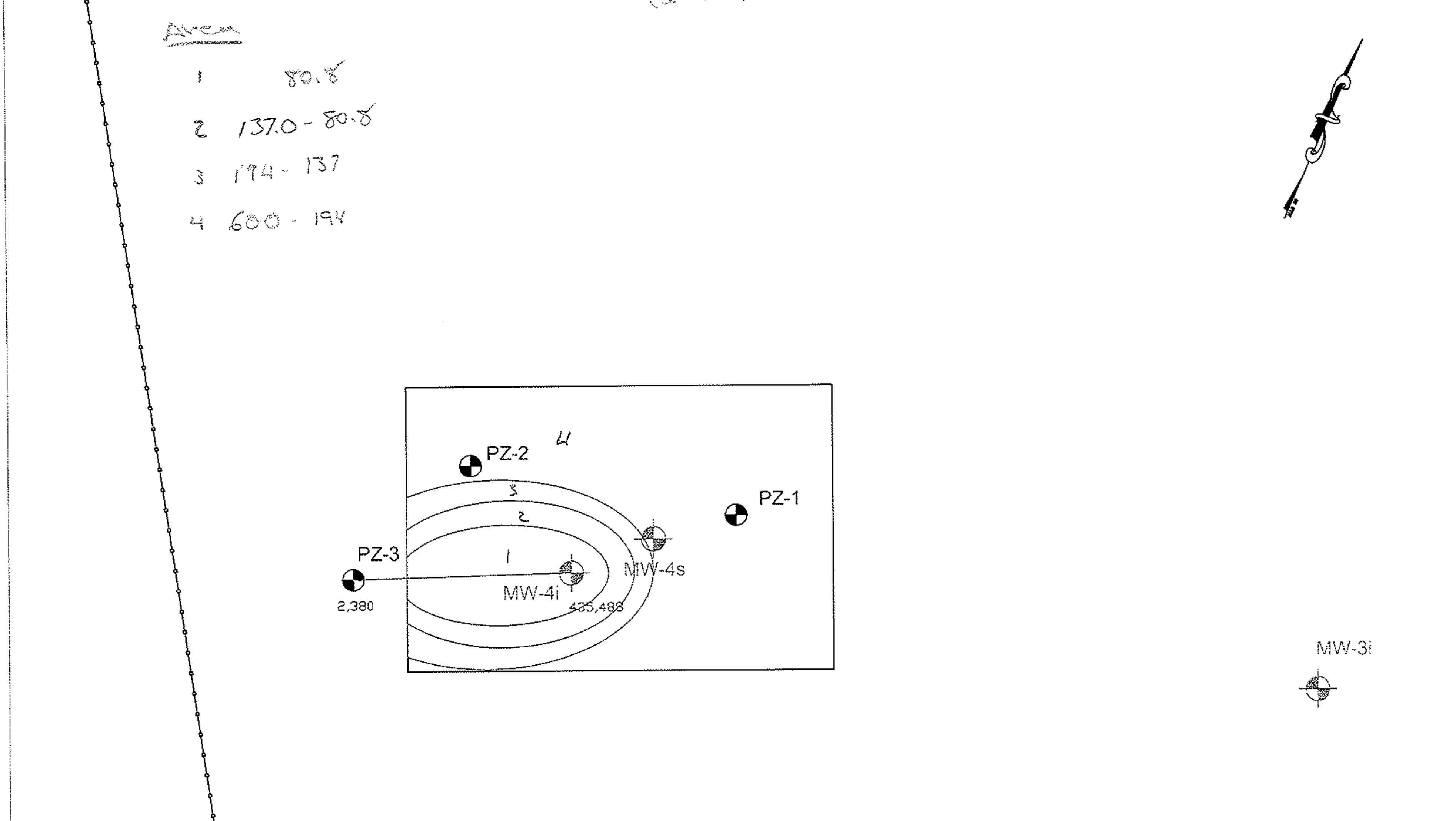
CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 4

Post Injection samples | 8/27/08

(Inter. Zone)



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

0 10 FT.
APPROXIMATE SCALE

TRC
TRC ENVIRONMENTAL CORP.
57 East Willow Street
Millburn, New Jersey 07041

PILOT TEST TREATMETN AREA
WELL, INJECTION POINT AND SOIL BORING LOCATIONS

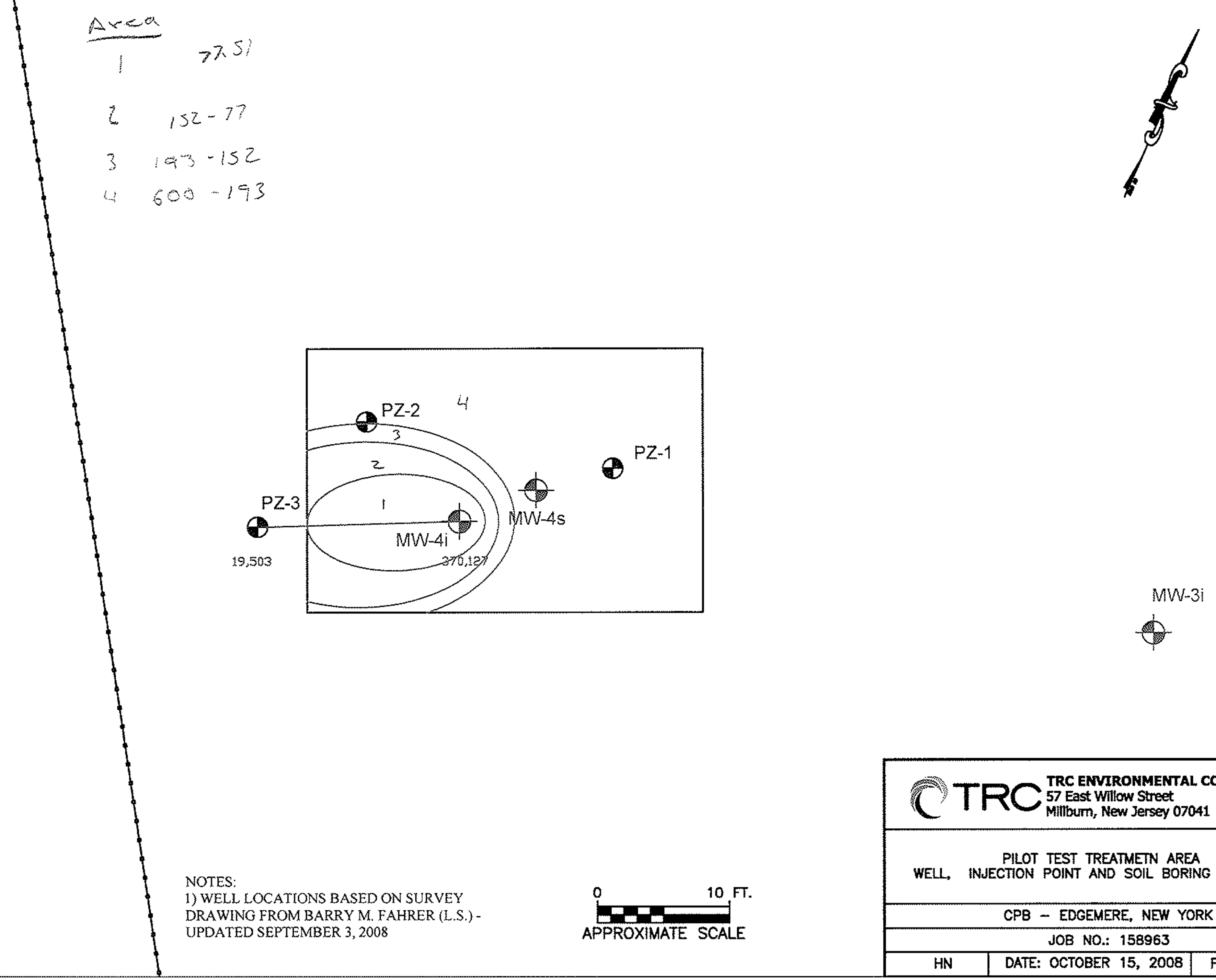
CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 4

Post Injection Samples 2 (9/3/08)

Int Zone



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

0 10 FT.
APPROXIMATE SCALE

TRC ENVIRONMENTAL CORP.
57 East Willow Street
Millburn, New Jersey 07041

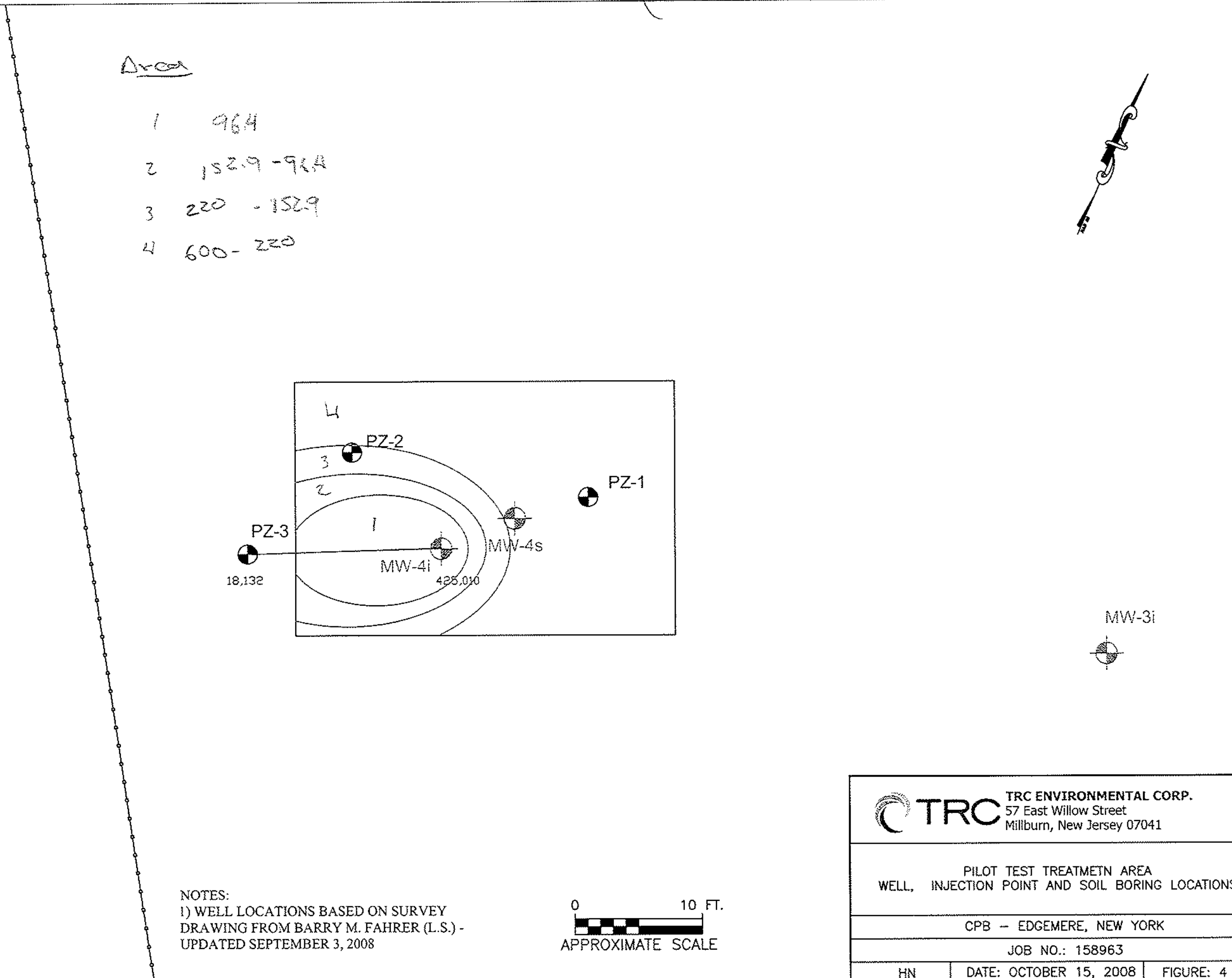
PILOT TEST TREATMETN AREA
WELL, INJECTION POINT AND SOIL BORING LOCATIONS

CPB – EDGEMERE, NEW YORK

JOB NO.: 158963

HN	DATE: OCTOBER 15, 2008	FIGURE: 4

Post Inj Samples 3 (9/17/08)
(Inter. Zone)



NOTES:
1) WELL LOCATIONS BASED ON SURVEY DRAWING FROM BARRY M. FAHRER (L.S.) - UPDATED SEPTEMBER 3, 2008

TRC ENVIRONMENTAL CORP. 57 East Willow Street Millburn, New Jersey 07041		
PILOT TEST TREATMETN AREA WELL, INJECTION POINT AND SOIL BORING LOCATIONS		
CPB – EDGEMERE, NEW YORK		
JOB NO.: 158963		
HN	DATE: OCTOBER 15, 2008	FIGURE: 4

Contaminant Mass Estimate
Shallow Zone Calculations
Dissolved Phase Mass
CPB Site - Edgemere, NY

Pre-Injection Sampling Event - 8/13/08

Area	Area (ft2)	Co (ug/L)	Co (g/L)	Co (kg/L)	Co (lbs/L)	Co (lbs/gal)	Co (lbs/ft3)	Porosity	Thickness	GW Volume (ft3)	VOC Mass (lbs)
1	59.4	6417	0.006417	0.000006417	1.41174E-05	5.33638E-05	0.000399	0.3	6	106.92	0.042678
2	58.3	2500	0.0025	0.0000025	0.0000055	0.00002079	0.000156	0.3	6	104.94	0.016319
3	209	500	0.0005	0.0000005	0.0000011	0.000004158	3.11E-05	0.3	6	376.2	0.011701
4	273.3	50	0.00005	0.00000005	0.00000011	4.158E-07	3.11E-06	0.3	6	491.94	0.00153
										Total Dissolved Mass:	0.072228

Post-Injection Sampling Event - 8/27/08

Area	Area (ft2)	Co (ug/L)	Co (g/L)	Co (kg/L)	Co (lbs/L)	Co (lbs/gal)	Co (lbs/ft3)	Porosity	Thickness	GW Volume (ft3)	VOC Mass (lbs)
1	189.25	9122	0.009122	0.000009122	2.00684E-05	7.58586E-05	0.000567	0.3	6	340.65	0.193292
2	127.05	7749	0.007749	0.000007749	1.70478E-05	6.44407E-05	0.000482	0.3	6	228.69	0.110232
3	283.7	4027	0.004027	0.000004027	8.8594E-06	3.34885E-05	0.00025	0.3	6	510.66	0.127917
			0	0	0	0	0	0.3	6	0	0
										Total Dissolved Mass:	0.431442
										% Change:	497%

Released from Adsorbed Phase
0.36 lbs

Post-Injection Sampling Event - 9/3/08

Area	Area (ft2)	Co (ug/L)	Co (g/L)	Co (kg/L)	Co (lbs/L)	Co (lbs/gal)	Co (lbs/ft3)	Porosity	Thickness	GW Volume (ft3)	VOC Mass (lbs)
1	37.5	5000	0.005	0.000005	0.000011	0.00004158	0.000311	0.3	6	67.5	0.020994
2	562.5	3500	0.0035	0.0000035	0.0000077	0.000029106	0.000218	0.3	6	1012.5	0.220434
			0	0	0	0	0	0.3	6	0	0
			0	0	0	0	0	0.3	6	0	0
										Total Dissolved Mass:	0.241428
										% Change:	-44%

Post-Injection Sampling Event - 9/17/08

Area	Area (ft2)	Co (ug/L)	Co (g/L)	Co (kg/L)	Co (lbs/L)	Co (lbs/gal)	Co (lbs/ft3)	Porosity	Thickness	GW Volume (ft3)	VOC Mass (lbs)
1	49.5	5000	0.005	0.000005	0.000011	0.00004158	0.000311	0.3	6	89.1	0.027712
2	297.5	3500	0.0035	0.0000035	0.0000077	0.000029106	0.000218	0.3	6	535.5	0.116585
3	302.5	1000	0.001	0.000001	0.0000022	0.000008316	6.22E-05	0.3	6	544.5	0.03387
			0	0	0	0	0	0.3	6	0	0
										Total Dissolved Mass:	0.178167
										% Change:	-26%

Contaminant Mass Estimate
Intermediate Zone Calculations
Dissolved Phase Mass
CPB Site - Edgemere, NY

Pre-Injection Sampling Event - 8/13/08

Area	Area (ft2)	Co (ug/L)	Co (g/L)	Co (kg/L)	Co (lbs/L)	Co (lbs/gal)	Co (lbs/ft3)	Porosity	Thickness	GW Volume (ft3)	VOC Mass (lbs)
1	62.4	210625.5	0.2106255	0.000210626	0.000463376	0.001751562	0.013102	0.3	20	374.4	4.905269
2	85.9	50000	0.05	0.00005	0.00011	0.0004158	0.00311	0.3	20	515.4	1.602989
3	101.4	5000	0.005	0.000005	0.000011	0.00004158	0.000311	0.3	20	608.4	0.189224
4	350.3	500	0.0005	0.0000005	0.0000011	0.000004158	3.11E-05	0.3	20	2101.8	0.06537
										Total Dissolved Mass:	6.762852

Post-Injection Sampling Event - 8/27/08

Area	Area (ft2)	Co (ug/L)	Co (g/L)	Co (kg/L)	Co (lbs/L)	Co (lbs/gal)	Co (lbs/ft3)	Porosity	Thickness	GW Volume (ft3)	VOC Mass (lbs)
1	80.8	267744	0.267744	0.000267744	0.000589037	0.002226559	0.016655	0.3	20	484.8	8.07418
2	56.2	50000	0.05	0.00005	0.00011	0.0004158	0.00311	0.3	20	337.2	1.048754
3	57	5000	0.005	0.000005	0.000011	0.00004158	0.000311	0.3	20	342	0.106368
4	406	500	0.0005	0.0000005	0.0000011	0.000004158	3.11E-05	0.3	20	2436	0.075764
										Total Dissolved Mass:	9.305067
										% Change:	38%

Released from Adsorbed Phase
2.54 lbs

Post-Injection Sampling Event - 9/3/08

Area	Area (ft2)	Co (ug/L)	Co (g/L)	Co (kg/L)	Co (lbs/L)	Co (lbs/gal)	Co (lbs/ft3)	Porosity	Thickness	GW Volume (ft3)	VOC Mass (lbs)
1	77.51	235063.5	0.2350635	0.000235064	0.00051714	0.001954788	0.014622	0.3	20	465.06	6.800021
2	75	50000	0.05	0.00005	0.00011	0.0004158	0.00311	0.3	20	450	1.399583
3	41	5000	0.005	0.000005	0.000011	0.00004158	0.000311	0.3	20	246	0.076511
4	407	500	0.0005	0.0000005	0.0000011	0.000004158	3.11E-05	0.3	20	2442	0.075951
										Total Dissolved Mass:	8.352065
										% Change:	-10%

Post-Injection Sampling Event - 9/17/08

Area	Area (ft2)	Co (ug/L)	Co (g/L)	Co (kg/L)	Co (lbs/L)	Co (lbs/gal)	Co (lbs/ft3)	Porosity	Thickness	GW Volume (ft3)	VOC Mass (lbs)
1	96.4	262505	0.262505	0.000262505	0.000577511	0.002182992	0.016329	0.3	20	578.4	9.444565
2	56.5	50000	0.05	0.00005	0.00011	0.0004158	0.00311	0.3	20	339	1.054352
3	67.1	5000	0.005	0.000005	0.000011	0.00004158	0.000311	0.3	20	402.6	0.125216
4	380	500	0.0005	0.0000005	0.0000011	0.000004158	3.11E-05	0.3	20	2280	0.070912
										Total Dissolved Mass:	10.69505
										% Change:	28%

Contaminant Mass Estimate
Shallow, Intermediate and Clay Zone Calculations
Adsorbed Phase Mass
CPB Site - Edgemere, NY

Shallow Zone Adsorbed Mass
Pre-Injection Sampling Event - 8/13/08

Soil Weight 1.5 Tons/CY

Foc (sand): 0.19% Kd: 0.31125 L/kg
Koc: 166

		Dissolved Phase		Adsorbed								
Area	Area (ft2)	Co (ug/L)	Co (mg/L)	Cs (mg/kg)	Porosity	Thickness	Soil Volume (ft3)	Soil Mass (	Soil Mass (	VOC Mass (mg)	VOC Mass (kg)	VOC Mass (lbs)
1	59.4	6417	6.417	1.997	0.3	6	249	27720	12600	25166	0.0252	0.0554
2	58.3	2500	2.5	0.778	0.3	6	245	27207	12367	9623	0.0096	0.0212
3	209	500	0.5	0.156	0.3	6	878	97533	44333	6899	0.0069	0.0152
4	273.3	50	0.05	0.016	0.3	6	1148	127540	57973	902	0.0009	0.0020
											Total Adsorbed Mass:	0.0937

Intermediate Zone Adsorbed Mass
Pre-Injection Sampling Event - 8/13/08

Area	Area (ft2)	Co (ug/L)	Co (mg/L)	Cs (mg/kg)	Porosity	Thickness	Soil Volume (ft3)	Soil Mass (	Soil Mass (	VOC Mass (mg)	VOC Mass (kg)	VOC Mass (lbs)
1	62.4	210625.5	210.6255	65.557	0.3	20	874	97067	44121	2892463	2.8925	6.3634
2	85.9	50000	50	15.563	0.3	20	1203	133622	60737	945225	0.9452	2.0795
3	101.4	5000	5	1.556	0.3	20	1420	157733	71697	111578	0.1116	0.2455
4	350.3	500	0.5	0.156	0.3	20	4904	544911	247687	38546	0.0385	0.0848
											Total Adsorbed Mass:	8.7732

Clay Unit Adsorbed Mass Calculations

Clay Thickness:	5	ft	
Control Area:	600	ft2	
Soil Volume:	3000	ft3	
	111	CY	
	333,333	lbs	
	151,515	kg	
Clay Concntrations:	146.5	mg/kg	<=PTSB-2-1 sample
	22,196,970	mg VOCs	
	22.20	kg VOC	
	48.83	lbs VOC	

Clay Thickness:	5	ft	
Control Area:	600	ft2	
Soil Volume:	3000	ft3	
	111	CY	
	333,333	lbs	
	151,515	kg	
Clay Concntrations:	0.53	mg/kg	<=PTSB-4-1 sample
	80,303.03	mg VOCs	
	0.08	kg VOC	
	0.18	lbs VOC	