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SUBJECT: SABANA ABAJO INDUSTRIAL PARK PCE SITE: SOURCE LOCATION IDENTIFICATION - WORK ASSIGNMENT 0-0111 - TRIP REPORT

BACKGROUND

The Sabana Abajo Industrial Park PCE Site (Site) is located in Carolina, Puerto Rico. The Site is bounded to the north by Iturregui Avenue, to the east by Route 26, to the west by a section of the Suarez Canal (a lined canal) and Calle B to the south (Figure 1). Chlorinated hydrocarbon contamination of over 300 milligrams per liter (mg/L) in groundwater and over 400 milligrams per kilogram (mg/kg) in soil persist in the shallow subsurface on the Gillette facility within the industrial park (Figure1). The Site is located in an Industrial park that includes a number of active manufacturing, pharmaceutical, storage and other commercial facilities. The park is built on poorly sorted fill underlain by clayey and silty alluvium. The source of the contamination is unknown; however, a number of facilities within the park could be potential sources.

Response Engineering and Analytical Contract (REAC) personnel provided technical assistance to the EPA Region II On Scene Coordinator (OSC) at the request of the Environmental Protection Agency/Environmental Response Team (U.S. EPA/ERT) during the subsurface assessment to identify the source of the chlorinated solvent contamination.

OBSERVATIONS AND ACTIVITIES

Between January 10 and 22, 2005, REAC personnel visited the site to delineate the source of the chlorinated solvent plume. The original assessment approach was to conduct a soil gas sampling survey; however, high vadose zone moisture content precluded the use of this method. Alternatively, a groundwater sampling and analysis exercise was initiated on several properties within the industrial complex to identify the source of a dissolved chlorinated solvent plume in the shallow subsurface. A

network of 55 temporary piezometers (R1 to R55) were installed and sampled throughout the industrial complex (Table 1 and Figure 2). A local engineering company was used to perform a utility search and clear sample locations prior to coring. A local contractor was hired to use direct push technology to install the temporary wells. In addition, ten permanent monitor wells (W02, W03, W05, W06, W16, W17, W21, W29, W30 and W33) on the Gillette Property (Table 1 and Figure 2) were also sampled and the data were used as part of the assessment. The temporary wells were constructed, with ten feet of screen from the bottom of the well, to be consistent with the permanent wells previously installed on the site (Table 2).

After installation, the temporary wells were developed using a peristaltic pump. The wells were purged a minimum of three well volumes of water or until they were dry. Wells were sampled within a maximum of 12 hours after purging, with most wells being sampled within one hour of purging. Sampling was performed using peristaltic pumps set at a minimum flow rate using dedicated Teflon® tubing. Samples were collected directly into labeled 40 milliliter (mL) glass VOA vials. All groundwater sampling was conducted in accordance with REAC SOP #2007, *Groundwater Sampling*. Field logbook notes are contained in Appendix A.

The groundwater samples were analyzed at an on-site laboratory for tetrachloroethylene (PCE) and trichloroethylene (TCE) using a Perkin Elmer Photovac Model Voyager™ field-portable gas chromatograph (FPGC). A subset of the groundwater samples was shipped to the REAC Laboratory in Edison, New Jersey (NJ) for confirmation of the field laboratory results.

A Trimble PRO XRS Real-time differential Global Positioning System (dGPS) was used to spatially document all sample locations, building foot prints, roads and other pertinent site features. Consistent with the TRIAD approach, the field analytical, sample location and other geo-spatial data were incorporated in a Geographic Information System (GIS) and a site conceptual model was developed in the field. The conceptual model was used to rationalize and further direct the sampling exercise.

RESULTS

Table 3 presents the PCE and TCE groundwater concentrations determined on-site by the FPGC. Appendix B contains a Technical Memorandum summarizing field methodology and results of the FPGC analyses including field data and daily injection logs. Note that at all sampling locations, groundwater was encountered within 10 feet of the ground surface (Table 2). Figures 3A and 3B show the spatial distribution in bullet format of PCE and TCE concentrations in the groundwater as determined by FPGC, respectively. The highest PCE and TCE concentrations were found in a contiguous area in the southwestern corner of the Gillette Property and the northwestern corner of the Biovail Property. PCE concentrations ranged from non-detect (ND) to greater than 67,000 micrograms per liter (µg/L), and TCE concentrations ranged from ND to 93,000 µg/L. With the exception of the low TCE detects on and in proximity to the Lumi Lamp Property (R11, R14, R15 and R36), PCE and TCE were both present with PCE having a higher concentration than TCE. The other possible exception was in temporary well R50 where again, PCE and TCE were both present, but the TCE concentration appeared to be much greater than the PCE concentration. Since the detector was saturated when this sample was analyzed, it is impossible to conclude this for certain.

Table 4 summarizes the results for the 17 confirmatory groundwater samples, trip and field blanks analyzed at the REAC Laboratory for volatile organic compounds (VOCs). The Final Analytical Report included in Appendix C, contains the final validated analytical data along with the case narrative, quality assurance/quality control (QA/QC), and summary of the analytical procedures. Figures 4A and 4B show the spatial distribution in bullet format of PCE and TCE concentrations in the groundwater as determined by fixed laboratory data, respectively. As noted with the FPGC data, the highest PCE and TCE concentrations were found in a contiguous area in the southwestern corner of the Gillette Property and the northwestern corner of the Biovail Property. PCE concentrations ranged from non-detect (ND) to greater than 24,000 µg/L, and TCE concentrations ranged from ND to 8,900 µg/L. Also in agreement with the FPGC data, PCE concentrations were generally greater than the corresponding TCE concentration at most sampling locations. The exception to this one of the samples collected on the Gillette facility (W17) and three samples collected in the proximity of the Lumi Lamps facility (R14, R15 and R36). In the case of the three samples collected at the Lumi Lamps facility (R14, R15 and R36), PCE was not detected while TCE was detected at concentrations ranging from 8.7 to 38 µg/L.

In addition to TCE, other microbially mediated reductive chlorination breakdown products of PCE (1,1 dichloroethene [1,1-DCE], cis-1,2 dichloroethene [cis-1,2-DCE], trans-1,2 dichloroethene [trans-1,2-DCE], and vinyl chloride [VCI]) were also present in the samples analyzed by the fixed laboratory. The concentrations of these compounds were significantly above their maximum contaminant levels (MCLs) where detected. Figures 5A and 5B show the PCE breakdown products, and Figure 5C shows the distribution of total chlorinated hydrocarbon species concentration. The pattern of the concentration distribution is consistent with the FPGC results where the elevated chlorinated hydrocarbon concentrations are primarily constrained to the area between the Gillette and Biovail properties towards the canal and with the highest concentration on the Biovail Property.

Fixed lab data and FPGC screening data were compared using simple linear regression on the paired data sets for TCE and PCE (Appendix D). Censored data, which includes concentrations below the method detection limit (ND) or above quantifiable ranges, were not included in the regression analyses. All regression analyses were computed using SAS® statistical software, version 9.0 and all statistical hypothesis tests were conducted at an p-level of 0.05.

In order for the tests associated with regression analyses to be valid and to set confidence intervals for regression parameters, certain assumptions must be met. These assumptions include 1) the residuals must be normally distributed, 2) measurements of the independent variable must be obtained without error, 3) a linear relationship does exist between the independent and dependent variable, 4) the variance of the dependent variable is equal for all values of the independent variable, also referred to as homoscedasticity, and 5) the error terms are independent. Realistically, neither laboratory analytical methods nor field screening methods produce measurements completely without error. However it is commonly accepted that laboratory measurements, in general, contain less error than field screening methods such as the FPGC. Laboratory measurements were therefore chosen as the independent variable, X, and FPGC measurements were chosen as the dependent variable Y (i.e., laboratory measurements were used to predict FPGC measurements).

A residual plot was created for each regression analysis to assist in verifying associated assumptions. Residuals were plotted as a function of their corresponding laboratory measurements. If homoscedasticity exists, the residuals are evenly distributed above and below a reference line set at Y = 0. Patterns within

the residuals identify a lack of independence between error terms. Residual plots also assist in identifying possible outliers and the need for data transformations, and in determining whether additional variables are needed in the regression analysis (i.e., the relationship is not a simple linear function but rather a multivariate function requiring additional variables to define the functional relationship between FPGC and laboratory values). Diagnostic testing was conducted to identify potential outliers and anomalies within the data sets. This included examination of the scatter and residual plots, studentized residuals, and the Cook's D-statistic.

Five paired data points (W02, W03, W17, R01, R47) were included in the regression analysis for PCE. A plot of the paired data was evaluated prior to analysis to determine the likelihood of a linear relationship existing between the lab and FPGC data. The resulting model, $\text{FPGC PCE} = 4177.42 + 2.67(\text{Lab PCE})$, was statistically significant with a probability-value (p-value) less than ($<$) the alpha-level of 0.05 indicating that a relationship does exist between the laboratory and FPGC results. The associated coefficient of determination, r^2 , was 0.90. One potential outlier, W03, stood out on the residual plot. However given the small data set of $N=5$ it is not possible to determine if this point represents an inaccurate measurement, an error in sample handling, or a part of the population that was not sampled. Although the model was significant and the r^2 was reasonable, prediction intervals were wide and residuals high. The small sample size must be taken into consideration when interpreting the model.

Nine paired data points (W02, W03, W17, R01, R14, R15, R36, R47, R48) were included in the regression analysis for TCE. Data from one sample location, R50, were excluded from the regression analysis because the concentration was reported from the Electron Capture Detector (ECD), as opposed to the Photoionization Detector (PID) concentration which was reported in all other cases. Evaluation of plots of the data indicated a logarithmic relationship existed between the FPGC and lab TCE data, therefore the paired data was transformed by taking the natural logarithm (\ln) of each value prior to analysis. The resulting model, $\ln(\text{FPGC TCE}) = 1.21 + 0.91\ln(\text{Lab TCE})$ was statistically significant ($p\text{-value} < 0.05$) and had an associated $r^2=0.83$. No outliers could be identified within this data set.

DISCUSSION OF RESULTS

There was a significant statistical relationship between the FPGC and the fixed laboratory data for PCE and TCE with r^2 of 0.90 and 0.83, respectively. This indicates that the data obtained in the field by FPGC were comparable with the data obtained in the laboratory. Data from one sample location, R50, were excluded from this discussion previously discussed.

Figures 6 and 7 are contour maps of the FPGC PCE and TCE results, respectively. The results indicate that a dissolved PCE/TCE shallow groundwater plume exists towards the Suarez Canal at the northwest corner of the Biovail and to the southwest of the Gillette Properties.

PCE and TCE groundwater concentrations are up to 8,800 and 1,460 times higher than their MCLs, respectively, for the FPGC analyzed samples (Table 5), and up to 4,800 and 1,780 times MCLs, respectively for the fixed laboratory analyzed samples (Table 6). The chlorinated hydrocarbon plume covers a larger area of the Gillette Property (Figures 6 and 7), which is most likely a function of the prevailing groundwater flow direction.

The highest chlorinated hydrocarbon (PCE, TCE, and their breakdown products dichloroethene and vinyl chloride) concentrations were detected the samples collected between the Gillette Property and the Biovail Property (Figures 3A, 3B, 4A, 4B, 5A, 5B, 5C, 6 and 7). The source of the contamination is near the boundary separating the Gillette and Biovail Properties, but, though uncertain, is more likely on the Biovail Property based on the prevailing groundwater flow direction. Additional assessments are needed to reduce the uncertainty surrounding the source location. These assessments would include:

- (A) installation of permanent monitor wells on the Biovail Property to form a network with the existing wells on the Gillette property. Figure 8 shows the location of six proposed wells on the Biovail Property;
- (B) collection and analysis of soil samples for chlorinated compounds at various depths during drilling to identify possible vadose zone chlorinated hydrocarbon contamination;
- (C) determination of the elevations of all monitor wells in the network referenced to a common datum;
- (D) Collection of synoptic rounds of groundwater elevation data and contouring of groundwater elevation data to determine groundwater flow direction and any seasonal effects; and
- (E) collection and analysis of groundwater samples from the monitor well network to establish baseline dissolved chlorinated hydrocarbon concentration levels.

The small dissolved TCE plume on the Lumi Lamp Property (Figure 7) appears to be from a source independent of the Gillette/Biovail plume. The magnitude of the concentrations (less than 200 µg/L) and the signature of the contaminants (absence of PCE as the primary contaminant) suggest that this plume is from a source independent of that at the Gillette/Biovail plume.

PCE degradation products (TCE, 1,1-DCE, cis- and trans-1,2-DCE, and VCl) were detected in the fixed laboratory analyzed samples (Table 4). This may indicate that microbially mediated reductive dechlorination may be active or was historically active at the site. As a part of additional assessment efforts, it should be determined if current conditions in the shallow groundwater are conducive to reductive dechlorination by measuring at a minimum, the dissolved oxygen concentration and the oxidation-reduction potential of the groundwater.

Tables 7 and 8 show the dissolved concentrations of PCE and TCE for the two analytical methods as a function of their solubility limits. For the FPGC, PCE concentrations range up to 22 percent of the solubility limit. For the fixed laboratory analyzed samples, PCE and TCE dissolved concentrations range up to 12 and 4.5 percent of their solubility limits, respectively. The U.S. EPA guidance for inferring the presence of a free or residual dense nonaqueous phase liquid (DNAPL) source is for the dissolved concentrations of a constituent to be greater than one percent of their solubility limit. Based on this criterion, it is likely that a DNAPL source is present at this site.

CONCLUSIONS AND FUTURE ACTIVITIES

Based on the results of this assessment the following can be concluded:

- (1) All facilities other than Biovail and Gillette were eliminated as the source of the dissolved

chlorinated plume at the Sabana Abajo Industrial Complex.

- (2) The source of the contamination, though uncertain, is likely located on the Biovail Property.
- (3) It is likely that the source consists of free or residual DNAPL.
- (4) Additional assessments are needed to reduce source location uncertainty and complete the conceptual site model.

Table 1
Well Summary
Sabana Abajo Site
Carolina, PR
November 2005

Location	Well Type	Property	Date Installed	Date Sampled	Actual Well Depth (feet BGS)
MW-W02	Monitor Well	Gillette	NA	1/15/2005	14.9
MW-W03	Monitor Well	Gillette	NA	1/15/2005	14.9
MW-W05	Monitor Well	Gillette	NA	1/15/2005	14.3
MW-W06	Monitor Well	Gillette	NA	1/15/2005	12.1
MW-W16	Monitor Well	Gillette	NA	1/15/2005	12.9
MW-W17	Monitor Well	Gillette	NA	1/15/2005	14.7
MW-W21	Monitor Well	Gillette	NA	1/15/2005	11.9
MW-W29	Monitor Well	Gillette	NA	1/15/2005	14.1
MW-W30	Monitor Well	Gillette	NA	1/15/2005	11.9
MW-W33	Monitor Well	Gillette	NA	1/15/2005	14.1
MW-R01	Temporary Well	Gillette	1/17/2005	1/17/2005	11.9
MW-R02	Temporary Well	Gillette	1/17/2005	1/17/2005	11.1
MW-R03	Temporary Well	Gillette	1/17/2005	1/17/2005	12.0
MW-R06	Temporary Well	Pitusa	1/17/2005	1/18/2005	13.1
MW-R07	Temporary Well	Pitusa	1/17/2005	1/18/2005	11.1
MW-R09	Temporary Well	Pitusa	1/17/2005	1/18/2005	12.6
MW-R10	Temporary Well	Lumi Lamps	1/18/2005	1/18/2005	12.3
MW-R11	Temporary Well	Lumi Lamps	1/18/2005	1/18/2005	10.7
MW-R12	Temporary Well	Lumi Lamps	1/19/2005	1/20/2005	15.0
MW-R13	Temporary Well	Lumi Lamps	1/18/2005	1/18/2005	14.0
MW-R14	Temporary Well	Lumi Lamps	1/19/2005	1/20/2005	14.7
MW-R15	Temporary Well	Lumi Lamps	1/18/2005	1/19/2005	9.7
MW-R16	Temporary Well	Lumi Lamps	1/18/2005	1/19/2005	10.1
MW-R17	Temporary Well	Lumi Lamps	1/18/2005	1/19/2005	13.7
MW-R18	Temporary Well	Johnson Diversity	1/19/2005	1/19/2005	14.7
MW-R19	Temporary Well	Johnson Diversity	1/19/2005	1/19/2005	14.7
MW-R21	Temporary Well	Johnson Diversity	1/19/2005	1/19/2005	14.6
MW-R22	Temporary Well	Johnson Diversity	1/19/2005	1/19/2005	14.9
MW-R30	Temporary Well	York International	1/19/2005	1/19/2005	14.9
MW-R31	Temporary Well	York International	1/19/2005	1/20/2005	15.0
MW-R33	Temporary Well	York International	1/20/2005	1/20/2005	15.0
MW-R34	Temporary Well	York International	1/20/2005	1/22/2005	15.0
MW-R35	Temporary Well	York International	1/20/2005	1/20/2005	15.3
MW-R36	Temporary Well	York International	1/20/2005	1/20/2005	14.5
MW-R37	Temporary Well	York International	1/19/2005	1/20/2005	13.0
MW-R40	Temporary Well	Johnson Diversity	1/18/2005	1/19/2005	14.4

BGS: Below Ground Surface

NA: Not Available

Actual Well Depth = Total Well Depth - Height of Casing

Table 1 (continued)
Well Summary
Sabana Abajo Site
Carolina, PR
November 2005

Location	Well Type	Property	Date Installed	Date Sampled	Actual Well Depth (feet BGS)
MW-R41	Temporary Well	Biovail	1/20/2005	1/21/2005	14.4
MW-R42	Temporary Well	Biovail	1/20/2005	1/21/2005	14.5
MW-R43	Temporary Well	Biovail	1/21/2005	1/21/2005	15.0
MW-R45	Temporary Well	Biovail	1/20/2005	1/21/2005	14.6
MW-R46	Temporary Well	Biovail	1/20/2005	1/21/2005	14.8
MW-R47	Temporary Well	Biovail	1/21/2005	1/21/2005	14.9
MW-R48	Temporary Well	Biovail	1/21/2005	1/21/2005	14.5
MW-R49	Temporary Well	Biovail	1/20/2005	1/21/2005	14.6
MW-R50	Temporary Well	Biovail	1/21/2005	1/21/2005	14.3
MW-R51	Temporary Well	Biovail	1/21/2005	1/21/2005	14.0
MW-R52	Temporary Well	Biovail Warehouse	1/21/2005	1/21/2005	14.5
MW-R53	Temporary Well	Biovail Warehouse	1/21/2005	1/21/2005	14.4
MW-R54	Temporary Well	Gem Stone Inc.	1/22/2005	1/22/2005	14.5
MW-R55	Temporary Well	Gem Stone Inc.	1/22/2005	1/22/2005	14.3
MW-R56	Temporary Well	Todo A Peso	1/22/2005	1/22/2005	14.8
MW-R57	Temporary Well	Gillette	1/22/2005	1/22/2005	14.5

BGS: Below Ground Surface

NA: Not Available

Actual Well Depth = Total Well Depth - Height of Casing

Table 2
Water Level, Total Depth, and Well Coordinate Data
Sabana Abajo Site
Carolina, PR
November 2005

Location	Well Type	Water Level from Ground Surface (feet)	Actual Well Depth (feet BGS)	UTM Coordinates	
				Easting	Northing
MW-W02	Monitor Well	5.1	14.9	184,050	2,039,382
MW-W03	Monitor Well	3.2	14.9	184,062	2,039,384
MW-W05	Monitor Well	5.2	14.3	184,087	2,039,390
MW-W06	Monitor Well	3.4	12.1	184,098	2,039,391
MW-W16	Monitor Well	5.6	12.9	184,094	2,039,404
MW-W17	Monitor Well	5.5	14.7	184,046	2,039,398
MW-W21	Monitor Well	3.0	11.9	184,035	2,039,402
MW-W29	Monitor Well	5.0	14.1	184,095	2,039,431
MW-W30	Monitor Well	3.9	11.9	184,028	2,039,421
MW-W33	Monitor Well	4.9	14.1	184,063	2,039,430
MW-R01	Temporary Well	3.2	11.9	184,040	2,039,383
MW-R02	Temporary Well	4.4	11.1	184,119	2,039,397
MW-R03	Temporary Well	4.9	12.0	184,126	2,039,422
MW-R06	Temporary Well	5.4	13.1	184,157	2,039,405
MW-R07	Temporary Well	5.7	11.1	184,152	2,039,435
MW-R09	Temporary Well	2.3	12.6	184,193	2,039,414
MW-R10	Temporary Well	2.3	12.3	184,170	2,039,344
MW-R11	Temporary Well	1.0	10.7	184,180	2,039,327
MW-R12	Temporary Well	2.5	15.0	184,190	2,039,316
MW-R13	Temporary Well	5.0	14.0	184,202	2,039,331
MW-R14	Temporary Well	4.4	14.7	184,218	2,039,325
MW-R15	Temporary Well	0.5	9.7	184,203	2,039,311
MW-R16	Temporary Well	3.4	10.1	184,178	2,039,297
MW-R17	Temporary Well	8.8	13.7	184,192	2,039,265
MW-R18	Temporary Well	4.9	14.7	184,173	2,039,401
MW-R19	Temporary Well	1.7	14.7	184,192	2,039,399
MW-R21	Temporary Well	4.5	14.6	184,191	2,039,363
MW-R22	Temporary Well	3.3	14.9	184,165	2,039,359
MW-R30	Temporary Well	6.8	14.9	184,127	2,039,346
MW-R31	Temporary Well	3.4	15.0	184,096	2,039,339
MW-R33	Temporary Well	3.9	15.0	184,056	2,039,320
MW-R34	Temporary Well	3.8	15.0	184,061	2,039,299
MW-R35	Temporary Well	4.1	15.3	184,097	2,039,302
MW-R36	Temporary Well	1.4	14.5	184,146	2,039,319
MW-R37	Temporary Well	1.3	13.0	184,139	2,039,333
MW-R40	Temporary Well	3.5	14.4	184,156	2,039,378

Coordinate Metadata: Universal Transverse Mercator, Zone 20N, 1983 North American Datum

The bottom 10 feet of all wells are screened

BGS: Below Ground Surface

Actual Well Depth = Total Well Depth - Height of Casing

Table 2 (continued)
Water Level, Total Depth, and Well Coordinate Data
Sabana Abajo Site
Carolina, PR
November 2005

Location	Well Type	Water Level from Ground Surface (feet)	Actual Well Depth (feet BGS)	UTM Coordinates	
				Easting	Northing
MW-R41	Temporary Well	4.1	14.4	184,133	2,039,397
MW-R42	Temporary Well	3.8	14.5	184,136	2,039,378
MW-R43	Temporary Well	1.2	15.0	184,143	2,039,355
MW-R45	Temporary Well	2.7	14.6	184,047	2,039,337
MW-R46	Temporary Well	3.7	14.8	184,043	2,039,357
MW-R47	Temporary Well	4.1	14.9	184,040	2,039,374
MW-R48	Temporary Well	5.2	14.5	184,055	2,039,378
MW-R49	Temporary Well	4.7	14.6	184,055	2,039,361
MW-R50	Temporary Well	5.5	14.3	184,078	2,039,386
MW-R51	Temporary Well	4.8	14.0	184,046	2,039,367
MW-R52	Temporary Well	3.1	14.5	184,228	2,039,319
MW-R53	Temporary Well	7.8	14.4	184,226	2,039,335
MW-R54	Temporary Well	3.3	14.5	184,160	2,039,277
MW-R55	Temporary Well	2.9	14.3	184,154	2,039,298
MW-R56	Temporary Well	3.8	14.8	184,025	2,039,465
MW-R57	Temporary Well	4.0	14.5	184,116	2,039,443

Coordinate Metadata: Universal Transverse Mercator, Zone 20N, 1983 North American Datum

The bottom 10 feet of all wells are screened

BGS: Below Ground Surface

Actual Well Depth = Total Well Depth - Height of Casing

Table 3
Summary of FPGC Data for Trichloroethene and Tetrachloroethene in Groundwater
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Sample Location	Tetrachloroethene (PCE)	Trichloroethene (TCE)
MW-W02	44,000	4,400
MW-W03	19,000	7,300
MW-W05	12,000	1,900
MW-W06	39,000	1,900
MW-W16	14,000	2,500
MW-W17	15,000	6,900
MW-W21	ND	ND
MW-W29	ND	ND
MW-W30	68	37
MW-W33	ND	ND
MW-R01	2,900	1,600
MW-R02	ND	ND
MW-R03	ND	19
MW-R06	ND	ND
MW-R07	ND	ND
MW-R09	ND	ND
MW-R10	ND	ND
MW-R11	ND	10
MW-R12	ND	ND
MW-R13	ND	ND
MW-R14	ND	140
MW-R15	ND	21
MW-R16	ND	19
MW-R17	ND	ND
MW-R18	ND	ND
MW-R19	ND	ND
MW-R21	ND	ND
MW-R22	ND	ND
MW-R30	ND	ND
MW-R31	ND	ND
MW-R33	ND	ND
MW-R34	ND	ND
MW-R35	ND	ND
MW-R36	11	26
MW-R37	ND	ND

FPGC - Field-Portable Gas Chromatograph

ND Indicates compound Not Detected

Table 3 (Continued)
Summary of FPGC Data for Trichloroethene and Tetrachloroethene in Groundwater
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Sample Location	Tetrachloroethene (PCE)	Trichloroethene (TCE)
MW-R40	ND	ND
MW-R41	ND	ND
MW-R42	ND	ND
MW-R43	ND	ND
MW-R45	ND	ND
MW-R46	ND	ND
MW-R47	110	22
MW-R48	>36,000	5,800
MW-R49	ND	ND
MW-R50	>>67,000	93,000
MW-R51	ND	ND
MW-R52	13	ND
MW-R53	ND	ND
MW-R54	ND	ND
MW-R55	ND	ND
MW-R56	ND	ND
MW-R57	ND	ND

FPGC - Field-Portable Gas Chromatograph

ND Indicates compound Not Detected

Table 4
Summary of Fixed Laboratory Analyses for Volatile Organic Compounds in Groundwater
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Location	Total Chlorinated	Trichloro-ethene	Tetrachloro-ethene	Vinyl Chloride	1,1-Dichloro-ethene	trans 1,2-Dichloroethene	cis -1,2 Dichloroethene	1,1-Dichloro-ethane
MW-W02	19,000	3,100	15,000	180	4.7	12	710	ND
MW-W03	5,600	1,500	2,000	310	3.3	5.6	1,800	ND
MW-W17	28,000	6,000	5,200	3,400	19	42	13,000	ND
MW-R01	540	97	280	13	2.4	1.8	150	ND
MW-R02	ND	ND	ND	ND	ND	ND	ND	ND
MW-R14	390	35	ND	66	220	ND	35	33
MW-R15	720	38	ND	23	590	ND	27	41
MW-R36	170	8.7	ND	2.1	38	ND	2.2	3.9
MW-R40	ND	ND	ND	ND	ND	ND	ND	ND
MW-R43	ND	ND	ND	ND	ND	ND	ND	ND
MW-R43D	ND	ND	ND	ND	ND	ND	ND	ND
MW-R47	180	26	80	34	1.8	ND	27	ND
MW-R48	36,000	8,900	24,000	610	42	380	2,400	ND
MW-R49	7.7	ND	ND	4.4	ND	ND	3.3	ND
MW-R50	11,000	3,300	3,500	400	63	330	2,900	ND
MW-R51	37	1.1	1.9	9.3	8.4	ND	1.4	15
MW-R55	3,300	710	1,800	87	ND	14	710	ND
Trip Blank	3.4	ND	ND	ND J	ND	ND	ND	ND
Trip Blank	2.0	ND	ND	ND	ND	ND	ND	ND
Trip Blank	1.4	ND	ND	ND	ND	ND	ND	ND
Field Blank	ND	ND	ND	ND	ND	ND	ND	ND

ND - Not Detected

J - Estimated Value

Table 4 (Continued)
Summary of Fixed Laboratory Analyses for Volatile Organic Compounds in Groundwater
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Location	Acetone	Chloroform	1,4-Dichloro- benzene	Chloroethane	Methylene Chloride	Carbon Disulfide	2-Butanone	Bromodichloro- methane
MW-W02	ND	ND	ND	ND	ND	ND	ND	ND
MW-W03	ND	ND	ND	1.4	ND	ND	ND	ND
MW-W17	ND	ND	ND	ND	ND	ND	ND	ND
MW-R01	ND	ND	ND	ND	ND	ND	ND	ND
MW-R02	ND	ND	ND	ND	ND	ND	ND	ND
MW-R14	ND	ND	ND	ND	ND	ND	ND	ND
MW-R15	ND	ND	ND	ND	ND	ND	ND	ND
MW-R36	78	43	36	ND	ND	ND	ND	4.3
MW-R40	ND	ND	ND	ND	ND	ND	ND	ND
MW-R43	ND	ND	ND	ND	ND	ND	ND	ND
MW-R43D	ND	ND	ND	ND	ND	ND	ND	ND
MW-R47	ND	ND	ND	ND	ND	ND	ND	ND
MW-R48	ND	ND	ND	12	ND	ND	ND	ND
MW-R49	ND	ND	ND	ND	ND	ND	ND	ND
MW-R50	ND	ND	1.1	7.9	1.6	1.2	ND	ND
MW-R51	ND	ND	ND	ND	ND	ND	ND	ND
MW-R55	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	ND	3.4	ND	ND	ND	ND	3.4	ND
Trip Blank	ND	2	ND	ND	ND	ND	2.2	ND
Trip Blank	19	1.4	ND	ND	ND	ND	2.3	ND
Field Blank	ND	ND	ND	ND	ND	ND	ND	ND

ND - Not Detected

Table 4 (Continued)
Summary of Fixed Laboratory Analyses for Volatile Organic Compounds in Groundwater
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Location	Toluene	Chloro- benzene	Ethyl- benzene	p&m- Xylene	o-Xylene	1,2-Dichloro- benzene	1,2,4-Trichloro- benzene	Naphthalene	1,2,3-Trichloro- benzene
MW-W02	ND	ND	ND	ND	ND	1.2	3.1	ND	ND
MW-W03	ND	ND	ND	ND	ND	ND	1.5	ND	ND
MW-W17	ND	ND	ND	ND	ND	ND	1.4	ND	ND
MW-R01	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-R02	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-R14	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-R15	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-R36	7.8	ND	ND	ND	ND	ND	ND	ND	ND
MW-R40	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-R43	2.5	ND	ND	ND	ND	ND	ND	ND	ND
MW-R43D	1.1	ND	ND	ND	ND	ND	ND	ND	ND
MW-R47	ND	7.2	ND	ND	ND	2.9	ND	ND	ND
MW-R48	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-R49	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-R50	ND	ND	2.8	6.6	3.4	3.7	19	1.7	2.1
MW-R51	2.0	ND	ND	ND	ND	ND	ND	ND	ND
MW-R55	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Blank	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND - Not Detected

Table 5
Ratios of Tetrachloroethene and Trichloroethene Concentrations to MCL for FPGC
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Sample Location	Tetrachloroethene Concentration	PCE Concentration to MCL Ratio	Trichloroethene Concentration	TCE Concentration to MCL Ratio
MW-W02	44,000	8,800	4,400	880
MW-W03	19,000	3,800	7,300	1,460
MW-W05	12,000	2,400	1,900	380
MW-W06	39,000	7,800	1,900	380
MW-W16	14,000	2,800	2,500	500
MW-W17	15,000	3,000	6,900	1,380
MW-W30	68	14	37	7.4
MW-R01	2,900	580	1,600	320
MW-R03	ND	NC	19	3.8
MW-R11	ND	NC	10	2.0
MW-R14	ND	NC	140	28
MW-R15	ND	NC	21	4.2
MW-R16	ND	NC	19	3.8
MW-R36	11	2.2	26	5.2
MW-R47	110	22	22	4.4
MW-R48	36,000	7,200	5,800	1,160
MW-R50	67,000	13,400	93,000	18,600
MW-R52	13	2.6	ND	NC

MCL for TCE and PCE = 5 $\mu\text{g/L}$

FPGC - Field-Portable Gas Chromatograph

NC - Not Calculated

Locations where TCE and PCE were not detected are not included in table.

Table 6
Ratios of Tetrachloroethene and Trichloroethene Concentrations to MCL for Fixed Lab Data
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Sample Location	Tetrachloroethene Concentration	PCE Concentration to MCL Ratio	Trichloroethene Concentration	TCE Concentration to MCL Ratio
MW-W02	15,000	3,000	3,100	620
MW-W03	2,000	400	1,500	300
MW-W17	5,200	1,040	6,000	1,200
MW-R01	280	56	97	19
MW-R14	ND	NC	35	7
MW-R15	ND	NC	38	8
MW-R36	ND	NC	8.7	2
MW-R47	80	16	26	5
MW-R48	24,000	4,800	8,900	1,780
MW-R50	3,500	700	3,300	660
MW-R51	1.9	0.38	1.1	0.22
MW-R55	1,800	360	710	142

MCL for TCE and PCE = $5 \mu\text{g/L}$

FPGC - Field-Portable Gas Chromatograph

NC - Not Calculated

Locations where TCE and PCE were not detected are not included in table.

Table 7
Percent of Water Solubility for TCE and PCE based on FPGC
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Sample Location	Tetrachloroethene Concentration	Percent of Water Solubility	Trichloroethene Concentration	Percent of Water Solubility
MW-W02	44,000	22%	4,400	0.44%
MW-W03	19,000	9.5%	7,300	0.73%
MW-W05	12,000	6.0%	1,900	0.19%
MW-W06	39,000	19.50%	1,900	0.19%
MW-W16	14,000	7.0%	2,500	0.25%
MW-W17	15,000	7.5%	6,900	0.69%
MW-W30	68	0.034%	37	0.0037%
MW-R01	2,900	1.5%	1,600	0.16%
MW-R03	ND	NA	19	0.0019%
MW-R11	ND	NA	10	0.0010%
MW-R14	ND	NA	140	0.014%
MW-R15	ND	NA	21	0.0021%
MW-R16	ND	NA	19	0.0019%
MW-R36	11	0.0055%	26	0.0026%
MW-R47	110	0.055%	22	0.0022%
MW-R48	36,000	18%	5,800	0.58%
MW-R52	13	0.0065%	ND	NA

EPA guidelines suggest dissolved concentrations in excess of 1 percent of solubility indicates presence of DNAPL.

TCE Water Solubility = 1,000 mg/L

PCE Water Solubility = 200 mg/L

Locations where TCE and PCE were not detected are not included in table.

FPGC - Field-Portable Gas Chromatograph

Table 8
Percent of Water Solubility for TCE and PCE based on Fixed Laboratory Data
Sabana Abajo Site
Carolina, PR
November 2005

(all concentrations in $\mu\text{g/L}$)

Sample Location	Tetrachloroethene Concentration	Percent of Water Solubility	Trichloroethene Concentration	Percent of Water Solubility
MW-W02	15,000	7.5%	3,100	1.6%
MW-W03	2,000	1.0%	1,500	0.75%
MW-W17	5,200	2.6%	6,000	3.0%
MW-R01	280	0.14%	97	0.049%
MW-R14	ND	NA	35	0.018%
MW-R15	ND	NA	38	0.019%
MW-R36	ND	NA	8.7	0.0044%
MW-R47	80	0.040%	26	0.013%
MW-R48	24,000	12%	8,900	4.5%
MW-R51	1.9	0.0010%	1.1	0.00055%

EPA guidelines suggest dissolved concentrations in excess of 1 percent of solubility indicates presence of DNAPL.

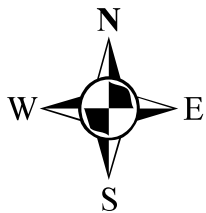
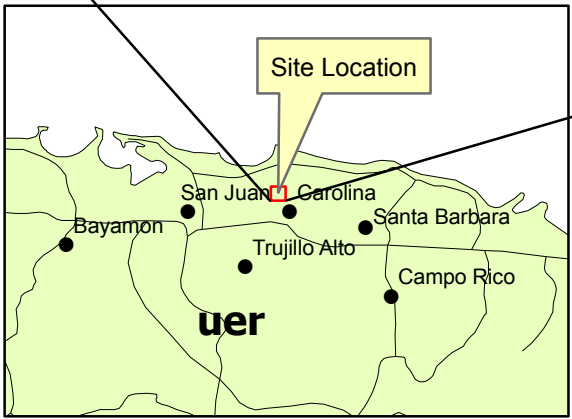
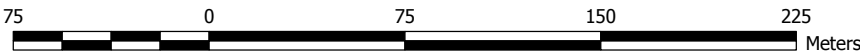
TCE Water Solubility = 1,000 mg/L

PCE Water Solubility = 200 mg/L

Locations where TCE and PCE were not detected are not included in table.

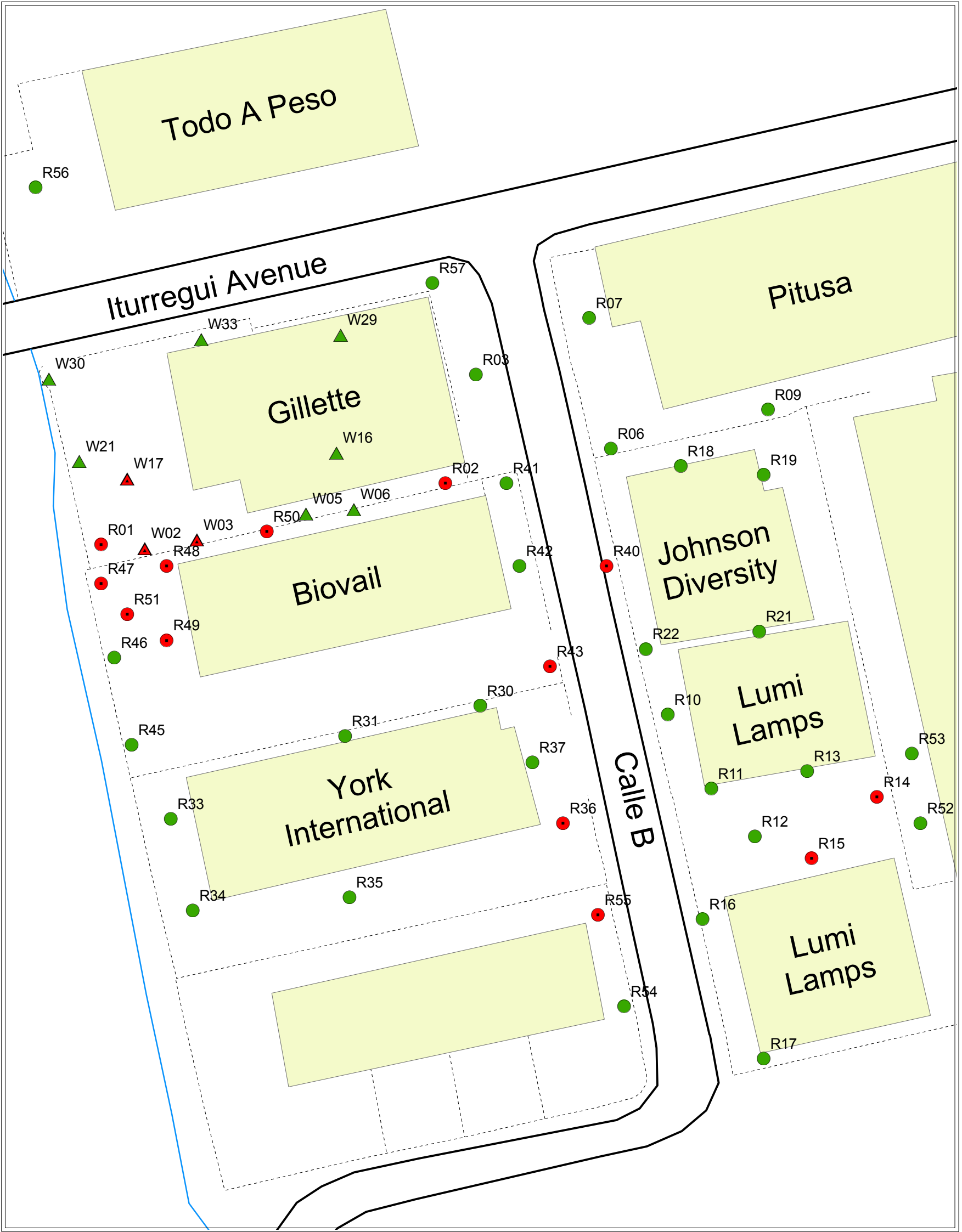


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Coordinate metadata: Universal
Transverse Mercator Zone 20N
1983 North American Datum

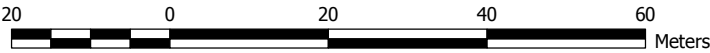


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Figure 1
Site Location Map
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico

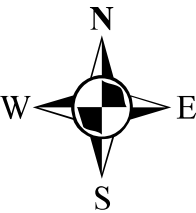


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Revised: 14 July 2005
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1983 North American Datum



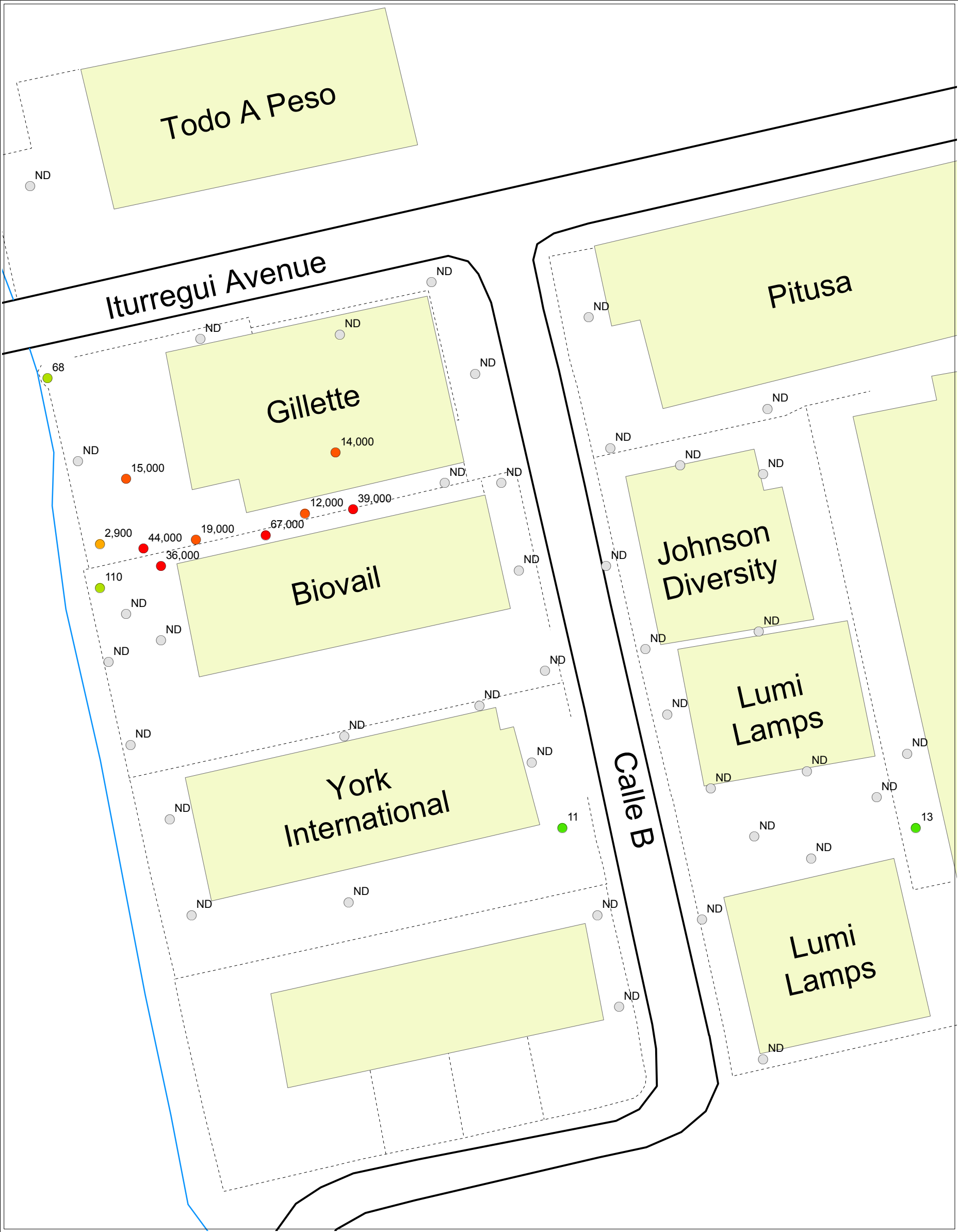
Legend

buildings	Permanent Well, Sampled Analyzed in Field and Fixed Laboratory
water	Permanent Well, Sampled Analyzed in Field Only
Roads	Temporary Well, Sampled Analyzed in Field and Fixed Laboratory
Fence	Temporary Well, Sampled Analyzed in Field Only

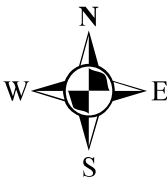
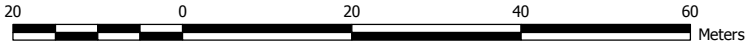


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Figure 2
Sample Location Map
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico



Map Creation Date: 7 March 2005
Revised: 14 July 2005
Coordinate metadata: Universal
Transverse Mercator Zone 20N
1983 North American Datum



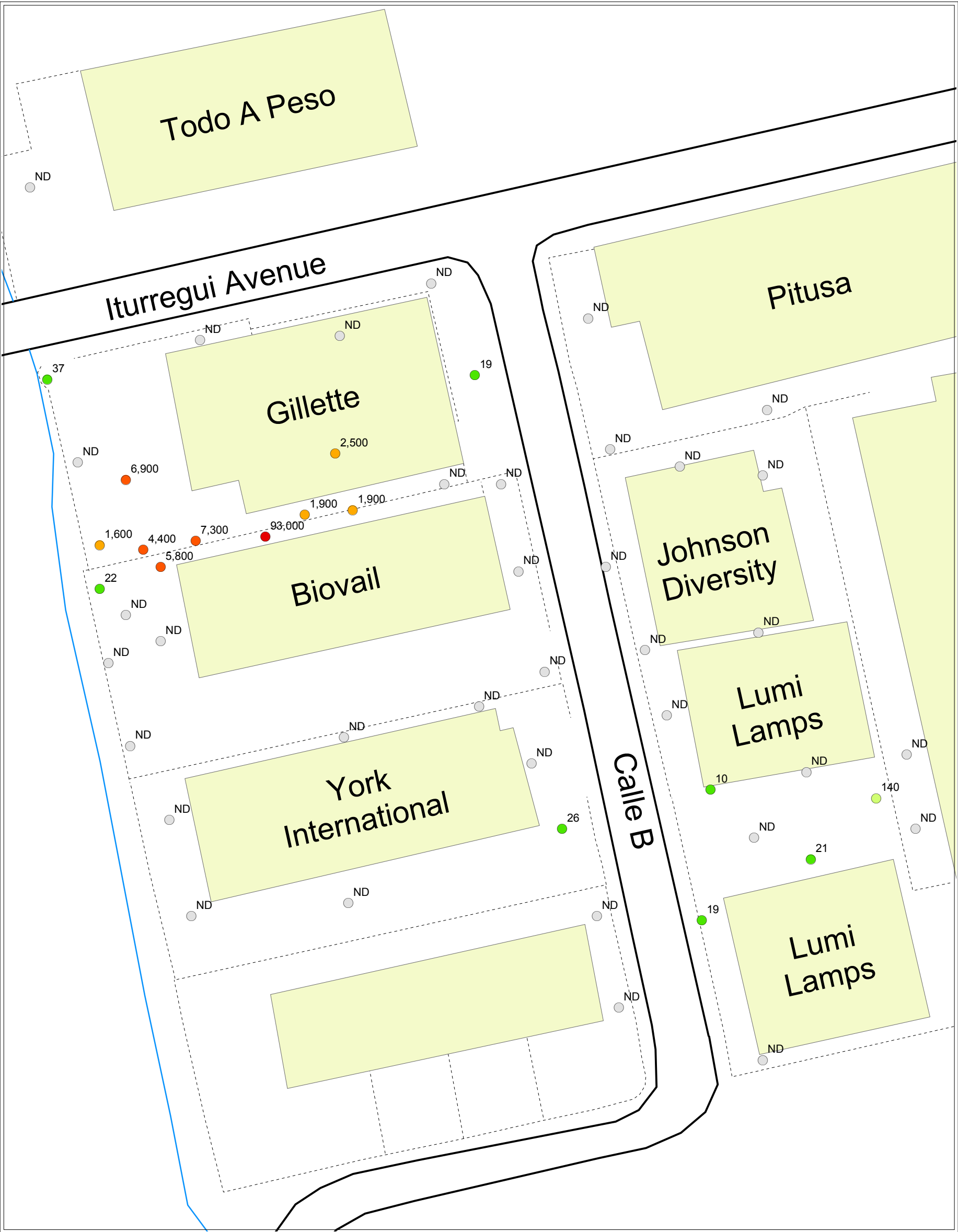
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Tetrachloroethylene (PCE) Concentration in µg/L

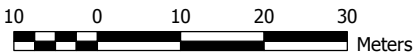
- 0
- 1 - 50
- 51 - 200
- 201 - 2,500
- 2,501 - 10,000
- 10,001 - 25,000
- 25,001 - 67,000

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Figure 3A
Tetrachloroethylene Concentration in Groundwater
Determined by Field-Portable Gas Chromatography
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico



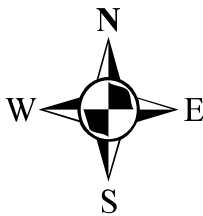
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Revised: 14 July 2005
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Transverse Mercator Zone 20N
1983 North American Datum



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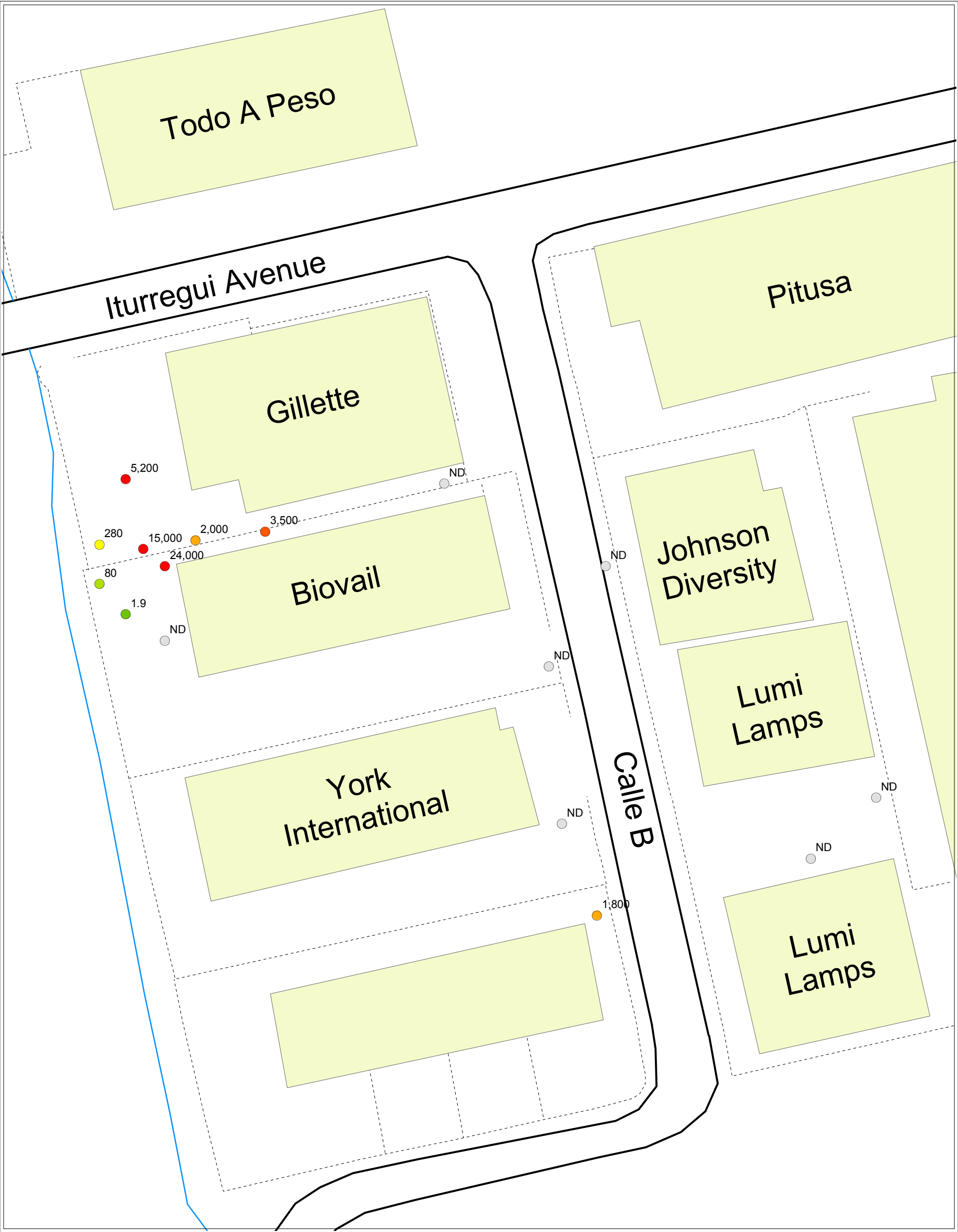
Trichloroethene (TCE) Concentration in µg/L

- Not Detected
- 10 - 50
- 51 - 200
- 201 - 1,500
- 1501 - 2,500
- 2501 - 10,000
- 10001 - 93,000

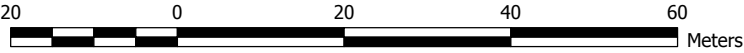


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Figure 3B
Trichloroethene Concentration in Groundwater
Determined by Field-Portable Gas Chromatography
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico



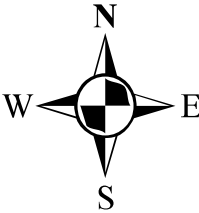
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Revised: 14 July 2005
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1983 North American Datum



Legend

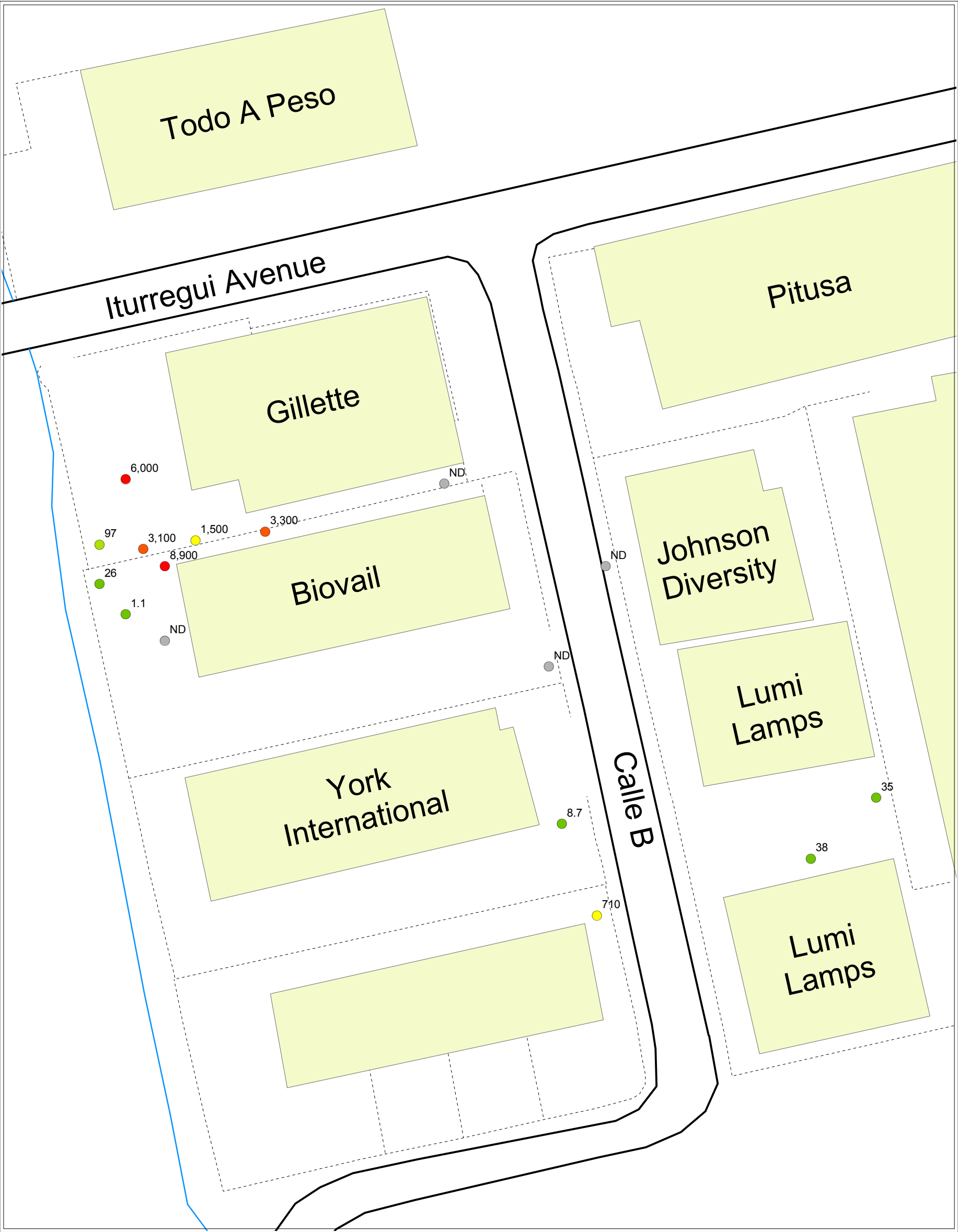
Tetrachloroethylene (PCE) Concentration in μg/L

- Not Detected
- 1 - 50
- 50 - 200
- 200 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 24,000

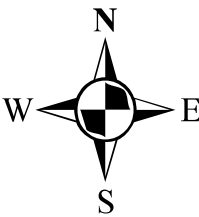
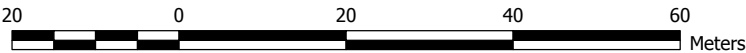


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Figure 4A
Tetrachloroethylene Concentration in Groundwater
Fixed Laboratory Data
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico



Map Creation Date: 7 March 2005
Revised: 14 July 2005
Coordinate metadata: Universal
Transverse Mercator Zone 20N
1983 North American Datum



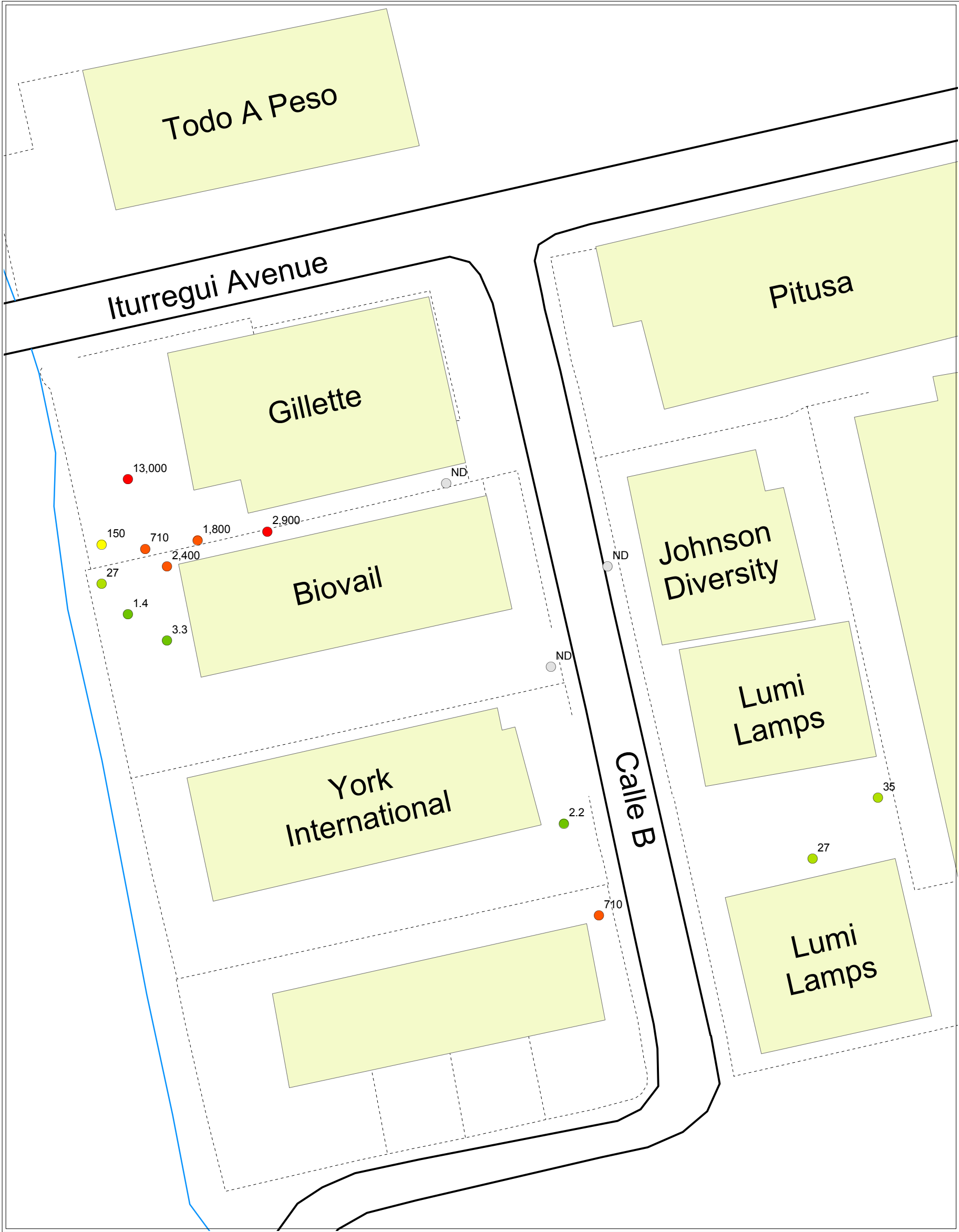
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Total Trichloroethylene (TCE) Concentration in $\mu\text{g/L}$

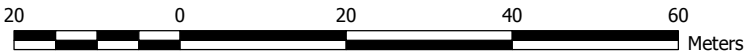
- Not Detected
- 1 to 50
- 50 to 200
- 200 to 1,500
- 1,500 to 2,500
- 2,500 to 5,000
- 5,000 to 8,900

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Figure 4B
Trichloroethylene Concentration in Groundwater
Fixed Laboratory Data
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico



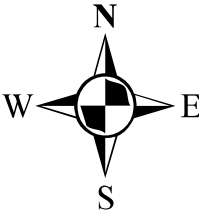
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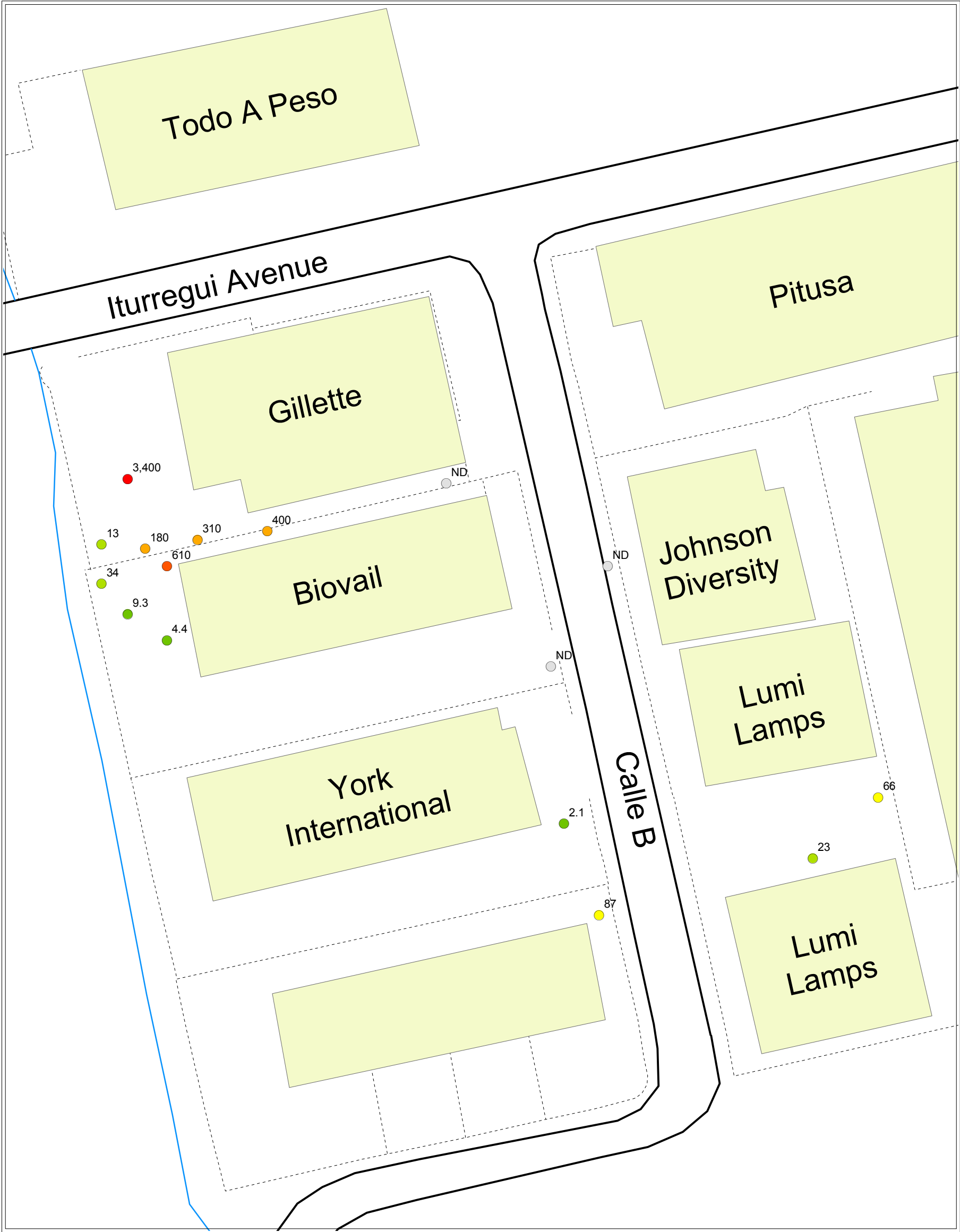
cis-1,2-Dichloroethene Concentration in µg/L

- Not Detected
- 1 - 10
- 10 - 50
- 50 - 200
- 200 - 500
- 500 - 2,500
- 2,500 - 13,000

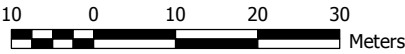


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Figure 5A
Total Dichloroethene Concentration in Groundwater
Fixed Laboratory Data
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico



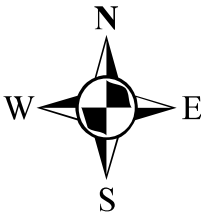
Map Creation Date: 7 March 2005
Revised: 14 July 2005
Coordinate metadata: Universal
Transverse Mercator Zone 20N
1983 North American Datum



Legend

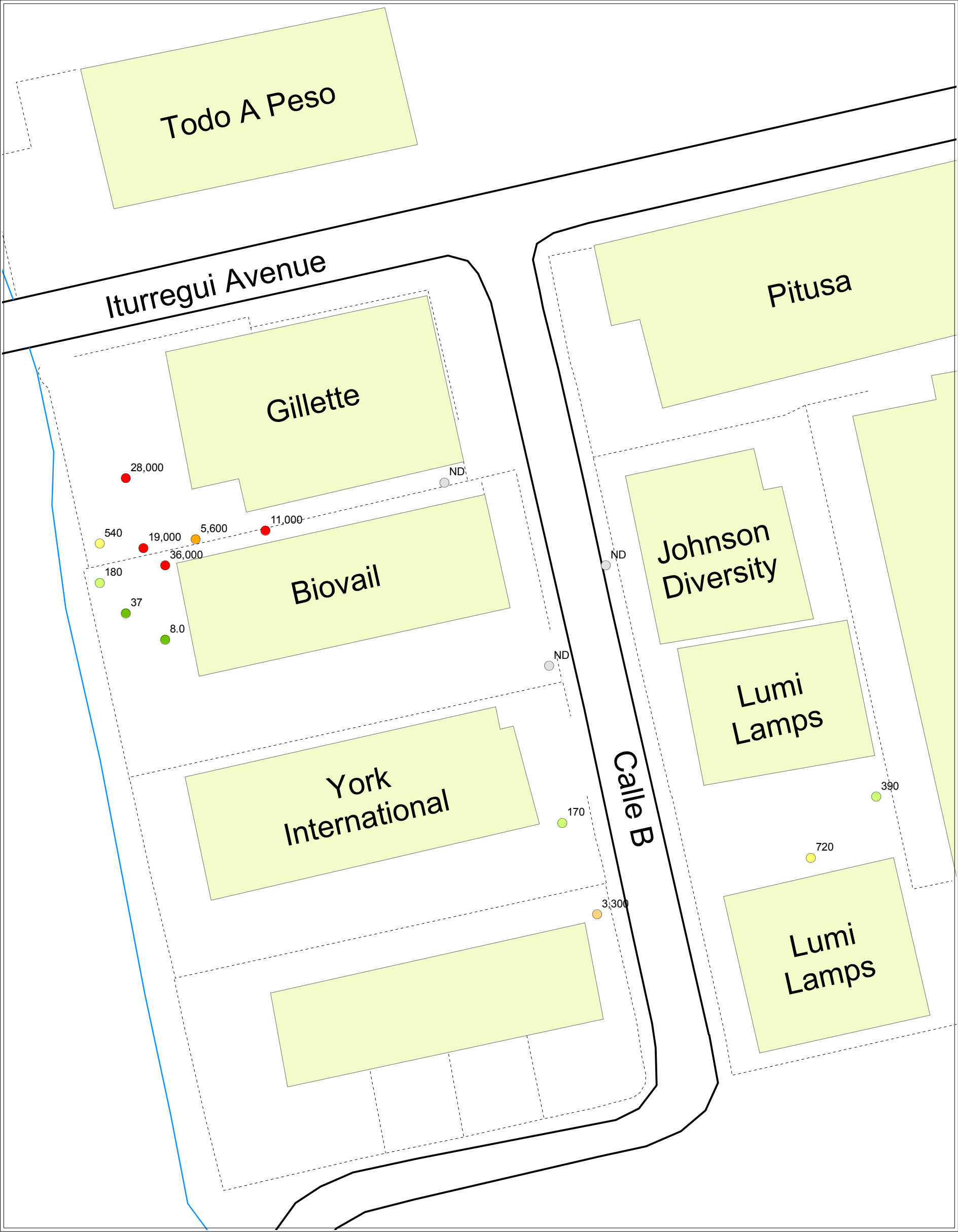
Vinyl Chloride Concentration in µg/L

- Not Detected
- 1 - 10
- 10 - 50
- 50 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 3,400



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Figure 5B
Vinyl Chloride Concentration in Groundwater
Fixed Laboratory Data
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico

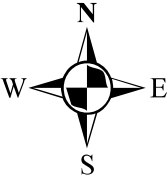
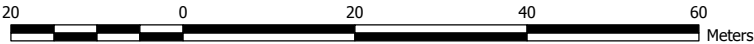


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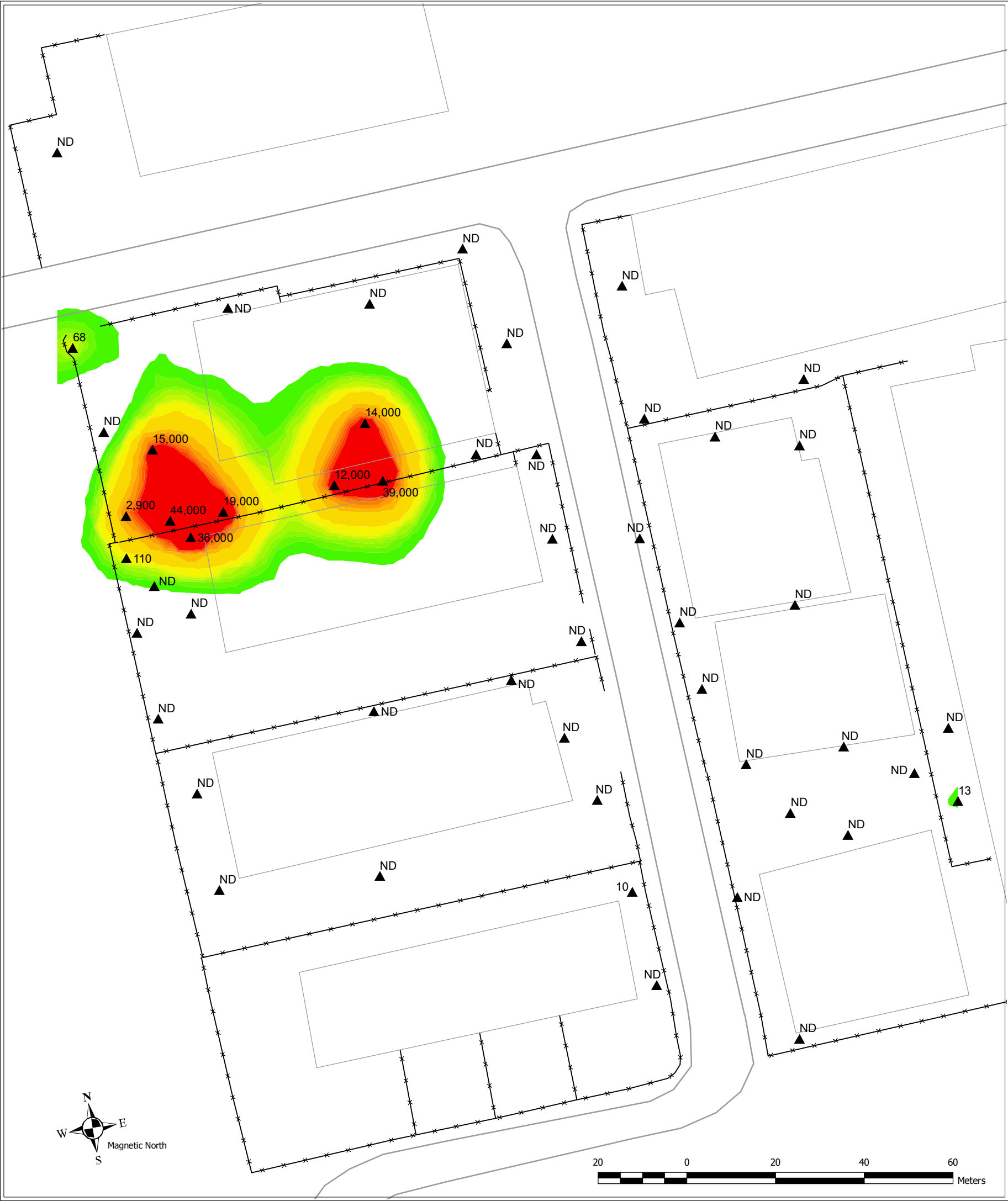
Total Chloronateds Concentration in µg/L

- Not Detected
- 8 - 100
- 110 - 500
- 510 - 1,000
- 1,100 - 5,000
- 5,100 - 10,000
- 11,000 - 36,000



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Figure 5C
Total Chlorinated Hyrdocarbon Concentration in Groundwater
Fixed Laboratory Data
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico



Map created using site survey GPS and USGS DOQQ. GPS collected in Lat., Lon., Decimal Degrees, WGS84

Map Creation Date: 26October2005

Coordinate system: UTM
Zone: 20N
Units: Meters
Datum: NAD83

Legend

- ▲ Sample Locations
- Fenceline
- Roads
- Buildings

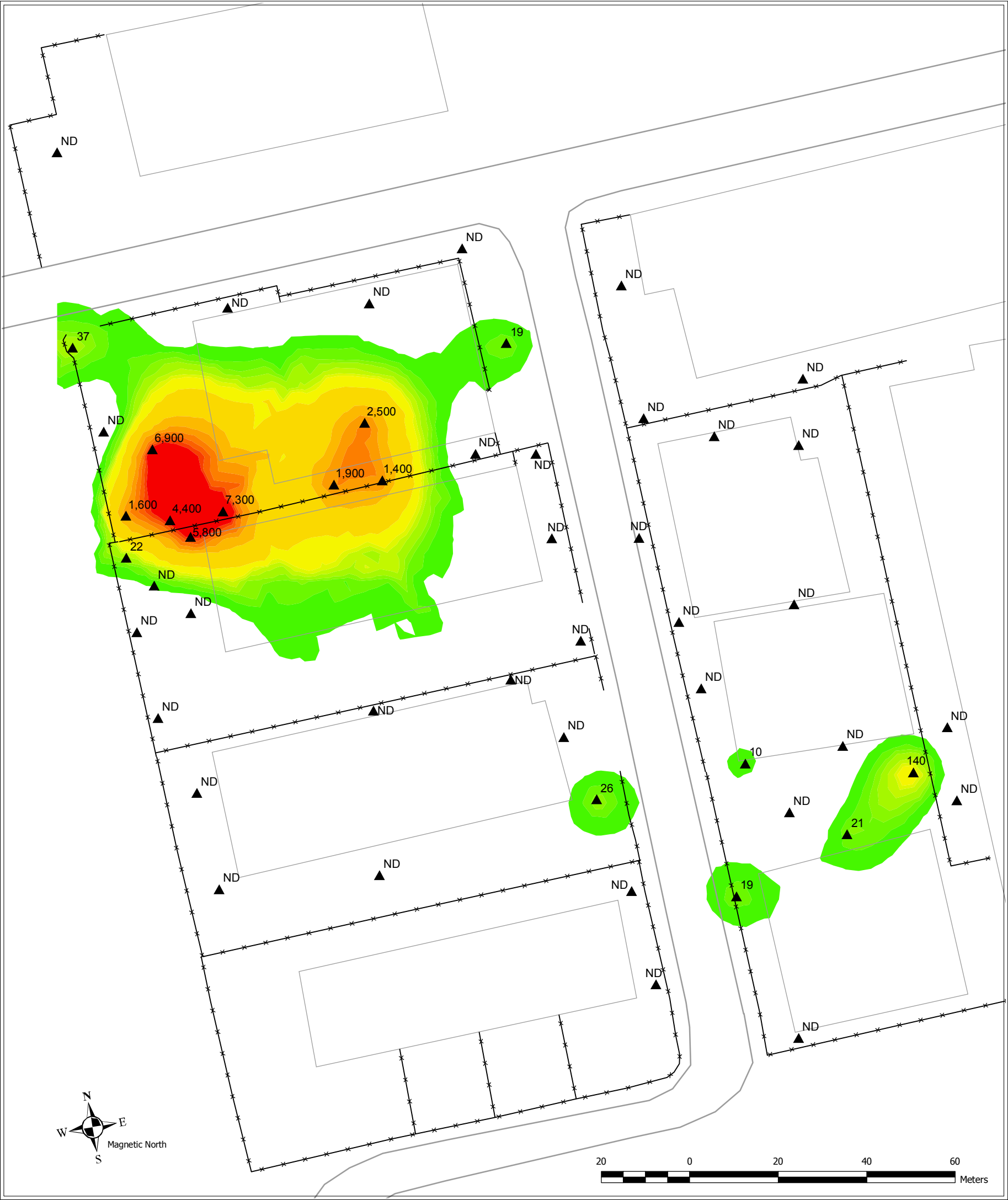
Tetrachloroethylene (PCE) Concentrations in µg/L*

<div></div>	< 5	<div></div>	30 - 40	<div></div>	1,000 - 1,500
<div></div>	5 - 10	<div></div>	40 - 50	<div></div>	1,500 - 2,000
<div></div>	10 - 15	<div></div>	50 - 100	<div></div>	2,000 - 2,500
<div></div>	15 - 20	<div></div>	100 - 500	<div></div>	2,500 - 3,000
<div></div>	20 - 30	<div></div>	500 - 1,000	<div></div>	> 3,000

*Location R50 not included in contouring

Figure 6
Contoured Tetrachloroethylene
Concentrations in Groundwater
Determined by Field-Portable Gas Chromatography
Sabana Abajo Site
January 2005
Carolina, Puerto Rico

U.S. EPA Environmental Response Team
Response Engineering and Analytical Contract
EP-C-04-032
WA # 0-111



Map created using site survey GPS and USGS DOQQ. GPS collected in Lat., Lon., Decimal Degrees, WGS84

Map Creation Date: 25August2005

Coordinate system: UTM
Zone: 20N
Units: Meters
Datum: NAD83

Legend

- ▲ Sample Locations
- Fenceline
- Roads
- Buildings

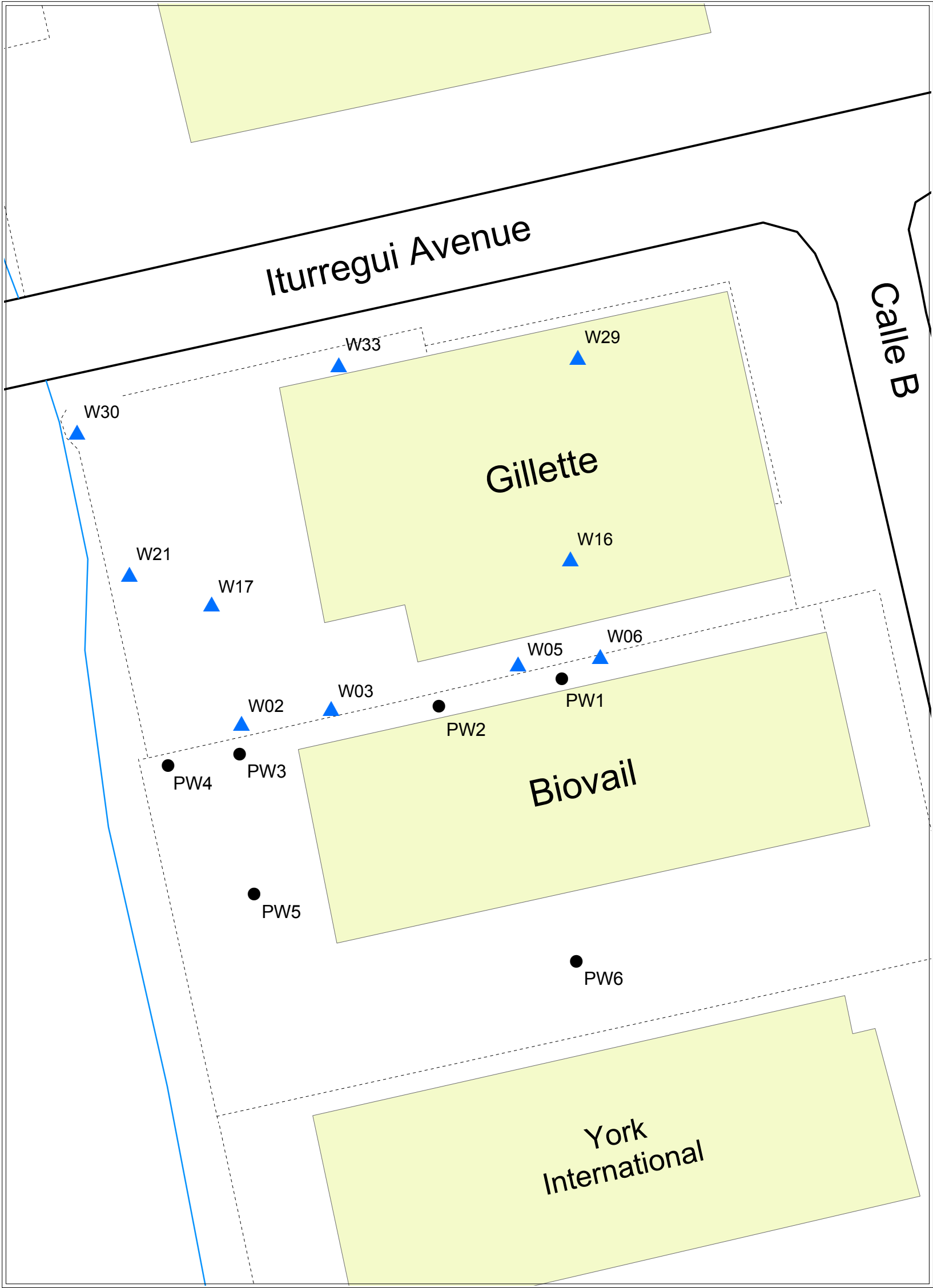
Trichloroethene (TCE) Concentrations in $\mu\text{g/L}^*$

	< 5		30 - 40		1,000 - 1,500
	5 - 10		40 - 50		1,500 - 2,000
	10 - 15		50 - 100		2,000 - 2,500
	15 - 20		100 - 500		2,500 - 3,000
	20 - 30		500 - 1,000		> 3,000

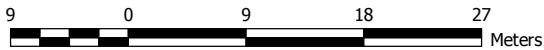
*Location R50 not included in contouring

Figure 7
Contoured Trichloroethene
Concentrations in Groundwater
Determined by Field-Portable Gas Chromatography
Sabana Abajo Site
January 2005
Carolina, Puerto Rico

U.S. EPA Environmental Response Team
Response Engineering and Analytical Contract
EP-C-04-032
WA # 0-111

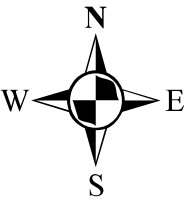


Map Creation Date: 7 March 2005
Revised: 14 July 2005
Coordinate metadata: Universal
Transverse Mercator Zone 20N
1983 North American Datum



Legend

buildings	Monitor Well Location
water	Proposed Monitor Well Location
Roads	Fence



U.S. EPA Environmental Response Team
Response Engineering and Analytical Contract
EP-C-04-032
WA # 0-111

Figure 8
Proposed Location of Permanent
Monitoring Wells on the Biovail Property
Sabana Abajo PCE Site
January 2005
Carolina, Puerto Rico

APPENDIX A
Field Log Book Notes
Sabana Abajo Industrial Park PCE Site
Trip Report
November 2005

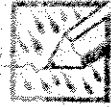
"Outd

"People"

0435/8t

Write in the Rain

ALL-WEATHER WRITING PAPER



HORIZONTAL LINE

All-Weather Notebook

No. 331-M

REAC IV-B-0074

<i>Jabana Abaja # 0-111</i>

3 1/2 x 4 1/4" - Numbered Pages

A163630
8223116 4



Due to low TCE/PCE in
soil gas will

begin to sample g.w.
on SAT all wells.

Facility will be sampled
on Monday Geo Enviro Tech.
will begin installing
temp wells at rate
of 15/day. Contract
in place for TBE and
Geo Enviro Tech. to begin
work on Mon

(TBE maybe Saturday?)
Go at close to
beginning 1/14/05.

1/15/05

also present on site

prepare g.w.
sampling.

0915 MW REAC 1 (GW-W30)
TOTAL 1187' | B 12601
DEPTH 393'

TO WATER 794' HEAD

1" PVC 0.043 g/ft

3.1

0.043

2282
3276.0

30

1190 GW 1021

2.95

8.95 head

.05

B 12602

0.4475

0.45 gallon x 3

Well purged to dry

@ 0.5 gallon

allowed to seep in 15 min

and sampled @ 1030

GW 17 1045 1" dia.

14.72 TOTAL DEPTH (feet)

5.52 DEPTH TO WATER (feet)

920 HEAD (feet)

1050 Purged until dry

1105 Sampled | B 12603

1125

W33

14.10

B 12604

4.93

9.17

2 gallon purged

1145 SAMPLE

W2 1203 5"

14.93

TOTAL

| B 12605

5.07

WATER

9.86

1115

2 gallon purged

1223 Sample

MW 3 1" MS/MSD

14.90

B 12606

3.22 WATER

17.68

11 to 0.9 = 29.16

90 START @ 1250

12 STOP @ 1300

0.43 1.1 gallon purged

36 and very slow recharge

420 Very clean well - just 1. ft. H₂O

0.516 x 3 2 sand at bottom

MW 6

B 12607

17.71

3.44

8.66

START @ 1325

large pieces of organic matter

FINISH @ 1335

well dry

recharge and sample @ 1340

MW 5

0.6 Sample in Lab

14.30

5.15

B 12608

START PURGE @ 1505

END PURGE @ 1315

pumped dry @ 0.6 gal/min

and still lib. of

silt in well -

Very silty well, well

let recharge for clear

more silt before

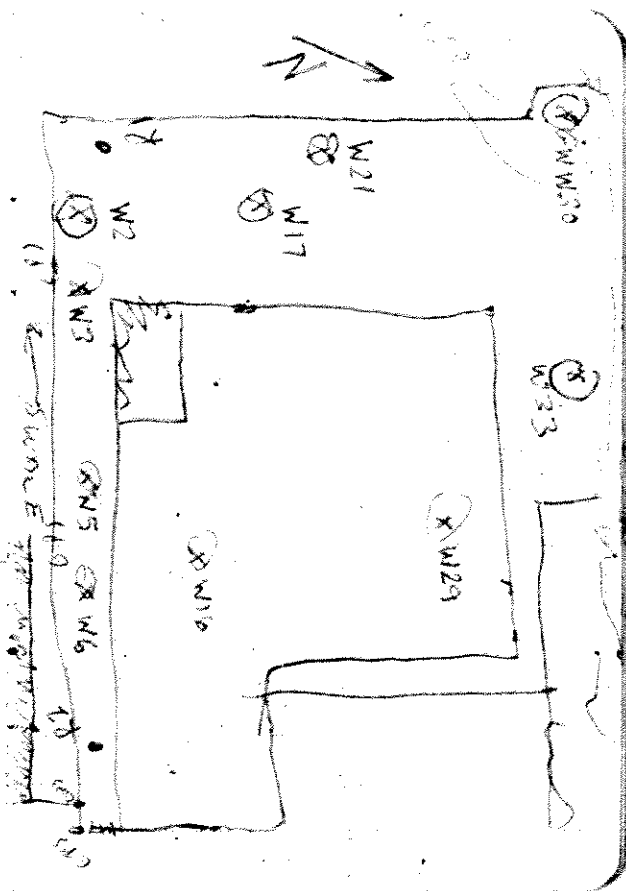
sampling

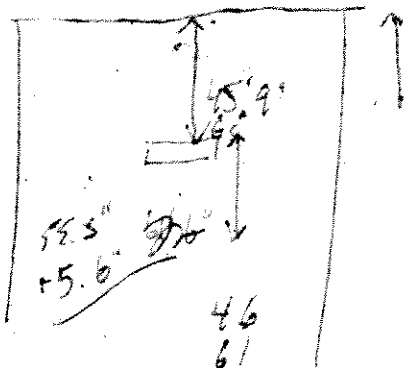
1445 START RECHARGE

1450 END Second purge

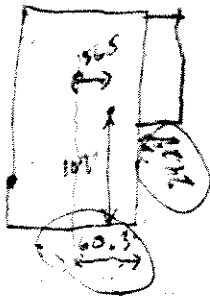
11/17/05 MW16
 1288 B 12609
 5.60 WATER
 7.28
 1.5 gallon purged
 10103 amp @ 6.16 sec.

MW29 B 12610
 14.07
 503
 904
 1.5 gallon purged
 1945 Sample collected

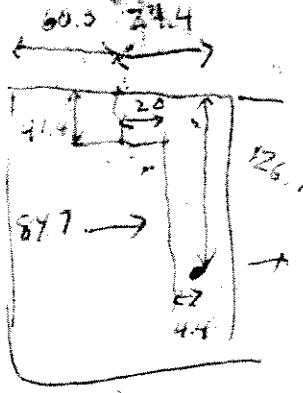




$$\begin{array}{r} 46 \\ 61 \\ \hline 107 \end{array}$$



$$\begin{array}{r} 52 \\ 62 \\ 56 \\ \hline 3-8 \end{array}$$



$$\begin{array}{r} 41.4 \\ 84.7 \\ \hline 126.1 \end{array}$$

100

1335 MW: R-1
W.L.: ~~4.36~~ 4.33
Well Depth: 13.10 ft
Above ground pipe: 1.18 ft
 $13.10 - 4.33 = 8.77$
 $8.77 \times 0.043 = 0.377 \times 3$
 $= 1.13 \text{ gallons}$

1500 MW: R-2
W.L.: 5.58 ft
Well Dpt: 12.32
 $12.32 - 5.58 = 6.74$
Above ground pipe: 1.2'
 $6.74 \times 3 \times 0.043 = 0.869 \text{ gallons}$

1515 MW: R-3
W.L.: 6.18
Depth: 13.20
Above ground: 1.25'
 $13.20 - 6.18 = 7.02$
 $7.02 \times 3 \times 0.043 = 0.905 \text{ gallons}$

MW: R-7 (MT)
W.L.: ~~9.60~~ 10.0 Redone
Depth: 12.5
Above ground pipe: 1.31'
 $12.5 - 10.0 = 2.5$
 $2.5 \times 3 \times 0.043 = 0.5 \text{ ft}$

MW: R-6 (MT)
W.L.: 9.3'
Depth: 13.9'
Above ground pipe: 1.94'
 $13.9 - 9.3 = 4.6$
 $4.6 \times 3 \times 0.043 = 0.6 \text{ gallons}$

(Tu) 1-18-05

0950 MW: R-6
W.L.: 7.3'
Depth: 15.0' DO: 10.2
Above pipe: 1.94
 $15.0 - 7.3 = 7.7$
 $7.7 \times 3 \times 0.043 = 1.0 \text{ gallons}$
PH: 6.6 Cond: 2.4 mS/cm T: 27°C

0955 MW: R-7
W.L.: 7.0'
Depth: 12.4
Above pipe: 1.31'
 $12.4 - 7.0 = 5.4$
 $5.4 \times 3 \times 0.043 = 0.7 \text{ gallons}$
T: 29.8 PH: 6.7 Cond: 1.034 DO: 7.7

1100 MW: R-9
W.L.: 2.3'
Depth: 12.6'
PH: 6.5
Cond: 0.912
T: 29.7°C
Pipe flush with road DO: 0.6
 $12.6 - 2.3 = 10.3$
 $10.3 \times 3 \times 0.043 = 1.3 \text{ gal}$

1330 MW: R-11

WL: 2.1'
Depth: 11.8'
Above pipe: 1.1'

$$11.8 - 2.1 = 9.7$$
$$9.7 \times 3 \times 0.043 = 1.25 \text{ gal}$$

pH: 6.5 Temp: 31.4 Cond: 1.728 DO: 3.2

MW: R-13

1420 WL: 5.0'
Depth: 13.95'
Pipe flush with road

$$13.95 - 5.0 = 8.95$$
$$8.95 \times 3 \times 0.043 = 1.15 \text{ gal}$$

pH: 6.3 Cond: 1.205 T: 30.8
DO: 3.7

1535 * MW: R-10

WL: 3.4
Depth: 13.35
Above pipe: 1.1'

$$13.35 - 3.4 = 9.95$$
$$9.95 \times 3 \times 0.043 = 1.28 \text{ gal}$$

1605

MW R-17

WL: 10.4

Depth: 14.9

(MT)

Redone

$$14.9 - 10.4 = 4.5$$
$$4.5 \times 3 \times 0.043 = 0.6 \text{ gal}$$

0835

MW R-40

1-19-05

WL: 3'-8 1/2"

Depth: 14'-7"

Above pipe: 4"

$$14.7 - 3.85 = 10.85$$

$$10.85 \times 3 \times 0.043 = 1.4 \text{ gal}$$

pH: 5.7 Cond: 0.6520 T: 28.3°
DO: 4.2

0900

MW R-17

Above pipe: 1'-2"

WL: 10'

Depth: 14.9'

$$14.9 - 10 = 4.9$$

$$4.9 \times 3 \times 0.043 = 0.6 \text{ gallons}$$

pH: 5.8 T: 26.8°C Cond: 0.393 ms/cm
DO: 3.9

* D-10 in a MW and E-1 in a MW

0925 MW R-16

WL: 4'-5" (4.4)

Depth: 11'-2"

Above pipe: 1'-1"

$$11.2 - 4.4 = 6.8$$

$$6.8 \times 3 \times 0.043 = 0.88 \text{ gallons}$$

pH: 5.7 T: 28.5°C Cond: 1.055

DO: 0.77

1545 MW R-19

WL: 1'-8"

Depth: 14'-8"

Above pipe: 1

GH: 6.6 T: 28.3 Cond: 0.729
DO: 2.9

0945 MW R-15

WL: 0'-6"

Depth: 9'-8" (9.7)

Pipe: 1/2"

$$9.7 - 0.5 = 9.2$$

$$9.2 \times 3 \times 0.043 = 1.2 \text{ gallons}$$

pH: 6.2 T: 28.3°C Cond: 1.448

DO: 2.5

435 MW R-21

WL: 4'-4 1/2" (4.5)

Depth: 14'-6"

Pipe: Flush

$$14.5 - 4.4 = 10.1$$

$$10.1 \times 3 \times 0.043 = 1.3 \text{ gallons}$$

pH: 5.9 T: 27.8°C Cond: 1.124

DO: 0.40

~~1145~~^{MT} 1425 MW R-18

WL: ~~No water~~ 4'-9"

Depth: 14'-7"

Above pipe: Flush

pH: 6.1 T: 27.3°C Cond: 1.275

520 MW R-22

WL: 3'-2 1/2" (3)

Depth: 14'-9"

Pipe: Flush

DO: 2.1

pH: 11.1 Temp: 28.8°C Cond: 2.6

1545 MW R-30

WL: 6'-8"
Depth: 14'-9"
Pipe: Flush

PH: ~~6.8~~^{5.6} MT: 26.27 Cond: 1.34
DO: 0.66

0900 MW R-31

WL: 3.35
Depth: 15'-0"
Pipe: Flush

PH: 9.12 T: 24.8°C Cond: 0.938
DO: 1.85

1-20-05 (Th) 915 MT 1045 MW * R-14 - MS/MSD (1)
- DUP (1)

0845 MW R-37

WL: 1'-3"
Depth: 13.0
Pipe: Flush

WL: 4.35'
Depth: 14.7'
Pipe: Flush

* Collected MS/MSD and DUP samples at 1615
PH: 6.4 T: 25.9 Cond: 0.012
DO: 0.79

PH: 9.5 T: 27.5 Cond: 0.975 1030 MT
DO: 2.26

1030 MT MW R-12

WL: 2.5'
Depth: 15.0'

PH: 11.4 T: 28.0 Cond: 1.70
DO: 1.2

1045^{MT} MW R-33

1130

WL: 4.16'

Depth: 15.2'

Pipe: Flush^{MT} 3"pH: 5.6 T: 26.4 Cond: 0.852
DO: 1.17

520 MW R-36

WL: 1.4'

WD: 14.5'

Pipe: Flush

pH: 9.2 T: 28.6 Cond: 0.96
DO: 3.07

1-21-0

1115 MW R-34

WL: 0.5"

Depth: 15.0'

Pipe: 3"

Dry - Done
on 1-22-05pH: T: Cond:
DO:

MW R-35

WL: Dry^{MT} 4.1'

Depth: 15.3'

Pipe: Flush

915' MW R-45

015

WL: 2.95'

Depth: 14.8'

Pipe: 3"

 $14.8 - 2.95 = 11.85$ $11.85 \times 3 \times 0.043 = 1.5 \text{ gal}$ pH: 6.2 T: 28.6 Cond: 1.19
DO: 0.04

030 MW R-46

028

WL: 3.8'

Depth: 14.9'

Pipe: 1"

 $14.9 - 2.95 = 11.95$ $11.95 \times 3 \times 0.043 = 1.5 \text{ gal}$

pH: 5.6 T: 78.7 Cond: 2.54

0945 MW R-49
~~1015~~
 1050

WL: 5.15'
 Depth: 14.97'
 Pipe: 5"

$$14.97 - 5.15 = 9.82$$

$$9.82 \times 3 \times 0.043 = 1.3 \text{ gal}$$

PH: ^{5.8}6.2 T: ^{26.2}28.6 Cond: ^{0.005}1.14 DO: ~~0.04~~ 0.64

1100 MW R-47
 1135

WL: 4.08'
 Depth: 14.85'
 Pipe: Flush

$$14.85 - 4.08 = 10.77$$

$$10.77 \times 3 \times 0.043 = 1.4 \text{ gal}$$

PH: 6.2 T: 28.2 Cond: 0.12 DO: 0.17

1115 MW R-48
 1150

WL: 5.22'
 Depth: 14.5'
 Pipe: Flush

$$14.5 - 5.22 = 9.28$$

$$9.28 \times 3 \times 0.043 = 1.2 \text{ gal}$$

PH: 6.0 T: 27.2 Cond: 1.40
 DO: 0.13

1330 MW R-50
 1410

WL: 6.2'
 WD: 15.0'
 Pipe: 8.0"

$$15.0 - 6.2 = 8.8$$

$$8.8 \times 3 \times 0.043 = 1.1 \text{ gal}$$

PH: 5.6 T: 28.7 Cond: 1.58
 DO: 0.24

1345 MW R-51
 1620

WL: 4.75'
 WD: 14.00'
 Pipe: Flush

$$14 - 4.75 = 9.25$$

$$9.25 \times 3 \times 0.043 = 1.2 \text{ gal}$$

1500 MW R-52

1520

WL: 3.71
WD: 15.15
Pipe: 7 1/2"

$$15.15 - 3.7 = 11.45$$

$$11.45 \times 3 \times 0.043 = 1.5 \text{ gal}$$

pH: 6.7 T: 26.9 Cond: 0.44 DO: 0.61

1510 MW R-53

1530

WL: 8.27
WD: 14.9
Pipe: 6"

$$14.9 - 8.27 = 6.63$$

$$6.63 \times 3 \times 0.043 = 0.5 \text{ gal}$$

pH: 6.1 T: 27.0 Cond: 0.56
DO: 0.15

1615 MW R-43

1643

WL: 1.2
WD: 15.0
Pipe: Flush

pH: 5.9 T: 29.0 Cond: 0.51

1615 MW R-44

WL: Dry
WD: 15.0
Pipe: Flush

MW R-42

1630 WL: 4.3 Field Blank bet R-4

1715 WD: 15.0 and R-43 from 1645-1730

Pipe: 6"
pH: 5.6 T: 27.4 Cond: 2.019
DO: 0.14

1730 MW R-41

WL: 4.57
WD: 14.87
Pipe: 6"

pH: 6.3 T: 28.1 Cond: 0.4
DO: 0.36

0915 R-34

1-22-05

WL: 3.75

WD: 15.5

Pipe: Flush

PH: 5.67 T: 29.1 Cond: 1.990

DO: 0.19

0930 R-44

WL - Dry

} Could not be
sampled.

1000 MW R-56

1000 WL 3.77

WD 14.83

Pipe: Flush

PH: 5.8 T: 30.4 Cond: 2.10

DO: 0.16

1015 MW R-57

1025 WL 4.48

WD 15.02

Pipe: 6"

PH: 5.7 T: 27.5 Cond: 1.12

DO: 0.60

140 MW R-55

WL: 3.36

WD: 14.75

Pipe: 6"

PH: 6.5 T: 26.9 Cond: 0.244

DO: 0.40

145 MW R-54

05

WL: 3.82

WD: 15.0

Pipe: 6"

PH: 5.6 T: 27.7 Cond: 0.91


DO: 0.56

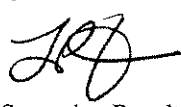
APPENDIX B
Voyager FPGC Technical Memorandum
Sabana Abajo Industrial Park PCE Site
Trip Report
November 2005



DATE: September 16, 2005

TO: Terrence Johnson, U.S. EPA/ERT Work Assignment Manager

THROUGH: Scott Grossman, REAC Task Leader 

FROM: Lawrence Kaelin, REAC Field Chemist 

SUBJECT: Technical Memorandum, Voyager FPGC Screening Results, Sabana Abaja Industrial Site Work Assignment # 0-111

Background. The Sabana Abajo Industrial Park site (Site) is located in Carolina, Puerto Rico (PR). The Site is bounded to the north by Ittunegul Avenue, to the east by Route 3, to west by drainage, and to the south by the Pueblo Warehouse. The Site is located within an industrial park that includes a number of active manufacturing, pharmaceutical, storage, and commercial facilities. Tetrachloroethene (PCE) contamination at levels over 300 parts per million (ppm) in the groundwater and over 400 ppm in shallow subsurface soil were detected at the Gillette Facility within the industrial park. The source(s) of the contamination is not known, but was suspected to be the Gillette facility itself or the adjacent Biovail Pharmaceutical Company.

On January 10, 2005, personnel from the Response Engineering and Analytical Contract (REAC) to the U.S. Environmental Protection Agency (EPA) Environmental Response Team (ERT) were mobilized to the Site to conduct a limited extent of contamination assessment. Field screening for the rapid on-site analysis of samples for the presence of PCE was accomplished using a Photovac Inc., Model Voyager™ field portable gas chromatograph (FPGC). Screening results were used to direct on-going and subsequent sampling and drilling efforts to define the PCE plume.

Voyager FPGC. The Voyager FPGC is a multi-column, dual detector, battery operated, portable analytical instrument. It consists of a syringe and loop injector port, a choice of up to three chromatographic columns and a photoionization detector (PID) and an electron capture detector (ECD), which are configured in series. The columns and detectors are independently temperature controlled. The Voyager FPGC is interfaced with a lap top computer where the analytical chromatographic runs (chromatograms) are stored and processed using a priority software package (Sitechart™). Multi-point calibrations are constructed using known concentrations of standards to identify and quantify the samples using analytical methods called "Assays" as part of the Sitechart software. The Assay method also contains the integration parameters, temperature settings, detectors settings, calibration retention times and coefficients necessary to properly identify and quantify the samples for trichloroethene (TCE) and PCE. Stored chromatograms can be reprocessed using the Sitechart software if needed. The TCE and PCE field screening results from the PID are summarized on Tables 1 and 2, unless otherwise noted.

The Voyager FPGC was set-up primarily for the analysis of PCE and TCE. A certified gas standard (cylinder number: SX-24541) was used for calibration during the analysis of soil gas samples. A series of three or more volumes of the gas standard was injected using a gas-tight syringe into the syringe injection port of the Voyager FPGC and multi-point calibration curves were constructed. To analyze soil gas samples, known volumes of soil gas, collected in Tedlar™ bags, were injected into the Voyager FPGC and analyzed for TCE and PCE. Benzene, although not a compound of concern on the Site, was present in the gas standard and was used in the Assay method. As such, benzene was also reported for the soil gas and well headspace samples on Table 1.

An aqueous static headspace standard technique was used to construct calibration curves for the Assay methods used to analyze the groundwater samples. Certified liquid standards containing known concentrations of TCE and PCE in a solvent were used. In brief, aqueous static headspace standards were made by injecting known amounts of standard solutions into 20-milliliters (mL) of distilled, de-ionized water in a septum sealed 40-mL VOA vial. An equilibrium between the aqueous phase and the vapor phase headspace in the sealed VOA vial was established, typically within 20-minutes, at room temperature. The headspace was sampled using a gas-tight syringe through the septum of the VOA vial and injected into the Voyager FPGC, using the syringe injection port. A series of three or more injection volumes were used to construct multi-point calibration curves. To analyze groundwater samples, 20-mL of sample were placed in 40-mL VOA vials and allowed to equilibrate for 20-minutes at room temperature. Known volumes of headspace were injected into the Voyager FPGC and analyzed for TCE and PCE.

Calibration curves of three or more points were constructed daily, except for January 17, 2005 due to a contaminated standard and January 22, 2005 when analysis was terminated because the Voyager FPGC prematurely shutdown due to excessive ambient temperatures. In these cases the most recent date of calibration was used for quantification, January 15, 2005 and January 21, 2005, respectively. Linear regression (LR) was performed daily on the calibration data to check the linearity of the PID and ECD responses. The LR was forced through the origin and a coefficient of determination (R^2) was determined for each daily calibration which indicated the correlation between concentration and detector response. An R^2 of 1.0 would mean that the regression equation is ideal, with values closer to unity indicating a better correlation, which in turn indicates a linear PID and ECD response to TCE and PCE concentrations. An R^2 of 0.6 is considered sufficient to determine a reliable linear regression model, however for health or risk assessment purposes a more stringent value of 0.8 may be more appropriate (OSWER 1991). The R^2 values were greater than 0.94 for benzene, TCE and PCE via PID on January 13, 2005 and January 14, 2005, during the analysis of the soil gas and well headspace samples. The R^2 values for TCE via PID were greater than 0.93, during the analysis of groundwater samples from January 15, 2005 through January 22, 2005. The R^2 for PCE via PID ranged from 0.61, on January 19, 2005 to 0.95, on January 21, 2005, during the analysis of groundwater samples from January 15, 2005 through January 22, 2005. The R^2 for TCE and PCE via ECD was 0.95 for both, during the analysis of groundwater samples on January 21, 2005. The R^2 values for all daily calibrations, with the exception of the PCE via PID on January 19, 2005 at 0.61, were above 0.84, and as such, show that the LR were valid and the Voyager FPGC detectors responses were linear and operating correctly during the field screening activities of January 13, 2005 through January 22, 2005.

Observations and Activities. A PE Photovac Model Voyager FPGC, was used by the REAC field chemist for the on-site screening starting on January 13, 2005, and was configured for the detection and quantization of TCE and PCE, initially in soil gas samples. The well headspace from four wells (EW-2, EW-3, EW-5 and EW-6) was screened for the presence of benzene, TCE and PCE, for informational purposes only. A soil gas survey was then initiated on January 14, 2005 but was abandoned due to the shallow water table found locally, in some cases less than 2-feet below ground surface (bgs). This prohibited the collection of soil gas samples at the prescribed 4-feet bgs, typical for most soil gas surveys. Eight soil gas samples were collected and analyzed via Voyager FPGC before terminating the soil gas survey.

On January 15, 2005, at the request of the ERT Work Assignment Manager (WAM), the Voyager FPGC was reconfigured for the analysis of TCE and PCE in groundwater samples using static headspace techniques. Temporary piezometers were installed to a depth of 4-feet bgs using a direct-push Geoprobe drilling unit and groundwater samples were collected. Fifty two (52) groundwater samples were collected and analyzed for TCE and PCE from January 15 through January 22, 2005.

Results. The soil gas and well headspace results for benzene, TCE and PCE are presented in Table 1. The groundwater results for TCE and PCE are presented in Table 2. Several groundwater samples (R48 and R50) had extremely high TCE and PCE results that were above the linear range of the detectors of the Voyager FPGC and are therefore estimates. Copies of the field log book entries are compiled in Appendix A. The Voyager FPGC, chromatograms and raw data are presented in Appendix B. The Voyager FPGC field results were manually recalculated using LR on selected standards with the intercept forced through the origin prior to constructing Tables 1 and 2. Recalculation was necessary to include dilution factors, poor integration in some cases, and the over/under estimation observed in some of the daily Assay method calibrations. The plots of the LR and the regression coefficients (slopes and R^2 values) are also compiled in Appendix B.

The soil gas TCE results ranged from Not Detected (ND), with a quantitation limit estimated at 0.010 parts per million by volume (ppmv), to 0.78 ppmv for sample 111-0105-4A-1. Samples 111-0105-31A-3, 111-0105-4-1 and 111-0105-4A-2 have TCE values biased artificially high as a result of poor peak to baseline integrations, probably due to matrix interferences. The soil gas PCE results ranged from ND to 0.65 ppmv for sample 111-0105-31A-3. Benzene, although not a Site compound of concern, ranged from ND to 0.23 ppmv for sample 111-0105-31-3. A large peak was detected for sample 111-0105-25-5 on the PID between the retention time benzene and TCE which may possibly be cis-1,2-dichloroethene.

The well headspace TCE results ranged from 0.53 ppmv for EW-5 to 7.2 ppmv for EW-3. The well headspace PCE results ranged from 3.3 ppmv for EW-6 to 48 ppmv for EW-5. Benzene, although not a Site compound of concern, ranged from 0.68 for EW-2 to 3.2 ppmv for well headspace sample EW-3.

The groundwater TCE results ranged from ND, with a quantitation limit of 0.010 microgram per milliliter ($\mu\text{g/mL}$), to 93 $\mu\text{g/mL}$ for sample R50. The groundwater PCE results ranged from ND to greater than 67 $\mu\text{g/mL}$ for sample R50. The results from the ECD were used to identify and quantify PCE on sample R48 and to identify and quantify TCE and PCE on sample 50, because the TCE and/or PCE peaks were beyond the linearity of the PID (off scale) for these samples. In all other instances the results from the PID were used to identify and quantify TCE and PCE.

Locations W-3, W-5 and W-6 were resampled from the same monitor wells, within 24 hours of purging the well, because of turbidity in the initial sample. The results of the resampled locations were similar to the initial sample results for TCE but higher by a factor of 2-20 times for PCE. Resampled results are listed in Table 2, in parenthesis, and should be used for the extent of contamination modeling and other decision making needs because they were less turbid and were within the 24 hours sampling criteria between well purging and actual sampling.

An early eluting peak and a large peak between the retention times of benzene and TCE were detected on the PID in the chromatograms of several groundwater samples (R14, R15, R16, R36, R47, R48, R50). These peaks were not detected on the ECD. It is believed that these peaks possibly correspond to the compounds vinyl chloride and cis-1,2-dichloroethene, respectively.

Future Activities. No future activities are planned for the Site.

REFERENCES

OSWER 1991. *Removal Program Representative Sampling Guidance, Volume 1: Soil, Section 5.6, Correlation Between Field Screening Results and Confirmation Results*. OSWER Directive 9360.4-10. November 1991.

Table 1
Soil Gas Results
Sabana Abaja Industrial Site
Technical Memorandum
September 2005

Sample Name	Type	Benzene	TCE	PCE
111-0105-19-1	Soil Gas-1' bgs	ND	0.071	0.023
111-0105-19-3	Soil Gas-3' bgs	ND	0.074	0.010
111-0105-25-3	Soil Gas-3' bgs	0.037	ND	0.078
111-0105-25A-4	Soil Gas-4' bgs	ND	ND	ND
111-0105-31-3	Soil Gas-3' bgs	0.23	0.067	0.65
111-0105-31A-3	Soil Gas-3' bgs	ND	0.63**	0.23
111-0105-4-1	Soil Gas-1' bgs	ND	0.78**	0.21
111-0105-4A-2	Soil Gas-2' bgs	0.21	0.69**	0.12
EW-2	Well Headspace	0.68	2.1	5.3
EW-3	Well Headspace	3.2	7.2	14
EW-5	Well Headspace	2.8	0.53	48
EW-6	Well Headspace	1.5	2.3	3.3

Results in parts per million by volume (ppmv)

TCE = Trichloroethene

PCE = Tetrachloroethene

bgs = Below ground surface

ND = Not detected, less than 0.010 ppmv

** = Integration poor, result artificially high

Table 2
Groundwater Results
Sabana Abaja Industrial Site
Technical Memorandum
September 2005

Sample	Trichloroethene	Tetrachloroethene
W-2	4.4	44
W-3	2.3 (7.3)	3.8 (19)
W-5	1.1 (1.9)	5.3 (12)
W-6	1.4 (1.9)	1.7 (39)
W-16	2.5	14
W-17	6.9	15
W-21	ND	ND
W-29	ND	ND
W-30	0.037	0.068
W-30 (Dup)	0.054	0.045
W-33	ND	ND
R1	1.6	2.9
R2	ND	ND
R3	0.019	ND
R6	ND	ND
R7	ND	ND
R9	ND	ND
R10	ND	ND
R11	0.010	ND
R12	ND	ND
R13	ND	ND
R14	0.14	ND
R14 (Dup)	0.08	ND
R15	0.021	ND
R16	0.019	ND
R17	ND	ND

Table 2 (Cont'd)
Groundwater Results
Sabana Abaja Industrial Site
Technical Memorandum
September 2005

Sample	Trichloroethene	Tetrachloroethene
R18	ND	ND
R19	ND	ND
R21	ND	ND
R22	ND	ND
R30	ND	ND
R31	ND	ND
R33	ND	ND
R34	ND	ND
R35	ND	ND
R36	0.026	0.011
R37	ND	ND
R40	ND	ND
R41	ND	ND
R42	ND	ND
R43	ND	ND
R45	ND	ND
R46	ND	ND
R47	0.022	0.11
R48	5.8	> 36*
R49	ND	ND
R50	93*	>> 67*
R51	ND	ND
R52	ND	0.013
R53	ND	ND
R54	ND	ND
R55	ND	ND

Table 2 (Cont'd)
Groundwater Results
Sabana Abaja Industrial Site
Technical Memorandum
September 2005

Sample	Trichloroethene	Tetrachloroethene
R56	ND	ND
R57	ND	ND

All Results in micrograms per milliliter ($\mu\text{g/mL}$)

ND = Not detected, less than $0.010 \mu\text{g/ml}$

Results in parenthesis () are results for the same locations, re-sampled 2 days later

> = Greater than

>> = Much greater than

* = Results determined using electron capture detector (ECD)

Appendix A
Field Log Book Entries
Sabana Abaja Industrial Site
Technical Memorandum
September 2005

"Outdoor writing products for outdoor writing people."

If Found, Please Return To:

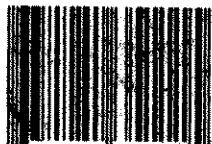
Name: _____

LOCKHEED-MARTIN/REAC
2890 Woodbridge Avenue
Edison, NJ 08837-3679
Phone: (732) 321-4200

COC & Sample Shipping Procedures

Peer review COC record	Call Sample Receiving Hotline at (732) 632-9345 or SRT's Cell Phone (609) 234-5318. Give
Remove pink copy for the Task Leader	- FedEx tracking # - Chain of Custody Record #s - # of Coolers
Place original COC in a plastic bag, seal, and secure to the lid inside the cooler.	- # of samples and matrices - Analyses requested - Subcontract lab info
Tape and seal the cooler.	Fax COC record to (732) 494-4021 (REAC analyses) or (732) 494-4020 (subcontract analyses) Follow-up to confirm sample receipt.

Tacoma, WA 98424-1017 USA
(253) 922-5000 • FAX (253) 922-5300
www.RiteInTheRain.com



8 32281 35111 5



FIELD

All-Weather Notepad
No. 351

NEAR 11-8-00

<i>[Signature]</i>
<i>[Signature]</i>
<i>[Signature]</i>
<i>[Signature]</i>

7-48 Numbers Pages



Name L. Kaeler

Address REAC

Phone _____

Project Sabona

WAX III

Clear Vinyl Protective Slipcovers (Item No. 30) are available for this style of notebook.
Helps protect your notebook from wear & tear. Contact your dealer or the J. L. Darling Corporation.

REAC IV-B-0077

CONTENTS

PAGE	REFERENCE	DATE
------	-----------	------

Voyager GC

Continued in
(log book #)

REAC IV-B-0077

Sab-11a; Sab-hs-1; Sab-hs-2

Briggs method assay

Column B: 60°C - 150

8 psi

ECD - hi-sensitivity

PID - hi-sensitivity

80 sec delay - integration

800 sec analysis time

400 sec blank flush

slows: up/down 0.1/0.1

injection width: 100 µL

normalized injection vol.

41 µL = 3.0

Column B: 20m, 0.32mm ID,

1.5 µm ^{COATING} thickness → Supelcowax 10

(WAX phase capillary column)

4/12/05

H 6 7 12 11

VOYAGER 0.0

STDA → cy/# SX-24541

VCE → 20.50 ppm V

Ø → 19.98

MeCl → 18.51

C12 DC propane → 16.30

CT → 18.86

TCE → 19.89

PCE → 20.65

12 DB methane → 16.14

12 N2 balance

0930 @ 1300 psi

PID

VCE 102

MeCl 190

CT 232 ECD

Ø 235

TCE 278

PCE 389

ER - EAC 00120

4/12/05

STB-111a, APP

3

100%L - STDA @ 20 ppm

PID B5011201

PIC @ ~100

#2 14222 MVS 336 sec Ø

#3 13820 418.4 TCE

#4 19832 616.5 PCE

#5 44102 850.0 DCP

ECD

#3 44990 274.7 sec CT

#4 15761 625.6 sec PCE

50%L STDA

B5011202

PID

#3 10918 335.7 TCE

#4 10400 417.6 TCE

#5 12308 610.7 PCE

#6 3826 844.9

→ #1 5280 110.1 (VCE?)

ECD

#2 37780 274.4

#4 12040 612

1/12/05

10 µl STD A → B 5011203 PID/SCD

PID

#2	818	109.2
#3	1933	335.7
#4	2206	418.0
#5	2067	612.8
#6	391	847.1

ECD

#2	9653	273.9	CT
#3	1317	620.3	PCE

25 µl STD A → B 5011204

PID

#1	3180	336.3	
#2	9306	419.6	TCE
#3	3132	619.7	PCE
#4	701	854.4	

ECD

#2	17758	274.4	CT
#4	2323	627.2	PCE

1/12/05

Blank (no inject) → B 5011205

PID #1	406 sec	→ 23 mV
#2	512.9 sec	→ 106 mV
SCD #1	101.2 sec	→ 4.2 mV

HS - water blank → B 5011206
100 µl

TCE / PCE → STD A

RESTEK

Cat# 80420

2000 µg/ml each in Purge and Trap Methanol

Trichloroethene Standard

Lot# A084749

Exp: 7/08

Store:

Freezer

Restek Corporation - 110 Banner Circle - Bellefonte, PA 16823

10 µl / 20 µl
H₂O**RESTEK**

Cat# 80418

2000 µg/ml each in Purge and Trap Methanol

Tetrachloroethene Standard

Lot# A038932

Exp: 11/07

Store:

Freezer

Restek Corporation - 110 Banner Circle - Bellefonte, PA 16823

10 µl / 20 µl
H₂O

$$\frac{10 \mu\text{L} \times 1 \text{ mL}}{20 \mu\text{L}} \times \frac{2000 \mu\text{g/mL}}{1000 \mu\text{L}} = 1 \mu\text{g/mL}$$

mg/L = ppm

1/12/05

207

HS-STD @ 10 μ l \rightarrow 100 μ l inject
TCE/PCE

(TCE) #1 @ 419.65 = 24270
(PCE) #4 @ 619.2 = 41851

ECO

#3 @ 428.45 \rightarrow 2406 (TCE)
#4 @ 627.7 \rightarrow 44644 (PCE)

HS-STD A @ 10 μ l injection
TCE/PCE B5011208

TCE AT = 420 secs
PCE RT = 620 secs

BTEX \rightarrow STD B

TESTEK

Cal# 30219
2000 μ g/ml each in Purge and Trap Methanol
BTEX Standard
Lot# A030688 Exp: 3/06 Store: Freezer
Parrish Corporation - 110 Beaver Circle - Bethlehem, PA 18023



10 μ l / 20 ml
H₂O

$$2000 \mu\text{g/ml} \times \frac{10 \mu\text{l}}{20 \times 10^3 \mu\text{l}} = 1 \mu\text{g/ml} = 1 \text{ ppm}$$

B5011 209

HS-BTEX-10 μ l @ 20 μ l inject
HS-STD B

HS-STD B @ 100 μ l inject
B5011210

Change Vowager time 14:31 \rightarrow 16:31

HS-STD B @ 100 μ l inject
Analyze time = 2000 sec
B5011-211

HS-STD C \rightarrow 10 μ l TCE
10 μ l PCE
10 μ l BTEX
all @ 2000 μ g/ml / 20 ml H₂O

$$2000 \mu\text{g/ml} \times \frac{10 \mu\text{l}}{20 \text{ ml}} \times \frac{1 \text{ ml}}{1000 \mu\text{l}} = 1 \mu\text{g/l} = 1 \text{ ppm}$$

01/12/05

HS std C @ 10 μ l each \rightarrow 100 μ l
B5011212 inject

HS std C @ 20 μ l each / 20 μ l inject
B5011213

HS std C @ 10 μ l each / 15 μ l inject
B5011214

CT = 1.886	1.998	PGE 2.065
TCR 1.989	DCP 1.630	

01/13/05 Voyager GC

Set up in Gillette loading dock
BLANK - no inject
no target peaks - clean

gas-STD A \approx 20 ppm v/v gas

B5011301
100 μ l - gas STD A (20 ppm)
B5011301
peak shifted, Δ RT

• 50 μ l gas STD A
B5011302
noise peak, possible 2 sec
loop inject time is pulling in
crap in air

• 20 μ l - gas STD A
B5011303 - set inject time
junk peaks to 0.1 sec

10 μ l - gas STD A
B5011304 calibration

reloaded syringe w/ MeOH

01/13/05

Voyager GC

100.4g GAS STD A
B 5011305 - no junk pkgs
calibration

50.4g GAS STD B → NG
B 5011306 repeat

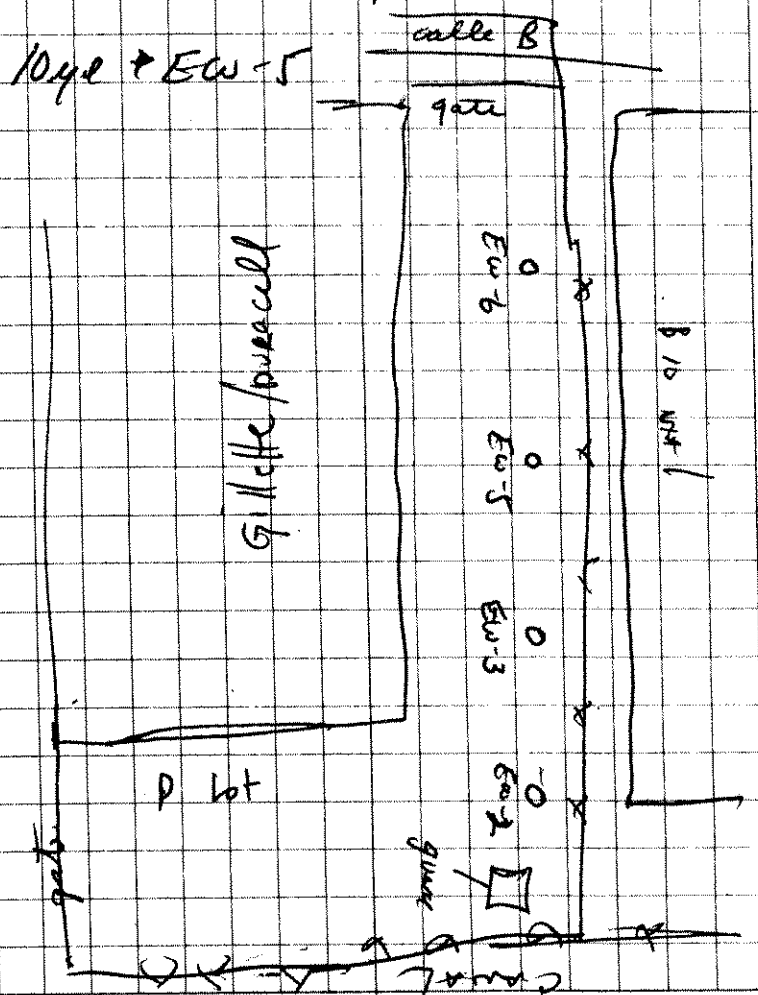
50.4g GAS STD B OK
B 5011307

20.4g GAS STD B OK
B 5011308

01/13/05

2330

well # → ECW-5 - collected
headspace bag @ 1334
B 5011309



01/13/08

B5011309 cont'd @ 1042

ECD

PID

PCE 6.643 BENZ 0.407

TCE 0.107

PCE 19.70

EW-5 → 1004R inject

ECD

PID

PCE ~ 115 ppm TCE 3.579 ppm

PCE ~ 143 ppm

B5011310

EW-6 → 1004R, well headspace
(resampled)

ECD

PID

PCE 4.480

PCE 13.0

B5011311

BENZ 2.082

TCE 4.648

01/13/08

B5011312

13

EW-2 well headspace

1004R

B5011312

EO/PCE = 10.2

collected @ 1455

P = 0.982, TCE = 9.243, PCE = 21.8 via PID

EW-3 → B50113

1004R

ECD

PID

PCE = 39.4

Benz = 0.002

TCE 14.2

PCE 58.6

Blank no injection
OK

104R STD A

B5011315

504R STD A

B5011316

1004R STD A

B5011317

01/13/05

BLANK

B5011368

no infection

OK

01/14/05

50µl gas STDA

Abort

B5011400

B5011401 - BLANK

? 50µl gas STDA
B5011402

10µl gas STDA
B5011403

new bag of
new syringe

50µl gas STDA
B5011404

01/14/05

50µl STDA
B5011405

B

BLANK

B5011406

no infection

100µl → sample 111-0105-19-1
(VOCs = 1.1 ppm)

B5011407

100µl - 111-0105-19-1 (new syringe)
B5011408
no target
no peaks

100µl → sample 111-0105-19-3
(VOC = 1.5 ppm)
B5011409
target
no peaks

500µl → 111-0105-19-3
B5011410

01/14/05

Voyager GC

100µl 90% STD A (500µl syringe)
B5011411

10µl → 111-0105-25-3'
(VOCs = 539 ppm)
B5011412

100µl → 111-0105-25-3'
413

large PID spike / not BCO
before ~ benzene

50µl → 111-0105-25
414

100µl STD A 016
415

BLANK - no in section

01/14/05

100µl 111-0105-25-3'/STD A
B5011417
unknown peak ≠ benzene

100µl → 111-0105-25A-4'
(VOCs = 30 ppm)
B5011418

100µl 111-0105-31-3'
(VOCs = 20 ppm)
B

100µl - sampling assembly
BLANK

100µl → 111-0105-31A-3'

01/14/05

Voyager GC

3042 STD A

422

ghost peak present?

new syringe, new bag of
STD A

10042 STD A

no ghost peak

10042 → 111-0105-4-1'
B 501142410042 → 111-0105-4A-2'
B 5011425

16042 STD A

50042 syringe
B 5011426

OK

19

01/14/05

Voyager GC

10042 B 5011427

111-0105-25-3'

1 cubic inch = 16.39

01/15/05 Headspace analysis

5042 → STD C HS (old)
(@ 1 ppm [as ug/ml])
B 5011500

1 ppm

1042 → React 1 HS (W-30)
B 5011501 HS10042 → React 1 (GW-W30) (HS)
B 5011502
PCR (PCR → 11-6011610042 → GW-W21
B 5011503

01/13/85

Vuyogger 4 / space

100 yr → GW-17 (HS)
 B5011504
 >> hot peak
 ~ Benz TCE / PCE

clean out block
 no injection
 B5011505 → OK

100 yr GW-17 (HS)
 B5011506
 PID ECD
 10X { Benz 2.957
 TCE 3.214 * TCE 0.192
 PCE 3.561 PCE 3.747
 * for non-analytical info
 ~ 30 ppm Bz, TCE, PCE

100 yr GW-W33 (HS)
 ~ clean
 B5011507

notes corrected HS
 Library

381 1 extra C₂H₂Cl₂ → PCE 1 (ethylene)

100 yr MW-2 (HS)
 B5011508
 TCE > PCE

note:

B5011506 recalculated

10X { PID ECD
 Benz = TCE = PCE =

5 yr - MW-2 (HS)
 B5011509

PID ECD
 Bz = low ppb PCE = 187
 TCE = 7.911
 PCE = 175

100 yr spring block (100 yr asis / month injection)
 B5011510
 OK

01/15/05

Voyager GC - HS

104e - STD C - HS (66C)
B5011511

1004e STD C - HS (66C)
B5011512

Method → sub-ha-1

01/15/05

STD - D (HS)

TESTEK

Cat# 30413
2000 ug/ml each in Purge and Trap Methanol
Tetrachloroethane Standard
Lot# A088932 Exp: 11/07 Store: Freezer
Prestek Corporation - 110 Banner Circle - Bala Cynwyd, PA 19003



104e
TCE/PCE

TESTEK

Cat# 30420
2000 ug/ml each in Purge and Trap Methanol
Trichloroethane Standard
Lot# A083756 Exp: 4/08 Store: Freezer
Prestek Corporation - 110 Banner Circle - Bala Cynwyd, PA 19003



in 20ml
H2O

104e of each x 2000 ug/ml x 1 ml = 1
20 ug/ml
1 ug/ml → 1 ppm of TCE & PCE
(ppm)

01/15/05

104e → MW-6 (HS)
B5011513

PID ECD

10x < TCE 4.17 PCE
PCE 2.389

PID → unknown peaks > BZ < TCE CRT

54e STD D (HS)
TCE/TCE @ 1 ppm
B5011514

104e STD D (HS)
B5011515

104e MW-3 (HS)
B5011516

PID BZ

10x < TCE
PCE

01/15/04 Voyager 04 ITS

• 50% STD D (AS)
B5011517

• 10% MW-5
B5011518
TCE/PCE

• 100% REACT-DUP (HS)
(GL-W30)
B5011519

PID → 82 0.455 PCE/ECD
PCE 0.775
PCE 0.835

• 100% STD D - (HS)
B5011520

note: Summa results
on soil gas (25-3')

VCL ≈ 27 ppmV
C12 DCE ≈ 27 ppmV

01/16/05 DATA

B5011514 5% 0.05 ppm
B5011515 10% 0.1 ppm
B5011517 50% 0.5 ppm
B5011520 100% 1.0 ppm

μl	ppm	PID	ECD	PID	ECD
		TCE		PCE	
5	0.05	2593	92	3152	1937
10	0.10	3685	141	4575	3109
50	0.50	13512	448	9758	7889
100	1.00	24159	790	15907	14318

$$y = mx + b, \quad b \rightarrow \phi$$

$$\text{TCE/PID} \rightarrow y = 24882x; R^2 = 0.9838$$

$$\text{PCE/PID} \rightarrow y = 16957x; R^2 = 0.8372$$

$$\text{TCE/ECD} \rightarrow y = 817.98x; R^2 = 0.973$$

$$\text{PCE/ECD} \rightarrow y = 14788x; R^2 = 0.952$$

← PID →		← ECD →	
Row	PCE	PCE	TCE PCE
504	134940	210417 */*	17964/167836
505	923	115	ND ND
506	17139	24864	1005 25354
7	121	61.5	ND 14.5
8	10964	68361 */*	428 52888
9	5424	37208	243 36459
13	3520	2889	124 1671
16	5672	6405	158 4692
18	2699	9068	54.0 7592
19	1333	759	36.8 380

sample	TCE/PID	PCE/PID	TCE/EC	PCE/EC
10x gw-w30	0.031	0.24	ND	0.081
1x gw-w30	0.037	0.068	0.039	0.030
1x gw-w24	0.001	0.001	0.021	ND
1x gw-w17	6.23*	12.41*	21.96*	11.35
10x gw-w17	6.89	14.66	12.29	17.15
1x gw-w33	0.005	0.004	ND	0.001
10x MW-2	4.41	40.31	5.23	35.76 ✓
20x MW-2	4.36	43.89	5.94	49.31
10x MW-6	1.42	3.78	1.93	3.17
10x MW-5	1.09	5.35	0.66	5.13
1x gw-w30	0.054	0.045	0.045	1.026
10x MW-3	2.279	3.777	1.932	3.173

Headspace

TCE

PCE

27

gw-30	0.054	0.045	0.026
gw-21	0.001	0.001	ND
gw-17	6.9	14.7	17.2
gw-33	0.005	0.004	0.001
MW-2	4.4	40.3	35.8
MW-6	1.42	3.9	3.2
MW-5	1.1	5.4	5.1
gw-31 (dup)	0		
MW-3	2.3	3.8	3.2

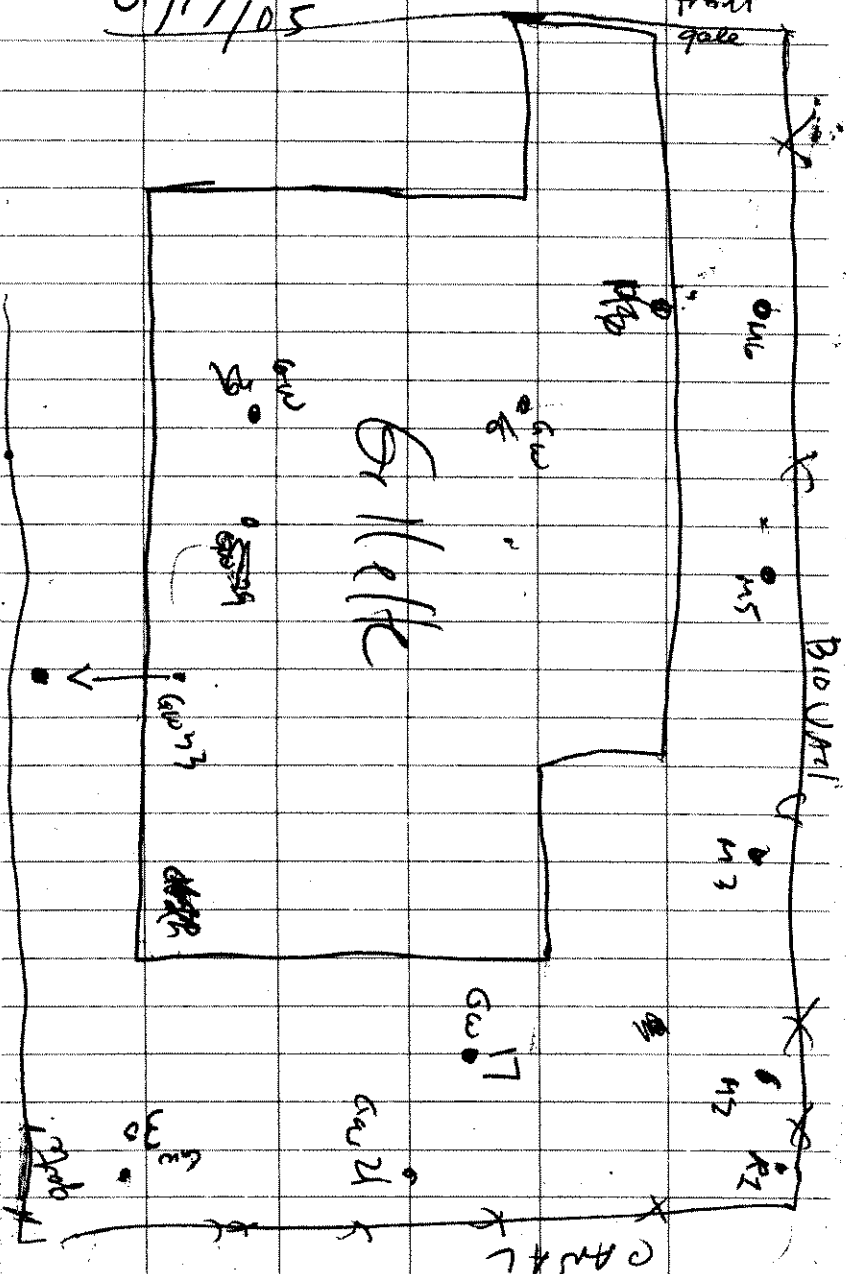
04/17/05

Headspace Gw

	TCE	PCE	NOI
MW2	4.4	40.3	1.5 ga
3	2.3	3.8	2.0 ga
5	1.1	5.4	1.5 ga
6	1.4	3.9	1.5 ga
GW 17	6.9	14.7	1.5 ga
21	ND	ND	1.5 ga
30	ND	ND	1.5 ga
33	ND	ND	1.5 ga

01/17/05

front
gate



01/17/05 Voyage SC

Method SAB-ho-2
100 ml water blank (15)
B5011700

100 ml STD D B5011701
TCE/PCE too low
syringe?

10 ml STD D → B5011702
TCE/PCE too low?

~~100 ml~~ 50 ml STD D
B5011703

STD E 100 ml → B5011704
10 ml of 2000 ppm TCE / 20 ml
2000 ppm PCE / H₂O

1 ppm TCE/PCE
TCE/PCE from 01/15/05/iced

01/17/05

Voyager GC

• 504e STD E
B 5011705
104e STD E
B 5011706

• 254e STD E
B 5011707

• 54e STD E
B 5011708

• 1004e MW 29
B 5011709
• clean

• 1004e MW 16 → B 5011710
B (syringe??)

recm → ~ 100-200 TCE / ACE

• 1004e MW 16
V.V. hat? 2
B 5011711
offscale (unknown > off) > 8ppm TCE
> 18.5 ppm

01/17/05

Voyager GC

31

• 1004e syringe blank
B 5011712
OK

• 104e MW-16 (new vial)
B 5011713

10X { V. hat
B 12 0.209 → 2.1
TCE 0.599 → 6.0
PCR 1.738 → 17.4

• 1004e MW-29 (new vial)
B 5011714
clean ✓

• 204e STD E
B 5011715

• blank - no injection
B 5011716
OK

104e → R1
 B5011717
 ~ 3.8 TCE benz 0.46
 3.6 PCR

254e → R1
 B5011718

R1 → S. turbid

resampled MW-2
 3 x VOL → 1.5 ga purged
 • 1/2 VOA (clean) @ 01/17/05
 - 1537

started turbid but cleared up

104e → MW-2 (resample repeat)
 TCE 7.85
 benz 1.1 PCR > 46.41 B5011719

54e MW-2 resample
 (syringe ??)

TCE 11.3
 PCR 60

B5011720

01/17/05 Voyager GC
 resampled MW-3
 clear - dry @ 1.0 ga
 (3 x VOL → 2.0 ga)
 sampled after recharged 2x
 01/17/05 - 1626

1004e → R2 B5011721
 M. turbid
 ~ Clean TCE = 0.053 but
 bad integration → ND
 slope 0.1 → 0.004
 104e MW-3 (resampled)
 B5011722

resampled MW-5
 clear purged dry @ 1 ga
 (3 x VOL → 1.5 ga)
 sampled after recharged 2x
 01/17/05 @ 1654

04/18/05

Voyager GC

01/18/05

RESEK

Cat# 80420

2000 ug/ml each in Purge and Trap Methanol

Trichloroethane Standard

Lot# A084749

Exp: 7/06

Store: Freezer

Rental Corporation - 110 Banner Circle - Bala Cynwyd, PA 19003



STDF

10 µl of
each in
20 mlH₂O →
1 ppm**RESEK**

Cat# 80418

2000 ug/ml each in Purge and Trap Methanol

Tetrachloroethane Standard

Lot# A038982

Exp: 11/07

Store: Freezer

Rental Corporation - 110 Banner Circle - Bala Cynwyd, PA 19003



• 100 µl syringe injection
B 5011800 OK

• 100 µl STD F
B 5011801

• 50 µl STD F
B 5011802

• 25 µl STD F
B 5011803

• 10 µl - 10 µl STD F
804

• 10 µl - 10 µl STDF → 805

← PID
TCE

→ ← ECD →

Peak#	Inject	TCE	PCE	TCE	PCE
801	100	26265	35241	1800	45053
802	50	17660	25617	1212	34700
803	25	13379	22688	1081	30679
804	10	7457	7609	268	6735
805	10	4927	4507	134	3034
806	20 μ l	6580	4507	171	2996
810	20	15384	15332	537	17476
Syringe ??		on/off			
$y = mx + b$					
Set $b \rightarrow 0$					
$y = (mx)$					
LR		PID			
TCE	$m = 28311$			PCE	
	$R^2 = 0.9321$			38001	
				0.9144	
		ECD		PCE	
TCE	$m = 189704$			48697	
	$R^2 = 0.9375$			0.8801	

204e STD F
B 5011806

1004e syringe blank
B 5011807

1004e → R6 (HS)
B 5011808 turbid
~ clear 5-11 ppb
TCB = 0.005 PCB = 0.011

1004e R7 (HS)
B 5011809 turbid
~ clear
TCB = 0.002 ICEND

204e STD F
B 5011810

1004e R6 (re run)
B 5011811 turbid
TCB = .004 PCB = 0.001

1004e R9 (HS)
B 5011812
TCB, PCB → ND
s. turbid

1004e STD F
B 5011813
TCB/PIB = 52863
PCB/PIB = 37205
TCB/ECB = 1811
PCB/ECB = 40443
ds

504e STD F
B 5011814
TCB/PIB = 45078
PCB/PIB = 40694
TCB/ECB = 1811
PCB/ECB = 40443
43878

104e STD F
B 5011815
TCB/PIB = 3532
PCB/PIB = 3322
TCB/ECB = 89.8
PCB/ECB = 1985

1004e R11 (HS) B 5011816
s. turbid ND / ND

stop lock → 504e STD F
B 5011817
TCB/PIB = 7078
PCB/PIB = 7848
TCB/ECB = 357
PCB/ECB = 6580

01/18/05

• 100 μ l \rightarrow R13 B 5011818
(s. turbid) clean NDS

250 μ l
54 μ l
50 μ l STD F TCE/PID = 14003
B 5011819 PCE/PID = 22399
TCE/ECD = 974
PCE/ECD = 26570

25 μ l STD F TCE/PID = 5837
B 5011820 PCE/PID = 7527
TCE/ECD = 291
PCE/ECD = 6263

• 100 μ l \rightarrow R10
B 5011821 TCE/PCE
V. turbid NDS

• 100 μ l STD F TCE/PID = 28846
B 5011822 PCE/PID = 53229
TCE/ECD = 2583
PCE/ECD = 54749

• 50 μ l STD F TCE/PID =
B 5011823 PCE/PID =
TCE/ECD =
PCE/ECD =

01/18/05

10 μ l STD F TCE/PID = 2987
B 5011824 PCE/PID = 3872
TCE/ECD = 126
PCE/ECD = 2451

01/19/05

• 100 μ l \rightarrow water blank/inject
B 5011900

• 100 μ l ~~STD F~~ ^{FAK} R 40 (s. turbid)
B 5011901 \rightarrow NDS

★ STD G 10 μ l of TCE/PCE @
2000 ppm in 20ml STD
4 vials \rightarrow 1 ppm TCE/PCE

★ note: 25 μ l injection on the
280 μ l syringe may have
been 30 μ l

250 μ l
54 μ l
• 25 μ l STD G TCE/PID =
B 5011902 PCE/PID = NG
B 5011902 TCE/ECD =
PCE/ECD =
(poor injection ??)

01/19/05

• 100 μ l STD G
 250 B 5011903
 54 μ l bad syringe?

(NGA)

stop
 tank
 54 μ l
 • 10 μ l STD G - OK
 B 5011904
 $TCE/PID = 12954$ $TCE/ECO = 335$
 $PCE/PID = 9714$ $PCE/ECO = 9516$

250
 48
 54 μ l syringe
 • 100 μ l R17 (M. turbid)
 B 5011905
 clean \rightarrow TCE/PCE

stop
 100 μ l
 54 μ l
 • 50 μ l STD G B 5011906
 $TCE/PID = 10415$ $TCE/ECO = 384$
 $PCE/PID = 10782$ $PCE/ECO = 11595$

• 100 μ l R16 (S. turbid)
 B 5011907
 $TCE @ 0.381$ ppm?? \rightarrow integrate
 maybe carry over from
 50 μ l STDG, reshoot
 new sample

01/19/05

Voyager GC (175)

• 100 μ l R16 (new sample)
 B 5011908 repeat
 repeat to confirm the TCE
 but \rightarrow TCE = 0.100

(+) early elutes OK

• 100 μ l STD G
 $TCE/PID = 55921$ $TCE/ECO = 2081$
 $PCE/PID = 40768$ $PCE/ECO = 46948$
 B 5011909

• 100 μ l water blank
 B 5011910 \rightarrow OK

• 100 μ l R15 (M. turbid)
 B 5011911
 $TCE = 0.107$ ✓

84
 142
 • 100 R15 (new sample)
 to confirmed TCE but
 $TCE = 0.176$ ✓
 B 5011912
 (+) early plotting PID peak
 maybe VCE

01/19/05

7-Larry

504e - STD G

B 5011913

TCE/PID =

TCE/ECD =

PCE/PID =

PCE/ECD =

350

541

6209.78858/33#

(fed)P GAZELLE

• 204e STD G

TCE/PID =

B 5011914

PCE/PID =

TCE/ECD =

PCE/ECD =

504e

541

(not stop)

• 104e STD G

B 5011915

• 504e STD G

B 5011916

• 1004e R19 (s. turbid)

P B 5011918

TCE/PCE → NDs

• 1004e under blank

B 5011917

- OK

01/19/05

voyager 9 (115)

• 1004e R18 (s. turbid)

B 5011919

TCE/PCE → NDs (2-3, 116)

• 1004e R19-RR (re-sampled @ pressure)
B 5011920
(01/19/05 → 1455) (M. turbid)

TCE/PCE → NDs

• 1004e R21 (s. turbid) (HS)

B 5011921

TCE = 0.044

TCE not → intermingled
pool

omit

• 1004e R21 (s. turbid) (HS)

B 5011922

TCE = 0.005

TCE reported → ND

(re-inject 1004e
new sample
vial)Samples (R1, 2, 3, 6, 7, 9, 11, 13
so far { R10, R40, 17, 16,
R15, 19, 18, 21

• 1004e STD G

B 5011923

TCE/PID =

TCE/ECD =

PCE/PID =

PCE/ECD =

01/19/05 Voyager GC (HS)
100 μ l - water blank inject
B5011924 \rightarrow OK

• 100 μ l STD \rightarrow B5011925
G

• 100 μ l water blank
B5011926

• 100 μ l STD G
B5011927

TCE/PID =
PCE/PID =

TCE/ECD =
PCE/ECD =

Received 1/20/06
R22 stored on
R30 ice over night

01/20/05 Voyager GC

RESTEK

Cat# 30419
2000 μ g/ml each in Purge and Trap Methanol
Tetrachloroethene Standard
Lot# A038932 Exp: 11/07 Store: Freezer
Restek Corporation - 110 Banner Circle - Bellefonte, PA 16823



10 μ l of each / 20 ml H₂O \rightarrow

RESTEK

Cat# 30420
2000 μ g/ml each in Purge and Trap Methanol
Trichloroethene Standard
Lot# A032756 Exp: 4/08 Store: Freezer
Restek Corporation - 110 Banner Circle - Bellefonte, PA 16823



1 ppm of
TCE + PCE

STD H

• 100 μ l water blank
B5012000 OK

• 10 μ l STD H TCE/PID = 5915
B5012001 PCE/PID = 7518
TCE/ECD = 326 PCB/ECD = 6640

sent
mally
1/2

Continued in REAC IN-B-0077

Run#	Benz	TCE	PCE	CT	PCE
100/201	14222	13819	19233	44989	15760
50/202	10918	10400	12310	37780	12040
10/203	1933	2207	2067	9653	1317
15/204	3180	3306	3132	17758	2323
207(HS)	—	24271	44883	41871	44683
208(HS)	—	2396	3759	—	2989
209(HS)	3514	TOL →	3512	—	—
210(HS)	32877	TOL →	18497	—	—
211(HS)	21542	TOL →	15544	—	—
212(HS)	11209	TOL 10% 6820	13498	TOL 10% 6820	14780
213(HS)	2647	TOL 2752	4640	TOL 10% 2398	4088
214(HS)	7185	6899	13057	TOL 10% 6773	15998

STD GASES STD A

	BZ	TCE	PCE	CT	PCE
10	1.998	1.989	2.065	1.886	2.065
20	3.996	3.978	4.13	3.772	4.13
50	9.99	9.945	10.325	9.43	10.325
100	19.98	19.89	20.65	18.86	20.65

DCP

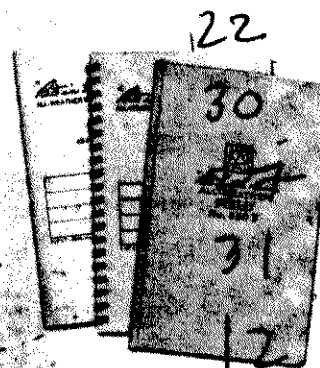
10
20
50
100

8.63
16.3

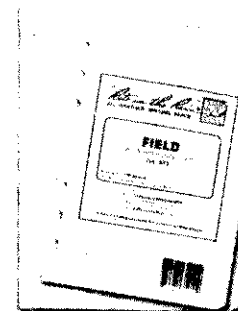
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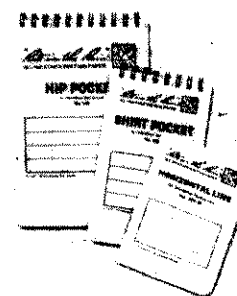
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Copier Paper / All-Weather Pens



Memo Books

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If Found, Please Return To:

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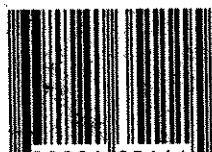
Edison, NJ 08837-3679

Phone: (732) 321-4200

COC & Sample Shipping Procedures

Peer review COC record	Call Sample Receiving Hotline at (732) 632-9345 or SRT's Cell Phone (609) 234-5318. Give
Remove pink copy for the Task Leader	-FedEx tracking # -Chain of Custody Record #s -# of Coolers -# of samples and matrices
Place original COC in a plastic bag, seal and secure to the lid inside the cooler.	-Analyses requested -Subcontract lab info
Tape and seal the cooler.	Fax COC record to (732) 494-4021 (REAC analyses) or (732) 494-4026 (subcontract analyses) Follow-up to confirm sample receipt.

(253) 922-5000 • FAX (253) 922-5300
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ALL-WEATHER WRITING PAPER



FIELD

All-Weather Notebook

No. 351

REAC IV-B-0077

<i>Sahana Abaya</i> # 0-111

4 5/8" x 7" - 48 Numbered Pages

"Rite in the Rain"
ALL-WEATHER WRITING PAPER



Name L. Kaelin

Address REAC

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Project SABANA WA#111

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Helps protect your notebook from wear & tear. Contact your dealer or the J. L. Darling Corporation.

REAC-IV-B-0076

CONTENTS

PAGE	REFERENCE	DATE
	Continued from logbook REAC-IV-B-0076	
	PE Photovac Voyager FPGC	
	SN FGGE 202	
	ASSAY: SAB-hs-2	
	Col B: 20M x 32mm	
	Supelcowax 10 TM , 1/54M thickness	
	60°C ISO, 8 psi	
	ECD PID = hi sensitivity	
	slope: up/down = 0.1/0.1	
	filter = 3	
	80 sec integration delay	
	800 sec analysis time	
	400 sec backflush time	
	syringe injector mode @	
	100 psi normalized injection volume	

01/20/05

Voyager GC (HS)

500
needle
syr• 40 μ l STD H \rightarrow B5012002

TCE/PID = 17346 TCE/ECD = 326171

PCE/PID = 33847 PCE/ECD = 43717

250 μ l
syr• 100 μ l STD H \rightarrow B5012003

TCE/PID = 24511 TCE/ECD = 2783

PCE/PID = 53223 PCE/ECD = 58068

• 100 μ l water blank
B5012004

OK

• 100 μ l \rightarrow R-22 B5012005TCE ND ∇ 0.018 \leftarrow overintegrated

PCE ND (s. turbid)

 \rightarrow reintegration = 0.008 \rightarrow ND• 100 μ l \rightarrow R-30 B5012006

(s. turbid)

~5 ppb TCE L10/ND

(s. turbid)

• 100 μ l R-37 \rightarrow B5012007

(s. turbid) TCE = 0.014 PCE = ND

• 100 μ l R-31 \rightarrow B5012008

TCE @ 0.005 (ND)

01/20/05

Voyager GC (HS)

500
needle
syr100 μ l STD H \rightarrow B5012009

TCE/PID = 26609 TCE/ECD = 2839

PCE/PID = 53990 PCE/ECD = 63684

• 100 μ l water blank
B5012010• 100 μ l \rightarrow R-12 (s. turbid)
B5012011TCE ND
PCE \rightarrow ND500
 μ l
syr• 100 μ l \rightarrow R-14 (n. turbid)~~B5012011~~ B5012011early elution \rightarrow VCE possibleTCE = 0.191 C12DCE/Benzene \rightarrow 0.112• 100 μ l R-14 (new vial)

confirm TCE hit

TCE 0.198 Benzene 0.198

over
integrated \rightarrow 0.422

B5012012

no fcs run # out of sync
after B5012010 - to be
corrected

re-establishes from top

• 10042 R12
B5012013 ND5

• 100% R14 \rightarrow VCE ??
B 5012014 \rightarrow Gen 2 0.22
early clothes TCE = 0.567

• 1004p R33 (m. turbid)
B5012015 - NDs

• 100% RLY (confirm TCE)
B5012016
early eluters = possible VCE
Benz = 0,088 TCE = 0,128
better →

• 1004c R37 (repeat)
B5012071
TCE < 10 → ND.

• 254e STD H
B 5012018
 $TCE/PID = 17880$ $TCE/EC0 = 1071$
 $PCE/PID = 23933$ $PCE/EC0 = 32900$

- 100% embryo blank B5012019
- ~~B5012019 (aborted)~~
- B5012020 → OK

• 1004e SGD H
B 5012021

$TCE/PID = 41580$ $TCE/ECO = 2500$
 $PCE/PID = 54062$ $PCE/ECO = 157 \text{ Hz}$

S_{30}
 4^2

2277 Hz
60665

100 yr water blank
B50/2022

• 100 gal R14-DUP (resampled)
B 50 12023 red 01/20/05 @ 14:30
* early eluting peaks
PID/RT ~ 150
Benzene 0.126
TCE = 0.303
PCE → ND

100 μ l \rightarrow R 36 (5. turbid)
 B 5012024-
 early elution
 Benz 0.027
 TCE 1.094 \leftarrow over integrated
 PCE 0.043

1/20/02

Voyager GC (113)

500 ul
54R

100 ul R-36 (new vial)
early cluster VCE 0.04%
berg 0.004 TCE = 0.105
B PCE = 0.049
0.012

100 ul R-35 (m. turbid) ND₅
B 5012026

250 ul →
54R

100 ul R-35 (new vial)
B 5012027 - started

500 ul
54R

100 ul R-35 (new vial)
B 5012028

* NO end of day STANDARDS
indeed GC runs
carrier gas too low

Voyager GC (113)

STD I 10 ul of 2000 ppm
TCE / PCE individual solns.
in 20 ml H₂O → 1 ppm

500
ul
54R

100 ul water blank injection
B 5012100 OK

100 ul STD I
B 5012101
TCE / PID = 60393% TCE / ECD = 2076
PCE / PID = 44101 PCE / ECD = 40336

500
ul
54R
non-stop

250 ul STD I TCE / PID = 13333
B 5012102 PCE / PID = 13333
TCE / ECD = 791 PCE / ECD = 16156 15887

100 ul STD I TCE / PID = 5554
B 5012103 PCE / PID = 7467
TCE / ECD = 322 PCE / ECD = 5549

500
ul
54R

100 ul R-45 (m. turbid)
B 5012104 ND < 10

PID < TCE 2005
PCE 6005

01/21/05

Vogel (NS)

CO₂ 412100 µl R-46 - (m. turbid)
B 5012105 → NDs★ LR @ 0.1, 0.25 & 1 ppm
y intercept → 0TCE/PID → $m = 59936$; $R^2 = 0.9982$ PCE/PID → $m = 45582$; $R^2 = 0.9545$ TCE/ECD → $m = 2150.1$; $R^2 = 0.9508$ PCE/ECD → $m = 41830$; $R^2 = 0.9474$ • 100 µl R-49 (m. turbid)
B 5012106 → NDs• 100 µl R-47 (s. turbid)
B 5012107
TCE/PID → 0.024 / PCE/PID = 0.093• 100 µl R-48 (s. turbid)
B 5012108
V.V. not → PID $\left\{ \begin{matrix} \text{TCE} \\ \text{PCE} \end{matrix} \right\} \%$

01/21/05

Vogel (NS)

500
4
542• 100 µl water blank injection
★ still a PCE any-over
peak → B 5012109• 100 µl water blank injection
repeat → OK B 5012110

• 10 µl R-48 → B 5012111

10X → PID $\frac{\text{PCE}}{\text{PCE}} = 1.24$

TCE = 3.7

PCE = 25.2 %

ECD TCE = 8.2

PCE = 33.9 %

• 5 µl R-48 → B 5012112

20X TCE/PID = 6.5 TCE/ECD
PCE/PID = 38 PCE/ECD = 50.68
Benz 24.0 → 51 ppm326
652

18.86

2.2

37.72

1.97

2.9

3.94

TCE = 6.5 ppmV

PCE = 51 ppmV

Benz(DCE) = 3.9 ppmV

01/21/05

Voyager (H3)

500 μ l
34R • 100 μ l water blank injection
TCE = 0.010 B5012113

• 100 μ l water blank — OK
B5012114

• 100 μ l water blank — OK
B5012115

• 10 μ l R-50 (s. turbid)
B5012116
V.V. hot

PID { Benz (DCE) \rightarrow 0/5 > 97
TCE 0/5 > 99, ~VCE \rightarrow 0/5
PCE 0/5 > 56
10X ECD \rightarrow TCE — OK \rightarrow 145
PCE — 0/5 > 83

• 5 μ l R-50 \rightarrow B5012117
PID { Benz/DCE = 0/5
20X TCE = 0/5 > 32
PCE = 0/5 > 65
ECD TCE = 89
PCE = 0/5 \rightarrow > 95 ppmv
reported \rightarrow TCE = 145 ppmv PCE > 95 ppmv

7-4103

Voyager GC

• 500 μ l water blank injection
injected 500 μ l H₂

B5012118 \rightarrow minor TCE/PCE
carry-over peaks

• 100 μ l water blank injection
B5012119

• 100 μ l water blank injection
B5012120 \rightarrow OK

• 100 μ l R52 \rightarrow B5012121
(s. turbid) TCE 3 ppb
DCE ~11 ppb **NDs**

• 100 μ l R53 \rightarrow B5012122
(s. turbid) **NDs**

• 10 μ l R51 \rightarrow B5012123
(s. turbid) low ppb TCE, PCE

• 100 μ l R51 \rightarrow B5012124
NDs(?)

01/24/05 Voyager GC (45)

500 μ l
5 μ l
100 μ l R-51 \rightarrow B5012125
NDs

• 100 μ l R-43 (v. turbid)
~~B5012126~~
B5012126

100 μ l R-43 \rightarrow B5012127
(s. turbid) - NDs

100 μ l R-42 \rightarrow B5012128
NDs

100 μ l R-41 B5012129
NDs

01/22/05

OUTSIDE

SAT

500 μ l5 μ l

• 100 μ l water blank
injection

B5012200 OK

2-4 ppb TCE/PCE

• 100 μ l water blank in
B5012201 - \sim 10 ppb TCE/PCE

01/24/05

TESTEK

Cat# 30420

2000 ug/ml each in Purge and Trap Methanol

Trichloroethene Standard

Lot# A034749

Exp: 7/06

Store:

Freezer

Ranstek Corporation - 110 Benner Circle - Belvidere, PA 16823



10 μ l of
each
into
20 ml H₂O

TESTEK

Cat# 30413

2000 ug/ml each in Purge and Trap Methanol

Tetrachloroethene Standard

Lot# A038932

Exp: 11/07

Store:

Freezer

Ranstek Corporation - 110 Benner Circle - Belvidere, PA 16823



\rightarrow 1 ppm of
TCE/PCE

STD J

• 100 μ l water blank injection
B5012202 \rightarrow OK

• 100 μ l \rightarrow R-34 (v. turbid)
B5012203 NDs

10 μ l STD J \rightarrow B5012204
TCE/PID = 1232 TCE/ECD =
PCE/PID = 1204 PCE/ECD = 485
? poor injection

14 01/22/05

Voyager GL (WS)

1004e → R-56 (v. turbid)
B 5012205 L10 ppb TCE/PCB
NDs

1004e → R-57 (s. turbid)
B 5012206 ND

1004e → R-57 repeat
B 5012207 ND

1004e STD J
B 5012208

5004e
54

TCE/PCB = 36458 TCE/PCB = 1269
PCB/ECB = 24683 PCB/ECB = 31922

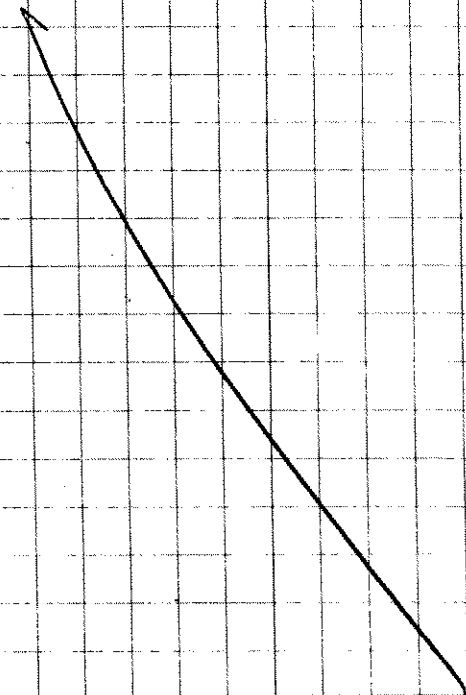
1004e water blank
B 5012209 OK

1004e R-54 - s. turbid
B 5012210 NDs

01/22/05 Voyager GL

• 1004e R-55 (s. turbid)
B 5012211
NDs

Aborted → ambient
temperature too high
for instrument



Appendix B
Voyager FPGC Daily Calibrations, Chromatograms and Raw Data
Sabana Abaja Industrial Site
Technical Memorandum
September 2005

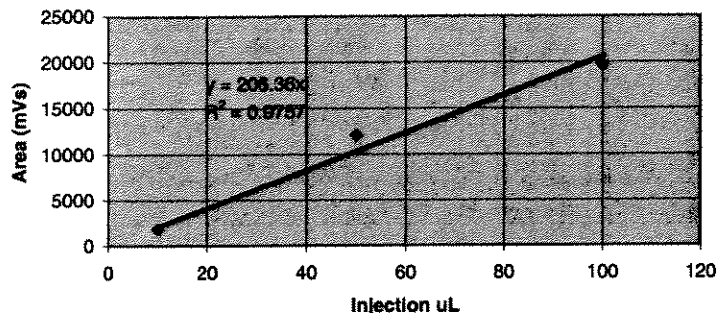
Voyager FPGC Daily Calibrations and Chromatograms
Sabana Abaja Industrial Site
January 13, 2005

Voyager FPGC

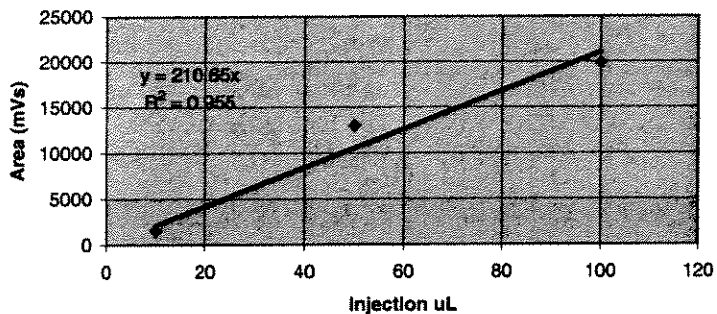
20 ppm v/v gas std

inject uL	pid benz	pid tce	pid pce	ecd ct	ecd pce
10	1886	1551	1052		
50	12085	12989	6266		
100	19770	19892	16962		

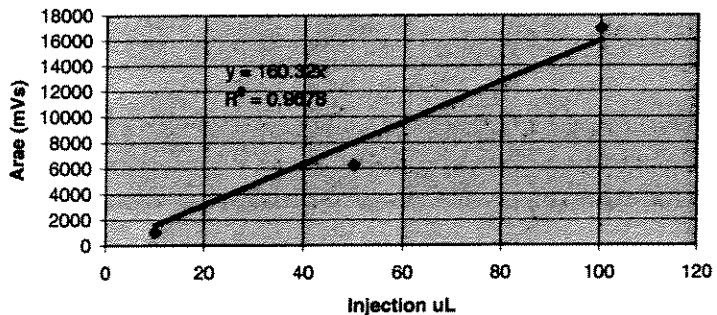
Benzene via PID - 01/13/05



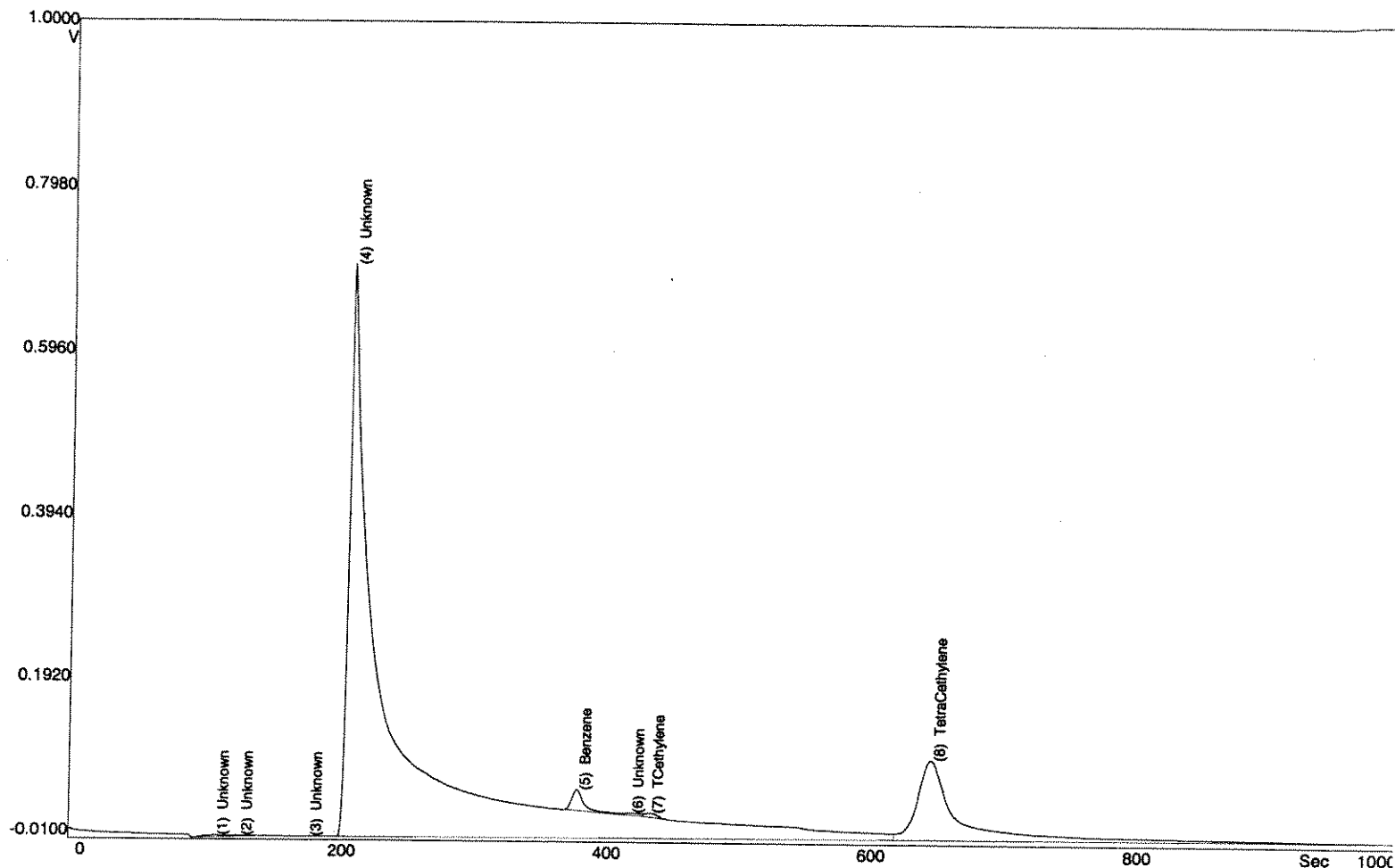
TCE via PID - 01/13/05



PCE via PID - 01/13/05



SiteChart Analysis Report - B5011309.PID



RESULTS:

Date Jan 13, 2005
 Time 13:44:13
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 19
 Tag sab
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 32.0 C

EW-5

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

10ME

10x

*well
headspace*

INTEGRATION METHOD:

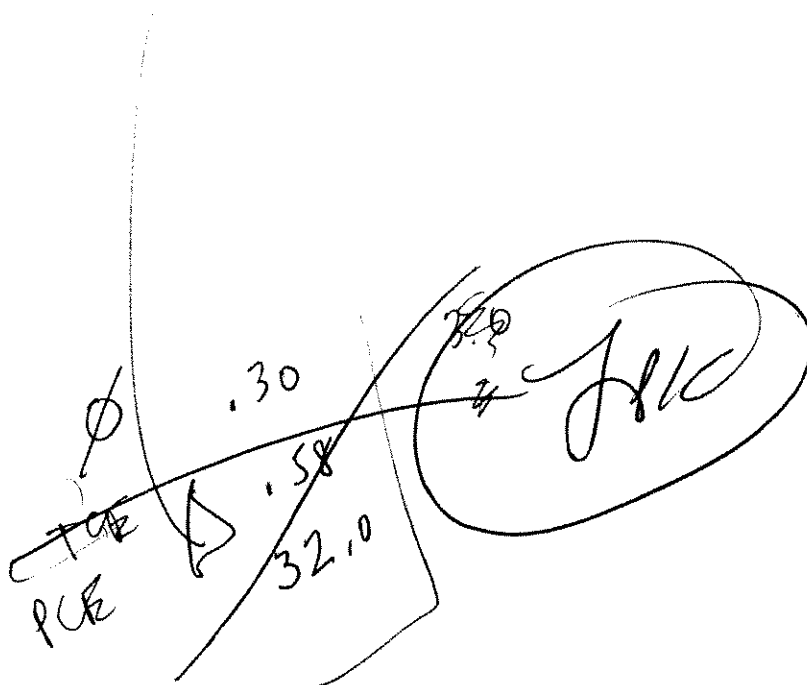
Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		38.5	3.397	109.5	
2	Unknown		17.3	0.080	127.3	
3	Unknown		3.823	0.426	179.4	
4	Unknown		24147	707	210.2	

SiteChart Analysis Report - B5011309.PID

5 Benzene	0.030	289	24.8	382.0
6 Unknown		43.6	0.471	422.4
7 TCethylene	0.058	55.9	1.057	437.2
8 TetraCethylene	3.151	3763	91.0	649.4



recalc'd

BZ 2.8

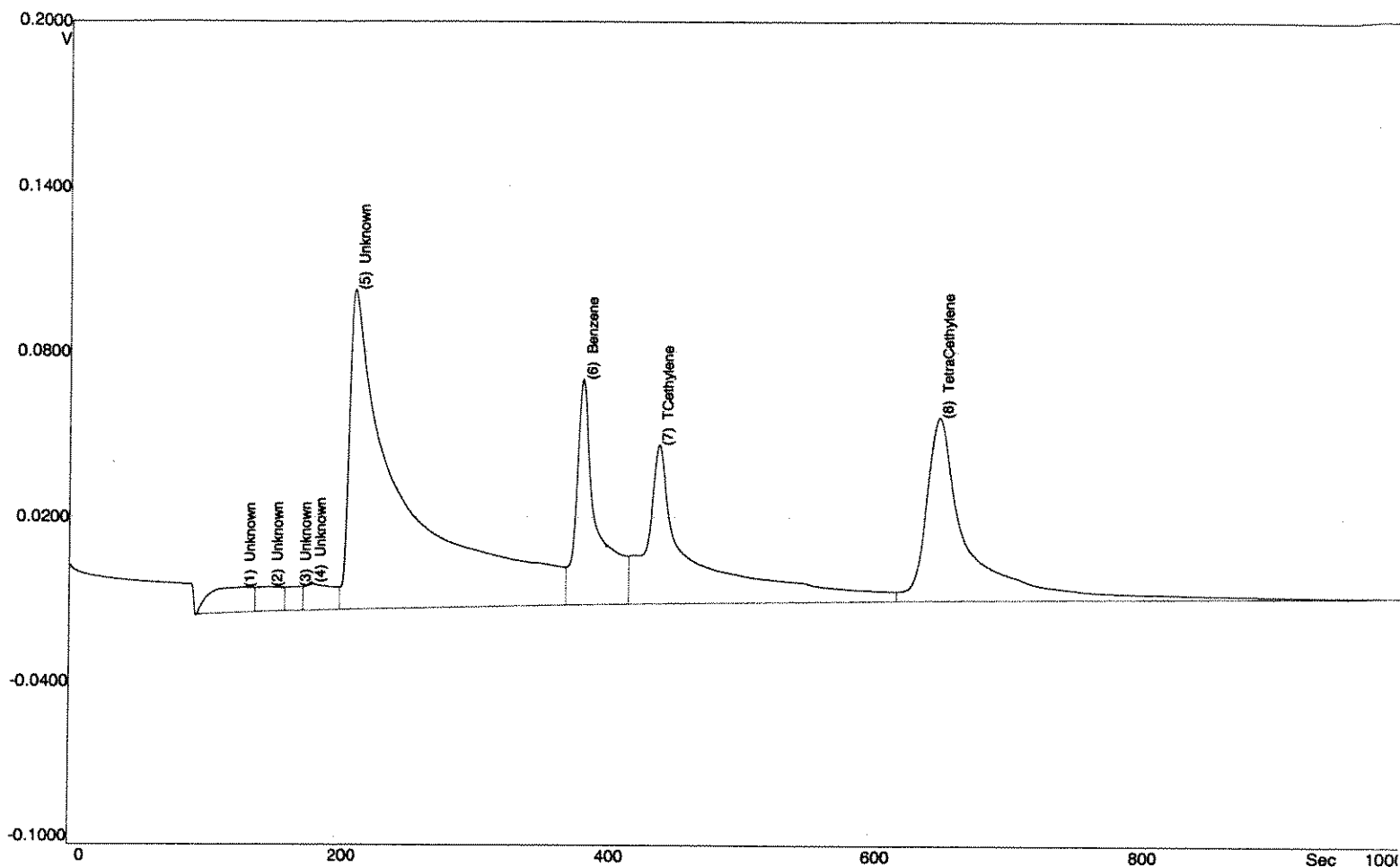
TCE 0.53

PCE 4.8

ppmv

↓

SiteChart Analysis Report - B5011311.PID



RESULTS:

Date Jan 13, 2005
 Time 14:30:42
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 23
 Tag sab
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 32.0 C

1x

60-6

100µl

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		345	9.928		128.1
2	Unknown		194	0.346		148.8
3	Unknown		120	0.280		169.8
4	Unknown		246	1.970		190.0

SiteChart Analysis Report - B5011311.PID

5 Unknown		5675	108	212.8
6 Benzene	2.082	1508	68.3	383.3
7 TCethylene	4.648	2478	40.5	440.4
8 TetraCethylene	13.0	2577	63.5	650.0

recalc'd

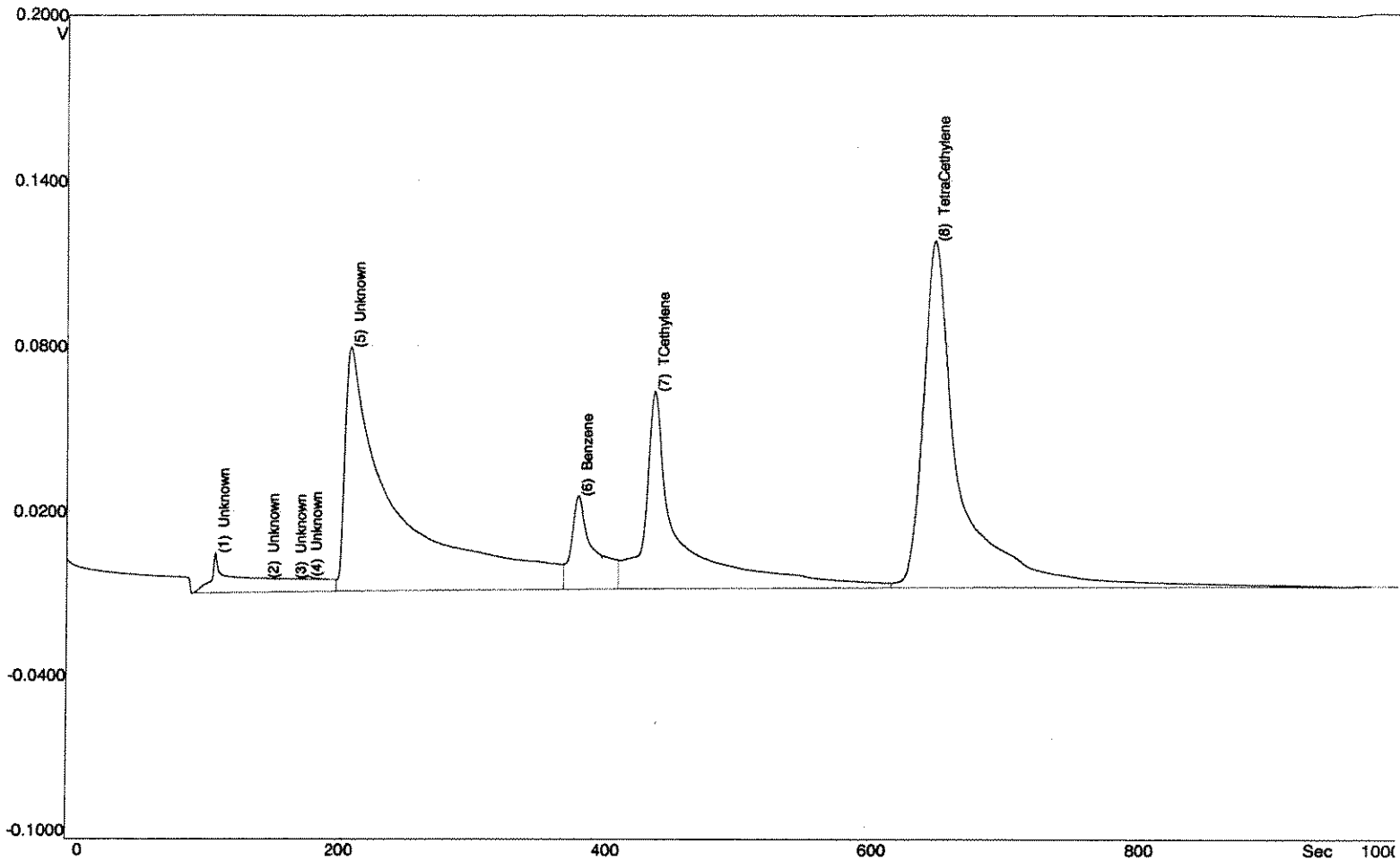
BZ = 1.5

TC = 2.3

TC = 3.3

UNK = BZ

SiteChart Analysis Report - B5011312.PID



RESULTS:

Date Jan 13, 2005
 Time 14:54:56
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 25
 Tag sab
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 32.0 C

*EW-2
1X*

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

100M2

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

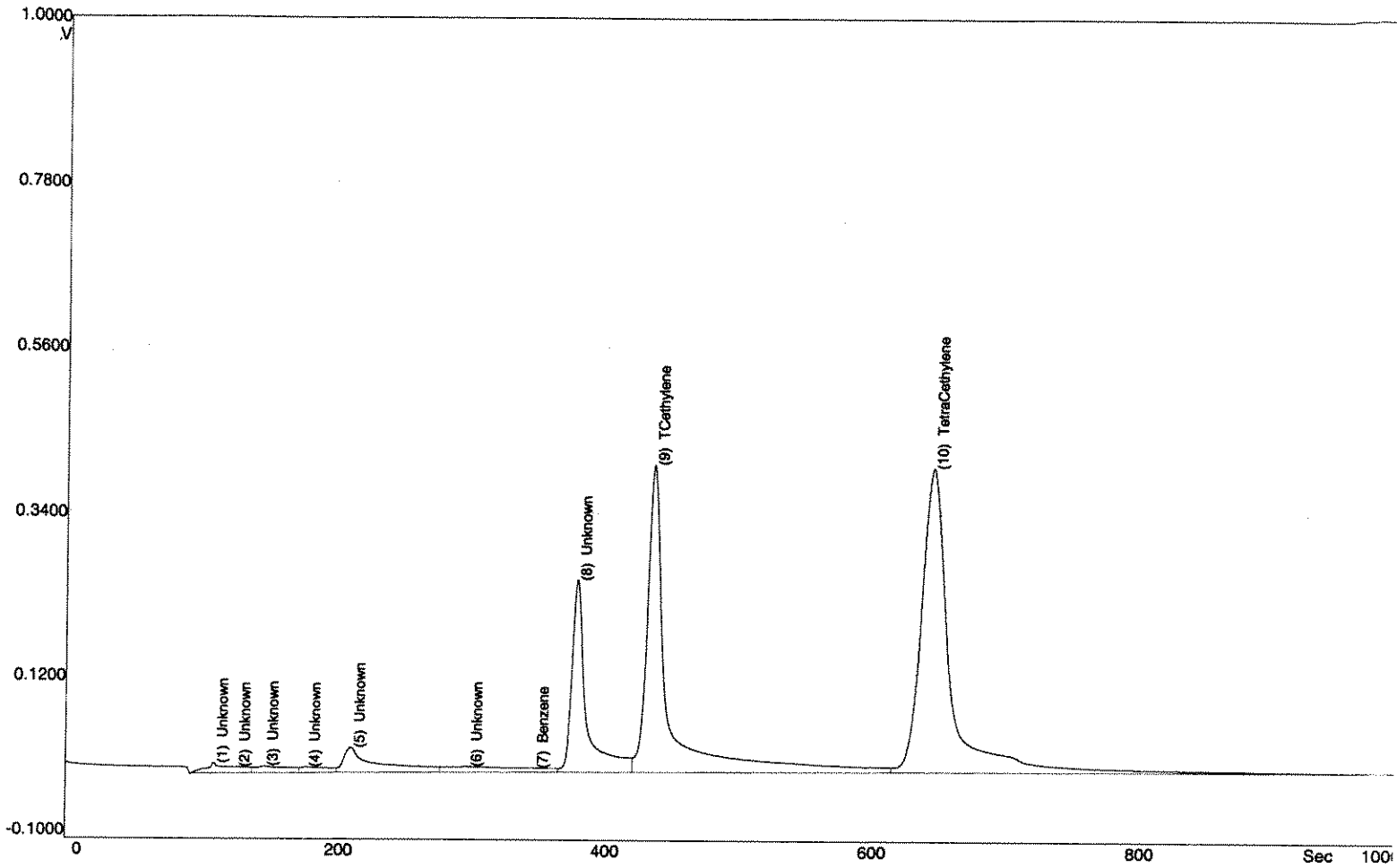
# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		523	14.9		110.4
2 Unknown		1.263	0.217		148.2
3 Unknown		1.599	0.148		168.6
4 Unknown		9.709	1.007		180.2

SiteChart Analysis Report - B5011312.PID

5 Unknown		4084	84.8	212.6
6 Benzene	0.982	698	25.2	383.0
7 TCethylene	4.243	2259	61.6	440.4
8 TetraCethylene	21.8	4109	125	649.4

recalc'd
BE = 0.68 — UNK
TCE = 2.1
PCE = 5.3
PCE

SiteChart Analysis Report - B5011313.PID



RESULTS:

Date Jan 13, 2005
 Time 15:15:12
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 27
 Tag sab
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 32.0 C

1x

EW-3 100 uL

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		343	14.8	110.7	
2	Unknown		0.442	0.068	127.6	
3	Unknown		264	2.171	148.8	
4	Unknown		190	1.179	180.2	

SiteChart Analysis Report - B5011313.PID

5 Unknown		975	27.9	214.0
6 Unknown		550	0.528	301.9
7 Benzene	0.002	1.371	0.045	351.3
8 Unknown		3307	253	382.7
9 TCethylene	14.2	7643	393	440.0
10 TetraCethylene	58.6	10483	402	648.8

recalc'd
 BZ 3.2 ppm
 TCE 7.2
 PCE 14

Voyager FPGC Daily Calibrations and Chromatograms
Sabana Abaja Industrial Site
January 14, 2005

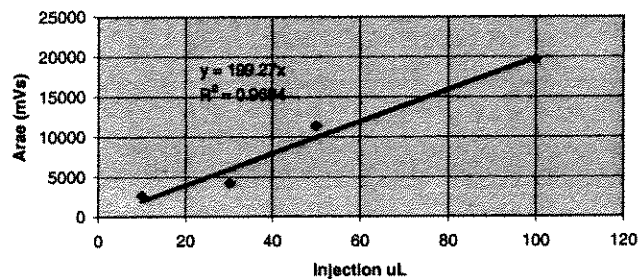
14-Jan-05

Voyager FPGC

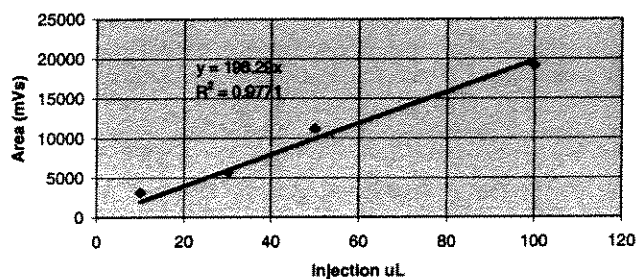
20 ppm v/v gas std

inject uL	pid benz	pid tce	pid pce
10	2670	3154	3157
30	4230	5661	4645
50	11372	11167	6214
100	19680	19172	17407

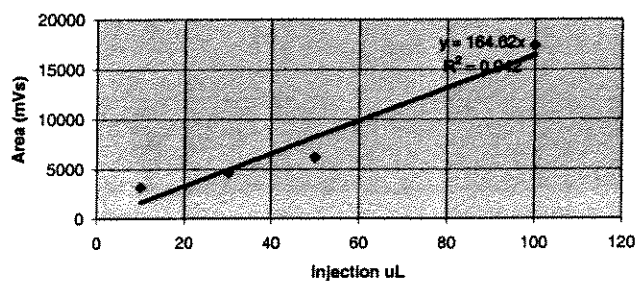
Benzene via PID - 01/14/05



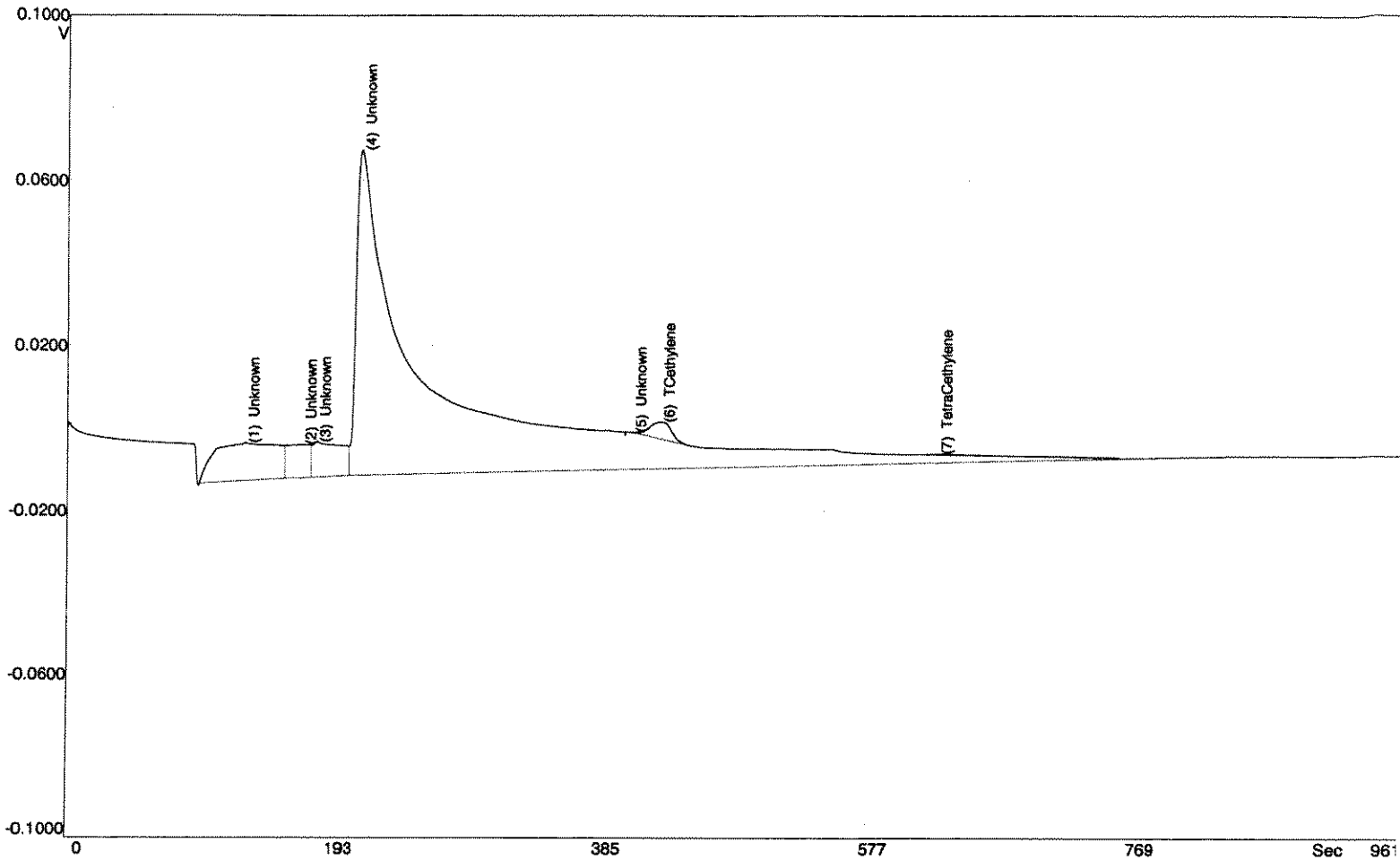
TCE via PID - 01/14/05



PCE via PID - 01/14/05



SiteChart Analysis Report - B5011408.PID



RESULTS:

Date Jan 14, 2005
 Time 09:10:49
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 17
 Tag sab
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 31.0 C

IX
19.-1 new syringe
10042

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

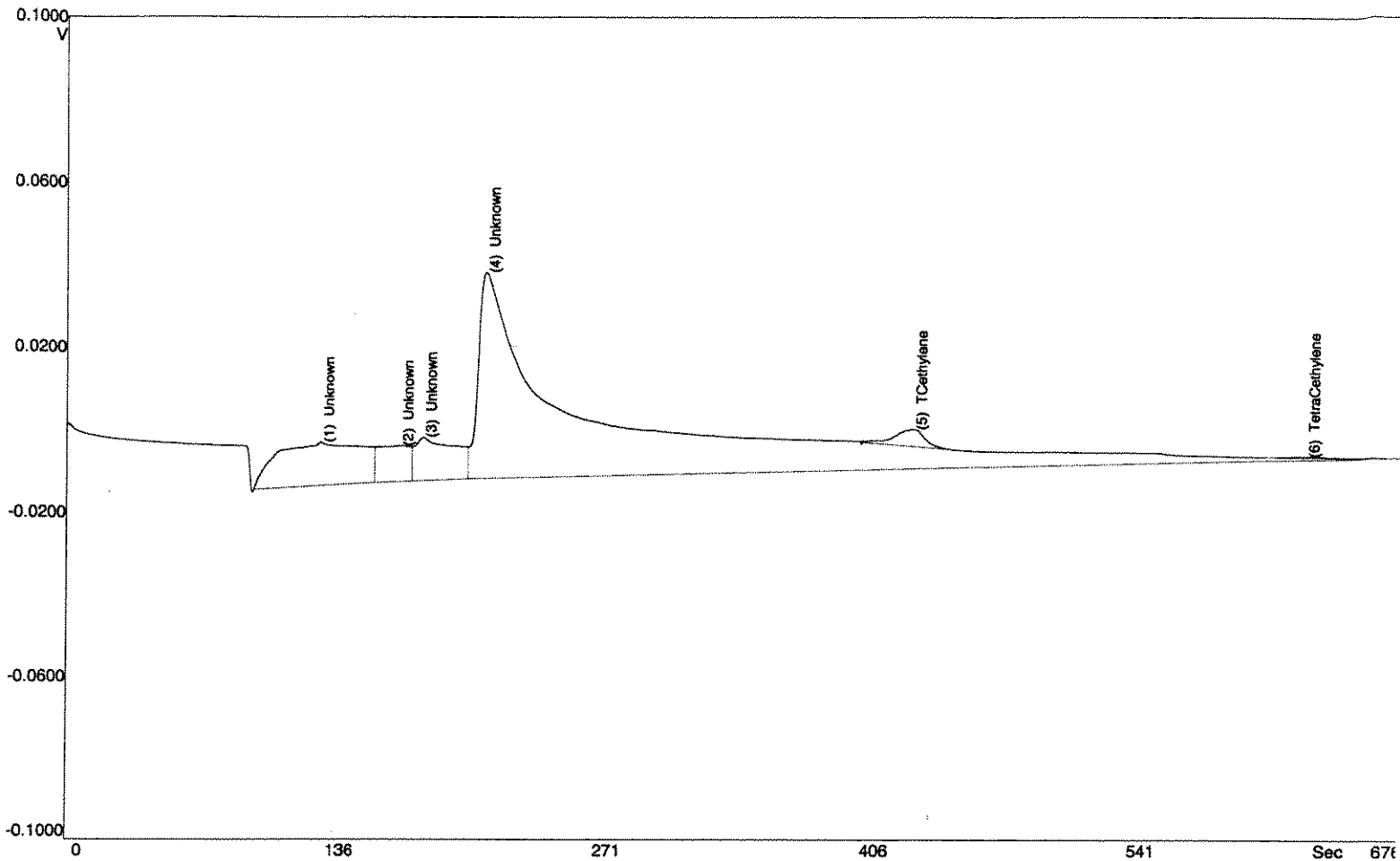
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		486	9.919	127.9	
2	Unknown		146	0.212	169.0	
3	Unknown		213	0.863	179.6	
4	Unknown		5163	71.8	211.8	

SiteChart Analysis Report - B5011408.PID

5 Unknown	1.769	0.104	406.3
6 TCethylene	70.7	2.460	426.8
7 TetraCethylene	17.6	0.225	626.1

recalc'd
BZ = ND's
Tub = 0.071 ppm
PUE's = 0.023 ppm

SiteChart Analysis Report - B5011409.PID



RESULTS:

Date Jan 14, 2005
 Time 09:28:01
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 19
 Tag sab
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 31.0 C

19-3 10048

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		523	11.5	128.0	
2	Unknown		156	0.284	168.0	
3	Unknown		244	2.266	179.8	
4	Unknown		3446	42.3	211.4	

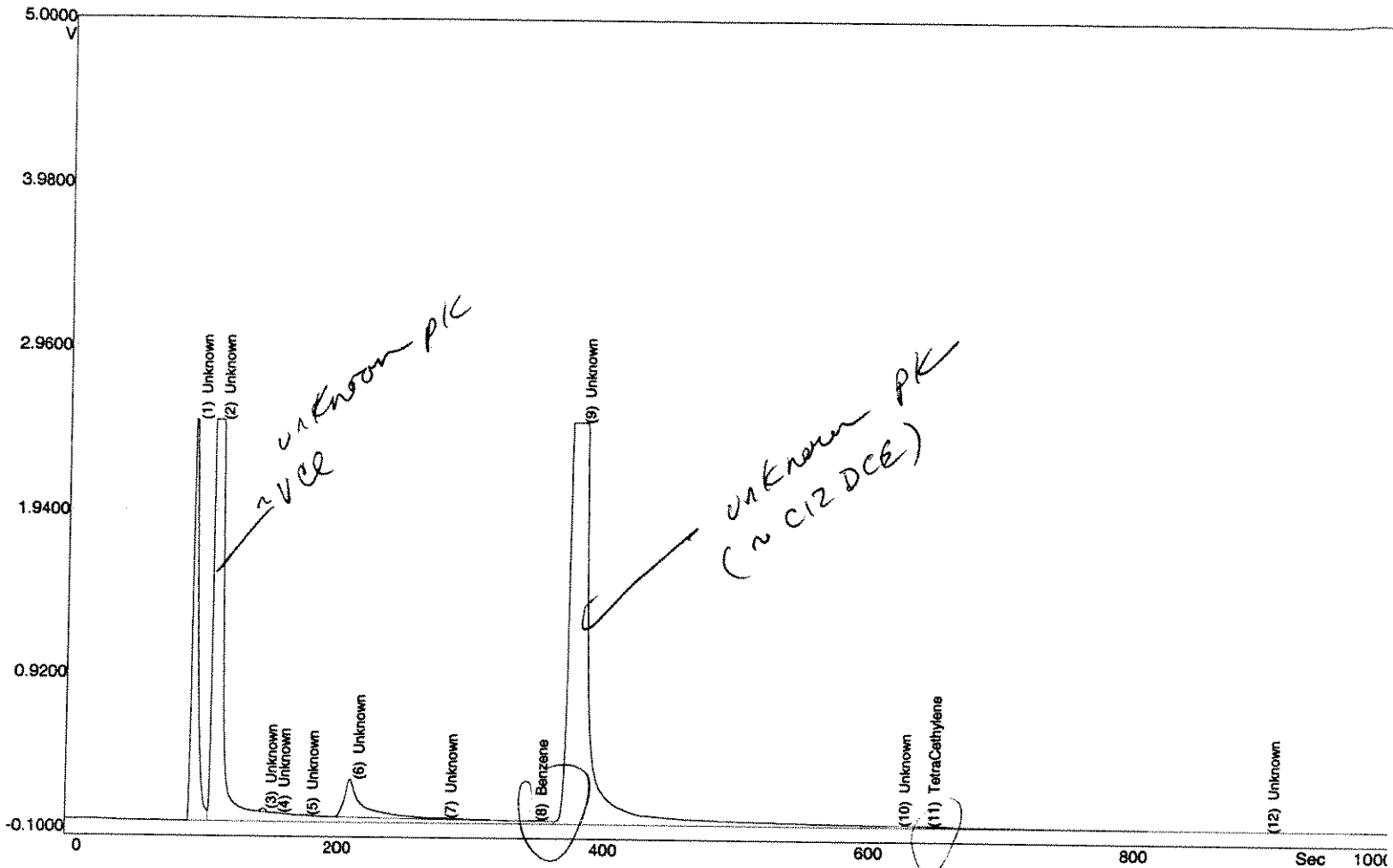
SiteChart Analysis Report - B5011409.PID

5 TCethylene
6 TetraCethylene

74.4	2.907	427.2
7.614	0.280	627.2

recalc'd
BE = ND
TC₂ = 0.074 ppm v
PCH = 0.010 ppm v

SiteChart Analysis Report - B5011427.PID



RESULTS:

Date Jan 14, 2005
 Time 15:36:19
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 55
 Tag sab
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 33.0 C

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

100mL
 25-31

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

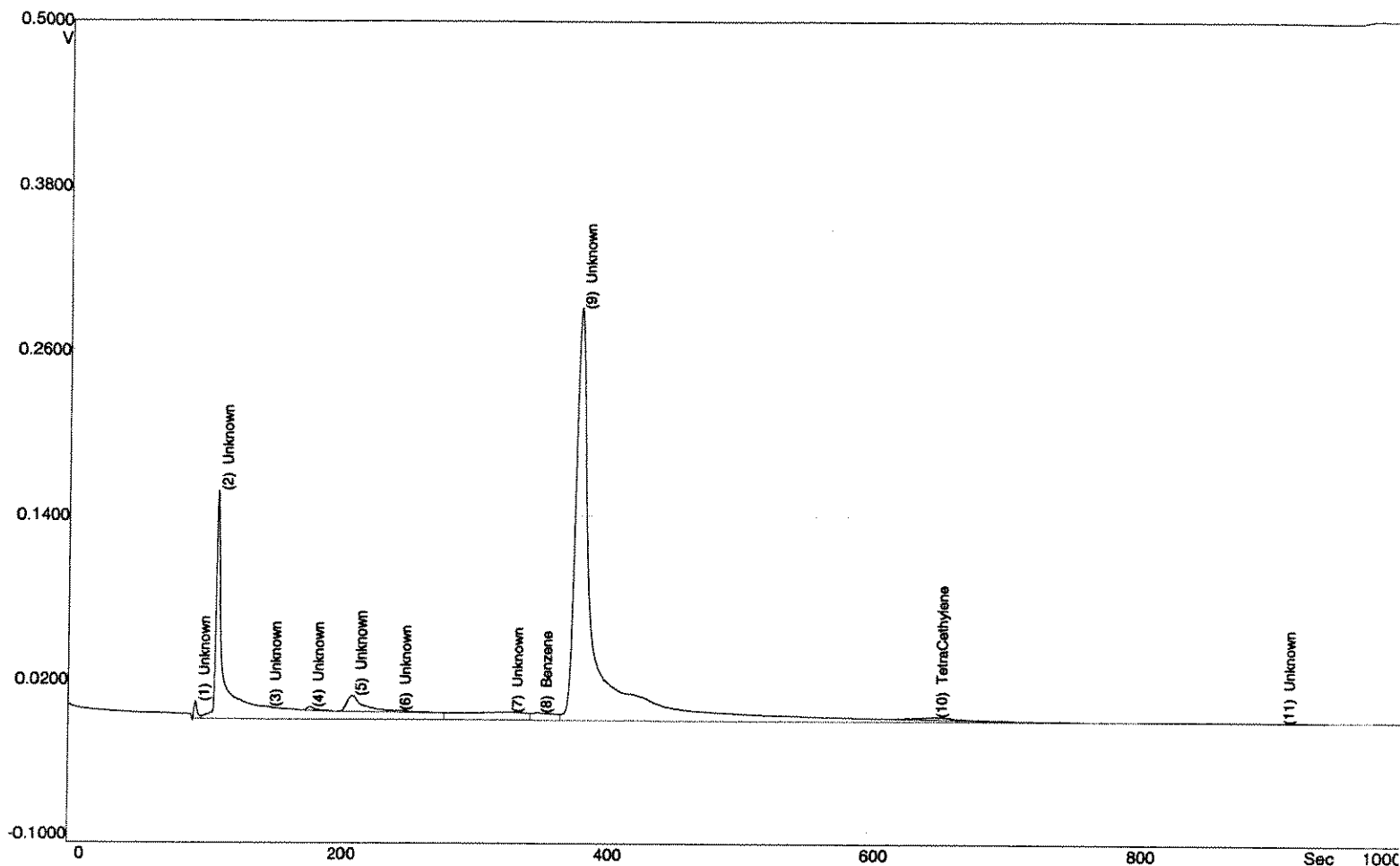
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		13796	2507		94.9
2	Unknown		81614	2438		112.3
3	Unknown		103	19.5		148.8
4	Unknown		10.9	1.328		158.4

SiteChart Analysis Report - B5011427.PID

5	Unknown	19.5	2.235	180.0
6	Unknown	3949	239	214.6
7	Unknown	210	0.214	284.0
8	Benzene	36.9	2.275	352.3
9	Unknown	81241	2492	383.7
10	Unknown	11.1	0.216	625.6
11	TetraCethylene	62.3	0.338	648.2
12	Unknown	2.223	0.083	905.6

recalc'd
BZ ~~TCE~~ s 0.037 ppmv
PCE s 0.078 ppmv
TCE = ND

SiteChart Analysis Report - B5011418.PID



RESULTS:

Date Jan 14, 2005
Time 12:17:27
Instrument FGGE202
Detector PID
Column B
Analysis# 37
Tag sab
Column Temp 59.0 C
Det Temp 59.0 C
Ambient Temp 33.0 C

1x
25A-4'

METHOD:

Analysis Time 1000.0 S
PumpTime 5.0 S
Back Flush 400.0 S
Temperature 60.0 C
Pressure 8.0 psi
Inject Syringe, 100.0 uL
PID State High Sense

10042

INTEGRATION METHOD:

Manual Integration
SlopeUp 0.0 mV/S
SlopeDown 0.0 mV/S
Min Height 0.0 mV
Min Area 0.0 mVS
FilterLevel 3
Delay 80 Sec

PEAK REPORT:

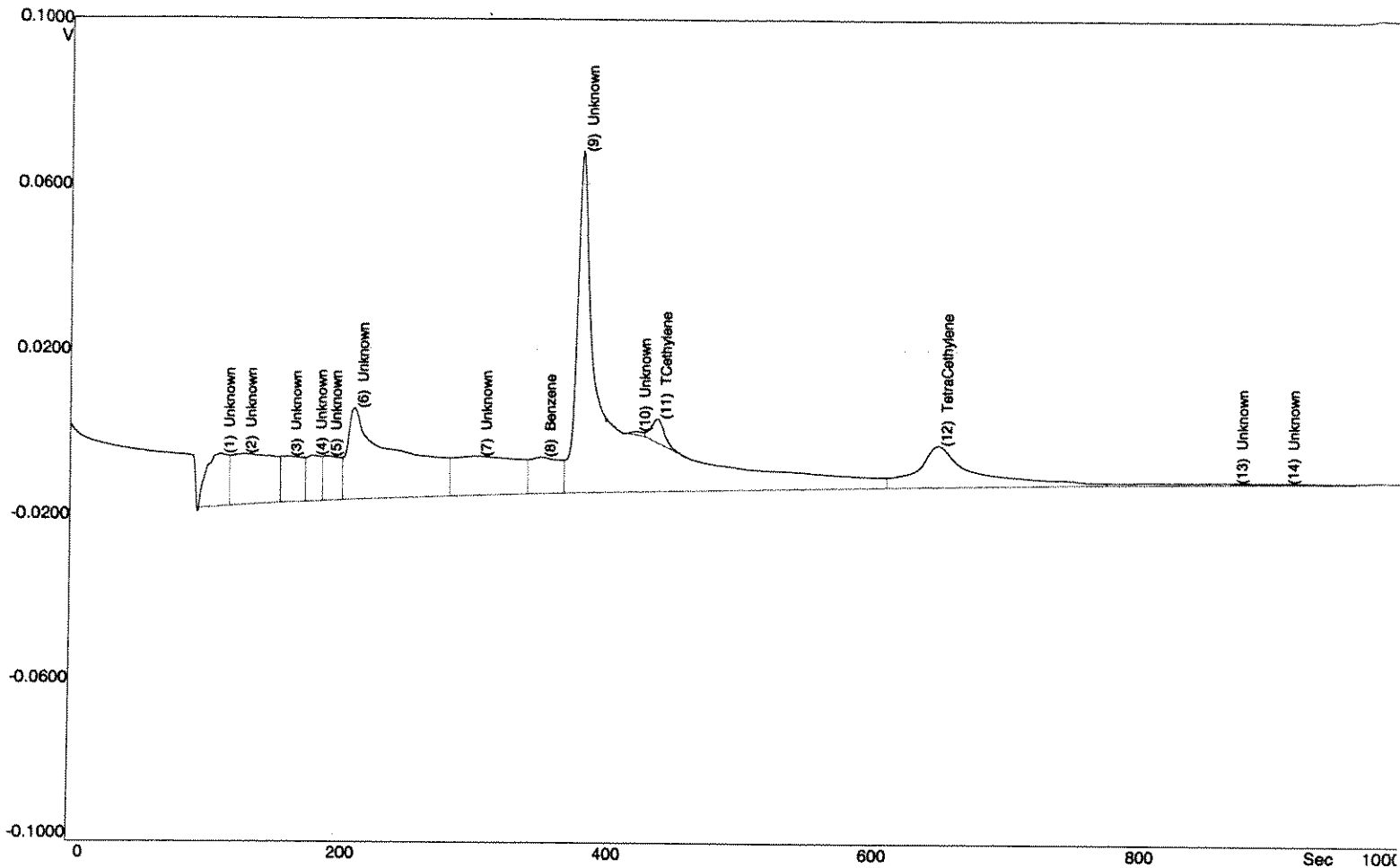
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		37.6	11.8	94.5	
2	Unknown		1882	165	110.9	
3	Unknown		1.467	0.138	148.4	
4	Unknown		19.6	2.450	180.4	

SiteChart Analysis Report - B5011418.PID

5 Unknown	174	11.6	212.8
6 Unknown	19.0	0.054	246.1
7 Unknown	343	0.665	329.9
8 Benzene	112	0.223	351.7
9 Unknown	5047	297	382.3
10 TetraCethylene	61.2	1.233	648.8
11 Unknown	14.0	0.314	910.4

NDs⁺ B2
TCE
PCE

SiteChart Analysis Report - B5011419.PID



RESULTS:

Date Jan 14, 2005
 Time 12:54:21
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 39
 Tag sab
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 33.0 C

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

1x
100mL
31'-3'

PEAK REPORT:

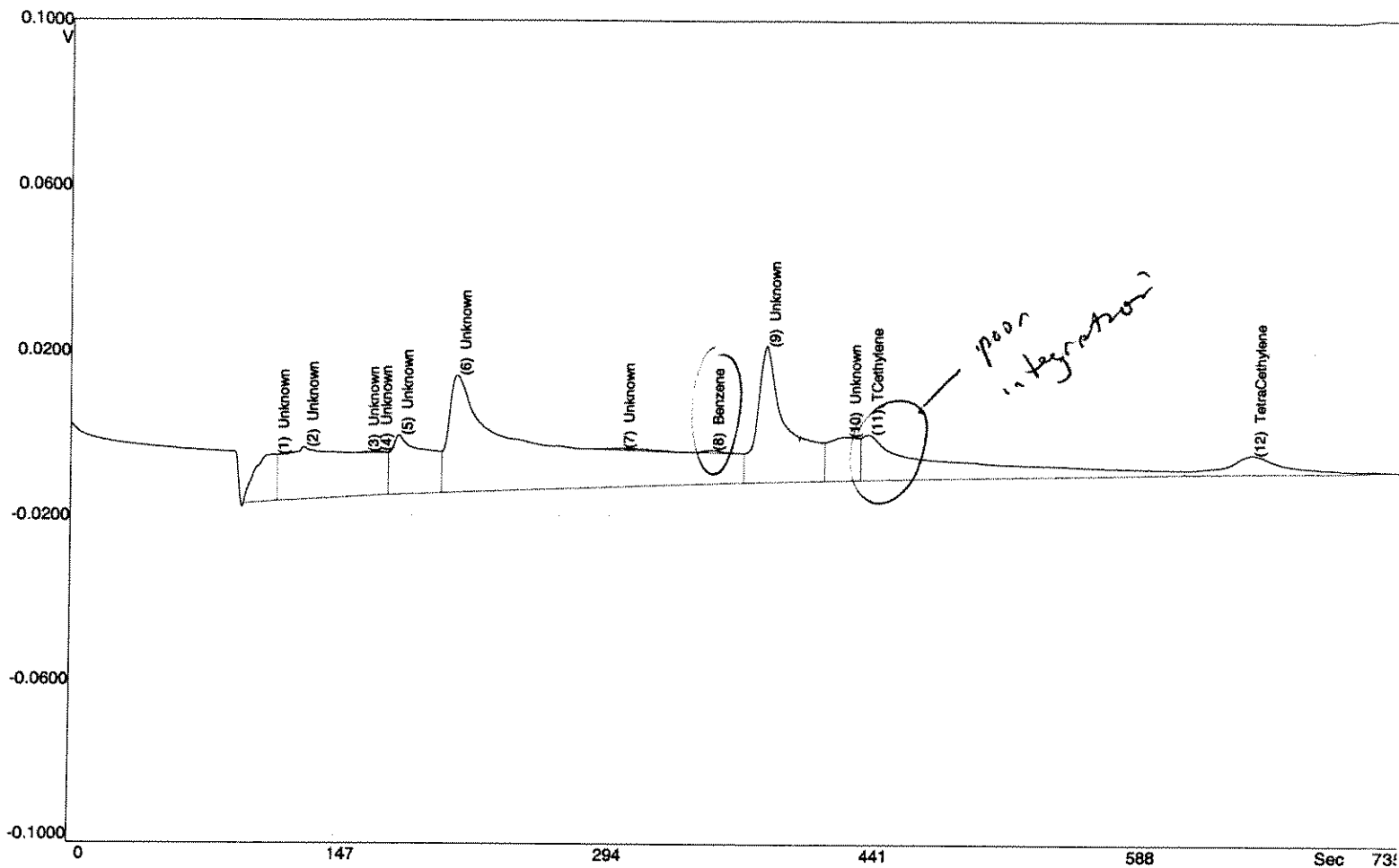
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		239	13.5	111.5	
2	Unknown		450	0.527	128.1	
3	Unknown		204	0.156	162.0	
4	Unknown		138	0.525	161.0	

SiteChart Analysis Report - B5011419.PID

5 Unknown		164	0.120	192.4
6 Unknown		996	12.0	212.4
7 Unknown		521	0.452	305.1
8 Benzene		229	0.667	353.0
9 Unknown		2544	74.9	383.0
10 Unknown		8.263	0.473	424.0
11 TCethylene		67.3	3.338	439.6
12 TetraCethylene	0.567	517	7.745	650.6
13 Unknown		57.0	0.184	872.0
14 Unknown		17.9	0.238	911.2

recalc'd
Bz = 0.23 ppmV
TCE = 0.067 ppmV
PCH = 0.65 ppmV

SiteChart Analysis Report - B5011421.PID



RESULTS:

Date Jan 14, 2005
 Time 13:39:28
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 43
 Tag sab
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 34.0 C

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		158	12.1	112.1	
2	Unknown		669	13.1	128.0	
3	Unknown		0.960	0.239	161.8	
4	Unknown		1.867	0.470	168.0	

31A - 3'
 100 ml

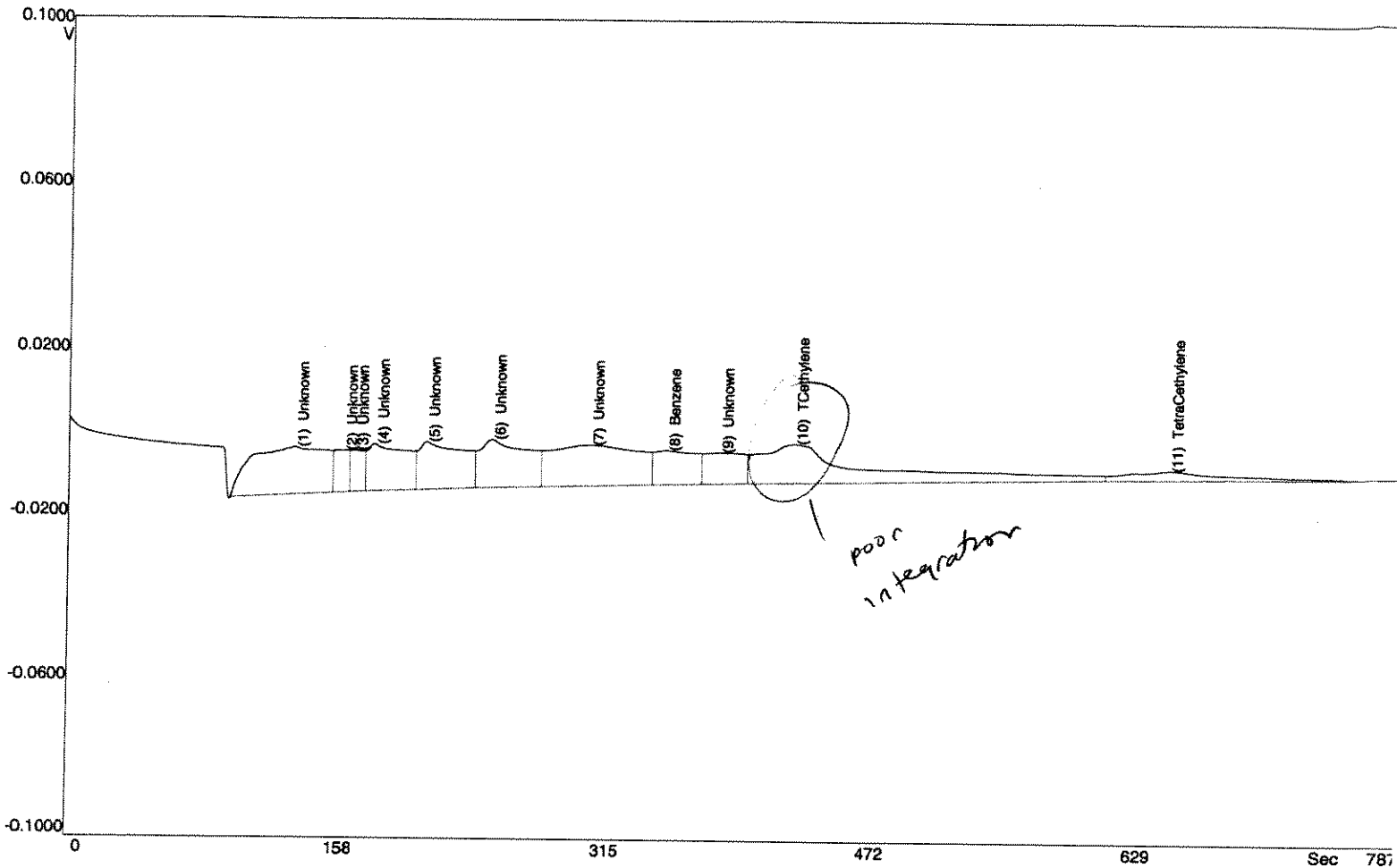
SiteChart Analysis Report - B5011421.PID

5 Unknown		330	4.372	180.2
6 Unknown		1850	18.5	211.8
7 Unknown		11.7	0.191	302.7
8 Benzene		6.670	0.544	352.0
9 Unknown		669	26.1	382.7
10 Unknown		204	1.369	427.2
11 TCethylene	0.056	631	1.807	439.2
12 TetraCethylene	0.150	183	3.689	650.0

Recalc'd q
 $Q_2 = 1.5 \text{ ppmv}$
 $TCB = 0.63 \text{ ppmv}$
 $PCB = 0.23 \text{ ppmv}$

over estimated

SiteChart Analysis Report - B5011424.PID



RESULTS:

Date Jan 14, 2005
 Time 14:46:25
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 49
 Tag sab
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 33.0 C

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		588	12.3	132.4	
2	Unknown		102	0.138	161.6	
3	Unknown		91.8	0.142	168.0	
4	Unknown		300	1.808	180.0	

SiteChart Analysis Report - B5011424.PID

5 Unknown		347	2.389	210.2
6 Unknown		385	2.825	248.8
7 Unknown		598	1.449	306.7
8 Benzene		232	0.445	352.0
9 Unknown		198	0.275	383.3
10 TCethylene	0.184	773	2.634	427.6
11 TetraCethylene	0.124	164	1.280	649.4

rec'd

BZ = ND ppm

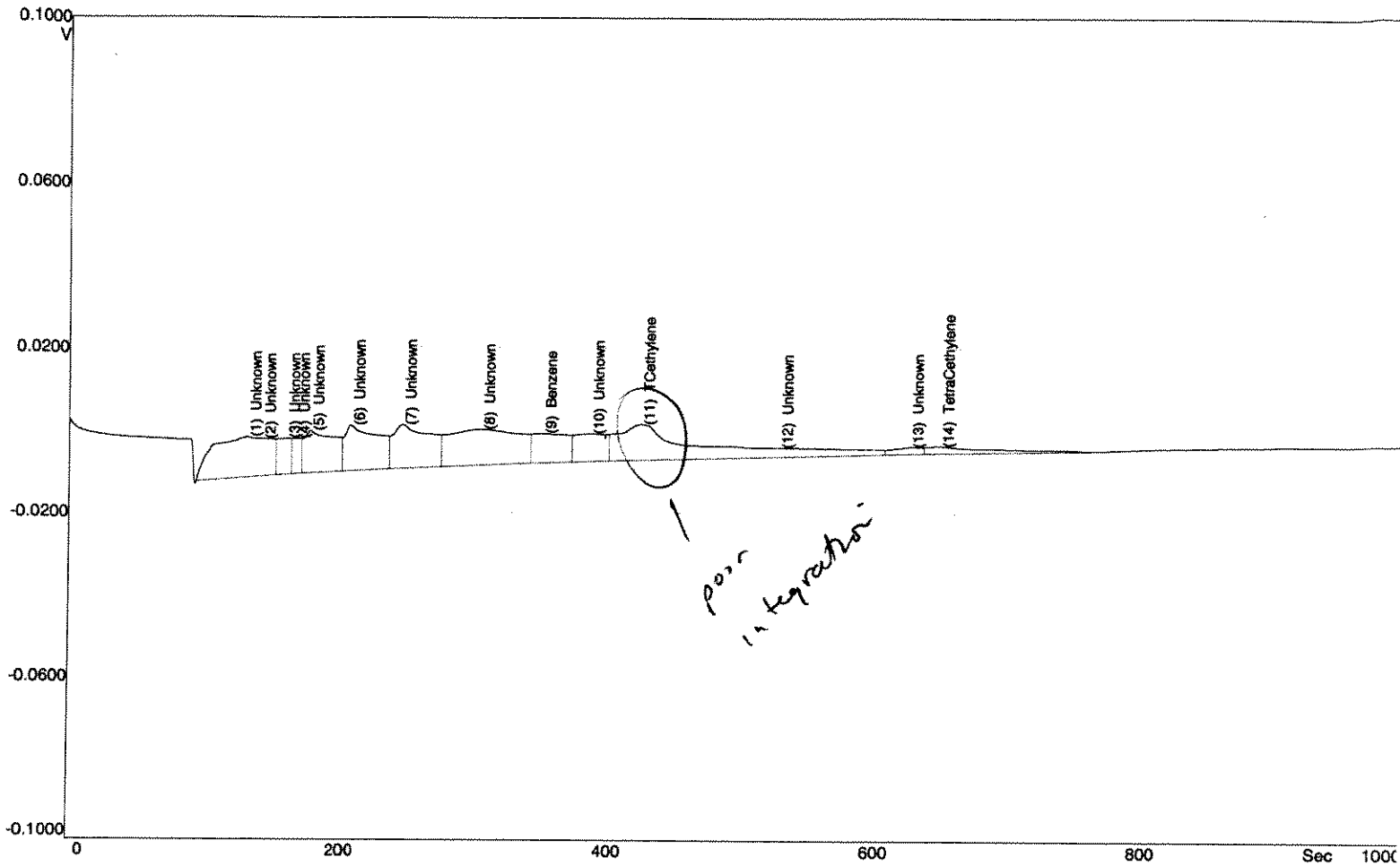
TCE = 0.78 ppm

PCE =

ppm

can be omitted

SiteChart Analysis Report - B5011425.PID



RESULTS:

Date Jan 14, 2005
 Time 15:00:34
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 51
 Tag sab
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 33.0 C

HA-2'
 100mL

METHOD:

Analysis Time 1000.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		496	11.2	133.1	
2	Unknown		0.134	0.034	144.2	
3	Unknown		97.6	0.214	162.2	
4	Unknown		68.7	0.061	169.4	

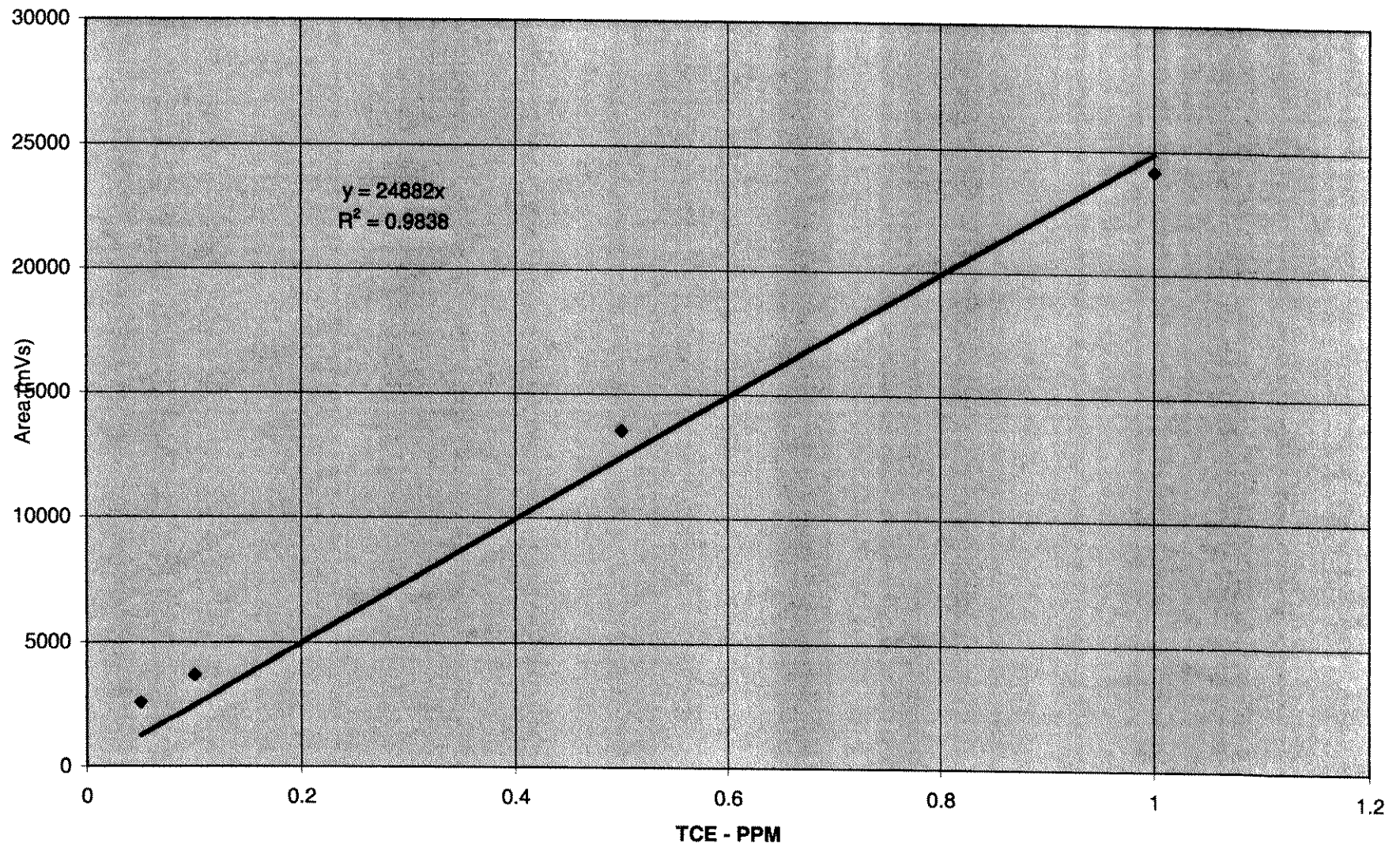
SiteChart Analysis Report - B5011425.PID

5	Unknown		270	2.083	180.4
6	Unknown		313	2.994	211.0
7	Unknown		338	2.742	249.1
8	Unknown		533	1.401	307.7
9	Benzene		211	0.266	353.7
10	Unknown		184	0.345	389.7
11	TCethylene	0.104	686	2.595	427.6
12	Unknown		1.247	0.026	531.6
13	Unknown		43.3	0.618	629.3
14	TetraCethylene	0.033	97.4	0.781	651.8

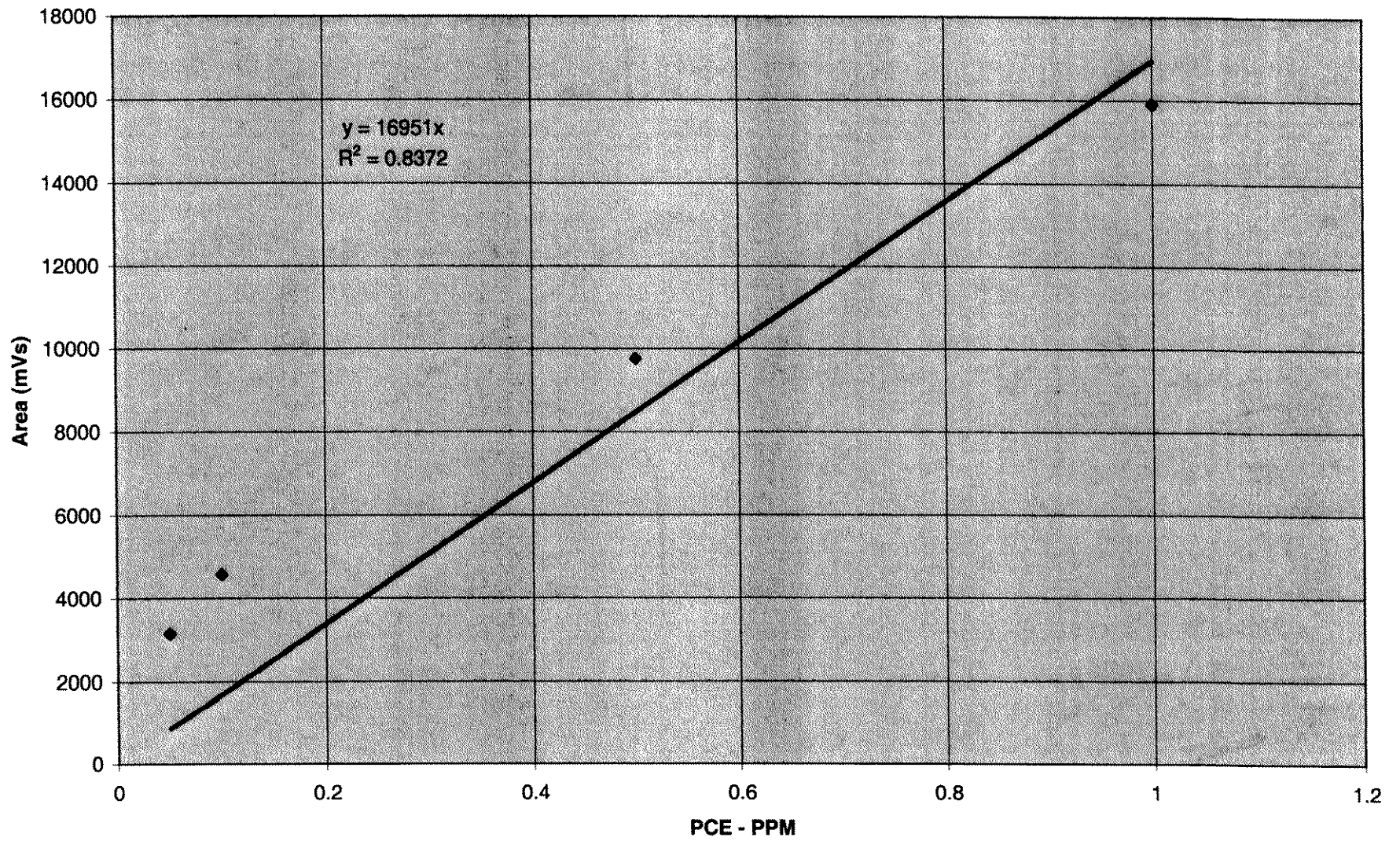
recalcd
Bz = 0.21 ppmv
TCB = 0.69 ppmv (over estimated)
PCB = 0.12 ppmv

Voyager FPGC Daily Calibrations and Chromatograms
Sabana Abaja Industrial Site
January 15 and 17, 2005

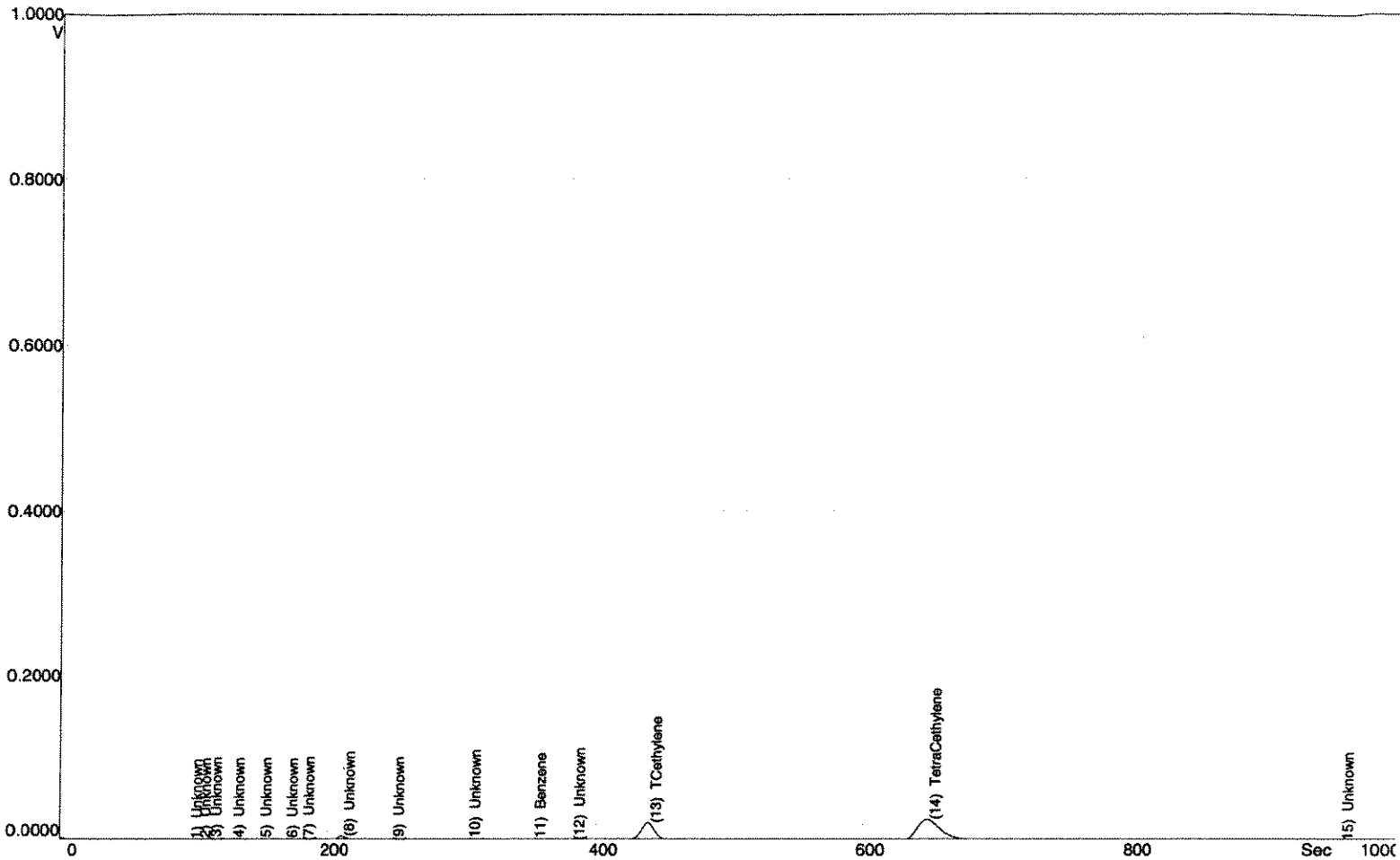
TCE via PID - 01/15/05



PCE via PID - 01/15/05



SiteChart Analysis Report - B5011502.PID



RESULTS:

Date Jan 15, 2005
 Time 08:36:58
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 5
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 32.0 C

1X
 100ML REACT (W-30)

METHOD:

Analysis Time 1200.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

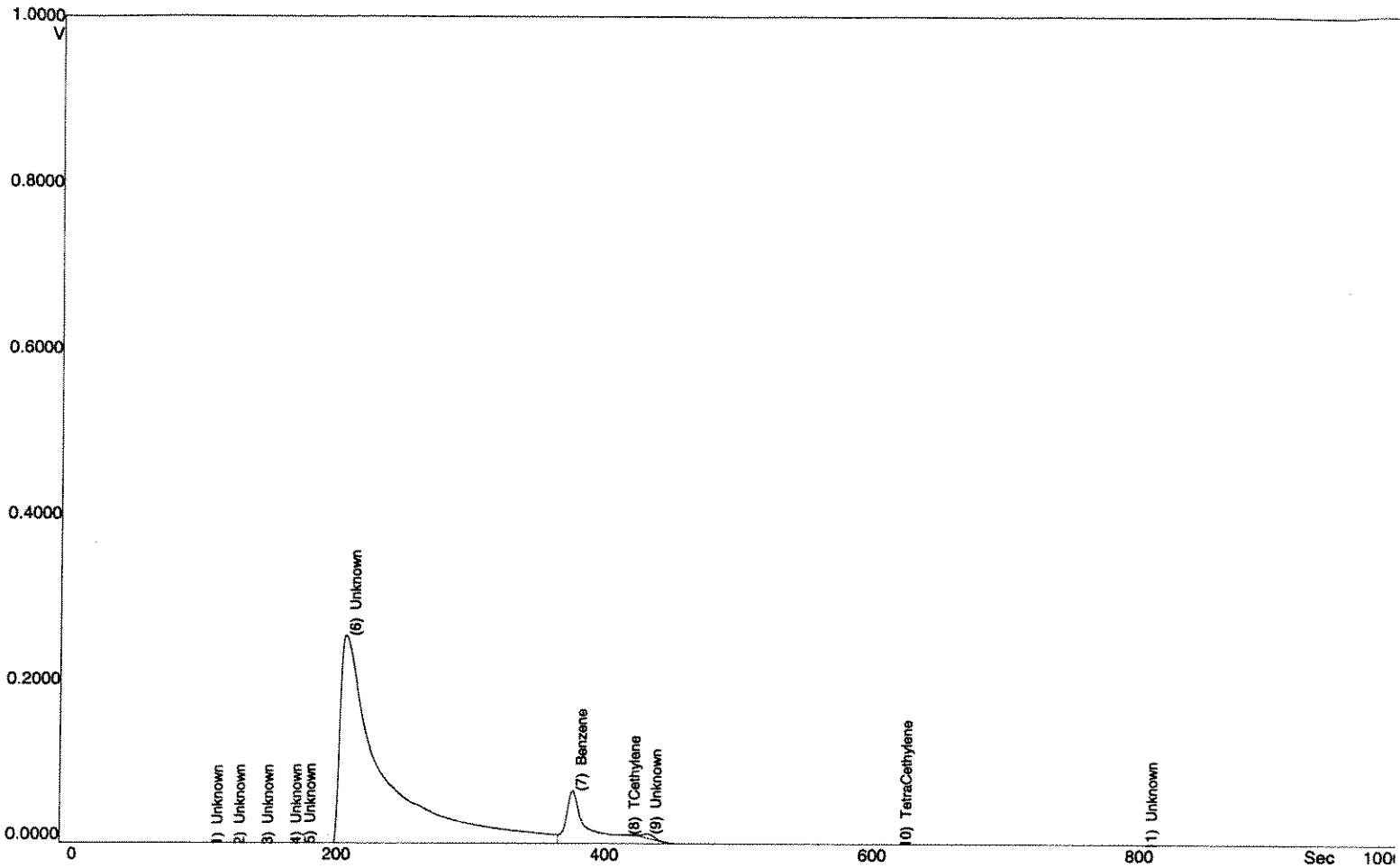
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		26.6	8.415	95.3	
2	Unknown		44.1	4.321	101.9	
3	Unknown		108	8.886	110.1	
4	Unknown		189	0.578	127.3	

SiteChart Analysis Report - B5011502.PID

5	Unknown		144	0.553	148.0
6	Unknown		137	0.153	167.6
7	Unknown		236	1.724	179.6
8	Unknown		683	7.674	210.2
9	Unknown		0.493	0.124	246.9
10	Unknown		419	0.381	303.5
11	Benzene	0.006	134	0.216	352.0
12	Unknown		247	2.611	381.0
13	TCethylene	0.044	929	23.7	438.4
14	TetraCethylene	0.043	1157	31.7	647.6
15	Unknown		144	0.341	957.2
16	Unknown		0.137	0.027	1014.4
17	Unknown		10.6	0.360	1062.0

reanalysis
TCE = .037 ug/ml
PCE = .068 ug/ml

SiteChart Analysis Report - B5011503.PID



RESULTS:

Date Jan 15, 2005
 Time 09:01:02
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 7
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 33.0 C

IX
 100ml
 W-21

METHOD:

Analysis Time 1200.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

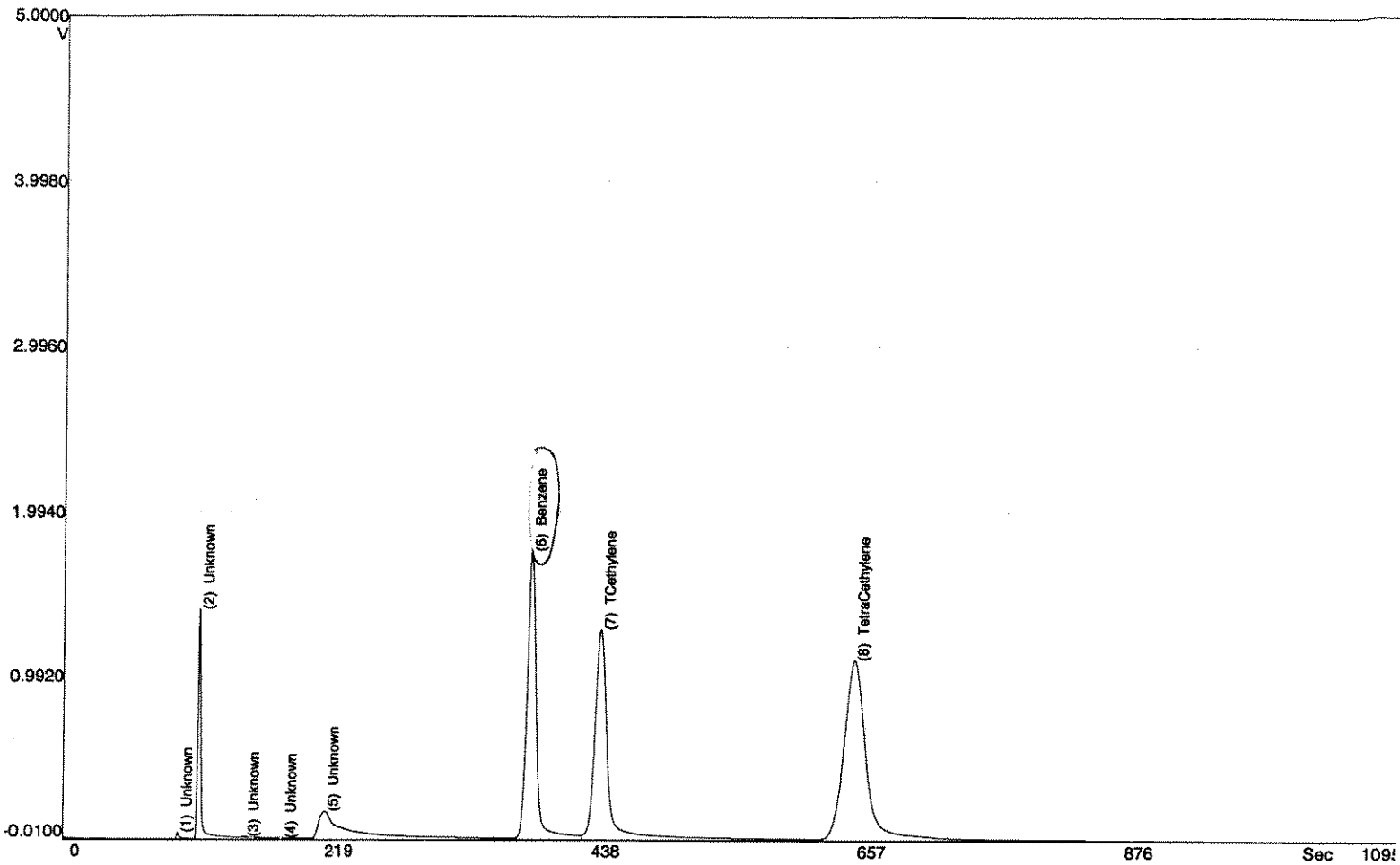
# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		83.5	6.561	110.4	
2 Unknown		175	6.687	127.2	
3 Unknown		119	0.318	148.4	
4 Unknown		108	1.298	169.0	

SiteChart Analysis Report - B5011503.PID

5 Unknown		174	1.706	179.4
6 Unknown		11774	261	212.0
7 Benzene	0.206	4612	53.3	381.3
8 TCethylene		16.6	0.545	421.2
9 Unknown		49.5	1.642	437.2
10 TetraCethylene		12.8	0.168	624.5
11 Unknown		1.388	0.071	808.2

recalc'd
TCE? ND
PCE? ND

SiteChart Analysis Report - B5011506.PID



RESULTS:

Date Jan 15, 2005
 Time 09:55:03
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 13
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 35.0 C

10x

1042

w-17

METHOD:

Analysis Time 1200.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

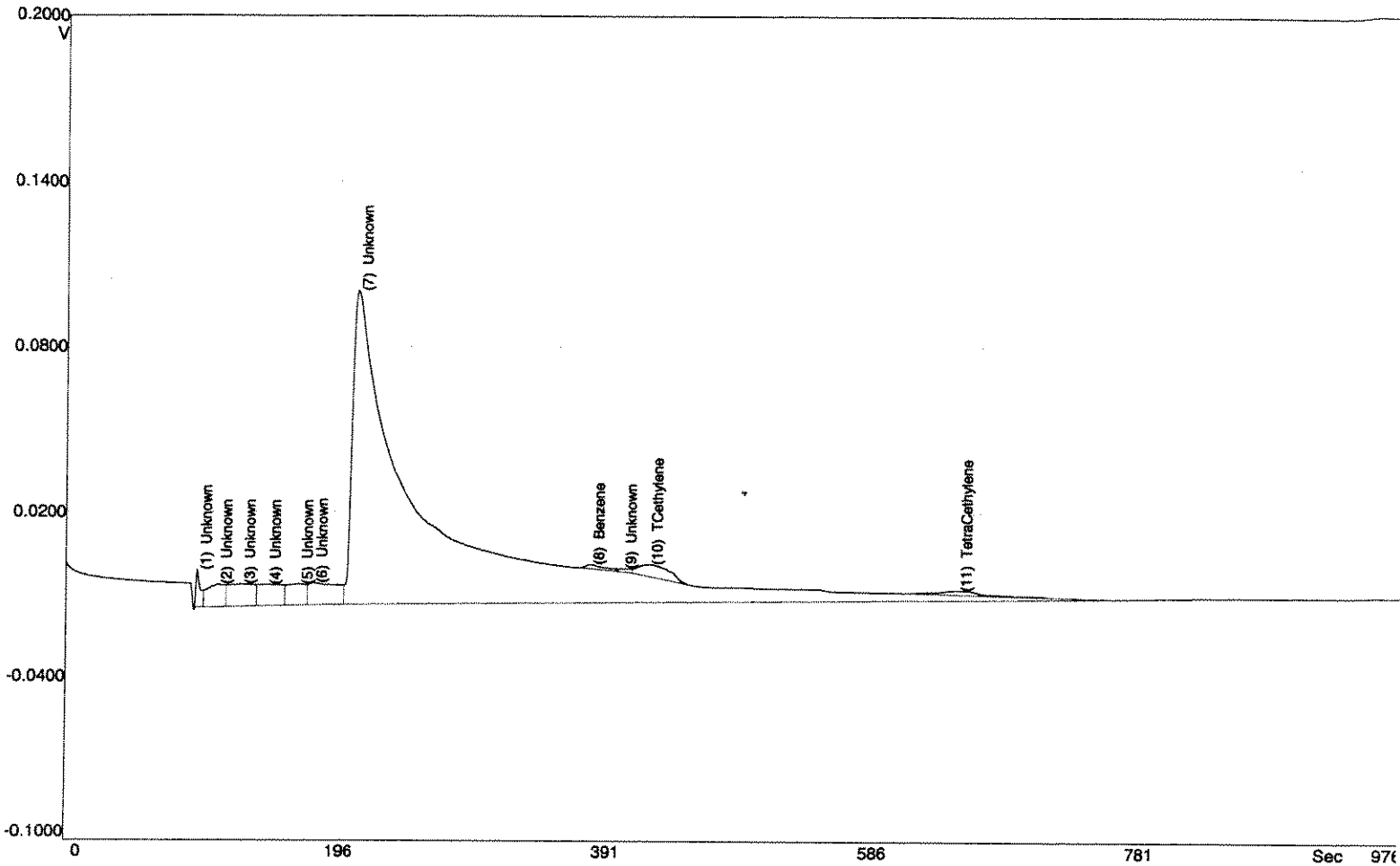
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		130	40.0	93.5	
2	Unknown		4854	1399	110.1	
3	Unknown		20.0	4.048	148.0	
4	Unknown		1.031	0.101	178.6	

SiteChart Analysis Report - B5011506.PID

5 Unknown		5610	168	213.2
6 Benzene		0.718 16093	1755	381.7
7 TCethylene	8.2	0.819 17139	1256	438.8
8 TetraCethylene	9.2	0.921 24864	1094	647.6

$TCB = 6.888 \rightarrow 6.9 \text{ } \mu\text{g/l}$
 $PCE = 1.4668 \rightarrow 14.7 \text{ } \mu\text{g/l}$

SiteChart Analysis Report - B5011507.PID



RESULTS:

Date Jan 15, 2005
 Time 10:13:52
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 15
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 35.0 C

IX
 10042 W-33

METHOD:

Analysis Time 1200.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

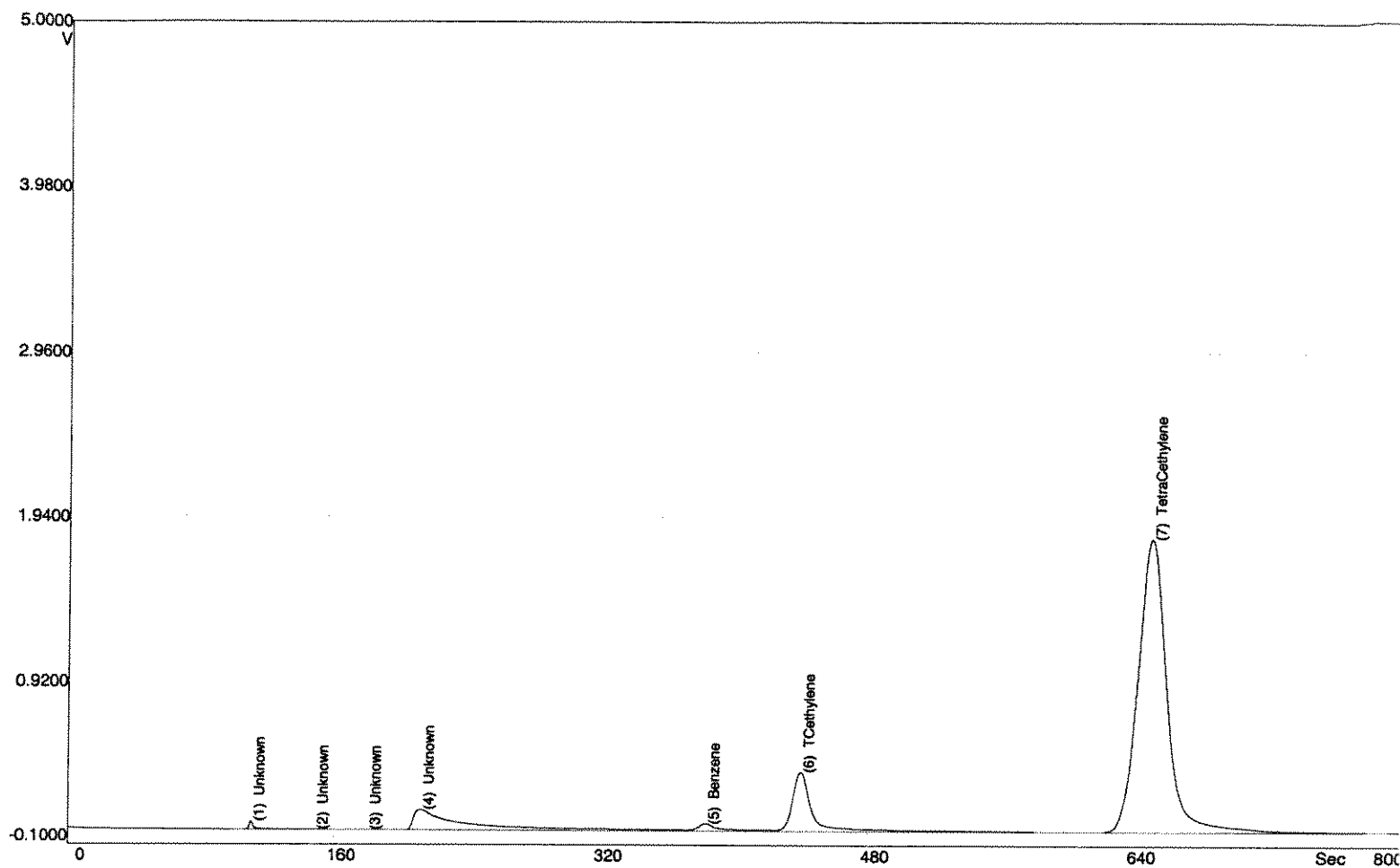
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		50.6	12.9	95.2	
2	Unknown		123	2.591	110.3	
3	Unknown		176	0.460	127.5	
4	Unknown		158	0.155	145.8	

SiteChart Analysis Report - B5011507.PID

5 Unknown		118	0.397	169.2
6 Unknown		198	0.889	179.6
7 Unknown		7280	107	211.8
8 Benzene	0.001	26.5	1.247	382.3
9 Unknown		12.5	0.157	405.7
10 TCethylene	0.006	121	1.587	424.8
11 TetraCethylene	0.002	61.5	1.045	651.2

recalc'd
TCE = ND
PCE = ND

SiteChart Analysis Report - B5011509.PID



RESULTS:

Date Jan 15, 2005
 Time 10:46:01
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 19
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 36.0 C

20X

542

MW-2

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		250	50.8	109.9	
2	Unknown		1.288	0.445	147.8	
3	Unknown		0.405	0.045	179.2	
4	Unknown		1500	120	211.0	

SiteChart Analysis Report - B5011509.PID

5 Benzene		786	39.4	382.3	
6 TCethylene	158 → 77.911	5424	365	439.2	
7 TetraCethylene	→ 175	37208	1823	648.8	ALARM

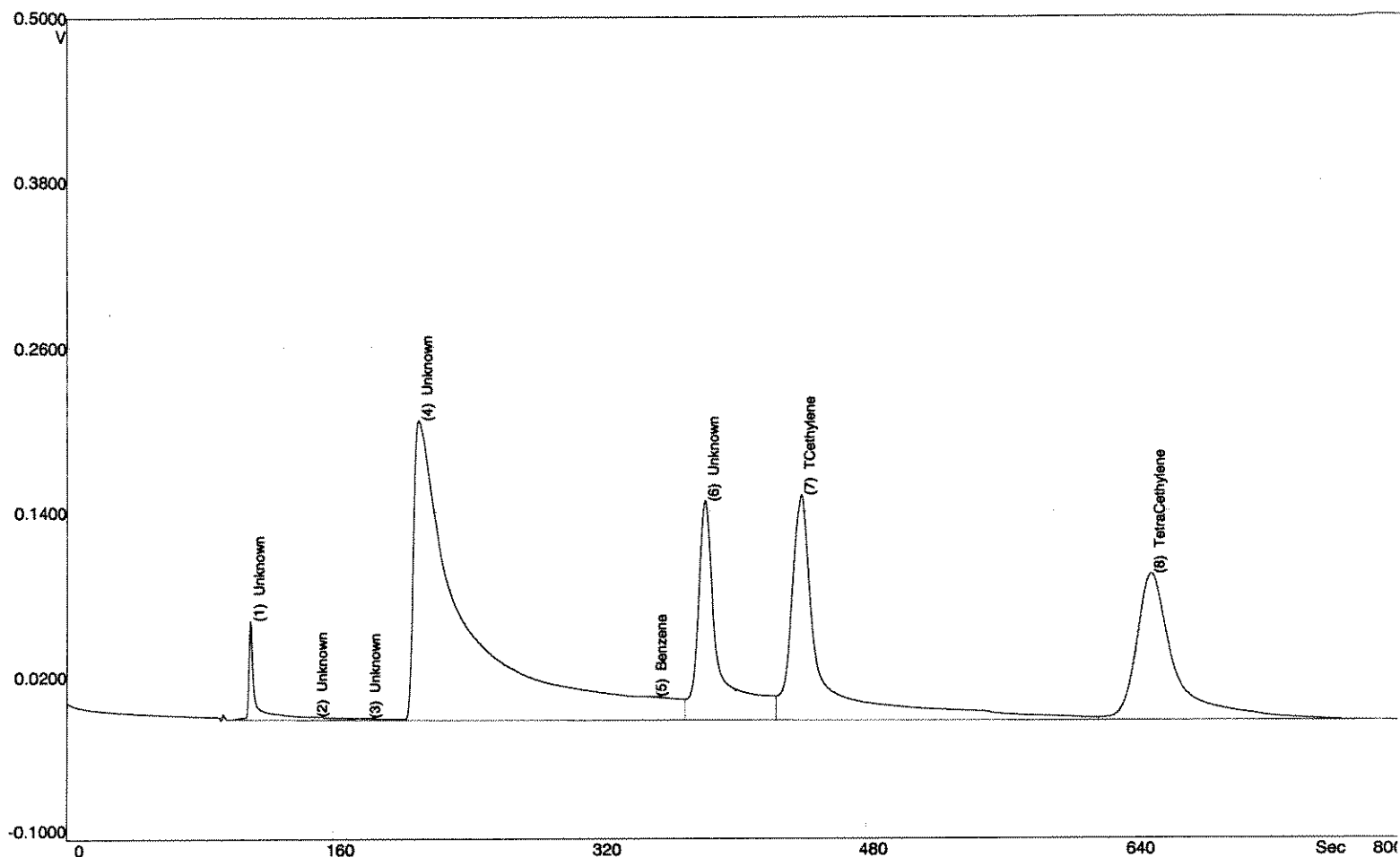
3560

17.911
20
158.22

175
20
3500
3

TCB = 4.36 → 4.4 ug/l
PCB = 43.9 → 44 ug/l

SiteChart Analysis Report - B5011513.PID



RESULTS:

Date Jan 15, 2005
 Time 11:47:07
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 27
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 37.0 C

10x
 10x2
 MW-6

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		403	72.7	110.0	
2	Unknown		1.143	0.162	147.8	
3	Unknown		3.031	0.405	179.8	
4	Unknown		8108	218	210.8	

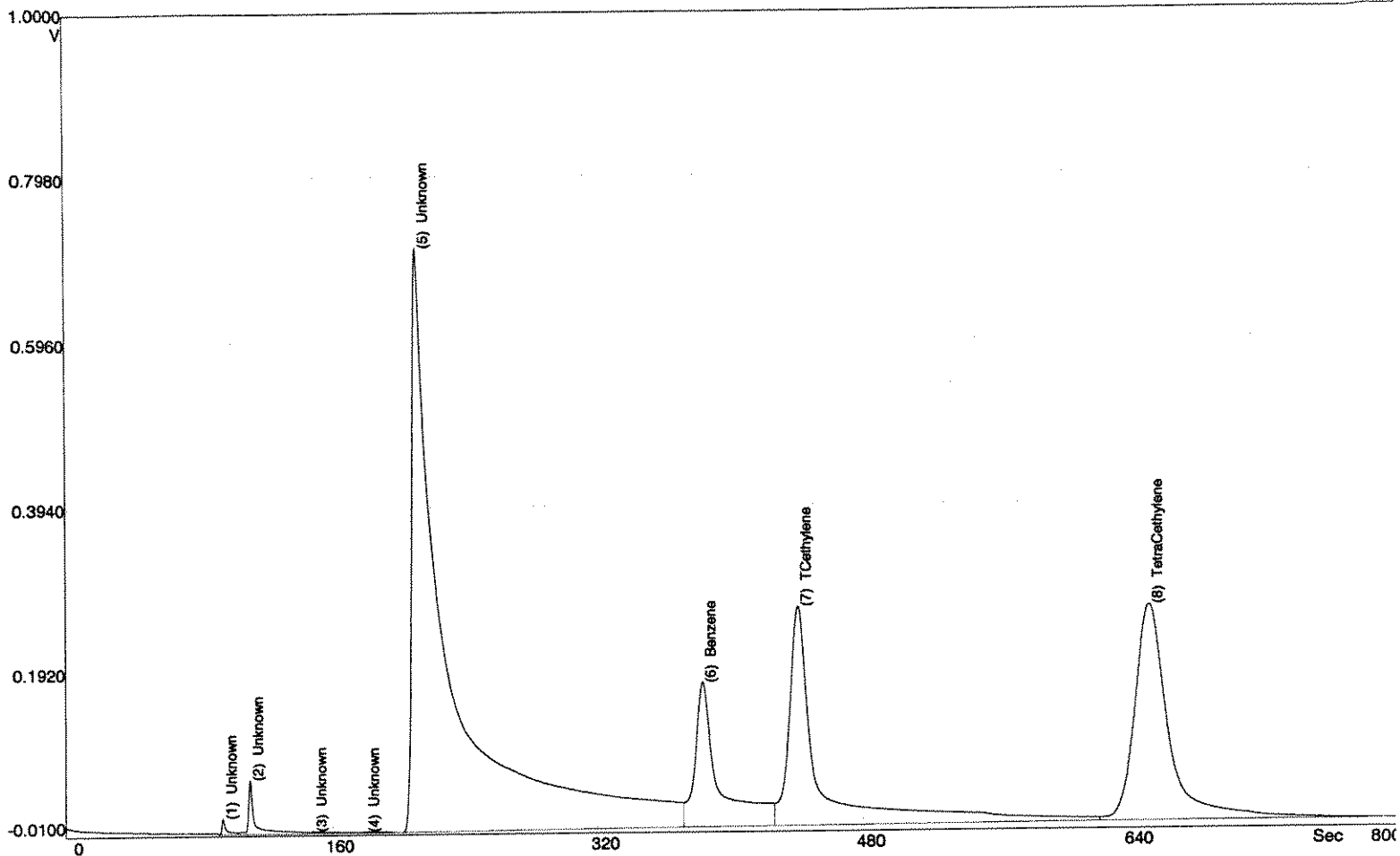
SiteChart Analysis Report - B5011513.PID

5 Benzene		8.339	0.405	351.3
6 Unknown		2339	145	382.3
7 TCethylene	41 - 4.117	3520	147	440.4
8 TetraCethylene	24 - 2.389	2889	105	649.4

24

recalc'd
TCE = 1.42 ug/l
PCE = 1.70 ug/l

SiteChart Analysis Report - B5011516.PID



RESULTS:

Date Jan 15, 2005
 Time 12:32:09
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 33
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 39.0 C

10X

104e
 MW-3

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		60.3	18.3		93.6
2	Unknown		349	64.0		109.9
3	Unknown		1.128	0.207		147.8
4	Unknown		3.948	0.529		179.8

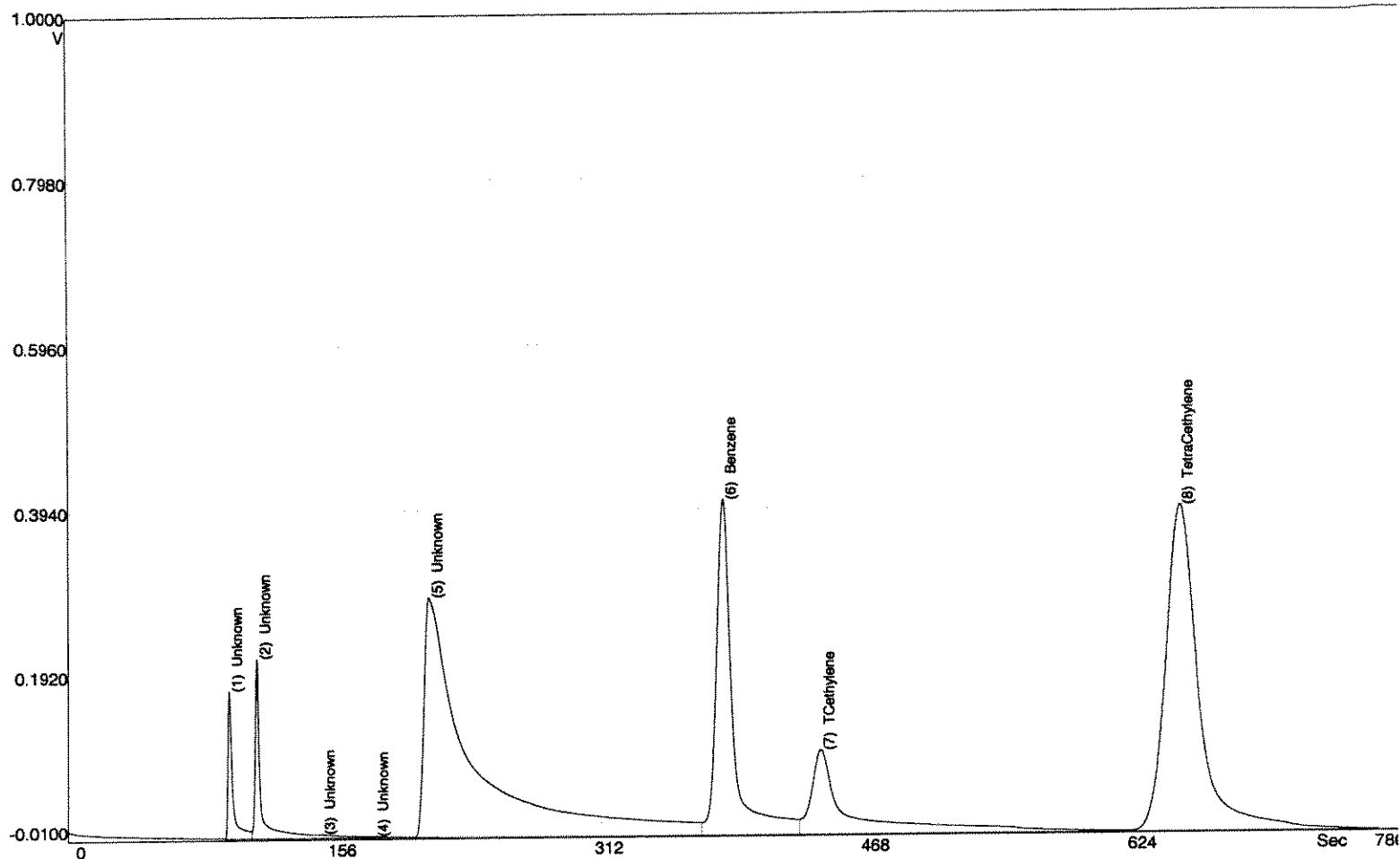
SiteChart Analysis Report - B5011516.PID

5 Unknown		18244	719	210.8
6 Benzene		3006	149	382.7
7 TCethylene	84	5672	244	440.4
8 TetraCethylene	5.177	6405	264	650.0

52

TCe = 2.3 ug/l
PCE = 3.8 ug/l

SiteChart Analysis Report - B5011518.PID



RESULTS:

Date Jan 15, 2005
 Time 13:01:35
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 37
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 39.0 C

10X
 1042
 MW-5

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

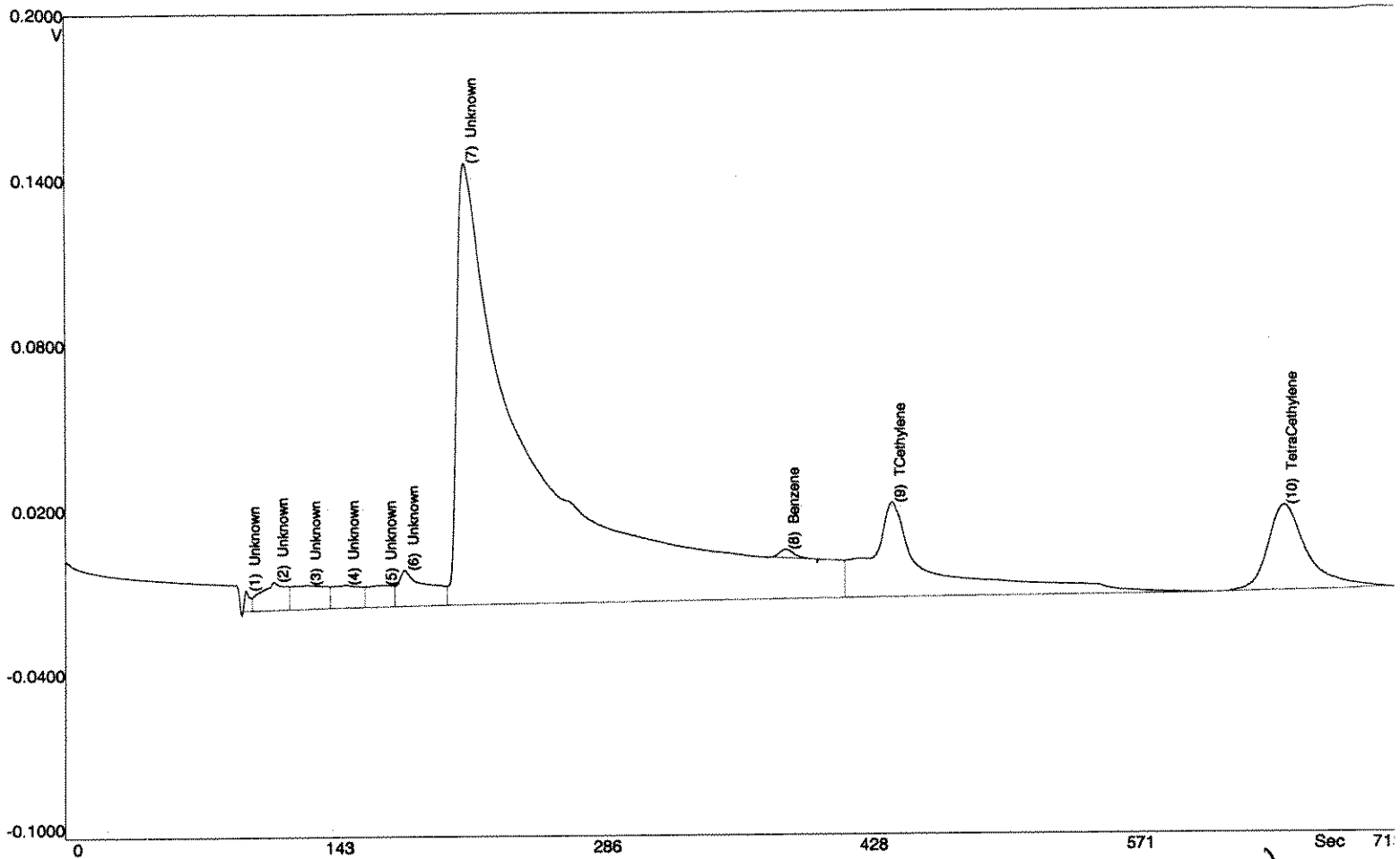
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		600	182	93.5	
2	Unknown		971	213	110.0	
3	Unknown		4.616	0.790	148.0	
4	Unknown		1.074	0.114	179.2	

SiteChart Analysis Report - B5011518.PID

5 Unknown		9720	295	210.8
6 Benzene	4.310	4698	399	383.0
7 TCethylene	2.696	2699	85.5	440.0
8 TetraCethylene	11.5	9068	402	649.4

TCE = 1.1 ug/l
PCE = 5.3 ug/l

SiteChart Analysis Report - B5011519.PID



RESULTS:

Date Jan 15, 2005
 Time 13:16:12
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 39
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 39.0 C

IX
100ml

REAC 1 (w-30)
dup

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

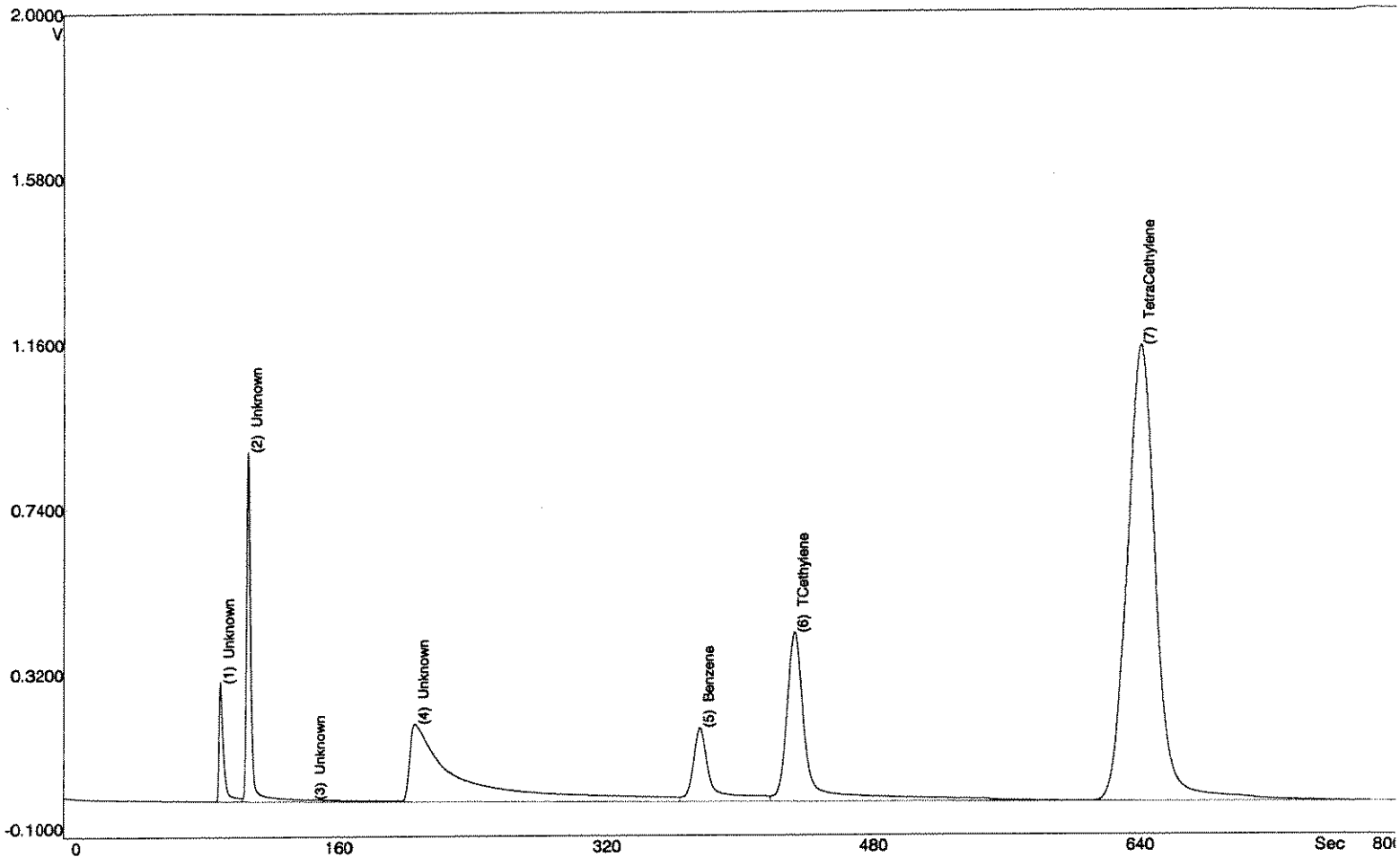
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		26.2	8.044	96.4	
2	Unknown		159	9.439	111.3	
3	Unknown		186	0.443	128.8	
4	Unknown		146	0.520	149.4	

SiteChart Analysis Report - B5011519.PID

5 Unknown		121	0.507	169.2
6 Unknown		248	5.889	181.0
7 Unknown		7832	154	212.6
8 Benzene		28.3	2.866	384.0
9 TCethylene	0.775	1333	21.1	440.8
10 TetraCethylene	0.835	759	32.1	651.2

TCE = .054 mg/l
 PCE = .045 mg/l

SiteChart Analysis Report - B5011713.PID



RESULTS:

Date Jan 17, 2005
 Time 11:39:10
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 27
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 33.0 C

10x

104R

MW-16

new vial

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

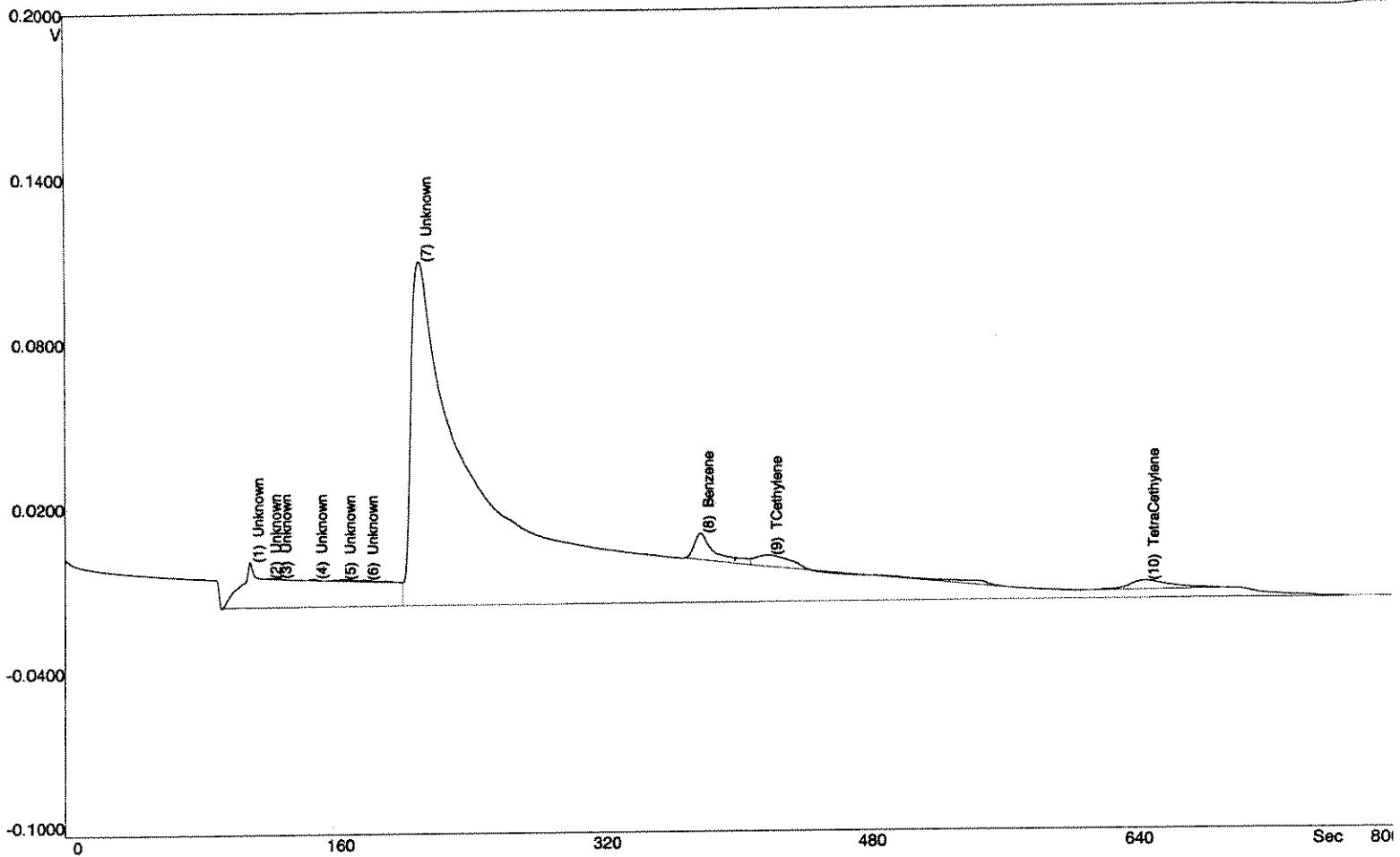
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		947	308	93.3	
2	Unknown		2900	888	109.9	
3	Unknown		2.714	0.437	147.4	
4	Unknown		6771	198	209.2	

SiteChart Analysis Report - B5011713.PID

5 Benzene	0.209	2341	179	379.7
6 TCethylene	0.599	6269	422	436.4
7 TetraCethylene	1.738	23462	1164	643.4

needed
TCB 2.5 mg/l
PCB 13.847 mg/l

SiteChart Analysis Report - B5011714.PID



RESULTS:

Date Jan 17, 2005
 Time 11:53:45
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 29
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 33.0 C

1X

10042

MW - 29
 new vial

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

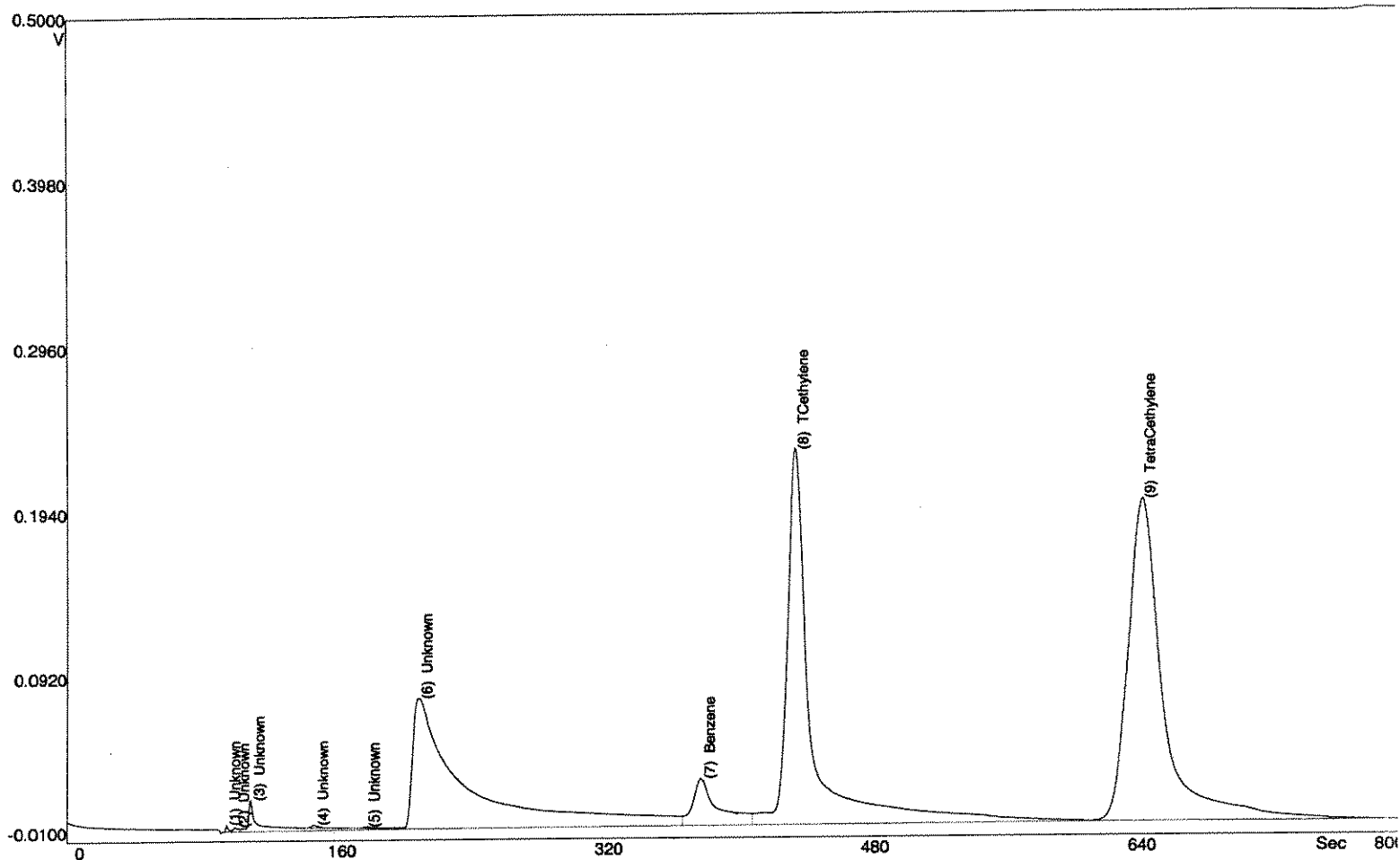
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		987	16.7	110.1	
2	Unknown		0.545	0.084	120.4	
3	Unknown		1.002	0.110	126.7	
4	Unknown		2.571	0.451	148.0	

SiteChart Analysis Report - B5011714.PID

5 Unknown		6.835	0.416	165.4
6 Unknown		6.190	0.282	178.6
7 Unknown		8614	117	211.4
8 Benzene	0.013	143	9.128	380.0
9 TCethylene	0.013	131	1.259	421.2
10 TetraCethylene	0.007	95.6	3.535	647.0

TC₂ = ND
PC₂ = ND

SiteChart Analysis Report - B5011717.PID



RESULTS:

Date Jan 17, 2005
 Time 13:01:28
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 35
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 34.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		9.130	4.398	95.1	
2 Unknown		9.990	1.776	100.4	
3 Unknown		223	18.9	109.5	
4 Unknown		8.276	1.581	147.6	

10p

104e

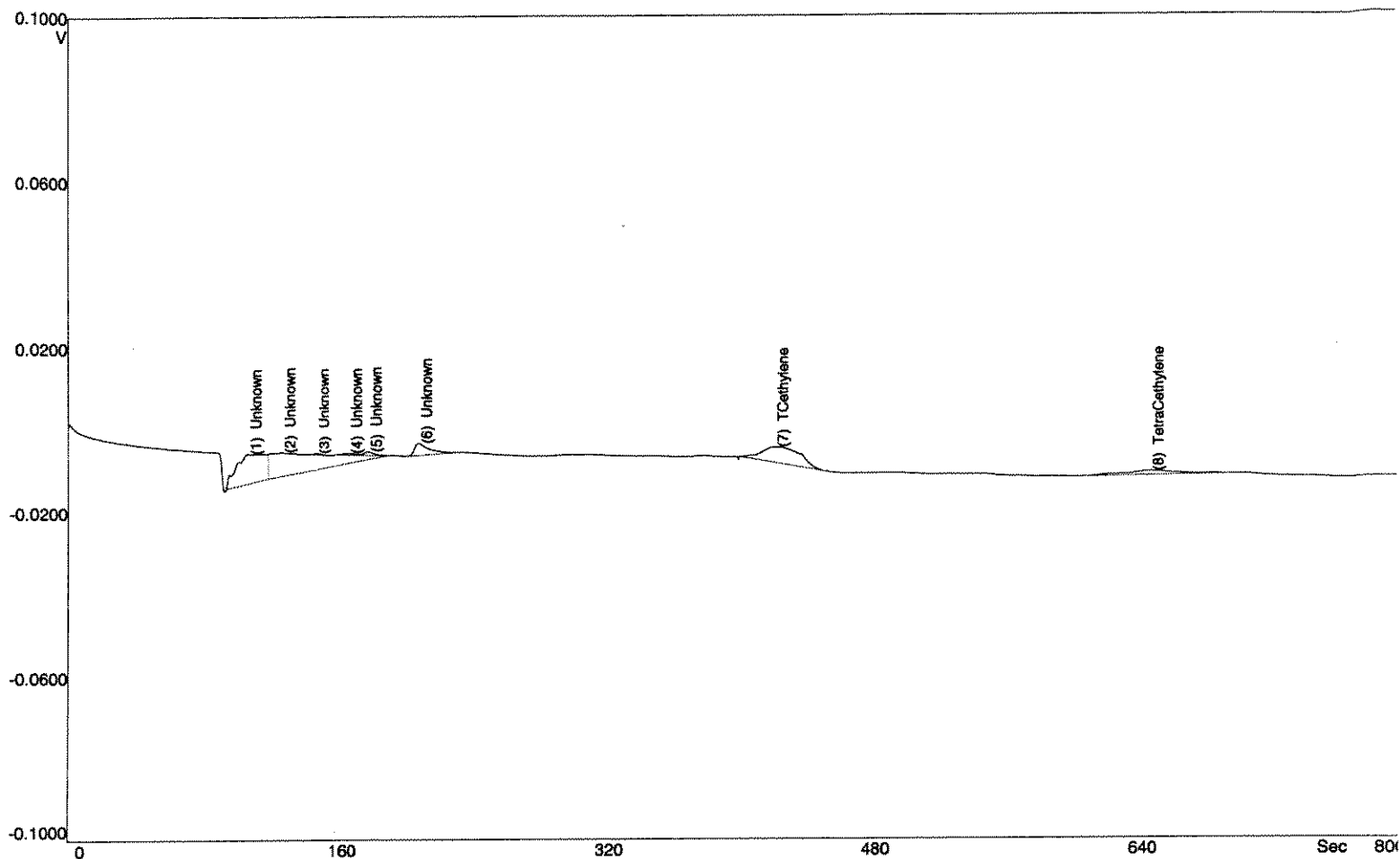
-R1

SiteChart Analysis Report - B5011717.PID

5 Unknown		5.994	0.768	178.4
6 Unknown		3085	80.7	209.8
7 Benzene	0.046	519	23.6	379.7
8 TCethylene	0.385	4029	227	436.0
9 TetraCethylene	0.365	4933	200	643.4

recalc'd
TCE = 1.6 ug/l
PCE = 2.9 ug/l

SiteChart Analysis Report - B5011721.PID



RESULTS:

Date Jan 17, 2005
 Time 14:29:02
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 43
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 34.0 C

1x
 100µl - R2

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 µL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

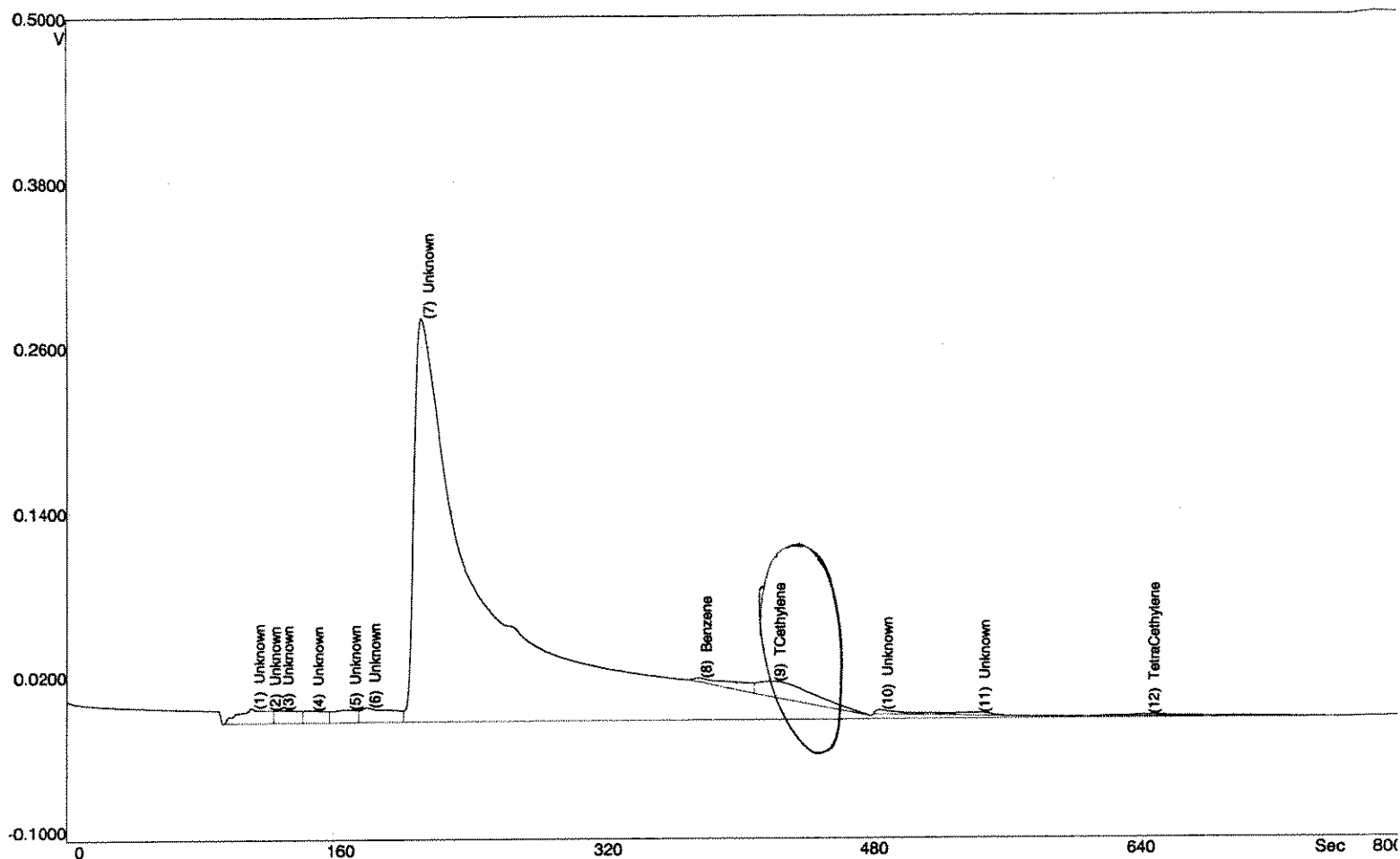
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		142	8.870	107.1	
2	Unknown		222	8.315	127.3	
3	Unknown		1.116	0.256	147.6	
4	Unknown		4.054	0.419	167.6	

SiteChart Analysis Report - B5011721.PID

5 Unknown		5.380	0.642	179.2
6 Unknown		29.8	3.105	209.4
7 TCethylene	0.004	105	2.418	423.2
8 TetraCethylene		34.5	1.206	647.0

Healed
TCF ND
PUE ND

SiteChart Analysis Report - B5011724.PID



RESULTS:

Date Jan 17, 2005
 Time 15:20:38
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 49
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 34.0 C

1x

100µl - R3

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 µL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

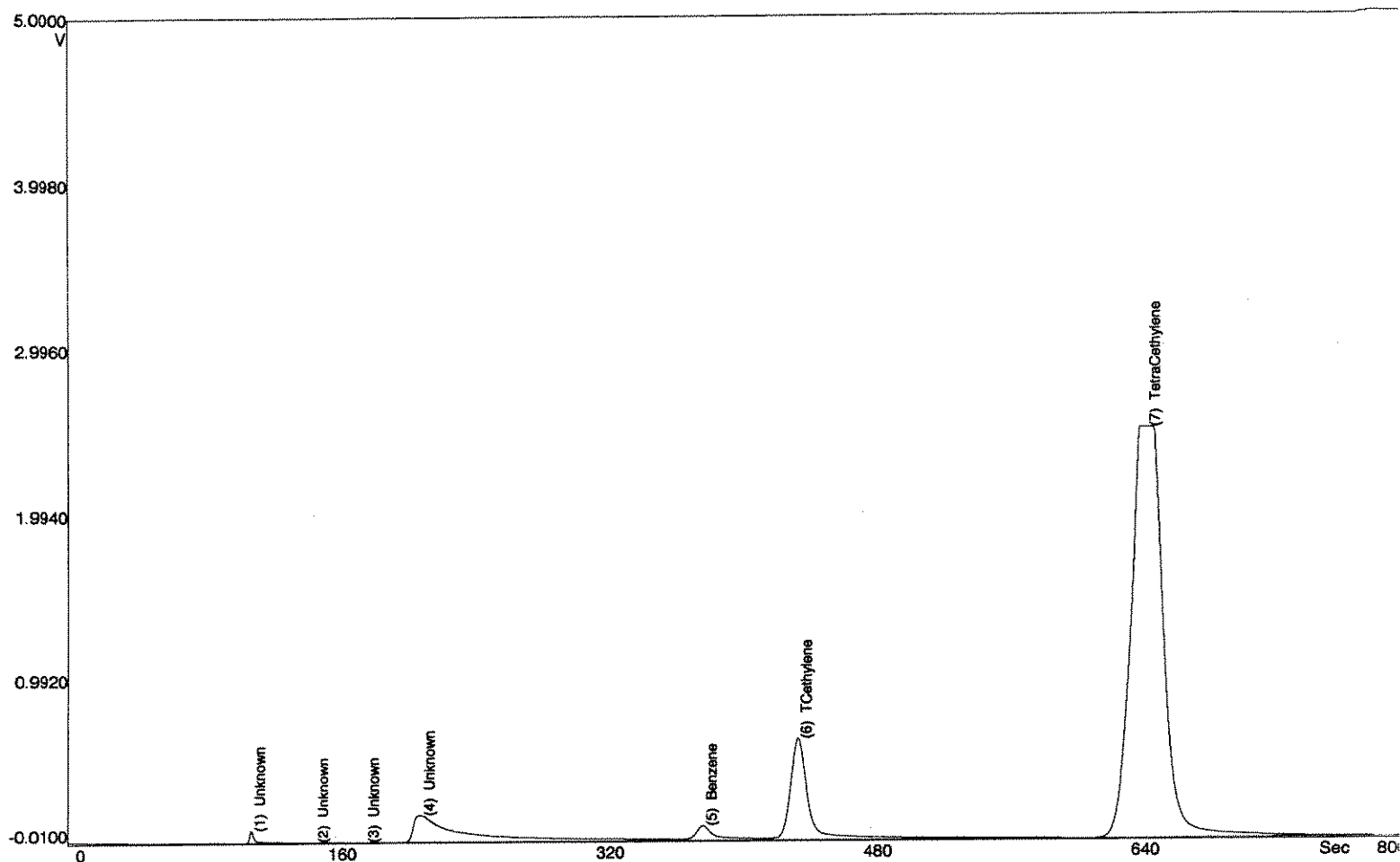
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		229	11.1	110.4	
2	Unknown		0.120	0.061	119.7	
3	Unknown		158	0.408	127.6	
4	Unknown		138	0.085	145.6	

SiteChart Analysis Report - B5011724.PID

5 Unknown		155	0.953	168.0
6 Unknown		246	2.481	179.8
7 Unknown		15382	286	211.8
8 Benzene	0.014	158	1.171	378.0
9 TCethylene	0.045	470	1.283	422.0
10 Unknown		76.5	3.512	486.8
11 Unknown		43.6	0.091	544.7
12 TetraCethylene	0.003	43.3	1.421	646.4

recalling
TCB³ .019 ug/l
PCB³ ND ug/l

SiteChart Analysis Report - B5011719.PID



RESULTS:

Date Jan 17, 2005
Time 13:46:05
Instrument FGGE202
Detector PID
Column B
Analysis# 39
Tag sab HS
Column Temp 60.0 C
Det Temp 60.0 C
Ambient Temp 34.0 C

10x
1048 - MW-2
resampled / repeat

METHOD:

Analysis Time 800.0 S
PumpTime 5.0 S
Back Flush 400.0 S
Temperature 60.0 C
Pressure 8.0 psi
Inject Syringe, 100.0 uL
PID State High Sense

INTEGRATION METHOD:

Manual Integration
SlopeUp 0.0 mV/S
SlopeDown 0.0 mV/S
Min Height 0.0 mV
Min Area 0.0 mVS
FilterLevel 3
Delay 80 Sec

PEAK REPORT:

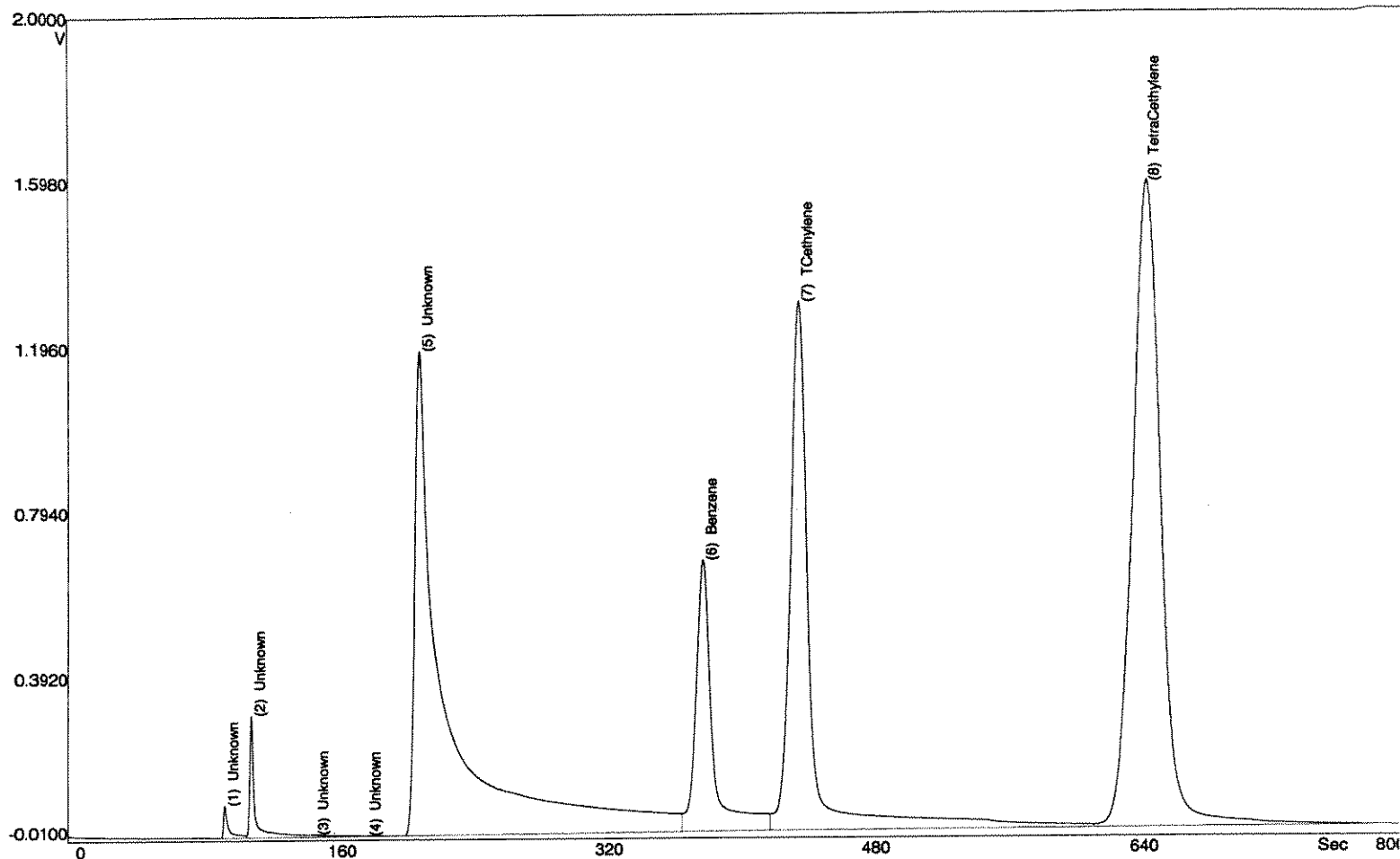
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		367	74.4	109.6	
2	Unknown		4.665	1.041	147.4	
3	Unknown		0.780	0.109	177.8	
4	Unknown		5790	162	210.8	

SiteChart Analysis Report - B5011719.PID

5 Benzene	0.109	1226	81.5	379.7
6 TCethylene	0.785	8209	609	436.4
7 TetraCethylene	4.641	62637	2503	644.0

recalc'd
TCB = 3.3 ug/l
PCE = 37. ug/l

SiteChart Analysis Report - B5011722.PID



RESULTS:

Date Jan 17, 2005
 Time 14:43:47
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 45
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 34.0 C

10X
 10uL
 MW-3
 (resampled)

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

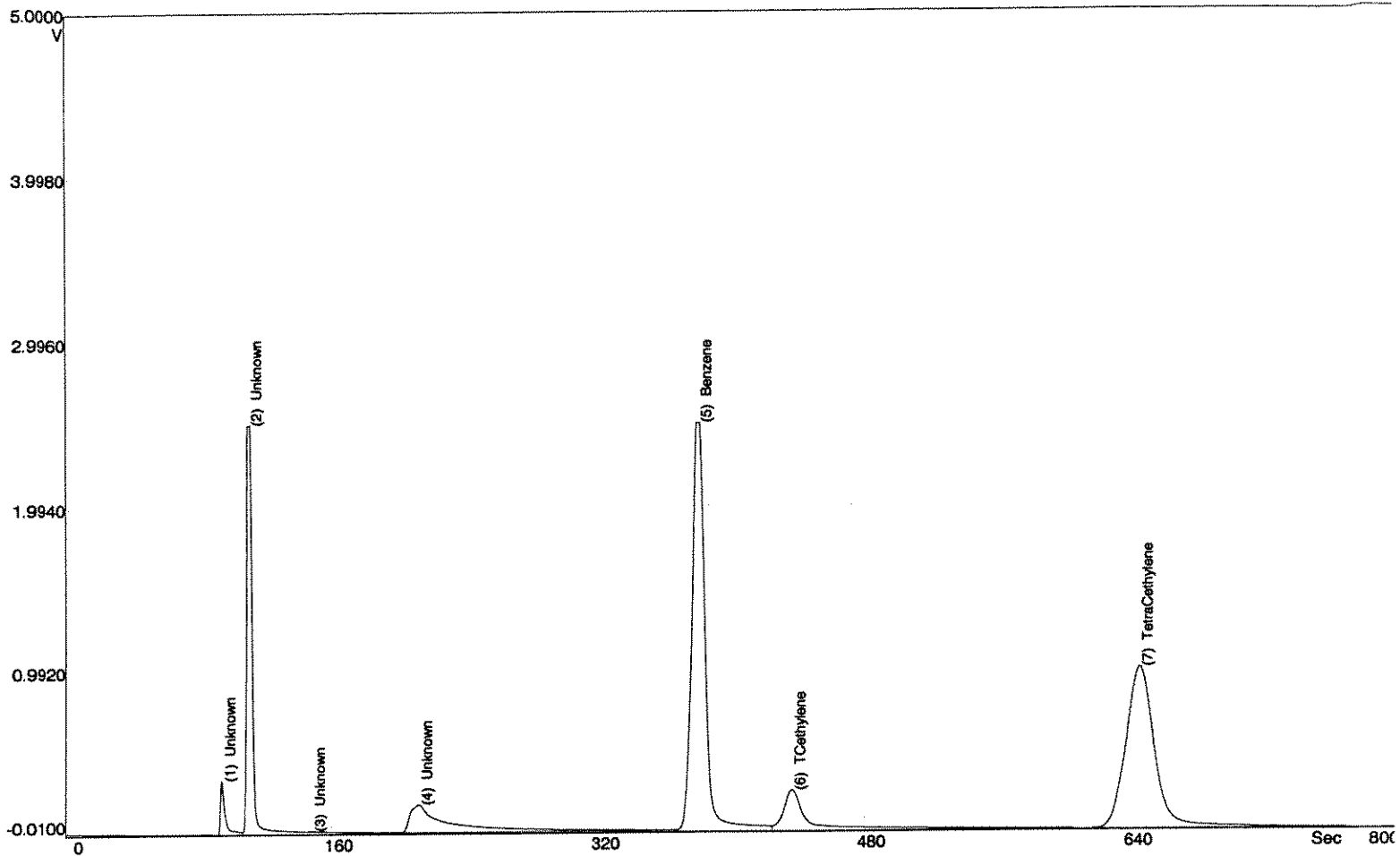
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		293	80.1	93.5	
2	Unknown		1191	295	109.6	
3	Unknown		5.947	1.077	147.4	
4	Unknown		1.930	0.313	178.8	

SiteChart Analysis Report - B5011722.PID

5 Unknown		25910	1186	210.0
6 Benzene	0.692	7761	621	380.0
7 TCethylene	1.742	18226	1252	437.2
8 TetraCethylene	2.321	31328	1570	644.0

reval'd
Tck = 7.3 ug/l
Pck = 18.5 ug/l

SiteChart Analysis Report - B5011723.PID



RESULTS:

Date Jan 17, 2005
 Time 15:05:23
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 47
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 34.0 C

10X

10ml

MW-5

resampled

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

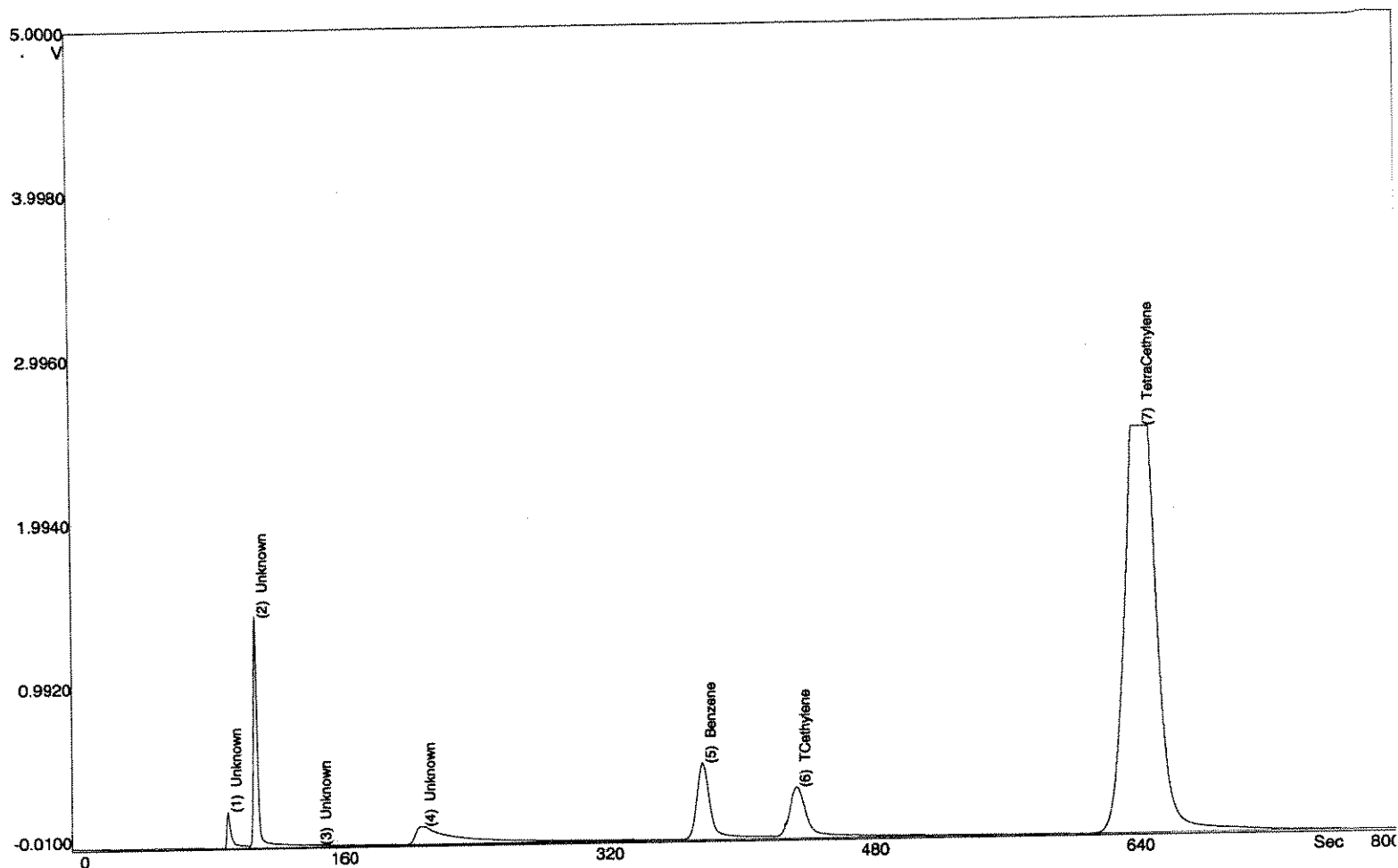
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		1094	329	93.1	
2	Unknown		14070	2490	109.7	
3	Unknown		14.0	3.119	147.4	
4	Unknown		4623	171	212.2	

SiteChart Analysis Report - B5011723.PID

5 Benzene	2.164	24259	2496	380.0
6 TCethylene	0.451	4719	222	436.4
7 TetraCethylene	1.507	20346	993	644.0

Recalc'd
TCB 1.9 ug/l
PCB 12.0 ug/l

SiteChart Analysis Report - B5011725.PID



RESULTS:

Date Jan 17, 2005
 Time 15:39:18
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 51
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 33.0 C

10X

1042

MW-6

resampled

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		746	222	93.6	
2 Unknown		5632	1415	110.1	
3 Unknown		9.497	1.734	147.6	
4 Unknown		3260	108	210.6	

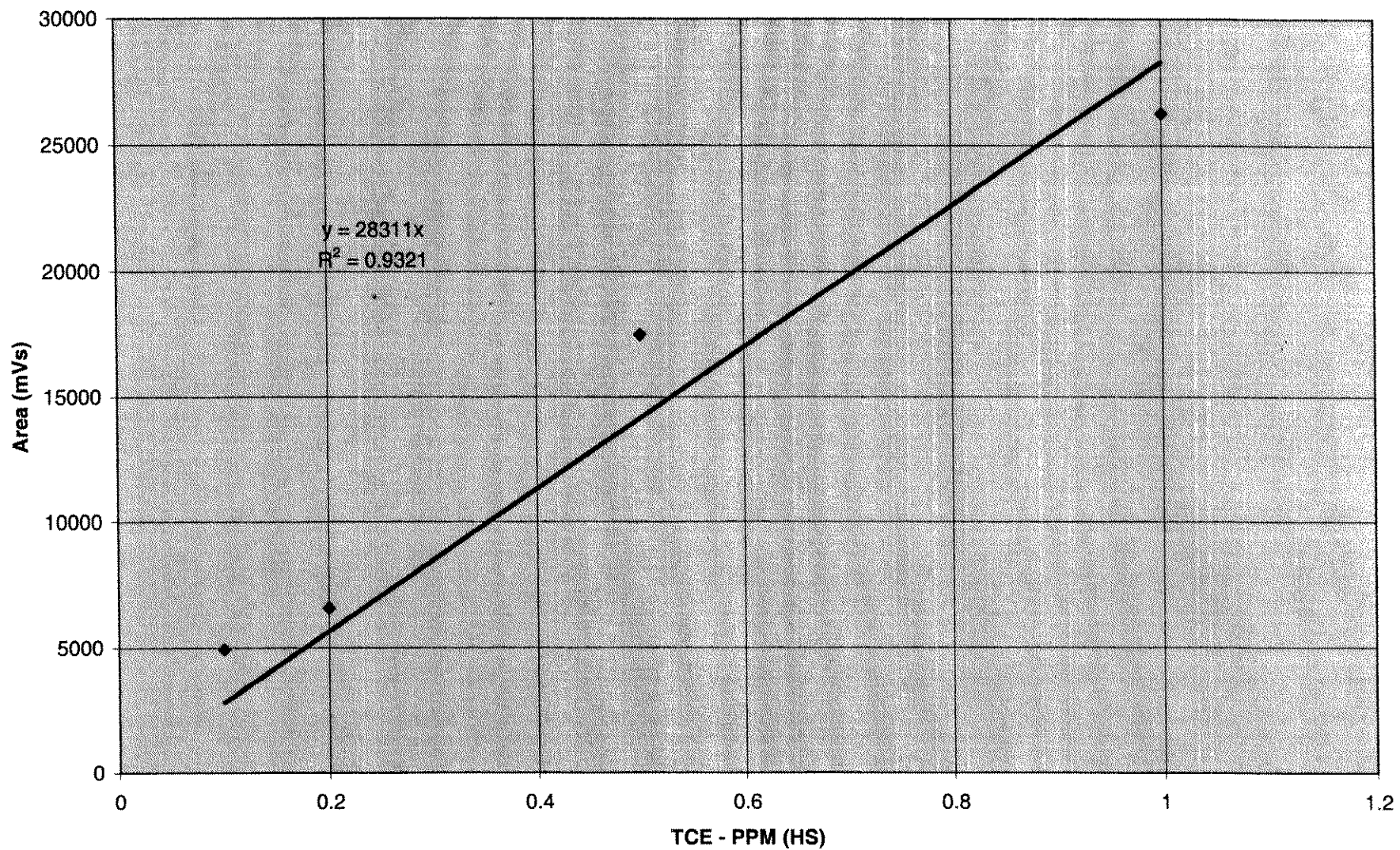
SiteChart Analysis Report - B5011725.PID

5 Benzene	0.433	4850	468	380.0
6 TCethylene	0.463	4840	302	436.8
7 TetraCethylene	4.847	65421	2501	644.6

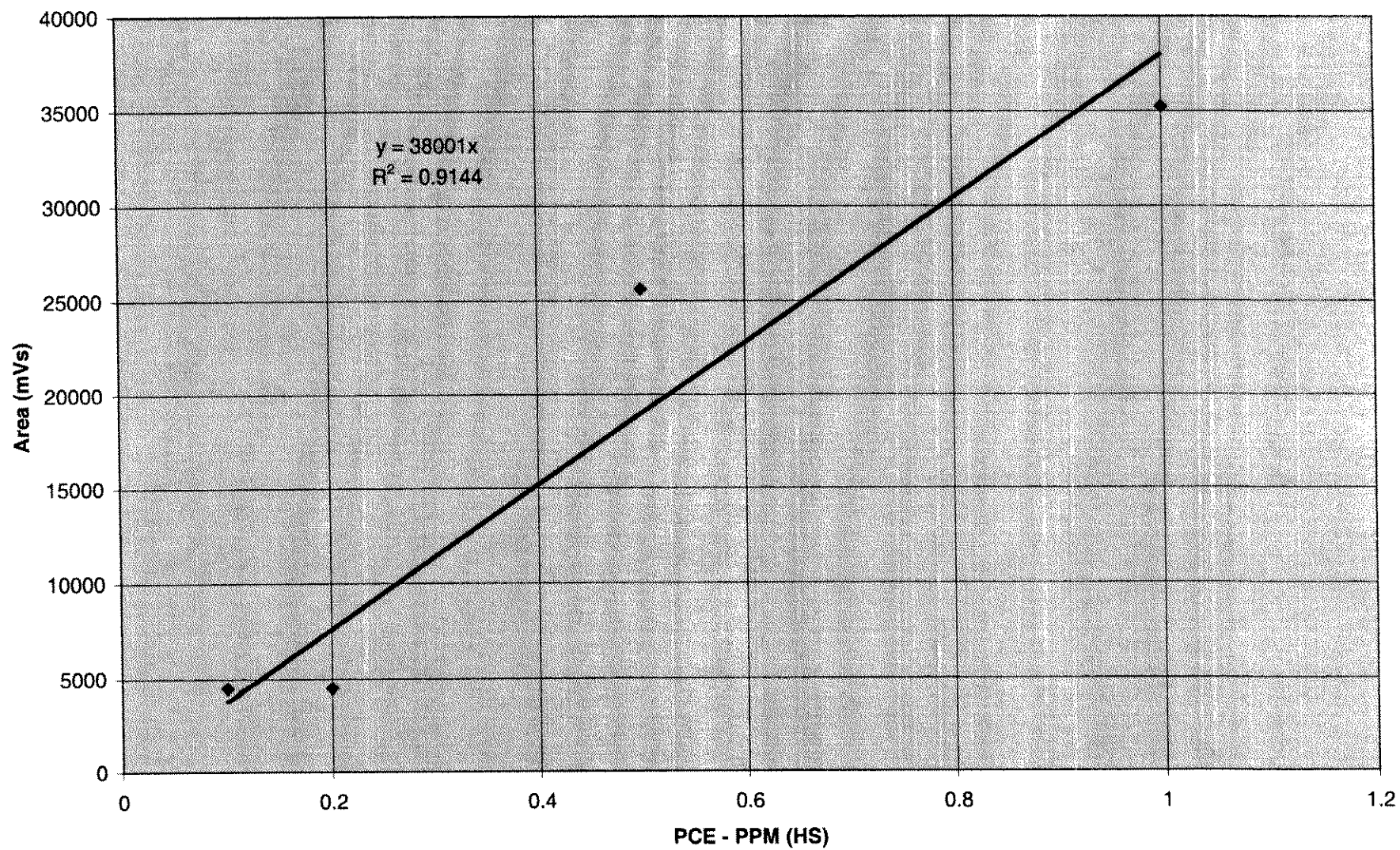
recalc'd
TCE = 1.9 µg/L
PCB = 38.6 µg/L

Voyager FPGC Daily Calibrations and Chromatograms
Sabana Abaja Industrial Site
January 18, 2005

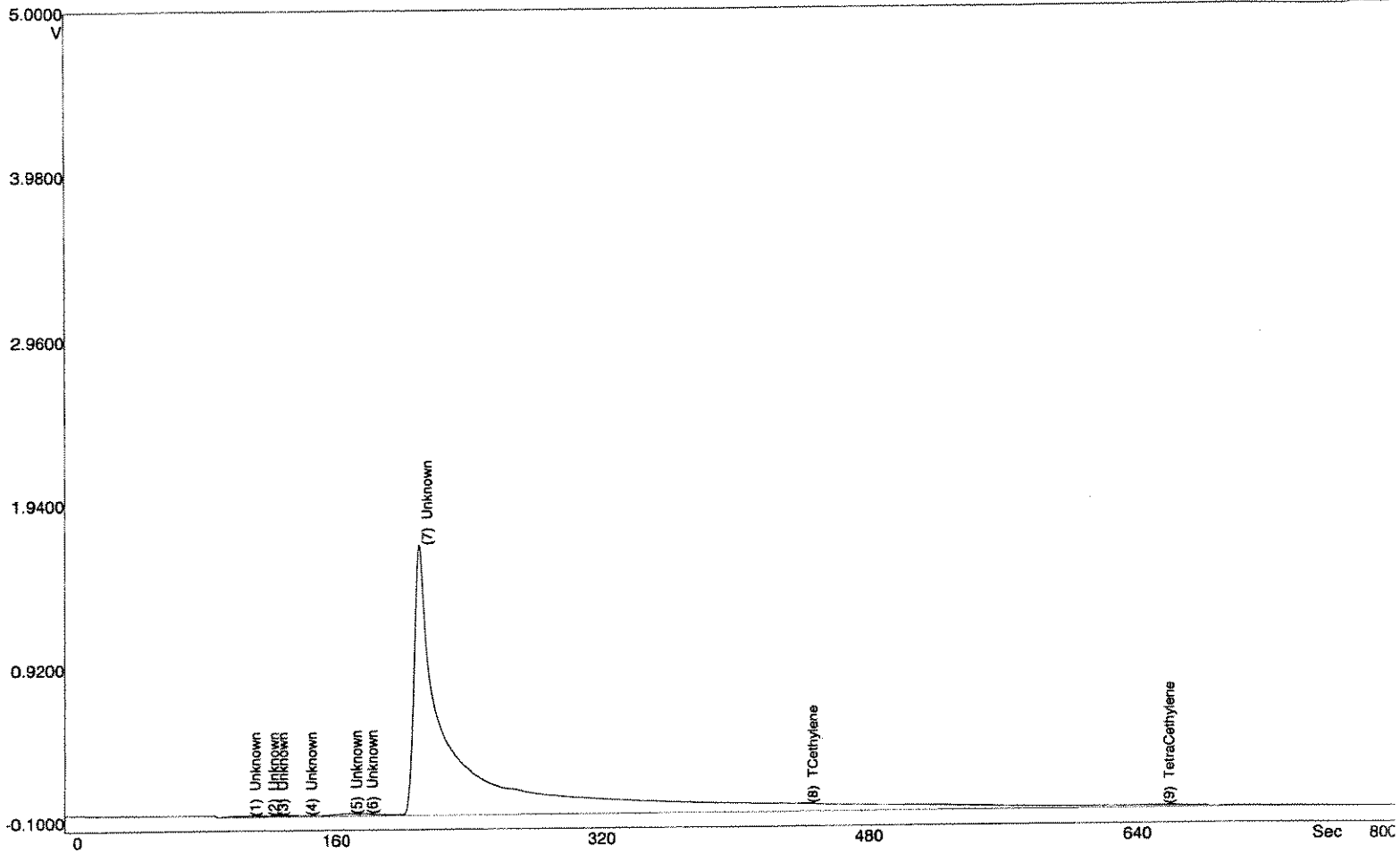
TCE via PID @ 01-18-05



PCE via PID @ 01-18-05



SiteChart Analysis Report - B5011808.PID



RESULTS:

Date Jan 18, 2005
 Time 10:59:27
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 17
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 31.0 C

IX
 10040 R-6

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

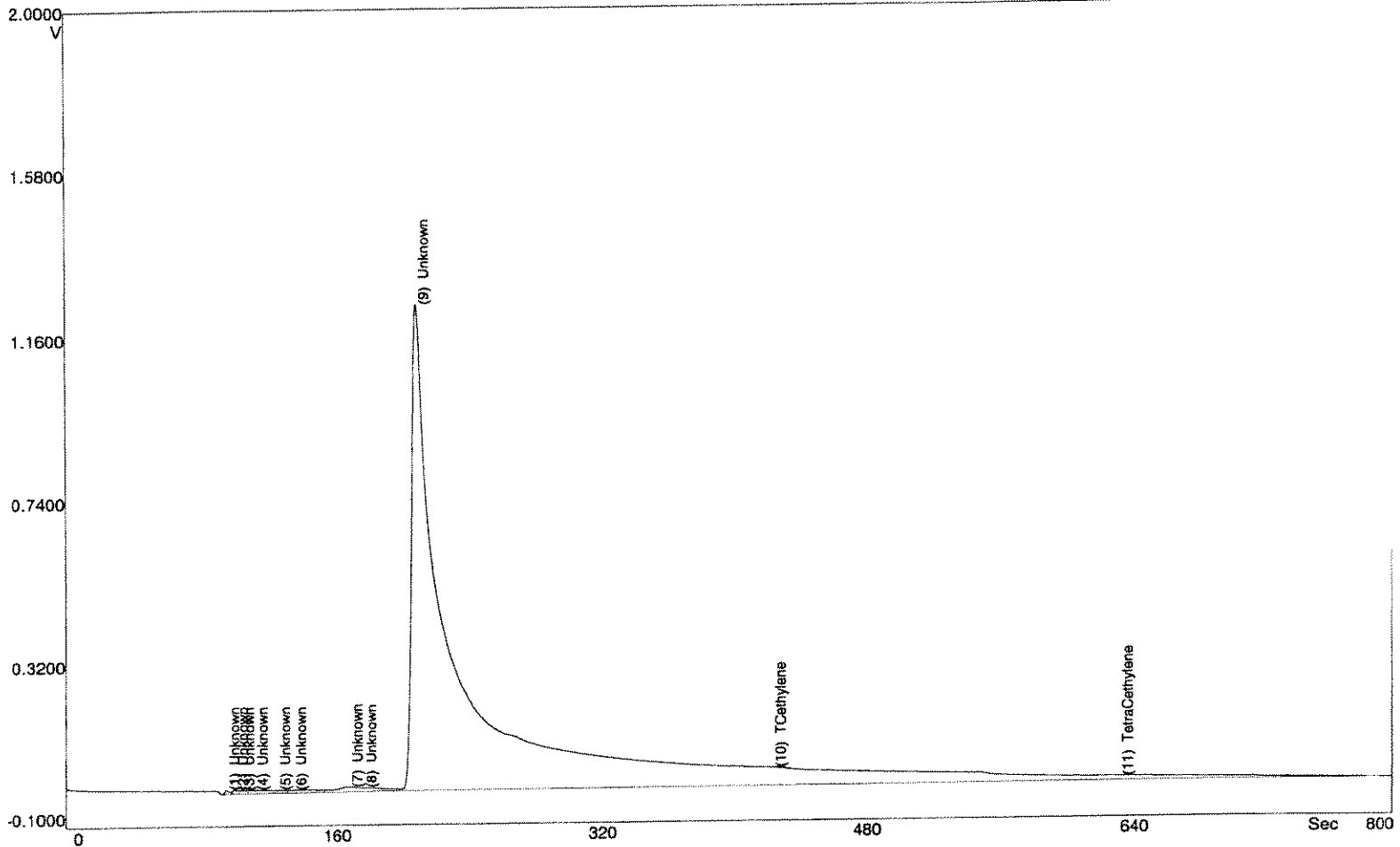
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		139	10.0		111.1
2	Unknown		90.0	8.818		122.1
3	Unknown		238	7.822		127.6
4	Unknown		1.157	0.080		144.6

SiteChart Analysis Report - B5011808.PID

5 Unknown		246	9.470	171.4
6 Unknown		244	1.494	181.0
7 Unknown		50047	1687	213.8
8 TCethylene	0.005	53.3	2.949	445.2
9 TetraCethylene	0.011	149	4.786	657.8

recalc'd
TCE^s ND
PCE^s ND

SiteChart Analysis Report - B5011809.PID



RESULTS:

Date Jan 18, 2005
 Time 11:40:04
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 19
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 32.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

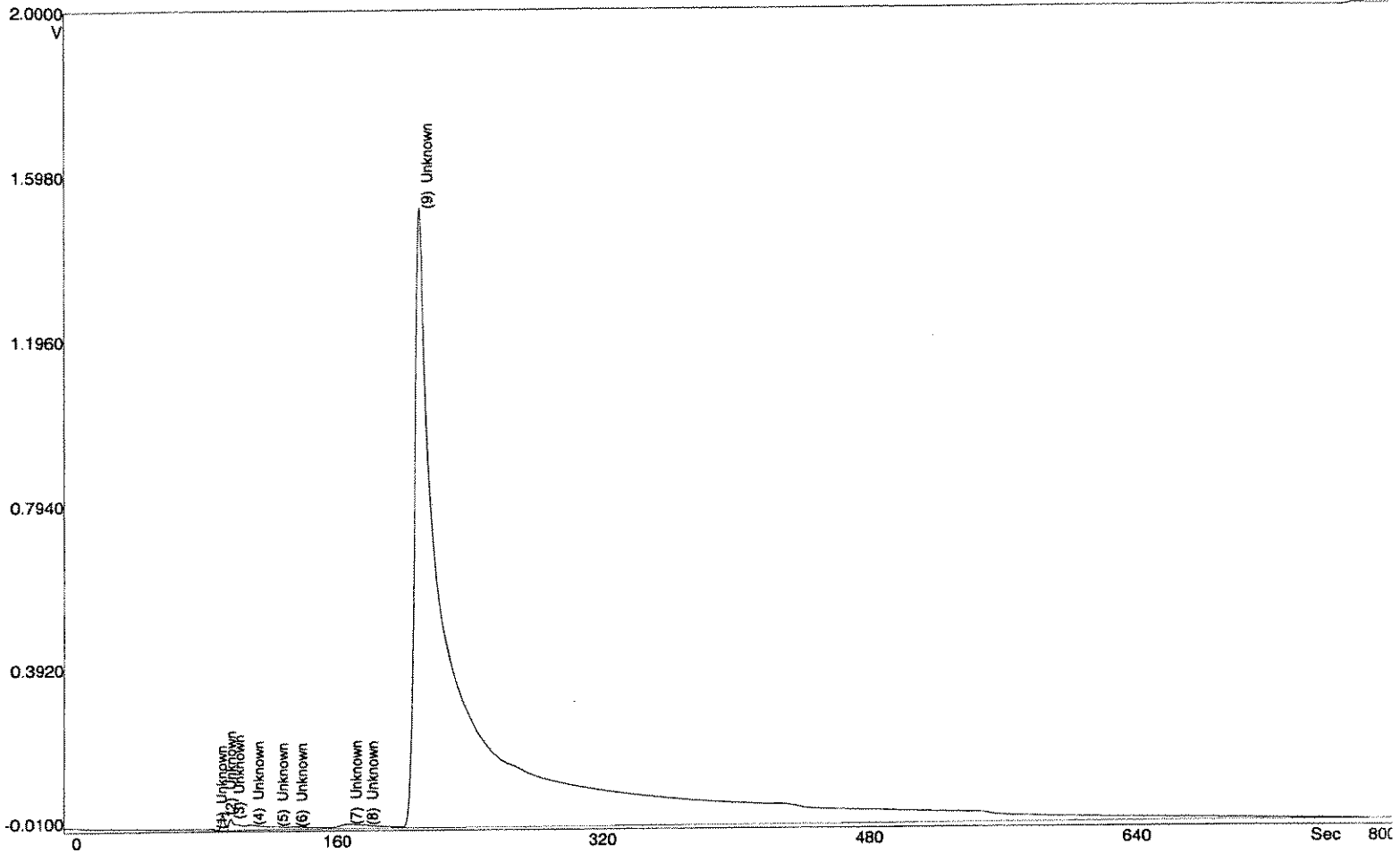
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		35.6	11.3		96.4
2	Unknown		44.3	5.032		101.5
3	Unknown		50.2	0.355		105.5
4	Unknown		135	0.758		113.5

SiteChart Analysis Report - B5011809.PID

5 Unknown		64.6	0.191	127.6
6 Unknown		145	0.350	137.1
7 Unknown		372	6.868	171.6
8 Unknown		3.278	0.197	180.2
9 Unknown		42414	1251	213.2
10 TCethylene	0.002	25.8	0.284	427.2
11 TetraCethylene		4.213	0.105	635.0

recalc'd
TCE = ND
PCE = ND

SiteChart Analysis Report - B5011812.PID



RESULTS:

Date Jan 18, 2005
 Time 13:15:44
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 25
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 33.0 C

1x
 100ml R-9

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

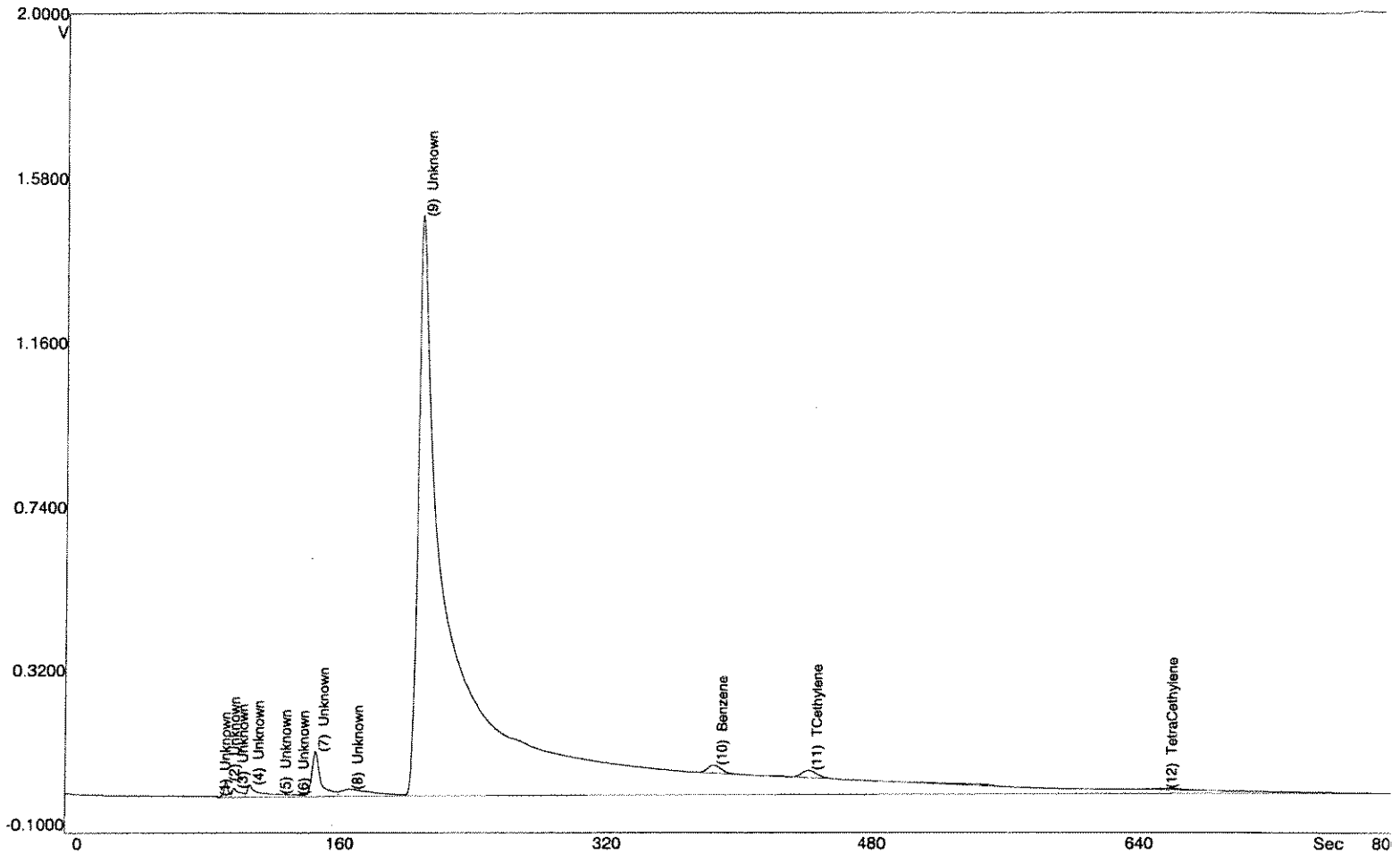
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		2.902	1.001		90.3
2	Unknown		109	39.3		95.9
3	Unknown		161	16.1		100.9
4	Unknown		205	2.872		112.5

SiteChart Analysis Report - B5011812.PID

5 Unknown	1.350	0.107	126.8
6 Unknown	111	0.888	138.0
7 Unknown	253	8.282	170.4
8 Unknown	3.083	0.279	180.2
9 Unknown	46891	1518	213.2

recalc'd
TCR = ND
PCR = ND

SiteChart Analysis Report - B5011816.PID



RESULTS:

Date Jan 18, 2005
 Time 15:17:50
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 33
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 34.0 C

1x
 1004e

R-11

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

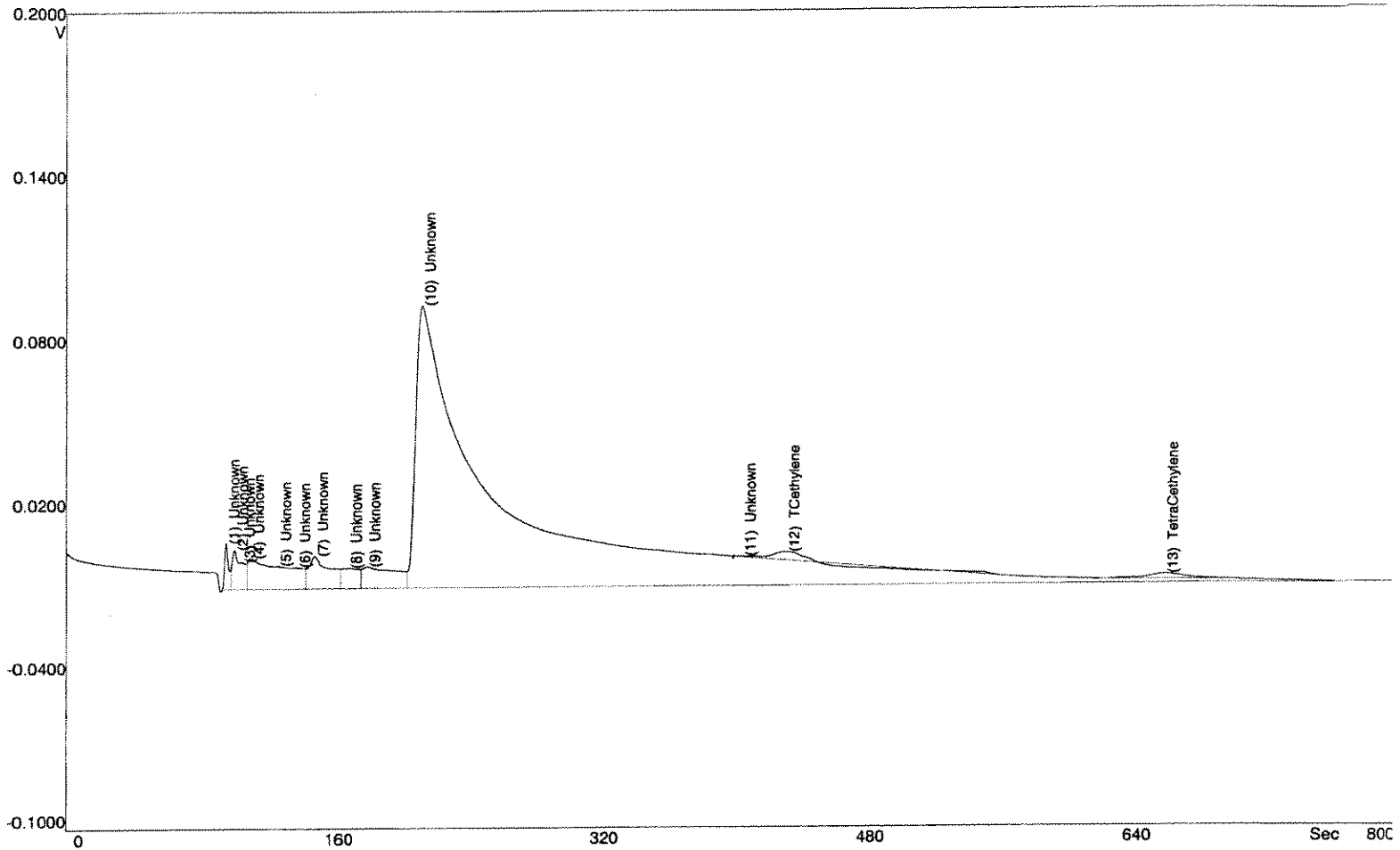
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		5.317	1.055		90.4
2	Unknown		126	41.7		96.0
3	Unknown		120	12.0		100.9
4	Unknown		328	20.7		110.3

SiteChart Analysis Report - B5011816.PID

5 Unknown		1.931	0.198	126.5
6 Unknown		2.154	0.330	137.2
7 Unknown		741	112	149.2
8 Unknown		421	6.122	169.8
9 Unknown		45489	1486	213.2
10 Benzene	0.018	207	19.2	388.0
11 TCethylene	0.026	274	16.9	446.0
12 TetraCethylene	0.006	84.7	2.980	658.4

recalc'd
 $TCR = 0.010 \text{ mg/l}$
 $PCR = 0.002 \rightarrow ND$

SiteChart Analysis Report - B5011818.PID



RESULTS:

Date Jan 18, 2005
 Time 16:14:33
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 37
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 34.0 C

1X
 100uL
 R 13

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

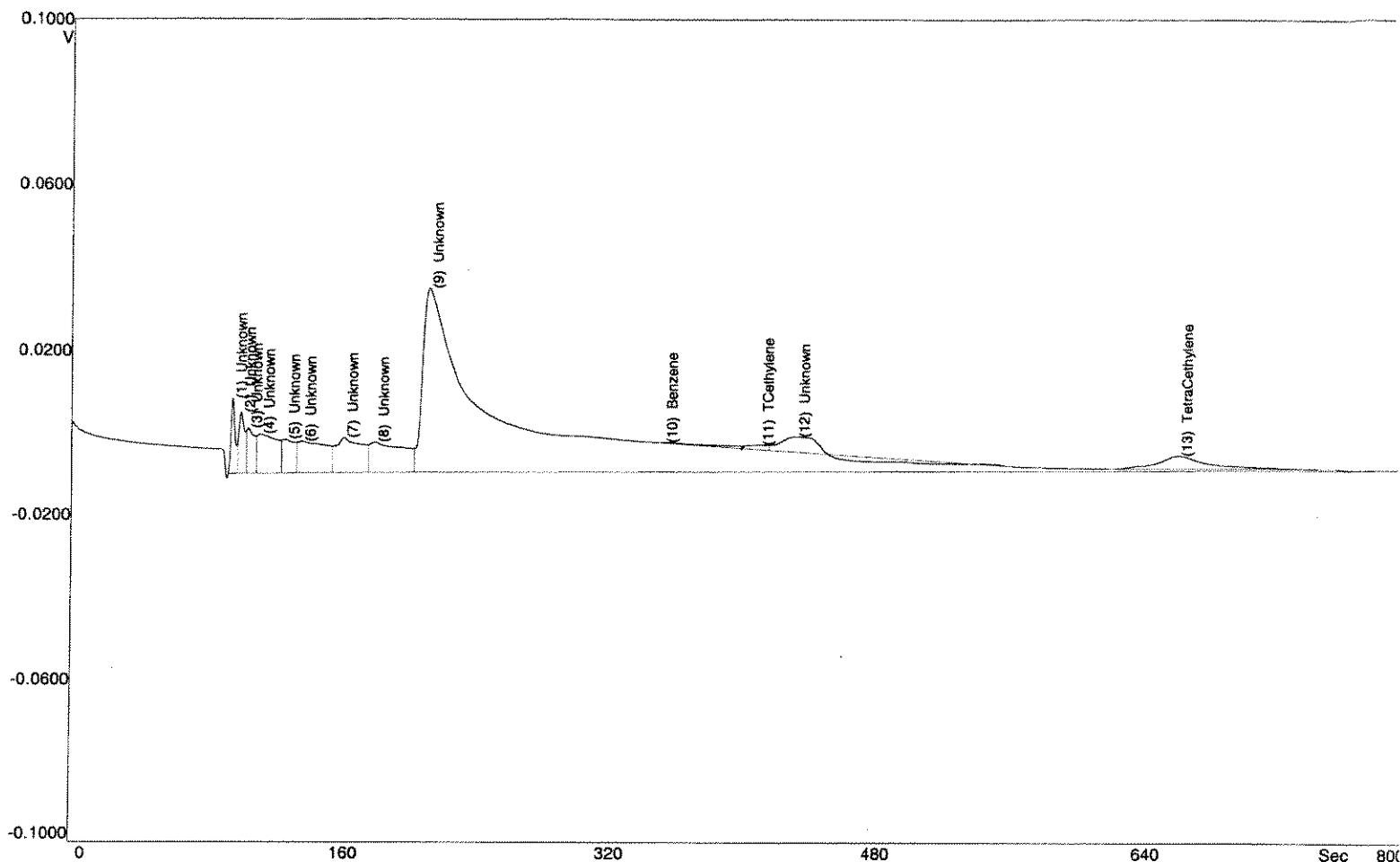
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		51.7	17.2		96.3
2	Unknown		102	7.120		101.3
3	Unknown		0.402	0.194		105.6
4	Unknown		304	1.951		111.1

SiteChart Analysis Report - B5011818.PID

5 Unknown	0.964	0.119	127.6
6 Unknown	1.096	0.180	138.8
7 Unknown	177	4.556	149.6
8 Unknown	87.5	0.168	169.6
9 Unknown	187	0.899	180.8
10 Unknown	6816	97.5	214.0
11 Unknown	7.832	0.129	406.7
12 TCethylene	0.003	30.8	1.686
13 TetraCethylene	0.004	53.6	1.702

recalcd
 TCE = 0.0011 → ND
 PCE = 0.0014 → ND

SiteChart Analysis Report - B5011821.PID



RESULTS:

Date Jan 18, 2005
 Time 17:01:08
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 43
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 34.0 C

IX

1004e

R-10

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		54.8	19.0	96.3	
2	Unknown		59.5	7.728	101.5	
3	Unknown		60.7	0.676	105.6	
4	Unknown		128	0.563	112.9	

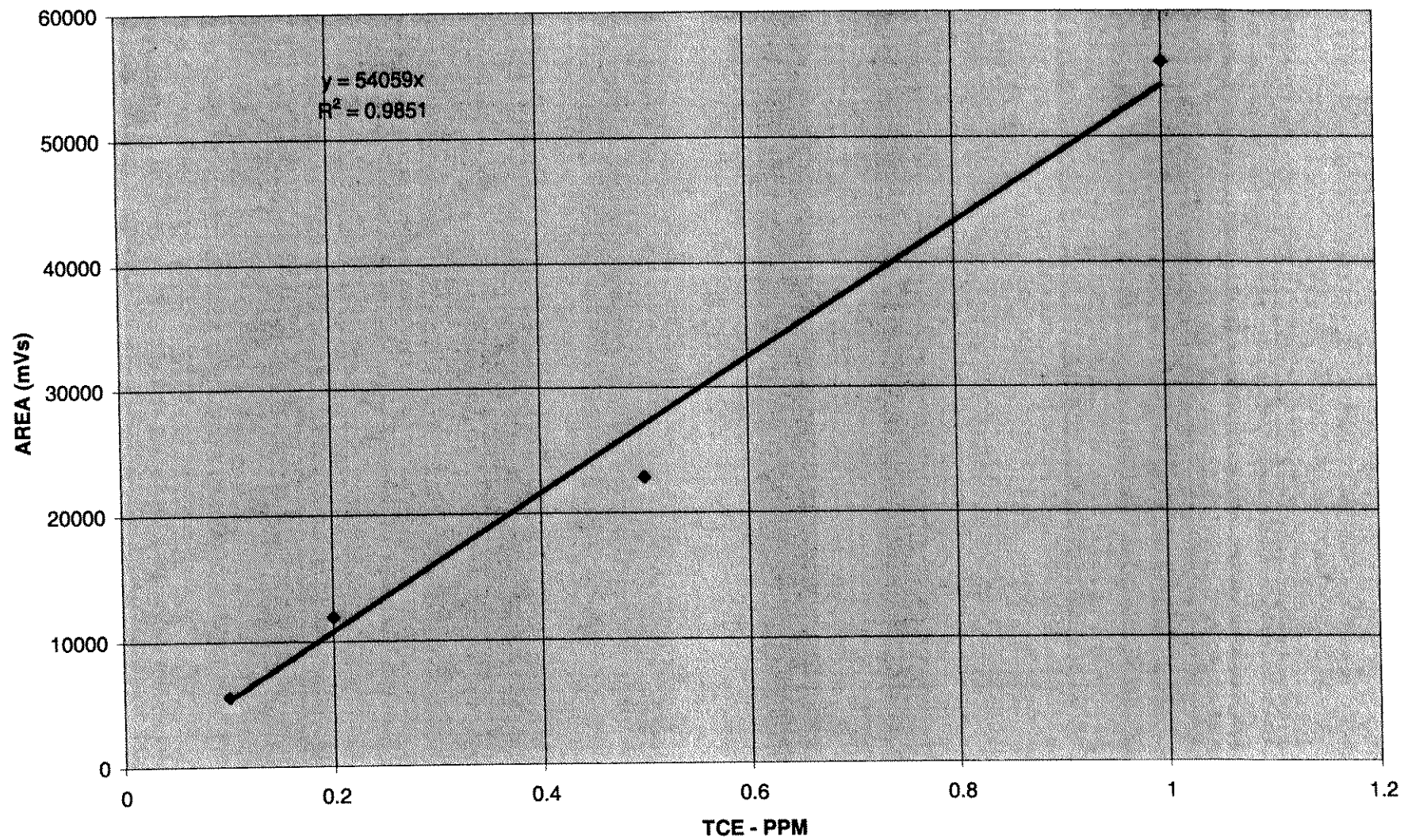
SiteChart Analysis Report - B5011821.PID

5 Unknown		70.6	0.303	127.7
6 Unknown		152	0.292	137.5
7 Unknown		155	2.012	162.6
8 Unknown		175	0.715	181.6
9 Unknown		3025	38.8	214.0
10 Benzene	0.001	13.6	0.032	354.3
11 TCethylene	0.002	16.3	0.335	411.7
12 Unknown		40.1	2.292	433.6
13 TetraCethylene	0.008	114	3.117	661.4

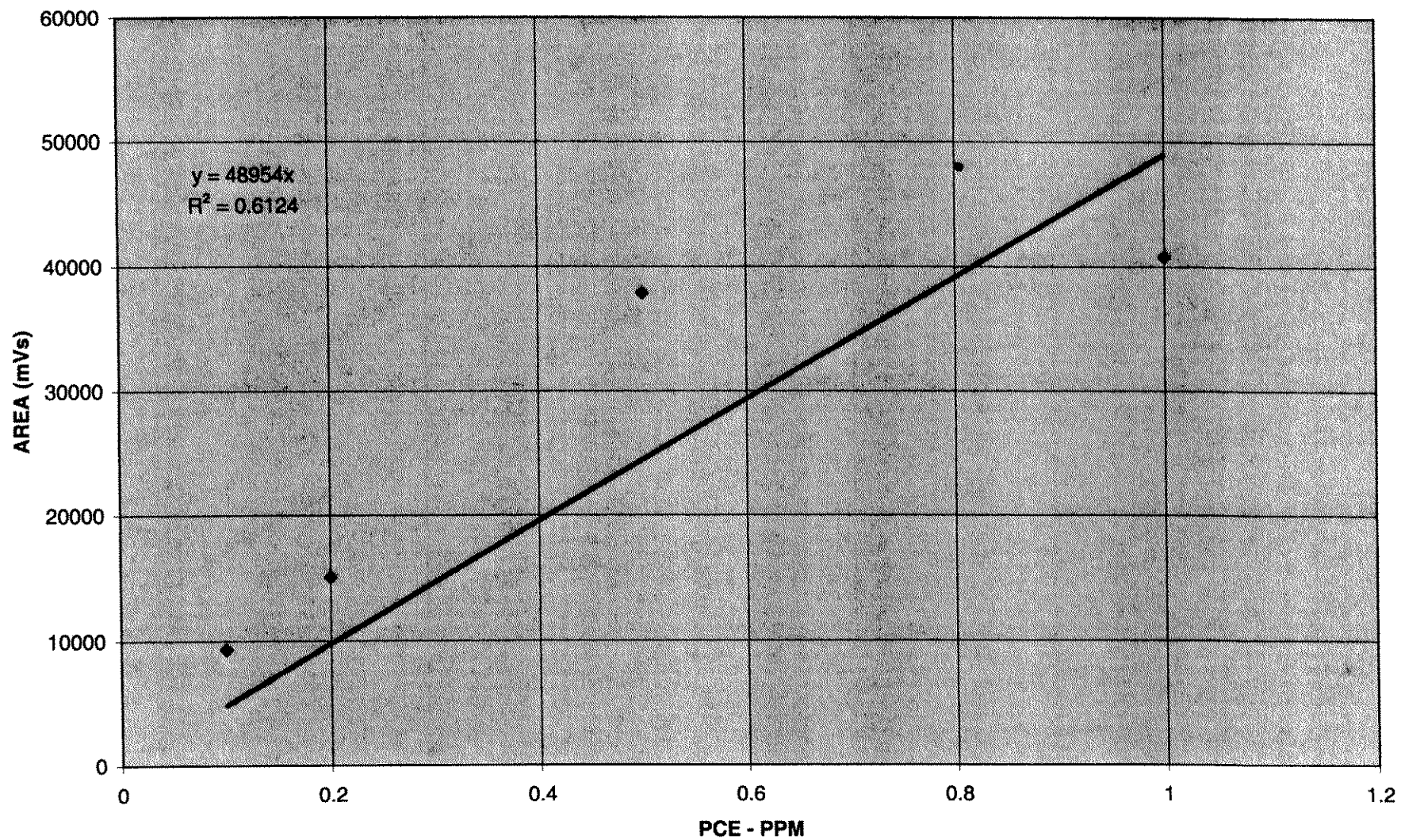
$\sum \text{CFE} = .0014 \rightarrow \text{ND}$
 $\text{PCB} = .003 \rightarrow \text{ND}$

Voyager FPGC Daily Calibrations and Chromatograms
Sabana Abaja Industrial Site
January 19, 2005

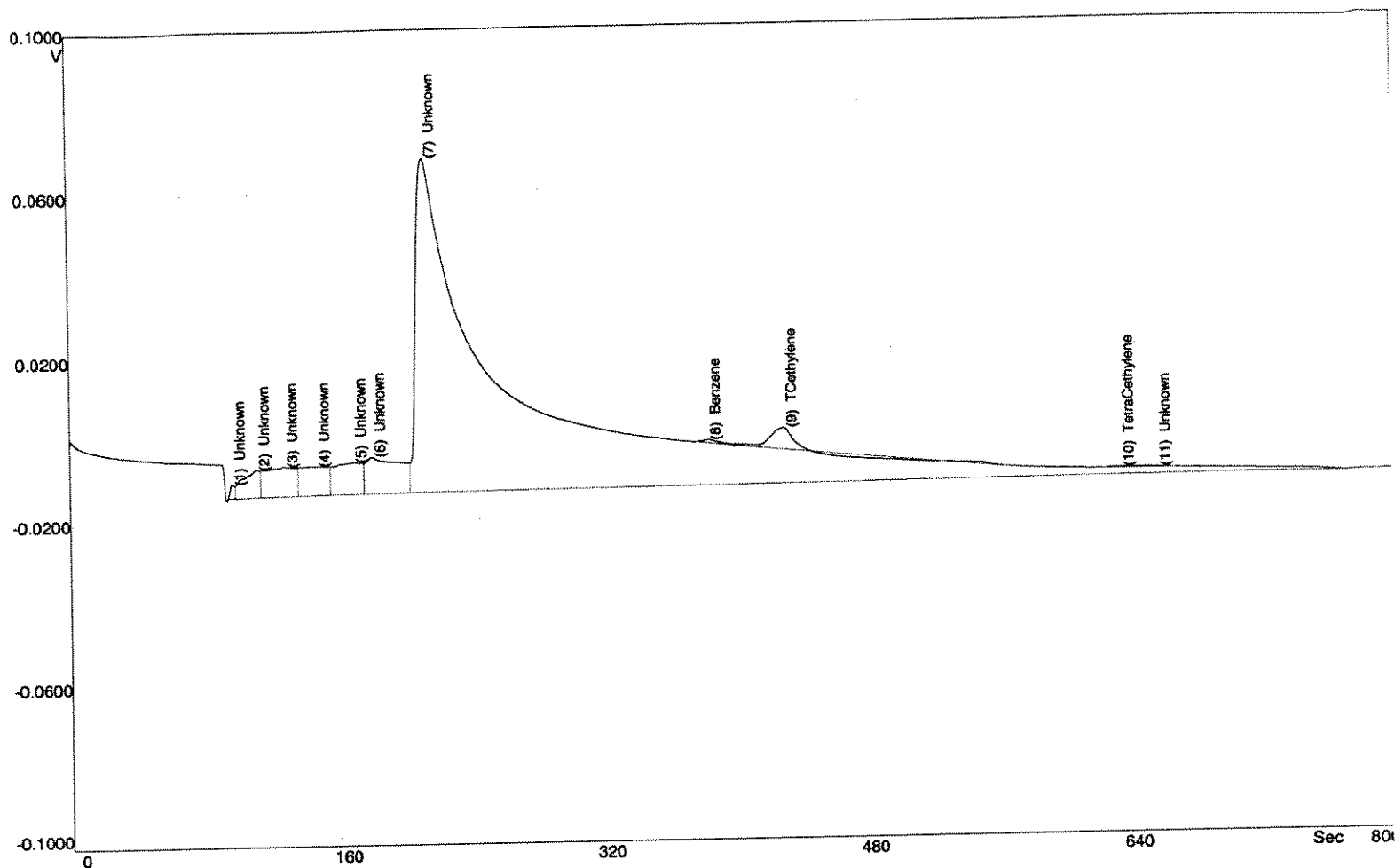
TCE via PID - 01/19/05



PCE via PID - 01/19/05



SiteChart Analysis Report - B5011901.PID



RESULTS:

Date Jan 19, 2005
 Time 09:16:24
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 3
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 29.0 C

1x
 100µl

R-40

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

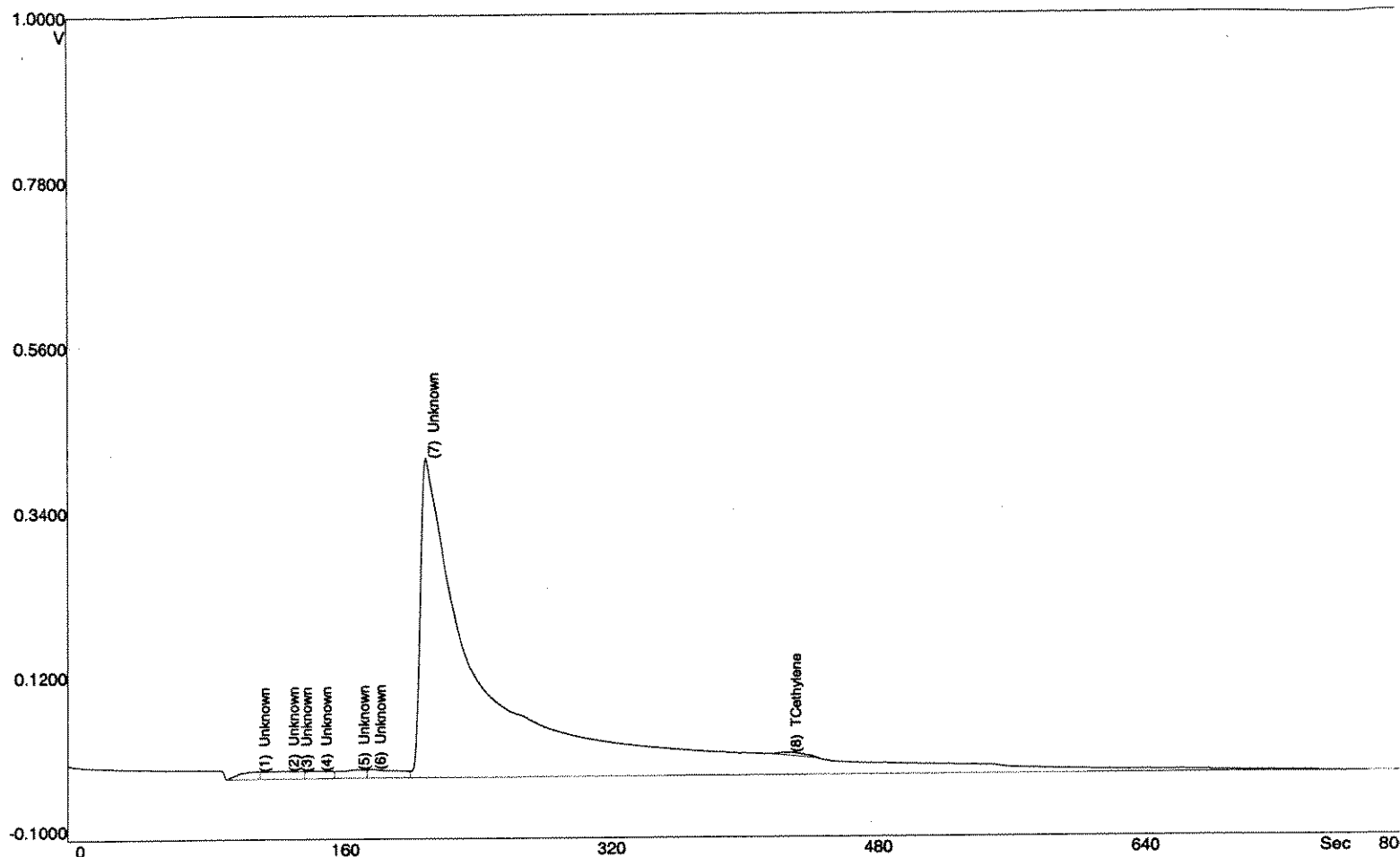
# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		11.4	3.587	96.0	
2 Unknown		84.1	3.753	110.8	
3 Unknown		157	6.463	127.7	
4 Unknown		139	0.173	146.8	

SiteChart Analysis Report - B5011901.PID

5	Unknown		150	0.863	169.2
6	Unknown		221	2.151	180.8
7	Unknown		5862	74.2	213.2
8	Benzene	0.001	14.2	0.464	385.0
9	TCethylene	0.004	44.3	4.077	431.2
10	TetraCethylene		3.166	0.136	635.0
11	Unknown		1.897	0.093	657.2

results
TCB = .0008 → ND
PCB = ND

SiteChart Analysis Report - B5011905.PID



RESULTS:

Date Jan 19, 2005
 Time 10:19:31
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 11
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 30.0 C

18
 10042 R17

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		140	10.5	110.7	
2	Unknown		266	9.491	128.0	
3	Unknown		0.081	0.045	135.7	
4	Unknown		178	0.311	147.6	

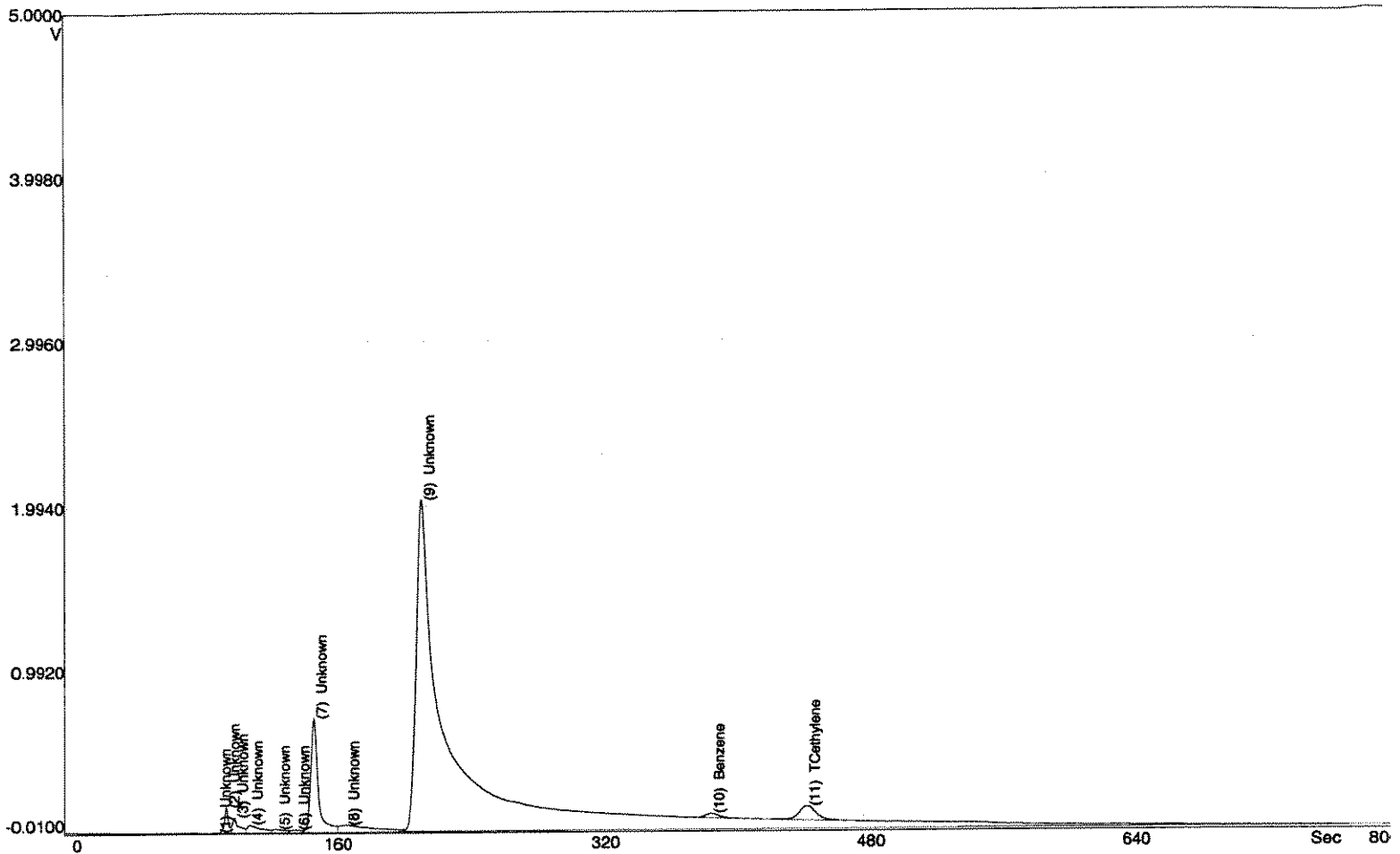
SiteChart Analysis Report - B5011905.PID

5	Unknown		199	2.051	170.2
6	Unknown		261	2.238	180.4
7	Unknown		21634	420	212.8
8	TCethylene	0.007	75.1	1.463	429.6

revised

TCE = ND
PCE = ND

SiteChart Analysis Report - B5011908.PID



RESULTS:

Date Jan 19, 2005
 Time 11:08:52
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 17
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 31.0 C

1x

10042

R-16

new sample / repeat

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		5.056	1.497	90.7	
2 Unknown		440	155	96.3	
3 Unknown		424	51.8	101.2	
4 Unknown		442	21.0	110.4	

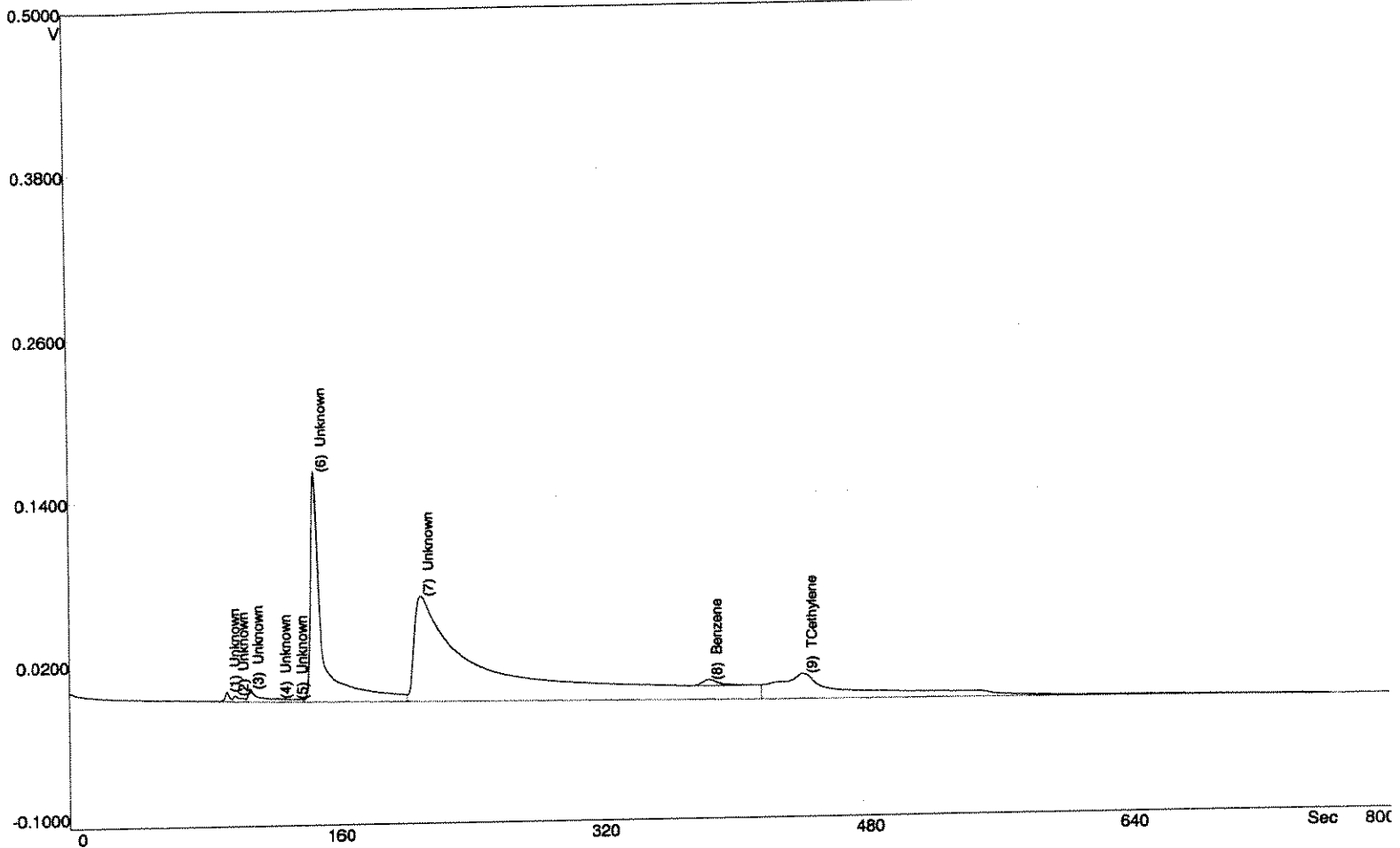
SiteChart Analysis Report - B5011908.PID

5 Unknown		161	3.227	126.7
6 Unknown		112	2.914	138.4
7 Unknown		3836	688	149.2
8 Unknown		975	5.226	168.6
9 Unknown		56926	2026	213.8
10 Benzene	0.025	279	24.4	387.7
11 TCethylene	0.100	<u>2050</u>	81.3	445.6

$$\frac{\text{reval'd}}{\text{TC} = .019 \text{ ug/l}}$$

 PCF ND

SiteChart Analysis Report - B5011911.PID



RESULTS:

Date Jan 19, 2005
 Time 12:05:40
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 23
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 32.0 C

1x
 100MR
 R15

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

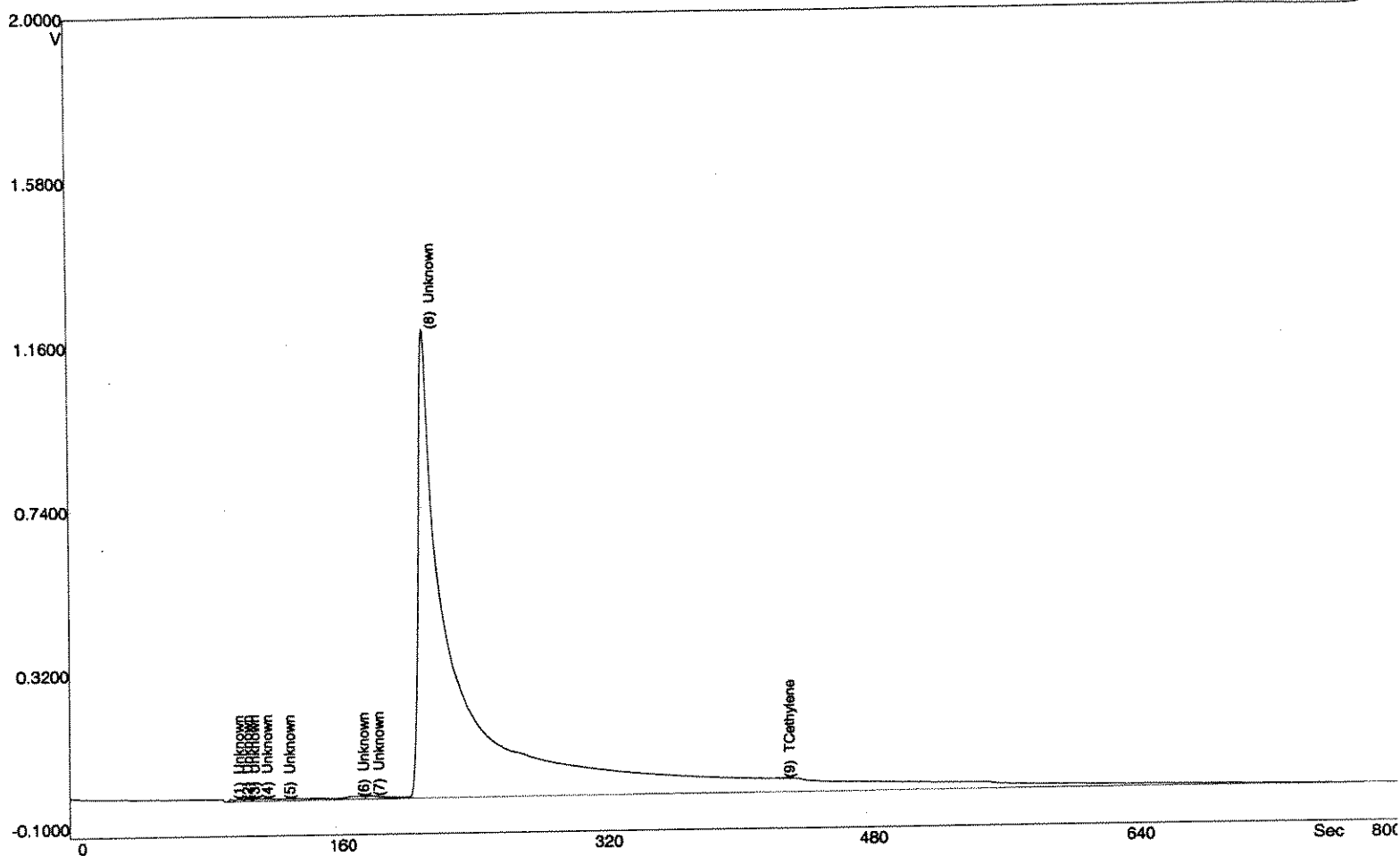
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		21.4	6.797		95.3
2	Unknown		23.8	2.042		100.5
3	Unknown		104	7.013		109.9
4	Unknown		1.395	0.213		126.3

SiteChart Analysis Report - B5011911.PID

5 Unknown	0.583	0.086	136.3
6 Unknown	1392	168	148.6
7 Unknown	4222	72.5	212.8
8 Benzene	0.004	49.0	387.0
9 TCethylene	0.107	1124	444.4

recalc'd
TCE = 0.0208 → 0.021 mg/l
PCE = ND

SiteChart Analysis Report - B5011918.PID



RESULTS:

Date Jan 19, 2005
 Time 14:38:52
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 37
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 33.0 C

1x

100 mL

R 18 JAC
 R19

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		20.8	6.117		96.5
2	Unknown		28.1	5.797		101.7
3	Unknown		27.4	0.160		106.0
4	Unknown		82.6	0.498		113.7

SiteChart Analysis Report - B5011918.PID

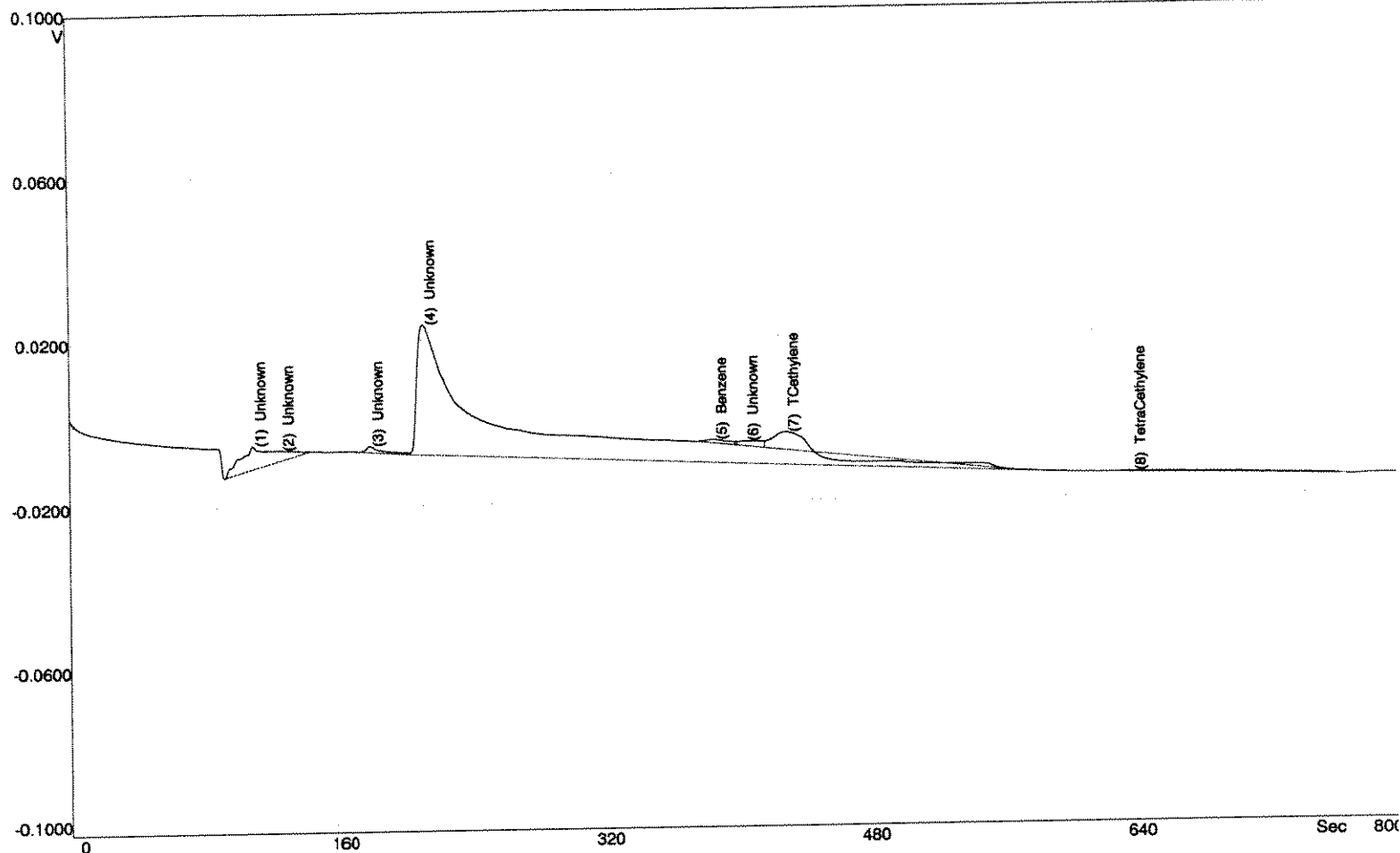
5 Unknown		145	0.077	127.1
6 Unknown		94.0	4.715	171.8
7 Unknown		124	5.102	181.0
8 Unknown		35366	1203	213.6
9 TCethylene	0.001	11.5	0.556	428.4

recalc'd

TCR₂ = .00022 → ND

PCR = ND

SiteChart Analysis Report - B5011919.PID



RESULTS:

Date Jan 19, 2005
Time 14:53:26
Instrument FGGE202
Detector PID
Column B
Analysis# 39
Tag sab HS
Column Temp 59.0 C
Det Temp 59.0 C
Ambient Temp 33.0 C

1x R18
-100ML R-19 (RR) (PPK)

METHOD:

Analysis Time 800.0 S
PumpTime 5.0 S
Back Flush 400.0 S
Temperature 60.0 C
Pressure 8.0 psi
Inject Syringe, 100.0 uL
PID State High Sense

INTEGRATION METHOD:

Manual Integration
SlopeUp 0.0 mV/S
SlopeDown 0.0 mV/S
Min Height 0.0 mV
Min Area 0.0 mVS
FilterLevel 3
Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		134	7.563	110.4	
2	Unknown		0.695	0.104	126.9	
3	Unknown		17.5	1.366	181.0	
4	Unknown		1952	31.1	213.2	

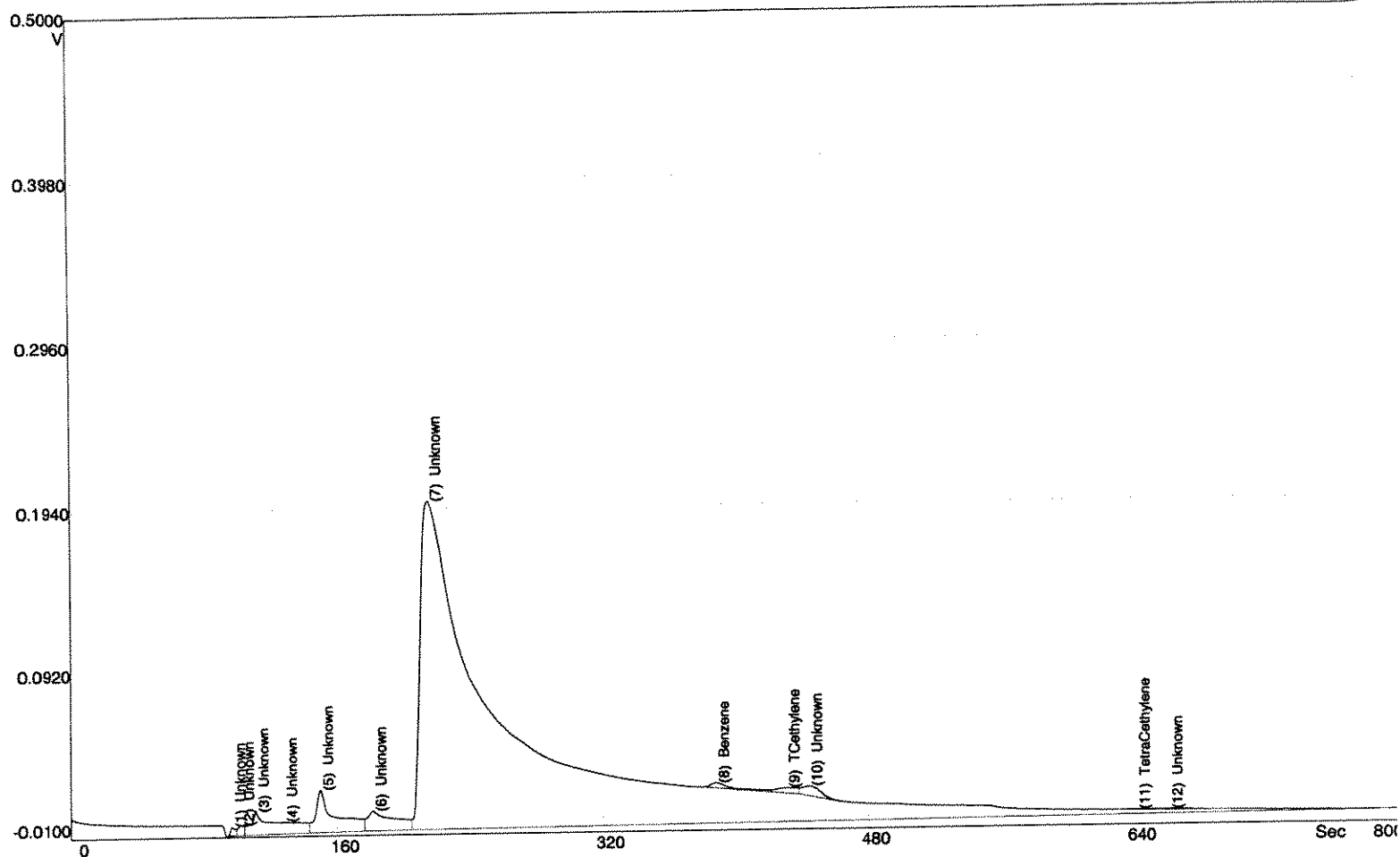
SiteChart Analysis Report - B5011919.PID

5 Benzene	0.001	13.2	0.429	388.3
6 Unknown		20.9	0.224	407.3
7 TCethylene	0.003	34.6	2.202	431.6
8 TetraCethylene	0.002	24.8	0.086	639.2

$$TCR = \frac{.00065}{.0005} \rightarrow ND$$

$$PCR = \frac{.0005}{.0005} \rightarrow ND$$

SiteChart Analysis Report - B5011922.PID



RESULTS:

Date Jan 19, 2005
 Time 15:36:23
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 45
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 33.0 C

1x

100ml

R-21

(repeat)

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		18.1	5.630	96.3	
2	Unknown		25.9	2.000	101.3	
3	Unknown		294	13.2	110.5	
4	Unknown		0.959	0.259	127.6	

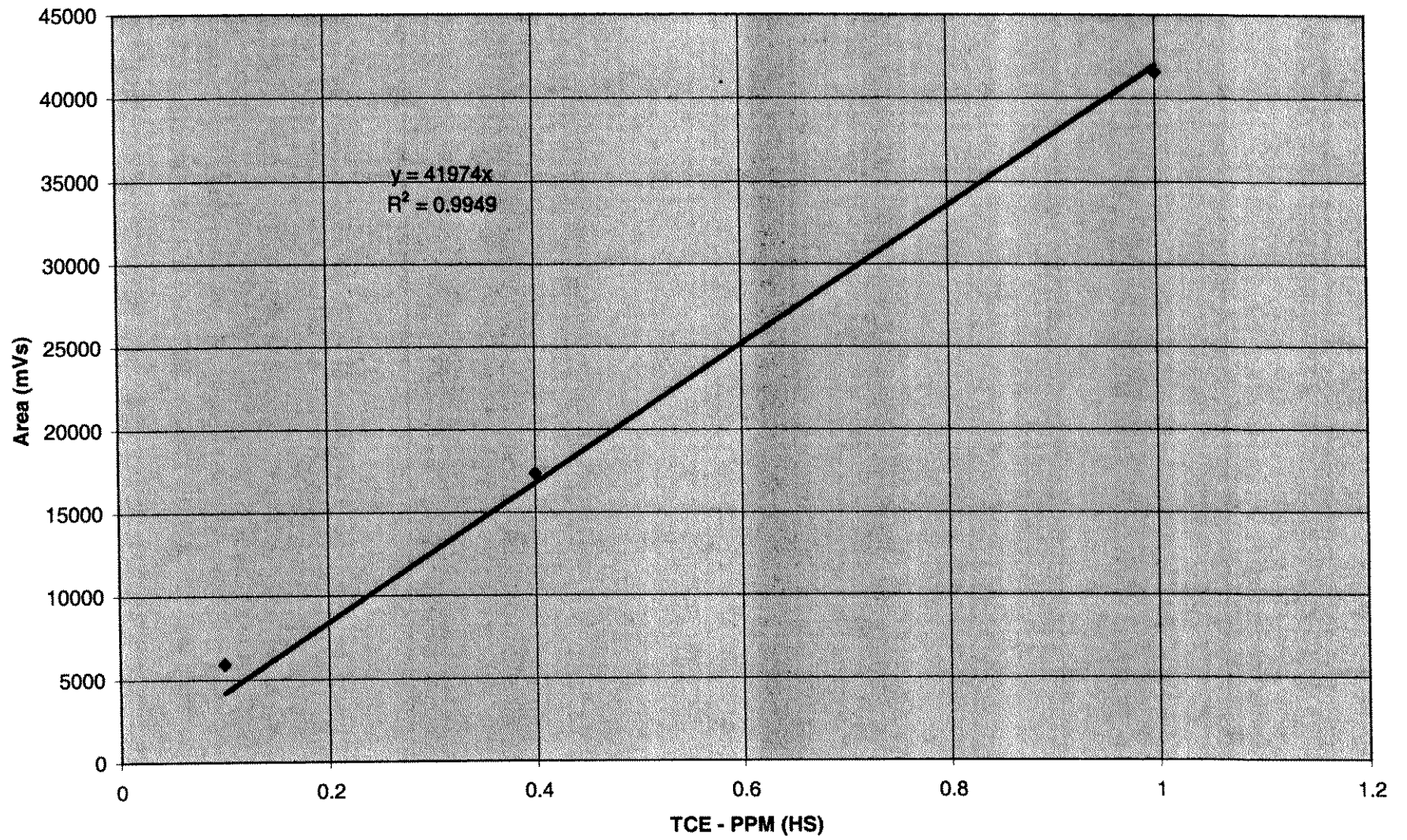
SiteChart Analysis Report - B5011922.PID

5 Unknown		364	20.2	149.4
6 Unknown		233	4.765	181.2
7 Unknown		13305	199	214.8
8 Benzene	0.005	50.8	2.681	387.7
9 TCethylene	0.005	47.7	1.287	430.4
10 Unknown		76.9	2.032	444.0
11 TetraCethylene		2.868	0.085	640.4
12 Unknown		11.9	0.231	660.2

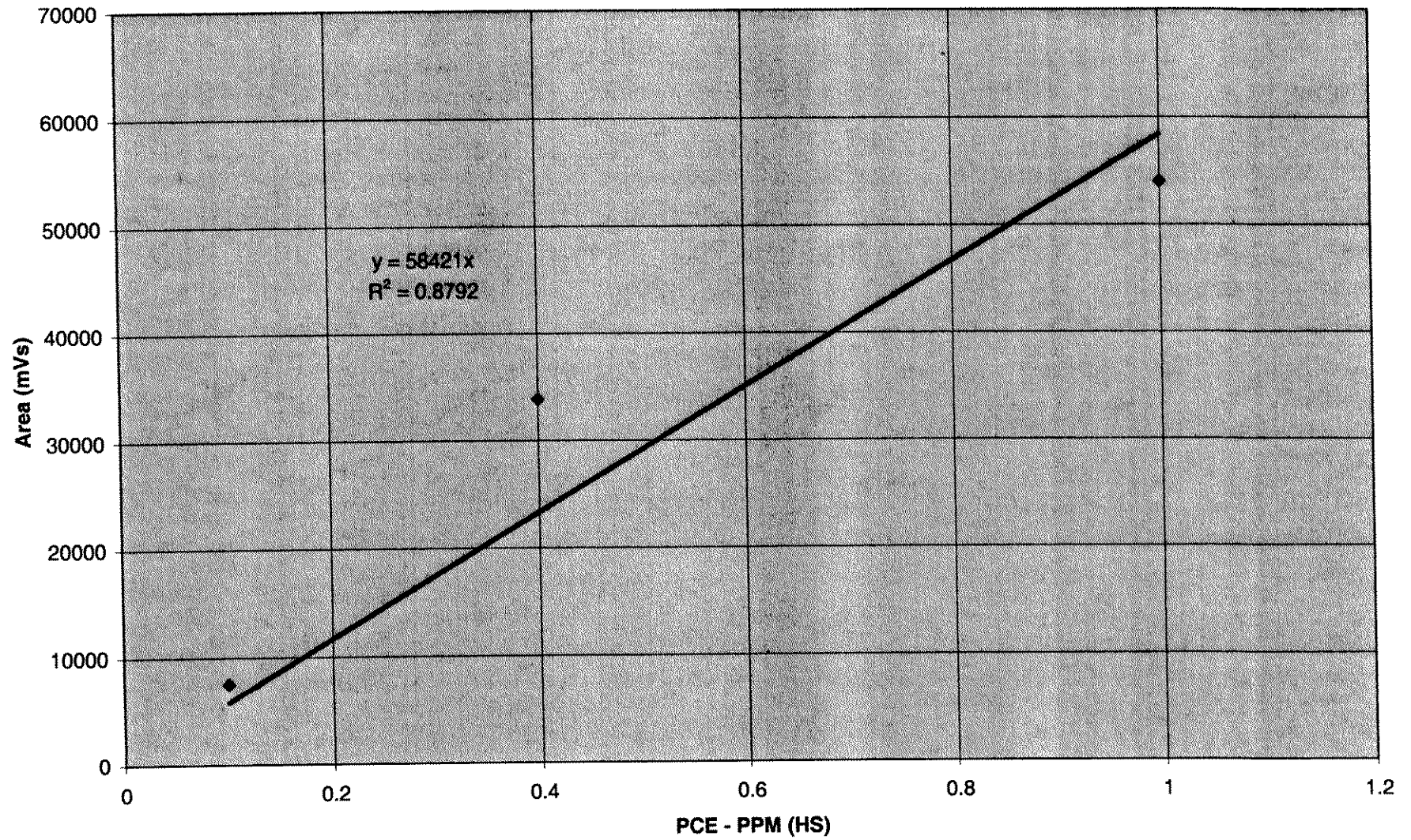
recalc'd
TCB = 0.0089 → ND
PCE = ND

Voyager FPGC Daily Calibrations and Chromatograms
Sabana Abaja Industrial Site
January 20, 2005

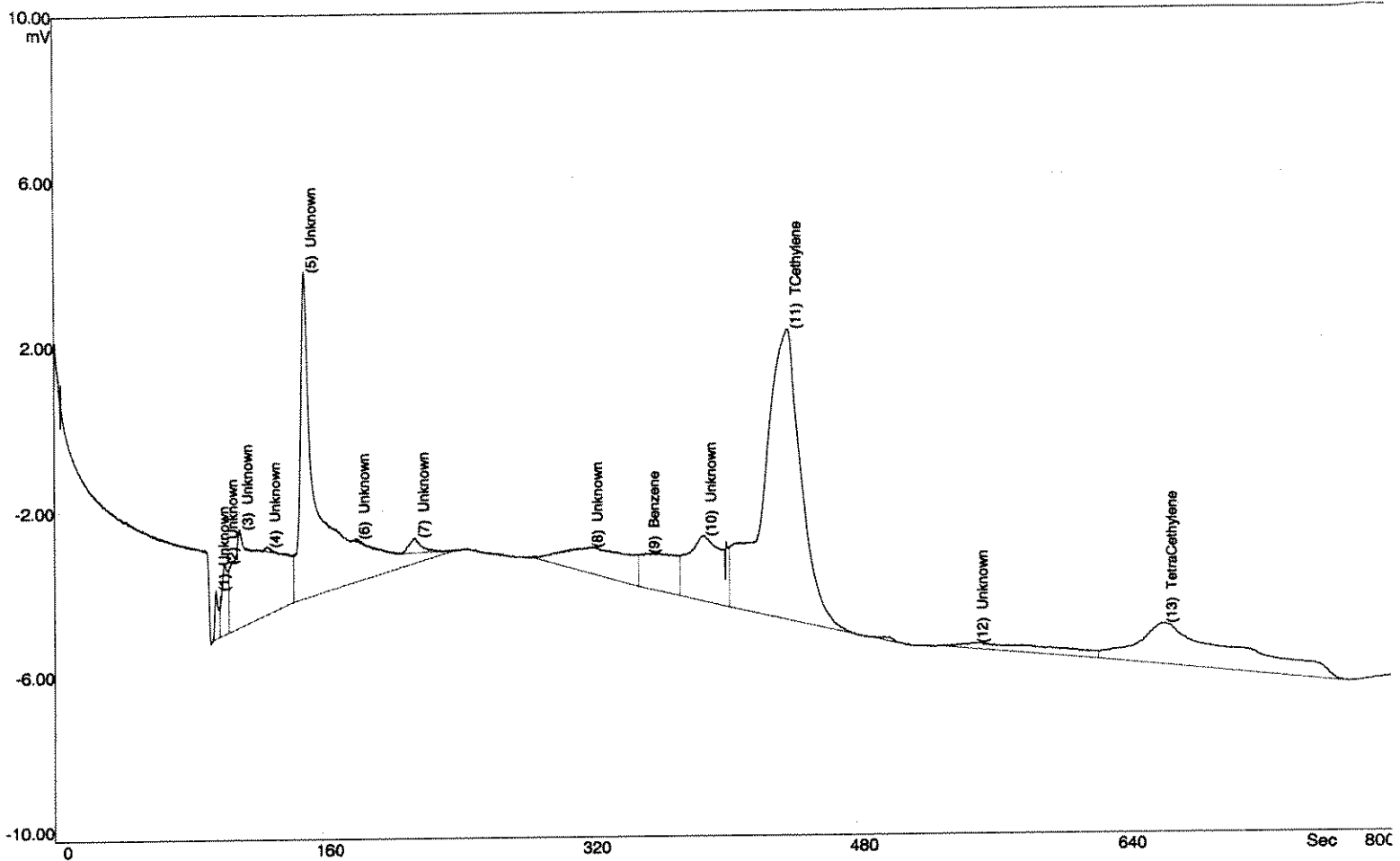
TCE via PID @ 01-20-05



PCE via PID @ 01-20-05



SiteChart Analysis Report - B5012005.PID



RESULTS:

Date Jan 20, 2005
 Time 09:55:32
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 11
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 28.0 C

1x
 1004Q R 22

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		3.180	1.238	95.9	
2	Unknown		7.531	1.055	101.1	
3	Unknown		62.2	2.334	110.3	
4	Unknown		0.478	0.095	126.7	

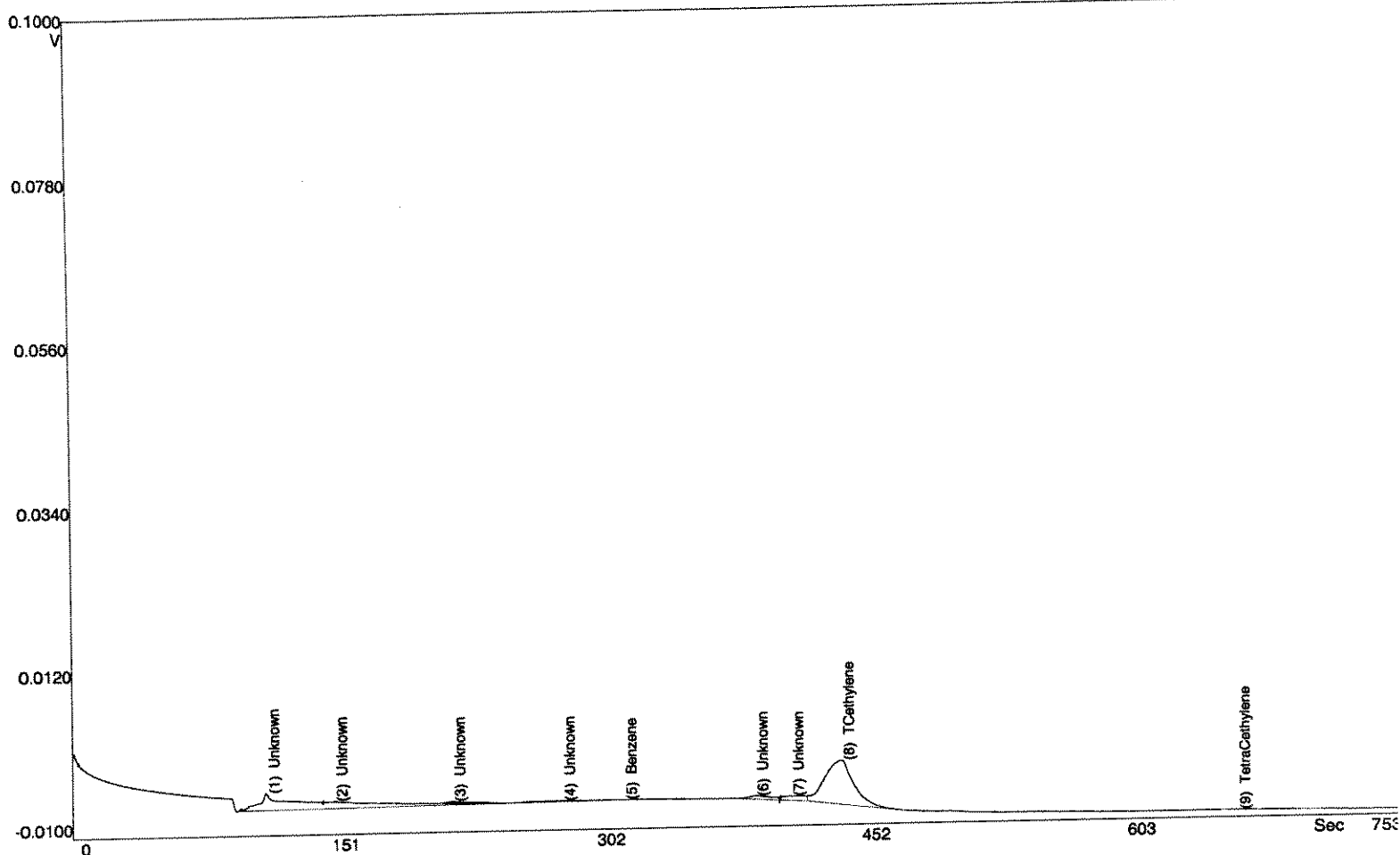
SiteChart Analysis Report - B5012005.PID

5 Unknown		109	6.830	149.0
6 Unknown		0.012	0.049	180.2
7 Unknown		3.025	0.369	215.6
8 Unknown		30.7	0.232	319.5
9 Benzene	0.002	21.8	0.037	353.7
10 Unknown		39.7	0.478	387.7
11 TCethylene	0.008	185	5.430	438.8
12 Unknown		12.3	0.067	549.3
13 TetraCethylene	0.001	71.1	0.666	662.0

recalc'd

TCE = .0004 → ND
PCE = .0012 → ND

SiteChart Analysis Report - B5012006.PID



RESULTS:

Date Jan 20, 2005
 Time 10:12:29
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 13
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 28.0 C

1x

10042

R-30

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

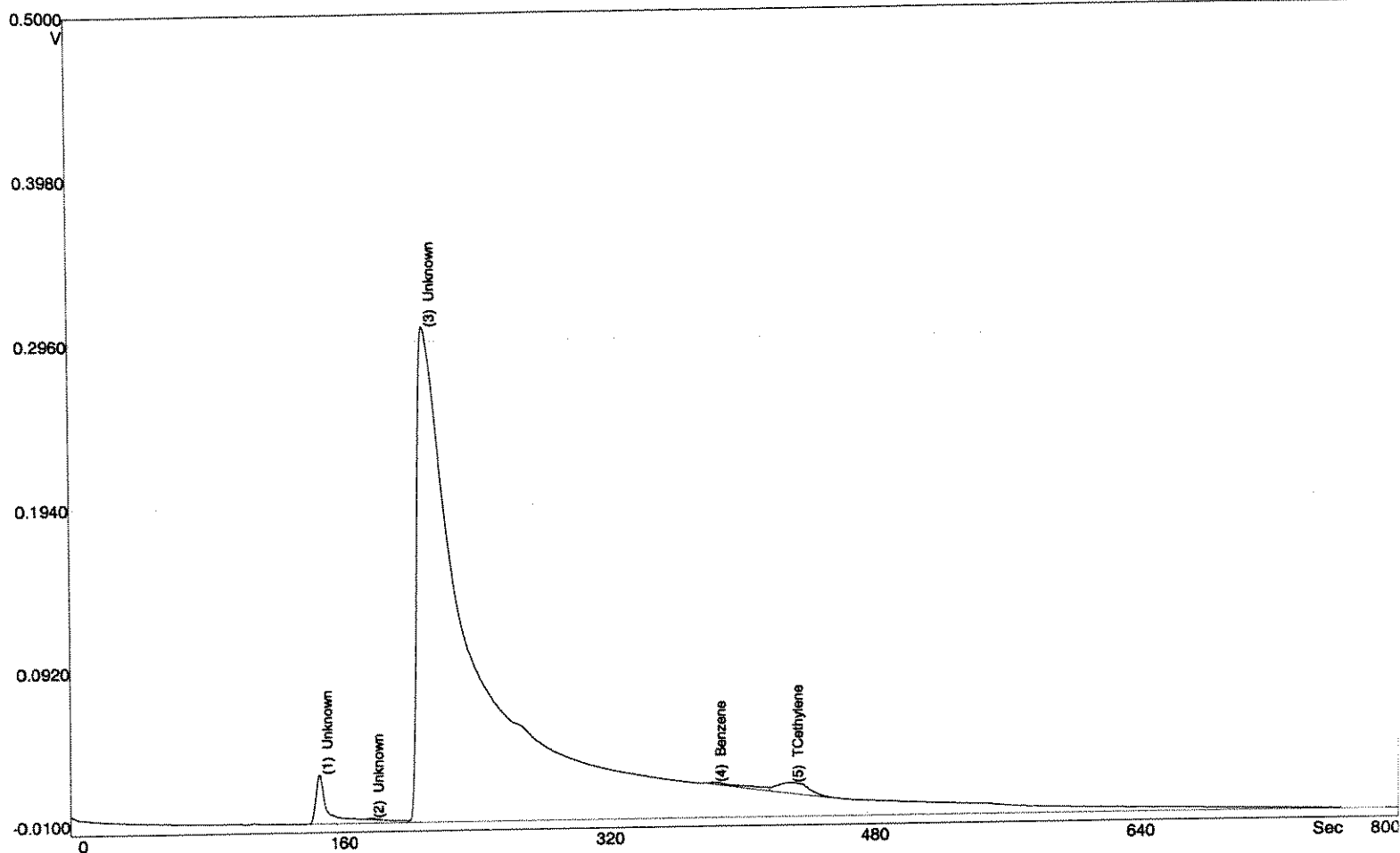
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		89.0	2.375	109.6	
2	Unknown		0.602	0.114	148.2	
3	Unknown		4.430	0.237	215.2	
4	Unknown		4.486	0.184	277.3	

SiteChart Analysis Report - B5012006.PID

5 Benzene		0.255	0.036	312.3
6 Unknown		7.830	0.309	387.0
7 Unknown		8.843	0.183	407.3
8 TCethylene	0.005	113	4.888	436.0
9 TetraCethylene		0.555	0.041	661.4

recalc'd
TCB = .0027 → ND
PCB ND

SiteChart Analysis Report - B5012007.PID



RESULTS:

Date Jan 20, 2005
 Time 10:27:17
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 15
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 29.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		295	31.0	149.2	
2	Unknown		4.552	0.626	180.4	
3	Unknown		15151	309	213.2	
		0.005	52.3	1.018	386.0	

1X
 100Me R 37

SiteChart Analysis Report - B5012007.PID

5 TCethylene

0.014

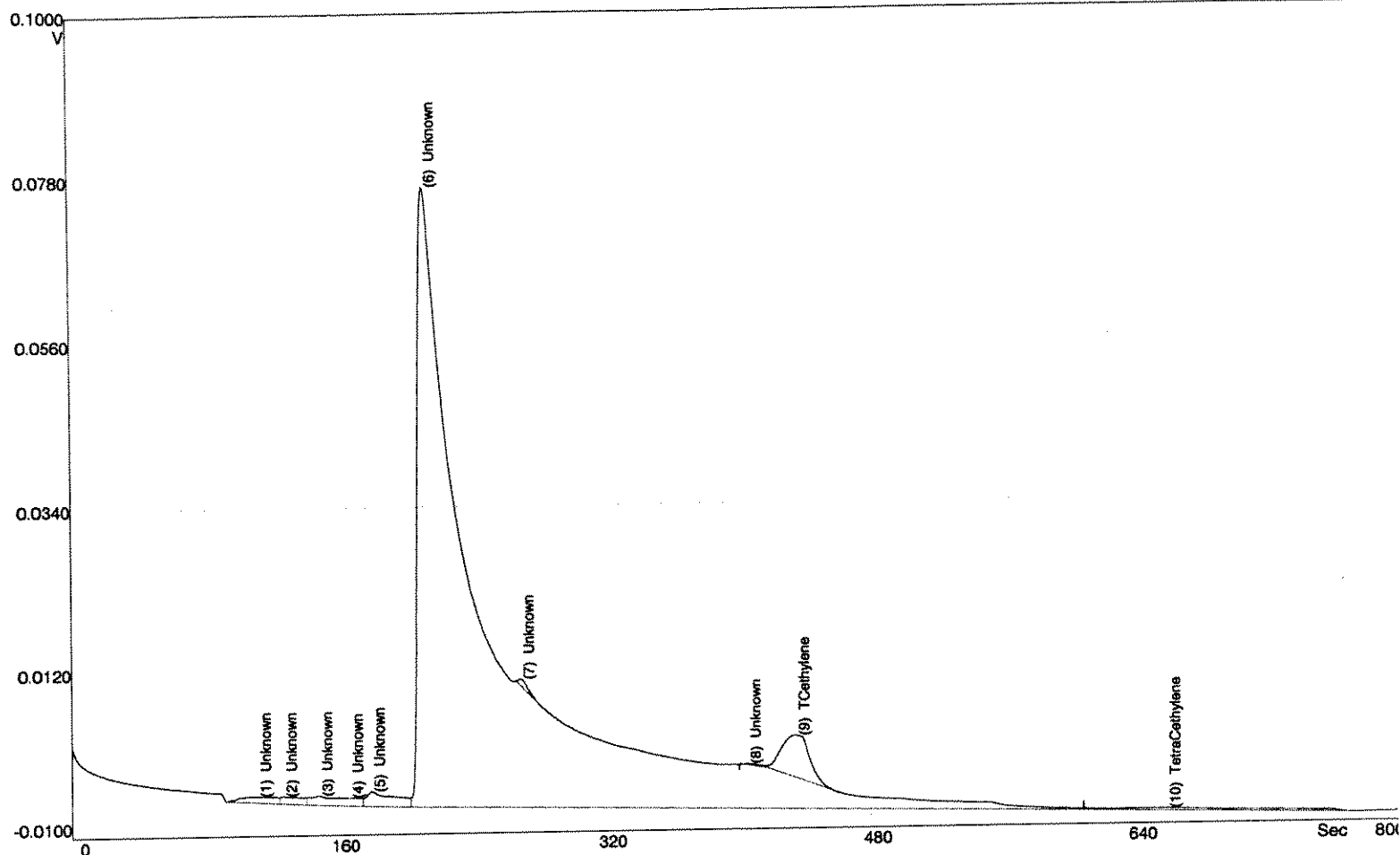
149

2.808

432.8

recalculated
TOE = ND
PCB = ND

SiteChart Analysis Report - B5012008.PID



RESULTS:

Date Jan 20, 2005
 Time 10:42:10
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 17
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 29.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		20.7	0.590	111.2	
2 Unknown		14.8	0.075	126.5	
3 Unknown		34.9	0.197	148.0	
4 Unknown		0.101	0.014	166.8	

1x

100MP

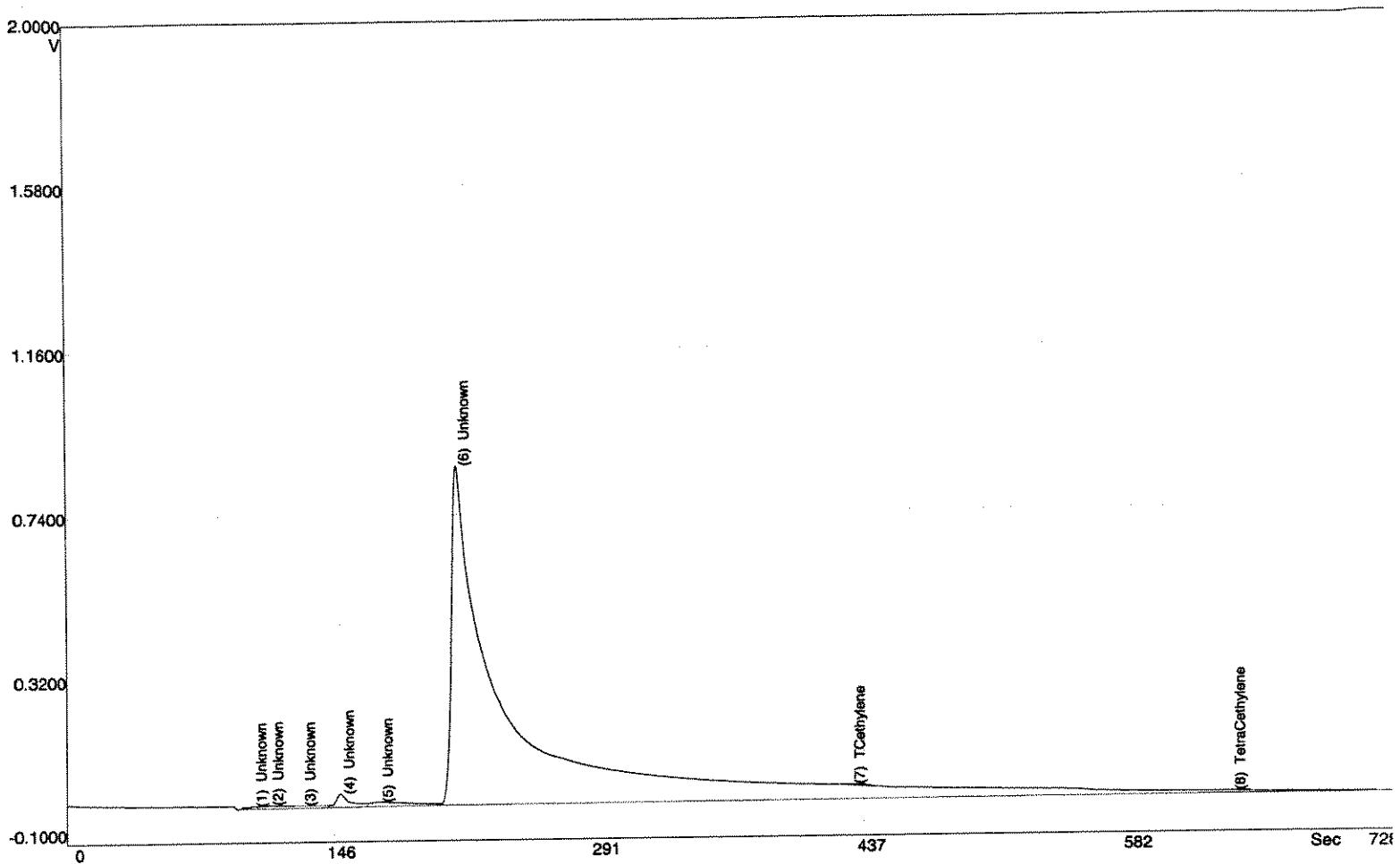
R-31

SiteChart Analysis Report - B5012008.PID

5 Unknown		40.0	0.876	179.6
6 Unknown		3969	81.9	212.2
7 Unknown		7.012	0.264	268.8
8 Unknown		2.190	0.156	406.0
9 TCethylene	0.005	109	4.025	435.2
10 TetraCethylene		1.706	0.022	658.4

recalc'd
TCE = 0.026 → ND
PCE = ND

SiteChart Analysis Report - B5012013.PID



RESULTS:

Date Jan 20, 2005
 Time 12:11:36
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 27
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 30.0 C

1x
 1004e

R-12 ✓

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

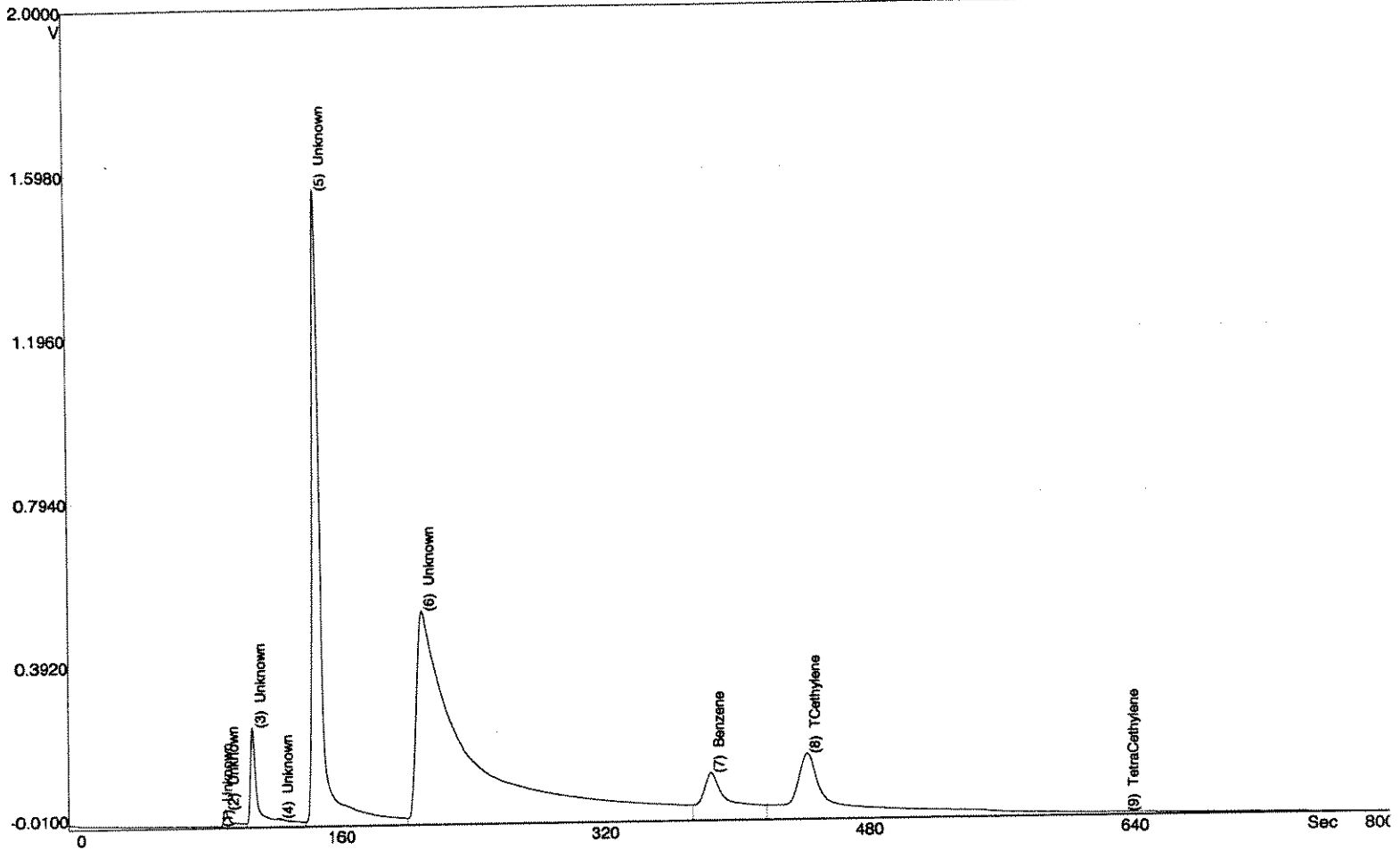
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		48.7	7.335	101.3	
2	Unknown		252	8.230	110.3	
3	Unknown		1.345	0.244	127.6	
			305	29.4	149.2	

SiteChart Analysis Report - B5012013.PID

5 Unknown		310	2.530	170.2
6 Unknown		33111	870	213.0
7 TCethylene	0.004	40.7	0.768	429.6
8 TetraCethylene	0.001	19.8	0.645	638.0

revised
TUR = 1.00098 → ND
PUR = 1.00034 → ND

SiteChart Analysis Report - B5012014.PID



RESULTS:

Date Jan 20, 2005
 Time 12:24:26
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 29
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 30.0 C

1 x
 10042 R14

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		2.796	0.341		90.3
2	Unknown		231	42.1		93.9
3	Unknown		1325	239		110.5
			5599	2221		126.7

SiteChart Analysis Report - B5012014.PID

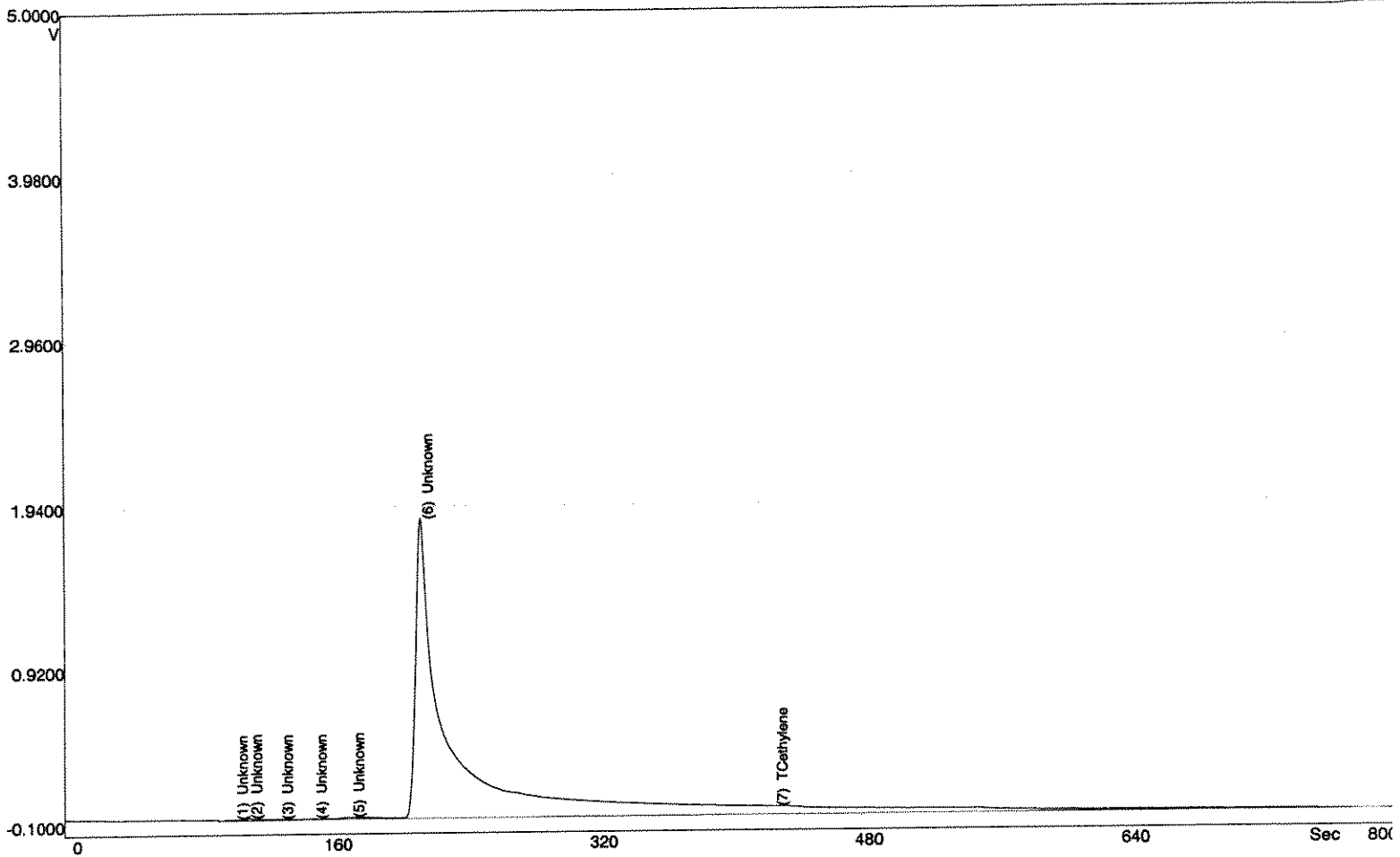
5 Unknown		9510	1559	149.4
6 Unknown		20264	512	213.2
7 Benzene	0.221	2482	80.6	388.3
8 TCethylene	0.567	5931	128	446.4
9 TetraCethylene		5.184	0.143	638.0

recalc'd

TCE = 0.141

PCE = ND

SiteChart Analysis Report - B5012015.PID



RESULTS:

Date Jan 20, 2005
 Time 12:39:18
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 31
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 30.0 C

14
 100 mL
 R 33

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		45.2	7.310		101.3
2	Unknown		329	13.0		110.1
3	Unknown		1.982	0.297		128.5
4	Unknown		4.937	0.904		149.2

SiteChart Analysis Report - B5012015.PID

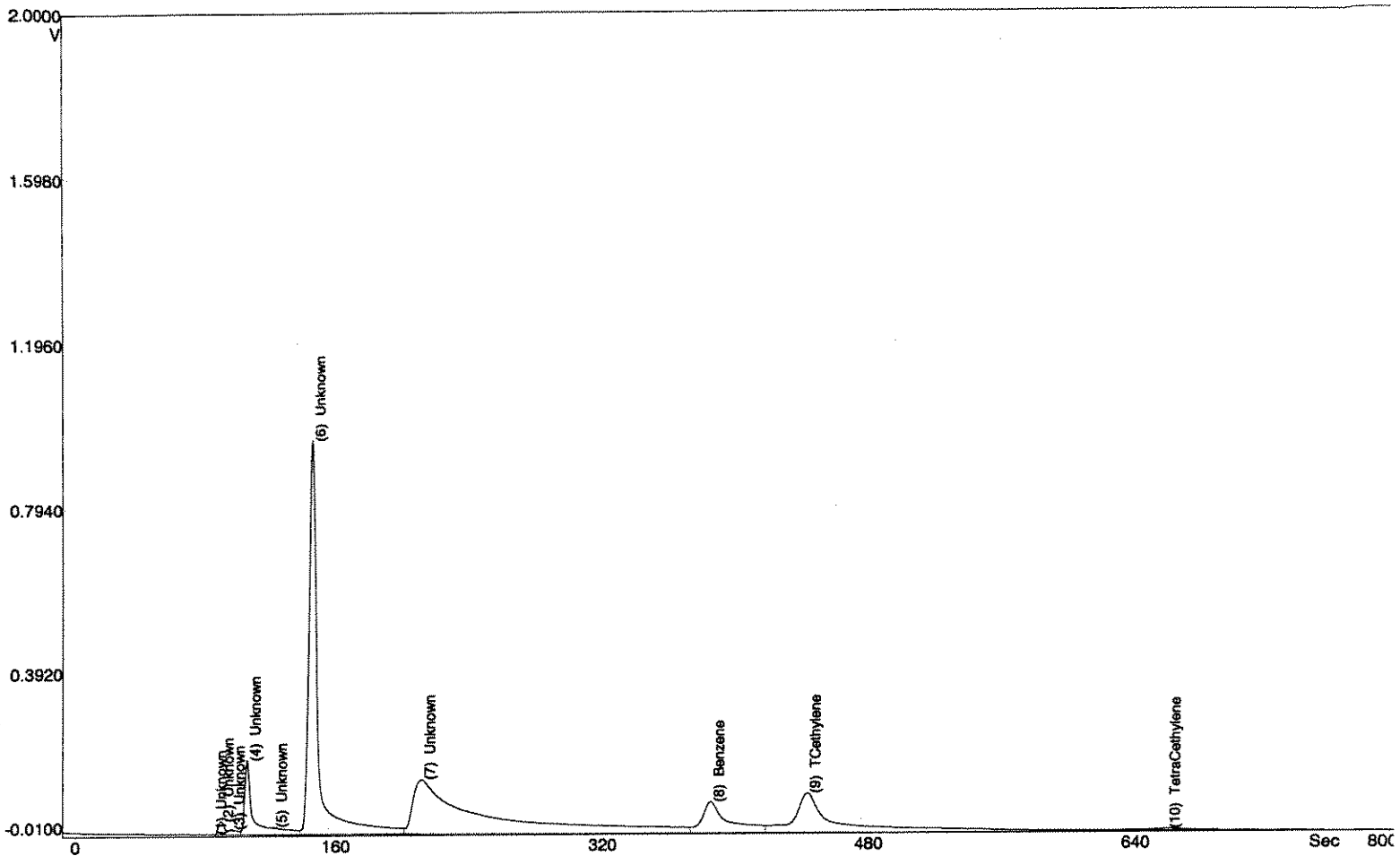
5 Unknown	314	8.757	171.6
6 Unknown	50255	1868	213.8
7 TCethylene	5.963	0.076	426.8

results of

TCE = ND

PCE = ND

SiteChart Analysis Report - B5012023.PID



RESULTS:

Date Jan 20, 2005
 Time 14:40:30
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 47
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 31.0 C

1x
 1004e

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

R-14 DOP
 (resampled)

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

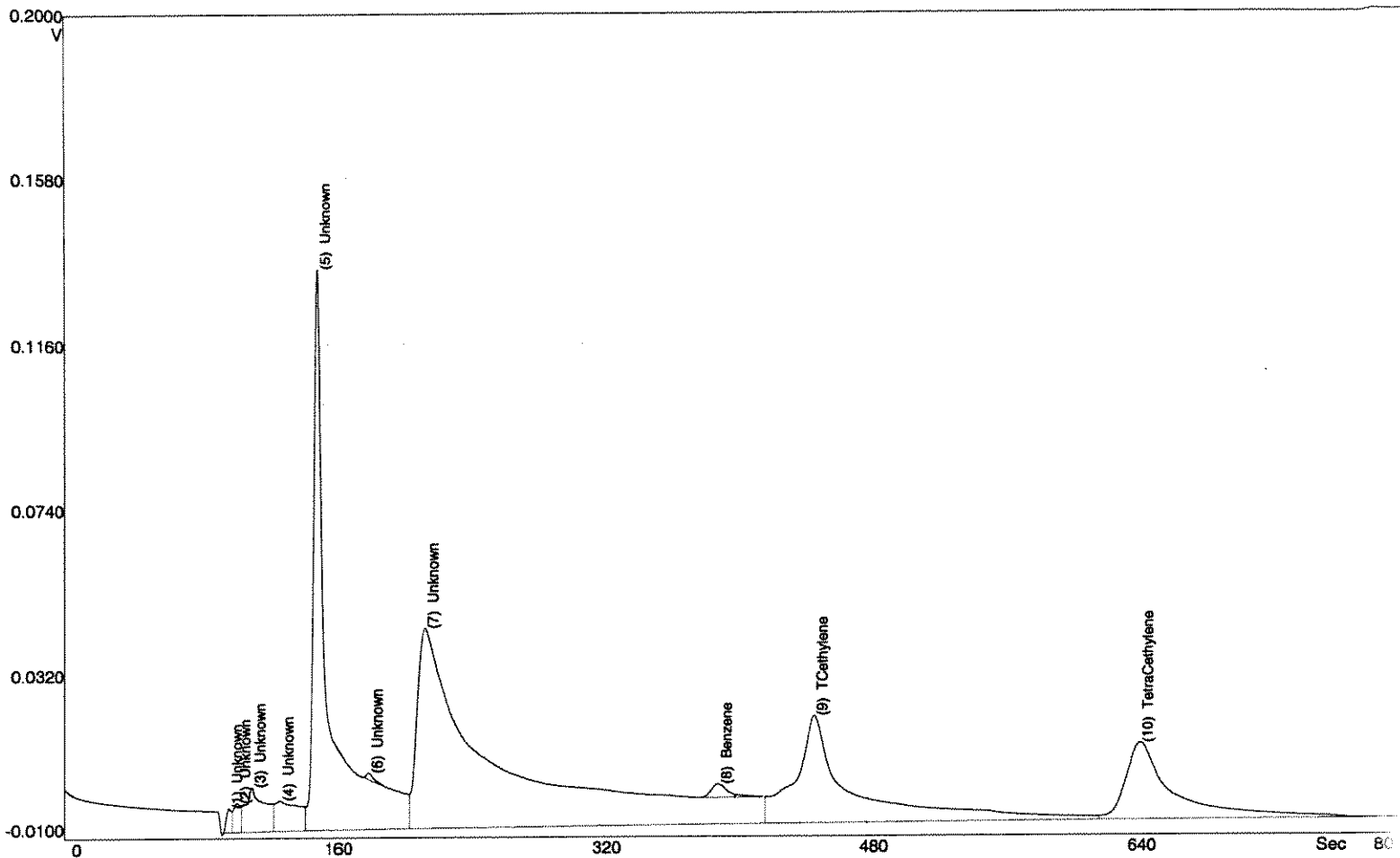
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		1.427	0.136	90.1	
2	Unknown		227	32.3	94.7	
3	Unknown		5.422	2.568	101.2	
4	Unknown		1140	175	110.8	

SiteChart Analysis Report - B5012023.PID

5 Unknown		0.585	1.112	126.7
6 Unknown		6276	958	149.8
7 Unknown		6415	120	215.4
8 Benzene	0.126	1412	62.8	389.3
9 TCethylene	0.303	3167	80.2	447.2
10 TetraCethylene	0.008	112	3.449	662.6

~~needle~~
 TCE = 1.0075 → .08
 PCE = ND

SiteChart Analysis Report - B5012025.PID



RESULTS:

Date Jan 20, 2005
 Time 15:53:39
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 51
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 31.0 C

1x
 100µe

R-36

RCRUR/
 new
 vial

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 µL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

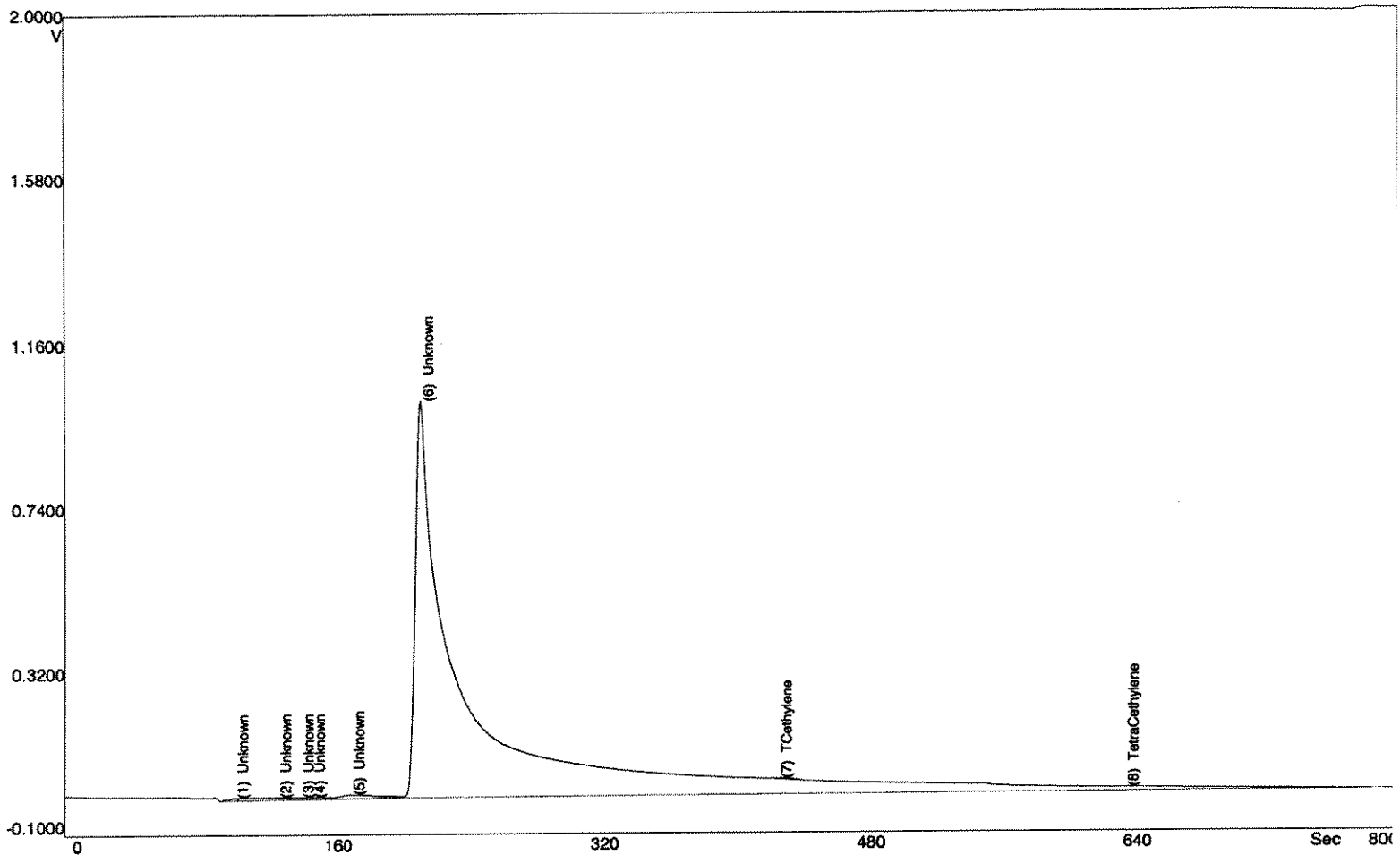
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		24.0	6.491		98.0
2	Unknown		38.4	1.887		103.1
3	Unknown		157	10.7		112.0

SiteChart Analysis Report - B5012025.PID

5 Unknown		1534	137	151.0
6 Unknown		9.057	0.969	182.4
7 Unknown		2913	42.6	215.6
8 Benzene	0.004	41.2	3.494	390.7
9 TCethylene	0.105	1103	20.9	448.4
10 TetraCethylene	0.049	665	19.0	642.2

Revised
TCF^s .026 ug/l
PCE^s 0.011 ug/l

SiteChart Analysis Report - B5012026.PID



RESULTS:

Date Jan 20, 2005
 Time 16:17:03
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 53
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 30.0 C

1x
 100mL R-35

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.0 mV/S
 SlopeDown 0.0 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		47.0	7.220		101.6
2	Unknown		210	7.007		127.6
3	Unknown		41.6	0.064		141.1
4	Unknown		75.5	0.107		147.8

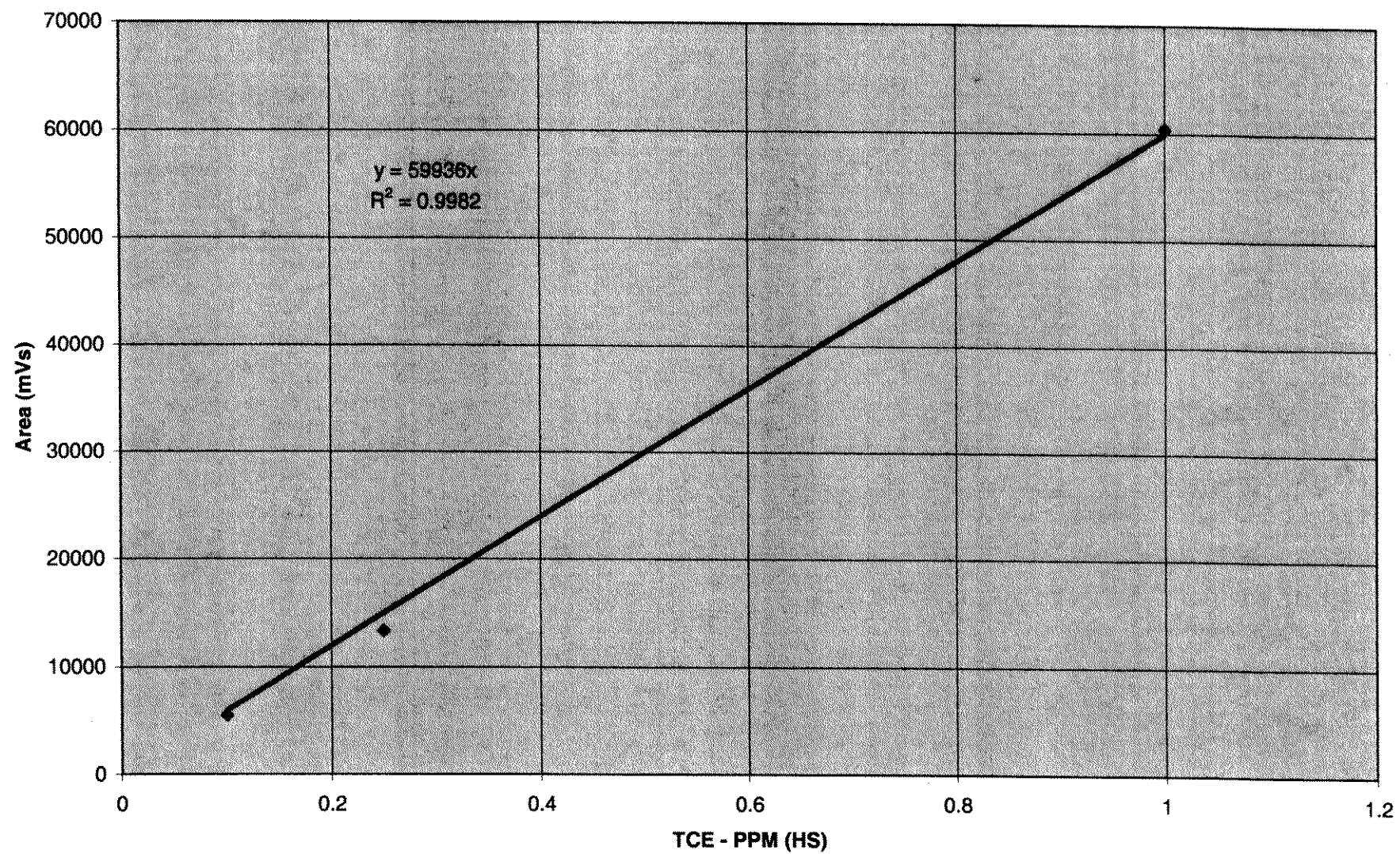
SiteChart Analysis Report - B5012026.PID

5 Unknown		319	6.308	171.8
6 Unknown		37386	1016	213.4
7 TCethylene	0.003	32.5	0.417	428.0
8 TetraCethylene		4.302	0.111	636.2

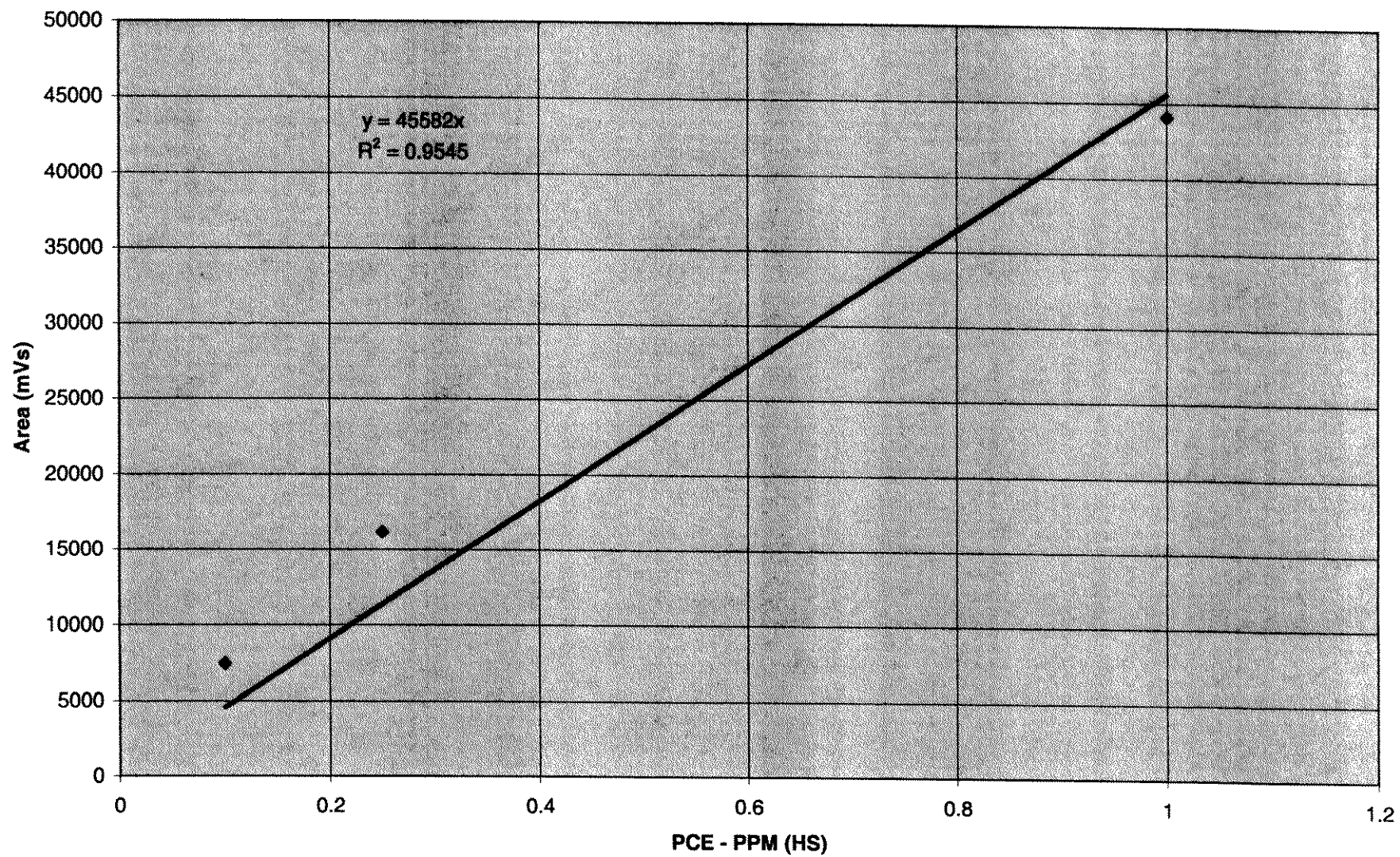
reval'd
✓
PCH² PD
PCH² NO

Voyager FPGC Daily Calibrations and Chromatograms
Sabana Abaja Industrial Site
January 21-22, 2005

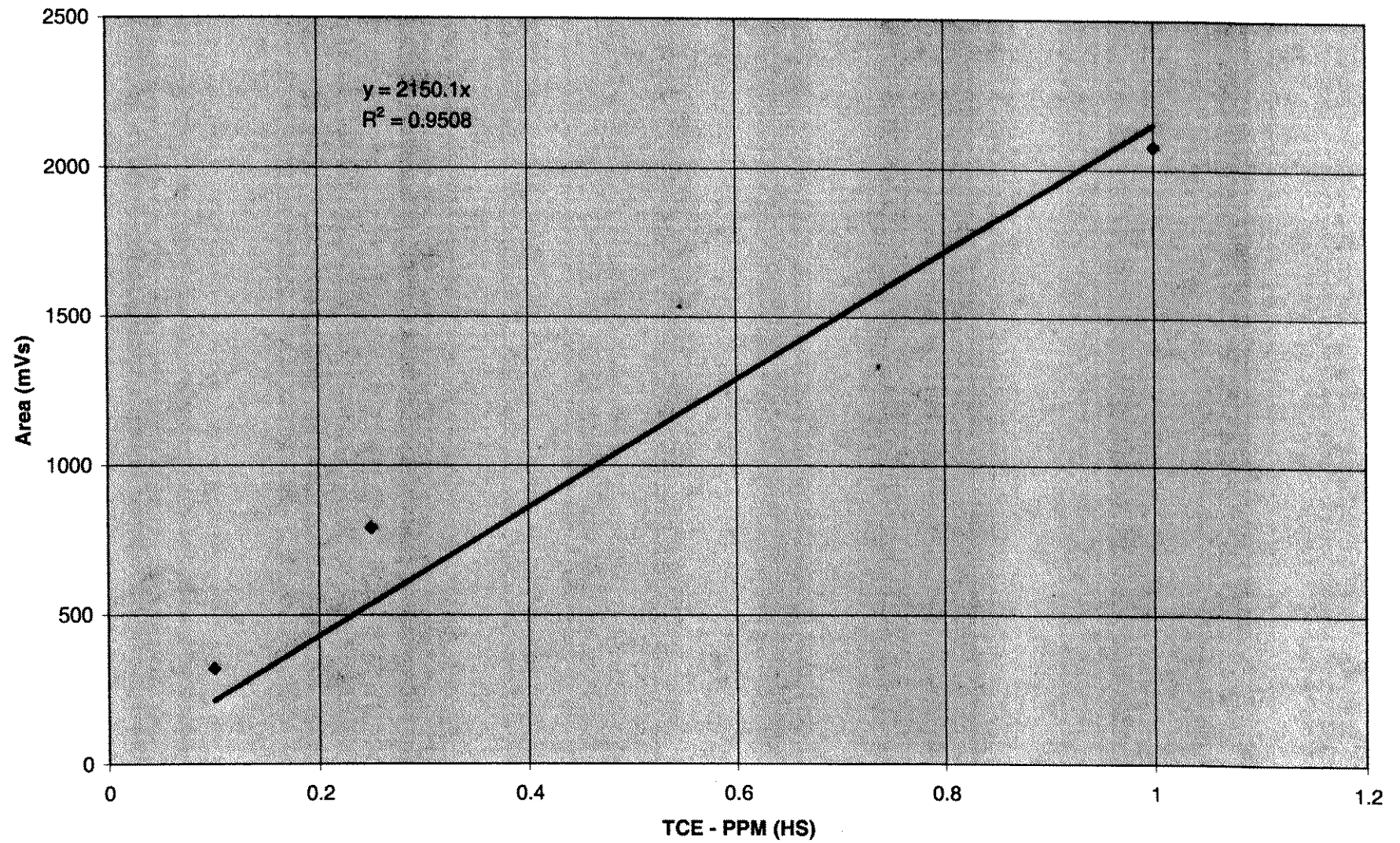
TCE via PID @ 01-21-05



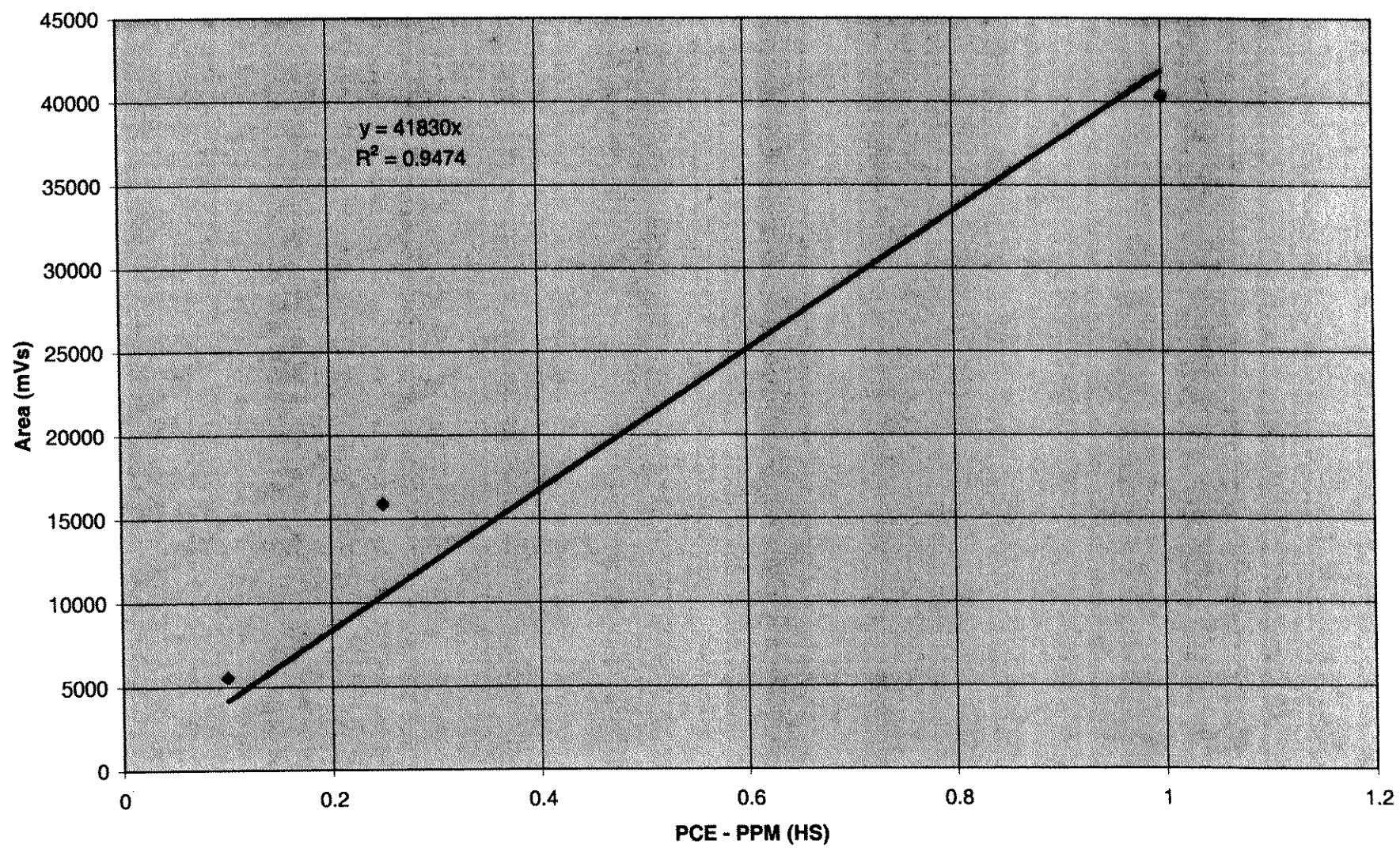
PCE via PID @ 01-21-05



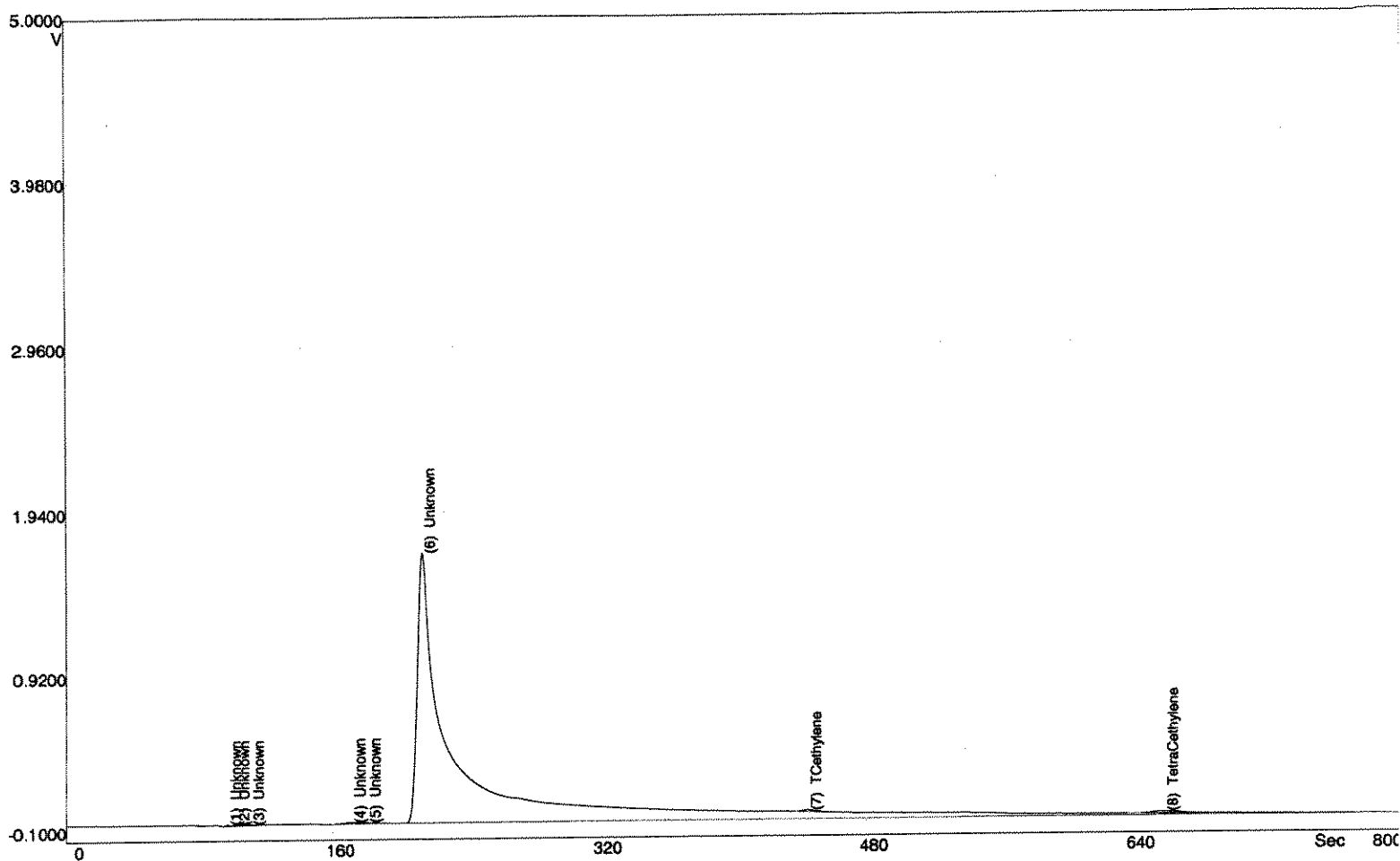
TCE via ECD @ 01-21-05



PCE via ECD @ 01-21-05



SiteChart Analysis Report - B5012104.PID



RESULTS:

Date Jan 21, 2005
 Time 10:39:37
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 9
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 30.0 C

1x
 10042 R-45

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

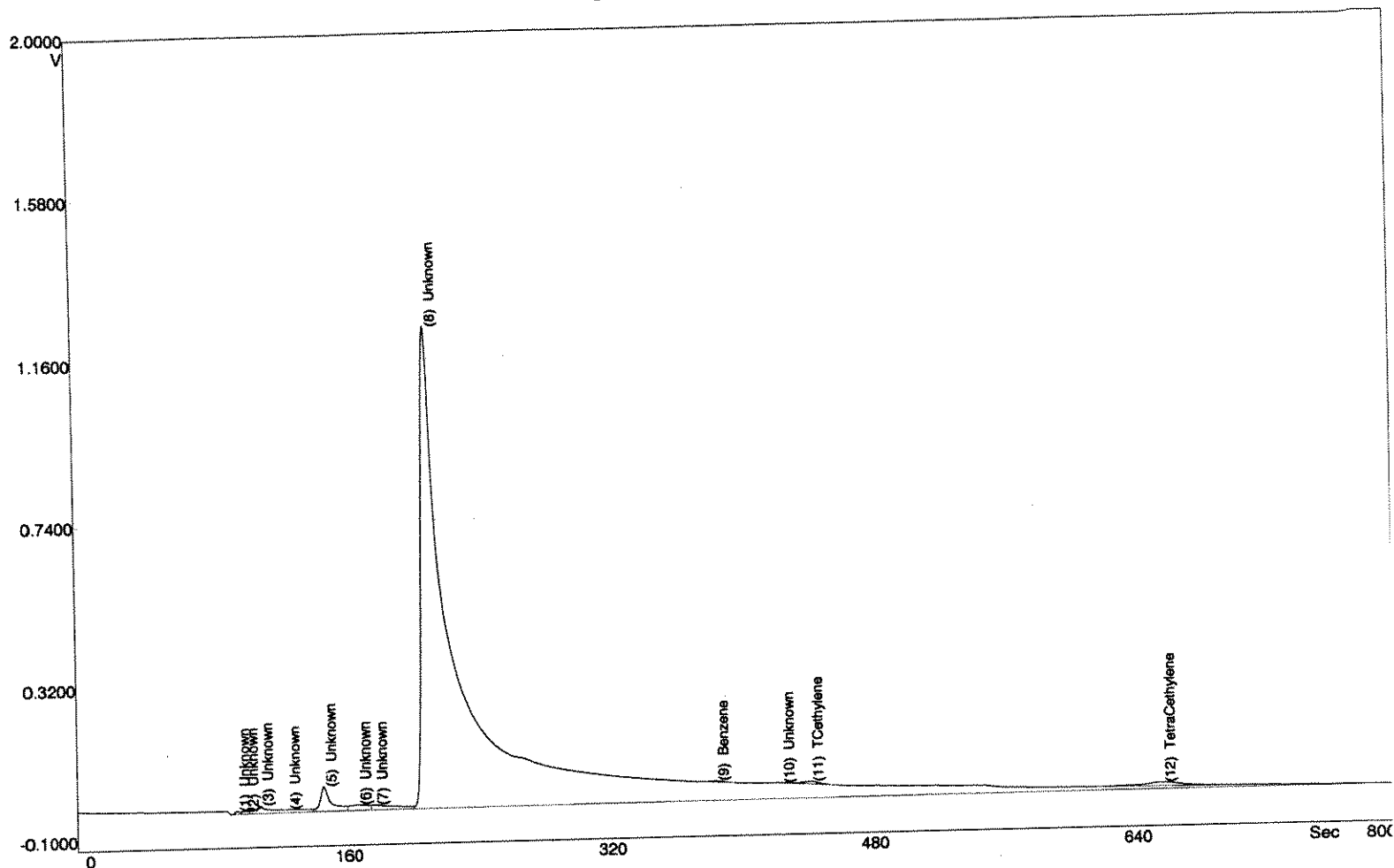
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		23.9	7.715	96.3	
2	Unknown		25.0	1.717	101.2	
3	Unknown		43.0	6.972	110.1	
			85.0	8.100	121.0	

SiteChart Analysis Report - B5012104.PID

5 Unknown		65.7	0.592	180.2
6 Unknown		47470	1689	213.0
7 TCethylene	0.002	99.0	7.577	444.4
8 TetraCethylene	0.006	303	12.0	658.4

revised
TCB = ND
PCB = ND

SiteChart Analysis Report - B5012105.PID



RESULTS:

Date Jan 21, 2005
 Time 10:59:27
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 11
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 30.0 C

1x
100µl
R 46

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

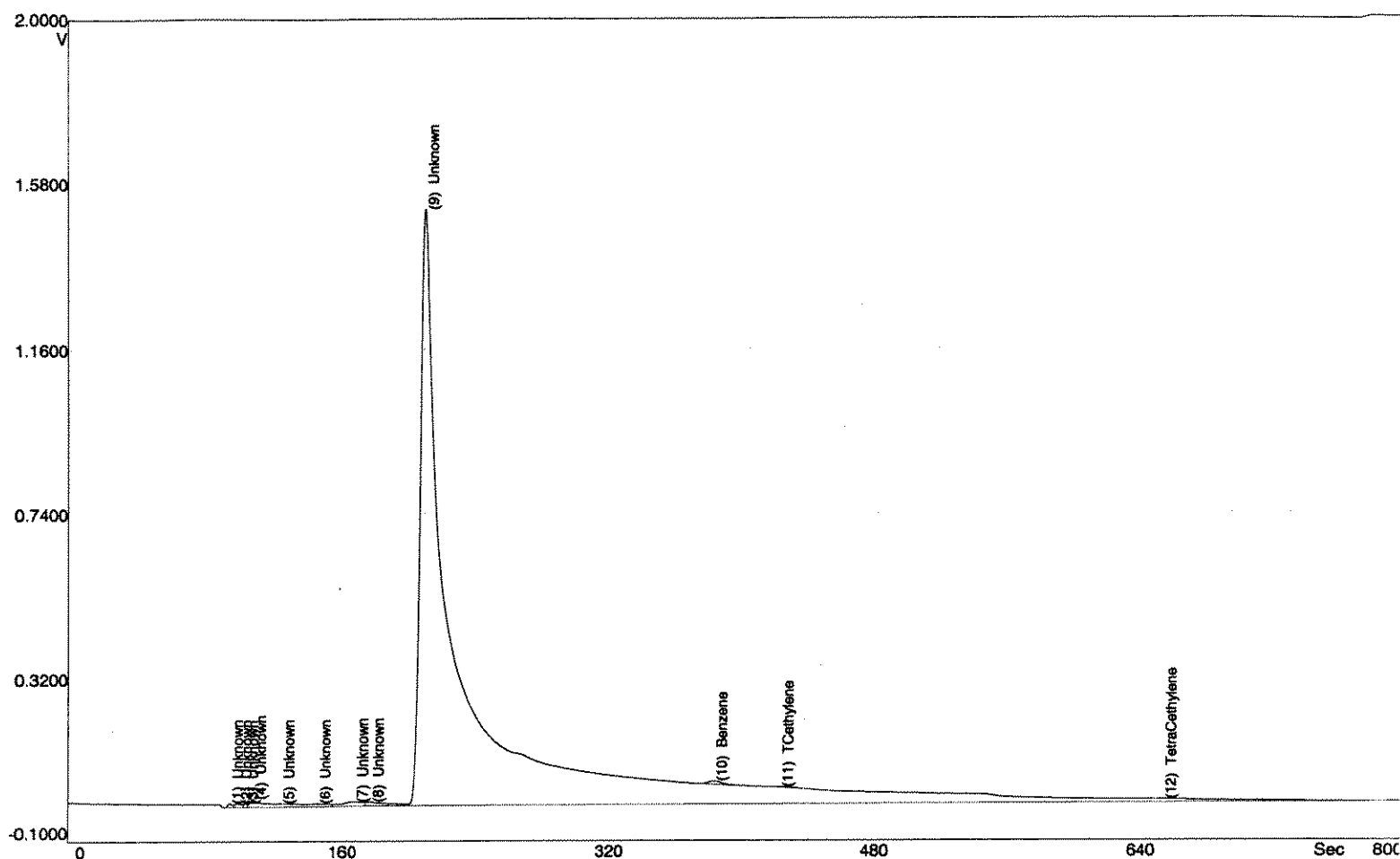
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		26.5	7.715	96.3	
2	Unknown		35.5	1.835	101.2	
3	Unknown		342	19.1	110.3	
4	Unknown		1.153	0.427	126.8	

SiteChart Analysis Report - B5012105.PID

5 Unknown		499	58.0	149.0
6 Unknown		182	3.134	169.8
7 Unknown		218	0.651	179.8
8 Unknown		38392	1246	212.8
9 Benzene	0.002	26.6	1.931	387.0
10 Unknown		17.3	0.405	427.2
11 TCethylene	0.001	70.6	2.969	444.8
12 TetraCethylene	0.005	286	8.546	659.0

revised
 TC's NO
 PCB's NO

SiteChart Analysis Report - B5012106.PID



RESULTS:

Date Jan 21, 2005
 Time 11:14:04
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 13
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 31.0 C

IX
 1004e

R-49

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

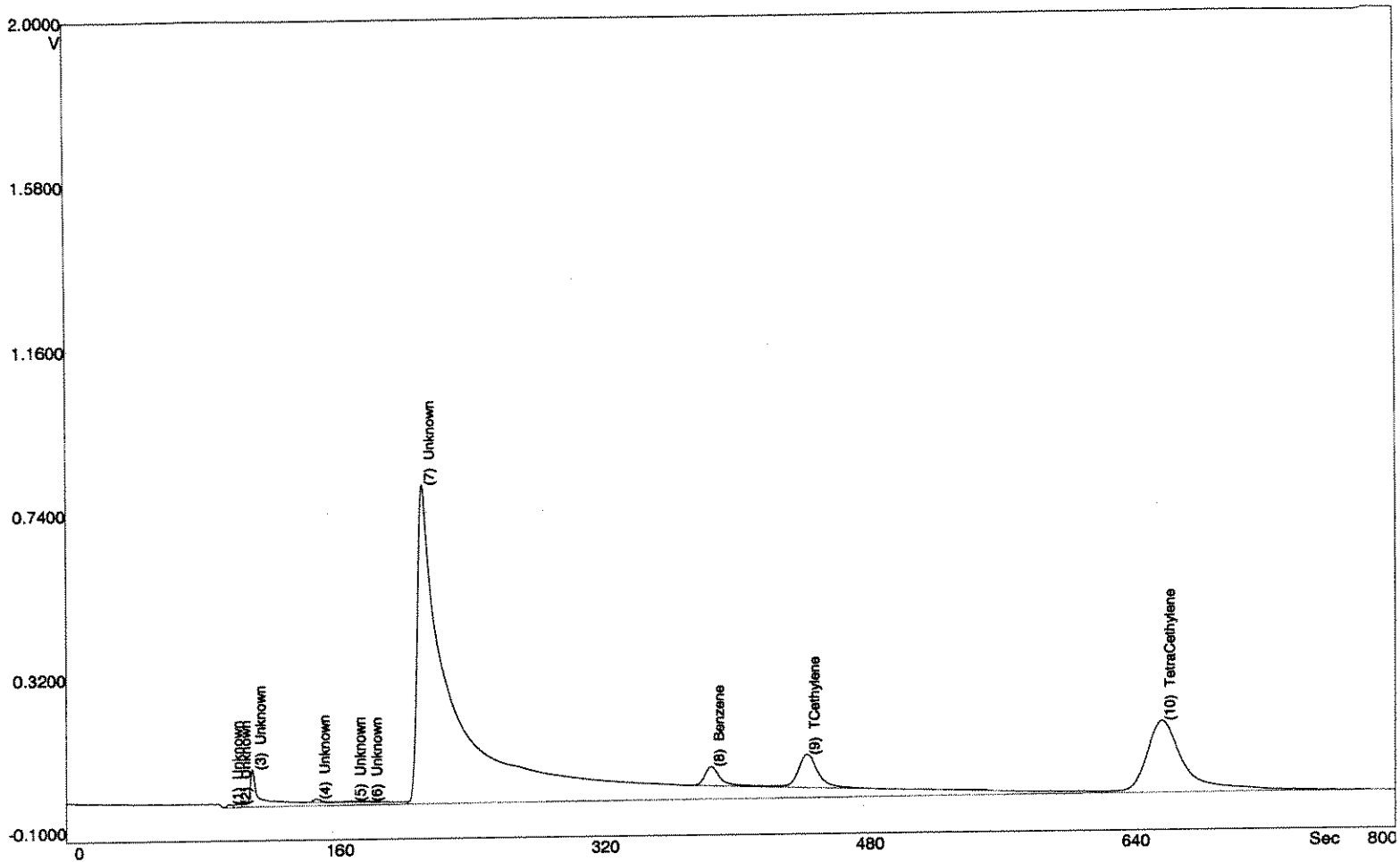
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		33.8	10.0	96.3	
2	Unknown		43.2	2.989	101.3	
3	Unknown		22.9	0.243	105.5	
4	Unknown		10.1	1.512	110.2	

SiteChart Analysis Report - B5012106.PID

5 Unknown		0.737	0.174	127.1
6 Unknown		5.901	1.172	149.0
7 Unknown		162	5.986	171.2
8 Unknown		168	0.832	180.8
9 Unknown		42528	1519	213.2
10 Benzene	0.007	76.6	6.280	387.0
11 TCethylene		22.0	0.173	427.2
12 TetraCethylene		6.849	0.254	657.2

Re Calc'd
TCB = ND
PCE = ND

SiteChart Analysis Report - B5012107.PID



RESULTS:

Date Jan 21, 2005
 Time 11:43:48
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 15
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 31.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		29.9	8.188		97.6
2	Unknown		36.0	2.085		102.5
3	Unknown		1213	95.6		111.5
			10.0	0.567		150.2

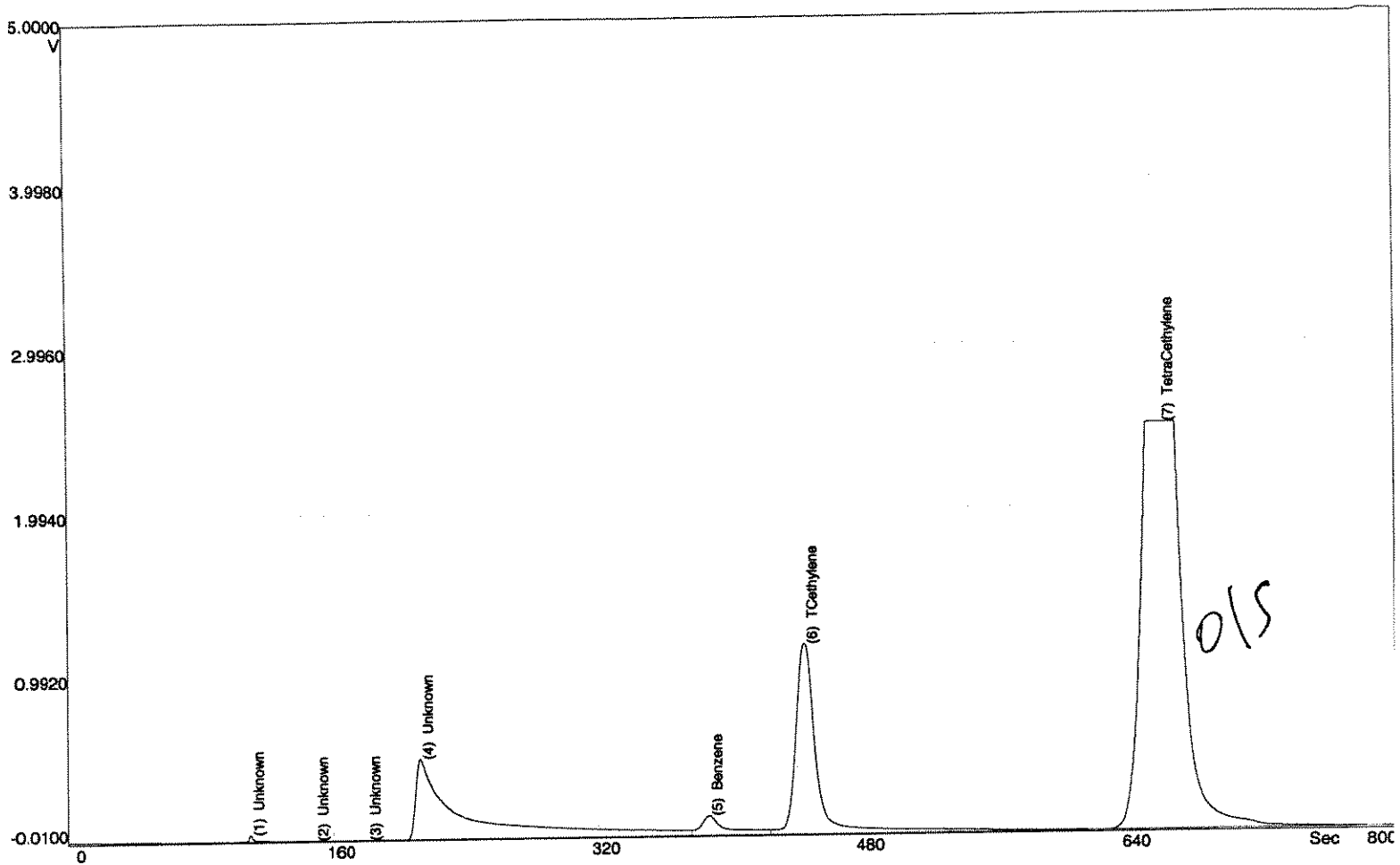
1x
 100uL
 R-47

SiteChart Analysis Report - B5012107.PID

5 Unknown		26.6	1.949	171.6
6 Unknown		20.6	0.391	181.6
7 Unknown		26854	816	213.8
8 Benzene	0.051	568	48.1	388.3
9 TCethylene	0.024	1290	80.0	446.0
10 TetraCethylene	0.093	4969	181	659.6

results
TCR^s 0.022 µg/l
PCR^s 0.011 → 0.11 µg/l

SiteChart Analysis Report - B5012112.PID



RESULTS:

Date Jan 21, 2005
 Time 12:57:52
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 25
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 31.0 C

20X
 54P R-48

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		186	40.0	109.3	
2 Unknown		6.987	1.458	148.2	
3 Unknown		0.832	0.201	179.8	
4 Unknown		16524	495	212.0	

SiteChart Analysis Report - B5012112.PID

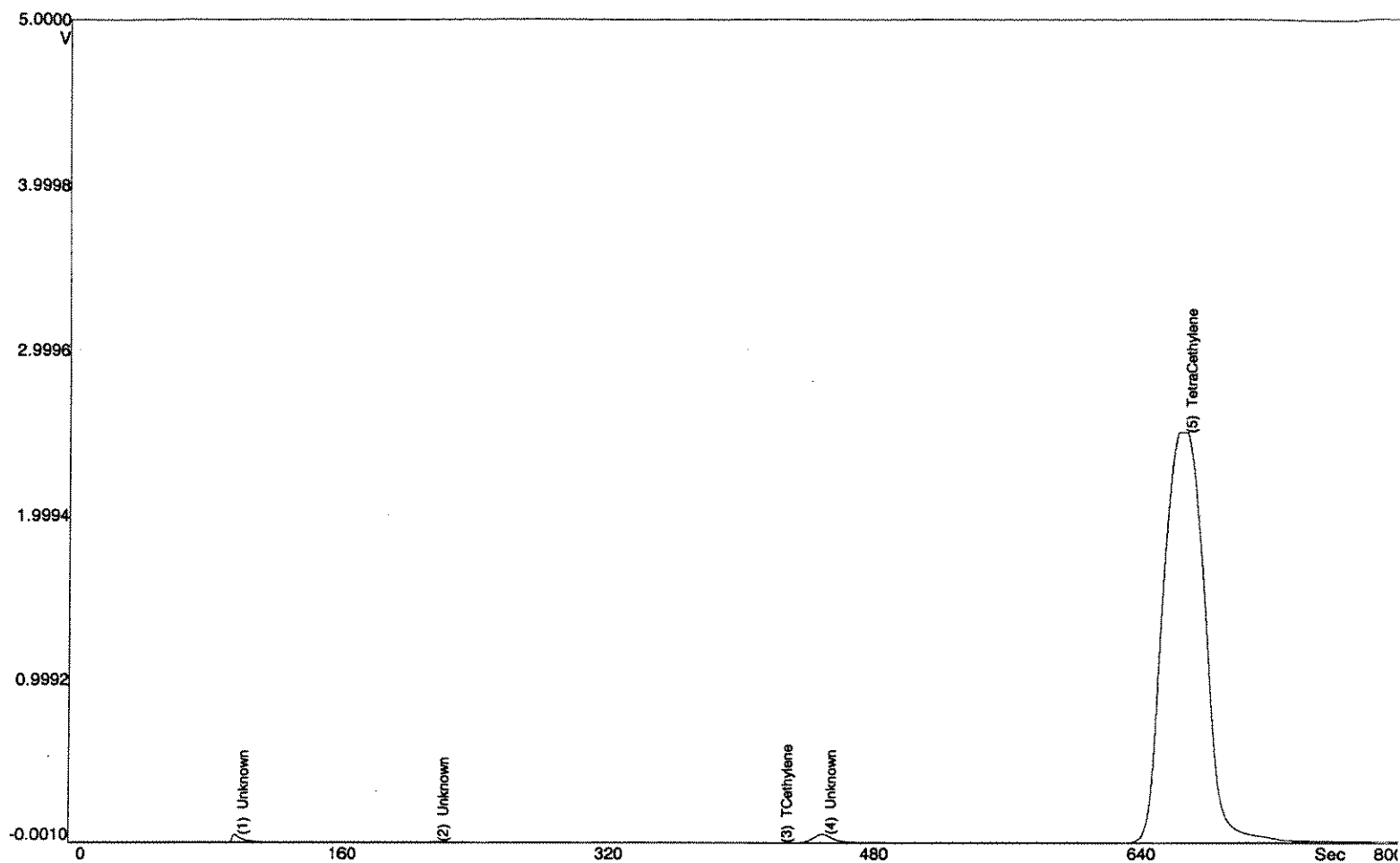
5 Benzene
6 TCethylene
7 TetraCethylene

0.197	2208	89.6	386.3
0.326	17371	1142	444.4
1.886	100386	2501	659.0

Handwritten: -652
-37.72

Handwritten:
06.82
TCF = 5.0 mg/l
PCF = 44/05 mg/l (not used)

SiteChart Analysis Report - B5012112.ECD



RESULTS:

Date Jan 21, 2005
 Time 12:57:52
 Instrument FGGE202
 Detector ECD
 Column B
 Analysis# 26
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 31.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

20p
 542
 R4B
 6.9
 > 35.8 %

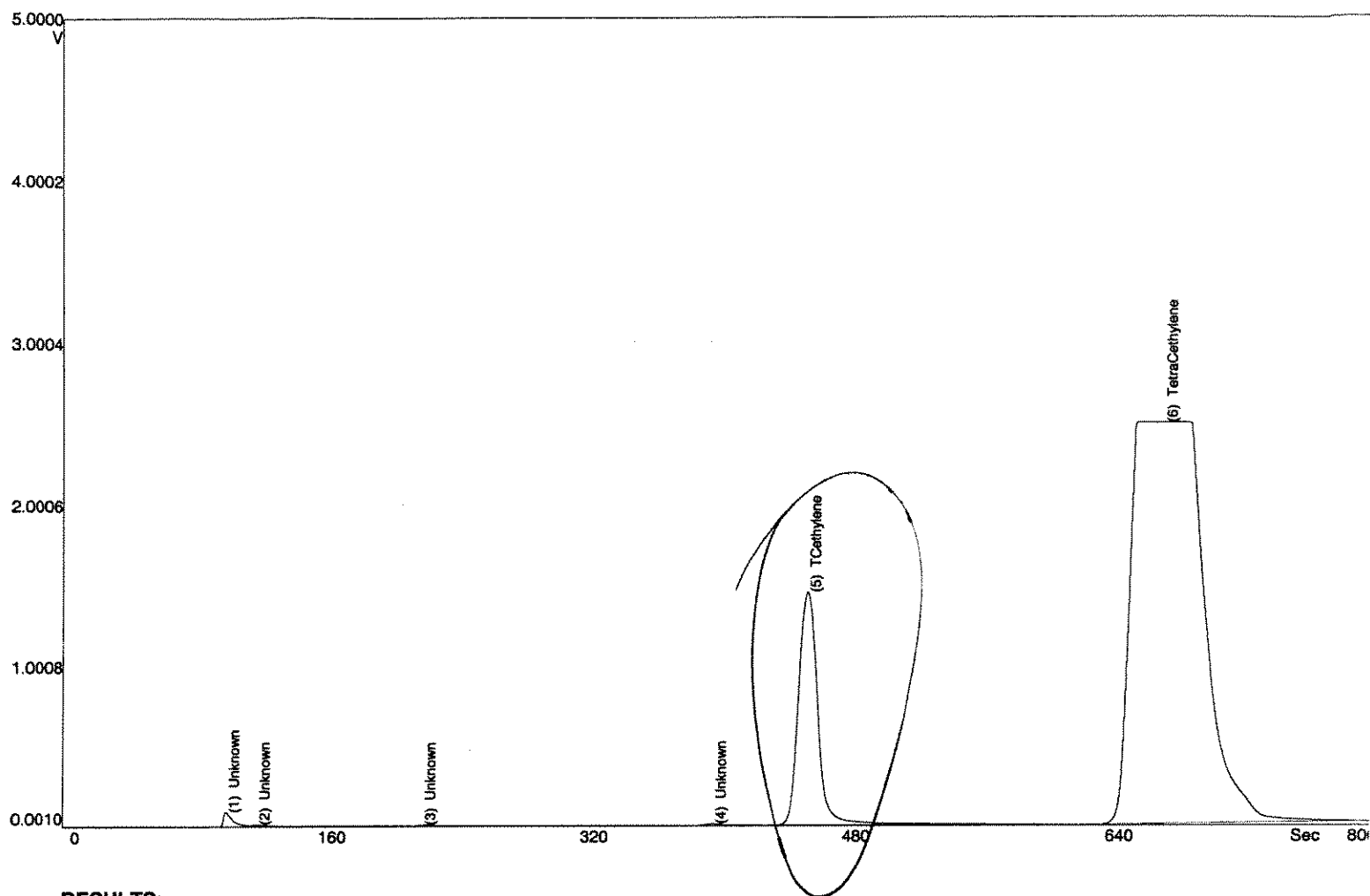
PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		305	45.2		99.1
2	Unknown		32.6	2.589		219.6
3	TCethylene		0.409	0.150		426.4
4	Unknown		745	50.6		452.8
5	TetraCethylene		24004	2500		667.1

SiteChart Analysis Report - B5012112.ECD

recalc'd
TCh⁺ 6.9 ug/l
pCh⁺ 736 ug/l

SiteChart Analysis Report - B5012116.ECD



RESULTS:

Date Jan 21, 2005
 Time 14:32:25
 Instrument FGGE202
 Detector ECD
 Column B
 Analysis# 34
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 32.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		651	89.2	99.1	
2	Unknown		27.5	4.973	118.1	
3	Unknown		69.9	5.475	219.4	
4	Unknown		127	10.7	396.7	

SiteChart Analysis Report - B5012116.ECD

6 TetraCethylene

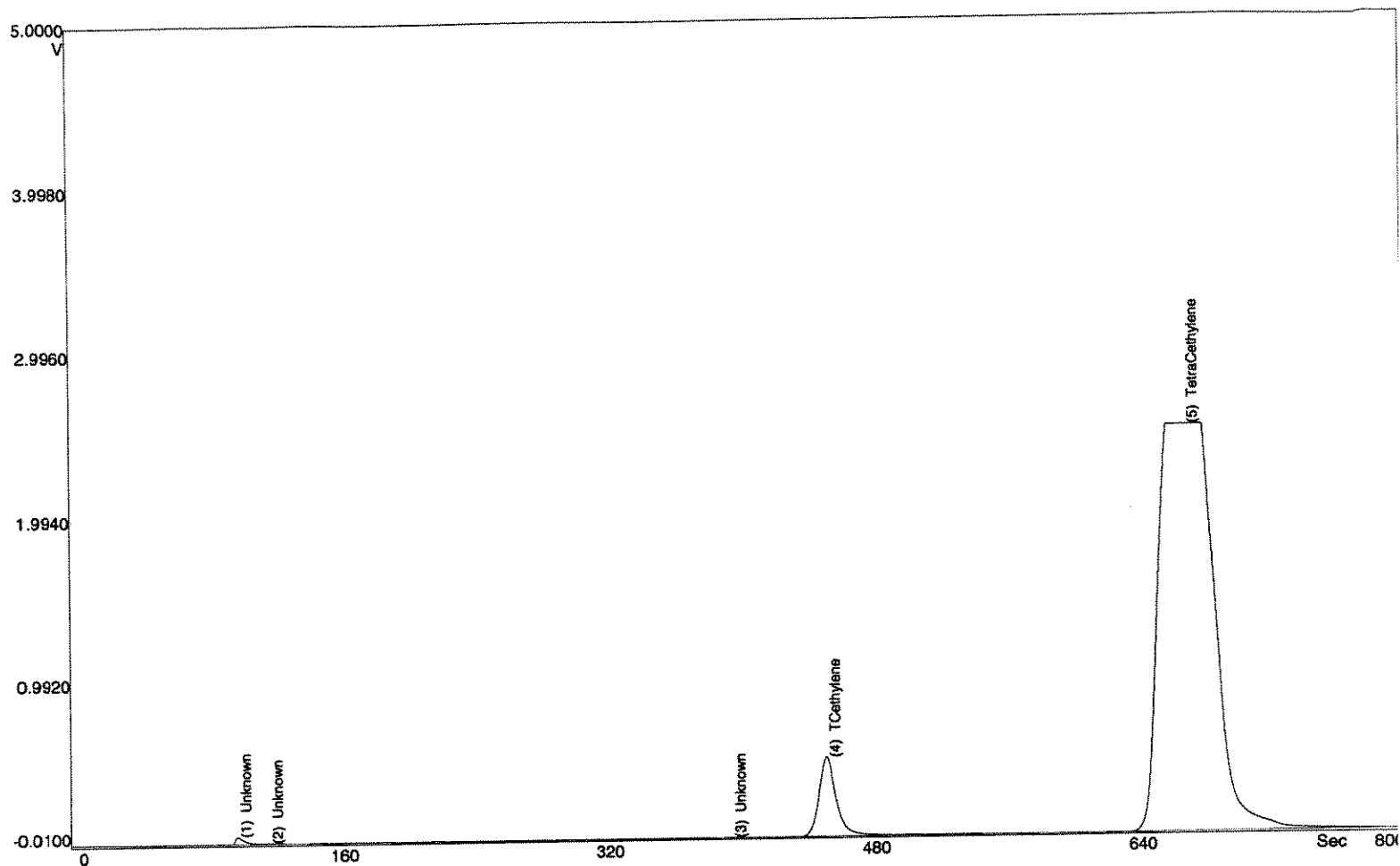
8.340 246521

2494

670.4

PCR = 93.3 $\mu\text{g/l}$ (not used)
PCR = 58.9 $\mu\text{g/l}$ (not used)
ots

SiteChart Analysis Report - B5012117.ECD



RESULTS:

Date Jan 21, 2005
 Time 14:47:22
 Instrument FGGE202
 Detector ECD
 Column B
 Analysis# 36
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 59.0 C
 Ambient Temp 33.0 C

204

54e

R50

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

57.7

67.1

0.13

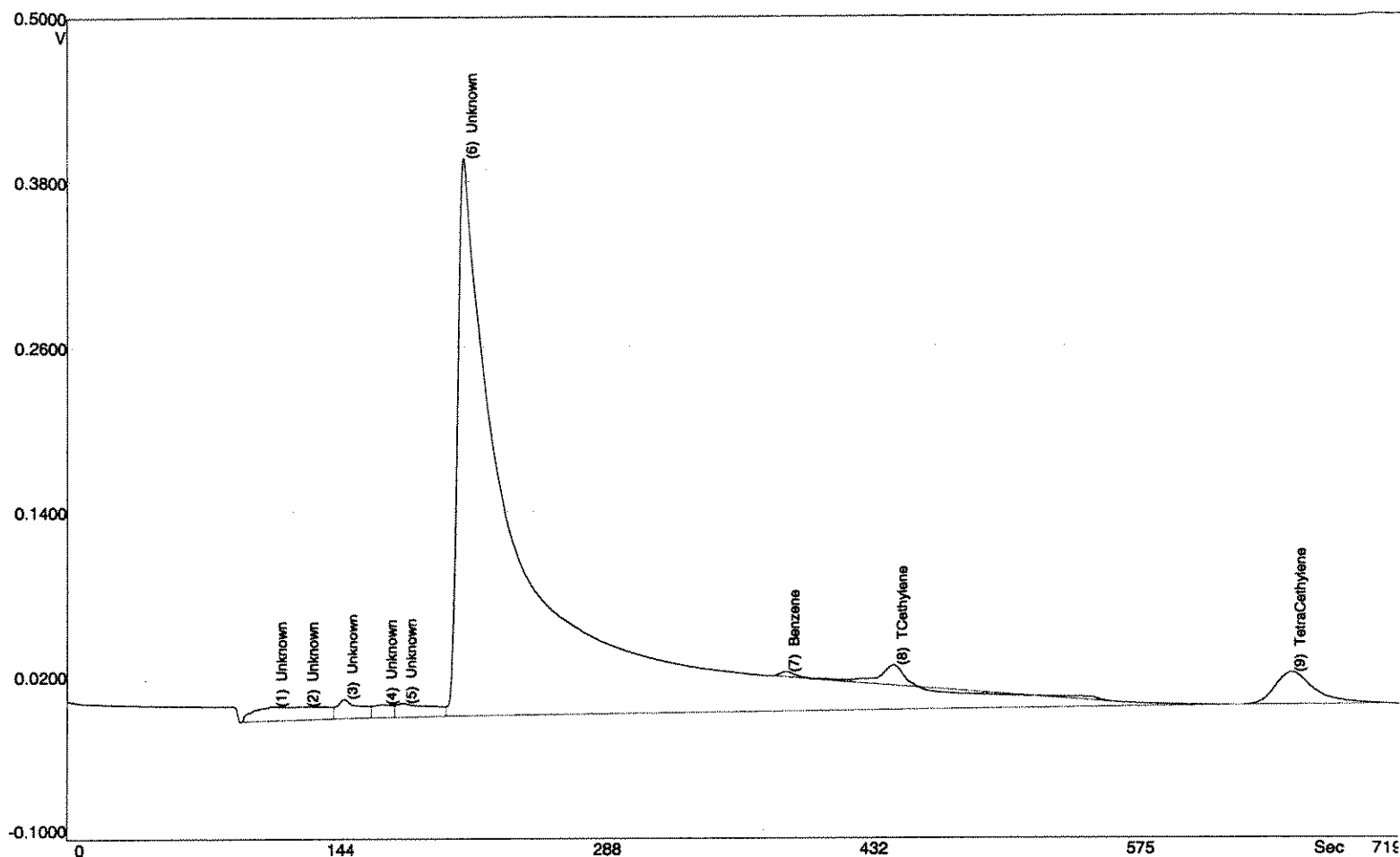
PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		288	44.7		99.5
2	Unknown		52.7	3.293		118.9
3	Unknown		49.7	4.088		397.3
4	TCethylene	4.472	6202	491		454.4
5	TetraCethylene	4.746	140304	2502		669.8

SiteChart Analysis Report - B5012117.ECD

revised
PE = 58 (not used)
PUE = 620/s (used)

SiteChart Analysis Report - B5012121.PID



RESULTS:

Date Jan 21, 2005
 Time 15:50:50
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 43
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 32.0 C

1x

1004e

R52

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		434	11.2	110.8	
2	Unknown		0.927	0.265	127.7	
3	Unknown		204	5.476	149.2	
4	Unknown		115	0.005	170.4	

SiteChart Analysis Report - B5012121.PID

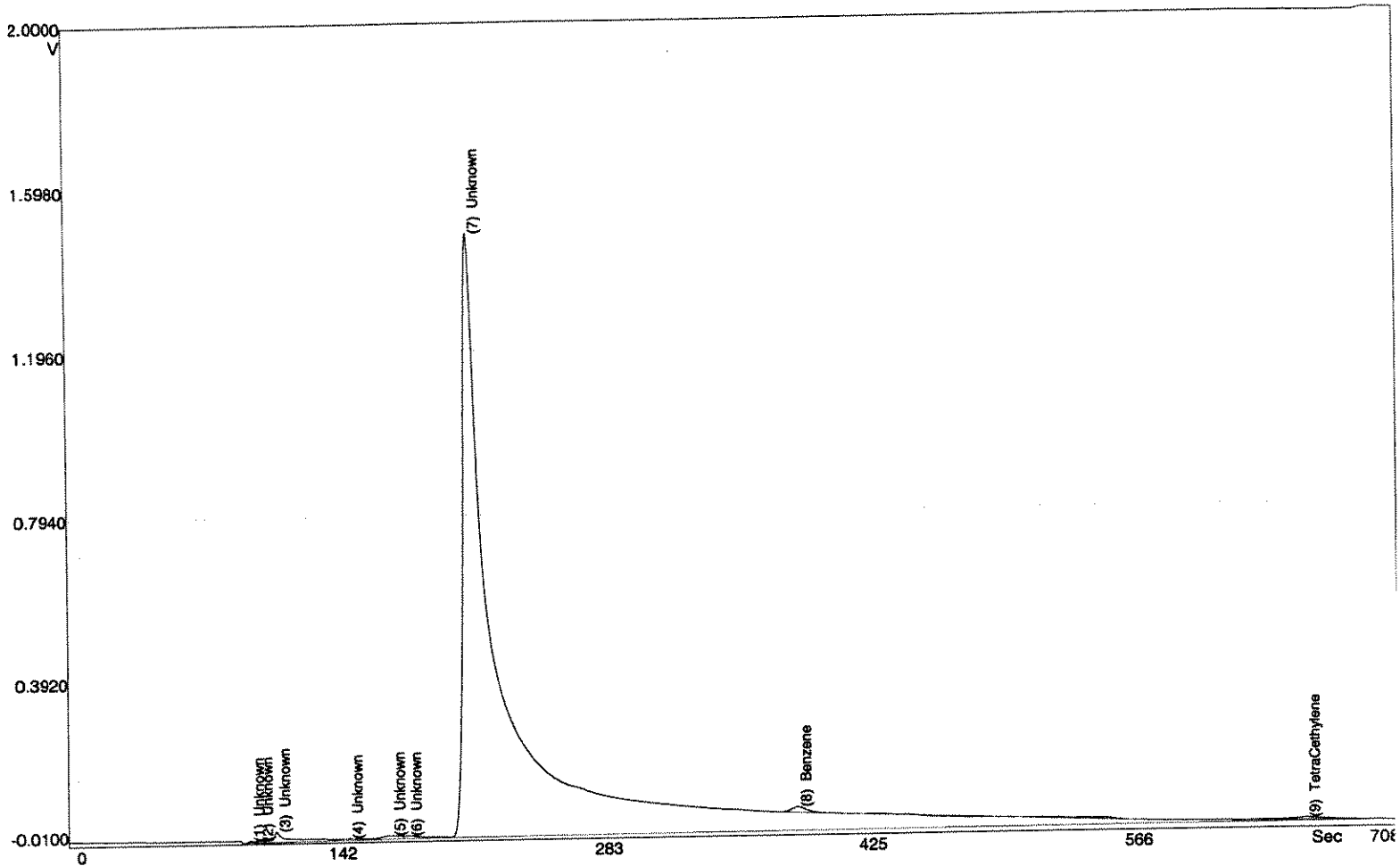
5 Unknown		224	1.839	180.8
6 Unknown		17583	400	213.0
7 Benzene	0.005	53.9	2.926	387.3
8 TCethylene	0.003	162	10.5	445.2
9 TetraCethylene	0.011	582	23.9	660.8

revised

TCE \rightarrow .0027 \rightarrow N.Y.

PCB's .0127 \rightarrow 0.013 ug/l

SiteChart Analysis Report - B5012122.PID



RESULTS:

Date Jan 21, 2005
 Time 16:04:16
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 45
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 32.0 C

1x
 1004e

R 5 3

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

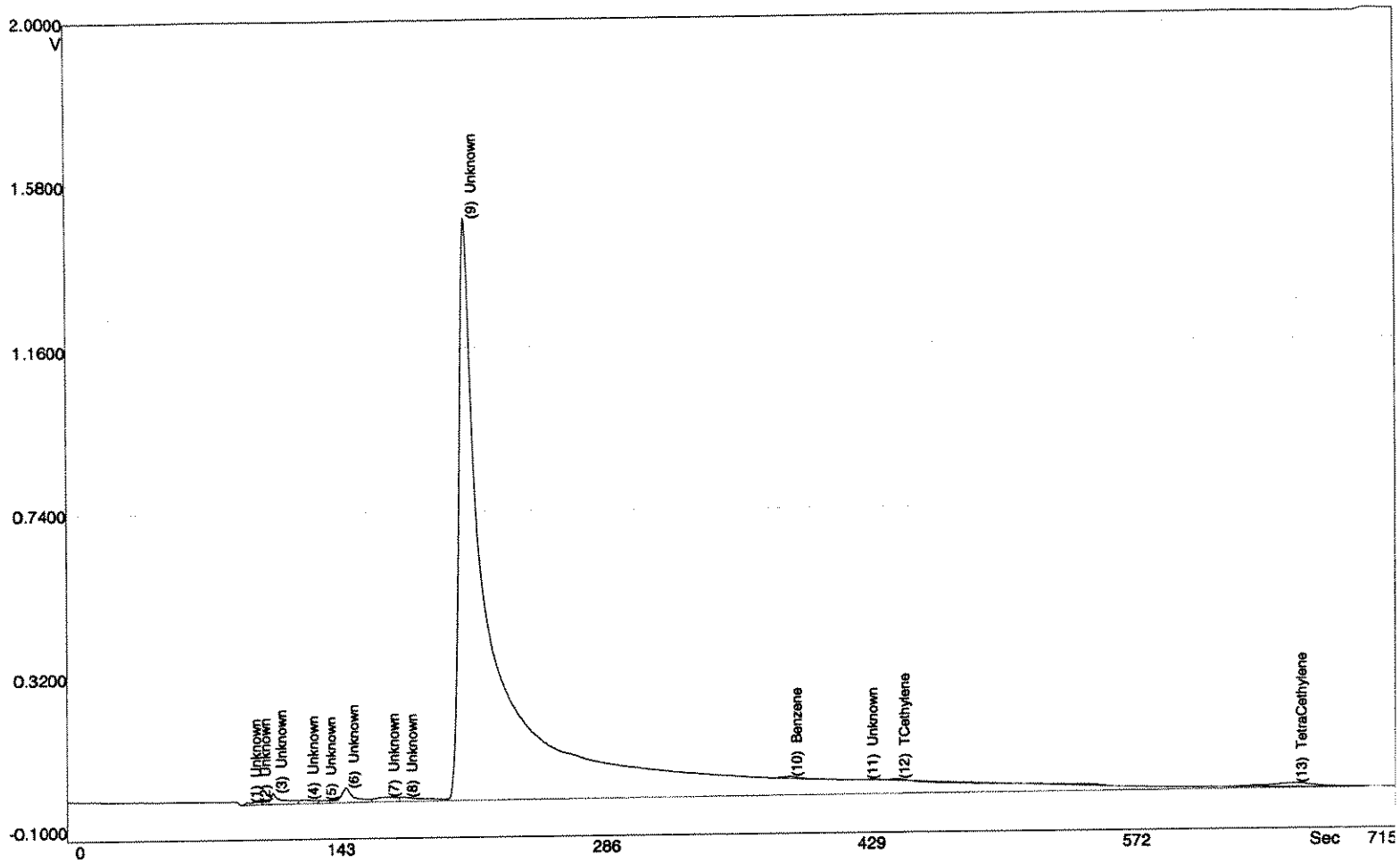
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		14.3	4.708		96.3
2	Unknown		22.5	1.707		100.9
3	Unknown		315	25.7		110.0
4	Unknown		1428	0.269		149.0

SiteChart Analysis Report - B5012122.PID

5 Unknown		112	6.384	171.4
6 Unknown		101	0.761	180.2
7 Unknown		38557	1486	213.4
8 Benzene	0.014	153	12.0	388.3
9 TetraCethylene	0.002	125	3.803	660.2

revised
TCE = ND
 PCB = ND

SiteChart Analysis Report - B5012124.PID



RESULTS:

Date Jan 21, 2005
 Time 16:29:57
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 49
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 32.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		20.6	6.825	96.5	
2	Unknown		40.5	2.678	101.5	
3	Unknown		231	27.0	110.3	
4	Unknown		90.5	1.921	127.1	

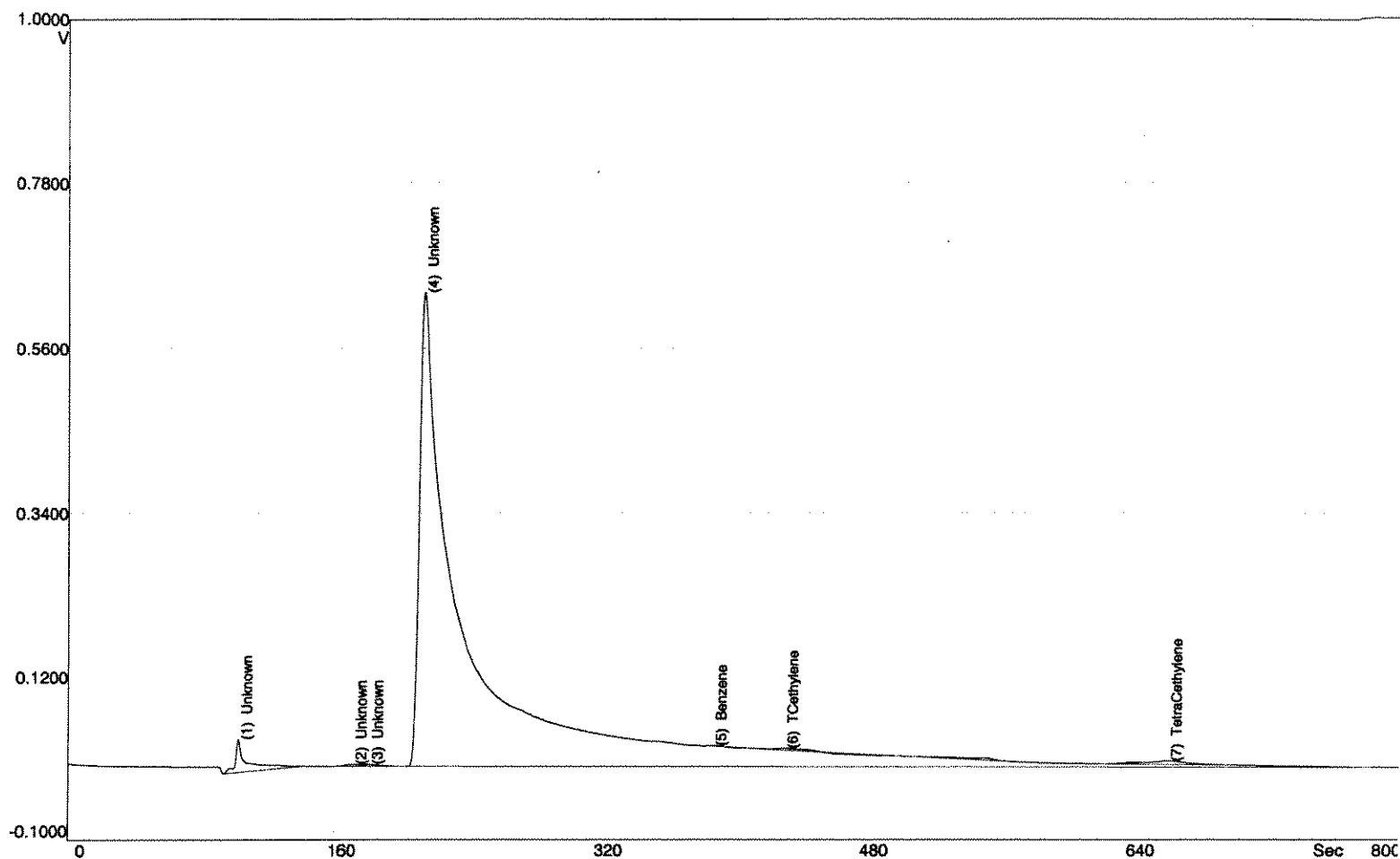
ix
 1004p R51

SiteChart Analysis Report - B5012124.PID

5	Unknown		45.8	0.498	136.9
6	Unknown		330	31.7	149.2
7	Unknown		161	4.979	170.8
8	Unknown		174	0.451	180.4
9	Unknown		38043	1491	213.6
10	Benzene	0.004	47.7	3.323	388.0
11	Unknown		20.0	0.430	428.8
12	TCethylene	0.001	54.1	2.353	446.0
13	TetraCethylene	0.006	299	9.047	660.8

recalc'd
TCH = ND
PCH = ND

SiteChart Analysis Report - B5012127.PID



RESULTS:

Date Jan 21, 2005
 Time 17:17:47
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 55
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 32.0 C

IX
10044 *R43*

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

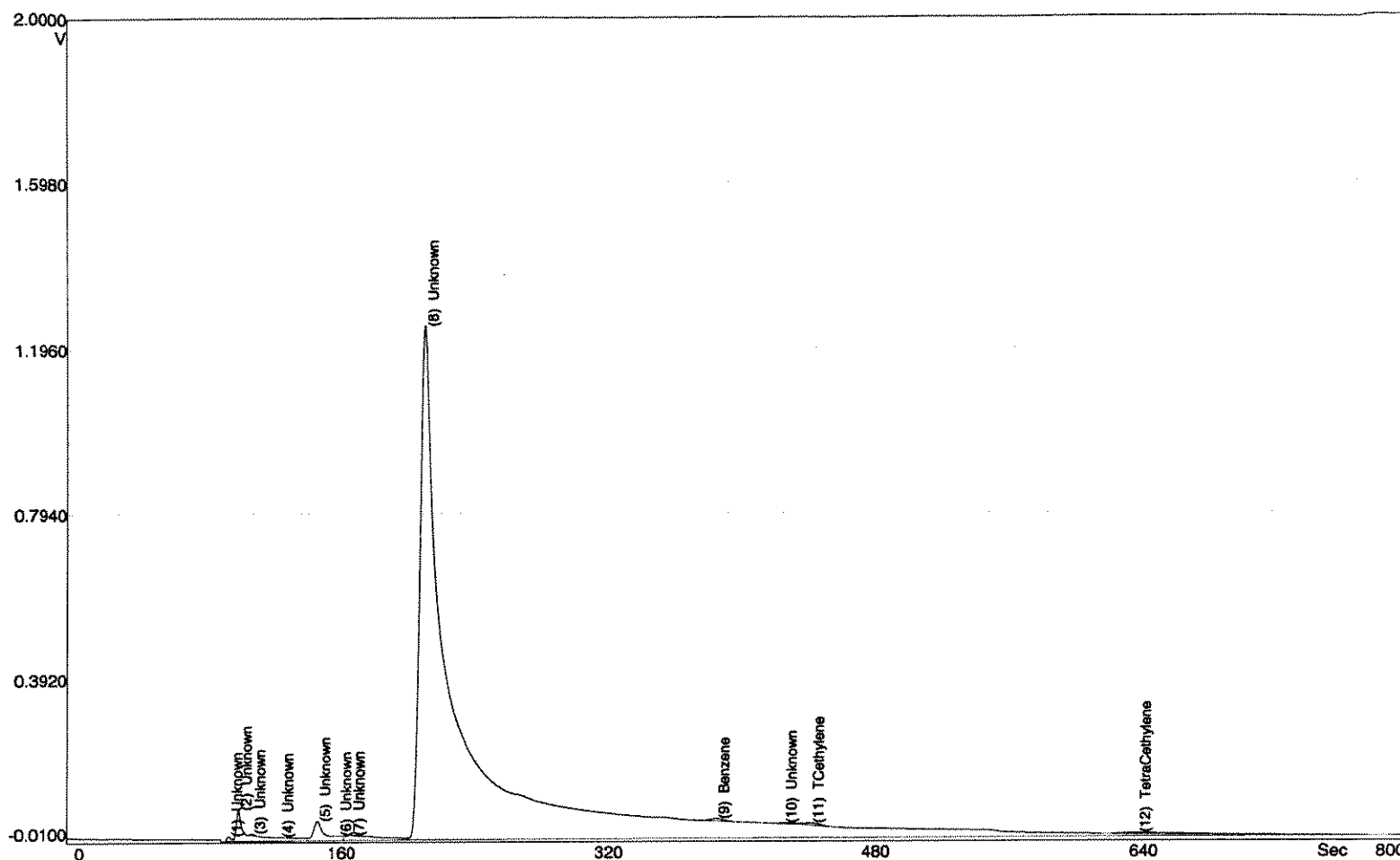
#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		360	45.8	101.9	
2	Unknown		33.7	3.163	170.8	
3	Unknown		31.3	0.781	180.6	

SiteChart Analysis Report - B5012127.PID

5 Benzene		9.931	0.548	387.0
6 TCethylene	0.002	98.6	0.721	430.0
7 TetraCethylene	0.003	161	4.031	660.2

recalc'd
TCe = Nb
PCE = ND

SiteChart Analysis Report - B5012128.PID



RESULTS:

Date Jan 21, 2005
 Time 17:32:04
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 57
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 32.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		37.8	12.5		96.4
2	Unknown		600	75.4		102.1
3	Unknown		11.3	3.373		110.3
4	Unknown		1.570	0.250		125.0

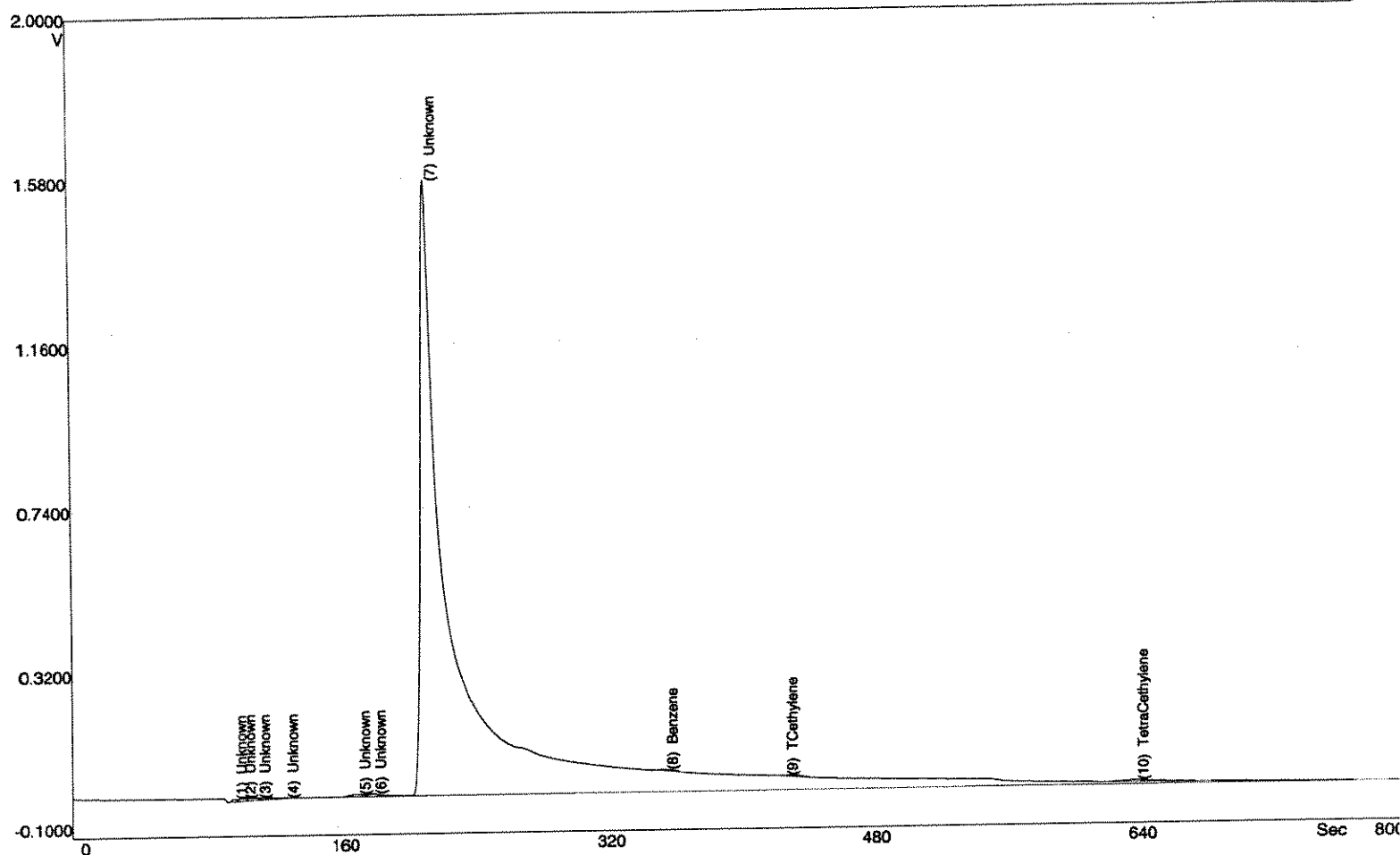
1x
 1004e R42

SiteChart Analysis Report - B5012128.PID

5 Unknown		387	41.1	149.4
6 Unknown		1.124	0.724	162.0
7 Unknown		296	1.784	170.0
8 Unknown		34967	1253	213.6
9 Benzene	0.005	58.3	5.105	388.3
10 Unknown		31.9	0.364	428.8
11 TCethylene	0.001	60.4	1.298	444.8
12 TetraCethylene	0.002	95.2	2.579	639.8

Recalc'd
 TCE = ND
 PCE = ND

SiteChart Analysis Report - B5012129.PID



RESULTS:

Date Jan 21, 2005
 Time 17:46:24
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 59
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 32.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		21.3	7.327		96.4
2	Unknown		38.6	8.840		101.5
3	Unknown		82.7	0.684		110.7
4	Unknown		3.239	0.164		127.6

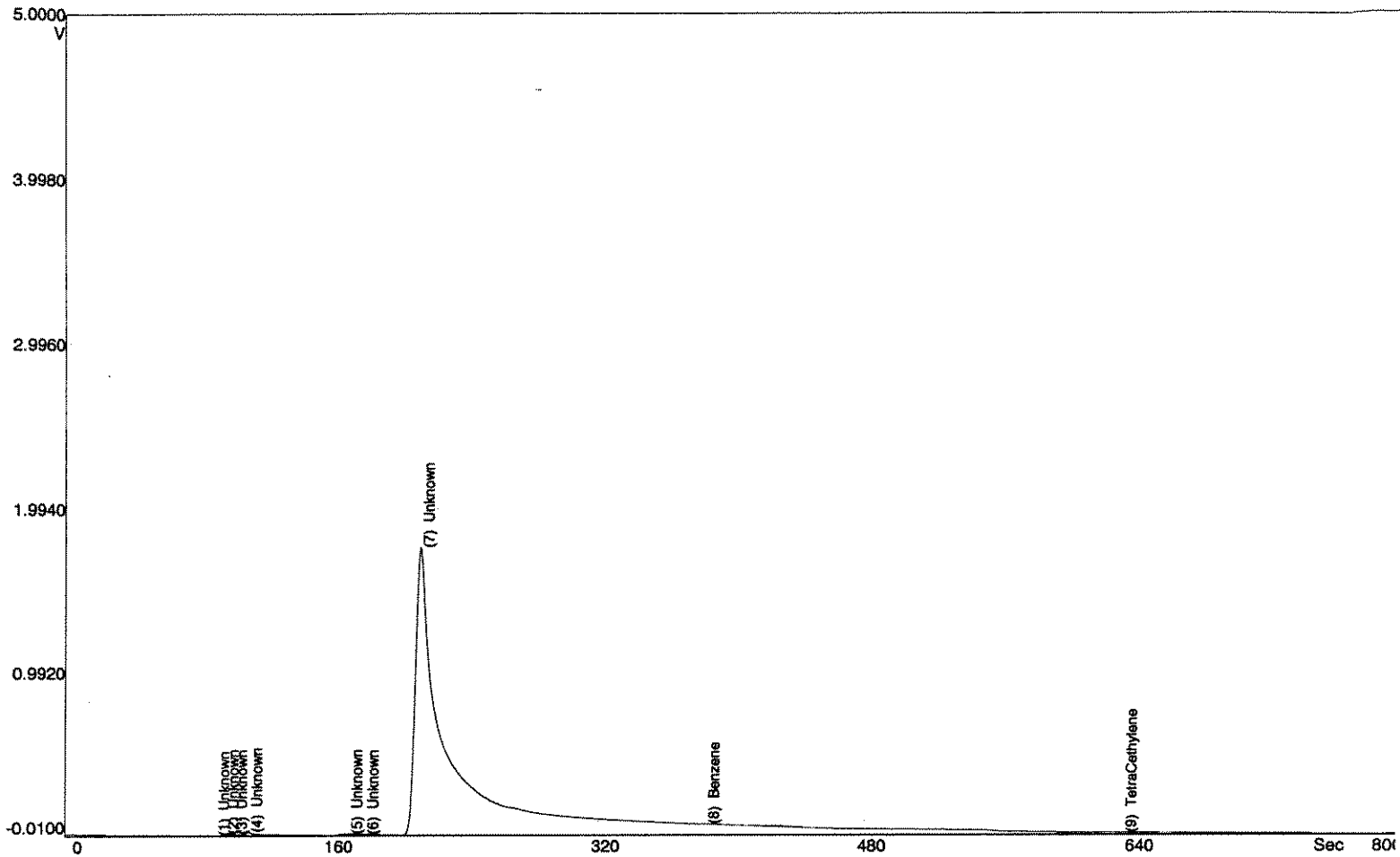
14
 LOOMER R41

SiteChart Analysis Report - B5012129.PID

5 Unknown		72.6	6.820	171.2
6 Unknown		80.8	7.743	180.8
7 Unknown		39685	1578	213.8
8 Benzene	0.003	33.2	1.438	356.3
9 TCethylene		30.5	0.269	428.8
10 TetraCethylene	0.002	107	3.502	639.2

Revised
TCE = ND
 PCB = ND

SiteChart Analysis Report - B5012203.PID



RESULTS:

Date Jan 22, 2005
 Time 09:49:08
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 7
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 29.0 C

1x
 100% R-34

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

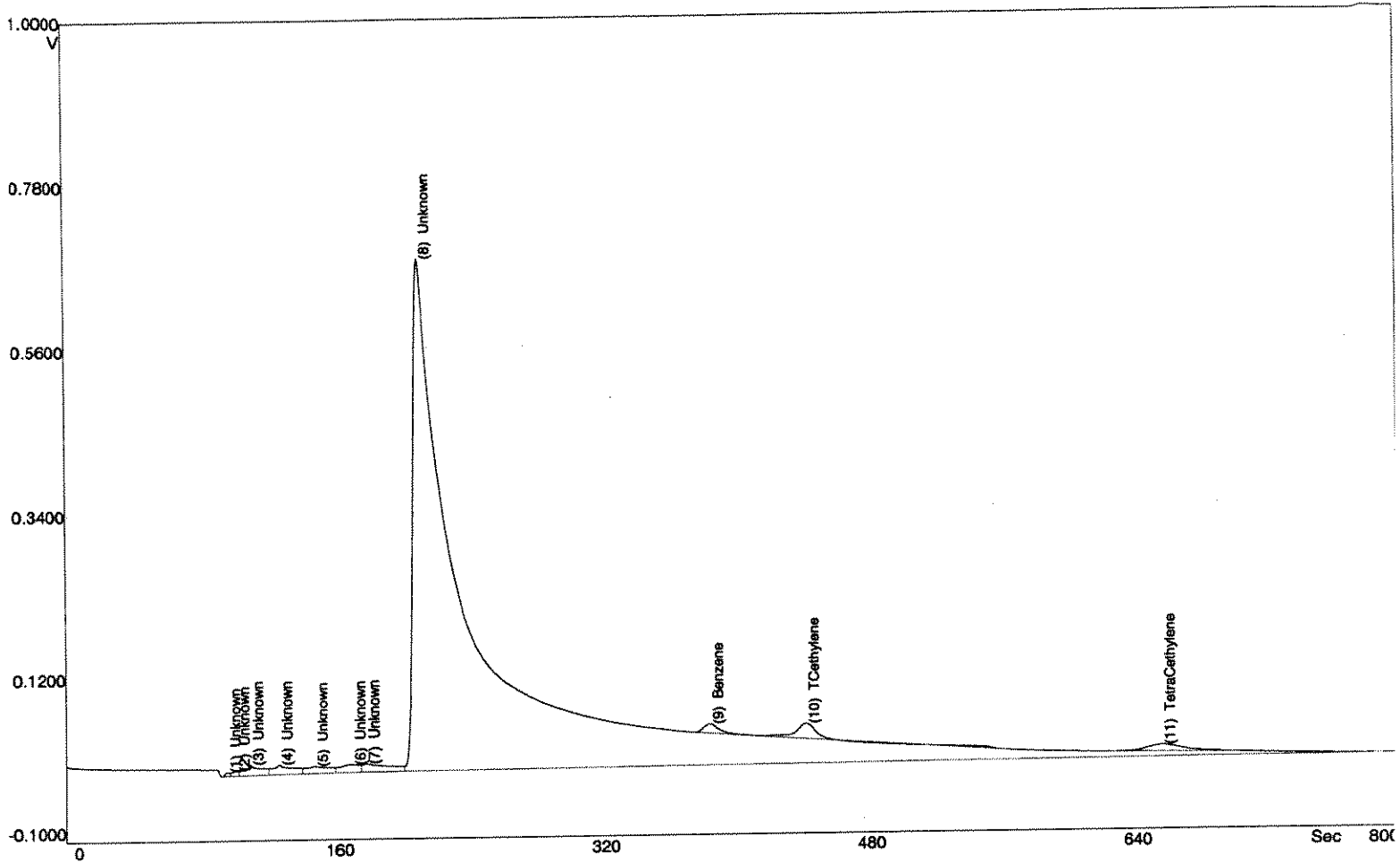
PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		0.957	0.757	90.3	
2	Unknown		42.2	12.2	95.9	
3	Unknown		50.2	3.917	100.8	
4	Unknown		240	18.8	110.0	

SiteChart Analysis Report - B5012203.PID

5 Unknown		112	8.044	170.2
6 Unknown		97.3	0.788	179.8
7 Unknown		51064	1762	212.6
8 Benzene	0.011	127	0.511	384.3
9 TetraCethylene		29.1	1.199	633.8

SiteChart Analysis Report - B5012205.PID



RESULTS:

Date Jan 22, 2005
 Time 10:21:13
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 11
 Tag sab HS
 Column Temp 59.0 C
 Det Temp 59.0 C
 Ambient Temp 29.0 C

1x
 1004e

R-56

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

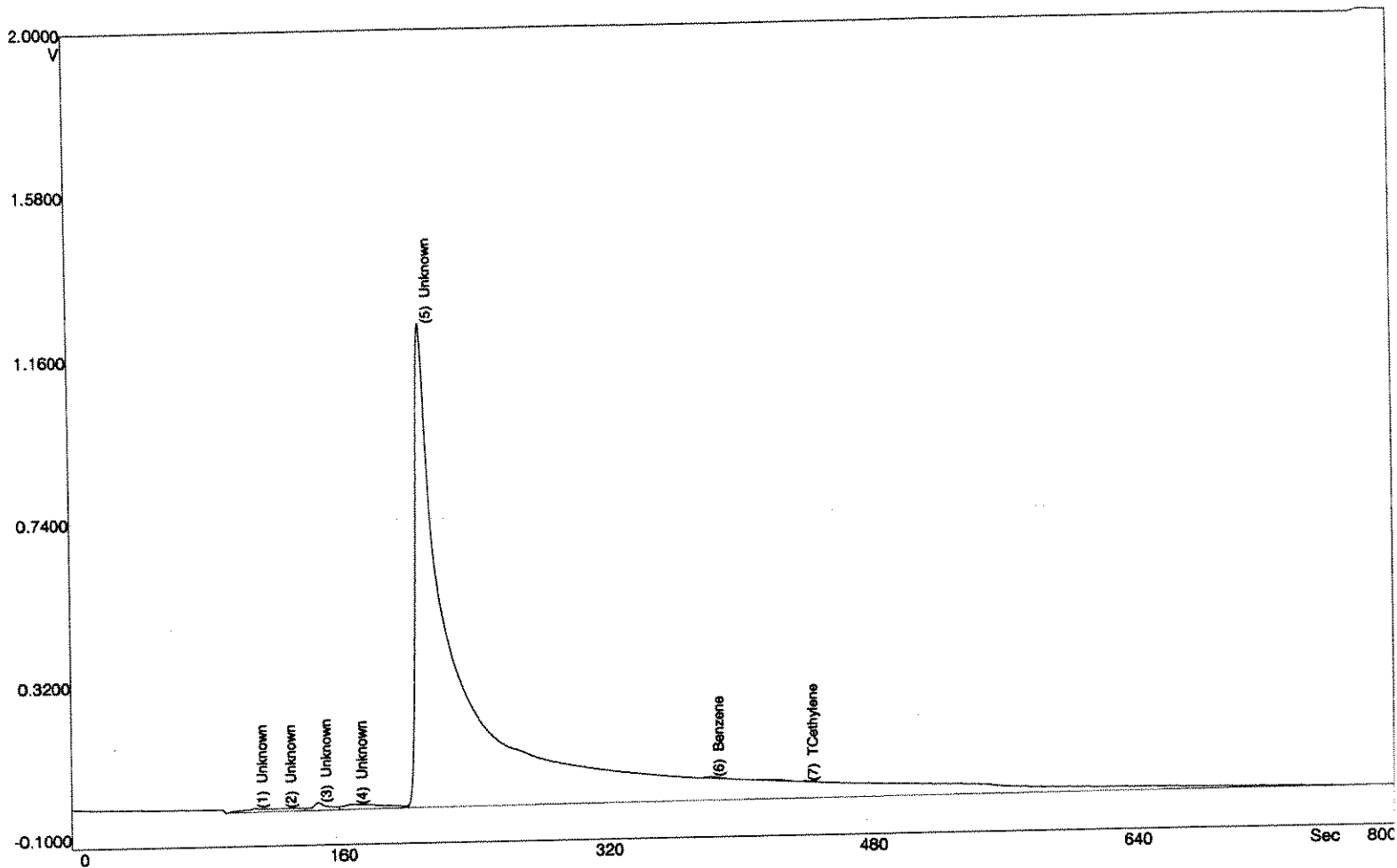
PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		16.6	5.638		96.3
2	Unknown		30.0	2.344		101.5
3	Unknown		163	13.4		110.3
4	Unknown		180	4.522		127.6

SiteChart Analysis Report - B5012205.PID

5 Unknown		158	1.957	149.0
6 Unknown		137	3.693	171.6
7 Unknown		210	4.180	180.0
8 Unknown		31408	682	212.2
9 Benzene	0.012	136	10.8	386.7
10 TCethylene	0.006	315	16.1	444.4
11 TetraCethylene	0.004	235	8.299	658.4

SiteChart Analysis Report - B5012206.PID



RESULTS:

Date Jan 22, 2005
 Time 10:36:14
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 13
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 29.0 C

1x
 1004C R57

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

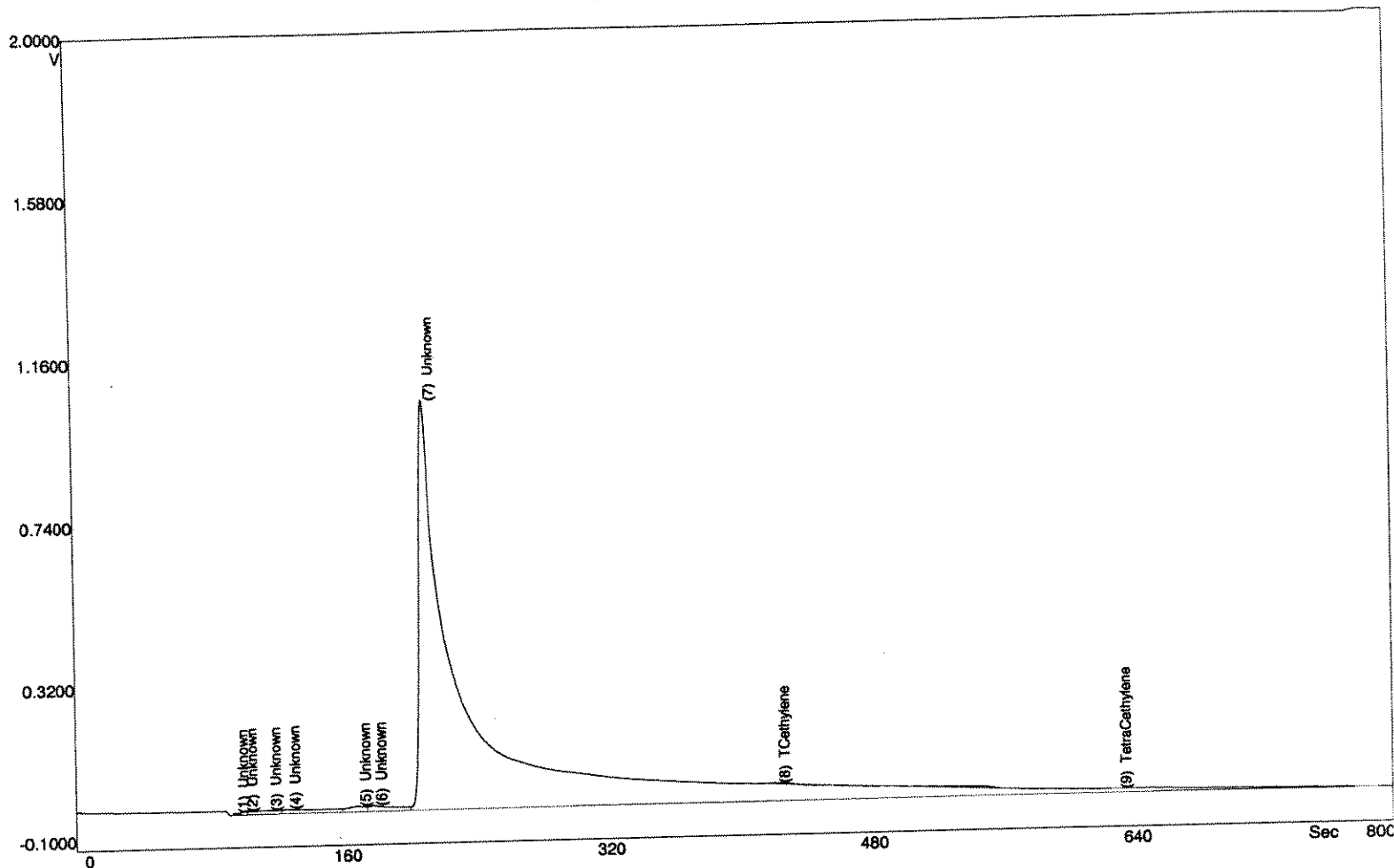
PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		292	11.4	110.0	
2	Unknown		3.225	0.808	127.3	
3	Unknown		216	14.7	148.8	
			354	5.806	170.6	

SiteChart Analysis Report - B5012206.PID

5 Unknown		43820	1248	212.4
6 Benzene	0.004	46.2	2.396	385.7
7 TCethylene		9.829	0.427	442.8

SiteChart Analysis Report - B5012210.PID



RESULTS:

Date Jan 22, 2005
 Time 11:36:52
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 21
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 36.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

lx
 100 uL
 R54

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

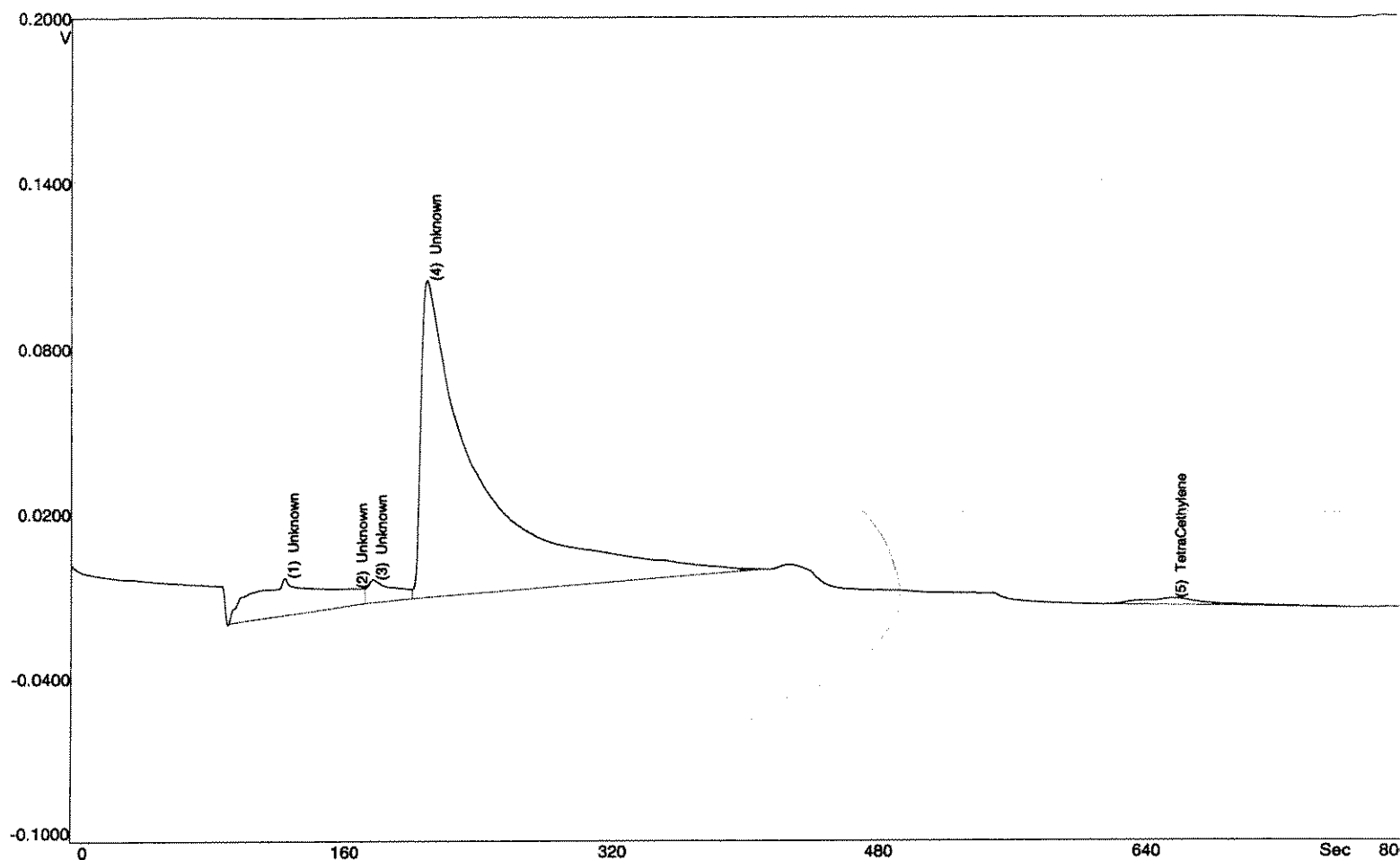
PEAK REPORT:

#	Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1	Unknown		18.7	5.699		96.1
2	Unknown		36.2	3.305		101.5
3	Unknown		185	1.636		115.9
			339	10.2		127.7

SiteChart Analysis Report - B5012210.PID

5 Unknown		181	5.439	170.4
6 Unknown		283	6.119	180.2
7 Unknown		37652	1054	212.2
8 TCethylene	0.002	93.1	0.772	424.8
9 TetraCethylene		2.256	0.142	632.0

SiteChart Analysis Report - B5012211.PID



RESULTS:

Date Jan 22, 2005
 Time 11:52:11
 Instrument FGGE202
 Detector PID
 Column B
 Analysis# 23
 Tag sab HS
 Column Temp 60.0 C
 Det Temp 60.0 C
 Ambient Temp 40.0 C

METHOD:

Analysis Time 800.0 S
 PumpTime 5.0 S
 Back Flush 400.0 S
 Temperature 60.0 C
 Pressure 8.0 psi
 Inject Syringe, 100.0 uL
 PID State High Sense

INTEGRATION METHOD:

Manual Integration
 SlopeUp 0.1 mV/S
 SlopeDown 0.1 mV/S
 Min Height 0.0 mV
 Min Area 0.0 mVS
 FilterLevel 3
 Delay 80 Sec

PEAK REPORT:

# Name	Conc (PPM)	Area (mVS)	Height (mV)	R.T. (S)	Status
1 Unknown		683	16.4	128.1	
2 Unknown		0.697	0.203	169.2	
3 Unknown		150	3.386	180.8	
4 Unknown		4706	112	213.0	

1x
 1004e R55

SiteChart Analysis Report - B5012211.PID

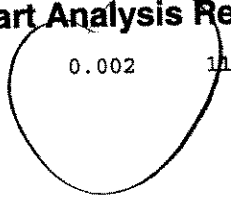
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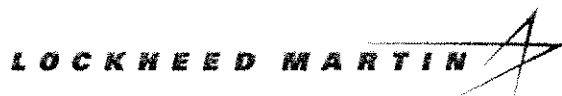
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APPENDIX C
Statistical Analyses of Field and Laboratory Data
Sabana Abajo Industrial Park PCE Site
Trip Report
October 2005

APPENDIX C
Final Analytical Report
Sabana Abajo Industrial Park PCE Site
Trip Report
November 2005

Lockheed Martin Technology Services
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DATE: 10 March 2005
TO: R. Singhvi EPA/ERTC
FROM: V. Kansal Analytical Section Leader *Vinod Kansal*
SUBJECT: DOCUMENT TRANSMITTAL UNDER WORK ASSIGNMENT # 0-111

Attached please find the following document prepared under this work assignment:

Sabana Abajo PCE - Analytical Report

Central File WA # 0-111
G. Newhart
S. Grossman
J. Soroka

(w/attachment)
Work Assignment Manager (w/attachment)
Task Leader (w/attachment)
Data Validation and Report Writing
Group Leader (w/o attachment)

ANALYTICAL REPORT

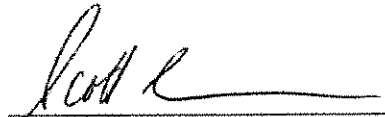
Prepared by
LOCKHEED MARTIN, Inc.

Sabana Abajo PCE
Sabana Abajo, Puerto Rico

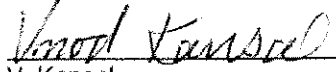
March 2004

EPA Work Assignment No. 0-111
LOCKHEED MARTIN Work Order EAC00111
EPA Contract No. EP-C-04-032

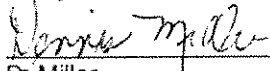
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Introduction

REAC in response to WA 0-111, provided analytical support for environmental samples collected from Sabana Abajo PCE, located in Carolina, Puerto Rico described in the following table. The support also included QA/QC, data review, and preparation of an analytical report containing a summary of the analytical methods, the results, and the QA/QC results.

The samples were treated with procedures consistent with those specified in SOP #1008.

COC #	Number of Samples	Sampling Date	Date Received	Matrix	Analysis	Laboratory	Data Package
111-0105-0001	3	1/15/2005	1/19/2005	Water	VOC	REAC	P 039
	2	1/17/2005					
	1	1/18/2005					
111-0105-0002	2	1/19/2005	1/24/2005				
	3	1/20/2005					
111-0105-0003	8	1/21/2005	1/25/2005				
	2	1/22/2005					

Case Narrative

The data in this report have been validated to two significant figures. Any other representation of the data is the responsibility of the user. All data validation flags have been inserted into the results tables.

VOC in Water Package P 039

The method blank B012105 contained acetone (2.1ug/L). The associated samples were for dilutions for other compounds. Data are not affected.

The method blank B012405-1 contained acetone (2.2ug/L). Acetone is considered as non-detect for 111-0105-TB2.

The trip blank sample 111-0105-TB contained 2-butanone (3.4ug/L) and chloroform(3.4ug/L). Data not affected, compounds were not detected in the associated samples.

The trip blank sample 111-0105-TB2 contained 2-butanone (2.2ug/L) and chloroform(2.0ug/L). The result for 2-butanone is considered non-detect in sample 111-0105-R36.

The trip blank sample 111-0105-TB3 contained acetone (19ug/L), 2-butanone(2.3ug/L), and chloroform(1.4ug/L). Acetone is considered as non-detect for samples: 111-0105-FB, 111-0105-R49, 111-0105-R51, 111-0105-R47, 111-0105-R50, and 111-0105-R48. Butanone is considered as non-detect for samples: 111-0105-FB and 111-0105-R49. Chloroform is considered as non-detect for samples: 111-0105-FB.

In the initial calibration run on 1/18/05 the response factor (RF) failed for 1,2-dibromo-3-chloropropane in the 5, 20 and 50ppb standards. The MDL was raised to 100ppb for the following samples: 111-0105-TB, 111-0105-R01, 111-0105-W02, 111-0105-W03, 111-0105-W17 and water blank B011905-1.

In the initial calibration run on 1/20/05 the average response factor (RF) failed for 1,2-dibromo-3-chloropropane (0.042). The 1,2-dibromo-3-chloropropane results are rejected for: 111-0105-R02, and water blank B012005-2.

In the initial calibration run on 1/21/05 the average response factor (RF) failed for 1,2-dibromo-3-chloropropane (0.048). The 1,2-dibromo-3-chloropropane results are rejected for the following samples: 111-0105-TB, 111-0105-R15, 111-0105-R14, 111-0105-TB3, 111-0105-FB, 111-0105-R40, 111-0105-R36, 111-0105-R43, 111-0105-43D, 111-0105-R48, 111-0105-R55, 111-0105-R49, 111-0105-R51, 111-0105-R47, and 111-0105-R50. Also, for the following water blanks: water blank B012405-1, water blank B012605-1, and water blank B012705-1.

The acceptable QC limits were exceeded for the relative response factor for 1,2-dibromo-3-chloropropane (0.045) in the continuing calibration check standard (BV9948) run on 1/19/2005. The results are rejected for samples: 111-0105-TB, 111-0105-R01, 111-0105-W02, 111-0105-W03, and 111-0105-W17. Also, for water blank B011905-1.

The acceptable QC limits were exceeded for the relative response factor for 1,2-dibromo-3-chloropropane (0.049) in the continuing calibration check standard (BV0096) run on 1/27/2005. This compound was previously qualified as rejected for the associated samples by the initial calibration (1/21/2005) non-conformance.

The acceptable QC limits were exceeded for the relative response factor for 1,2-dibromo-3-chloropropane (0.042) in the continuing calibration check standard (BV0129) run on 1/29/2005. The associated samples were for dilution runs for other compounds. The data are not affected.

In the initial calibration run on 1/20/05 the relative standard deviation (%RSD) failed for bromomethane (47%), chloroethane (48%), trichlorofluoromethane (38%). These compounds were not detected in the associated samples. The data are not affected.

The acceptable QC limits were exceeded for the percent difference for vinyl chloride (55%) in the continuing calibration check standard of 1/19/05 (BV9948). Samples which had vinyl chloride detected were reanalyzed under an acceptable calibration. The non detect results for 111-0105-TB and water blank B011905-1 are estimated.

The acceptable QC limits were exceeded for the percent difference for chloroethane (26%) in the continuing calibration check standard of 1/24/05 (BV0027). Chloromethane was not detected in the associated samples. The data are not affected.

Summary of Abbreviations

AA	Atomic Absorption
B	The analyte was found in the blank
BFB	Bromofluorobenzene
C	Centigrade
cont.	Continued
D	(Surrogate Table) this value is from a diluted sample and was not calculated (Result Table) this result was obtained from a diluted sample
Dioxin and/or	
PCDD and PCDF	denotes Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans
CLP	Contract Laboratory Protocol
COC	Chain of Custody
CONC	Concentration
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
DFTPP	Decafluorotriphenylphosphine
DL	Detection Limit
E	The value is greater than the highest linear standard and is estimated
EMPC	Estimated maximum possible concentration
ICAP	Inductively Coupled Argon Plasma
ISTD	Internal Standard
J	The value is below the method detection limit and is estimated
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MDL	Method Detection Limit
MI	Matrix Interference
MS (BS)	Matrix Spike (Blank Spike)
MSD (BSD)	Matrix Spike Duplicate (Blank Spike Duplicate)
MW	Molecular Weight
NA	either Not Applicable or Not Available
NC	Not Calculated
NR	Not Requested
NS	Not Spiked
% D	Percent Difference
% REC	Percent Recovery
PPB	Parts per billion
PPBV	Parts per billion by volume
PPMV	Parts per million by volume
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
QL	Quantitation Limit
R	The datum is rejected
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SIM	Selected Ion Monitoring
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
U	Denotes not detected
W	Weathered analyte; Aroclor pattern displays a degradation of earlier eluting peaks
m ³	cubic meter kg kilogram µg microgram
L	liter g gram pg picogram
mL	milliliter mg milligram ng nanogram
µL	microliter
*	denotes a value that exceeds the acceptable QC limit
	Abbreviations that are specific to a particular table are explained in footnotes on that table

Revision 11/18/04

Analytical Procedure for VOC in Water

A modified 524.2 method for the analysis of Volatile Organic Compounds in water was used. Samples were purged, trapped, and desorbed to a GC/MS system. Prior to purging, the samples were spiked with a three component surrogate mixture consisting of toluene- d_8 , 4-bromofluorobenzene and 1,2-dichloroethane- d_4 and a three component internal standard mixture consisting of bromochloromethane, 1,4-difluorobenzene, and chlorobenzene- d_5 .

The purge and trap unit consisted of: A Tekmar concentrator (3000 series) equipped with an Archon autosampler (Dynateck Corp.) and a VOCARB 3000 trap (Supelco).

The purge and trap instrument conditions were:

Purge	10 min at 35° C
Dry Purge	2 min at 35° C
Desorb Preheat	245° C
Desorb	4 min at 250° C
Purge Flow Rate	40 mL/min
Bake	10 min at 260° C

A Hewlett Packard 5973 GC/MSD equipped with an HP Chem Station data system was used to analyze the data.

The instrument conditions were:

Column:	30 meter x 0.25 mm ID, RTx-Volatiles (Restek Corp.) column with 3.0 μ m film thickness.
Temperature:	4 min at 40° C 9° C/min to 165° C, hold for 2 min. 12° C/min to 220° C, hold for 7 min.
Flow Rate	Helium at 1.0 mL/min.
Mass Spectrometer:	Electron Impact Ionization at a nominal electron energy of 70 electron volts, scanning from 35-350 amu at one scan/sec.

Computer: Preprogrammed to plot Extracted Ion Current Profile (EICP); capable of integrating ions and plotting abundances vs time or scan number. A library search (NIST-98) for tentatively identified compounds was performed on samples.

The GC/MS system was calibrated using 6 VOC standards at 5, 20, 50, 100, 150, and 200 μ g/L. (Exception was acetone, calibrated using 5 VOC standards-20, 50, 100, 150 and 200 μ g/L). Before analysis each day, the system was tuned with 50-ng BFB and passed a continuing calibration check when analyzing a 50 μ g/L standard mixture in which the responses were evaluated by comparison to the average responses of the calibration curve.

The results are in Table 1.1; the tentatively identified compounds are listed in Table 1.2.

The concentrations of the analytes were calculated using the following equation:

$$C_u = \frac{A_x \times I_{is} \times D}{A_{is} \times RF \text{ (or } RF_{ave})}$$

where

C_u = Concentration of target analyte ($\mu\text{g/L}$)
 A_x = Area of the target analyte
 I_{is} = Concentration of specific internal standard ($\mu\text{g/L}$)
 A_{is} = Area of the specific internal standard
 RF = Response Factor
 RF_{ave} = average Response Factor
 D = Dilution factor

The average Response Factor is used when a sample is associated with an initial calibration curve. The Response Factor is used when a sample is associated with a continuing calibration curve.

Response Factor calculation:

The response factor (RF) for each specific analyte is quantitated based on the area response from the continuing calibration check as follows:

$$RF = \frac{A_c \times I_{is}}{A_{is} \times I_c}$$

where,

RF = Response factor for a specific analyte
 A_c = Area of the analyte in the standard
 I_{is} = Concentration of the specific internal standard
 A_{is} = Area of the specific internal standard
 I_c = Concentration of the analyte in the standard

$$RF_{ave} = \frac{RF_1 + \dots + RF_n}{n}$$

and

n = number of Samples

Revision of 01/21/04

Table 1.1 Results of the Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample #	Water Blank B Q11935-1		111-0105-TB		111-0105-R01		111-0105-W02		111-0105-W03	
Location			Trip Blank		MW-R1		MW-W02		MW-W03	
Dist. Fact.										
Unit	µg/L		µg/L		µg/L		µg/L		µg/L	
Compound	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL
Dichlorodifluoromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Chloromethane	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
Vinyl Chloride	U	1.0	U	1.0	13	1.0	180	1.0	310	1.0
Bromomethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Chloroethane	U	1.0	U	1.0	U	1.0	U	1.0	1.4	1.0
Trichlorofluoromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Acetone	U	8.0	U	8.0	U	8.0	U	8.0	U	8.0
1,1-Dichloroethene	U	1.0	U	1.0	2.4	1.0	4.7	1.0	3.3	1.0
Methylene Chloride	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Carbon Disulfide	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Methyl-t-butyl Ether	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
trans-1,2-Dichloroethene	U	1.0	U	1.0	1.8	1.0	12	1.0	5.6	1.0
1,1-Dichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
2-Butanone	U	1.0	3.4	1.0	U	1.0	U	1.0	U	1.0
2,2-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
cis-1,2-Dichloroethene	U	1.0	U	1.0	150	1.0	710	1.0	1800	1.0
Chloroform	U	1.0	3.4	1.0	U	1.0	U	1.0	U	1.0
1,1-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,1-Trichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Carbon Tetrachloride	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Benzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Trichloroethane	U	1.0	U	1.0	97	1.0	3100	1.0	1500	1.0
1,2-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromodichloromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Dibromomethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
cis-1,3-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
trans-1,3-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,2-Trichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Dibromochloromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dibromoethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromoform	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
4-Methyl-2-Pentanone	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Toluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
2-Hexanone	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Tetrachloroethene	U	1.0	U	1.0	280	1.0	15000	1.0	2000	1.0
Chlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,1,2-Tetrachloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Ethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
p,m-Xylene	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
o-Xylene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Styrene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Isopropylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,2,2-Tetrachloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,3-Trichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
n-Propylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3,5-Trimethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
2-Chlorotoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
4-Chlorotoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
tert-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,4-Trimethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
sec-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
p-Isopropyltoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,4-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
n-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dichlorobenzene	U	1.0	U	1.0	U	1.0	1.2	1.0	U	1.0
1,2-Dibromo-3-chloropropane	R	100	R	100	R	100	R	100	R	100
1,2,4-Trichlorobenzene	U	1.0	U	1.0	U	1.0	3.1	1.0	1.5	1.0
Hexachlorobutadiene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Naphthalene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,3-Trichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0

~1445

Table 1.1(Cont.) Results of the Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample # :	Water Blank B 011905-1	111-0105-W17		
Location		MW-W17		
Oil Fact.	1	1		
Unit	µg/L	µg/L		
Compound	Conc.	MDL	Conc.	MDL
Dichlorodifluoromethane	U	1.0	U	1.0
Chloromethane	U	2.0	U	2.0
Vinyl Chloride	U	1.0	3400	1.0
Bromomethane	U	1.0	U	1.0
Chloroethane	U	1.0	U	1.0
Trichlorofluoromethane	U	1.0	U	1.0
Acetone	U	8.0	U	8.0
1,1-Dichloroethene	U	1.0	19	1.0
Methylene Chloride	U	1.0	U	1.0
Carbon Disulfide	U	1.0	U	1.0
Methyl-t-butyl Ether	U	1.0	U	1.0
trans-1,2-Dichloroethene	U	1.0	42	1.0
1,1-Dichloroethane	U	1.0	U	1.0
2-Butanone	U	1.0	U	1.0
2,2-Dichloropropane	U	1.0	U	1.0
cis-1,2-Dichloroethene	U	1.0	13000	1.0
Chloroform	U	1.0	U	1.0
1,1-Dichloropropene	U	1.0	U	1.0
1,2-Dichloroethane	U	1.0	U	1.0
1,1,1-Trichloroethane	U	1.0	U	1.0
Carbon Tetrachloride	U	1.0	U	1.0
Benzene	U	1.0	U	1.0
Trichloroethene	U	1.0	6000	1.0
1,2-Dichloropropane	U	1.0	U	1.0
Bromodichloromethane	U	1.0	U	1.0
Dibromomethane	U	1.0	U	1.0
cis-1,3-Dichloropropene	U	1.0	U	1.0
trans-1,3-Dichloropropene	U	1.0	U	1.0
1,1,2-Trichloroethane	U	1.0	U	1.0
1,3-Dichloropropane	U	1.0	U	1.0
Dibromochloromethane	U	1.0	U	1.0
1,2-Dibromoethane	U	1.0	U	1.0
Bromoform	U	1.0	U	1.0
4-Methyl-2-Pentanone	U	1.0	U	1.0
Toluene	U	1.0	U	1.0
2-Hexanone	U	1.0	U	1.0
Tetrachloroethene	U	1.0	5200	1.0
Chlorobenzene	U	1.0	U	1.0
1,1,1,2-Tetrachloroethane	U	1.0	U	1.0
Ethylbenzene	U	1.0	U	1.0
p&m-Xylene	U	2.0	U	2.0
o-Xylene	U	1.0	U	1.0
Styrene	U	1.0	U	1.0
Isopropylbenzene	U	1.0	U	1.0
1,1,2,2-Tetrachloroethane	U	1.0	U	1.0
1,2,3-Trichloropropane	U	1.0	U	1.0
n-Propylbenzene	U	1.0	U	1.0
Bromobenzene	U	1.0	U	1.0
1,3,5-Trimethylbenzene	U	1.0	U	1.0
2-Chlorotoluene	U	1.0	U	1.0
4-Chlorotoluene	U	1.0	U	1.0
tert-Butylbenzene	U	1.0	U	1.0
1,2,4-Trimethylbenzene	U	1.0	U	1.0
sec-Butylbenzene	U	1.0	U	1.0
p-Isopropyltoluene	U	1.0	U	1.0
1,3-Dichlorobenzene	U	1.0	U	1.0
1,4-Dichlorobenzene	U	1.0	U	1.0
n-Butylbenzene	U	1.0	U	1.0
1,2-Dichlorobenzene	U	1.0	U	1.0
1,2-Dibromo-3-chloropropane	R	100	R	100
1,2,4-Trichlorobenzene	U	1.0	1.4	1.0
Hexachlorobutadiene	U	1.0	U	1.0
Naphthalene	U	1.0	U	1.0
1,2,3-Trichlorobenzene	U	1.0	U	1.0

rv1446

Table 1.1(Cont.) Results of the Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample # :	Water Blank B 012005-2		111-0105-R02	
Location :			MW-R2	
Dil. Fact. :	1		1	
Unit :	µg/L		µg/L	
Compound	Conc.	MDL	Conc.	MDL
Dichlorodifluoromethane	U	1.0	U	1.0
Chloromethane	U	2.0	U	2.0
Vinyl Chloride	U	1.0	U	1.0
Bromomethane	U	1.0	U	1.0
Chloroethane	U	1.0	U	1.0
Trichlorofluoromethane	U	1.0	U	1.0
Acetone	U	8.0	U	8.0
1,1-Dichloroethene	U	1.0	U	1.0
Methylene Chloride	U	1.0	U	1.0
Carbon Disulfide	U	1.0	U	1.0
Methyl-t-butyl Ether	U	1.0	U	1.0
trans-1,2-Dichloroethene	U	1.0	U	1.0
1,1-Dichloroethane	U	1.0	U	1.0
2-Butanone	U	1.0	U	1.0
2,2-Dichloropropane	U	1.0	U	1.0
cis-1,2-Dichloroethene	U	1.0	U	1.0
Chloroform	U	1.0	U	1.0
1,1-Dichloropropene	U	1.0	U	1.0
1,2-Dichloroethane	U	1.0	U	1.0
1,1,1-Trichloroethane	U	1.0	U	1.0
Carbon Tetrachloride	U	1.0	U	1.0
Benzene	U	1.0	U	1.0
Trichloroethene	U	1.0	U	1.0
1,2-Dichloropropane	U	1.0	U	1.0
Bromodichloromethane	U	1.0	U	1.0
Dibromomethane	U	1.0	U	1.0
cis-1,3-Dichloropropene	U	1.0	U	1.0
trans-1,3-Dichloropropene	U	1.0	U	1.0
1,1,2-Trichloroethane	U	1.0	U	1.0
1,3-Dichloropropane	U	1.0	U	1.0
Dibromochloromethane	U	1.0	U	1.0
1,2-Dibromoethane	U	1.0	U	1.0
Bromoform	U	1.0	U	1.0
4-Methyl-2-Pentanone	U	1.0	U	1.0
Toluene	U	1.0	U	1.0
2-Hexanone	U	1.0	U	1.0
Tetrachloroethene	U	1.0	U	1.0
Chlorobenzene	U	1.0	U	1.0
1,1,1,2-Tetrachloroethane	U	1.0	U	1.0
Ethylbenzene	U	1.0	U	1.0
p&m-Xylene	U	2.0	U	2.0
o-Xylene	U	1.0	U	1.0
Styrene	U	1.0	U	1.0
Isopropylbenzene	U	1.0	U	1.0
1,1,2,2-Tetrachloroethane	U	1.0	U	1.0
1,2,3-Trichloropropane	U	1.0	U	1.0
n-Propylbenzene	U	1.0	U	1.0
Bromobenzene	U	1.0	U	1.0
1,3,5-Trimethylbenzene	U	1.0	U	1.0
2-Chlorotoluene	U	1.0	U	1.0
4-Chlorotoluene	U	1.0	U	1.0
tert-Butylbenzene	U	1.0	U	1.0
1,2,4-Trimethylbenzene	U	1.0	U	1.0
sec-Butylbenzene	U	1.0	U	1.0
p-Isopropyltoluene	U	1.0	U	1.0
1,3-Dichlorobenzene	U	1.0	U	1.0
1,4-Dichlorobenzene	U	1.0	U	1.0
n-Butylbenzene	U	1.0	U	1.0
1,2-Dichlorobenzene	U	1.0	U	1.0
1,2-Dibromo-3-chloropropane	R	1.0	R	1.0
1,2,4-Trichlorobenzene	U	1.0	U	1.0
Hexachlorobutadiene	U	1.0	U	1.0
Naphthalene	U	1.0	U	1.0
1,2,3-Trichlorobenzene	U	1.0	U	1.0

n1447

Table 1.1(Cont.) Results of the Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample # :	Water Blank B 012405-1		111-0105-T82		111-0105-R15		111-0105-R14	
Location :			Trip Blank		MW-R15		MW-R14	
Dr. Fact. :	1		1		10		10	
Unit :	µg/L		µg/L		µg/L		µg/L	
Compound	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL
Dichlorodifluoromethane	U	1.0	U	1.0	U	10	U	10
Chloromethane	U	2.0	U	2.0	U	20	U	20
Vinyl Chloride	U	1.0	U	1.0	23	10	66	10
Bromomethane	U	1.0	U	1.0	U	10	U	10
Chloroethane	U	1.0	U	1.0	U	10	U	10
Trichlorofluoromethane	U	1.0	U	1.0	U	10	U	10
Acetone	2.2	8.0	U	17	U	80	U	80
1,1-Dichloroethene	U	1.0	U	1.0	590	10	220	10
Methylene Chloride	U	1.0	U	1.0	U	10	U	10
Carbon Disulfide	U	1.0	U	1.0	U	10	U	10
Methyl-t-Butyl Ether	U	1.0	U	1.0	U	10	U	10
trans-1,2-Dichloroethene	U	1.0	U	1.0	U	10	U	10
1,1-Dichloroethane	U	1.0	U	1.0	41	10	33	10
2-Butanone	U	1.0	2.2	1.0	U	10	U	10
2,2-Dichloropropane	U	1.0	U	1.0	U	10	U	10
cis-1,2-Dichloroethene	U	1.0	U	1.0	27	10	35	10
Chloroform	U	1.0	2.0	1.0	U	10	U	10
1,1-Dichloropropene	U	1.0	U	1.0	U	10	U	10
1,2-Dichloroethane	U	1.0	U	1.0	U	10	U	10
1,1,1-Trichloroethane	U	1.0	U	1.0	U	10	U	10
Carbon Tetrachloride	U	1.0	U	1.0	U	10	U	10
Benzene	U	1.0	U	1.0	U	10	U	10
Trichloroethene	U	1.0	U	1.0	38	10	35	10
1,2-Dichloropropane	U	1.0	U	1.0	U	10	U	10
Bromodichloromethane	U	1.0	U	1.0	U	10	U	10
Dibromomethane	U	1.0	U	1.0	U	10	U	10
cis-1,3-Dichloropropene	U	1.0	U	1.0	U	10	U	10
trans-1,3-Dichloropropene	U	1.0	U	1.0	U	10	U	10
1,1,2-Trichloroethane	U	1.0	U	1.0	U	10	U	10
1,3-Dichloropropane	U	1.0	U	1.0	U	10	U	10
Dibromochloromethane	U	1.0	U	1.0	U	10	U	10
1,2-Dibromoethane	U	1.0	U	1.0	U	10	U	10
Bromoform	U	1.0	U	1.0	U	10	U	10
4-Methyl-2-Pentanone	U	1.0	U	1.0	U	10	U	10
Toluene	U	1.0	U	1.0	U	10	U	10
2-Hexanone	U	1.0	U	1.0	U	10	U	10
Tetrachloroethene	U	1.0	U	1.0	U	10	U	10
Chlorobenzene	U	1.0	U	1.0	U	10	U	10
1,1,1,2-Tetrachloroethane	U	1.0	U	1.0	U	10	U	10
Ethylbenzene	U	1.0	U	1.0	U	10	U	10
p&m-Xylene	U	2.0	U	2.0	U	20	U	20
o-Xylene	U	1.0	U	1.0	U	10	U	10
Styrene	U	1.0	U	1.0	U	10	U	10
Isopropylbenzene	U	1.0	U	1.0	U	10	U	10
1,1,2,2-Tetrachloroethane	U	1.0	U	1.0	U	10	U	10
1,2,3-Trichloropropane	U	1.0	U	1.0	U	10	U	10
n-Propylbenzene	U	1.0	U	1.0	U	10	U	10
Bromobenzene	U	1.0	U	1.0	U	10	U	10
1,3,5-Trimethylbenzene	U	1.0	U	1.0	U	10	U	10
2-Chlorotoluene	U	1.0	U	1.0	U	10	U	10
4-Chlorotoluene	U	1.0	U	1.0	U	10	U	10
tert-Butylbenzene	U	1.0	U	1.0	U	10	U	10
1,2,4-Trimethylbenzene	U	1.0	U	1.0	U	10	U	10
sec-Butylbenzene	U	1.0	U	1.0	U	10	U	10
p-Isopropyltoluene	U	1.0	U	1.0	U	10	U	10
1,3-Dichlorobenzene	U	1.0	U	1.0	U	10	U	10
1,4-Dichlorobenzene	U	1.0	U	1.0	U	10	U	10
n-Butylbenzene	U	1.0	U	1.0	U	10	U	10
1,2-Dichlorobenzene	U	1.0	U	1.0	U	10	U	10
1,2-Dibromo-3-chloropropane	R	1.0	R	1.0	R	10	R	10
1,2,4-Trichlorobenzene	U	1.0	U	1.0	U	10	U	10
Hexachlorobutadiene	U	1.0	U	1.0	U	10	U	10
Naphthalene	U	1.0	U	1.0	U	10	U	10
1,2,3-Trichlorobenzene	U	1.0	U	1.0	U	10	U	10

rv1448

Table 1.1(Cont.) Results of the Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample # :	Water Blank B 012605-1		111-0105-TB3		111-0105-FB		111-0105-R40		111-0105-R36	
Location :			Trp Blank		Field Blank		MW-R40		MW-R36	
Dir. Fact. :	1		1		1		1		1	
Unit :	µg/L		µg/L		µg/L		µg/L		µg/L	
Compound	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL
Dichlorodifluoromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Chloromethane	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
Vinyl Chloride	U	1.0	U	1.0	U	1.0	U	1.0	2.1	1.0
Bromomethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Chloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Trichlorofluoromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Acetone	U	8.0	19	8.0	U	19	U	8.0	78	8.0
1,1-Dichloroethene	U	1.0	U	1.0	U	1.0	U	1.0	38	1.0
Methylene Chloride	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Carbon Disulfide	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Methyl-t-butyl Ether	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
trans-1,2-Dichloroethene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1-Dichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	3.9	1.0
2-Butanone	U	1.0	2.3	1.0	U	2.3	U	1.0	U	2.3
2,2-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
cis-1,2-Dichloroethene	U	1.0	U	1.0	U	1.0	U	1.0	2.2	1.0
Chloroform	U	1.0	1.4	1.0	U	1.7	U	1.0	43	1.0
1,1-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,1-Trichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Carbon Tetrachloride	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Benzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Trichloroethene	U	1.0	U	1.0	U	1.0	U	1.0	8.7	1.0
1,2-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromodichloromethane	U	1.0	U	1.0	U	1.0	U	1.0	4.3	1.0
Dibromomethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
cis-1,3-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
trans-1,3-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,2-Trichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Dibromochloromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dibromoethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromoform	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
4-Methyl-2-Pentanone	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Toluene	U	1.0	U	1.0	U	1.0	U	1.0	7.6	1.0
2-Hexanone	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Tetrachloroethene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Chlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,1,2-Tetrachloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Ethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
p&m-Xylene	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
o-Xylene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Styrene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Isopropylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,2,2-Tetrachloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,3-Trichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
n-Propylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3,5-Trimethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
2-Chlorotoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
4-Chlorotoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
tert-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,4-Trimethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
sec-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
p-isopropyltoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,4-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	36	1.0
n-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dibromo-3-chloropropane	R	1.0	R	1.0	R	1.0	R	1.0	R	1.0
1,2,4-Trichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Hexachlorobutadiene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Naphthalene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,3-Trichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0

rv1449

Table 1.1(Cont.) Results of the Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample # :	Water Blank B 012605-1	111-0105-R43	111-0105-43D	111-0105-R48	111-0105-R55					
Location :		MW-R43	MW-R43D	MW-R48	MW-R55					
Dil. Fact. :	1	1	1	10	10					
Unit :	µg/L	µg/L	µg/L	µg/L	µg/L					
Compound	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL
Dichlorodifluoromethane	U	1.0	U	1.0	U	1.0	U	10	U	10
Chloromethane	U	2.0	U	2.0	U	2.0	U	20	U	20
Vinyl Chloride	U	1.0	U	1.0	U	1.0	610	10	87	10
Bromomethane	U	1.0	U	1.0	U	1.0	U	10	U	10
Chloroethane	U	1.0	U	1.0	U	1.0	12	10	U	10
Trichlorofluoromethane	U	1.0	U	1.0	U	1.0	U	10	U	10
Acetone	U	8.0	U	8.0	U	8.0	U	80	U	80
1,1-Dichloroethene	U	1.0	U	1.0	U	1.0	42	10	U	10
Methylene Chloride	U	1.0	U	1.0	U	1.0	U	10	U	10
Carbon Disulfide	U	1.0	U	1.0	U	1.0	U	10	U	10
Methyl-t-butyl Ether	U	1.0	U	1.0	U	1.0	U	10	U	10
trans-1,2-Dichloroethene	U	1.0	U	1.0	U	1.0	386	10	14	10
1,1-Dichloroethane	U	1.0	U	1.0	U	1.0	U	10	U	10
2-Butanone	U	1.0	U	1.0	U	1.0	U	10	U	10
2,2-Dichloropropane	U	1.0	U	1.0	U	1.0	U	10	U	10
cis-1,2-Dichloroethene	U	1.0	U	1.0	U	1.0	2400	10	710	10
Chloroform	U	1.0	U	1.0	U	1.0	U	10	U	10
1,1-Dichloropropene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,2-Dichloroethane	U	1.0	U	1.0	U	1.0	U	10	U	10
1,1,1-Trichloroethane	U	1.0	U	1.0	U	1.0	U	10	U	10
Carbon Tetrachloride	U	1.0	U	1.0	U	1.0	U	10	U	10
Benzene	U	1.0	U	1.0	U	1.0	U	10	U	10
Trichloroethene	U	1.0	U	1.0	U	1.0	8900	10	710	10
1,2-Dichloropropane	U	1.0	U	1.0	U	1.0	U	10	U	10
Bromodichloromethane	U	1.0	U	1.0	U	1.0	U	10	U	10
Dibromomethane	U	1.0	U	1.0	U	1.0	U	10	U	10
cis-1,3-Dichloropropene	U	1.0	U	1.0	U	1.0	U	10	U	10
trans-1,3-Dichloropropene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,1,2-Trichloroethane	U	1.0	U	1.0	U	1.0	U	10	U	10
1,3-Dichloropropane	U	1.0	U	1.0	U	1.0	U	10	U	10
Dibromochloromethane	U	1.0	U	1.0	U	1.0	U	10	U	10
1,2-Dibromoethane	U	1.0	U	1.0	U	1.0	U	10	U	10
Bromoform	U	1.0	U	1.0	U	1.0	U	10	U	10
4-Methyl-2-Pentanone	U	1.0	U	1.0	U	1.0	U	10	U	10
Toluene	U	1.0	2.5	1.0	1.1	1.0	U	10	U	10
2-Hexanone	U	1.0	U	1.0	U	1.0	U	10	U	10
Tetrachloroethene	U	1.0	U	1.0	U	1.0	24000	10	1800	10
Chlorobenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,1,1,2-Tetrachloroethane	U	1.0	U	1.0	U	1.0	U	10	U	10
Ethylbenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
p&m-Xylene	U	2.0	U	2.0	U	2.0	U	20	U	20
o-Xylene	U	1.0	U	1.0	U	1.0	U	10	U	10
Styrene	U	1.0	U	1.0	U	1.0	U	10	U	10
isopropylbenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,1,2,2-Tetrachloroethane	U	1.0	U	1.0	U	1.0	U	10	U	10
1,2,3-Trichloropropane	U	1.0	U	1.0	U	1.0	U	10	U	10
n-Propylbenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
Bromobenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,3,5-Trimethylbenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
2-Chlorotoluene	U	1.0	U	1.0	U	1.0	U	10	U	10
4-Chlorotoluene	U	1.0	U	1.0	U	1.0	U	10	U	10
tert-Butylbenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,2,4-Trimethylbenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
sec-Butylbenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
p-Isopropyltoluene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,3-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,4-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
n-Butylbenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,2-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,2-Dibromo-3-chloropropane	R	1.0	R	1.0	R	1.0	R	10	R	10
1,2,4-Trichlorobenzene	U	1.0	U	1.0	U	1.0	U	10	U	10
Hexachlorobutadiene	U	1.0	U	1.0	U	1.0	U	10	U	10
Naphthalene	U	1.0	U	1.0	U	1.0	U	10	U	10
1,2,3-Trichlorobenzene	U	1.0	U	1.0	U	1.0	U	10	U	10

rv1450

Table 1.1(Cont.) Results of the Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample #	Water Blank B 012705-1	111-0105-R49	111-0105-R51	111-0105-R47	111-0105-R50
Location					
Dil. Fact.	1	1	1	1	1
Unit	µg/L	µg/L	µg/L	µg/L	µg/L
Compound	Conc.	MDL	Conc.	MDL	Conc.
Dichlorodifluoromethane	U	1.0	U	1.0	U
Chloromethane	U	2.0	U	2.0	U
Vinyl Chloride	U	1.0	4.4	1.0	9.3
Bromomethane	U	1.0	U	1.0	U
Chloroethane	U	1.0	U	1.0	U
Trichlorofluoromethane	U	1.0	U	1.0	U
Acetone	U	8.0	U	37	U
1,1-Dichloroethene	U	1.0	U	1.0	8.4
Methylene Chloride	U	1.0	U	1.0	U
Carbon Disulfide	U	1.0	U	1.0	U
Methyl-t-butyl Ether	U	1.0	U	1.0	U
trans-1,2-Dichloroethene	U	1.0	U	1.0	U
1,1-Dichloroethane	U	1.0	U	1.0	15
2-Butanone	U	1.0	U	6.7	U
2,2-Dichloropropane	U	1.0	U	1.0	U
cis-1,2-Dichloroethene	U	1.0	3.3	1.0	1.4
Chloroform	U	1.0	U	1.0	U
1,1-Dichloropropene	U	1.0	U	1.0	U
1,2-Dichloroethane	U	1.0	U	1.0	U
1,1,1-Trichloroethane	U	1.0	U	1.0	U
Carbon Tetrachloride	U	1.0	U	1.0	U
Benzene	U	1.0	U	1.0	U
Trichloroethene	U	1.0	U	1.0	1.1
1,2-Dichloropropane	U	1.0	U	1.0	U
Bromodichloromethane	U	1.0	U	1.0	U
Dibromomethane	U	1.0	U	1.0	U
cis-1,3-Dichloropropene	U	1.0	U	1.0	U
trans-1,3-Dichloropropene	U	1.0	U	1.0	U
1,1,2-Trichloroethane	U	1.0	U	1.0	U
1,3-Dichloropropane	U	1.0	U	1.0	U
Dibromochloromethane	U	1.0	U	1.0	U
1,2-Dibromoethane	U	1.0	U	1.0	U
Bromoform	U	1.0	U	1.0	U
4-Methyl-2-Pentanone	U	1.0	U	1.0	U
Toluene	U	1.0	U	1.0	2.0
2-Hexanone	U	1.0	U	1.0	U
Tetrachloroethene	U	1.0	U	1.0	1.9
Chlorobenzene	U	1.0	U	1.0	7.2
1,1,1,2-Tetrachloroethane	U	1.0	U	1.0	U
Ethylbenzene	U	1.0	U	1.0	U
p&m-Xylene	U	2.0	U	2.0	U
o-Xylene	U	1.0	U	1.0	U
Styrene	U	1.0	U	1.0	U
Isopropylbenzene	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	U	1.0	U	1.0	U
1,2,3-Trichloropropane	U	1.0	U	1.0	U
n-Propylbenzene	U	1.0	U	1.0	U
Bromobenzene	U	1.0	U	1.0	U
1,3,5-Trimethylbenzene	U	1.0	U	1.0	U
2-Chlorotoluene	U	1.0	U	1.0	U
4-Chlorotoluene	U	1.0	U	1.0	U
tert-Butylbenzene	U	1.0	U	1.0	U
1,2,4-Trimethylbenzene	U	1.0	U	1.0	U
sec-Butylbenzene	U	1.0	U	1.0	U
p-Isopropyltoluene	U	1.0	U	1.0	U
1,3-Dichlorobenzene	U	1.0	U	1.0	U
1,4-Dichlorobenzene	U	1.0	U	1.0	U
n-Butylbenzene	U	1.0	U	1.0	U
1,2-Dichlorobenzene	U	1.0	U	1.0	2.9
1,2-Dibromo-3-chloropropane	R	1.0	R	1.0	R
1,2,4-Trichlorobenzene	U	1.0	U	1.0	U
Hexachlorobutadiene	U	1.0	U	1.0	U
Naphthalene	U	1.0	U	1.0	U
1,2,3-Trichlorobenzene	U	1.0	U	1.0	U

rv1451

B Indicates compound is present in Blank
 U Indicates compound Not Detected
 R Indicates compound Method Detection Limit

012

Table 1. 2(cont.) Results of TIC for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample #	Compound
Water Blank B 011905-1	No Peaks Found
111-0105-TB	No Peaks Found
111-0105-R01	No Peaks Found
111-0105-W02	No Peaks Found
111-0105-W03	No Peaks Found
111-0105-W17	No Peaks Found
Water Blank B 012005-2	No Peaks Found
111-0105-R02	No Peaks Found
Water Blank B 012405-1	No Peaks Found
111-0105-TB2	No Peaks Found
111-0105-R15/10x	No Peaks Found
111-0105-R14/10x	No Peaks Found
Water Blank B 012605-1	No Peaks Found
111-0105-TB3	No Peaks Found
111-0105-FB	No Peaks Found
111-0105-R40	No Peaks Found
111-0105-R36	No Peaks Found
111-0105-R43	No Peaks Found
111-0105-43D	No Peaks Found
111-0105-R48/10x	No Peaks Found
111-0105-R55/10x	No Peaks Found
Water Blank B 012705-1	No Peaks Found
111-0105-R49	No Peaks Found
111-0105-R51	No Peaks Found
111-0105-R47	No Peaks Found
111-0105-R50	No Peaks Found

QA/QC for VOC

Results of the Internal Standard Areas and Surrogate Percent Recoveries for VOC in Water

Each sample was spiked with a three component mixture of CLP surrogate standards consisting of toluene-d₈, p-bromofluorobenzene and 1,2-dichloroethane-d₄. The surrogate percent recoveries, listed in Table 2.1, ranged from 91 to 108. All one hundred thirty two values were within the acceptable QC limits. The internal standard areas for bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d₅ are also listed in Table 2.1. All one hundred thirty two areas are within the acceptable QC limits.

Results of the MS/MSD Percent Recoveries for VOC in Water

Samples 111-0105-WO3, 111-0105-R49, and 111-0105-R47 were chosen for the matrix spike/matrix spike duplicate analysis (MS/MSD). The percent recoveries, listed in Table 2.2, ranged from 99 to 137. All twenty eight calculated values are within the acceptable QC limits. Two values were not calculated because the sample concentration was greater than 5x the spike amount. The relative percent differences, also listed in Table 2.2, ranged from 1 to 5. All fourteen calculated values are within the acceptable QC limits. One value was not calculated because the percent recoveries were not calculated.

Table 2.1 Results of the Internal Standard Areas & Surrogate Percent Recoveries for VOC in Water
WA# 0-111 Sabana Abajo PCE

Analysis Date 01/19/05
Matrix Water

File ID	Sample No.	IS 1	IS 2	IS 3	Surr. 1	Surr. 2	Surr. 3
BV9949.D	Water Blank B 011905-1	293450	2412699	1511697	102	102	95
BV9956.D	111-0105-TB	378891	3161415	1876558	94	104	105
BV9957.D	111-0105-R01	376882	3101589	1859995	93	104	105
BV9959.D	111-0105-W02	376915	3072380	1830873	91	105	108
BV9960.D	111-0105-W03	372702	3041101	1789392	91	105	107
BV9961.D	111-0105-W03 MS	370540	3023643	1781615	91	105	106
BV9962.D	111-0105-W03 MSD	366325	3000967	1768070	91	105	107
BV9963.D	111-0105-W17	361857	3000348	1756485	92	106	108

Cal Check Area BV9948.D 305237 2455390 1598860

		Surrogate Limits			Water
IS 1	Bromochloromethane	Surr. 1	1,2-Dichloroethane-d4		76 - 114
IS 2	1,4-Difluorobenzene	Surr. 2	Toluene-d8		88 - 110
IS 3	Chlorobenzene-d5	Surr. 3	p-Bromofluorobenzene		86 - 115

isv802

Table 2.1 (cont.) Results of the Internal Standard Areas & Surrogate Percent Recoveries for VOC in Water
WA# 0-111 Sabana Abajo PCE

Analysis Date 01/20/05
Matrix Water

File ID	Sample No.	IS 1	IS 2	IS 3	Surr. 1	Surr. 2	Surr. 3
BV9981.D	Water Blank B 012005-2	465388	4009911	2245572	102	104	97
BV9982.D	111-0105-R02	461203	3942849	2215199	103	103	96
BV9984.D	111-0105-R01/10x	479056	4164606	2334331	102	104	96
BV9985.D	111-0105-W02/50x	474863	4052957	2291604	101	103	96
BV9986.D	111-0105-W03/50x	473524	3959157	2244353	99	103	97
BV9987.D	111-0105-W17/50x	469359	3911062	2211396	100	103	96

Cal Check Area BV9972.D 475032 3939949 2300898

		Surrogate Limits		
IS 1	Bromochloromethane	Surr. 1	1,2-Dichloroethane-d4	Water 76 - 114
IS 2	1,4-Difluorobenzene	Surr. 2	Toluene-d8	88 - 110
IS 3	Chlorobenzene-d5	Surr. 3	p-Bromofluorobenzene	86 - 115

isv805

Table 2.1 (cont.) Results of the Internal Standard Areas & Surrogate Percent Recoveries for VOC in Water
WA# 0-111 Sabana Abajo PCE

Analysis Date 01/21/05
Matrix Water

File ID	Sample No.	IS 1	IS 2	IS 3	Surr. 1	Surr. 2	Surr. 3
BV0001.D	Water Blank B 012105	339079	2870813	1697144	102	102	101
BV0002.D	111-0105-W02/250x	335131	2853646	1690244	100	102	101
BV0003.D	111-0105-W17/250x	356908	2871115	1691562	100	102	103

Cal Check Area BV9998.D 358514 2930610 1770770

		Surrogate Limits	
			Water
IS 1	Bromochloromethane	Surr. 1	1,2-Dichloroethane-d4 76 - 114
IS 2	1,4-Difluorobenzene	Surr. 2	Toluene-d8 88 - 110
IS 3	Chlorobenzene-d5	Surr. 3	p-Bromofluorobenzene 86 - 115

isv807

Table 2.1 (cont.) Results of the Internal Standard Areas & Surrogate Percent Recoveries for VOC in Water
WA# 0-111 Sabana Abajo PCE

Analysis Date 01/24/05
Matrix Water

File ID	Sample No.	IS 1	IS 2	IS 3	Surr. 1	Surr. 2	Surr. 3
BV0028.D	Water Blank B 012405-1	355449	3029632	1789984	102	101	97
BV0029.D	111-0105-TB-2	352918	2989308	1758840	102	101	98
BV0030.D	111-0105-R15/10x	362538	3005930	1769760	101	101	98
BV0033.D	111-0105R14/10x	347826	2904942	1728430	100	100	97

Cal Check Area BV0027.D 390031 3122170 1872080

				Surrogate Limits	Water
IS 1	Bromochloromethane	Surr. 1	1,2-Dichloroethane-d4	76 - 114	
IS 2	1,4-Difluorobenzene	Surr. 2	Toluene-d8	88 - 110	
IS 3	Chlorobenzene-d5	Surr. 3	p-Bromofluorobenzene	86 - 115	

isv811

Table 2.1 (cont.) Results of the Internal Standard Areas & Surrogate Percent Recoveries for VOC in Water
WA# 0-111 Sabana Abajo PCE

Analysis Date 01/26/05
Matrix Water

File ID	Sample No.	IS 1	IS 2	IS 3	Surr. 1	Surr. 2	Surr. 3
BV0064.D	Water Blank B 012605-1	337467	2852284	1729957	102	100	96
BV0065.D	111-0105-TB3	337976	2823266	1717530	102	100	97
BV0066.D	111-0105-FB	335973	2780567	1695680	102	100	97
BV0067.D	111-0105-R40	333436	2763831	1684081	102	100	97
BV0068.D	111-0105-R36	353007	2813822	1702197	98	101	97
BV0070.D	111-0105-R43	332840	2854308	1736166	101	101	96
BV0073.D	111-0105-43D	323070	2822767	1718267	103	101	95
BV0078.D	111-0105-R48/10x	348134	2863067	1798477	98	99	92
BV0079.D	111-0105-R55/10x	325887	2780593	1766469	101	98	91

Cal Check Area BV0063.D 365899 2999210 1837160

		Surrogate Limits		
				Water
IS 1	Bromochloromethane	Surr. 1	1,2-Dichloroethane-d4	76 - 114
IS 2	1,4-Difluorobenzene	Surr. 2	Toluene-d8	88 - 110
IS 3	Chlorobenzene-d5	Surr. 3	p-Bromofluorobenzene	86 - 115

isv816

Table 2.1 (cont.) Results of the Internal Standard Areas & Surrogate Percent Recoveries for VOC in Water
WA# 0-111 Sabana Abajo PCE

Analysis Date 01/27/05
Matrix Water

File ID	Sample No.	IS 1	IS 2	IS 3	Surr. 1	Surr. 2	Surr. 3
BV0097.D	Water Blank 012705-1	333117	2902684	1773741	103	101	98
BV0098.D	111-0105-R49	330455	2874238	1752302	102	101	98
BV0099.D	111-0105-R49 MS	323933	2871487	1750137	102	100	97
BV0100.D	111-0105-R49 MSD	315931	2829118	1721064	102	101	96
BV0101.D	111-0105-R51	306754	2710278	1685572	102	100	96
BV0102.D	111-0105-R47	303124	2685521	1684155	101	99	94
BV0103.D	111-0105-R47 MS	303707	2689215	1666029	102	99	94
BV0104.D	111-0105-R47 MSD	305042	2686633	1660645	102	99	95
BV0105.D	111-0105-R50	323015	2830159	1799929	98	99	94
BV0106.D	111-0105-R48/200x	287180	2544708	1601608	106	99	94
BV0107.D	111-0105-R55/100x	281496	2543223	1597831	106	99	93

Cal Check Area BV0096.D 364102 2995960 1853790

		Surrogate Limits			Water
IS 1	Bromochloromethane	Surr. 1	1,2-Dichloroethane-d4		76 - 114
IS 2	1,4-Difluorobenzene	Surr. 2	Toluene-d8		88 - 110
IS 3	Chlorobenzene-d5	Surr. 3	p-Bromofluorobenzene		86 - 115

isv818

Table 2.1 (cont.) Results of the Internal Standard Areas & Surrogate Percent Recoveries for VOC in Water
WA# 0-111 Sabana Abajo PCE

Analysis Date 01/29/05
Matrix Water

File ID	Sample No.	IS 1	IS 2	IS 3	Surr. 1	Surr. 2	Surr. 3
BV0131.D	Water Blank B 012905-2	307213	2672459	1649213	103	101	98
BV0132.D	111-0105-R50/10x	323701	2700700	1710061	98	100	95
BV0133.D	111-0105-R50/100x	307486	2633052	1632189	100	101	96

Cal Check Area BV0129.D 332152 2856890 1780730

		Surrogate Limits		
		Water		
IS 1	Bromochloromethane	Surr. 1	1,2-Dichloroethane-d4	76 - 114
IS 2	1,4-Difluorobenzene	Surr. 2	Toluene-d8	88 - 110
IS 3	Chlorobenzene-d5	Surr. 3	p-Bromofluorobenzene	86 - 115

isv821

Table 2.2 Results of MS/MSD Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample ID: 111-0105-W03

Compound Name	Sample Conc. (µg/L)	MS Spike Added (µg/L)	MSD Spike Added (µg/L)	MS Conc. (µg/L)	MSD Conc. (µg/L)	MS % Rec.	MSD % Rec.	RPD	QC Limits	
									RPD	% Rec.
1,1-Dichloroethene	3.3	50.0	50.0	61.3	64.4	116	122	5	14	61 - 145
Benzene	U	50.0	50.0	49.5	50.8	99	102	3	11	76 - 127
Trichloroethene	1570.0	50.0	50.0	1482.3	1426.8	NC	NC	NC	14	71 - 120
Toluene	U	50.0	50.0	55.7	57.3	111	115	3	13	76 - 125
Chlorobenzene	U	50.0	50.0	56.4	57.9	113	116	3	13	75 - 130

msv507

Table 2.2(Cont.) Results of MS/MSD Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample ID: 111-0105-R49

Compound Name	Sample Conc. (µg/L)	MS Spike Added (µg/L)	MSD Spike Added (µg/L)	MS Conc. (µg/L)	MSD Conc. (µg/L)	MS % Rec.	MSD % Rec.	RPD	QC Limits	
									RPD	% Rec.
1,1-Dichloroethene	U	50.0	50.0	68.5	65.7	137	131	4	14	61 - 145
Benzene	U	50.0	50.0	57.4	54.7	115	109	5	11	76 - 127
Trichloroethene	U	50.0	50.0	57.1	54.1	114	108	5	14	71 - 120
Toluene	U	50.0	50.0	58.3	55.6	117	111	5	13	76 - 125
Chlorobenzene	U	50.0	50.0	56.3	53.8	113	108	5	13	75 - 130

msv508

Table 2.2(Cont.) Results of MS/MSD Analysis for VOC in Water
WA# 0-111 Sabana Abajo PCE

Sample ID: 111-0105-R47

Compound Name	Sample Conc. (µg/L)	MS Spike Added (µg/L)	MSD Spike Added (µg/L)	MS Conc. (µg/L)	MSD Conc. (µg/L)	MS % Rec.	MSD % Rec.	RPD	QC Limits	
									RPD	% Rec.
1,1-Dichloroethene	1.8	50.0	50.0	68.8	69.1	134	135	1	14	61 - 145
Benzene	U	50.0	50.0	57.3	59.2	115	118	3	11	76 - 127
Trichloroethene	26.4	50.0	50.0	81.9	80.2	111	108	3	14	71 - 120
Toluene	U	50.0	50.0	56.8	58.6	114	117	3	13	76 - 125
Chlorobenzene	7.2	50.0	50.0	61.7	62.8	109	111	2	13	75 - 130

msv509

REAC, Edison, NJ

EPA Contract #: *ED-C-04-032*

CHAIN OF CUSTODY RECORD

Site #: 111

Scott Grossman

732-321-4200

No: 111-0105-0001

Cooler #:

REAC

732-321-4200

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	MS/MSD
<i>2354</i>	111-0105-R01	MW-R1	VOCs	Ground Water	1/17/2005	3	40 ml VOA	4 C	
<i>2355</i>	111-0105-R02	MW-R2	VOCs	Ground Water	1/17/2005	3	40 ml VOA	4 C	
<i>2356</i>	111-0105-TB	Trip Blank	VOCs	Water	1/18/2005	3	40 ml VOA	4 C	
<i>2357</i>	111-0105-W02	MW-W02	VOCs	Ground Water	1/15/2005	3	40 ml VOA	4 C	
<i>2358</i>	111-0105-W03	MW-W03	VOCs	Ground Water	1/15/2005	6	40 ml VOA	4 C	Y
<i>2359</i>	111-0105-W17	MW-W17	VOCs	Ground Water	1/15/2005	3	40 ml VOA	4 C	
<i>[Large diagonal line across the table]</i>									

025

Special Instructions:

*ED: [Signature]**Custody Seal intact 3°C*SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
<i>All/Anal</i>	<i>[Signature]</i>	<i>1/18/05</i>	<i>Mark Bernick</i>	<i>1/19/05</i>	<i>10:25</i>	<i>All/Analysis</i>	<i>Mark Bernick</i>	<i>1/19/05</i>	<i>[Signature]</i>	<i>1/18/05</i>	<i>11:00</i>

0111-DAR-031005

REAC, Edison, NJ

EPA Contract # *ED-C-04-032* *PI*

CHAIN OF CUSTODY RECORD

Site # 111
Scott Grossman
732-321-4200

No: 111-0105-0002

Cooler #:
REAC
732-321-4200

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	MS/MSD
<i>2386</i>	111-0105-R15	MW-R15	VOCs	Ground Water	1/19/2005	3	40 ml VOA	4 C	
<i>2387</i>	111-0105-R40	MW-R40	VOCs	Ground Water	1/19/2005	3	40 ml VOA	4 C	
<i>2388</i>	111-0105-TB2	Trip Blank	VOCs	Water	1/20/2005	3	40 ml VOA	4 C	
<i>2389</i>	111-0105-R36	MW-R36	VOCs	Ground Water	1/20/2005	3	40 ml VOA	4 C	
<i>2390</i>	111-0105-R14	MW-R14	VOCs	Ground Water	1/20/2005	5	40 ml VOA	4 C	
<i>026</i>									

Special Instructions: VOCs

*Custody Seals received intact 16°C*SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
<i>ALL ANALYSIS</i>	<i>[Signature]</i>	<i>1/24/05</i>	<i>M. Bernick</i>	<i>1/24/05</i>	<i>13:30</i>	<i>all analysis</i>	<i>M. Bernick</i>	<i>1/24/05</i>	<i>JR Donaghy</i>	<i>1/24/05</i>	<i>1435</i>

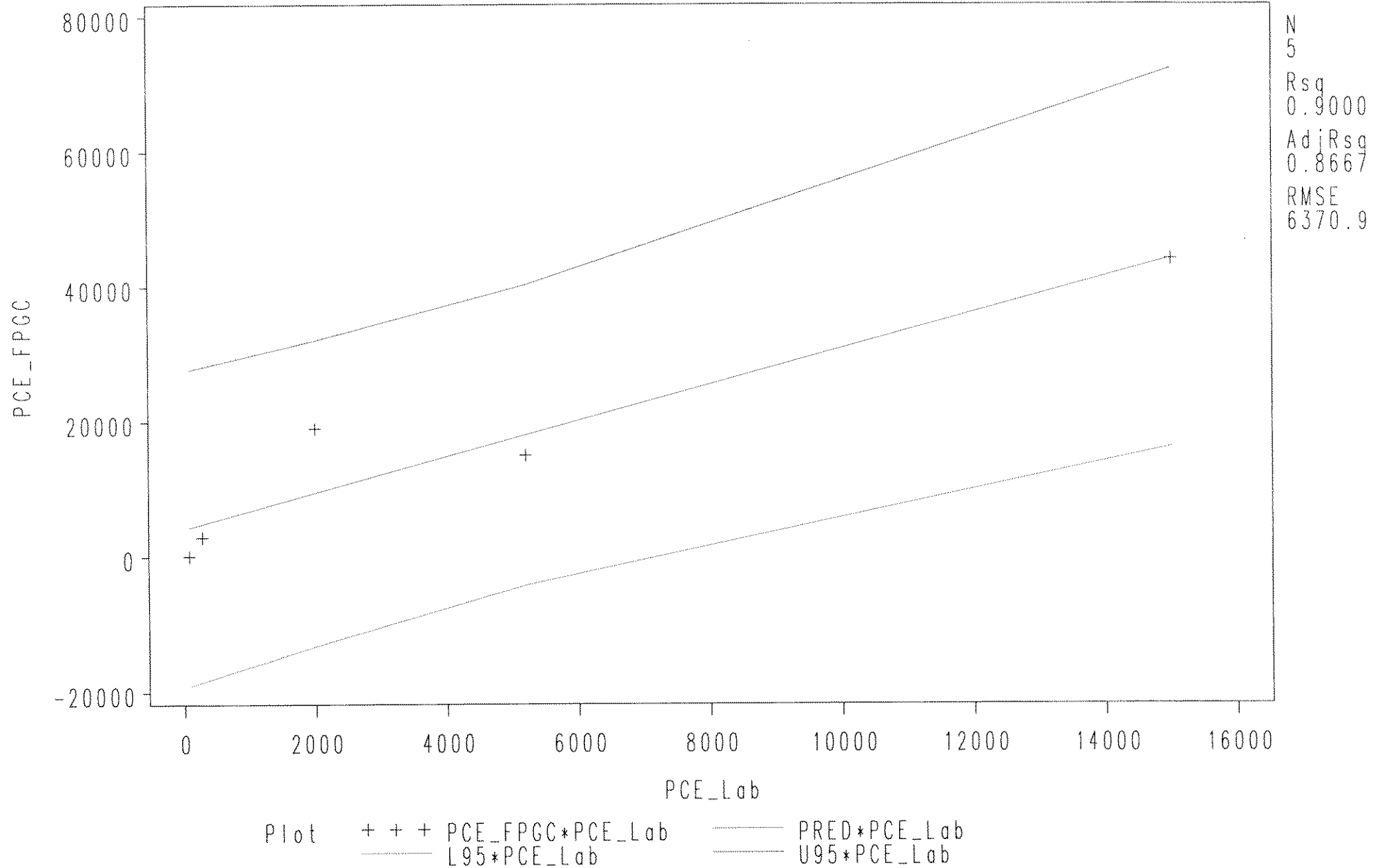
0111-DAR-031005

APPENDIX D
Statistical Analyses of Field and Laboratory Data
Sabana Abajo Industrial Park PCE Site
Trip Report
November 2005

Regression of Field Portable Gas Chromatograph and Laboratory PCE Results

Sabana Abajo Industrial Park PCE Site

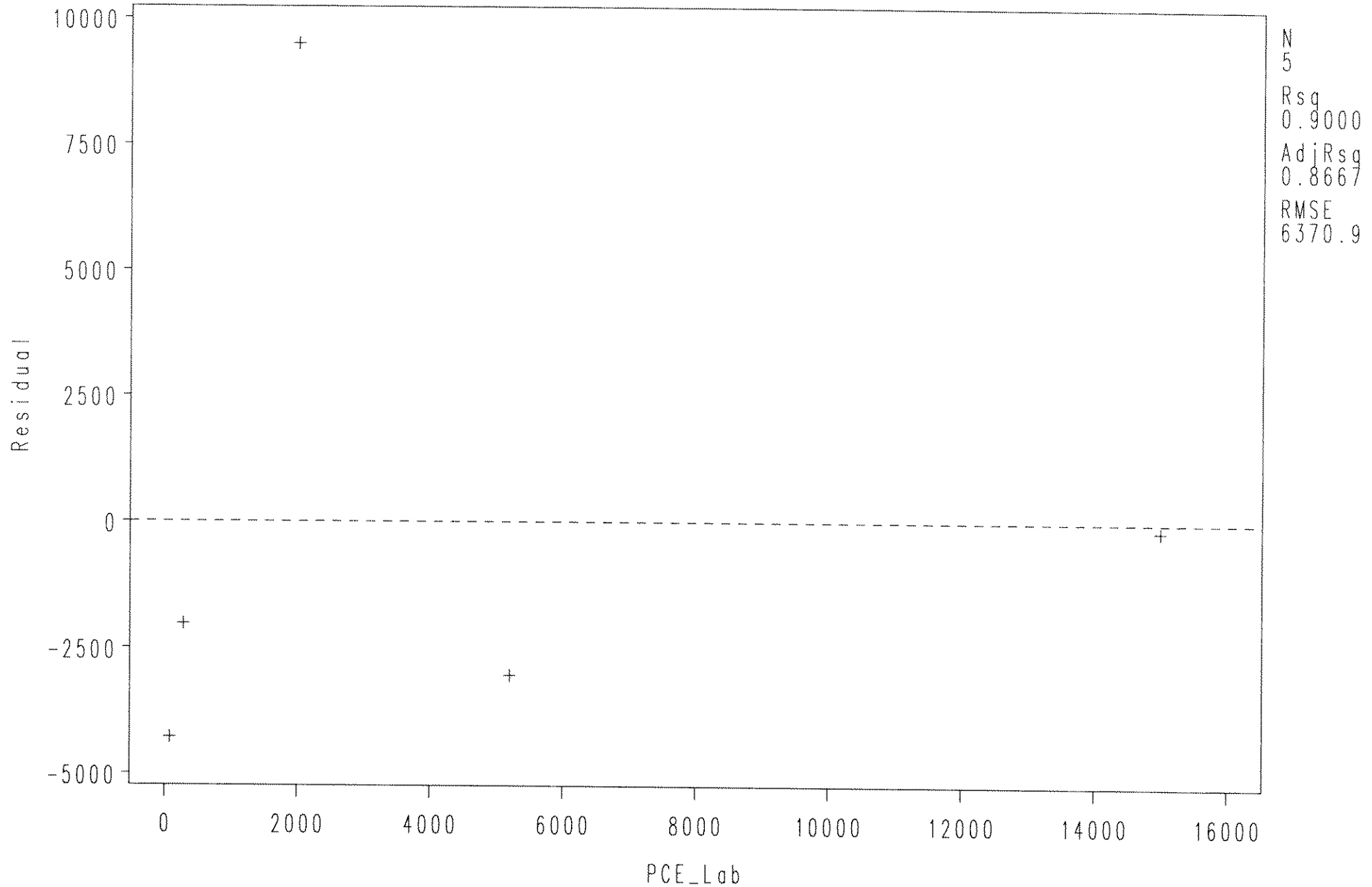
$$\text{PCE_FPGC} = 4177.4 + 2.665 \text{ PCE_Lab}$$



Regression of Field Portable Gas Chromatograph and Laboratory PCE Results

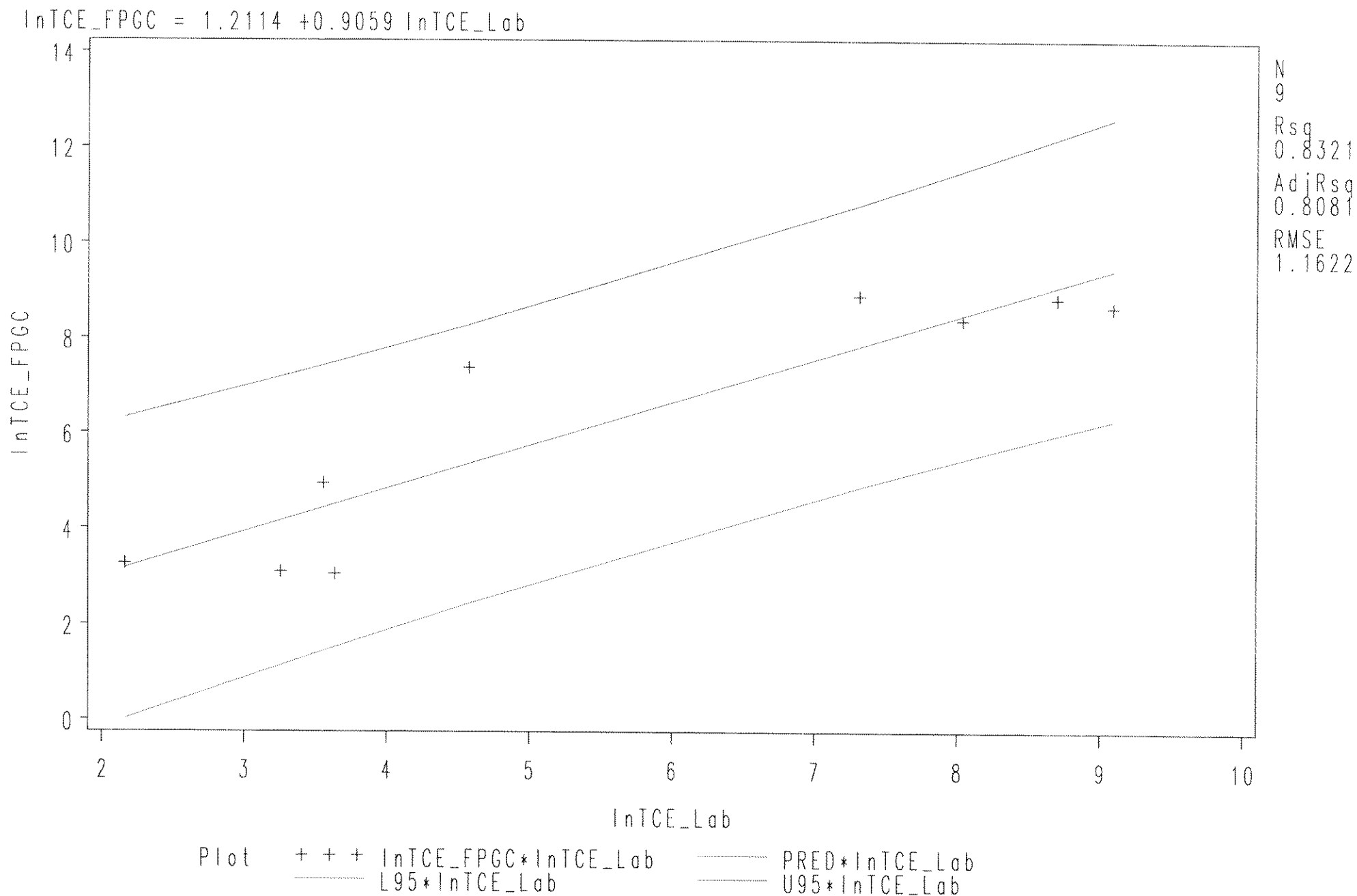
Sabana Abajo Industrial Park PCE Site

$$\text{PCE_FPGC} = 4177.4 + 2.665 \text{ PCE_Lab}$$



Regression of Field Portable Gas Chromatograph and Laboratory TCE Results

Sabana Abajo Industrial Park PCE Site



Regression of Field Portable Gas Chromatograph and Laboratory TCE Results

Sabana Abajo Industrial Park PCE Site

$$\ln TCE_FPGC = 1.2114 + 0.9059 \ln TCE_Lab$$

