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SEMI-ANNUAL GROUNDWATER MONITORING REPORT

MARCH 2003 SAMPLING EVENT
BASE LANDFILL
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

CONTRACT TASK ORDER 0277

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ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis of Variance
Baker	Baker Environmental, Inc.
CTO	Contract Task Order
CV	Coefficient of Variation
EFA WEST	Engineering Field Activity West
EPA	United States Environmental Protection Agency
ft/day	feet per day
ft/ft	feet per foot
FOD	Frequency of Detection
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
msl	mean sea level
NSRR	Naval Station Roosevelt Roads
PDF	Probability Density Function
PVC	polyvinyl chloride
QA	Quality Assurance
RBC	Risk Based Concentration
S	Standard Deviation
SAP	Sampling and Analysis Plan
SWDIV	Naval Facilities Engineering Command, Southwest Division
VOC	Volatile Organic Compound
X	Arithmetic mean
X_{UL}	Upper limit of the mean

1.0 INTRODUCTION

This Semi-Annual Groundwater Monitoring Report has been prepared by Baker Environmental, Inc. (Baker) under contract to the Atlantic Division, Naval Facilities Engineering Command (LANTDIV) Contract Number N62470-89-D-4814, Contract Task Order (CTO) 277. This report has been prepared to present results of the March 2003 Semi-Annual Groundwater Monitoring Sampling at Naval Station Roosevelt Roads (NSRR) Solid Waste Landfill.

1.1 Purpose of Sampling

The Solid Waste Landfill Facility at NSRR, Puerto Rico has been in operation since the mid-1960s on approximately 85 acres of land in the southeastern area of the base. The active landfill is approximately 2 acres and is located within the limits of the inactive 85-acre landfill. It is positioned on a peninsula bounded by Ensenada Honda to the west and Puerca Bay the south and east. A site map is provided in Figure 1-1.

Continued use of this landfill required implementation of a Groundwater Sampling and Analysis Plan (SAP). Monitor wells were installed and background sampling at the facility was performed from June 1998 through August 2000 in nine wells. These results were presented in the Background Groundwater Monitoring Report submitted by Burns and McDonnell (2001).

Subsequent to the background sampling events, replacement of six wells was performed by Baker to establish the integrity of the wells for compliance sampling. Three existing wells were retained for compliance sampling including R7GW09, R7GW10, and R7GW11. Two rounds of semi-annual compliance sampling have been performed on these wells (new and existing) in March 2002 and September 2002, with results presented in the Draft Semi-Annual Groundwater Monitoring Reports (Baker, 2002, 2003). The third round of semi-annual compliance sampling was performed on all nine monitor wells with results provided in this document.

1.2 Background Concentrations

Prior to the initiation of compliance round sampling, the background groundwater concentrations of parameters on the Appendix I volatile organic compounds (VOCs) and metals lists were to be established through the results of four sampling events. Although four sampling events occurred during background sampling, results for some analytes on the Appendix I lists were not obtained

during these sampling events. At the completion of the previous compliance sampling round (September 2002), there were four concentration results for all Appendix I analytes, both volatile organic compounds and metals, at each well. Recommendations were made in previous reports to include subsequent compliance round results for those particular analytes in the background data set. At this point the background data set is to be considered complete, and this report will include a final discussion of the background groundwater quality data. In subsequent reports, the background data will not be discussed. Rather, it will be presented in comparison tables for detected compounds only, and the complete background data set with representative statistics will be given in an appendix.

1.3 Report Organization

The report is organized into six sections including this introduction. Section 2 presents the final background groundwater quality data and discussion. Section 3 describes the monitoring activities while Section 4 provides the results of the groundwater monitoring event. This section also includes a discussion of the results relative to background data and other comparison criteria. Section 5 provides conclusions and recommendations. Lastly, Section 6 consists of the references.

2.0 EVALUATION OF BACKGROUND GROUNDWATER DATA

One of the goals of the SAP (Burns and McDonnell, 1999) was to develop a background data set, consisting of the analysis of four rounds of independent sampling, which is representative of groundwater at the landfill facility. This background data set was to be used to compare to subsequent analytical data to make decisions as to whether detected constituents in the subsequent data are related to past site activities and may be considered contaminants or whether the detected constituents represent background conditions. Specific compounds that were considered in this evaluation included the Appendix I VOCs and Appendix I metals. These compounds and associated method performance limits are given in Table 2-1. Once an established background concentration is obtained for a constituent, statistically significant increases in concentration for that compound can be determined through the methods outlined in the SAP.

The majority of the background data was obtained from June 1998 through August 2000 and reported by Burns and McDonnell (2001). A brief discussion of the background groundwater quality at the site was made in the first and second Subtitle D monitoring reports (Baker, 2002, 2003). During background sampling, some compounds were not analyzed for four times. A list of these compounds is given in Table 2-2. Recommendations were made in the previous reports (Baker, 2002, 2003) to include in the background groundwater data set any subsequent compliance round analytical results for those analytes that did not have four analytical results, until a complete set of four results for these parameters could be obtained. At this time, four results for each constituent on the Appendix I lists are available. The complete background data set for each compound can be found in Appendix A.

There were a total of eight VOCs that were detected in the background sampling events. The incorporation of the first compliance round sampling into the background resulted in two additional VOCs as having background detections: carbon disulfide and dibromomethane.

All of the metals on the Appendix I list with the exception of beryllium, selenium, and thallium, were detected in the background sampling events. Zinc was the only metal that did not have four background concentrations established as of the first compliance round of sampling. The last compliance round results were incorporated into the original background analyses to yield four background results at this time.

The upgradient wells are identified as R7GW11 and R7GW01R. During the background sampling only one VOC, acetone was detected in an upgradient well (R7GW11). Nine metals were detected in the upgradient wells during the background sampling. The three metals that were not detected in the upgradient wells but were detected in the downgradient wells were antimony, arsenic, and cadmium.

This section provides a general discussion of the descriptive statistics used to characterize the background data set, along with presenting some of the assumptions associated with their use. The development of a set of background screening values and the criteria for comparing site data to the background data set are discussed at the end of this section.

The data sets specifically evaluated in this section include:

- Background Appendix I VOC and metals results – June 1998, February 2000, May 2000, and August 2000.

- Compliance Appendix I VOC and metals results – March 2002, September 2002, and March 2003, selected results used, if necessary

2.1 Censored Data

A data set is censored when it contains values that are unknown, although their existence is known. In other words, a data set is censored when it contains non-detections or blank results. A consistent means of handling censored data is needed prior to statistically analyzing the data set. Additional discussion on methods to evaluate censored data is provided in "Procedural Guidance for Statistically Analyzing Environmental Background Data," prepared by Naval Facilities Engineering Command, Southwest Division (SWDIV) and the Engineering Field Activity West (EFA WEST), September 1998.

All the VOC and metals data from the background analyses is censored.

2.1.1 Frequency of Detection

The Frequency of Detection (FOD) for a parameter is the number of positively detected results divided by the total number of samples (usually expressed as a percent). By definition, the FOD gives an indication of the number of censored data in a given data set. For example, if the FOD is 85 percent, then 15 percent of the data set is censored and consists of either non-detects or blank-qualified results.

Table 2-3 lists all of the compounds considered as positively detected in the groundwater during background sampling. Prior to proceeding with other statistical evaluations, the FOD of these detected compounds was examined and used as a tool to further screen the analytical data. Four ranges of FODs were established (A through D) to evaluate whether further statistical analysis is warranted. These ranges or categories include no detections, only one detection, an FOD of less than or equal to 50 percent and more than one detection; and an FOD of greater than 50 percent:

- A: FOD = 0 detections: The laboratory results indicate no detections of a compound at a given quantitation limit. These compounds may or may not be present in the background media; however, the current data set yields insufficient information to quantify the concentration of these compounds. For the purpose of evaluating site-specific data, non-detected compounds are considered as "not present" in the background data set.

- B: FOD = 1 detection: Statistical evaluations could not be conducted for parameters in which there was only one positive detection for a given media. Consequently, these compounds will be reported as potentially present in the background; however, the concentration cannot be quantified.

- C: FOD $\leq$ 50 percent with more than one detection: this category equates to greater than 50 percent non-detect and/or blank results. It is likely that goodness-of-fit tests or other statistical evaluations to determine distribution or other characteristics for parameters with an FOD less than or equal to 50 percent would result in a high level of uncertainty. Consequently, the range, the mean, standard deviation and coefficient of variation of the detections were developed for these compounds based on an assumed standard normal distribution. In this category, the data set is truncated such that non-detect and blank results are not considered in the calculation of descriptive statistics. Although this will

reduce the power of the calculated statistics, the use of non-detect or blank results could yield an unacceptably large bias of any calculated statistics.

- D: FOD > 50 percent: this category equates to less than 50 percent non-detects and/or blank results. For parameters that have an FOD greater than 50 percent, an outlier test will be conducted, descriptive statistics were developed using surrogate values for the censored data (if necessary), and the distribution of the data set was evaluated using the Analysis of Variance test. For this category, the surrogate values for non-detect results were one-half of the reporting limit.

The analytical data were separated into one of the four categories (A through D) as shown in Table 2-3. As shown, the volatile organics were either categorized as B or C, with the majority of the VOCs having only one detection. Only acetone, carbon disulfide, and cis 1,2-dichloroethene were categorized with C. These compounds had two detections each. The majority of the metals compounds were categorized into C. Only four compounds: chromium, copper, vanadium, and zinc were categorized as D, and as such, had statistical quantities calculated using surrogate values for the non-detect results.

2.2 Outliers

Outliers are measurements, in this case, concentrations, that are unusually larger or smaller than the rest of the data for that compound. Outliers are not necessarily representative of the sample population and may bias the resulting statistics. An outlier may be an item for which the data has been incorrectly recorded, an item that was incorrectly added to the data set, or it may be an unusual item that has been recorded correctly and does belong in the data set. Each outlier warrants careful examination. In the first two cases above, the outlier should be corrected or removed from the data set and analysis of the data set should be rerun. In the case where the outlier has been recorded correctly and does belong in the data set, the outlier should remain; in general outliers should not be removed from the data set unless clear evidence shows that they are not based on elements of the population being studied and should not have been included in the original data set.

An outlier test was conducted on data sets for which the FOD was greater than 50 percent. The results showed that for the copper compound, two outliers are present outside of the 0.5 percent confidence interval. In the zinc data set, one outlier is present outside of the 0.1 percent

confidence interval. No outliers are present in the chromium and vanadium data sets. Although these data sets contain elevated results, they are located within the distribution of each data set, and therefore are considered valid data points. The outliers determined for copper and zinc were, to the best of the knowledge available, recorded correctly. As a result, they will remain in the background data set.

2.3 Distributions

Determining the probability density function (PDF) or distribution that best fits a particular data set is important for selecting the statistical test best suited for the data (SWDIV, September 1998). Many statistical procedures have been developed for data sets presumed to have been drawn from a population having a symmetric, bell-shaped, Gaussian or "normal" distribution. However, environmental data sets are often asymmetrical and skewed to the right, or in other words, with a "long tail towards high concentrations". A right-skewed distribution can be transformed to become approximately Gaussian, by using a logarithmic transformation, so that the procedures for normally distributed data can be applied to the transformed data. For data sets that do not follow the normal or lognormal distributions, other statistical tests to determine the distribution or non-parametric tests that do not rely on a particular distribution would be used in the statistical evaluation of the data.

The Shapiro-Wilk's W-test was performed for all Category "D" data sets, including chromium, copper, vanadium, and zinc, to aid in the determination of the underlying distribution. The W-test is a "goodness-of-fit" test considered to be effective for determining whether a data set can be described as "normally" or lognormally distributed for samples sets with 50 or fewer samples.

The W-test results for each of the four category "D" data sets indicated that the data sets were neither normal nor log normally distributed. For the purpose of this report, however, the data sets were assumed to be normally distributed.

2.4 Descriptive Statistics

Descriptive statistics provide a concise method of summarizing some of the more important and commonly used characteristics of a data set. Descriptive statistics developed for the category "D" background data include:

- Total Number of Samples (n): the total number of samples collected from each medium.

- Frequency of Detection: the number of positive detections divided by the total number of samples for a given medium

- Minimum and Maximum (Range): the minimum and maximum of the detected concentrations for a parameter in a given medium

- Arithmetic Mean (X): calculated as the sum of the measurements for a parameter in a given medium divided by the total number of measurements:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

- Standard Deviation (s): calculated as the square root of the sum of the variances divided by the degrees of freedom:

$$s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}$$

- Coefficient of Variation (CV): calculated as the standard deviation divided by the mean:

$$CV = \frac{s}{\bar{x}}$$

- Upper Limit of the Mean: calculated as the mean plus two times the standard deviation of the mean

$$\overline{x_{UL}} = \bar{x} + 2s$$

Descriptive statistics were also developed for category "C" data sets using a truncated data set. The results of the descriptive statistics calculations are summarized in the Statistical Summary found in Table 2-3.

2.4.1 Data Variability

The CV is a measure of the dispersion of a data set about the central value or mean. Environmental data sets typically contain a relatively high degree of variability. Some of the reasons for this include variations in detection limits due to sample size, dilution/concentration factors, variations in surrogate recoveries and other factors associated with laboratory analysis, variations in the matrix, matrix composition, source, as well as small sample set sizes, and many other factors.

2.4.2 Upper Limit of the Mean

As indicated above, the upper limit of the mean of the background data was calculated as the mean plus two times the standard deviation of the mean

$$\overline{x_{UL}} = \bar{x} + 2s$$

This estimate of the upper limit of the mean effectively equates to a one-sided tolerance limit or the value below which approximately 95 percent of the background population is expected to fall.

Since the purpose of this study is to provide a screening tool by which site contamination may be identified, the calculated background screening value was used, in addition to the Federal maximum contaminant level (MCL) and/or tap water risk-based concentration (RBC). For the purpose of developing background screening values, the x_{UL} value was used rather than the maximum detected concentration of a parameter. If only one detection was found, that concentration was used as a quasi-background concentration. It should be noted that the actual background concentrations for a compound for which only one detection was noted is essentially unquantified.

2.5 Development of Background Screening Values

The descriptive statistics presented in Table 2-4 provide a characterization of each parameter in the groundwater at the Solid Waste Landfill Facility. The next step in the development of background constituent concentrations for the groundwater was to use the descriptive statistics to develop a set of values for each parameter that may be used as a tool to compare compliance round site-specific data to background data. The background screening values were developed based on the FOD category for a parameter in a given media:

- A: There were no parameters classified into FOD category "A" as presented in Table 2-3. These parameters are listed as not detected in Table 2-4.

- B: There were eight parameters classified into FOD category "B" as presented in Table 2-3. Most of these analytes are VOCs. One metal, antimony, had only one detection. The descriptive statistics for these parameters include only the one concentration that was obtained. Background screening values for these parameters will be qualified as being unquantified. In most cases, the Federal MCL or the Region 2 tap water RBC will be used as a screening value for these compounds.

- C: There were ten parameters classified into FOD category "C" as presented in Table 2-3. The descriptive statistics for these parameters were done only on the quantified concentrations. Non-detect values were truncated from the data set. For this report, a value for the upper limit of the mean plus two times the standard deviation was selected as the background screening value, although, because the data set was truncated, this concentration should be strongly qualified during comparison.

- D: Four parameters classified into category "D" were detected at a frequency greater than 50 percent and an estimate of the mean was calculated. For this study, a value for the upper limit of the mean plus two times the standard deviation was selected as the background screening value. Descriptive statistics were calculated by substituting a surrogate value of one-half the detection limit for non-detect concentrations.

Table 2-4 contains the completed background screening values for all Appendix I parameters. Included in this table are the government standards, the overall site background screening values, the upgradient well screening values, and all intrawell comparison concentrations.

This concludes the discussion of background groundwater quality parameters for the Solid Waste Landfill Facility. Subsequent reports will only report current compliance round results and comparisons to these established background groundwater screening values. Should an analyte exceed the screening values in a subsequent compliance round sampling event, appropriate statistical tests as described by the SAP will be applied if warranted by the FOD category for that compound. These tests will determine if that exceedance indicates contamination. Appendix A contains the complete background groundwater data for each constituent.

3.0 MONITORING ACTIVITIES

3.1 Groundwater Sampling

The sampling event for the semi-annual groundwater monitoring at the Solid Waste Landfill Facility occurred March 23, 2003 and March 25, 2003. Nine monitor wells were sampled, and the groundwater samples were sent to a fixed-base laboratory to be analyzed for Appendix I Compounds. A list of these compounds, the analytical methods used along with the reporting limits, were presented in Table 2-1. Chain of custody records for this investigation are presented in Appendix B.

Field parameters were obtained and sampling occurred according to the procedures listed in the SAP (Burns and McDonnell, 1999). Specifically, measurements of temperature, pH, and specific conductivity, were obtained. Meters were calibrated twice daily, including prior to and following the days sampling. The results of the field analyses are presented in Table 3-1. Flow rates used during stabilization were approximately 0.2 – 0.3 Liters/minute.

No deviations from the sampling plan were made with the exception of sampling R7GW07R. At this well purging of the well resulted in insufficient water for sampling. As a result, samples were collected after recharge to this well occurred. All field notes are given in Appendix C.

3.2 Groundwater Flow

The groundwater elevations at the Solid Waste Landfill Facility were collected on March 23 and March 25, 2003. Table 3-2 shows a summary of the groundwater elevation information from these two rounds. It should be noted that the datum used is the mean sea level (msl) + 100 feet.

Figures 3-1 and 3-2 depict the groundwater elevations in the form of contours on a site map. The contours were developed numerically using the natural neighbor algorithm with a constant nodal function interpolation scheme. Some modifications of the contour lines were done manually. As shown, the highest groundwater elevation is located at R7GW11. This is to be expected because this well is located the furthest inland. Consistent highs at this location have been noted throughout the background and compliance sampling events. Another local groundwater high is seen at R7GW01R, near the Forrestal Wastewater Treatment Plant. This well is also at an inland

location. Radial groundwater flow occurs from this location toward the coasts in the west, south, and east directions. It should be noted that the groundwater levels are lower than previous sampling rounds, including an approximate 0.5-foot decrease at R7GW11. This results in lower groundwater flow gradients across the site.

As shown on Table 3-2, some groundwater elevations are below sea level. This is most likely due to tidal fluctuations at the coast. In particular, R7GW05R and R7GW07R both had groundwater elevations below sea level during this and previous sampling events.

The maximum and minimum groundwater gradients were calculated from the contour drawings of the piezometric surface. The locations where the gradients were calculated from are also shown on Figures 3-1 and 3-2. Table 3-3 shows the summary of gradients calculated from these drawings. Also shown is the calculated groundwater velocity for each gradient. The equation used to calculate the groundwater velocity is the Darcy equation:

$$V = Ki/n$$

Where: V = average linear groundwater velocity [feet per day (ft/day)]
K = average hydraulic conductivity (ft/day)
i = hydraulic gradient [feet per foot (ft/ft)]
n = effective porosity

The hydraulic conductivity was assumed to be 0.945 ft/day as determined from Burns and McDonnell hydraulic conductivity testing, and the porosity was assumed to be 0.3 (Burns and McDonnell, 2001). Based on these assumptions, the average groundwater velocities at the Solid Waste Landfill Facility ranged from 0.0008 to 0.0035 ft/day during the semi-annual monitoring investigation. The composite average groundwater velocity at this site was 0.0021 ft/day. The average groundwater velocity at the site is lower (approximately half) when compared to previous calculations (Baker, 2002).

3.3 Field Observations

At R7GW07R, it was noted that there appeared to be a blockage caused by roots in the polyvinyl chloride (PVC) casing approximately 14 feet down. It was broken through with the total depth probe.

4.0 RESULTS OF GROUNDWATER MONITORING EVENT

The results of the Appendix I analyses are given in Table 4-1. Only compounds with positive detections are given in this table. Appendix D contains the complete set of Appendix I analyses results. Appendix E contains the certification from a Puerto Rican chemist, along with copies of the raw laboratory analytical summary results.

4.1 Volatile Organic Compounds

Two VOCs were detected in the monitoring wells at the Solid Waste Landfill Facility: 1,1-dichloroethane and cis 1,2-dichloroethene. Both compounds were detected in estimated quantities. Monitor wells R7GW05R and R7GW10R were the only wells with volatile organic compound detections. No previously undetected VOCs were detected during the current sampling round.

4.2 Metals

Eleven metals on the Appendix I list were detected in this sampling event. Only antimony, arsenic, selenium, and silver were not detected. The analyses were done on both unfiltered and filtered samples to obtain total metals and dissolved metals. Fewer detections of metals were found in the dissolved analyses. Antimony, arsenic, chromium, lead, selenium, and silver were not detected in the dissolved analyses. However, thallium was detected in the dissolved analysis but not in the total analyses. In all cases, very low concentrations of metals were obtained, less than 0.4 milligrams per liter (mg/L).

4.3 Data Quality Control and Validation

One duplicate sample was collected from R7GW02R. The results of those analyses are presented alongside the original sample in Table 4-1. Good correlation is shown between the results for the two samples. The duplicate sample results will be used in the discussion because these results were slightly higher in concentration.

Quality control samples included a matrix spike and matrix spike duplicate sample. Also included were one trip blank sample, one field blank sample of lab grade deionized water, and one equipment rinsate sample of the tubing used with the peristaltic pump. There were three positive detections of Appendix I VOCs in the trip blank including 2-butanone, acetone, and toluene. One positive detection of zinc was found in both the field blank and equipment rinsate samples. Table 4-2 presents the positive detections in the quality control samples. Appendix D contains the complete set of analytical results for the quality control samples.

A detailed and independent data validation was performed by Heartland Environmental Services, Inc. to verify the qualitative and quantitative reliability of the data presented and adherence to stated analytical protocols. This review included a detailed review and interpretation of all the data generated by the laboratory for data quality Level D deliverables. The primary tools that were utilized by the experienced data validation personnel included analytical method operating procedures, Statement of Work for CLP guidance documents, United States Environmental Protection Agency (EPA) Region II guidelines for data validation, established criteria, and professional judgement.

The data validation reports stated that the overall laboratory performance and overall data quality was acceptable. One compound, bromomethane, was qualified as rejected in all sample analyses resulting in a non- detection due to the relative response factor being less than 0.05. The detections of 2-butanone and toluene in the trip blank resulted in the positive estimated detections of those compounds in the sample analyses being qualified as non-detect. The reported results are accepted as reported by the laboratory with the noted qualifications. Data validation reports were prepared by the data validator that provided the back-up information accompanying the qualifying statements presented in the quality assurance (QA) review. The validation report narratives can be found in Appendix F.

4.4 Criteria Comparison and Statistical Analyses

The compliance groundwater concentration data were compared to the Federal MCL and the background concentrations for each compound. When the MCL was not established for a particular compound or compounds, the tap water RBC criteria were used for comparison.

Table 4-3 presents the compliance round concentrations for all detected compounds in the current compliance round sampling event. The background concentrations for each compound are presented for comparison. A summary of background concentrations is given in Appendix A and was discussed in Section 2. Also shown for comparison on Table 4-3 are the upgradient well concentrations for each compound and the well-specific background average or maximum for intrawell comparison.

There were no exceedances of either the Federal MCL or the tap-water RBC for the volatile organic compounds during the current compliance sampling round. Exceedance of the Federal MCL and the overall background upper limit of means occurred for the detections of thallium. This compound was not present in the background data set, and, as such, has no established background concentration. No background concentration is present for beryllium, either, and, therefore, the current detection exceeds the non-detect background concentration, although not the Federal MCL. Cadmium exceeded the background screening value but the limited data available for this compound makes evaluation of contamination impossible. Copper exceeded the upper limit of means for background, but not the Federal MCL. Accordingly, since this compound has an FOD of greater than 50 percent, the Krustall-Wallis test was performed to determine if contamination of copper is present. The result was that no contamination is present at the 1 percent confidence limit. The lower confidence limit (typically 5%) was used because of the presence of outliers in the data set. The current concentration was less than the outliers present in the data set. This test is given in Appendix G.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The primary conclusion of this report is that there is no apparent groundwater contamination resulting from the continued use of the Solid Waste Landfill Facility. The analytical results from this semi annual compliance round sampling event indicates that one metal compound, thallium, was detected that exceeded Federal MCL criteria, although both concentrations were qualified as estimated. This compound was not detected during background sampling, although it was detected during March 2002, the first compliance round sampling event. Beryllium also was not present in the background data set, but has been detected during all of the compliance rounds at estimated concentrations. Cadmium was present in excess of the screening background level. However, this exceedance could not be statistically tested due to a large portion of non-detects in the data set. Copper exceedance of the background screening level was statistically tested and found to lie within the range of the distribution at the 1 percent level, given the fact that outliers are present in this data set.

It is recommended that the semi-annual sampling events continue as originally developed for this facility.

6.0 REFERENCES

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TABLES

TABLE 2-1

METHOD PERFORMANCE LIMITS
APPENDIX I COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Volatiles	Quantitiation Limits Water (ug/L)	Method Number
Acetone	50	8260
Acrylonitrile	100	8260
Benzene	5	8260
Bromochloromethane	5	8260
Bromodichloromethane	5	8260
Bromoform	5	8260
Carbon Disulfide	5	8260
Carbon tetrachloride	5	8260
Chlorobenzene	5	8260
Chloroethane	10	8260
Chloroform	5	8260
Dibromochloromethane	5	8260
1,2-Dibromo-3-chloropropane	5	8260
1,2-Dibromoethane (EDB)	5	8260
1,2-Dichlorobenzene	5	8260
1,4-Dichlorobenzene	5	8260
trans-1,4-Dichloro-2-butene	10	8260
1,1-Dichloroethane	5	8260
1,2-Dichloroethane	5	8260
1,1-Dichloroethene	5	8260
cis-1,2-Dichloroethene	5	8260
trans-1,2-Dichloroethene	5	8260
1,2-Dichloropropane	5	8260
cis-1,3-Dichloropropene	5	8260
trans-1,3-Dichloropropene	5	8260
Ethylbenzene	5	8260
2-Hexanone	25	8260
Bromomethane	10	8260
Chloromethane	10	8260
Dibromomethane	5	8260
Dichloromethane	5	8260
2-Butanone (MEK)	25	8260
Iodomethane	5	8260
4-Methyl-2-pentanone (MIBK)	25	8260
Styrene	5	8260
1,1,1,2-Tetrachloroethane	5	8260
1,1,2,2-Tetrachloroethane	5	8260
Tetrachloroethene	5	8260
Toluene	5	8260
1,1,1-Trichloroethane	5	8260
1,1,2-Trichloroethane	5	8260
Trichloroethene	5	8260
Trichlorofluoromethane	5	8260
1,2,3-Trichloropropane	5	8260
Vinyl acetate	10	8260
Vinyl chloride	10	8260
Xylenes, Total	10	8260

TABLE 2-1

METHOD PERFORMANCE LIMITS
APPENDIX I COMPOUND LIST AND CONTRACT
REQUIRED QUANTITATION LIMITS (CRQL)

Total and Dissolved Metals	Quantitiation Limits Water (mg/L)	Method Number
Antimony	0.02	6010
Arsenic	0.01	6010
Barium	0.01	6010
Beryllium	0.004	6010
Cadmium	0.005	6010
Chromium	0.01	6010
Cobalt	0.01	6010
Copper	0.02	6010
Lead	0.005	6010
Nickel	0.04	6010
Selenium	0.01	6010
Silver	0.01	6010
Thallium	0.01	6010
Vanadium	0.01	6010
Zinc	0.02	6010

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.

TABLE 2-2

COMPOUNDS WITH LESS THAN FOUR BACKGROUND RESULTS, 6/1998-8/2000
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Volatile Organic Compounds
Acetone
1,1,1,2-Tetrachloroethane
1,2,3-Trichloropropane
1,2-Dibromo-3-Chloropropane
1,2-Dibromoethane
2-Hexanone
4-Methyl-2-pentanone
Bromochloromethane
Bromodichloromethane
carbon disulfide
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
dibromomethane (methylene bromide)
Methyl Ethyl Ketone
Methyl Iodide
Methylene Chloride
o-Dichlorobenzene
p-Dichlorobenzene
Styrene
trans-1,3-Dichloropropene
trans-1,4-Dichoro-2-Butene
Vinyl Acetate
Xylene (total)
Metals
Zinc

TABLE 2-3

STATISTICAL SUMMARY OF BACKGROUND DETECTED COMPOUNDS
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

VOCs Detected	FOD	FOD Category	Maximum Detected Concentration (mg/L)	Minimum Detected Concentration (mg/L)	Detected in Upgradient Wells?
1,1-Dichloroethane	1/36	B	0.001	0.001	no
1,1-Dichloroethylene	1/36	B	0.001	0.001	no
Acetone	2/36	C	0.005	0.002	yes +
Carbon Disulfide	2/36	C	0.0019	0.0016	no
Chlorobenzene	1/36	B	0.0008	0.0008	no
cis-1,2-Dichloroethylene	2/36	C	0.002	0.00068	no
Ethylbenzene	1/36	B	0.015	0.015	no
Methyl Chloride (chloromethane)	1/36	B	0.0007	0.0007	no
Methylene Bromide (dibromomethane)	1/36	B	0.0046	0.0046	no
Vinyl Chloride	1/36	B	0.001	0.001	no
Metals Detected					
Antimony	1/36	B	0.002	0.002	no
Arsenic	3/36	C	0.0169	0.0062	no
Barium	17/36	C	0.766	0.0105	yes
Cadmium	2/36	C	0.00057	0.00054	no
Chromium	29/36	D	0.104	0.0013	yes
Cobalt	13/36	C	0.092	0.0004	yes
Copper	*19/36*	*D*	*0.272*	*0.0046*	*yes*
Lead	4/36	C	0.008	0.0026	yes
Nickel	9/36	C	0.03	0.0006	yes
Silver	2/36	C	0.01	0.01	yes
Vanadium	28/36	D	0.116	0.0059	yes
Zinc	*31/36*	*D*	*11.9*	*0.0084*	*yes*

NM: Not Meaningful
FOD: Frequency of Detection
"+" Detected in upgradient well R7GW11
italics: outliers detected in data set

TABLE 2-3

STATISTICAL SUMMARY OF BACKGROUND DETECTED COMPOUNDS
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

VOCs Detected	Arithmetic Mean (X) (mg/L)	Standard Deviation (S) (mg/L)	Coefficient of Variation (S/X)	Upper Limit of Means (X + 2S) (mg/L)
1,1-Dichloroethane	NM	NM	NM	NM
1,1-Dichloroethylene	NM	NM	NM	NM
Acetone	0.0035	0.0021	0.6057	0.0077
Carbon Disulfide	0.0018	0.0002	0.1111	0.0022
Chlorobenzene	NM	NM	NM	NM
cis-1,2-Dichloroethylene	0.0013	0.0009	0.7177	0.0032
Ethylbenzene	NM	NM	NM	NM
Methyl Chloride (chloromethane)	NM	NM	NM	NM
Methylene Bromide (dibromomethane)	NM	NM	NM	NM
Vinyl Chloride	NM	NM	NM	NM
Metals Detected				
Antimony	NM	NM	NM	NM
Arsenic	0.0111	0.0054	0.4865	0.0219
Barium	0.1178	0.2097	1.7801	0.5372
Cadmium	0.0006	0.000021	0.0375	0.0006
Chromium	0.0274	0.0288	1.0511	0.0850
Cobalt	0.0191	0.0270	1.4136	0.0731
Copper	*0.0310*	*0.0562*	*1.8129*	*0.1434*
Lead	0.0048	0.0031	0.6458	0.0110
Nickel	0.0083	0.0115	1.3855	0.0313
Silver	0.0100	0.0000	NM	NM
Vanadium	0.0309	0.0315	1.0194	0.0939
Zinc	*0.4851*	*1.9626*	*4.0458*	*4.4103*

NM: Not Meaningful
FOD: Frequency of Detection
"+" Detected in upgradient well R7GW11
italics: outliers detected in data set

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW01 Intrawell Average/Max, Upgradient
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	ND
1,1-Dichloroethene	7	1	ND	ND
Acetone	NE (610)	7.74	2	ND
Carbon Disulfide	NE (1000)	2.2	ND	ND
Chlorobenzene	100	0.8	ND	ND
Chloromethane	NE (190)	0.7	ND	ND
cis-1,2-Dichloroethene	70	3.1	ND	ND
Dibromomethane	NE (608)	4.6	ND	ND
Ethylbenzene	700	15	ND	ND
Vinyl chloride	2	1	ND	ND
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND

(see notes on last page)

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW02 Intrawell Average/Max
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	ND
1,1-Dichloroethene	7	1	ND	ND
Acetone	NE (610)	7.74	2	ND
Carbon Disulfide	NE (1000)	2.2	ND	ND
Chlorobenzene	100	0.8	ND	ND
Chloromethane	NE (190)	0.7	ND	ND
cis-1,2-Dichloroethene	70	3.1	ND	ND
Dibromomethane	NE (608)	4.6	ND	ND
Ethylbenzene	700	15	ND	ND
Vinyl chloride	2	1	ND	ND
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND
(see notes on last page)				

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW04 Intrawell Average/Max
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	ND
1,1-Dichloroethene	7	1	ND	ND
Acetone	NE (610)	7.74	2	5
Carbon Disulfide	NE (1000)	2.2	ND	ND
Chlorobenzene	100	0.8	ND	ND
Chloromethane	NE (190)	0.7	ND	0.7
cis-1,2-Dichloroethene	70	3.1	ND	ND
Dibromomethane	NE (608)	4.6	ND	ND
Ethylbenzene	700	15	ND	ND
Vinyl chloride	2	1	ND	ND
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND
(see notes on last page)				

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW05 Intrawell Average/Max
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	1
1,1-Dichloroethene	7	1	ND	1
Acetone	NE (610)	7.74	2	ND
Carbon Disulfide	NE (1000)	2.2	ND	1.9
Chlorobenzene	100	0.8	ND	0.8
Chloromethane	NE (190)	0.7	ND	ND
cis-1,2-Dichloroethene	70	3.1	ND	1.3
Dibromomethane	NE (608)	4.6	ND	4.6
Ethylbenzene	700	15	ND	ND
Vinyl chloride	2	1	ND	1
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND
(see notes on last page)				

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW07 Intrawell Average/Max (1)
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	ND
1,1-Dichloroethene	7	1	ND	ND
Acetone	NE (610)	7.74	2	ND
Carbon Disulfide	NE (1000)	2.2	ND	ND
Chlorobenzene	100	0.8	ND	ND
Chloromethane	NE (190)	0.7	ND	ND
cis-1,2-Dichloroethene	70	3.1	ND	ND
Dibromomethane	NE (608)	4.6	ND	ND
Ethylbenzene	700	15	ND	ND
Vinyl chloride	2	1	ND	ND
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND
(see notes on last page)				

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW08 Intrawell Average/Max (1)
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	ND
1,1-Dichloroethene	7	1	ND	ND
Acetone	NE (610)	7.74	2	ND
Carbon Disulfide	NE (1000)	2.2	ND	ND
Chlorobenzene	100	0.8	ND	ND
Chloromethane	NE (190)	0.7	ND	ND
cis-1,2-Dichloroethene	70	3.1	ND	ND
Dibromomethane	NE (608)	4.6	ND	ND
Ethylbenzene	700	15	ND	ND
Vinyl chloride	2	1	ND	ND
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND
(see notes on last page)				

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW09 Intrawell Average/Max (1)
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	ND
1,1-Dichloroethene	7	1	ND	ND
Acetone	NE (610)	7.74	2	ND
Carbon Disulfide	NE (1000)	2.2	ND	1.6
Chlorobenzene	100	0.8	ND	ND
Chloromethane	NE (190)	0.7	ND	ND
cis-1,2-Dichloroethene	70	3.1	ND	ND
Dibromomethane	NE (608)	4.6	ND	ND
Ethylbenzene	700	15	ND	ND
Vinyl chloride	2	1	ND	ND
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND
(see notes on last page)				

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW10 Intrawell Average/Max (1)
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	ND
1,1-Dichloroethene	7	1	ND	ND
Acetone	NE (610)	7.74	2	ND
Carbon Disulfide	NE (1000)	2.2	ND	ND
Chlorobenzene	100	0.8	ND	ND
Chloromethane	NE (190)	0.7	ND	ND
cis-1,2-Dichloroethene	70	3.1	ND	ND
Dibromomethane	NE (608)	4.6	ND	ND
Ethylbenzene	700	15	ND	15
Vinyl chloride	2	1	ND	ND
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND
(see notes on last page)				

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW11 Intrawell Average/Max (1), Upgradient
Detected Volatiles (ug/l)				
1,1-Dichloroethane	NE (798)	1	ND	ND
1,1-Dichloroethene	7	1	ND	ND
Acetone	NE (610)	7.74	2	2
Carbon Disulfide	NE (1000)	2.2	ND	ND
Chlorobenzene	100	0.8	ND	ND
Chloromethane	NE (190)	0.7	ND	ND
cis-1,2-Dichloroethene	70	3.1	ND	ND
Dibromomethane	NE (608)	4.6	ND	ND
Ethylbenzene	700	15	ND	ND
Vinyl chloride	2	1	ND	ND
Non-Detected Volatiles (ug/l)				
Acrylonitrile	NE (0.037)	ND	ND	ND
Benzene	5	ND	ND	ND
Bromochloromethane	NE	ND	ND	ND
Bromodichloromethane	NE (1.7)	ND	ND	ND
Bromoform	NE (84)	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Chloroethane	NE (36)	ND	ND	ND
Chloroform	NE (1.5)	ND	ND	ND
Dibromochloromethane	NE (1.2)	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.2	ND	ND	ND
1,2-Dibromoethane (EDB)	NE (0.0075)	ND	ND	ND
1,2-Dichlorobenzene	600	ND	ND	ND
1,4-Dichlorobenzene	75	ND	ND	ND
trans-1,4-Dichloro-2-butene	NE	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
trans-1,2-Dichloroethene	100	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
cis-1,3-Dichloropropene	NE	ND	ND	ND
trans-1,3-Dichloropropene	NE	ND	ND	ND
2-Hexanone	NE (1460)	ND	ND	ND
Bromomethane	NE (8.52)	ND	ND	ND
Dichloromethane	5	ND	ND	ND
2-Butanone (MEK)	NE (1910)	ND	ND	ND
Iodomethane	NE	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	NE (2000)	ND	ND	ND
Styrene	100	ND	ND	ND
1,1,1,2-Tetrachloroethane	NE (4.1)	ND	ND	ND
1,1,2,2-Tetrachloroethane	NE (0.53)	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Toluene	1000	ND	ND	ND
1,1,1-Trichloroethane	200	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
Trichlorofluoromethane	NE (1300)	ND	ND	ND
1,2,3-Trichloropropane	NE (0.05)	ND	ND	ND
Vinyl acetate	NE (410)	ND	ND	ND
Xylenes, Total	10000	ND	ND	ND

(see notes on last page)

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW01 Intrawell Average/Max, Upgradient
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	ND
Arsenic	0.01	**0.0219**	ND	ND
Barium	2	0.5372	0.1298	0.174
Cadmium	0.005	0.000602	ND	ND
Chromium	0.1	0.085	0.0259	0.028
Cobalt	NE (0.73)	0.0731	0.0188	0.02445
Copper	1.3	0.1434	0.0456	0.0447
Lead	0.015	0.011	0.0018	ND
Nickel	NE (0.73)	0.0313	0.0161	0.0022
Silver	NE (0.18)	0.01	0.01	0.01
Vanadium	NE (0.26)	0.0939	0.0402	0.0498
Zinc**	NE (10.95)	4.4103	0.1494	4.066
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW02 Intrawell Average/Max
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	ND
Arsenic	0.01	**0.0219**	ND	**0.0169**
Barium	2	0.5372	0.1298	0.014
Cadmium	0.005	0.000602	ND	ND
Chromium	0.1	0.085	0.0259	0.059
Cobalt	NE (0.73)	0.0731	0.0188	0.0016
Copper	1.3	0.1434	0.0456	0.0217
Lead	0.015	0.011	0.0018	ND
Nickel	NE (0.73)	0.0313	0.0161	0.00064
Silver	NE (0.18)	0.01	0.01	ND
Vanadium	NE (0.26)	0.0939	0.0402	0.0149
Zinc**	NE (10.95)	4.4103	0.1494	0.1537
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW04 Intrawell Average/Max
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	ND
Arsenic	0.01	**0.0219**	ND	ND
Barium	2	0.5372	0.1298	0.343
Cadmium	0.005	0.000602	ND	ND
Chromium	0.1	0.085	0.0259	0.039
Cobalt	NE (0.73)	0.0731	0.0188	0.0042
Copper	1.3	0.1434	0.0456	0.0494
Lead	0.015	0.011	0.0018	ND
Nickel	NE (0.73)	0.0313	0.0161	0.0011
Silver	NE (0.18)	0.01	0.01	ND
Vanadium	NE (0.26)	0.0939	0.0402	0.0239
Zinc**	NE (10.95)	4.4103	0.1494	0.1864
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW05 Intrawell Average/Max
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	ND
Arsenic	0.01	**0.0219**	ND	0.0062
Barium	2	0.5372	0.1298	0.011
Cadmium	0.005	0.000602	ND	ND
Chromium	0.1	0.085	0.0259	0.04
Cobalt	NE (0.73)	0.0731	0.0188	0.0016
Copper	1.3	0.1434	0.0456	0.0194
Lead	0.015	0.011	0.0018	ND
Nickel	NE (0.73)	0.0313	0.0161	0.00083
Silver	NE (0.18)	0.01	0.01	ND
Vanadium	NE (0.26)	0.0939	0.0402	0.0215
Zinc**	NE (10.95)	4.4103	0.1494	0.1432
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW07 Intrawell Average/Max (1)
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	ND
Arsenic	0.01	**0.0219**	ND	ND
Barium	2	0.5372	0.1298	0.01
Cadmium	0.005	0.000602	ND	ND
Chromium	0.1	0.085	0.0259	0.012
Cobalt	NE (0.73)	0.0731	0.0188	0.0005
Copper	1.3	0.1434	0.0456	0.0293
Lead	0.015	0.011	0.0018	0.0026
Nickel	NE (0.73)	0.0313	0.0161	ND
Silver	NE (0.18)	0.01	0.01	ND
Vanadium	NE (0.26)	0.0939	0.0402	0.0496
Zinc**	NE (10.95)	4.4103	0.1494	0.1611
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW08 Intrawell Average/Max (1)
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	ND
Arsenic	0.01	**0.0219**	ND	ND
Barium	2	0.5372	0.1298	0.035
Cadmium	0.005	0.000602	ND	ND
Chromium	0.1	0.085	0.0259	0.048
Cobalt	NE (0.73)	0.0731	0.0188	0.001
Copper	1.3	0.1434	0.0456	0.0263
Lead	0.015	0.011	0.0018	0.008
Nickel	NE (0.73)	0.0313	0.0161	0.0006
Silver	NE (0.18)	0.01	0.01	ND
Vanadium	NE (0.26)	0.0939	0.0402	0.0337
Zinc**	NE (10.95)	4.4103	0.1494	0.1948
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW09 Intrawell Average/Max (1)
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	ND
Arsenic	0.01	**0.0219**	ND	ND
Barium	2	0.5372	0.1298	0.146
Cadmium	0.005	0.000602	ND	0.00057
Chromium	0.1	0.085	0.0259	0.037
Cobalt	NE (0.73)	0.0731	0.0188	0.0518
Copper	1.3	0.1434	0.0456	0.1539
Lead	0.015	0.011	0.0018	ND
Nickel	NE (0.73)	0.0313	0.0161	0.0164
Silver	NE (0.18)	0.01	0.01	ND
Vanadium	NE (0.26)	0.0939	0.0402	0.0447
Zinc**	NE (10.95)	4.4103	0.1494	0.1712
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW10 Intrawell Average/Max (1)
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	0.002
Arsenic	0.01	**0.0219**	ND	**0.0101**
Barium	2	0.5372	0.1298	0.174
Cadmium	0.005	0.000602	ND	0.00054
Chromium	0.1	0.085	0.0259	0.015
Cobalt	NE (0.73)	0.0731	0.0188	0.0081
Copper	1.3	0.1434	0.0456	0.0258
Lead	0.015	0.011	0.0018	0.0069
Nickel	NE (0.73)	0.0313	0.0161	0.0068
Silver	NE (0.18)	0.01	0.01	0.01
Vanadium	NE (0.26)	0.0939	0.0402	0.052
Zinc**	NE (10.95)	4.4103	0.1494	0.1809
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 2-4

BACKGROUND GROUNDWATER QUALITY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Appendix I Parameters	Federal MCL (Tap Water RBC)	Overall Background Upper Limit of Means	Upgradient Background Average/ Max (1)	R7GW11 Intrawell Average/Max (1), Upgradient
Detected Total Metals (mg/l)				
Antimony	0.006	0.002	ND	ND
Arsenic	0.01	**0.0219**	ND	ND
Barium	2	0.5372	0.1298	0.044
Cadmium	0.005	0.000602	ND	ND
Chromium	0.1	0.085	0.0259	0.024
Cobalt	NE (0.73)	0.0731	0.0188	0.0004
Copper	1.3	0.1434	0.0456	0.0842
Lead	0.015	0.011	0.0018	0.0018
Nickel	NE (0.73)	0.0313	0.0161	0.03
Silver	NE (0.18)	0.01	0.01	ND
Vanadium	NE (0.26)	0.0939	0.0402	0.0406
Zinc**	NE (10.95)	4.4103	0.1494	0.3318
Non-Detected Total Metals (mg/l)				
Beryllium	0.004	ND	ND	ND
Selenium	0.05	ND	ND	ND
Thallium	0.002	ND	ND	ND

Notes:
(1) Average determined on detections only, unless frequency of detection is above 50%.
ND - Not Detected
NE - Not Established
Bold--indicates exceedance of Federal MCL or tap water RBC
Background not absolutely quantified, too few detections

TABLE 3-1

SUMMARY OF GROUNDWATER FIELD PARAMETERS
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Well ID/ Sample Date	Time Interval	Static Water Level (feet from top of PVC)	Temperature (^{O}F)	pH (S.U.)	Specific Conductance (umhos/cm)	Sample Description
R7GW01R-07 03/24/03	1033	8.55				Sample appeared relatively clear with no apparent odor.
	1039	8.85	88.0	NA	3,714	
	1045	8.88	86.9	NA	3,325	
	1051	8.85	86.5	NA	3,194	
	1057	8.88	86.2	NA	3,239	
R7GW02R-07 03/25/03	0820	4.83				Sample appeared relatively clear with strong sulfur odor.
	0825	5.08	83.8	NA	55,600	
	0830	5.10	83.3	NA	51,200	
	0836	5.12	83.7	NA	31,950	
	0841	5.14	83.1	NA	25,850	
	0846	5.13	83.5	NA	25,230	
	0851	5.15	83.3	NA	25,100	
R7GW04R-07 03/24/03	1139	11.67				Sample appeared relatively clear with no apparent odor.
	1146	14.06	88.2	NA	55,500	
	1154	14.88	87.8	NA	55,000	
	1201	15.81	87.3	NA	55,700	
R7GW05R-07 03/24/03	0915	14.10				Sample appeared to be slightly cloudy with a slight sulfur odor.
	0922	14.17	84.7	NA	41,360	
	0930	14.14	85.1	NA	36,910	
	0936	14.26	84.7	NA	35,880	
	0941	14.24	85.5	NA	34,120	
R7GW07R-07 03/24/03	0842	15.65				Sample appeared slightly gray with no apparent odor.
	0900	18.33	86.18	8.70	8,700	
	0906	Well purged dry.				
03/25/03	0800	Sample was collected.				
R7GW08R-07 03/23/03	1500	10.96				Sample appeared to have a gray tint with no observable odor.
	1507	11.13	87.4	6.97	48,400	
	1512	11.12	87.1	7.01	47,800	
	1518	11.09	86.9	7.03	47,700	
R7GW09-07 03/24/03	1246	9.49				Sample appeared clear with no apparent odor.
	1252	9.30	91.4	NA	51,000	
	1257	9.53	90.9	NA	50,400	
	1303	9.50	90.3	NA	50,500	
R7GW10-07 03/23/03	1600	13.64				Sample appeared to be slightly cloudy with a slight sulfur odor.
	1607	13.77	88.3	6.43	20,730	
	1613	13.72	87.3	6.58	18,870	
	1620	13.72	87.3	6.56	21,710	
	1627	13.72	87.3	NA	21,370	
	1640	13.71	87.3	NA	21,970	
R7GW11-07 03/23/03	1414	8.57				Sample appeared relatively clear with no apparent odor.
	1420	8.79	86.7	6.68	1,800	
	1426	8.81	87.4	6.77	1,636	
	1430	8.84	87.3	6.80	1,495	

TABLE 3-1

SUMMARY OF GROUNDWATER FIELD PARAMETERS
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Notes:
PVC - Polyvinyl chloride.
^{o}F - Degrees Fahrenheit.
S.U. - Standard Unit.
umhos/cm - micro ohms per centimeter.
NA - Not available due to meter malfunction.

TABLE 3-2

GROUNDWATER ELEVATION SUMMARY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROSEVELT ROADS, CEIBA, PUERTO RICO

Well No.	Date Sampled	Top of PVC Elevation (feet msl)	Depth to Water (feet from top of PVC)	Groundwater Elevation (feet msl)
R7GW01R	03/23/03	108.90	8.50	100.40
R7GW01R	03/25/03	108.90	8.56	100.34
R7GW02R	03/23/03	105.11	5.00	100.11
R7GW02R	03/25/03	105.11	4.83	100.28
R7GW04R	03/23/03	112.39	12.02	100.37
R7GW04R	03/25/03	112.39	11.96	100.43
R7GW05R	03/23/03	113.73	14.16	99.57
R7GW05R	03/25/03	113.73	14.18	99.55
R7GW07R	03/23/03	114.94	15.60	99.34
R7GW07R	03/25/03	114.94	15.65	99.29
R7GW08R	03/23/03	111.33	10.96	100.37
R7GW08R	03/25/03	111.33	10.98	100.35
R7GW09	03/23/03	109.69	9.53	100.16
R7GW09	03/25/03	109.69	9.50	100.19
R7GW10	03/23/03	113.96	13.64	100.32
R7GW10	03/25/03	113.96	13.71	100.25
R7GW11	03/23/03	110.20	8.57	101.63
R7GW11	03/25/03	110.20	8.65	101.55

Notes:
msl - mean sea level + 100 feet.
PVC - Polyvinyl Chloride.

TABLE 3-3

GROUNDWATER VELOCITY CALCULATIONS
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Event	Line Location	Line Length (ft)	Head Difference (ft)	Gradient (I)	Velocity (ft/day)
3/23/2003	1	1348.00	1.50	0.00111	0.0035
3/23/2003	2	1760.00	0.50	0.00028	0.0009
3/25/2003	1	940.00	1.00	0.00106	0.0034
3/25/2003	2	1900.00	0.50	0.00026	0.0008

Assumption:	K =	0.945	ft/day
Assumption:	n =	0.3	
V = Ki/n			

SUMMARY		
average gradient =	0.00068	ft/ft
minimum groundwater velocity =	0.0008	ft/day
maximum groundwater velocity =	0.0035	ft/day
average groundwater velocity =	0.0021	ft/day

Notes:
K = hydraulic conductivity
n = porosity
ft/day = feet per day

TABLE 4-1

POSITIVE DETECTION SUMMARY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PR

Site ID	R7GW01R	R7GW02R	R7GW02R	R7GW04R	R7GW05R	R7GW07R	R7GW08R
Sample ID	R7GW01R-07	R7GW02R-07	R7GW02R-07D	R7GW04R-07	R7GW05R-07	R7GW07R-07	R7GW08R-07
Sample Date	3/24/2003	3/25/2003	3/25/2003	3/24/2003	3/24/2003	3/25/2003	3/23/2003
Appendix I Volatile Organics (ug/L)							
1,1-Dichloroethane	5 U	5 U	5 U	5 U	0.25 J	5 U	5 U
Bromomethane	5 R	5 R	5 R	5 R	5 R	5 R	5 R
cis-1,2-Dichloroethene	5 U	5 U	5 U	5 U	0.63 J	5 U	5 U
Appendix I Metals (mg/L)							
Barium	0.082	0.086	0.087	0.21	0.02	0.4	0.087
Beryllium	0.0022 J	0.004 U	0.004 U	0.00042 J	0.0027 J	0.004 U	0.0029 J
Cadmium	0.005 U	0.005 U	0.005 U	0.0029 J	0.005 U	0.005 U	0.005 U
Chromium	0.01 U	0.01 U	0.01 U	0.002 J	0.01 U	0.0088 J	0.01 U
Cobalt	0.01 U	0.01 U	0.01 U	0.018	0.01 U	0.022	0.01 U
Copper	0.02 U	0.02 U	0.02 U	0.046	0.0037 J	0.16	0.0041 J
Lead	0.005 U	0.005 U	0.005 U	0.025 U	0.005 U	0.0039 J	0.025 U
Nickel	0.04 U	0.0022 J	0.003 J	0.0074 J	0.04 U	0.011 J	0.0029 J
Vanadium	0.0036 J	0.011	0.011	0.026	0.0037 J	0.068	0.0026 J
Zinc	0.012 J	0.0041 J	0.0041 J	0.15 J	0.049 J	0.35	0.016 J
Appendix I Metals (Dissolved) (mg/L)							
Barium, (Dissolved)	0.083	0.083	0.089	0.18	0.021	0.27	0.087
Beryllium (Dissolved)	0.0022 J	0.004 U	0.004 U	0.004 U	0.0026 J	0.004 U	0.0029 J
Cadmium (Dissolved)	0.005 U	0.005 U	0.005 U	0.0016 J	0.005 U	0.005 U	0.005 U
Cobalt (Dissolved)	0.0016 J	0.0019 J	0.01 U	0.02	0.01 U	0.0086 J	0.01 U
Copper, Dissolved	0.02 U	0.02 U	0.02 U	0.0059 J	0.02 U	0.02 U	0.0037 J
Nickel, (Dissolved)	0.04 U	0.04 U	0.04 U	0.005 J	0.04 U	0.0043 J	0.04 U
Thallium (Dissolved)	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.05 U
Vanadium (Dissolved)	0.0022 J	0.0097 J	0.011	0.00077 J	0.0014 J	0.0084 J	0.01 U
Zinc, (Dissolved)	0.0052 J	0.0038 J	0.0034 J	0.044 J	0.0068 J	0.018 J	0.0063 J

Notes:

U - Not Detected
ug/L - micrograms per liter
J - Qualified as Estimated
mg/L - milligrams per liter
R- Reported concentration rejected by the validator
J - Qualified as Estim
mg/L - milligrams pe

TABLE 4-1

POSITIVE DETECTION SUMMARY
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PR

Site ID	R7GW09R	R7GW10R	R7GW11
Sample ID	R7GW09R-07	R7GW10R-07	R7GW11-07
Sample Date	3/24/2003	3/23/2003	3/23/2003
Appendix I Volatile Organics (ug/L)			
1,1-Dichloroethane	5 U	0.15 J	5 U
Bromomethane	5 R	5 R	5 R
cis-1,2-Dichloroethene	5 U	0.38 J	5 U
Appendix I Metals (mg/L)			
Barium	0.092	0.23	0.028
Beryllium	0.0029 J	0.0022 J	0.002 J
Cadmium	0.00093 J	0.005 U	0.005 U
Chromium	0.0011 J	0.01 U	0.01 U
Cobalt	0.0041 J	0.01 U	0.01 U
Copper	0.018 J	0.0027 J	0.02 U
Lead	0.025 U	0.005 U	0.005 U
Nickel	0.0039 J	0.04 U	0.04 U
Vanadium	0.014	0.0025 J	0.00097 J
Zinc	0.016 J	0.0085 J	0.006 J
Appendix I Metals (Dissolved) (mg/L)			
Barium, (Dissolved)	0.091	0.23	0.027
Beryllium (Dissolved)	0.0027 J	0.002 J	0.002 J
Cadmium (Dissolved)	0.0013 J	0.005 U	0.005 U
Cobalt (Dissolved)	0.01 U	0.01 U	0.0016 J
Copper, Dissolved	0.02 U	0.02 U	0.02 U
Nickel, (Dissolved)	0.0025 J	0.04 U	0.04 U
Thallium (Dissolved)	0.037 J	0.0058 J	0.01 U
Vanadium (Dissolved)	0.0081 J	0.0013 J	0.00095 J
Zinc, (Dissolved)	0.0082 J	0.0056 J	0.0046 J

Notes:

U - Not Detected
ug/L - micrograms per liter

ıated
ɜr liter

R- Reported concentration rejected by the validator

TABLE 4-2

POSITIVE DETECTION SUMMARY OF QUALITY CONTROL/QUALITY ASSURANCE SAMPLE ANALYSES
SEMI-ANNUAL LANDFILL MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

	Trip Blank	Equipment Rinsate	Field Blank
Site ID	**R7TB01**	**R7ER01**	**R7FB01**
Sample ID	**R7TB01-07**	**R7ER01-07**	**R7FB01-07**
Sample Date	**3/23/2003**	**3/23/2003**	**3/23/2003**
Appendix 1 Volatile Organics (ug/L)			
2-Butanone (MEK)	1.5 J	5 U	5 U
Acetone	5 J	50 U	50 U
Bromomethane	5 R	5 R	5 R
Toluene	1.7 J	5 U	5 U
Appendix 1 Metals (mg/L)			
Zinc	NA	0.004 J	0.0052 J

U - Not Detected
NA--not analyzed
ug/L - micrograms per liter

J - Qualified as Estimated
R- Qualified as Rejected
mg/L - milligrams per liter

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW01 Background Intrawell (1)		R7GW01R Compliance 03/24/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	ND		5	U
cis-1,2-Dichloroethene	70	3.1	ND	ND		5	U
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.174		0.082	
Beryllium	0.004	ND	ND	ND		*0.0022*	J
Cadmium	0.005	0.000602	ND	ND		0.005	U
Chromium	0.1	0.085	0.0259	0.028		0.01	U
Cobalt	NE (0.73)	0.0731	0.0188	0.02445		0.01	U
Copper	1.3	0.1434	0.0456	0.0447		0.02	U
Lead	0.015	0.011	0.0018	ND		0.005	U
Nickel	NE (0.73)	0.0313	0.0161	0.0022		0.04	U
Thallium +	0.002	ND	ND	ND		0.01	U
Vanadium	NE (0.26)	0.0939	0.0402	0.0498		0.0036	J
Zinc**	NE (10.95)	4.4103	0.1494	4.066		0.012	J

Background not absolutely quantified, too few detections

Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated
Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW02 Background Intrawell (1)		R7GW02R Compliance (2) 03/25/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	ND		5	U
cis-1,2-Dichloroethene	70	3.1	ND	ND		5	U
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.014		0.087	
Beryllium	0.004	ND	ND	ND		0.004	U
Cadmium	0.005	0.000602	ND	ND		0.005	U
Chromium	0.1	0.085	0.0259	0.059		0.01	U
Cobalt	NE (0.73)	0.0731	0.0188	0.0016		0.01	U
Copper	1.3	0.1434	0.0456	0.0217		0.02	U
Lead	0.015	0.011	0.0018	ND		0.005	U
Nickel	NE (0.73)	0.0313	0.0161	0.00064		0.003	J
Thallium +	0.002	ND	ND	ND		0.01	U
Vanadium	NE (0.26)	0.0939	0.0402	0.0149		0.011	
Zinc**	NE (10.95)	4.4103	0.1494	0.1537		0.0041	J

Background not absolutely quantified, too few detections

Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated

Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW04 Background Intrawell (1)		R7GW04R Compliance 03/24/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	ND		5	U
cis-1,2-Dichloroethene	70	3.1	ND	ND		5	U
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.343		0.21	
Beryllium	0.004	ND	ND	ND		*0.00042*	J
Cadmium	0.005	0.000602	ND	ND		*0.0029*	J
Chromium	0.1	0.085	0.0259	0.039		0.002	J
Cobalt	NE (0.73)	0.0731	0.0188	0.0042		0.018	
Copper	1.3	0.1434	0.0456	0.0494		0.046	
Lead	0.015	0.011	0.0018	ND		0.025	U
Nickel	NE (0.73)	0.0313	0.0161	0.0011		0.0074	J
Thallium +	0.002	ND	ND	ND		0.05	U
Vanadium	NE (0.26)	0.0939	0.0402	0.0239		0.026	
Zinc**	NE (10.95)	4.4103	0.1494	0.1864		0.15	J

Background not absolutely quantified, too few detections

Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated
Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW05 Background Intrawell (1)		R7GW05R Compliance 03/24/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	1		0.25	J
cis-1,2-Dichloroethene	70	3.1	ND	1.3		0.63	J
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.011		0.02	
Beryllium	0.004	ND	ND	ND		*0.0027*	J
Cadmium	0.005	0.000602	ND	ND		0.005	U
Chromium	0.1	0.085	0.0259	0.04		0.01	U
Cobalt	NE (0.73)	0.0731	0.0188	0.0016		0.01	U
Copper	1.3	0.1434	0.0456	0.0194		0.0037	J
Lead	0.015	0.011	0.0018	ND		0.005	U
Nickel	NE (0.73)	0.0313	0.0161	0.00083		0.04	U
Thallium +	0.002	ND	ND	ND		0.01	U
Vanadium	NE (0.26)	0.0939	0.0402	0.0215		0.0037	J
Zinc**	NE (10.95)	4.4103	0.1494	0.1432		0.049	J

Background not absolutely quantified, too few detections

Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated
Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW07 Background Intrawell (1)		R7GW07R Compliance 03/25/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	ND		5	U
cis-1,2-Dichloroethene	70	3.1	ND	ND		5	U
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.01		0.4	
Beryllium	0.004	ND	ND	ND		0.004	U
Cadmium	0.005	0.000602	ND	ND		0.005	U
Chromium	0.1	0.085	0.0259	0.012		0.0088	J
Cobalt	NE (0.73)	0.0731	0.0188	0.0005		0.022	
Copper	1.3	0.1434	0.0456	0.0293		*0.16*	
Lead	0.015	0.011	0.0018	0.0026		0.0039	J
Nickel	NE (0.73)	0.0313	0.0161	ND		0.011	J
Thallium +	0.002	ND	ND	ND		0.01	U
Vanadium	NE (0.26)	0.0939	0.0402	0.0496		0.068	
Zinc**	NE (10.95)	4.4103	0.1494	0.1611		0.35	

Background not absolutely quantified, too few detections

Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated
Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW08 Background Intrawell (1)		R7GW08R Compliance 03/23/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	ND		5	U
cis-1,2-Dichloroethene	70	3.1	ND	ND		5	U
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.035		0.087	
Beryllium	0.004	ND	ND	ND		*0.0029*	J
Cadmium	0.005	0.000602	ND	ND		0.005	U
Chromium	0.1	0.085	0.0259	0.048		0.01	U
Cobalt	NE (0.73)	0.0731	0.0188	0.001		0.01	U
Copper	1.3	0.1434	0.0456	0.0263		0.0041	J
Lead	0.015	0.011	0.0018	0.008		0.025	U
Nickel	NE (0.73)	0.0313	0.0161	0.0006		0.0029	J
Thallium +	0.002	ND	ND	ND		0.05	U
Vanadium	NE (0.26)	0.0939	0.0402	0.0337		0.0026	J
Zinc**	NE (10.95)	4.4103	0.1494	0.1948		0.016	J

Background not absolutely quantified, too few detections

Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated
Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW09 Background Intrawell (1)		R7GW09 Compliance 03/24/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	ND		5	U
cis-1,2-Dichloroethene	70	3.1	ND	ND		5	U
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.146		0.092	
Beryllium	0.004	ND	ND	ND		*0.0029*	J
Cadmium	0.005	0.000602	ND	0.00057		*0.00093*	J
Chromium	0.1	0.085	0.0259	0.037		0.0011	J
Cobalt	NE (0.73)	0.0731	0.0188	0.0518		0.0041	J
Copper	1.3	0.1434	0.0456	0.1539		0.018	J
Lead	0.015	0.011	0.0018	ND		0.025	U
Nickel	NE (0.73)	0.0313	0.0161	0.0164		0.0039	J
Thallium +	0.002	ND	ND	ND		***0.037***	J
Vanadium	NE (0.26)	0.0939	0.0402	0.0447		0.014	
Zinc**	NE (10.95)	4.4103	0.1494	0.1712		0.016	J

Background not absolutely quantified, too few detections

Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated
Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW10 Background Intrawell (1)		R7GW10 Compliance 03/23/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	ND		0.15	J
cis-1,2-Dichloroethene	70	3.1	ND	ND		0.38	J
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.174		0.23	
Beryllium	0.004	ND	ND	ND		*0.0022*	J
Cadmium	0.005	0.000602	ND	0.00054		0.005	U
Chromium	0.1	0.085	0.0259	0.015		0.01	U
Cobalt	NE (0.73)	0.0731	0.0188	0.0081		0.01	U
Copper	1.3	0.1434	0.0456	0.0258		0.0027	J
Lead	0.015	0.011	0.0018	0.0069		0.005	U
Nickel	NE (0.73)	0.0313	0.0161	0.0068		0.04	U
Thallium +	0.002	ND	ND	ND		***0.0058***	J
Vanadium	NE (0.26)	0.0939	0.0402	0.052		0.0025	J
Zinc**	NE (10.95)	4.4103	0.1494	0.1809		0.0085	J

Background not absolutely quantified, too few detections

Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated
Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

TABLE 4-3

CRITERIA COMPARISON TABLE
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID Sample Purpose				R7GW11 Background Intrawell (1)		R7GW11 Compliance 03/23/03	
Volatiles (ug/l)	**Federal MCL (Tap Water RBC)**	**Overall Background Upper Limit of Means**	**Upgradient Background Average/Max**				
1,1-Dichloroethane	NE (798)	1	ND	ND		5	U
cis-1,2-Dichloroethene	70	3.1	ND	ND		5	U
Total Metals (mg/l)							
Barium	2	0.5372	0.1298	0.044		0.028	
Beryllium	0.004	ND	ND	ND		*0.002*	J
Cadmium	0.005	0.000602	ND	ND		0.005	U
Chromium	0.1	0.085	0.0259	0.024		0.01	U
Cobalt	NE (0.73)	0.0731	0.0188	0.0004		0.01	U
Copper	1.3	0.1434	0.0456	0.0842		0.02	U
Lead	0.015	0.011	0.0018	0.0018		0.005	U
Nickel	NE (0.73)	0.0313	0.0161	0.03		0.04	U
Thallium +	0.002	ND	ND	ND		0.01	U
Vanadium	NE (0.26)	0.0939	0.0402	0.0406		0.00097	J
Zinc**	NE (10.95)	4.4103	0.1494	0.3318		0.006	J

Background not absolutely quantified, too few detections

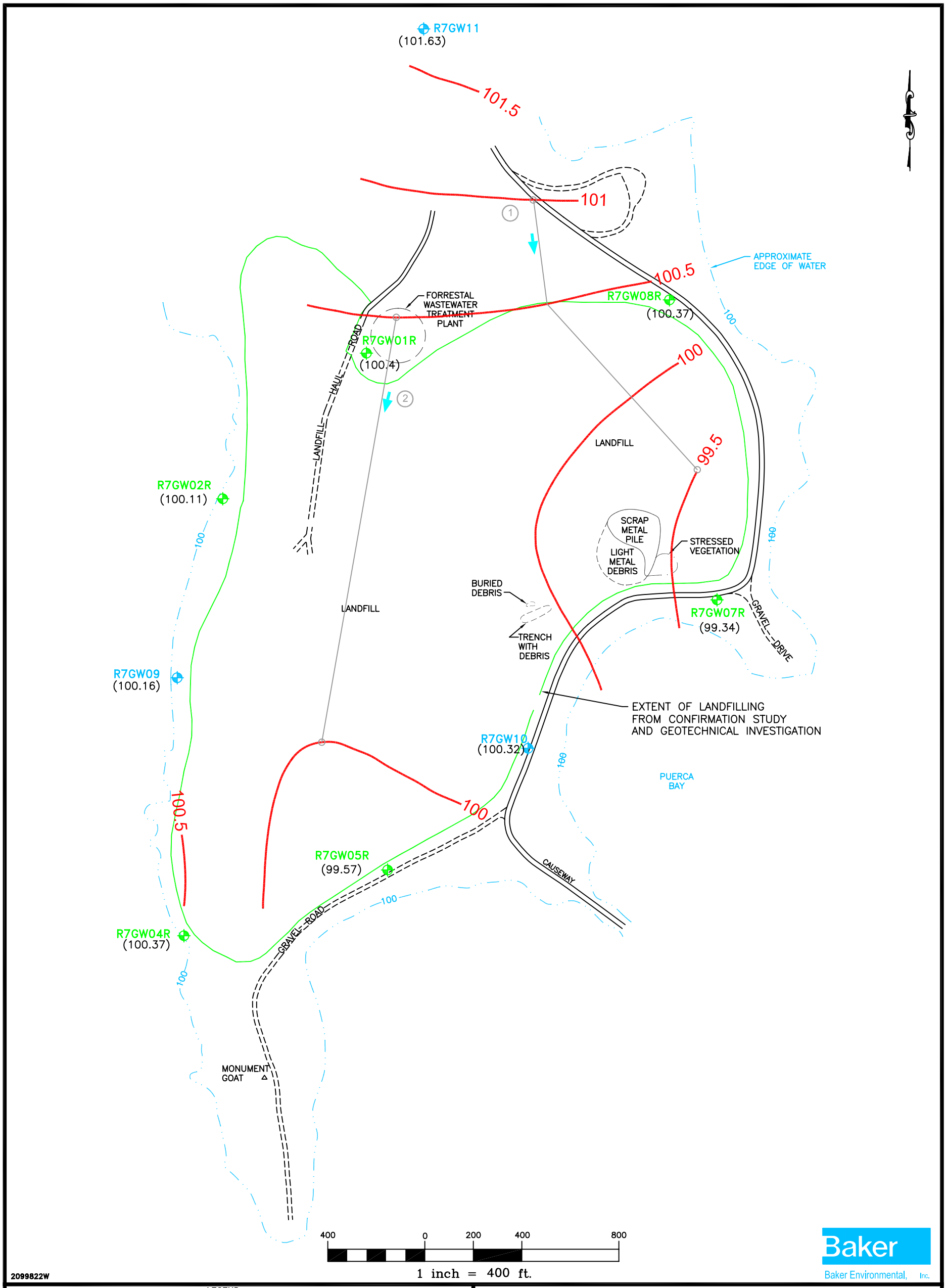
Notes:
(1) Intrawell averages determined from detections only,
maximum concentration shown if only one detection
(2) Duplicate concentrations used if higher than original sample
+ - concentrations from dissolved analysis
ND and U - Not Detected
NE - Not Established
J - Qualified as Estimated
Bold--indicates exceedance of Federal MCL or tap water RBC
italics - indicates exceedance of overall background upper limit of means
underline - indicates exceedance of upgradient background average/max

FIGURES

FIGURE 1-1
SITE MAP
SOLID WASTE LANDFILL FACILITY

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

SOURCE: LANTDIV, FEB. 1992



2099822W

Baker
Baker Environmental, Inc.

LEGEND

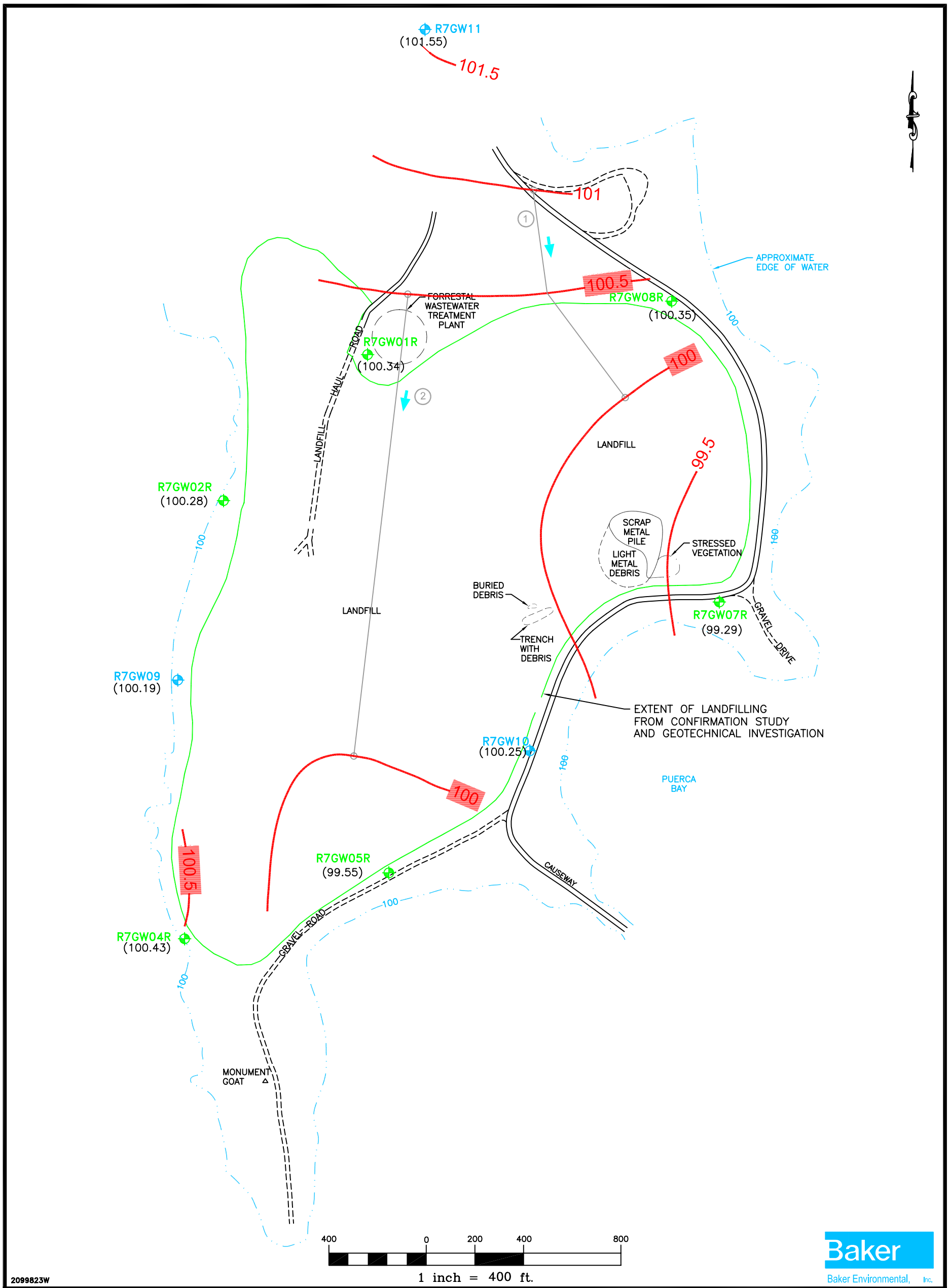
- MONITOR WELL LOCATION (INSTALLED JUNE 1998, BURNS AND McDONNELL)
- MONITOR WELL LOCATION (INSTALLED DECEMBER 2000, BAKER)
- GROUNDWATER CONTOUR LINE AND ELEVATION, DATUM = MEAN SEA LEVEL + 100 FEET
- GROUNDWATER FLOW DIRECTION
- LINE USED TO CALCULATE HYDRAULIC GRADIENT
- APPROXIMATE EXTENT OF LANDFILL BOUNDARY

NOTE: CONTOURS WERE GENERATED WITH SURFER USING A MINIMUM CURVATURE INTERPOLATION ROUTINE. ALL CONTOURS ARE APPROXIMATE AND SUBJECT TO THE INTERPOLATION METHOD USED.

SOURCE: LANTDIV, FEB. 1992

FIGURE 3-1
GROUNDWATER CONTOUR MAP, MARCH 23, 2003
SEMI-ANNUAL GROUNDWATER MONITORING REPORT
SOLID WASTE LANDFILL FACILITY – SWMU 3

NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO



2099823W

LEGEND

- MONITOR WELL LOCATION (INSTALLED JUNE 1998, BURNS AND McDONNELL)
- MONITOR WELL LOCATION (INSTALLED DECEMBER 2000, BAKER)
- GROUNDWATER CONTOUR LINE AND ELEVATION, DATUM = MEAN SEA LEVEL + 100 FEET
- GROUNDWATER FLOW DIRECTION
- LINE USED TO CALCULATE HYDRAULIC GRADIENT
- APPROXIMATE EXTENT OF LANDFILL BOUNDARY

NOTE: CONTOURS WERE GENERATED WITH SURFER USING A MINIMUM CURVATURE INTERPOLATION ROUTINE. ALL CONTOURS ARE APPROXIMATE AND SUBJECT TO THE INTERPOLATION METHOD USED.

SOURCE: LANTDIV, FEB. 1992

FIGURE 3-2
GROUNDWATER CONTOUR MAP, MARCH 25, 2003
SEMI-ANNUAL GROUNDWATER MONITORING REPORT
SOLID WASTE LANDFILL FACILITY – SWMU 3

NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

APPENDIX A
Background Groundwater Data and Statistics

1,1-Dichloroethane(mg/L)

Well	Date 6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW02	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW04	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW05	0.001	0.01 U	0.01 U	0.01 U	0.001
R7GW07	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW08	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW09	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW10	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW11	0.0005 U	0.01 U	0.01 U	0.01 U	ND

proportion of detects	0.0277778
background maximum	0.001
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

1,1-Dichloroethylene(mg/L)

Well	Date 6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0005 U	0.01 U J*	0.01 U	0.01 U	ND
R7GW02	0.001 U	0.01 U J*	0.01 U	0.01 U	ND
R7GW04	0.0005 U	0.01 U J*	0.01 U	0.01 U	ND
R7GW05	0.001	0.01 U J*	0.01 U	0.01 U	0.001
R7GW07	0.0005 U	0.01 U J*	0.01 U	0.01 U	ND
R7GW08	0.0005 U	0.01 U J*	0.01 U	0.01 U	ND
R7GW09	0.0005 U	0.01 U J*	0.01 U	0.01 U	ND
R7GW10	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW11	0.0005 U	0.01 U	0.01 U	0.01 U	ND

proportion of detects	0.0277778
background maximum	0.001
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Acetone (mg/L)			Date				
Well	6/17/1998	2/2/2000		3/3/2002	09/24/02	3/24/2003	Intrawell Average/Maximum
R7GW01	0.002 U	0.01 U	R7GW01R	0.05 UJ	0.05 R	50 U	ND
R7GW02	0.002 U	0.01 U	R7GW02R	0.05 UJ	0.05 R	50 U	ND
R7GW04	0.005	0.01 U	R7GW04R	0.05 UJ	0.05 R	50 U	0.005
R7GW05	0.002 U	0.01 U	R7GW05R	0.05 UJ	0.05 R	50 U	ND
R7GW07	0.002 U	0.01 U	R7GW07R	0.05 UJ	0.05 R	50 U	ND
R7GW08	0.002 U	0.01 U	R7GW08R	0.05 UJ	0.05 R	50 U	ND
R7GW09	0.002 U	0.01 U	R7GW09	0.05 UJ	0.05 R	50 U	ND
R7GW10	0.002 U	0.01 U	R7GW10	0.05 UJ	0.05 R	50 U	ND
R7GW11	0.002	0.01 U	R7GW11	0.05 UJ	0.05 R	50 U	0.002

proportion of detects	0.0555556
background maximum	0.001
background mean	0.0035
background median	0.0035
background standard deviation	0.00212

R--rejected by the validator
note: 3/2002 and 3/2003 compliance round moved to background round.
U- not detected
ND - not detected
J - estimated
R- rejected by validator

Chlorobenzene (mg/L)

Well	Date 6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW02	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW04	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW05	0.0008	0.01 U	0.01 U	0.01 U	0.0008
R7GW07	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW08	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW09	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW10	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW11	0.0005 U	0.01 U	0.01 U	0.01 U	ND

proportion of detects	0.0222222
background maximum	0.0008
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

cis-1,2-Dichloroethylene (mg/L)

Well	6/17/1998	2/2/2000	Date	3/3/2002	9/24/2002	Intrawell Average/Maximum
R7GW01	0.0005 U	0.01 U	R7GW01R	0.005 U	0.005 U	ND
R7GW02	0.0005 U	0.01 U	R7GW02R	0.005 U	0.005 U	ND
R7GW04	0.0005 U	0.01 U	R7GW04R	0.005 U	0.005 U	ND
R7GW05	0.002	0.01 U	R7GW05R	0.00068 J	0.005 U	0.00134
R7GW07	0.0005 U	0.01 U	R7GW07R	0.005 U	0.005 U	ND
R7GW08	0.0005 U	0.01 U	R7GW08R	0.005 U	0.005 U	ND
R7GW09	0.0005 U	0.01 U	R7GW09	0.005 U	0.005 U	ND
R7GW10	0.0005 U	0.01 U	R7GW10	0.005 U	0.005 U	ND
R7GW11	0.0005 U	0.01 U	R7GW11	0.005 U	0.005 U	ND

proportion of detects	0.0555556
background maximum	0.002
background mean	0.0013
background median	not meaningful
background standard deviation	0.0009334

note: 3/2002 and 9/2002 compliance round moved to background round.
U- not detected
ND - not detected
J - estimated
R- rejected by validator

Ethylbenzene (mg/L)

Well	Date 6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW02	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW04	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW05	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW07	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW08	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW09	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW10	0.0005 U	0.01 U	0.015	0.01 U	0.015
R7GW11	0.0005 U	0.01 U	0.01 U	0.01 U	ND

proportion of detects	0.0277778
background maximum	0.015
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Methyl Chloride (mg/L)			Date		
(chloromethane)	6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW02	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW04	0.0007	0.01 U	0.01 U	0.01 U	0.0007
R7GW05	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW07	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW08	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW09	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW10	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW11	0.0005 U	0.01 U	0.01 U	0.01 U	ND

proportion of detects	0.0277778
background maximum	0.0007
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Vinyl Chloride (mg/L)

Well	Date 6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW02	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW04	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW05	0.001	0.01 U	0.01 U	0.01 U	0.001
R7GW07	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW08	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW09	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW10	0.0005 U	0.01 U	0.01 U	0.01 U	ND
R7GW11	0.0005 U	0.01 U	0.01 U	0.01 U	ND

proportion of detects	0.027778
background maximum	0.001
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Chloroform (mg/L)

Well	Date 6/17/1998	2/2/2000	5/9/2000	8/15/2000
R7GW01	0.0005 U	0.01 U	0.01 U	0.01 U
R7GW02	0.0005 U	0.01 U	0.01 U	0.01 U
R7GW04	0.0005 U	0.01 U	0.01 U	0.01 U
R7GW05	0.0005 U	0.01 U	0.01 U	0.01 U
R7GW07	0.0005 U	0.01 U	0.01 U	0.01 U
R7GW08	0.0005 U	0.01 U	0.01 U	0.01 U
R7GW09	0.0005 U	0.01 U	0.01 U	0.01 U
R7GW10	0.0005 U	0.01 U	0.01 U	0.01 U
R7GW11	0.0005 U	0.01 U	0.01 U	0.01 U

proportion of detects	
background maximum	ND
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Carbon Disulfide (mg/L)

Well	6/17/1998	2/2/2000	Date	3/3/2002	9/24/2002	Intrawell Average/Maximum
R7GW01	0.002 U	0.01 U	R7GW01R	0.005 U	0.005 U	ND
R7GW02	0.002 U	0.01 U	R7GW02R	0.005 U	0.005 U	ND
R7GW04	0.002 U	0.01 U	R7GW04R	0.005 U	0.005 U	ND
R7GW05	0.002 U	0.01 U	R7GW05R	0.0019 J	0.005 U	0.0019
R7GW07	0.002 U	0.01 U	R7GW07R	0.005 U	0.005 U	ND
R7GW08	0.002 U	0.01 U	R7GW08R	0.005 U	0.005 U	ND
R7GW09	0.002 U	0.01 U	R7GW09	0.005 U	0.0016 J	0.0016
R7GW10	0.002 U	0.01 U	R7GW10	0.005 U	0.005 U	ND
R7GW11	0.002 U	0.01 U	R7GW11	0.005 U	0.005 U	ND

proportion of detects	0.0555556
background maximum	0.0019 J
background mean	0.0018
background median	
background standard deviation	0.0002

compliance round

note: 3/2002 compliance round moved to background round.

U- not detected

ND - not detected

J - estimated

R- rejected by validator

Methylene Bromide (mg/L)			Date			
(Dibromomethane)	6/17/1998	2/2/2000		3/3/2002	9/24/2002	Intrawell Average/Maximum
R7GW01	0.0005 U	0.01 U	R7GW01R	0.005 U	0.005 U	ND
R7GW02	0.0005 U	0.01 U	R7GW02R	0.005 U	0.005 U	ND
R7GW04	0.0005 U	0.01 U	R7GW04R	0.005 U	0.005 U	ND
R7GW05	0.0005 U	0.01 U	R7GW05R	0.0046 J	0.005 U	0.0046
R7GW07	0.0005 U	0.01 U	R7GW07R	0.005 U	0.005 U	ND
R7GW08	0.0005 U	0.01 U	R7GW08R	0.005 U	0.005 U	ND
R7GW09	0.0005 U	0.01 U	R7GW09	0.005 U	0.005 U	ND
R7GW10	0.0005 U	0.01 U	R7GW10	0.005 U	0.005 U	ND
R7GW11	0.0005 U	0.01 U	R7GW11	0.005 U	0.005 U	ND

proportion of detects	0.0277778
background maximum	0.0046
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful
	compliance round

note: 3/2002 compliance round moved to background round.

U- not detected

ND - not detected

J - estimated

R- rejected by validator

Toluene (mgL)

Well	Date 6/17/1998	2/2/2000	5/9/2000	8/15/2000
R7GW01	0.0005 U	0.01 U	0.01 UJ*	0.01 U
R7GW02	0.0005 U	0.01 U	0.01 UJ*	0.01 U
R7GW04	0.0005 U	0.01 U	0.01 UJ*	0.01 U
R7GW05	0.0005 U	0.01 U	0.01 UJ*	0.01 U
R7GW07	0.0006 U*	0.01 U	0.01 UJ*	0.01 U
R7GW08	0.0006 U	0.01 U	0.01 U	0.01 U
R7GW09	0.0005 U	0.01 U	0.01 UJ*	0.01 U
R7GW10	0.0005 U	0.01 U	0.01 UJ*	0.01 U
R7GW11	0.0006 U*	0.01 U	0.01 UJ*	0.01 U

proportion of detects	
background maximum	ND
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Upgradient wells, R7GW01/01R, and R7GW11.

Volatiles (ug/l)	upgradient average/max	
1,1-Dichloroethane	ND	
1,1-Dichloroethene	ND	
Acetone	0.002	
Carbon Disulfide	ND	
Chlorobenzene	ND	
Chloroform	ND	
Chloromethane	ND	
cis-1,2-Dichloroethene	ND	
Dibromomethane	ND	
Ethylbenzene	ND	
Toluene	ND	note: toluene was detected in R7GW11 on 9/24/02
Vinyl chloride	ND	

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Antimony (mg/L)			Date		
Well	6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0018 U	0.02 U R	0.02 UJ*	0.02 U	ND
R7GW02	0.0018 U	0.02 U R	0.02 UJ*	0.02 U	ND
R7GW04	0.0018 U	0.02 U R	0.02 UJ*	0.02 U	ND
R7GW05	0.0018 U	0.02 U R	0.02 UJ*	0.02 U	ND
R7GW07	0.0018 U	0.02 U R	0.02 UJ*	0.02 U	ND
R7GW08	0.0018 U	0.02 U R	0.02 U	0.02 U	ND
R7GW09	0.0018 U	0.02 U R	0.02 UJ*	0.02 U	ND
R7GW10	0.002 B	0.02 U R	0.02 UJ*	0.02 U	0.002
R7GW11	0.0018 U	0.02 U R	0.02 UJ*	0.02 U	ND

proportion of detects	0.0278
background maximum	0.002
background mean	not meaningful
background median	not meaningful
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Arsenic (mg/L)			Date		
Well	6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0021 U	0.01 U	0.01 U	0.01 U	ND
R7GW02	0.0169	0.01 U	0.01 U	0.01 U	0.0169
R7GW04	0.0021 U	0.01 U	0.01 U	0.01 U	ND
R7GW05	0.0062 B	0.01 U	0.01 U	0.01 U	0.0062
R7GW07	0.0021 U	0.01 U	0.01 U	0.01 U	ND
R7GW08	0.0066 U	0.01 U	0.01 U	0.01 U	ND
R7GW09	0.0021 U	0.01 U	0.01 U	0.01 U	ND
R7GW10	0.0101	0.01 U	0.01 U	0.01 U	0.0101
R7GW11	0.0021 U	0.01 U	0.01 U	0.01 U	ND

proportion of detects	0.0833	
background maximum	0.0169	
background mean	0.0111	note: statistics performed on detections only
background median	0.0101	
background standard deviation	0.0054	

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Barium (mg/L)					Date	
Well	6/17/1998	2/2/2000		5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.324	0.022	J*	0.248	0.098	0.173
R7GW02	0.0141 B	0.001 U	J*	0.001 U	0.001 U	0.014
R7GW04	0.106 B	0.001 U	J*	0.766	0.158	0.343
R7GW05	0.0105 B	0.001 U	J*	0.001 U	0.001 U	0.011
R7GW07	0.0096 B	0.001 U	J*	0.001 U	0.001 U	0.010
R7GW08	0.0451 B	0.001 U	J*	0.024	0.001 U	0.035
R7GW09	0.195 B	0.001 U	J*	0.096	0.001 U	0.146
R7GW10	0.174 B	0.001 U	J*	0.001 U	0.001 U	0.174
R7GW11	0.025 B	0.001 U	J*	0.062	0.001 U	0.044

proportion of detects	0.472222222
background maximum	0.7660
background mean	0.1178 note: statistics performed on detections only
background median	0.0250
background standard deviation	0.1977 note: may be lognormally distributed
upgradient average	0.1298 note: statistics performed on detections only

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Beryllium				Date	
Well	6/17/1998	2/2/2000		5/9/2000	8/15/2000
R7GW01	0.0002 U	0.001 U	J*	0.001 U	0.001 U
R7GW02	0.0002 U	0.001 U	J*	0.001 U	0.001 U
R7GW04	0.0002 U	0.001 U	J*	0.001 U	0.001 U
R7GW05	0.0002 U	0.001 U	J*	0.001 U	0.001 U
R7GW07	0.0002 U	0.001 U	J*	0.001 U	0.001 U
R7GW08	0.0002 U	0.001 U	J*	0.001 U	0.001 U
R7GW09	0.0002 U	0.001 U	J*	0.001 U	0.001 U
R7GW10	0.0002 U	0.001 U	J*	0.001 U	0.001 U
R7GW11	0.0002 U	0.001 U	J*	0.001 U	0.001 U

proportion of detects	
background maximum	ND
background mean	ND
background median	ND
background standard deviation	ND
	compliance round

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Cadmium (mg/L)			Date		
Well	6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0003 U	0.001 U J*	0.001 U	0.001 U	ND
R7GW02	0.0003 U	0.001 U J*	0.001 U	0.001 U	ND
R7GW04	0.0003 U	0.001 U J*	0.001 U	0.001 U	ND
R7GW05	0.0003 U	0.001 U J*	0.001 U	0.001 U	ND
R7GW07	0.0003 U	0.001 U J*	0.001 U	0.001 U	ND
R7GW08	0.0003 U	0.001 U J*	0.001 U	0.001 U	ND
R7GW09	0.00057 B	0.001 U J*	0.001 U	0.001 U	0.00057
R7GW10	0.00054 B	0.001 U J*	0.001 U	0.001 U	0.00054
R7GW11	0.0003 U	0.001 U J*	0.001 U	0.001 U	ND

proportion of detects	0.0555556	
background maximum	0.00057	
background mean	0.00056	note: statistics performed on detections only
background median	0.00056	
background standard deviation	0.000021	

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Chromium (mg/L)

Well	6/17/1998	2/2/2000		5/9/2000	8/15/2000	Intrawell Average/Maximum
			Date			
R7GW01	0.0034 B	0.026	J*	0.038	0.044	0.028
R7GW02	0.0004 U	0.078	J*	0.0005 U	0.04	0.059
R7GW04	0.0004 U	0.014	J*	0.064	0.005 U	0.039
R7GW05	0.0014 B	0.07	J*	0.06	0.03	0.040
R7GW07	0.0013 B	0.012	J*	0.022	0.005 U	0.012
R7GW08	0.0017 B	0.06	J*	0.08	0.052	0.048
R7GW09	0.0032 B	0.001	J*	0.104	0.038	0.037
R7GW10	0.016	0.014	J*	0.0005 U	0.005 U	0.015
R7GW11	0.0021 B	0.01	J*	0.064	0.02	0.024

proportion of detects	0.805556
background maximum	0.1040
background mean	0.0274
background median	0.0150
background standard deviation	0.0288
	surrogate value
upgradient average	0.0259

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Cobalt (mg/L)			Date			
Well	6/17/1998	2/2/2000		5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0089 B	0.001 U	J*	0.04	0.001 U	0.02445
R7GW02	0.0016 B	0.001 U	J*	0.001 U	0.001 U	0.0016
R7GW04	0.0042 B	0.001 U	J*	0.001 U	0.001 U	0.0042
R7GW05	0.0016 B	0.001 U	J*	0.001 U	0.001 U	0.0016
R7GW07	0.0005 B	0.001 U		0.001 U	0.001 U	0.0005
R7GW08	0.001 B	0.001 U	J*	0.001 U	0.001 U	0.001
R7GW09	0.0155 B	0.001 U		0.092	0.048	0.0518
R7GW10	0.0081	0.001 U	J*	0.001 U	0.001 U	0.0081
R7GW11	0.0004 B	0.001 U	J*	0.026	0.001 U	0.0004

proportion of detects	0.361111	
background maximum	0.0920	
background mean	0.0191	note: mean determined from detections only
background median	0.0010 U	note: median determined from all data
background standard deviation	0.0270	note: standard deviation determined from detections only
upgradient average	0.0188	note: mean determined from detections only

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Copper (mg/L)

Well	6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
		Date			
R7GW01	0.0134 B	0.005 U	0.076	0.013 U*	0.0447
R7GW02	0.0094 B	0.005 U J*	0.034	0.005 U	0.0217
R7GW04	0.0228 B	0.005 U J*	0.076	0.005 U	0.0494
R7GW05	0.0088 B	0.005 U	0.03	0.005 U	0.0194
R7GW07	0.0046 B	0.005 U	0.054	0.005 U	0.0293
R7GW08	0.0086 B	0.005 U	0.044	0.005 U	0.0263
R7GW09	0.0358	0.005 U	0.272	0.026 U*	0.1539
R7GW10	0.0195 B	0.005 U	0.032	0.014 U*	0.02575
R7GW11	0.0046 B	0.005 U	0.216	0.032	0.0842

proportion of detects	0.527778	
background maximum	0.2720	note: outlier
background mean	0.0310	
background median	0.0091	
background standard deviation	0.0562	
	surrogate value	
upgradient average	0.0456	

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Lead (mg/L)

Well	Date 6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0017 UJ*	0.008 U J*	0.008 UJ*	0.008 U	ND
R7GW02	0.0085 UJ*	0.008 U J*	0.008 UJ*	0.008 U	ND
R7GW04	0.0085 UJ*	0.008 U J*	0.008 UJ*	0.008 U	ND
R7GW05	0.0017 UJ*	0.008 U J*	0.008 UJ*	0.008 U	ND
R7GW07	0.0026 BJ*	0.008 U J*	0.008 UJ*	0.008 U	0.0026
R7GW08	0.0085 UJ*	0.008 U J*	0.008	0.008 U	0.008
R7GW09	0.0085 UJ*	0.008 U J*	0.008 UJ*	0.008 U	ND
R7GW10	0.0069 J*	0.008 U J*	0.008 UJ*	0.008 U	0.0069
R7GW11	0.0018 BJ*	0.008 U J*	0.008 UJ*	0.008 U	0.0018

proportion of detects 0.1111111

background maximum 0.008
background mean 0.0048 note: mean determined from detections only
background median 0.0080 U note: median determined from all data
background standard deviation 0.0031 note: standard deviation determined from detections only

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Nickel (mg/L)			Date		
Well	6/17/1998	2/2/2000	5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0022 B	0.01 U J*	0.008 UJ*	0.01 U	0.0022
R7GW02	0.00064 B	0.01 U J*	0.01 UJ*	0.01 U	0.00064
R7GW04	0.0011 B	0.01 U J*	0.01 UJ*	0.01 U	0.0011
R7GW05	0.00083 B	0.01 U J*	0.01 UJ*	0.01 U	0.00083
R7GW07	0.0006 U	0.01 U J*	0.01 UJ*	0.01 U	ND
R7GW08	0.0006 B	0.01 U J*	0.01 U	0.01 U	0.0006
R7GW09	0.0067 B	0.01 U J*	0.026 J*	0.01 U	0.01635
R7GW10	0.0068 B	0.01 U J*	0.01 UJ*	0.01 U	0.0068
R7GW11	0.0006 U	0.01 U J*	0.03 J*	0.01 U	0.03

proportion of detects	0.25	
background maximum	0.0300	
background mean	0.0083	note: mean determined from detections only
background median	0.0100 U	note: median determined from all data
background standard deviation	0.0115	note: standard deviation determined from detections only, data may be lognormal
upgradient average	0.0161	note: mean determined from detections only

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Selenium (mg/L)			Date	
Well	6/17/1998	2/2/2000	5/9/2000	8/15/2000
R7GW01	0.0022 U	0.01 U J*	0.01 U	0.01 U
R7GW02	0.0022 U	0.01 U J*	0.01 U	0.01 U
R7GW04	0.011 U	0.01 U J*	0.01 U	0.01 U
R7GW05	0.0022 U	0.01 U J*	0.01 U	0.01 U
R7GW07	0.0022 U	0.01 U J*	0.01 U	0.01 U
R7GW08	0.0022 U	0.01 U J*	0.01 U	0.01 U
R7GW09	0.0022 U	0.01 U J*	0.01 U	0.01 U
R7GW10	0.0022 U	0.01 U J*	0.01 U	0.01 U
R7GW11	0.0022 U	0.01 U J*	0.01 U	0.01 U

proportion of detects

background maximum	ND
background mean	ND
background median	ND
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Silver (mg/L)			Date			
Well	6/17/1998	2/2/2000		5/9/2000	8/15/2000	Intrawell Average/Maximum
R7GW01	0.0007 U	0.01	J*	0.001 UR	0.001 U	0.01
R7GW02	0.00076 U	0.01	R	0.001 UR	0.001 U	ND
R7GW04	0.0007 U	0.001 U	R	0.001 R	0.001 U	ND
R7GW05	0.0007 U	0.001 U	R	0.001 UR	0.001 U	ND
R7GW07	0.0007 U	0.001 U	R	0.001 UR	0.001 U	ND
R7GW08	0.0007 U	0.001 U	R	0.001 U	0.001 U	ND
R7GW09	0.0007 U	0.01	R	0.001 UR	0.001 U	ND
R7GW10	0.0007 U	0.001 U	R	0.001 UR	0.01	0.01
R7GW11	0.0007 U	0.01	R	0.001 UR	0.001 U	ND

proportion of detects	0.0555556	
background maximum	0.0100	
background mean	0.0100	note: mean determined from detections only
background median	0.0010 U	
background standard deviation	0.000000	

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Thallium (mg/L)			Date		
Well	6/17/1998	2/2/2000		5/9/2000	8/15/2000
R7GW01	0.0031 U	0.02 U	J*	0.02 UJ*	0.02 U
R7GW02	0.0031 U	0.02 U	J*	0.02 UJ*	0.02 U
R7GW04	0.0031 U	0.02 U	J*	0.02 UJ*	0.02 U
R7GW05	0.0031 U	0.02 U	J*	0.02 UJ*	0.02 U
R7GW07	0.0031 U	0.02 U	J*	0.02 UJ*	0.02 U
R7GW08	0.0031 U	0.02 U	J*	0.02 U	0.02 U
R7GW09	0.0031 U	0.02 U	J*	0.02 UJ*	0.02 U
R7GW10	0.0031 U	0.02 U	J*	0.02 UJ*	0.02 U
R7GW11	0.0031 U	0.02 U	J*	0.02 UJ*	0.02 U

proportion of detects	
background maximum	ND
background mean	ND
background median	ND
background standard deviation	not meaningful

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Vanadium (mg/L)									
				Date					
Well	6/17/1998		2/2/2000			5/9/2000	8/15/2000		Intrawell Average/Maximum
R7GW01	0.0152	B	0.034		J*	0.048	0.102		0.0498
R7GW02	0.0098	B	0.0005	U	J*	0.02	0.0005	U	0.0149
R7GW04	0.0198	B	0.012		J*	0.04	0.0005	U	0.0239
R7GW05	0.013	B	0.0005	U	J*	0.03	0.0005	U	0.0215
R7GW07	0.0084	B	0.04		J*	0.116	0.034		0.0496
R7GW08	0.0092	B	0.0005	U	J*	0.06	0.032		0.0337
R7GW09	0.0182	B	0.078		J*	0.038	0.0005	U	0.0447
R7GW10	0.0899		0.016		J*	0.044	0.06		0.0525
R7GW11	0.0059	B	0.0005	U	J*	0.088	0.028		0.0406

proportion of detects	0.777777778
background maximum	0.1160
background mean	0.0309
background median	0.0199
background standard deviation	0.0315
	surrogate value
upgradient average	0.0402

U- not detected
ND - not detected
J - estimated
R- rejected by validator

Zinc (mg/L)			Date			
Well	6/17/1998	2/2/2000	8/15/2000		3/2/2002	Intrawell average/maximum
R7GW01	0.0128 B	11.9	0.286	R7GW01R	0.01 U	4.0663
R7GW02	0.0227	0.262	0.324	R7GW02R	0.0061 J	0.1537
R7GW04	0.0296 B	0.174	0.252	R7GW04R	0.29	0.1864
R7GW05	0.0386	0.26	0.248	R7GW05R	0.026	0.1432
R7GW07	0.0084 B	0.334	0.246	R7GW07R	0.056	0.1611
R7GW08	0.0225	0.24	0.322	R7GW08R	0.01 U	0.1948
R7GW09	0.0296	0.226	0.258	R7GW09	0.01 U	0.1712
R7GW10	0.0207	0.214	0.308	R7GW10	0.01 U	0.1809
R7GW11	0.0254 B	0.628	0.342	R7GW11	0.01 U	0.3318

proportion of detects	0.861111111	
background maximum	11.9000	note: outlier
background mean	0.4851	
background median	0.1940	
background standard deviation	1.9626	
		surrogate value

note: background mean without possible outlier = 0.183747

note: background standard deviation without possible outlier = 0.151081

note: 3/2002 compliance round moved to background round.

upgradient average	1.6518	note: including possible outlier
upgradient average	0.1877	note: excluding possible outlier
R7GW01 average without outlier	0.1494	

U- not detected

ND - not detected

J - estimated

R- rejected by validator

OUTLIER TESTS

chromium	copper	vanadium	zinc
0.0034	0.0046	0.0005	0.0061
0.0004	0.0046	0.0005	0.0084
0.0004	0.0086	0.0005	0.0128
0.0005	0.0088	0.0005	0.02
0.0005	0.0094	0.0005	0.02
0.001	0.005	0.0005	0.02
0.0013	0.005	0.0005	0.02
0.0014	0.005	0.0005	0.02
0.0017	0.005	0.0059	0.0207
0.0021	0.005	0.0084	0.0225
0.0032	0.005	0.0092	0.0227
0.005	0.005	0.0098	0.0254
0.005	0.005	0.012	0.026
0.005	0.005	0.013	0.0296
0.01	0.005	0.0152	0.0296
0.012	0.005	0.016	0.0386
0.014	0.005	0.0182	0.056
0.014	0.005	0.0198	0.174
0.016	0.005	0.02	0.214
0.02	0.0134	0.028	0.226
0.022	0.0195	0.03	0.24
0.026	0.0228	0.032	0.246
0.03	0.013	0.034	0.248
0.038	0.014	0.034	0.252
0.038	0.03	0.038	0.258
0.04	0.032	0.04	0.26
0.044	0.032	0.04	0.262
0.052	0.034	0.044	0.286
0.06	0.0358	0.048	0.29
0.06	0.044	0.06	0.308
0.064	0.026	0.06	0.322
0.064	0.054	0.078	0.324
0.07	0.076	0.088	0.334
0.078	0.076	0.0899	0.342
0.08	**0.216**	**0.102**	0.628
0.104	**0.272**	**0.116**	**11.9**

mean	0.027414			0.031014			0.030928			0.486456
sd	0.028848			0.056203			0.031464			1.962271
Tn	2.654836			4.287816	3.291419		2.703757	2.258811		5.816496
Tn	does not exceed the Tn statistic			exceeds 0.1%			does not exceed			exceeds 0.1%
result:	not an outlier			outlier	outlier		not an outlier			outlier

Tn statistic for 36 observations

2.823	5%
2.991	2.50%
3.191	1%
3.33	0.50%
3.616	0.10%

surrogate value

SHAPIRO-WILK W TEST

Normal

chromium	d		copper	d		vanadium	d		zinc	d	
0.0034	0.000577	0.04279524	0.0046	0.000698	0.11375196	0.0005	0.000926	0.0491337	0.0061	0.230741	5.05966506
0.0004	0.00073	0.02343424	0.0046	0.000698	0.06223616	0.0005	0.000926	0.0298816	0.0084	0.228537	0.18241024
0.0004	0.00073	0.01929912	0.0086	0.000502	0.01676238	0.0005	0.000926	0.0222338	0.0128	0.22435	0.08187204
0.0005	0.000724	0.0149286	0.0088	0.000493	0.01443456	0.0005	0.000926	0.018795	0.02	0.217581	0.0674472
0.0005	0.000724	0.0118745	0.0094	0.000467	0.0083402	0.0005	0.000926	0.0144925	0.02	0.217581	0.056848
0.001	0.000698	0.012877	0.005	0.000677	0.034393	0.0005	0.000926	0.0096985	0.02	0.217581	0.049226
0.0013	0.000682	0.00830605	0.005	0.000677	0.0055185	0.0005	0.000926	0.0084193	0.02	0.217581	0.040752
0.0014	0.000677	0.00714334	0.005	0.000677	0.00375452	0.0005	0.000926	0.0057903	0.02	0.217581	0.032813
0.0017	0.000661	0.002683959	0.005	0.000677	0.002695039	0.0059	0.000628	0.0025929	0.0207	0.216928	0.048252278
0.0021	0.000641	0.00361178	0.005	0.000677	0.0023274	0.0084	0.000508	0.0027239	0.0225	0.215255	0.0206449
0.0032	0.000588	0.00258496	0.005	0.000677	0.0008273	0.0092	0.000472	0.0017286	0.0227	0.215069	0.01598221
0.005	0.000502	0.0018795	0.005	0.000677	0.0014499	0.0098	0.000446	0.0016217	0.0254	0.212572	0.01259802
0.005	0.000502	0.0012573	0.005	0.000677	0.0009525	0.012	0.000358	0.0009906	0.026	0.212019	0.0088392
0.005	0.000502	0.0005675	0.005	0.000677	0.0001816	0.013	0.000321	0.0004767	0.0296	0.208717	0.00495768
0.01	0.000303	0.0001216	0.005	0.000677	0.00013528	0.0152	0.000247	0.0001277	0.0296	0.208717	0.00164464
0.012	0.000238	0	0.005	0.000677	0	0.016	0.000223	0	0.0386	0.200575	0
0.014	0.00018	0	0.005	0.000677	0	0.0182	0.000162	0	0.056	0.185292	0
0.014	0.00018	0	0.005	0.000677	0	0.0198	0.000124	0	0.174	0.097628	0
0.016	0.00013	0	0.005	0.000677	0	0.02	0.000119	0	0.214	0.074232	0
0.02	5.5E-05		0.0134	0.00031		0.028	8.57E-06		0.226	0.067837	
0.022	2.93E-05		0.0195	0.000133		0.03	8.61E-07		0.24	0.06074	
0.026	2E-06		0.0228	6.75E-05		0.032	1.15E-06		0.246	0.057819	
0.03	6.89E-06		0.013	0.000325		0.034	9.44E-06		0.248	0.056861	
0.038	0.000112		0.014	0.000289		0.034	9.44E-06		0.252	0.054969	
0.038	0.000112		0.03	1.03E-06		0.038	5E-05		0.258	0.052192	
0.04	0.000158		0.032	9.72E-07		0.04	8.23E-05		0.26	0.051282	
0.044	0.000275		0.032	9.72E-07		0.04	8.23E-05		0.262	0.05038	
0.052	0.000604		0.034	8.92E-06		0.044	0.000171		0.286	0.040182	
0.06	0.001062		0.0358	2.29E-05		0.048	0.000291		0.29	0.038595	
0.06	0.001062		0.044	0.000169		0.06	0.000845		0.308	0.031846	
0.064	0.001339		0.026	2.51E-05		0.06	0.000845		0.322	0.027046	
0.064	0.001339		0.054	0.000528		0.078	0.002216		0.324	0.026392	
0.07	0.001814		0.076	0.002024		0.088	0.003257		0.334	0.023243	
0.078	0.002559		0.076	0.002024		0.0899	0.003478		0.342	0.020867	
0.08	0.002785		**0.216**	0.03422		**0.102**	0.005051		0.628	0.020035	
0.104	0.005865		**0.272**	0.058074		**0.116**	0.007237		**11.9**	130.289	

			W				W				W				W	
mean	0.027414		**0.897107467**		0.031014		**0.647535421**		0.030928		**0.821493**		0.486456		**0.239734176**	
d		0.029127				0.110555				0.03465				134.7678	**W= 0.97 for alpha = 50 %**	
															Since W< W table,	
															All data appears not normally distribu	

SHAPIRO-WILK W TEST

Lognormal

chromium	d		copper	d		vanadium	d		zinc	d	
-5.68398	1.249035	1.45512982	-5.3817	1.18693	1.735523847	-7.6009	10.0387	2.3170421	-5.09947	7.307963	3.222832488
-7.82405	10.6124	1.559824633	-5.3817	1.18693	1.133210987	-7.6009	10.0387	1.5656545	-4.77952	5.680507	1.270132411
-7.82405	10.6124	1.31139499	-4.75599	0.215071	0.541910122	-7.6009	10.0387	1.2912119	-4.35831	3.850103	0.817070416
-7.6009	9.20834	1.061464792	-4.733	0.194276	0.463104852	-7.6009	10.0387	1.11062	-3.91202	2.297895	0.604749793
-7.6009	9.20834	0.907329659	-4.66705	0.140482	0.326927305	-7.6009	10.0387	0.9443231	-3.91202	2.297895	0.520797102
-6.90776	5.482049	0.714270341	-5.29832	1.0122	0.613832001	-7.6009	10.0387	0.7803612	-3.91202	2.297895	0.452947541
-6.64539	4.322296	0.542225212	-5.29832	1.0122	0.307727369	-7.6009	10.0387	0.6774301	-3.91202	2.297895	0.386913003
-6.57128	4.019645	0.458084636	-5.29832	1.0122	0.239961367	-7.6009	10.0387	0.556394	-3.91202	2.297895	0.32597872
-6.37713	3.278813	0.187593628	-5.29832	1.0122	0.104230042	-5.1328	0.490407	0.0725501	-3.87762	2.194781	0.153481269
-6.16582	2.558209	0.262242147	-5.29832	1.0122	0.160012887	-4.77952	0.120417	0.1345278	-3.79424	1.954678	0.211606277
-5.7446	1.388218	0.176043287	-5.29832	1.0122	0.071764473	-4.68855	0.065556	0.0911088	-3.78539	1.930011	0.167772372
-5.29832	0.535736	0.111666011	-5.29832	1.0122	0.099683202	-4.62537	0.037195	0.0755289	-3.67301	1.630382	0.124902573
-5.29832	0.535736	0.077272448	-5.29832	1.0122	0.068266036	-4.42285	9.34E-05	0.0439171	-3.64966	1.571304	0.087434282
-5.29832	0.535736	0.04067294	-5.29832	1.0122	0.02169011	-4.34281	0.008047	0.021824	-3.51998	1.263014	0.048252355
-4.60517	0.001505	0.007261887	-5.29832	1.0122	0.011531652	-4.18646	0.060542	0.0056577	-3.51998	1.263014	0.016093435
-4.42285	0.020601	0	-5.29832	1.0122	0	-4.13517	0.088414	0	-3.2545	0.736783	0
-4.2687	0.088613	0	-5.29832	1.0122	0	-4.00633	0.181628	0	-2.8824	0.23645	0
-4.2687	0.088613	0	-5.29832	1.0122	0	-3.92207	0.260548	0	-1.7487	0.419181	0
-4.13517	0.185943	0	-5.29832	1.0122	0	-3.91202	0.270909	0	-1.54178	0.729936	0
-3.91202	0.42818		-4.3125	0.000411		-3.57555	0.734383		-1.48722	0.826139	
-3.81671	0.561997		-3.93734	0.125951		-3.50656	0.857391		-1.42712	0.939011	
-3.64966	0.840374		-3.78099	0.261367		-3.44202	0.981076		-1.40242	0.987476	
-3.50656	1.123218		-4.34281	0.002557		-3.38139	1.104847		-1.39433	1.003635	
-3.27017	1.680157		-4.2687	0.000554		-3.38139	1.104847		-1.37833	1.035949	
-3.27017	1.680157		-3.50656	0.61729		-3.27017	1.351041		-1.3548	1.084402	
-3.21888	1.815761		-3.44202	0.722868		-3.21888	1.472913		-1.34707	1.100545	
-3.12357	2.081707		-3.44202	0.722868		-3.21888	1.472913		-1.33941	1.116681	
-2.95651	2.591669		-3.38139	0.829632		-3.12357	1.713341		-1.25176	1.309603	
-2.81341	3.072893		-3.32981	0.926269		-3.03655	1.948698		-1.23787	1.341584	
-2.81341	3.072893		-3.12357	1.36579		-2.81341	2.621489		-1.17766	1.48471	
-2.74887	3.303326		-3.64966	0.412905		-2.81341	2.621489		-1.1332	1.595013	
-2.74887	3.303326		-2.91877	1.886405		-2.55105	3.539913		-1.12701	1.610692	
-2.65926	3.637098		-2.57702	2.941959		-2.43042	4.008378		-1.09661	1.688773	
-2.55105	4.06156		-2.57702	2.941959		-2.40906	4.094369		-1.07294	1.750852	
-2.52573	4.164249		-1.53248	7.61627		-2.28278	4.621337		-0.46522	3.728479	
-2.26336	5.30387		-1.30195	8.94179		-2.15417	5.190865		2.476538	23.74302	

			W				W				W				W
mean	-4.566378		0.738090871		-4.292236		0.734057404		-4.432512		0.7735782		-2.396142		0.798431277
d		106.6547				47.41133				121.3326				88.60414	
													W= 0.97 for alpha = 50 %		

Since W< W table, All data appears not log-normally distribute

Upgradient wells, R7GW01/01R, and R7GW11.

Total Metals (mg/l)	**upgradient average/max**	
Antimony	ND	
Arsenic	ND	
Barium	0.1298	note: mean determined from detections only
Beryllium	ND	
Cadmium	ND	
Chromium	0.0259	
Cobalt	0.0188	note: mean determined from detections only
Copper	0.0684	
Lead	0.0018	maximum
Nickel	0.0161	note: mean determined from detections only
Selenium	ND	
Silver	0.01	maximum
Thallium	ND	
Vanadium	0.0459	
Zinc	2.2/0.2588	note: lower number excluding outlier

APPENDIX B
Chain of Custody Records

Serial Number 02354

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Round 07-06

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: CLEAN I CTO-0277	PROJECT NO.: SWMU 3 Base Landfill	PROJECT LOCATION (STATE): PR	PAGE 1 OF 1
STL (LAB) PROJECT MANAGER: Angie Wehmerskirk	P.O. NUMBER:	CONTRACT NO.:	STANDARD REPORT DELIVERY ●
CLIENT (SITE) PM: Mark Kimes	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995	DATE DUE: 28 Day TAT
CLIENT NAME: Baker	CLIENT E-MAIL: mkimes@mbakercorp.com		EXPEDITED REPORT DELIVERY (SURCHARGE) ○
CLIENT ADDRESS: 100 Airside Dr., Moon Twp, PA 15108			DATE DUE:
COMPANY CONTRACTING THIS WORK (if applicable): Baker			NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE — COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	App. I Metals	App. I Diss. Metals	Low Level PAHs	1,4-Dioxane	Beta-BHC						REMARKS
		PRESERVATIVE						HNO_3	HNO_3									
3/24/03	1220	R7GW04R-07	G	X							2	2						
3/24/03	1315	R7GW09-07	G	X				1	1	2	2	2						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. K	3/24/03	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
Mark E. K	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
	3/25/03	9:58			6382059	

STL8240-680 (12/02)

Serial Number 052589

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

ROUND 07-02

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: CLEAN I CTO-0277	PROJECT NO.: SWMU 3 Base Landfill	PROJECT LOCATION (STATE): PR
STL (LAB) PROJECT MANAGER: ANGIE WEIMERSKIRK	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: MARK KIMES	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995
CLIENT NAME: BAKER	CLIENT E-MAIL: mkimes@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr., Moon Twp. PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable): BAKER		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ●
DATE DUE 28 DAY TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	App. 1 Metals	App. 1 Diss. Metals low level PAHs	1,4-Dioxane	Beta-BHC						REMARKS
								HNO_3	HNO_3	PRESERVATIVE							
								NUMBER OF CONTAINERS SUBMITTED									
3/23/03	1430	R7GW11-07						1	1	2	2	2					
3/23/03	1530	R7GW08R-07						1	1	2							

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. Kimes	3/24/03	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
EMPTY CONTAINERS	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
	3/25/03	9:46	YES ○ NO ○		S382059	

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

Serial Number 052592

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

ROUND 07-04

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: CLEAN I CTO-0277	PROJECT NO.: Summo 3 Base Landfill	PROJECT LOCATION (STATE): PR
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark Kimes	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995
CLIENT NAME: Baker	CLIENT E-MAIL: MKimes@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable): Baker		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ●
DATE DUE 28 Day TAT

EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	App. I Metals (HNO_3)	App. I Diss. Metals (HNO_3)	Low Level PAHs	1,4-Dioxane	Beta-BHC						REMARKS
3/23/03	1530	R7GW08R-07	G	X								2						
3/24/03	1100	R7GW01R-07	G	X				1	1	2	2	2						

PRESERVATIVE

NUMBER OF CONTAINERS SUBMITTED

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. K	3/24/03	1500			

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Mark E. K EMPTY CONTAINERS	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
[illegible]	3/24/03	9:46	YES ○ NO ○		5382059	

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

Serial Number 052591

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Round 07-03

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: CLEAN I CTO-0277	PROJECT NO.: Summer 3 Base Landfill	PROJECT LOCATION (STATE): PR
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark Kimes	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995
CLIENT NAME: Baker	CLIENT E-MAIL: mkimes@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable): Baker		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ●
DATE DUE 28 Day TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	App I Metals	App I Diss. Metals	Low Level PAHs	1,4-Dioxane	Beta-BHC						REMARKS
								HNO_3	HNO_3	PRESERVATIVE								
								NUMBER OF CONTAINERS SUBMITTED										
3/24/02	0945	R7GW05R-07	G	X				1	1	2	2	2						
3/23/02	1530	R7GW08R-07	G	X							2							

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			[signature]	3/24/03	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
[signature]	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	3/25/03	9:45	YES ○ NO ○			

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

Serial Number 052593

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Round 07-05

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: CLEAN I - CTO-0277	PROJECT NO.: Summ 3 Base Landfill	PROJECT LOCATION (STATE): PR
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark Kimes	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995
CLIENT NAME: Baker	CLIENT E-MAIL: mkimes@mbakercorp.com ~~MBakercorp~~	
CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable): Baker		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ●
DATE DUE 28 Day TAT

EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	App. I Metals	App. I Diss. Metals	Low Level PAHs	1,4-Dioxane	Beta-BHC							
								HNO_3	HNO_3	PRESERVATIVE									
								NUMBER OF CONTAINERS SUBMITTED											REMARKS
3/23/03	1645	R7GW10-07	G	X				1	1	2	2	2							
3/24/03	1220	R7GW04R-07	G	X				1	1	2									

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. Kimes	3/24/03	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
Mark E. Kimes EMPTY CONTAINERS	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
[illegible]	3/25/03	9:46	YES ○ NO ○		S382059	

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

Serial Number 048507

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Round 07-10

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE	OF
CLEAN I CTO-0277	Survey 3 BASE LANDFILL	PR	1	1

STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.

CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
MARK KIMES	412-269-2009	412-337-3995

CLIENT NAME	CLIENT E-MAIL
BAKER	mkimes@mbakercorp.com

CLIENT ADDRESS: 100 AIRSIDE DRIVE MOON TWP., PA 15108

COMPANY CONTRACTING THIS WORK (if applicable):

STANDARD REPORT DELIVERY ●
DATE DUE 28 DAY TAT

EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 5

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	App. 1 Metals	App-1 Diss. Metals	Low Level PAHs	LA - Dioxane	Beta - BHC						REMARKS
								HNO_3	HNO_3	PRESERVATIVE								
								NUMBER OF CONTAINERS SUBMITTED										
3/25/03	0900		G	X				1	1	1	1	1						
3/25/03	0900		G	X				1	1	1	1	1						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. Kimes	3/25/03	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
Mark E. Kimes	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
J Swafford	3/26/03	9:40	YES ✓ NO ○		S3-82092	

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

Serial Number 048506

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

ROUND 07-09

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: CLEAN I CTO-0277	PROJECT NO.: SWMU 3 BASE LANDFILL	PROJECT LOCATION (STATE): PR	PAGE 1 OF 1
STL (LAB) PROJECT MANAGER: ANGIE WEIMERSKIRK	P.O. NUMBER	CONTRACT NO.	STANDARD REPORT DELIVERY ● DATE DUE 28 DAY TAT
CLIENT (SITE) PM: MARK KIMES	CLIENT PHONE: 412-218-2009	CLIENT FAX: 412-337-3995	
CLIENT NAME: BAKER	CLIENT E-MAIL: mkimes@mbakercorp.com		EXPEDITED REPORT DELIVERY (SURCHARGE) ○ DATE DUE ____
CLIENT ADDRESS: 100 AIRSIDE DR. MOON TWP., PA 15108			
COMPANY CONTRACTING THIS WORK (if applicable)			NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 4

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	REQUIRED ANALYSIS: App. I Metals	App. I Diss. Metals	Low Level PAHs	1,4-Dioxane	Beta-BHC						REMARKS
								PRESERVATIVE: HNO_3	HNO_3									
								NUMBER OF CONTAINERS SUBMITTED										
3/25/03	0900	R7GW02R-07 MS	G	X				1	1	1	1	1						
3/25/03	0900	R7GW02R-07 MSD	G	X				1	1	1	1	1						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			[signature]	3/25/03	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[signature]	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
J Swafford	3/26/03	9:40	YES ✓ NO ○		5382092	

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

Serial Number 02355

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Round 07-07

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: CLEAN I - CTO - 0277	PROJECT NO.: Survey 3 Base Landfill	PROJECT LOCATION (STATE): PR	PAGE 1 OF 1
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER:	CONTRACT NO.:	STANDARD REPORT DELIVERY ●
CLIENT (SITE) PM: Mark Kimes	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995	DATE DUE: 28 Day TAT
CLIENT NAME: Baker	CLIENT E-MAIL: MKimes@MBakerCorp.com		EXPEDITED REPORT DELIVERY (SURCHARGE) ○
CLIENT ADDRESS: 100 Airside Dr., Moon Twp., PA 15108			DATE DUE:
COMPANY CONTRACTING THIS WORK (if applicable): Baker			NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	App. 1 Metals	App. 1 Diss. Metals	Low Level PAHs	1,4-Dioxane	Beta-BHC						REMARKS
							PRESERVATIVE	HNO_3	HNO_3	—	—	—						
							NUMBER OF CONTAINERS SUBMITTED											
3/24/03	1335	R7GW07R-07	G	X				1	1	2	2	2						

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			[signature]	3/24/03	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
[signature]	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
J Swafford	3/26/03	9:40	YES ● NO ○		S382092	

STL8240-680 (12/02)

Serial Number U48505

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Round 07-08

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: CLEAN I - CTO-0277	PROJECT NO.: SUMU 3 BASE LANDFILL	PROJECT LOCATION (STATE): PR	PAGE 1 OF 1
STL (LAB) PROJECT MANAGER: ANGIE WEIMERSKIRK	P.O. NUMBER	CONTRACT NO.	
CLIENT (SITE) PM: MARK KIMES	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995	
CLIENT NAME: BAKER	CLIENT E-MAIL		
CLIENT ADDRESS: 100 AIRSIDE DRIVE, MOON TWP., PA 15108			
COMPANY CONTRACTING THIS WORK (if applicable)			

STANDARD REPORT DELIVERY ●
DATE DUE 28 DAY TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 4

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	App. I Metals	Low Level PAHs	1,4-Dioxane	Beta-BHC									REMARKS
								HNO_3 - PRESERVATIVE												
								NUMBER OF CONTAINERS SUBMITTED												
3/23/03	1845	R7ER01-07	G	X				1	2	2	2									

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			[signature]	3/25/03	1500			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[signature]	3/26/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
F. Swafford	3/26/03	9:40	YES ● NO ○		03-82092	

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

Serial Number 02358

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

ROUND 07-01

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: CLEAN I CTO-0277	PROJECT NO.: SWMU 3 BASE LANDFILL	PROJECT LOCATION (STATE): PR
STL (LAB) PROJECT MANAGER: Angie Hamerbkerk	P.O. NUMBER	CONTRACT NO.
CLIENT (SITE) PM: MARK KIMES	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995
CLIENT NAME: BAKER	CLIENT E-MAIL: MKimes@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable): BAKER		

PAGE 1 OF 2

STANDARD REPORT DELIVERY ●
DATE DUE 28 DAY TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 5

REQUIRED ANALYSIS / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	APP. 1 VOCs	APP. 1 Metals	APP. 1 Diss. Metals	Low Level PAHs	1,4-Dioxane	Beta-BHC					REMARKS
								HCl	HNO_3	HNO_3	—	—	—					
3/24/03	1100	R7GW01R-07	G	X				3										
3/25/03	0900	R7GW02R-07	G	X				3										
3/25/03	0900	R7GW02R-07D	G	X				2										
3/25/03	0900	R7GW02R-07MS	G	X				2										
3/25/03	0900	R7GW02R-07MSD	G	X				2										
3/24/03	1220	R7GW04R-07	G	X				3										
3/24/03	0945	R7GW05R-07	G	X				3										
3/24/03	1335	R7GW07R-07	G	X				3										
3/23/03	1530	R7GW08R-07	G	X				3										
3/24/03	1315	R7GW09[illegible]-07	G	X				3										
3/23/03	1645	R7GW10[illegible]-07	G	X				3										
3/23/03	1430	R7GW11[illegible]-07	G	X				3										

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	3/19/03	3:30	[signature]	3/24/03	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
[signature]	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
J Swafford	3/26/03	9:40	YES ● NO ○		S382092	

STL8240-680 (12/02)

Serial Number 052590

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Round 07-01

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: CLEAN I CTO-0277	PROJECT NO.: Surms 3 Base Landfill	PROJECT LOCATION (STATE): PR
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Mark Kimes	CLIENT PHONE: 412-269-2009	CLIENT FAX: 412-337-3995
CLIENT NAME: BAKER	CLIENT E-MAIL: mkimes@mbakercorp.com	
CLIENT ADDRESS: 100 Airside Dr., Moon Twp., PA 15102		
COMPANY CONTRACTING THIS WORK (if applicable): BAKER		

PAGE 2 OF 2

STANDARD REPORT DELIVERY ●
DATE DUE 28 Day TAT

EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 5

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	App 1 VOCs	App 1 Metals	App 1 Diss. Metals	low level PAHs	1,4-Dioxane	Beta-BHC					REMARKS
								HCl	HNO_3	HNO_3	PRESERVATIVE							
								NUMBER OF CONTAINERS SUBMITTED										
3/23/03		R7TB01-07	G	X				3										
3/23/03	1845	R7ER01-07	G	X				2										
3/23/03	1850	R7FB01-07	G	X				2	1		2	2	2					

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Mark E. Kimes	3/24/03	1500			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
Mark E. Kimes	3/21/03	0900						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
J Swafford	3/26/03	9:40	YES ✓ NO ○		S382097	

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

APPENDIX C
Field Notebooks

Sunday March 23, 2003

1240 Mark Kimes (MEK) and I (JLE) arrive at the base landfill to begin sampling wells once we get equipment and sample bottles ready.

1310 MEK and I arrive at R7GW01R to collect groundwater level. (8.50 ft below top of pvc).

1320 MEK and I arrive at R7GW04R to get SWL. (12.07 ft below pvc)

1326 MEK and I arrive at R7GW09 to get SWL. (9.58 ft below pvc)

1338 MEK and I arrive at R7GW02R to get SWL. (5.00 ft below pvc).

1342 MEK and I arrive at R7GW05R to collect SWL. (14.16 ft below pvc).

1345 MEK and I arrive at R7GW10 to get SWL. (13.64 ft below pvc.)

1347 MEK and I arrive at R7GW07R to get SWL. (15.60 ft below pvc.)

1362 MEK and I arive at R7GW08R to get SWL. (10.96 ft below pvc.)

1355 MEK and I arrive at R7GW11 to get SWL and a groundwater sample. (8.57)

1356 I am calibrating the meters to be used.

Jon E. Edell Jr.

Sunday March 23, 2003

conductivity is 1041 uS on a 1,000 uS standard. Temp. on conductivity was 34.6. PH meter was calibrated using 4, 7, and 10 standard.

1430 MEK collected R7GW11-07.

1453 MEK and I are packing up and heading to R7GW08R.

1457 MEK and I arrive at R7GW08R to collect groundwater samples.

1540 MEK and I are finished collecting sample R7GW08R-07 (1530). Leaving to get ice, as the marina. We need additional bags.

1555 MEK and I arrive at R7GW10 to collect a groundwater sample.

1635 We are experiencing problems with our pH meter. Changed batteries out but it will not come back on. We are going to proceed without it for this well.

1645 MEK collected R7GW10-07.

1713 MEK and I are leaving R7GW10.

1715 MEK and I collected R7ER01-07.

1750 MEK and I collected R7FB01-07.

(60) Jon C. Edell Jr.

Sunday March 23, 2003

R7GW11-07

TD. = 15' 4"
Ø = 2"
SWL = 8.57 ft below pvc

Start pump 1414
Bottom of tubing within well screen.

Time	SWL	pH	Cond. (uS)	Temp. (oC) (Cond. meter)	Comments
1420	8.79	6.68	1800	30.4 86.7°F	Relatively clear - some floating debris
				3/23/03 JCE	
1426	8.81	6.77	1636	30.8 87.4°F	Rel. clear, no odor.
1430	8.84	6.80	1495	30.7 87.3°F	Rel. clear, no odor.

* MEK sampled well.
* Stop purging at 1430.
* Final SWL was 8.87.
* Sample time is 1430. Sampled for full App I parameters including beta-BHC, 1,4-Dioxane, and low level PAHs.
* Sample appeared relatively clear, with no observable odor.
* Flow rate was between 0.2 to 0.3 L/min.
* Weather was hot, humid, and sunny.
* An interface probe was used to collect

(61) Jon C. Edell Jr.

initial SWL. A groundwater level meter was used during each round of purging. No product was observed on water table.

* A total depth probe was used to measure TD.

* Full App. I parameters requested:
  (3) 40 mL - VOAs - HCL
  (2) 250 mL poly - HNO_3

* Beta-BHC (2) JEF 3/23/03 1 Liter Ambers
  1,4-Dioxane (2) 1 Liter Ambers
  Low Level PAHs (2) 1 Liter Ambers

* The SWL was about 0.5' lower during this round than during September 2002. The TD was the same.

* Peristaltic pump was used to purge & sample.

Jon C. Edel Jr.

RJGW05R-02

TD = 20' 7"
Ø = 2"
SWL = 10.96 ft below top pvc.

Start pump 1500
Bottom of tubing within well screen

Time	SWL	pH	Cond. (µs)	Temp (°C) (cond. meter)	Comments
1507	11.13	6.97	48.4 (mS)	JEF 3/23/03 30.8 87.4°F	Sample has a gray tint to it. No odor
1512	11.12	7.01	47.8 (mS)	30.6 87.1°F	Sample has a gray tint. No odor.
1518	11.09	7.03	47.7	30.5 86.9°F	Sample has a gray tint. No odor

* Stop purging at 1520.
* Final SWL was 11.17.
* HBK Sampled well.
* Sample time is 1530. Sample for full App I parameters including beta-BHC, 1,4-Dioxane, and low level PAHs.
* Sample appeared to have a gray tint to it, but no observable odor.
* Flow Rate was between 0.2 to 0.3 L/min.
* Weather was hot, humid, and sunny.

Jon C. Edel Jr.

Sunday March 23, 2003

* An interface probe was used to collect initial SWL. A groundwater level meter was used during each round of purging. No product was observed on water table.

* A total depth probe was used to measure TD.

* Full App. I parameters requested:
  (3) 40 mL VOAs - HCl
  (2) 250 mL Poly - HNO_3

* Beta-BHC (2) 1 Liter Ambers
  1,4-Dioxane (2) 1 Liter Ambers
  Low Level PAHs (2) 1 Liter Ambers

* The SWL was about 0.2' lower than during the September 2002 monitoring. The TD was approx. the same.

* Peristaltic Pump was used to purge & sample.

Jon C. Edell Jr.

Sunday March 23, 2003

RJGW 10-07

TD = 20' 3⅞"
Ø = 2"
SWL = 13.64' below PVC

Start pump 1600
Bottom of tubing within well screen.

Time	SWL	pH	Cond.	Temp.	Comments
1607	13.77	6.43	20.73 (mS)	31.3°C 88.3°F	Sample is slightly cloudy. No odor
1618	13.72	6.58	18.89 (mS)	30.7°C 87.3°F	Sample is sl. cloudy, slight odor.
1620	13.72	6.56	21.71 (mS)	30.7°C 87.3°F	Sample is sl. cloudy, sl. odor present
1627	13.72	NA	21.37 (mS)	30.7°C 87.3°F	Sample is sl. cloudy, sl. odor present.
1640	13.71	NA	21.97 (mS)	30.7°C 87.3°F	Sample is sl. cloudy, sl. odor present.

* Stop purging at 1642
* Final SWL is 13.69'
* MEK sampled well.
* Sample time 1645. Sample for full App. I parameters including beta-BHC, 1,4-Dioxane,

Jon C. Edell Jr.

and low level PAHs.

* Sample appeared to be strongly cloudy with a slight odor (Sulfur smell)
* Flow rate was 0.2 to 0.3 L/min.
* Weather was hot, humid, and sunny.
* An interface probe was used to collect initial SWL. A groundwater level meter was used during each round of purging. No product was observed on water table.
* A total depth probe was used to measure TD.
* Full App. I parameters requested:
  (3) 40 mL VOAs - HCl
  (2) 250 mL poly - HNO_3
* Beta-BHC (2) 1 Liter ambers
  1,4-Dioxane (2) 1 L ambers
  Low Level PAHs (2) 1 L ambers
* The SWL was about 0.2' lower during this round than during September 2002. The TD was the same.
* Peristaltic pump was used to purge & sample.

Jon C. Edell Jr.

The equipment rinsate was collected of the silicon and PE tubing used during sampling at the base landfill.

1815 MEK and I are leaving the site for the day. Offsite. We check the calibration of the conductivity meter before we left. It was 1039 uS at 33.8°C.

NA Not available.

Jon C. Edell Jr.

Monday March 24, 2003

0820 MEK and I arrived at the Base Landfill to pick up the equipment and sample containers for sampling today. We were able to borrow a pH meter off of the Forrestal Waste Water Treatment facility. It is a Hach Sension 1.

0835 MEK and I arrive at R7GW07R to collect a groundwater sample.

0840 I am calibration meters both the ph and conductivity. The conductivity meter was calibrate to 1,000 uS at 28.1°C.

0845 The purged water is very silty. It is a grayish color.

0906 Well R7GW07R went dry on us. We will let recharge so we can collect a sample.

0909 MEK and I are leaving R7GW07R to go to R7GW05R.

0912 MEK and I arrived at R7GW05R to collect groundwater samples.

0930 Borrowed pH meter is not working properly. We are proceeding without

 Jon C. Edell Jr.

Monday March 24, 2003

R7GW07R-07

T.D. = 19.6
Ø = 2"
SWL = 15.65' below top PVC

Start pump 0842
Bottom of tubing within well screen.

Time	SWL	pH	Cond.	Temp	Comments
0900	18.33	8.7	8.70mS	30.1°C 86.18°F	Very cloudy No odor

0906 Well went dry. We will let recharge so we can sample it.

* See notes for our collection process.

Jon C. Edell Jr.

Monday

R76W05-0R

March 24, 2003

T.D. = 26' 6 3/8"
Ø = 2"
SWL = 14.10' below top of PVC

Start pump 0915
Bottom of tubing within well screen.

Time	SWL	pH	Cond.	Temp.	Comments
0922	14.17	N/A	41.36 (mS)	29.3°C 84.7°F	Cloudy, No odor
0930	14.14	N/A	36.91 (mS)	29.5°C 85.1°F	Cloudy, SL. Sulfur smell
0936	14.26	N/A	35.88 (mS)	29.3°C 84.7°F	SL. Cloudy, No odor.
0941	14.24	N/A	34.12 (mS)	29.7°C 85.5°F	SL. Cloudy, No odor

* Stop purging at 0942.
* Final SWL is 14.22
* MEL Sampled well.
* Sample time is 0945. Sample for Full App. I parameters, including beta-bhc, 1,4-Dioxane, and low level PAHs.

Jon C. Edell Jr.

Monday

March 24, 2003

* Sample appeared to have a slight sulfur odor, and was slightly cloudy.
* Flow rate was between 0.2 to 0.3 L/min.
* Weather was hot, humid, and sunny.
* An interface probe was used to collect initial SWL. A groundwater level meter was used during each round of purging. No product was observed on water table.
* A total depth probe was used to measure TD.
* Full App. I parameters;
  (3) 40 mL - VOAs - HCl
  (2) 250 mL Poly - HNO_3
* Beta-bhc (2) 1 L Ambers
  1,4-Dioxane (2) 1 L Ambers
  Low level PAHs (2) 1 L Ambers
* The SWL was approx. 0.1' lower during this round than during September 2002 monitoring. The TD was the same.
* Peristaltic was used to purge & sample.
* N/A - Not available.

Jon C. Edell Jr.

R7GW05R-07

TD.= 26'6 1/2"
D=2"
SWL= 14.10' below
to of PVC

Time	SWL	pH	Cond.	Temp.	Comments

JEE
3/24/03

Monday March 24, 2003

to.

1002 MEK and I are leaving R7GW05R to go get additional ice at Marina.

1026 MEK and I arrive at R7GW01R to collect groundwater samples. We stopped and got more ice.

1100 MEK and I are leaving R7GW01R to go to R7GW04R. We sampled R7GW01R at 1100.

1131 Arrive at R7GW04R to collect groundwater samples.

1220 MEK sampled well R7GW04R.

1233 MEK and I are leaving R7GW04R to go to R7GW09.

1238 MEK and I arrive at R7GW09 to collect groundwater samples.

1315 MEK sampled well R7GW09.

1328 MEK and I are leaving R7GW09 to go back to R7GW02R to check on recharge.

1332 Arrive back at R7GW07R.

1335 MEK and I started to collect sample R7GW07R-07. Well went dry on us again. We will let recharge and come back.

1345 Arrive at storage facility inside SWMU3 fence where we have been storing our equipment. We are packing up samples

Monday
RJGW012-07

March 24, 2003

TD = 16' 5 1/8"
D = 2"
SWL = 8.55' below top of pvc

Start pump 1033
Bottom of tubing within well screen.

Time	SWL	pH	Cond.	Temp.	Comments
1039	8.85	N/A	3,714 (uS)	31.1°C 88.0°F	Rel. clear, no odor
1045	8.88	N/A	3,325 (uS)	30.5°C 86.9°F	Rel. clear, No odor
1051	8.85	N/A	3,194 (uS)	30.5°C 86.5°F	Rel. clear, No odor
1057	8.88	N/A	3,287 (uS)	30.1°C 86.2°F	Rel. clear, No odor

* stop purging at 1058
* Final SWL was 8.89
* MBK Sampled well.
* Sample time is 1100. Sample for Full App. I parameters, including beta-bhc, 1,4-dioxane, low level PAHs.
* Sample appeared relatively clear with

Jon C. Edell Jr.

Monday

March 24, 2003

no odor.

* Flow rate was between 0.2 to 0.3 L/min.
* Weather was hot, humid, and sunny.
* An interface probe was used to collect initial SWL. A groundwater level was used during each round of purging. No product was observed on water table.
* A total depth probe was used to measure TD.
* Full App. I parameters:
  (3) 40 mL VOAs - HCl
  (2) 250 mL Poly - HNO_3
* Beta-bhc (2) 1L Ambers
  1,4-Dioxane (2) 1L Ambers
  Low level PAHs (2) 1L Ambers.
* The SWL during this round was approx. 1.1' lower than during the September monitoring. The TD was the same.
* N/A - Not available.

Jon C. Edell Jr.

Monday March 24, 2003

R>GW04R-07

TD = 29' 7 3/4"
Ø = 2"
SWL = 11.67' below top of PVC

Start pump at 1139
Bottom of tubing within well screen.

Time	SWL	pH	Cond.	Temp	Comments
1146	14.06	N/A	55.5 (mS)	31.2°C 88.2°F	Very cloudy, No odor
1154	14.88	N/A	55.0 (mS)	31.0°C 87.8°F	Very cloudy, No odor
1201	15.81	N/A	55.7 (mS)	30.7°C 87.3°F	Clearing up, No odor

* Stop purging at 1205.
* Final SWL was 17.1'.
* MSK sampled well.
* Sample time was 1220. Sample for full App. I parameters, including beta-BHC, 1,4-Dioxane, low level PAHs
* Sample appeared relatively clear with no apparent odor.
* Flow rate was between 0.2 to 0.3 L/min.
* Weather was hot, humid, and sunny.

Jon C. Edell Jr.

Monday March 24, 2003

* An interface probe was used to collect initial SWL. A groundwater level meter was used during each round of purging. No product was observed on water table.
* A total depth probe was used to measure TD.
* Run App. I parameters:
  (2) 40 mL VOAs - HCL
  (2) 250 mL Poly - HNO_3
* Beta-BHC (2) 1L ambers.
  1,4-Dioxane (2) 1L Ambers.
  Low level PAHs (2) 1L Ambers.
* The SWL was approx. the same during this round as opposed to the September 2002 Monitoring.
* N/A - Not available.

Jon C. Edell Jr.

Monday March 24, 2003

to ship out to FedEx today.

1350 Called FedEx to schedule a pickup at Bldg. 2430. Pickup # NRR225.

1600 FedEx arrived to pick up our coolers.

1615 MEK and I left to go get more ice at Marina.

1620 Arrive back at R7GW07R to check on recharge. Collected a few more containers with groundwater before went dry. We will try back tomorrow.

1645 MEK and I are leaving the site for the day. Off site.

* Samples were shipped out today by FedEx as mentioned above. We also checked the calibration of the conductivity meter before leaving the site. It was 1014 (uS) at 32.1°C. The master air waybill number for the Fedex ~~shipment~~ DUE 3/24/03 shipment was 8894 5305 3681. The shipments was relinquished by MEK at 1500. Custody seals were used.

Jon C. Edel Jr.

Tuesday March 25, 2003

0740 MEK and I arrived at the base landfill to pick up equipment and sample bottles to start sampling.

0800 MEK and I arrived at R7GW07R to collect remaining containers of groundwater samples.

0808 MEK and I are proceeding to R7GW02R to collect groundwater samples.

0813 MEK and I arrived at R7GW02R to collect groundwater samples including duplicate and MS/MSD.

0816 I am performing calibration on the conductivity meter. The meter was calibrated to 1,000 uS at 29.1°C. The pH meter is still not working correctly, we will be proceeding without it.

0900 MEK and I collected R7GW02R-07 including duplicate, MS, and MSD.

0940 MEK and I are leaving R7GW02R to get a round of water levels.

	Well	SWL (Top PVC)	Comments
0943	R7GW09	9.50	Locking cap on
0946	R7GW04R	11.96	"
0951	R7GW01R	8.56	"
0955	R7GW11	8.65	"

 Jon C. Edel Jr.

Monday

March 24, 2003

RJGW09-07

TD = 20' 3/8"
Ø = 2"
SWL = 9.49 below to PVC

Start pump at 1246
Bottom of tubing within well screen.

Time	SWL	pH	Cond.	Temp.	Comments
1252	9.30	N/A	57.0 (mS)	32.0°C 91.4°F	Rel. clear, Some floating orange debris, no odor
1253	9.53	N/A	50.4 (mS)	32.7°C 90.9°F	Clear, no odor
1303	9.50	N/A	50.5 (mS)	32.9°C 90.3°F	Clear, some floating white debris, no odor.

* Stop purgin at 1310.
* Final SWL was 9.62.
* MSK sampled well.
* Sample time was 1315. Sample for full App. I parameters, including benzene, 1,4-Dioxane, low level PAHs.
* Sample appeared clear with no odor.

 Jon E. Edell Jr.

Monday

March 24, 2003

* Flow rate was between 0.2 to 0.3 L/min.
* Weather was hot, humid, and sunny.
* An interface probe was used to collect initial SWL. A groundwater level meter was used during each round of purging. No product was observed on water table.
* A total depth probe was used to measure TD.
* Full App. I parameters:
  (3) 40 mL VOAs - HCl
  (2) 250 mL Poly - HNO_3
* Benzene bhc (2) 1 L ambers
  1,4-Dioxane (2) 1 L ambers
  Low level PAHs (2) 1 L ambers
* The SWL was approx. .5' lower during this sampling round then during the September 2002 monitoring event. The TD was the same.
* N/A - Not available.

Jon E. Edell Jr.

Tuesday March 25, 2003

RDGW02R-04

TD = 13' 11 5/8"
Ø = 2"
SWL = 4.83' below top of PVC

Start pump 0820
Bottom of tubing within well screen.

Time	SWL	pH	Cond.	Temp.	Comments
0825	5.08	N/A	55.6 (mS)	28.8°C 83.8°F	Greyish color, sl. Sulfur odor.
0830	5.10	N/A	51.2 (mS)	28.5°C 83.3°F	Greyish color, no odor
0836	5.12	N/A	31.95 (mS)	28.7°C 83.7°F	sl. greyish color, sl. Sulfur odor.
0841	5.14	N/A	25.85 (mS)	28.4°C 83.1°F	Rel. clear, No odor
0846	5.13	N/A	25.23 (mS)	28.6°C 83.5°F	Rel. clear, No odor
0851	5.15	N/A	25.10 (mS)	28.5°C 83.3°F	Rel. clear, No odor

Jon C. Edell Jr.

Tuesday March 25, 2003

- Stop purging 0853
- Final SWL is 5.16
- Sample time 0900. Sampled for full App. I. parameters, including beta-bhc, 1,4-Dioxane, and low level PAHs.
- MSK and I sampled wells.
- Sample appeared relatively clear with strong H_2S smell.
- Flow rate was between 0.2 to 0.3 L/min.
- Weather was hot, humid, and sunny.
- An interface probe was used to measure initial SWL. A groundwater level meter was used during each round of purging. No product was detected on water table.
- A total depth probe was used to measure TD.
- Full App. I parameters:
  - (2) 40 mL VOAs - HCl
  - (2) 250 mL Poly - HNO_3
- Beta-bhc (1) 1 L ambers
  1,4-Dioxane (1) 1 L ambers
  Low level PAHs (1) 1 L ambers
- A duplicate, MS, and MSD were sampled here.

JCE 3/25/03

Jon C. Edell Jr.

Tuesday March 25, 2003

* The SWL was approx. .4' lower during this round than during the September 2002 Monitoring. The TD was the same.

* N/A - Not available.

Jim C. Edell Jr

Tuesday March 25, 2003

	Well	SWL (Top PVC)	Comment
1000	R06W05R	14.18	Locking cap on
1003	R06W10	13.71	"
1005	R06W07R	15.65	"
1008	R06W08R	10.98	"

1015 MEK and I arrived at the Public Works Dept. to talk to Madeline Rivera. She is our base contact.

1115 Leaving Public Works Dept. to go get more ice.

1215 Arrive back at storage facility at the base landfill to pack up equipment and supplies.

1330 Call FedEx to schedule a pickup. Pickup will be over at the PWD - Bldg. 31. Pickup # was 170

1540 FedEx arrived at PWD to pick up coolers, and equipment.

1550 MEK and I are leaving PWD. Finished for the day. Leaving the base. We rechecked the calibration of the conductivity meter before being packed and shipped out. It was 1090 uS at 31.4°C.

* Samples were shipped out today as mentioned above. The Master air waybill number was 8844 5305 3607. The shipment was relinquished by MEK at 1500. Custody seals were used

 Jim C. Edell Jr.

Tuesday March 25, 2003

on the coolers.

Jim C. Gill Jr

APPENDIX D
Laboratory Analytical Results

LABORATORY ANALYTICAL RESULTS
SEMI-ANNUAL GROUNDWATER MONITROING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID	R7GW01R	R7GW02R	R7GW02R	R7GW04R
Sample ID	R7GW01R-07	R7GW02R-07	R7GW02R-07D	R7GW04R-07
Sample Date/Time :	03-24-2003/1100	03-25-2003/0900	03-25-2003/0900	03-24-2003/1220
Appendix 1 Volatile Organics (ug/L)				
1,1,1,2-Tetrachloroethane	5 U	5 U	5 U	5
1,1,1-Trichloroethane	5 U	5 U	5 U	5
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5
1,1,2-Trichloroethane	5 U	5 U	5 U	5
1,1-Dichloroethane	5 U	5 U	5 U	5
1,1-Dichloroethene	5 U	5 U	5 U	5
1,2,3-Trichloropropane	5 U	5 U	5 U	5
1,2-Dibromo-3-chloropropane	5 U	5 U	5 U	5
1,2-Dibromoethane (EDB)	5 U	5 U	5 U	5
1,2-Dichlorobenzene	5 U	5 U	5 U	5
1,2-Dichloroethane	5 U	5 U	5 U	5
1,2-Dichloropropane	5 U	5 U	5 U	5
1,4-Dichlorobenzene	5 U	5 U	5 U	5
2-Butanone (MEK)	5 U	5 U	5 U	5
2-Hexanone	25 U	25 U	25 U	25
4-Methyl-2-pentanone (MIBK)	25 U	25 U	25 U	25
Acetone	50 U	50 U	50 U	50
Acrylonitrile	100 U	100 U	100 U	100
Benzene	5 U	5 U	5 U	5
Bromochloromethane	5 U	5 U	5 U	5
Bromodichloromethane	5 U	5 U	5 U	5
Bromoform	5 U	5 U	5 U	5
Bromomethane	5 R	5 R	5 R	5
Carbon Disulfide	5 U	5 U	5 U	5
Carbon tetrachloride	5 U	5 U	5 U	5
Chlorobenzene	5 U	5 U	5 U	5
Chloroethane	5 U	5 U	5 U	5
Chloroform	5 U	5 U	5 U	5
Chloromethane	5 U	5 U	5 U	5
cis-1,2-Dichloroethene	5 U	5 U	5 U	5
cis-1,3-Dichloropropene	5 U	5 U	5 U	5
Dibromochloromethane	5 U	5 U	5 U	5
Dibromomethane	5 U	5 U	5 U	5
Dichloromethane	5 U	5 U	5 U	5
Ethylbenzene	5 U	5 U	5 U	5
Iodomethane	5 UJ	5 UJ	5 UJ	5
Styrene	5 U	5 U	5 U	5
Tetrachloroethene	5 U	5 U	5 U	5
Toluene	5 U	5 U	5 U	5
trans-1,2-Dichloroethene	5 U	5 U	5 U	5
trans-1,3-Dichloropropene	5 U	5 U	5 U	5
trans-1,4-Dichloro-2-butene	10 U	10 U	10 U	10
Trichloroethene	5 U	5 U	5 U	5
Trichlorofluoromethane	5 U	5 U	5 U	5
Vinyl acetate	10 UJ	10 UJ	10 UJ	10
Vinyl chloride	5 U	5 U	5 U	5
Xylenes, Total	10 U	10 U	10 U	10

LABORATORY ANALYTICAL RESULTS
SEMI-ANNUAL GROUNDWATER MONITROING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID	R7GW01R	R7GW02R	R7GW02R	R7GW04R
Sample ID	R7GW01R-07	R7GW02R-07	R7GW02R-07D	R7GW04R-07
Sample Date/Time :	03-24-2003/1100	03-25-2003/0900	03-25-2003/0900	03-24-2003/1220
Appendix 1 Metals (mg/L)				
Antimony	0.02 U	0.02 U	0.02 U	0.1
Arsenic	0.01 U	0.01 U	0.01 U	0.01
Barium	0.082	0.086	0.087	0.21
Beryllium	0.0022 J	0.004 U	0.004 U	0.00042
Cadmium	0.005 U	0.005 U	0.005 U	0.0029
Chromium	0.01 U	0.01 U	0.01 U	0.002
Cobalt	0.01 U	0.01 U	0.01 U	0.018
Copper	0.02 U	0.02 U	0.02 U	0.046
Lead	0.005 U	0.005 U	0.005 U	0.025
Nickel	0.04 U	0.0022 J	0.003 J	0.0074
Selenium	0.01 U	0.01 U	0.01 U	0.05
Silver	0.01 U	0.01 U	0.01 U	0.01
Thallium	0.01 U	0.01 U	0.01 U	0.05
Vanadium	0.0036 J	0.011	0.011	0.026
Zinc	0.012 J	0.0041 J	0.0041 J	0.15
Appendix 1 Metals (Dissolved) (mg/L)				
Antimony (Dissolved)	0.02 U	0.02 U	0.02 U	0.1
Arsenic, (Dissolved)	0.01 U	0.01 U	0.01 U	0.01
Barium, (Dissolved)	0.083	0.083	0.089	0.18
Beryllium (Dissolved)	0.0022 J	0.004 U	0.004 U	0.004
Cadmium (Dissolved)	0.005 U	0.005 U	0.005 U	0.0016
Chromium, (Dissolved)	0.01 U	0.01 U	0.01 U	0.01
Cobalt (Dissolved)	0.0016 J	0.0019 J	0.01 U	0.02
Copper, Dissolved	0.02 U	0.02 U	0.02 U	0.0059
Lead, (Dissolved)	0.005 U	0.005 U	0.005 U	0.025
Nickel, (Dissolved)	0.04 U	0.04 U	0.04 U	0.005
Selenium (Dissolved)	0.01 U	0.01 U	0.01 U	0.05
Silver (Dissolved)	0.01 U	0.01 U	0.01 U	0.01
Thallium (Dissolved)	0.01 U	0.01 U	0.01 U	0.05
Vanadium (Dissolved)	0.0022 J	0.0097 J	0.011	0.00077
Zinc, (Dissolved)	0.0052 J	0.0038 J	0.0034 J	0.044

U - Not Detected
ug/L - micrograms per liter
mg/L - milligrams per liter
J - Qualified as Estimated
UJ - Reported quantitation limit is qualified as estimated

LABORATORY ANALYTICAL RESULTS
SEMI-ANNUAL GROUNDWATER MONITROING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID		R7GW05R	R7GW07R	R7GW08R
Sample ID		R7GW05R-07	R7GW07R-07	R7GW08R-07
Sample Date/Time :		03-24-2003/0945	03-25-2003/0900	03-23-2003/1530
Appendix 1 Volatile Organics (ug/L)				
1,1,1,2-Tetrachloroethane	U	5 U	5 U	5 U
1,1,1-Trichloroethane	U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	U	5 U	5 U	5 U
1,1,2-Trichloroethane	U	5 U	5 U	5 U
1,1-Dichloroethane	U	0.25 J	5 U	5 U
1,1-Dichloroethene	U	5 U	5 U	5 U
1,2,3-Trichloropropane	U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	U	5 U	5 U	5 U
1,2-Dibromoethane (EDB)	U	5 U	5 U	5 U
1,2-Dichlorobenzene	U	5 U	5 U	5 U
1,2-Dichloroethane	U	5 U	5 U	5 U
1,2-Dichloropropane	U	5 U	5 U	5 U
1,4-Dichlorobenzene	U	5 U	5 U	5 U
2-Butanone (MEK)	U	5 U	5 U	5 U
2-Hexanone	U	25 U	25 U	25 U
4-Methyl-2-pentanone (MIBK)	U	25 U	25 U	25 U
Acetone	U	50 U	50 U	50 U
Acrylonitrile	U	100 U	100 U	100 U
Benzene	U	5 U	5 U	5 U
Bromochloromethane	U	5 U	5 U	5 U
Bromodichloromethane	U	5 U	5 U	5 U
Bromoform	U	5 U	5 U	5 U
Bromomethane	R	5 R	5 R	5 R
Carbon Disulfide	U	5 U	5 U	5 U
Carbon tetrachloride	U	5 U	5 U	5 U
Chlorobenzene	U	5 U	5 U	5 U
Chloroethane	U	5 U	5 U	5 U
Chloroform	U	5 U	5 U	5 U
Chloromethane	U	5 U	5 U	5 U
cis-1,2-Dichloroethene	U	0.63 J	5 U	5 U
cis-1,3-Dichloropropene	U	5 U	5 U	5 U
Dibromochloromethane	U	5 U	5 U	5 U
Dibromomethane	U	5 U	5 U	5 U
Dichloromethane	U	5 U	5 U	5 U
Ethylbenzene	U	5 U	5 U	5 U
Iodomethane	UJ	5 UJ	5 UJ	5 UJ
Styrene	U	5 U	5 U	5 U
Tetrachloroethene	U	5 U	5 U	5 U
Toluene	U	5 U	5 U	5 U
trans-1,2-Dichloroethene	U	5 U	5 U	5 U
trans-1,3-Dichloropropene	U	5 U	5 U	5 U
trans-1,4-Dichloro-2-butene	U	10 U	10 U	10 U
Trichloroethene	U	5 U	5 U	5 U
Trichlorofluoromethane	U	5 U	5 U	5 U
Vinyl acetate	UJ	10 UJ	10 UJ	10 UJ
Vinyl chloride	U	5 U	5 U	5 U
Xylenes, Total	U	10 U	10 U	10 U

LABORATORY ANALYTICAL RESULTS
SEMI-ANNUAL GROUNDWATER MONITROING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID		R7GW05R		R7GW07R		R7GW08R	
Sample ID		R7GW05R-07		R7GW07R-07		R7GW08R-07	
Sample Date/Time :		03-24-2003/0945		03-25-2003/0900		03-23-2003/1530	
Appendix 1 Metals (mg/L)							
Antimony	U	0.02	U	0.02	U	0.1	U
Arsenic	U	0.01	U	0.01	U	0.01	U
Barium		0.02		0.4		0.087	
Beryllium	J	0.0027	J	0.004	U	0.0029	J
Cadmium	J	0.005	U	0.005	U	0.005	U
Chromium	J	0.01	U	0.0088	J	0.01	U
Cobalt		0.01	U	0.022		0.01	U
Copper		0.0037	J	0.16		0.0041	J
Lead	U	0.005	U	0.0039	J	0.025	U
Nickel	J	0.04	U	0.011	J	0.0029	J
Selenium	U	0.01	U	0.01	U	0.05	U
Silver	U	0.01	U	0.01	U	0.01	U
Thallium	U	0.01	U	0.01	U	0.05	U
Vanadium		0.0037	J	0.068		0.0026	J
Zinc	J	0.049	J	0.35		0.016	J
Appendix 1 Metals (Dissolved) (mg/L)							
Antimony (Dissolved)	U	0.02	U	0.02	U	0.1	U
Arsenic, (Dissolved)	U	0.01	U	0.01	U	0.01	U
Barium, (Dissolved)		0.021		0.27		0.087	
Beryllium (Dissolved)	U	0.0026	J	0.004	U	0.0029	J
Cadmium (Dissolved)	J	0.005	U	0.005	U	0.005	U
Chromium, (Dissolved)	U	0.01	U	0.01	U	0.01	U
Cobalt (Dissolved)		0.01	U	0.0086	J	0.01	U
Copper, Dissolved	J	0.02	U	0.02	U	0.0037	J
Lead, (Dissolved)	U	0.005	U	0.005	U	0.025	U
Nickel, (Dissolved)	J	0.04	U	0.0043	J	0.04	U
Selenium (Dissolved)	U	0.01	U	0.01	U	0.05	U
Silver (Dissolved)	U	0.01	U	0.01	U	0.01	U
Thallium (Dissolved)	U	0.01	U	0.01	U	0.05	U
Vanadium (Dissolved)	J	0.0014	J	0.0084	J	0.01	U
Zinc, (Dissolved)	J	0.0068	J	0.018	J	0.0063	J

U - Not Detected
ug/L - micrograms per liter
mg/L - milligrams per liter
J - Qualified as Estimated
UJ - Reported quantitation limit is qualified as estiı

LABORATORY ANALYTICAL RESULTS
SEMI-ANNUAL GROUNDWATER MONITROING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID	R7GW09R	R7GW10R	R7GW11
Sample ID	R7GW09R-07	R7GW10R-07	R7GW11-07
Sample Date/Time :	03-24-2003/1315	03-23-2003/1645	03-23-2003/1430
Appendix 1 Volatile Organics (ug/L)			
1,1,1,2-Tetrachloroethane	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U
1,1-Dichloroethane	5 U	0.15 J	5 U
1,1-Dichloroethene	5 U	5 U	5 U
1,2,3-Trichloropropane	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	5 U	5 U	5 U
1,2-Dibromoethane (EDB)	5 U	5 U	5 U
1,2-Dichlorobenzene	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U
1,4-Dichlorobenzene	5 U	5 U	5 U
2-Butanone (MEK)	5 U	5 U	5 U
2-Hexanone	25 U	25 U	25 U
4-Methyl-2-pentanone (MIBK)	25 U	25 U	25 U
Acetone	50 U	50 U	50 U
Acrylonitrile	100 U	100 U	100 U
Benzene	5 U	5 U	5 U
Bromochloromethane	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
Bromomethane	5 R	5 R	5 R
Carbon Disulfide	5 U	5 U	5 U
Carbon tetrachloride	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Chloroethane	5 U	5 U	5 U
Chloroform	5 U	5 U	5 U
Chloromethane	5 U	5 U	5 U
cis-1,2-Dichloroethene	5 U	0.38 J	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U
Dibromomethane	5 U	5 U	5 U
Dichloromethane	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U
Iodomethane	5 UJ	5 UJ	5 UJ
Styrene	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	5 U	5 U	5 U
trans-1,2-Dichloroethene	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U
trans-1,4-Dichloro-2-butene	10 U	10 U	10 U
Trichloroethene	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U
Vinyl acetate	10 UJ	10 UJ	10 UJ
Vinyl chloride	5 U	5 U	5 U
Xylenes, Total	10 U	10 U	10 U

LABORATORY ANALYTICAL RESULTS
SEMI-ANNUAL GROUNDWATER MONITROING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

Site ID	R7GW09R	R7GW10R	R7GW11
Sample ID	R7GW09R-07	R7GW10R-07	R7GW11-07
Sample Date/Time :	03-24-2003/1315	03-23-2003/1645	03-23-2003/1430
Appendix 1 Metals (mg/L)			
Antimony	0.1 U	0.02 U	0.02 U
Arsenic	0.01 U	0.01 U	0.01 U
Barium	0.092	0.23	0.028
Beryllium	0.0029 J	0.0022 J	0.002 J
Cadmium	0.00093 J	0.005 U	0.005 U
Chromium	0.0011 J	0.01 U	0.01 U
Cobalt	0.0041 J	0.01 U	0.01 U
Copper	0.018 J	0.0027 J	0.02 U
Lead	0.025 U	0.005 U	0.005 U
Nickel	0.0039 J	0.04 U	0.04 U
Selenium	0.05 U	0.01 U	0.01 U
Silver	0.01 U	0.01 U	0.01 U
Thallium	0.05 U	0.01 U	0.01 U
Vanadium	0.014	0.0025 J	0.00097 J
Zinc	0.016 J	0.0085 J	0.006 J
Appendix 1 Metals (Dissolved) (mg/L)			
Antimony (Dissolved)	0.1 U	0.02 U	0.02 U
Arsenic, (Dissolved)	0.01 U	0.01 U	0.01 U
Barium, (Dissolved)	0.091	0.23	0.027
Beryllium (Dissolved)	0.0027 J	0.002 J	0.002 J
Cadmium (Dissolved)	0.0013 J	0.005 U	0.005 U
Chromium, (Dissolved)	0.01 U	0.01 U	0.01 U
Cobalt (Dissolved)	0.01 U	0.01 U	0.0016 J
Copper, Dissolved	0.02 U	0.02 U	0.02 U
Lead, (Dissolved)	0.025 U	0.005 U	0.005 U
Nickel, (Dissolved)	0.0025 J	0.04 U	0.04 U
Selenium (Dissolved)	0.05 U	0.01 U	0.01 U
Silver (Dissolved)	0.01 U	0.01 U	0.01 U
Thallium (Dissolved)	0.037 J	0.0058 J	0.01 U
Vanadium (Dissolved)	0.0081 J	0.0013 J	0.00095 J
Zinc, (Dissolved)	0.0082 J	0.0056 J	0.0046 J

U - Not Detected
ug/L - micrograms per liter
mg/L - milligrams per liter
J - Qualified as Estimated
UJ - Reported quantitation limit is qualified as estı

QUALITY CONTROL/QUALITY ASSURANCE LABORATORY ANALYTICAL RESULTS
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

	Trip Blank	Equipment Rinsate	Field Blank
Site ID	R7TB01	R7ER01	R7FB01
Sample Description :	R7TB01-07	R7ER01-07	R7FB01-07
Sample Date/Time :	3/23/2003	03-23-2003/1845	03-23-2003/1850
Appendix 1 Volatile Organics (ug/L)			
1,1,1,2-Tetrachloroethane	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U
1,2,3-Trichloropropane	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	5 U	5 U	5 U
1,2-Dibromoethane (EDB)	5 U	5 U	5 U
1,2-Dichlorobenzene	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U
1,4-Dichlorobenzene	5 U	5 U	5 U
2-Butanone (MEK)	1.5 J	5 U	5 U
2-Hexanone	25 U	25 U	25 U
4-Methyl-2-pentanone (MIBK)	25 U	25 U	25 U
Acetone	5 J	50 U	50 U
Acrylonitrile	100 U	100 U	100 U
Benzene	5 U	5 U	5 U
Bromochloromethane	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
Bromomethane	5 R	5 R	5 R
Carbon Disulfide	5 U	5 U	5 U
Carbon tetrachloride	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Chloroethane	5 U	5 U	5 U
Chloroform	5 U	5 U	5 U
Chloromethane	5 U	5 U	5 U
cis-1,2-Dichloroethene	5 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U
Dibromomethane	5 U	5 U	5 U
Dichloromethane	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U
Iodomethane	5 UJ	5 UJ	5 UJ
Styrene	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	1.7 J	5 U	5 U
trans-1,2-Dichloroethene	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U
trans-1,4-Dichloro-2-butene	10 U	10 U	10 U
Trichloroethene	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U
Vinyl acetate	10 UJ	10 UJ	10 UJ
Vinyl chloride	5 U	5 U	5 U
Xylenes, Total	10 U	10 U	10 U

QUALITY CONTROL/QUALITY ASSURANCE LABORATORY ANALYTICAL RESULTS
SEMI-ANNUAL GROUNDWATER MONITORING REPORT, MARCH 2003
SOLID WASTE LANDFILL FACILITY
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO

	Trip Blank	Equipment Rinsate	Field Blank
Site ID	R7TB01	R7ER01	R7FB01
Sample Description :	R7TB01-07	R7ER01-07	R7FB01-07
Sample Date/Time :	3/23/2003	03-23-2003/1845	03-23-2003/1850
Appendix 1 Metals (mg/L)			
Antimony	NA	0.02 U	0.02 U
Arsenic	NA	0.01 U	0.01 U
Barium	NA	0.01 U	0.01 U
Beryllium	NA	0.004 U	0.004 U
Cadmium	NA	0.005 U	0.005 U
Chromium	NA	0.01 U	0.01 U
Cobalt	NA	0.01 U	0.01 U
Copper	NA	0.02 U	0.02 U
Lead	NA	0.005 U	0.005 U
Nickel	NA	0.04 U	0.04 U
Selenium	NA	0.01 U	0.01 U
Silver	NA	0.01 U	0.01 U
Thallium	NA	0.01 U	0.01 U
Vanadium	NA	0.01 U	0.01 U
Zinc	NA	0.004 J	0.0052 J

U - Not Detected
ug/L - micrograms per liter
mg/L - milligrams per liter
J - Qualified as Estimated
UJ - Reported quantitation limit is qualified as estimated

APPENDIX E
Puerto Rican Chemist Certification

SEVERN TRENT STL

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Certification Page

I hereby certify that I have reviewed the quality assurance data for SWMU 3 (CTO-0277, Clean I), pages 1-19 and 1-31, signed by Angie Weimerskirk and to the best of my knowledge, the results are correct and reliable.

ESTADO LIBRE ASOCIADO DE PUERTO RICO
A 862678
Lic Abraham Ortiz Charriez
Lic 2314
May 01 05
QUIMICO LICENCIADO

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LOG NO: S3-82059
Received: 25 MAR 03
Reported: 17 APR 03

Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS58/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 101930522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82059-1	R7GW10-07	03-23-03/16:45	PRNS58
82059-2	R7GW05R-07	03-24-03/09:45	PRNS58
82059-3	R7GW01R-07	03-24-03/11:00	PRNS58
82059-4	R7GW11-07	03-23-03/14:30	PRNS58
82059-5	R7GW09-07	03-24-03/13:15	PRNS58

PARAMETER	82059-1	82059-2	82059-3	82059-4	82059-5
Appendix 1 Metals (6010)					
Barium, mg/l	0.23	0.020	0.082	0.028	0.092
Beryllium, mg/l	0.0022B	0.0027B	0.0022B	0.0020B	0.0029B
Cadmium, mg/l	---	---	---	---	0.00093B
Chromium, mg/l	---	---	---	---	0.0011B
Cobalt, mg/l	---	---	---	---	0.0041B
Copper, mg/l	0.0027B	0.0037B	---	---	0.018B
Nickel, mg/l	---	---	---	---	0.0039B
Vanadium, mg/l	0.0025B	0.0037B	0.0036B	0.00097B	0.014
Zinc, mg/l	0.0085BN	0.049N	0.012BN	0.0060BN	0.016BN

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LOG NO: S3-82059
Received: 25 MAR 03
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Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS58/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 101930522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82059-1	R7GW10-07	03-23-03/16:45	PRNS58
82059-2	R7GW05R-07	03-24-03/09:45	PRNS58
82059-3	R7GW01R-07	03-24-03/11:00	PRNS58
82059-4	R7GW11-07	03-23-03/14:30	PRNS58
82059-5	R7GW09-07	03-24-03/13:15	PRNS58

PARAMETER	82059-1	82059-2	82059-3	82059-4	82059-5
Appendix 1 Metals (Dissolved)					
Barium, (Dissolved), mg/l	0.23	0.021	0.083	0.027	0.091
Beryllium (Dissolved), mg/l	0.0020B	0.0026B	0.0022B	0.0020B	0.0027B
Cadmium (Dissolved), mg/l	---	---	---	---	0.0013B
Cobalt (Dissolved), mg/l	---	---	0.0016B	0.0016B	---
Nickel, (Dissolved), mg/l	---	---	---	---	0.0025B
Vanadium (Dissolved), mg/l	0.0013B	0.0014B	0.0022B	0.00095B	0.0081B
Zinc, (Dissolved), mg/l	0.0056BN	0.0068BN	0.0052BN	0.0046BN	0.0082BN
Thallium (Dissolved) (6010)					
Thallium, mg/l	0.0058B	---	---	---	0.037B

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LOG NO: S3-82059
Received: 25 MAR 03
Reported: 17 APR 03

Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS58/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 101930522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82059-6	R7GW08R-07	03-23-03/15:30	PRNS58
82059-7	R7GW04R-07	03-24-03/12:20	PRNS58

PARAMETER	82059-6	82059-7
Appendix 1 Metals (6010)		
Barium, mg/l	0.087	0.21
Beryllium, mg/l	0.0029B	0.00042B
Cadmium, mg/l	---	0.0029B
Chromium, mg/l	---	0.0020B
Cobalt, mg/l	---	0.018
Copper, mg/l	0.0041B	0.046
Nickel, mg/l	0.0029B	0.0074B
Vanadium, mg/l	0.0026B	0.026
Zinc, mg/l	0.016BN	0.15N

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Received: 25 MAR 03
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Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS58/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 101930522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82059-6	R7GW08R-07	03-23-03/15:30	PRNS58
82059-7	R7GW04R-07	03-24-03/12:20	PRNS58

PARAMETER	82059-6	82059-7
Appendix 1 Metals (Dissolved)		
Barium, (Dissolved), mg/l	0.087	0.18
Beryllium (Dissolved), mg/l	0.0029B	---
Cadmium (Dissolved), mg/l	---	0.0016B
Cobalt (Dissolved), mg/l	---	0.020
Copper, Dissolved, mg/l	0.0037B	0.0059B
Nickel, (Dissolved), mg/l	---	0.0050B
Vanadium (Dissolved), mg/l	---	0.00077B
Zinc, (Dissolved), mg/l	0.0063BN	0.044N
Thallium (Dissolved) (6010)		

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LOG NO: S3-82059
Received: 25 MAR 03
Reported: 17 APR 03

Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS58/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 101930522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82059-8	Reporting Limit (RL)		PRNS58
82059-9	Method Detection Limit (MDL)		PRNS58

PARAMETER	82059-8	82059-9
Appendix 1 Metals (6010)		
Antimony, mg/l	0.020	0.0037
Arsenic, mg/l	0.010	0.0050
Lead, mg/l	0.0050	0.0025
Selenium, mg/l	0.010	0.0053
Barium, mg/l	0.010	0.0010
Beryllium, mg/l	0.0040	0.00040
Cadmium, mg/l	0.0050	0.00086
Chromium, mg/l	0.010	0.0011
Cobalt, mg/l	0.010	0.0014
Copper, mg/l	0.020	0.0027
Nickel, mg/l	0.040	0.0022
Silver, mg/l	0.010	0.0020
Vanadium, mg/l	0.010	0.00070
Zinc, mg/l	0.020	0.0013
Thallium (6010)		
Thallium, mg/l	0.010	0.0057
Mercury (7470)		
Mercury, mg/l	0.00020	0.000078

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LOG NO: S3-82059
Received: 25 MAR 03
Reported: 17 APR 03

Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS58/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 101930522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82059-8	Reporting Limit (RL)		PRNS58
82059-9	Method Detection Limit (MDL)		PRNS58

PARAMETER	82059-8	82059-9
Appendix 1 Metals (Dissolved)		
Antimony (Dissolved), mg/l	0.020	0.0037
Arsenic, (Dissolved), mg/l	0.010	0.0050
Lead, (Dissolved), mg/l	0.0050	0.0025
Selenium (Dissolved), mg/l	0.010	0.0053
Barium, (Dissolved), mg/l	0.010	0.0010
Beryllium (Dissolved), mg/l	0.0040	0.00040
Cadmium (Dissolved), mg/l	0.0050	0.00086
Chromium, (Dissolved), mg/l	0.010	0.0011
Cobalt (Dissolved), mg/l	0.010	0.0014
Copper, Dissolved, mg/l	0.020	0.0027
Nickel, (Dissolved), mg/l	0.040	0.0022
Silver (Dissolved), mg/l	0.010	0.0020
Vanadium (Dissolved), mg/l	0.010	0.00070
Zinc, (Dissolved), mg/l	0.020	0.0013
Thallium (Dissolved) (6010)		
Thallium, mg/l	0.010	0.0057
Mercury (Dissolved) (7470)		
Mercury (Dissolved), mg/l	0.00020	0.000078

These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.

Angie Weimerskirk

Angie Weimerskirk

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LOG NO: S3-82092
Received: 26 MAR 03
Reported: 18 APR 03

Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS59/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-1	R7GW02R-07	03-25-03/09:00	PRNS59
82092-2	R7GW02R-07D	03-25-03/09:00	PRNS59
82092-3	R7GW07R-07	03-25-03/09:00	PRNS59

PARAMETER	82092-1	82092-2	82092-3
Appendix 1 Metals (6010)			
Lead, mg/l	---	---	0.0039B
Barium, mg/l	0.086	0.087	0.40
Chromium, mg/l	---	---	0.0088B
Cobalt, mg/l	---	---	0.022
Copper, mg/l	---	---	0.16
Nickel, mg/l	0.0022B	0.0030B	0.011B
Vanadium, mg/l	0.011	0.011	0.068
Zinc, mg/l	0.0041B	0.0041B	0.35

SEVERN TRENT STL

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LOG NO: S3-82092
Received: 26 MAR 03
Reported: 18 APR 03

Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS59/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-1	R7GW02R-07	03-25-03/09:00	PRNS59
82092-2	R7GW02R-07D	03-25-03/09:00	PRNS59
82092-3	R7GW07R-07	03-25-03/09:00	PRNS59

PARAMETER	82092-1	82092-2	82092-3
Appendix 1 Metals (Dissolved)			
Barium, (Dissolved), mg/l	0.083	0.089	0.27
Cobalt (Dissolved), mg/l	0.0019B	---	0.0086B
Nickel, (Dissolved), mg/l	---	---	0.0043B
Vanadium (Dissolved), mg/l	0.0097B	0.011	0.0084B
Zinc, (Dissolved), mg/l	0.0038B	0.0034B	0.018B

SEVERN TRENT STL

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LOG NO: S3-82092
Received: 26 MAR 03
Reported: 18 APR 03

Mr. Mark Kimes
Michael Baker Corporation/Baker Environmental Inc. Client PO. No.: 277-06200
Airside Business Park - 100 Airside D Cl Project No: CLEAN I CTO-0277
Moon Township, PA 15108

Project: PRNS59/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-1	R7GW02R-07	03-25-03/09:00	PRNS59
82092-2	R7GW02R-07D	03-25-03/09:00	PRNS59
82092-3	R7GW07R-07	03-25-03/09:00	PRNS59

PARAMETER	82092-1	82092-2	82092-3
Appendix 1 Volatile Organics (8260)			
Acetone, ug/l	2.5J	4.0J	4.6J
2-Butanone (MEK), ug/l	1.2J	1.4J	1.6J
Toluene, ug/l	0.17J	0.17J	0.30J

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Project: PRNS59/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-4	R7GW01R-07	03-24-03/11:00	PRNS59
82092-5	R7GW04R-07	03-24-03/12:20	PRNS59
82092-6	R7GW05R-07	03-24-03/09:45	PRNS59
82092-7	R7GW08R-07	03-23-03/15:30	PRNS59
82092-8	R7GW09R-07	03-24-03/13:15	PRNS59

PARAMETER	82092-4	82092-5	82092-6	82092-7	82092-8
Appendix 1 Volatile Organics (8260)					
Acetone, ug/l	2.5J	3.1J	---	---	3.7J
1,1-Dichloroethane, ug/l	---	---	0.25J	---	---
cis-1,2-Dichloroethene, ug/l	---	---	0.63J	---	---
2-Butanone (MEK), ug/l	1.3J	1.3J	1.3J	1.1J	1.2J
Toluene, ug/l	0.18J	0.30J	0.22J	0.21J	0.30J

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Project: PRNS59/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-9	R7GW10R-07	03-23-03/16:45	PRNS59
82092-10	R7GW11-07	03-23-03/14:30	PRNS59
82092-11	R7TB01-07	03-23-03	PRNS59

PARAMETER	82092-9	82092-10	82092-11
Appendix 1 Volatile Organics (8260)			
Acetone, ug/l	---	---	5.0J
1,1-Dichloroethane, ug/l	0.15J	---	---
cis-1,2-Dichloroethene, ug/l	0.38J	---	---
2-Butanone (MEK), ug/l	1.1J	1.0J	1.5J
Toluene, ug/l	0.23J	0.27J	1.7J

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Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-12	R7ER01-07	03-23-03/18:45	PRNS59
82092-13	R7FB01-07	03-23-03/18:50	PRNS59

PARAMETER	82092-12	82092-13
Appendix 1 Metals (6010)		
Zinc, mg/l	0.0040B	0.0052B

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POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-12	R7ER01-07	03-23-03/18:45	PRNS59
82092-13	R7FB01-07	03-23-03/18:50	PRNS59

PARAMETER	82092-12	82092-13
Appendix 1 Volatile Organics (8260)		
Acetone, ug/l	3.8J	4.3J
2-Butanone (MEK), ug/l	1.2J	1.0J
Toluene, ug/l	0.42J	0.43J

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Project: PRNS59/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-14	Reporting Limit (RL)		PRNS59
82092-15	Method Detection Limit (MDL)		PRNS59

PARAMETER	82092-14	82092-15
Appendix 1 Metals (6010)		
Antimony, mg/l	0.020	0.0037
Arsenic, mg/l	0.010	0.0050
Lead, mg/l	0.0050	0.0025
Selenium, mg/l	0.010	0.0053
Barium, mg/l	0.010	0.0010
Beryllium, mg/l	0.0040	0.00040
Cadmium, mg/l	0.0050	0.00086
Chromium, mg/l	0.010	0.0011
Cobalt, mg/l	0.010	0.0014
Copper, mg/l	0.020	0.0027
Nickel, mg/l	0.040	0.0022
Silver, mg/l	0.010	0.0020
Vanadium, mg/l	0.010	0.00070
Zinc, mg/l	0.020	0.0013
Thallium (6010)		
Thallium, mg/l	0.010	0.0057
Mercury (7470)		
Mercury, mg/l	0.00020	0.000078

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Moon Township, PA 15108

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Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-14	Reporting Limit (RL)		PRNS59
82092-15	Method Detection Limit (MDL)		PRNS59

PARAMETER	82092-14	82092-15
Appendix 1 Metals (Dissolved)		
Antimony (Dissolved), mg/l	0.020	0.0037
Arsenic, (Dissolved), mg/l	0.010	0.0050
Lead, (Dissolved), mg/l	0.0050	0.0025
Selenium (Dissolved), mg/l	0.010	0.0053
Barium, (Dissolved), mg/l	0.010	0.0010
Beryllium (Dissolved), mg/l	0.0040	0.00040
Cadmium (Dissolved), mg/l	0.0050	0.00086
Chromium, (Dissolved), mg/l	0.010	0.0011
Cobalt (Dissolved), mg/l	0.010	0.0014
Copper, Dissolved, mg/l	0.020	0.0027
Nickel, (Dissolved), mg/l	0.040	0.0022
Silver (Dissolved), mg/l	0.010	0.0020
Vanadium (Dissolved), mg/l	0.010	0.00070
Zinc, (Dissolved), mg/l	0.020	0.0013
Thallium (Dissolved) (6010)		
Thallium, mg/l	0.010	0.0057
Mercury (Dissolved) (7470)		
Mercury (Dissolved), mg/l	0.00020	0.000078

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Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-14	Reporting Limit (RL)		PRNS59
82092-15	Method Detection Limit (MDL)		PRNS59

PARAMETER	82092-14	82092-15
Appendix 1 Volatile Organics (8260)		
Acetone, mg/l	50	2.3
Acrylonitrile, mg/l	100	3.9
Benzene, mg/l	5.0	0.096
Bromochloromethane, mg/l	5.0	0.16
Bromodichloromethane, mg/l	5.0	0.18
Bromoform, mg/l	5.0	0.19
Carbon Disulfide, mg/l	5.0	0.72
Carbon tetrachloride, mg/l	5.0	0.15
Chlorobenzene, mg/l	5.0	0.10
Chloroethane, mg/l	5.0	0.86
Chloroform, mg/l	5.0	0.12
Dibromochloromethane, mg/l	5.0	0.078
1,2-Dibromo-3-chloropropane, mg/l	5.0	0.22
1,2-Dibromoethane (EDB), mg/l	5.0	0.083
1,2-Dichlorobenzene, mg/l	5.0	0.21
1,4-Dichlorobenzene, mg/l	5.0	0.11
trans-1,4-Dichloro-2-butene, mg/l	10	0.77
1,1-Dichloroethane, mg/l	5.0	0.12
1,2-Dichloroethane, mg/l	5.0	0.18
1,1-Dichloroethene, mg/l	5.0	0.31
cis-1,2-Dichloroethene, mg/l	5.0	0.16

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Moon Township, PA 15108

Project: PRNS59/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-14	Reporting Limit (RL)		PRNS59
82092-15	Method Detection Limit (MDL)		PRNS59

PARAMETER	82092-14	82092-15
trans-1,2-Dichloroethene, mg/l	5.0	0.36
1,2-Dichloropropane, mg/l	5.0	0.17
cis-1,3-Dichloropropene, mg/l	5.0	0.12
trans-1,3-Dichloropropene, mg/l	5.0	0.15
Ethylbenzene, mg/l	5.0	0.11
2-Hexanone, mg/l	25	0.29
Bromomethane, mg/l	5.0	0.49
Chloromethane, mg/l	5.0	0.40
Dibromomethane, mg/l	5.0	0.21
Dichloromethane, mg/l	5.0	0.61
2-Butanone (MEK), mg/l	25	0.48
Iodomethane, mg/l	5.0	0.085
4-Methyl-2-pentanone (MIBK), mg/l	25	0.27
Styrene, mg/l	5.0	0.050
1,1,1,2-Tetrachloroethane, mg/l	5.0	0.20
1,1,2,2-Tetrachloroethane, mg/l	5.0	0.17
Tetrachloroethene, mg/l	5.0	0.43
Toluene, mg/l	5.0	0.065
1,1,1-Trichloroethane, mg/l	5.0	0.065
1,1,2-Trichloroethane, mg/l	5.0	0.11
Trichloroethene, mg/l	5.0	0.13
Trichlorofluoromethane, mg/l	5.0	0.27

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Moon Township, PA 15108

Project: PRNS59/CTO-0277/SWMU-3 BASE LANDFILL
Sampled By: Client
Code: 102130522

POSITIVE RESULTS SUMMARY REPORT

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED	SDG#
82092-14	Reporting Limit (RL)		PRNS59
82092-15	Method Detection Limit (MDL)		PRNS59

PARAMETER	82092-14	82092-15
1,2,3-Trichloropropane, mg/l	5.0	0.53
Vinyl acetate, mg/l	10	0.36
Vinyl chloride, mg/l	5.0	0.13
Xylenes, Total, mg/l	10	0.28

These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.

Angie Weimerskirk

Angie Weimerskirk

APPENDIX F
Laboratory Data Validation Summary

Data Validation Report

Michael Baker Jr., Inc.
Roosevelt Roads CTO-277
SDG#: PRNS58 & PRNS59

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS58
Date:	May 8, 2003
Client Name:	Michael Baker Jr., Inc.
Project/Site Name:	Roosevelt Roads CTO-277
Date Sampled:	March 23 - 24, 2003
Number of Samples:	7 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	NEESA D
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Polynuclear Aromatic Hydrocarbons, Pesticides, Metals, and Dissolved Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Scafoss
for Paul B. Humburg, President

5-8-03
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT NARRATIVE
METALS

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM04.1 methods: the Region II Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # PRNS58

A validation was performed on the metals Data from SDG PRNS58. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
*	●	Blanks
*	●	Interferences
	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

Matrix Spike Recovery Blanks

The matrix spike recovery results for waters for Silver (131%) and Zinc (126%) were above the upper control limits(>125% but <150%). All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

SDG PRNS58

Sample ID	Analyte	DL	QL
all water samples	Ag and Zn.	+	J
all "B" qualifier samples	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS59
Date:	May 8, 2003
Client Name:	Michael Baker Jr., Inc.
Project/Site Name:	Roosevelt Roads CTO-277
Date Sampled:	March 23 - 25, 2003
Number of Samples:	13 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	NEESA D
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Polynuclear Aromatic Hydrocarbons, Pesticides, Metals, and Dissolved Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

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for Paul B. Humburg, President

5-8-03.
Date

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DATA ASSESSMENT NARRATIVES

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8260B; Region II Standard Operating Procedure, June 1999, and NEESA D. All comments made within this report should be considered when examining the analytical results.

SDG # PRNS59

A validation was performed on the Volatile Data from SDG #PRNS59. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
  Calibrations
* Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
  Compound Identification/Quantitation

* - All criteria were met for this parameter

Calibrations

The continuing calibration, BQ779, contained compounds with %Ds greater than 20% and less than 90%. For the samples and non-compliant compounds listed below qualify all positive results as estimated (J) and non detected results as estimated (UJ).

All Samples	iodomethane vinyl acetate

The continuing calibration, BQ779, contained compounds with RRFs less than 0.050. For the samples and non-compliant compounds listed below qualify all positive results as estimated (J) and non detected results as rejected (R).

All Samples	bromomethane

Blanks

Reject all laboratory "B" flagged TICs due to blank contamination.

The blank(s) associated with samples in this SDG exhibited contamination. Qualifications were required. The end user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into considerations when applying the 5X and 10X criteria to field samples.

Associated blank	Compound	Concentration	Action Level
R7TB01-07	acetone	5.0J ug/L	50 ug/L
	2-butanone	1.5J	15
	toluene	1.7J	8.5

Blanks (cont.)

Samples	Compound	Qualification
R7GW02R-07 R7GW02R-07D R7GW07R-07 R7GW01R-07 R7GW04R-07 R7GW09R-07 R7ER01-07 R7FB01-07	acetone	CRQL
R7GW02R-07 R7GW02R-07D R7GW07R-07 R7GW01R-07 R7GW04R-07 R7GW05R-07 R7GW08R-07 R7GW09R-07 R7GW10R-07 R7GW11-07 R7ER01-07 R7FB01-07	2-butanone	CRQL
R7GW02R-07 R7GW02R-07D R7GW07R-07 R7GW01R-07 R7GW04R-07 R7GW05R-07 R7GW08R-07 R7GW09R-07 R7GW10R-07 R7GW11-07 R7ER01-07 R7FB01-07	toluene	CRQL

Compound Identification/Quantitation

Qualify all positive results below the CRQL as estimated (J).

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	iodomethane vinyl acetate	+/-	J/UJ
All Samples	bromomethane	+/-	J/R
All Samples	"B" flagged TICs	+	R
R7GW02R-07 R7GW02R-07D R7GW07R-07 R7GW01R-07 R7GW04R-07 R7GW09R-07 R7ER01-07 R7FB01-07	acetone	+	CRQL
R7GW02R-07 R7GW02R-07D R7GW07R-07 R7GW01R-07 R7GW04R-07 R7GW05R-07 R7GW08R-07 R7GW09R-07 R7GW10R-07 R7GW11-07 R7ER01-07 R7FB01-07	2-butanone	+	CRQL
R7GW02R-07 R7GW02R-07D R7GW07R-07 R7GW01R-07 R7GW04R-07 R7GW05R-07 R7GW08R-07	toluene	+	CRQL

SUMMARY OF DATA QUALIFICATIONS
Page 2

SAMPLE ID	COMPOUND ID	DL	QL
R7GW09R-07 R7GW10R-07 R7GW11-07 R7ER01-07 R7FB01-07	toluene	+	CRQL
All Samples	all results below CRQL	+	J

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM04.1 methods: the Region II Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # PRNS59

A validation was performed on the metals Data from SDG PRNS59. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
*	●	Blanks
*	●	Interferences
	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

Matrix Spike Recovery Blanks

The matrix spike recovery results for waters for Mercury (66%) was below the lower control limits(>30% but <75%). All positive and non-detect results are qualified as estimated, "J" or "UJ".

The matrix spike recovery results for waters for Silver (128%) was above the upper control limits(>125% but <150%). All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

SDG PRNS59

Sample ID	Analyte	DL	QL
all water samples	Hg.	+/U	J/UJ
all water samples	Ag.	+	J
all "B" qualifier samples	all analytes	B	J

APPENDIX G
Summary of Statistical Analyses

COPPER Hypothesis: there is no copper contamination at the 1% significance level,

one-way nonparametric analysis of variance Krustal Wallis test

	rank	concentration	sum of ranks	sum of ranks squared	average rank
R7GW01	13	0.005			
R7GW01	24	0.01			
R7GW01	26	0.013			
R7GW01	27	0.0134			
R7GW01	41	0.076	131	17161	26.2
R7GW02	13	0.005			
R7GW02	13	0.005			
R7GW02	22	0.0094			
R7GW02	24	0.01			
R7GW02	36	0.034	108	11664	21.6
R7GW04	13	0.005			
R7GW04	13	0.005			
R7GW04	31	0.0228			
R7GW04	39	0.046			
R7GW04	42	0.076	138	19044	27.6
R7GW05	2	0.0037			
R7GW05	13	0.005			
R7GW05	13	0.005			
R7GW05	21	0.0088			
R7GW05	33	0.03	82	6724	16.4
R7GW07	4.5	0.0046			
R7GW07	13	0.005			
R7GW07	13	0.005			
R7GW07	40	0.054			
R7GW07	43	0.16	113.5	12882.25	22.7
R7GW08	3	0.0041			
R7GW08	13	0.005			
R7GW08	13	0.005			
R7GW08	20	0.0086			
R7GW08	38	0.044	87	7569	17.4
R7GW09	13	0.005			
R7GW09	29	0.018			
R7GW09	32	0.026			
R7GW09	37	0.0358			
R7GW09	45	0.272	156	24336	31.2
R7GW10	1	0.0027			
R7GW10	13	0.005			
R7GW10	28	0.014			
R7GW10	30	0.0195			
R7GW10	34.5	0.032	106.5	11342.25	21.3
R7GW11	4.5	0.0046			
R7GW11	13	0.005			
R7GW11	24	0.01			
R7GW11	34.5	0.032			
R7GW11	44	0.216	120	14400	24

krustal- wallis statistic 19.664

chi-squared value for 8 degrees of freedom (9 -1 wells) and 1% level = 20.01 (standard tables)

Since 19.66< 20.01, can accept hypothesis that no copper contamination is present at the 1% level

Note: 1 % confidence limit was used because of outliers in background data set.