Professional Service Industries, Inc.
Environmental & Analytical Division

October 27, 1994

Manatee County Public Works/Utilities
Solid Waste, Management Division
3333 Lena Road
Bradenton, Florida 34202

Attention: Mr. Bud Bell

Re: Groundwater Monitoring Plan Annual Evaluation
Manatee County Solid Waste Management Facility (Lena Road Landfill)
Permit No. SO41-211176
PSI Project No. 378-4L015

Dear Mr. Bell:

Enclosed is the Annual Evaluation of the Groundwater Monitoring Plan for the Manatee County Solid Waste Management Facility, known as Lena Road Landfill, per F.A.C. Rule 17-701.510(9)b.

Please feel free to contact me if you have any further questions or comments regarding the status of the Annual Evaluation.

Sincerely,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Laura A. Rector
Staff Engineer

10/27/94
Richard A. Dunn, P.G.
Senior Reviewer
License No. PG0001509

RICHARD A. DUNN LICENSE NO. PG0001509 STATE OF FLORIDA PROFESSIONAL GEOLOGIST

Adel M. Blassy
Manager, Environmental Services

(1) Copy to: Florida Department of Environmental Protection
Attention: Ms. Allison Amram

4400 140th Avenue North, Suite 100 • Clearwater, FL 34622 • Phone: 813/538-2300 • Fax: 813/538-2244

GROUNDWATER MONITORING PLAN ANNUAL EVALUATION

MANATEE COUNTY SOLID WASTE MANAGEMENT FACILITY

(LENA ROAD LANDFILL)

BRADENTON, FLORIDA

PERMIT NO. SO41-211176

PREPARED FOR

MANATEE COUNTY PUBLIC WORKS/UTILITIES

SOLID WASTE MANAGEMENT DIVISION

3333 LENA ROAD

BRADENTON, FLORIDA 34202

PREPARED BY

PROFESSIONAL SERVICE INDUSTRIES, INC.

OCTOBER 27, 1994

PSI PROJECT NO. 378-4L015

psi

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EXECUTIVE SUMMARY

Professional Service Industries, Inc. (PSI) performed an Annual Evaluation of the data gathered from the Groundwater Monitoring Plan for the Manatee County Solid Waste Management Facility, known as Lena Road Landfill. This report is designed to meet the annual report provision of the Florida Department of Environmental Protection (FDEP) Permit No. S041-211176 for Lena Road Landfill. Such evaluation provided an assessment of the existing landfill design and operation in relation to potential environmental impacts on groundwater. The evaluation/assessment was accomplished by analyzing data that has been compiled quarterly over the time period of January 1, 1992 to December 31, 1993. The data consists of specific parameters requested by the FDEP permit for the site.

The subject site is located in east-central Manatee County within Section 1, Township 35 South, Range 18 East, Section 6 and 7, Township 35 South, Range 19 East, and Section 31, Township 34 South, Range 19 East. The north boundary of the site runs along State Road 64.

Based on the findings of our assessment, the following are the general trends and concerns associated with the Lena Road Landfill:

- The groundwater elevation maps indicate that the general groundwater flow appears to extend to the northwest across the landfill. However, the construction of the slurry wall system that surrounds Lena Road Landfill appears to have created a general mounding effect in groundwater elevation that follows the slurry wall. Generally, the groundwater elevations indicate that on the outside of the slurry wall, the groundwater flows away from the landfill cells (Stages I, II, and III). On the inside of the landfill cells, the groundwater is flowing inward, into the middle of each cell. Hence, indicating that the slurry wall is doing what is expected of its design, i.e. creating a mounding effect along the perimeters of each cell. Thus it appears that the slurry wall system exhibits the highest groundwater elevations and forms a ridge between the area outside the landfill and the actual landfill staging areas.

- The monitoring well hydrographs show an apparent seasonal fluctuation in the groundwater elevations.

- For the shallow monitoring wells, the analytical parameters that vary from an acceptable value or range include pH, total dissolved solids, turbidity, color, and iron.

- For the deep monitoring wells, the analytical parameters that vary from an acceptable value or range include pH, total dissolved solids, and turbidity.

- The upgradient/downgradient monitoring well analysis revealed increased levels of various parameters in monitoring well to the south and west of the landfill. The analysis also revealed a general decrease in the analysis of various parameters in monitoring well to the north of the landfill.

INTRODUCTION

Scope

The Groundwater Monitoring Plan (GWMP) Annual Evaluation (AE) is designed to meet the annual report provision of the Florida Department of Environmental Protection (FDEP) Permit No. S041-211176 for the Manatee County Solid Waste Management Facility known as Lena Road Landfill. Such evaluation will provide an assessment of the existing landfill design and operation in relation to potential environmental impacts on groundwater. The evaluation/assessment will be accomplished by analyzing data that has been compiled quarterly over the time period of January 1, 1992 to December 31, 1993. The data consists of specific parameters requested by the FDEP permit for the site.

The evaluation will focus on the trend development of the data concerning each well over the two (2) year period, shallow/deep zone wells, and upgradient/downgradient wells. The AE will also provide tabular and graphical display of pertinent data as well as interpretation of the findings.

The data presented in this AE falls under two separate sets of permits. The current and past permits are listed as follows:

- Current Permit — FDEP Permit No. S041-211176
- Previous Permits — FDEP Permit No. SC41-095667
  FDEP Permit No. SC41-095658
  FDEP Permit No. SO41-118353

Objective

The objective of the AE is to present data and information as specified under the current permit (FDEP Permit No SO41-211176). The required data and information under the current permit includes:

- Water Level Data
- Chemical Analysis Data
- Interpretation of the Available Data

Location

The Manatee County Solid Waste Management Facility, known as Lena Road Landfill, is located in east-central Manatee County within Section 1, Township 35 South, Range 18 East, Section 6 and 7, Township 35 South, Range 19 East, and Section 31, Township 34 South, Range 19 East. The north boundary of the site approximately runs along State Road 64. The location of the subject landfill is superimposed on the Lorraine Quadrangle of a United States Geological Survey (USGS) topographic map in Figure 1, Appendix A.

Sources of Data

The Revised Groundwater Monitoring Plan and subsequent addendums were performed by Ardaman & Associates, Inc. These reports discuss the history, hydrogeological setting and groundwater conditions of the subject site and have been used as reference material in preparing the AE. The available previous reports are listed in the references section of this AE.

In addition the Manatee County Solid Waste Department has provided PSI with copies of the 1992 and 1993 quarterly water quality results for the monitoring well network, quarterly piezometer water table measurements, and the current permit for the subject site.

SITE BACKGROUND

History

The Lena Road Landfill is constructed of three (3) stages. Stage I is the existing landfill area. Stage II is the additional landfill located to the north of Stage I. Stage III is the Gun Club landfill that is located to the west of the Stage I area. No refuse is located in the Stage II area. Refuse from a currently inactive landfill is located within the Stage III area.

As part of a seepage control system, a slurry wall system was installed around the three stages of the Lena Road Landfill between August 29, 1985 and September 22, 1989. Stage I construction was completed between August 29, 1985 and November 14, 1985. Stage II was completed between August 20, 1989 and September 22, 1989. The leachate collection system was installed as a part of Stages I and III. Stage II will have a leachate system installed prior to its use as an active landfill area. (Ardaman & Associates, Inc., January, 1990).

Hydrogeological Setting

Subsurface Profile

The results from the standard penetration test (SPT) borings from previous reports (Ardaman & Associates, 1990) were reviewed by PSI. SPT borings were performed within the subject site and around the border of the slurry wall. Data from these borings indicated the following:

- a surficial fine sand to clayey fine sand, and
- a relatively impervious stratum of clayey sand to clay (the confining layer).

The surficial sandy soils generally consist of brown to gray fine sands to silty fine sand interbedded with gray clayey fine sands. The thickness of the surficial sandy soils is typically 10-15 feet and overlies the confining layer. The clayey stratum begins about 15 feet below land surface and extends to the top of the Tampa Limestone unit, approximately 335 feet below land surface.

Summary of Existing Landfill Design

The confining layer is a virtually impervious stratum of clayey sand to clay which contains interbedded seams of silt and sand most prevalent between 50 to 150 feet below land surface. The upper portion of the confining unit consists of clay, silt, or very clayey sand. However, the predominant layer at the top of the confining unit is a green to gray clayey sand to clay with phosphate. The major facies of the top of the confining unit are as follows:

- a gray and green to brown sandy clay to clay,
- a gray and green clayey sand, and
- a gray dolosilt.

The upper part of the confining unit beneath the Lena Road Landfill also contains approximately 50 feet of alternating layers of highly plastic clay, slightly sandy to sandy clay, clayey to slightly clayey sand, and occasional lenses of silty fine sand.

The coefficient of vertical permeability was found to be $5x10^{-8}$ centimeters per second (cm/s) for the top portion of the confining unit (Ardaman & Associates, Inc. (January, 1990). The GWMP states that based on the hydraulic characteristics of the upper confining unit at the landfill the downward seepage rate is estimated to be on the order of 0.2 inches per year (Ardaman & Associates, Inc. January, 1990). The lower portion of the clayey unit beneath the upper confining unit consists of clayey sands to clay with rock lenses to 335 feet below land surface. The water table is approximately 13 feet above the potentiometric surface at the first artesian aquifer.

The classification of the soils listed above is based on the Unified Soil Classification System (USCS). This classification system is based on the plasticity of the soils and ranges from clayey sands to highly plastic, inorganic clay or sandy clay (Ardaman & Associates, Inc. January, 1990).

DATA COLLECTION

Methods

The data used in this AE was obtained from the groundwater quality reports submitted that have been submitted to the Florida Department of Environmental Protection over the past two years (1992 and 1993). The Groundwater Monitoring Plan indicates that the sampling, collection, and testing procedures will adhere to the applicable procedures set forth by the Florida Department of Environmental Protection.

The groundwater samples that are collected are analyzed by P. E. LaMoreaux & Associates, Inc. (PELA), a geochemistry laboratory located in Lakeland, Florida. The State of Florida certification number for PELA is 84183. The methods used by PELA are from "Standards Methods for the Methods of Water and Wastewater," latest edition APHA, AWWA, and WPCF, and/or other EPA approved methods which meet FDEP protocol.

Additional Data

There are instances in the quarterly reports where additional data was available, although not required by the current permit. Quarter 1, 1992 through Quarter 2, 1993 have the results of analysis run to determine values for nitrites, total Kjeldahl nitrogen (TKN), sulfates, copper, manganese, zinc, odor, surfactants, pH (in lab), conductivity(in lab), true color (in lab), and turbidity (in lab). The report from Quarter 3, 1993 provides additional information on nitrites, TKN, pH (in lab), and conductivity (in lab). Laboratory values of pH, conductivity, true color,

and turbidity were also beyond the scope of the current permit because these parameters should be evaluated as field parameters. Due to the transition period between the permits and the time needed to acquire the field testing equipment these laboratory values were used where field values were not yet available. If additional data was provided that was not required by the current permit, in either the form of a laboratory or field value, then the data was not reviewed for trend analysis.

Omissions in Data Collection

There were omissions in data relating to the change in permit requirements. Quarter 1, 1992 through Quarter 2, 1993 did not contain data concerning Dissolved Oxygen (DO), ammonium, arsenic, and cadmium. Quarter 3, 1993 did not report values for DO, ammonium, true color, and turbidity. As previously stated, these omissions were simply due to the change in permit requirement, and all of the required parameters were reported in the Quarter 4, 1993 report in compliance with the permit.

Data was occasionally omitted due to malfunctioning or broken equipment. The following is a listing of these instances:

- Quarter 1, 1992, Quarter 2, 1992, and Quarter 4, 1992 - Piezometer groundwater elevation values were not reported. No reason was given in the report for this omission.

- Quarter 3, 1992, Piezometer groundwater elevation values were not reported for PZ-8, PZ-9, PZ-10, and PZ-11. No reason was given in the report for this omission.

- Quarter 3, 1992 - Bicarbonate values were not reported for Monitoring Wells LRII-3, LRII-4, SMR-1, SMR-2, SA-6, SA-7, and SA-8. No reason was given in the report for this omission.

- Quarter 4, 1992 - pH was not measured in the field due to broken equipment, the lab value for pH was used for the purposes of this report.

- Quarter 1, 1993 - Temperature was not reported for monitoring wells LRII-1, LRII-3, LRII-4, SA-6, SA-7, and SA-8 due to the lack of a thermometer.

- Quarter 2, 1993, Quarter 3, 1993, Quarter 4, 1993, - Piezometer groundwater elevation values were not reported for PZ-1 due to PZ-1 being destroyed.

How does this affect outside the liner? Only downward flow.

- Quarter 3, 1993 - pH for GC-1, GC-3, GC-4, GC-5, GC-6, SA-3, SA-4, M-2, M-3, and M-5 were not reported. No reason was given in the report for this omission.

- Quarter 4, 1993 - Monitoring Well CW-5 was destroyed.

GROUNDWATER TREND ANALYSIS

Groundwater Background Information

The USDA Soil Survey of Manatee County (April 1983) gives general soil descriptions for the soils found in the vicinity of the landfill. The majority of soils in the area are classified as "EauGallie Fine Sand." Other soils that are interspersed within this main area include, "Cassia fine sand, moderately well drained," "Canova, Anclote, and Okeelanta soils," Delray Complex," and "Floridana-Immokalee-Okeelanta association."

In general, the water table exhibited by the predominant soil in the area, "EauGallie, fine sand," is at a depth of less than 10 inches for two to four months during wet season and within a depth of 40 inches for more than six months out of the year. This soil exhibits a permeability that is rapid in the surface and subsurface layers and moderate to moderately rapid in the subsoil and substratum. The other soils found in the area exhibit roughly the same groundwater level and permeability as the "EauGallie, fine sand" soils.

However, the construction of the Lena Road Landfill alters the natural groundwater elevations and the general water table heights throughout the year. However, the water table configuration within the shallow zone generally follows the same shape as the ground surface. The groundwater flow direction within the surficial aquifer system (shallow monitoring well zone) at the landfill is dependent upon the changing dynamics of the system. Variables such as landfill heights, fill areas, varying compaction, varying types of refuse, varying porosities of refuse, slurry walls, and other factors continually influence the groundwater flow direction. The groundwater in the surficial aquifer flows toward relief points along natural or artificial channels and depressions in the land surface.

Previous reports indicate that the local relief points at this site are toward the intermittent stream north of Stage II and toward the intermittent tributary as part of Cypress Strand west of Stage I south of Stage III and the headwaters of Cypress Strand at the south end of Stage I. The following sections evaluate the groundwater level measurements reported over the past eight quarters through contour maps and individual well hydrographs. The locations of the monitoring

well at the landfill site are provided in Figure 2, Appendix A. The following table lists the monitoring wells that located at the landfill site and that were included in this evaluation.

GROUNDWATER MONITORING WELLS AT LENA ROAD LANDFILL		
MONITORING WELL	AQUIFER	WELL TYPE
LRII-1	Surficial	Detection/Compliance
LRII-2	Surficial	Detection/Compliance
LRII-3	Surficial	Detection/Compliance
LRII-4	Surficial	Detection/Compliance
LRII-5	Surficial	Detection/Compliance
MW-1	Surficial	Compliance
MW-2	Surficial	Detection/Compliance
MW-3	Surficial	Detection/Compliance
MW-5	Surficial	Detection/Compliance
MW-6	Surficial	Detection/Compliance
CW-4	Surficial	Compliance
CW-5	Surficial	Detection/Compliance
GC-1	Surficial	Detection/Compliance
GC-2	Surficial	Detection/Compliance
GC-3	Surficial	Detection/Compliance
GC-4	Surficial	Detection/Compliance
GC-5	Surficial	Detection/Compliance
GC-6	Surficial	Background
SMR-1	Surficial	Background
SMR-2	Artesian (deep)	Background
SA-2	Artesian (deep)	Detection/Compliance

GROUNDWATER MONITORING WELLS AT LENA ROAD LANDFILL		
MONITORING WELL	AQUIFER	WELL TYPE
SA-3	Artesian (deep)	Detection/Compliance
SA-4	Artesian (deep)	Detection/Compliance
SA-5	Artesian (deep)	Detection/Compliance
SA-6	Artesian (deep)	Detection/Compliance
SA-7	Artesian (deep)	Detection/Compliance
SA-8	Artesian (deep)	Detection/Compliance
PZ-1	Surficial	Piezometer
PZ-2	Surficial	Piezometer
PZ-3	Surficial	Piezometer
PZ-4	Surficial	Piezometer
PZ-5	Surficial	Piezometer
PZ-6	Surficial	Piezometer
PZ-7	Surficial	Piezometer
PZ-8	Surficial	Piezometer
PZ-9	Surficial	Piezometer
PZ-10	Surficial	Piezometer
PZ-11	Surficial	Piezometer
PZ-12	Surficial	Piezometer
PZ-13	Surficial	Piezometer
PZ-14	Surficial	Piezometer
PZ-15	Surficial	Piezometer
PZ-16	Surficial	Piezometer
PZ-17	Surficial	Piezometer

Not seen w/ data | LCRS remaining, expect interior flow to be from mound toward slurry wall

Groundwater Elevation Map Analysis

The groundwater elevations maps presented in Figures 3 through 7 in Appendix A, are a compilation of the shallow groundwater measurements taken over the past two years (1992 and 1993). The groundwater elevations were measured at each of the available piezometers and monitoring wells. Each groundwater elevation contour map represents one quarter of reported groundwater level data for all the shallow monitoring wells and piezometers. The monitoring wells are located along the perimeters of the Lena Road Landfill and the piezometers mirror the locations of the monitoring wells on the inside of the slurry wall system of the landfill. Figures 3 through 7, Appendix A, indicate that the general groundwater flow appears to extend to the northwest across the landfill. However, the construction of the slurry wall system that surrounds Lena Road Landfill appears to have created a general mounding effect in groundwater elevation that follows the slurry wall.

Generally, the groundwater elevations indicate that on the outside of the slurry wall, the groundwater flows away from the landfill cells (Stages I, II, and III). On the inside of the landfill cells, the groundwater is flowing inward, into the middle of each cell. Hence, indicating that the slurry wall is doing what is expected of its design, i.e. creating a mounding effect along the perimeters of each cell. Thus it appears that the slurry wall system exhibits the highest groundwater elevations and forms a ridge between the area outside the landfill and the actual landfill staging areas.

Monitoring Well Hydrograph Analysis

The monitoring well hydrographs presented in Appendix B, are based on groundwater elevation calculations. These hydrographs represent the fluctuation in the groundwater levels over the time frame of two years (1992 and 1993) for all of the monitoring wells. The average overall fluctuation in the water level is approximately 6 feet per year. The average fluctuation of the groundwater level for the shallow wells is approximately 4 feet and for the deep well the average fluctuation is approximately 7.5 feet.

The general trend appears to be a seasonal fluctuation in groundwater levels. Most of the fluctuations in the monitoring wells appear to mirror each others rise and fall in reference to the groundwater level. The overall trends are as follows:

- Between Quarter 1, 1992 and Quarter 2, 1992 there is an average drop in the groundwater level of approximately 2.2 feet for the shallow wells and 1.25 feet for the deep wells.

- Between Quarter 2, 1992 and Quarter 3, 1992 there is an average rise in the groundwater level of approximately 3 feet for the shallow wells and 7.6 feet for the deep wells (wet season).

- Between Quarter 3, 1992 and Quarter 4, 1992 there is an average drop in the groundwater level of approximately 1.75 feet for the shallow wells and 0.75 feet for the deep wells.

For the remainder of the reporting period, from Quarter 4, 1992 through Quarter 4, 1993, the general trend indicates a lower fluctuation of the groundwater level that results in and average variance of about one foot.

- Between Quarter 4, 1992 and Quarter 1, 1993, there is a general increase in the average groundwater levels reported.

- Between Quarter 1, 1993 and Quarter 2, 1993 there is an overall decrease in the average groundwater levels reported.

- Between Quarter 2, 1993 and Quarter 3, 1993 there is an overall decrease in the average groundwater levels reported.

- Between Quarter 3, 1993 and Quarter 4, 1994 there is no overall trend for the groundwater levels reported. Approximately half of the wells show an increase and approximately half of the well show a decrease in the average water levels reported.

There are some cases were there is a fluctuation that does not support the general behavior exhibited by the groundwater levels. These cases may be due to errors in the measurement procedures or in the reporting of the data. These situations can be defined as outliers, and not representative of the true value.

GROUNDWATER ANALYTICAL TREND ANALYSIS

Groundwater Analytical Parameters

The current permit (FDEP Permit No. SO41-211176) at the Lena Road Landfill requires the each monitoring well at the subject landfill and the leachate produced at the subject landfill to undergo quarterly analysis for the parameters specified in the current FDEP permit. These

parameters are also listed in the state cleanup guidelines - pursuant to Chapter 701.510(8) - 17-701.510(9) of the Florida Administration Code (FAC). The maximum contaminant levels are acquired per FAC Chapter 17-550 for Drinking Water Standards, Monitoring, and Reporting unless otherwise indicated. The parameters whose MCL is listed as "**" do not currently have an MCL per the Drinking Water Standards. These sections were reviewed for general trend analysis and fluctuation from the average values. The specified parameters and their respective maximum contaminant levels for monitoring wells are listed in the following table:

MONITORING WELL QUARTERLY ANALYSIS PARAMETERS MAXIMUM CONTAMINANT LEVELS (MCL)			
Field Parameters	**MCL**	**Laboratory Parameters**	**MCL**
Static Water Level - NGVD	Seasonal-ft	Ammonium	**
Conductivity	**	Arsenic	0.05 mg/l
pH	6.5-8.5 SU	Bicarbonate	**
Dissolved Oxygen	**	Cadmium	0.005 mg/l
Turbidity	**	Chlorides	250 mg/l
Temperature	Seasonal-°C	Chromium	0.1 mg/l
Color/Sheen	15 CPU	Iron	0.3 mg/l
		Lead	0.015 mg/l
		Mercury	0.002 mg/l
		Nitrate (as N)	10.0 mg/l
		Sodium	160 mg/l
		Total Dissolved Solids	500 mg/l
		Total Organic Carbon	**
		EPA 601 Parameters	Various
		EPA 602 Parameters	Various

The field parameters listed above were to be evaluated at the well sampling point. When these were not available the laboratory value was used in place of the field value. If the laboratory value and field value were both not available (NA) it will be indicated as such. Other irregularities in data collection will be addressed in the Data Collection section of this AE. The available data was reviewed for trend analysis concerning quarterly changes in groundwater quality, comparison of shallow/deep zone wells, comparison of upgradient/downgradient wells, and correlation between related parameters. Discussion is made concerning interpretation of quarterly groundwater contour maps and monitoring well hydrographs. A compilation of the data for Quarter 1, 1992 through Quarter 4, 1993, for each monitoring well is provided in Tables 1 - 27, Appendix C of this report.

Shallow Zone Monitoring Well Analysis

The monitoring wells at the Lena Road Landfill are grouped in two major categories in relation to their total depth. These categories are shallow and deep monitoring wells, or, wells that tap the surficial aquifer or the artesian aquifer, respectively. The data analysis from each of these well categories is used to evaluate the effectiveness of the landfill design and the relative extent of the potential for groundwater contamination. For the purposes of this annual evaluation the shallow wells are defined as ranging in depth from 10 - 25 feet below the surface. A listing of the shallow wells and their total depths are provided below:

TOTAL DEPTH OF SHALLOW ZONE MONITORING WELLS (FEET)			
Monitoring Well	Depth	Monitoring Well	Depth
MW-1	14.53	LRII-4	22.50
MW-2	13.97	LRII-5	22.78
MW-3	13.97	GC-1	23.76
MW-5	21.42	GC-2	18.03
MW-6	20.72	GC-3	22.58
CW-4	17.91	GC-4	22.18
CW-5	11.92	GC-5	22.02
LRII-1	21.12	GC-6	22.40
LRII-2	22.83	SMR-I	22.88

TOTAL DEPTH OF SHALLOW ZONE MONITORING WELLS (FEET)			
Monitoring Well	Depth	Monitoring Well	Depth
LRII-3	22.61		

Shallow Monitoring Well Analytical Trends

The measurements for Bicarbonate, Chlorides, Sodium, Chromium, Lead, Mercury, and Nitrates were below maximum contamination levels (MCL) according to state cleanup guidelines. Fluctuation in the reported values for the parameters were slight and were not effected largely by seasonal changes.

Some data measurements were not reported regularly due to the change in permit requirements. The parameters effected were dissolved oxygen (DO) and ammonium. The DO and ammonium content of the water samples were reported during the last quarter of 1993 (Quarter 4, 1994). The results for arsenic and cadmium were reported only for Quarters 3-4, 1993. The values obtained from the shallow wells for DO and ammonium fall within acceptable ranges. The test results for arsenic and cadmium content of the shallow wells were all below detectable limits (BDL).

Shallow Monitoring Wells: Areas of Concern

Parameters that were either exceptions to the general trends or exceeded the maximum contaminant level (MCL) are discussed below:

- *pH* - The acceptable range for pH is between 6.5 SU and 8.5 SU, as indicated by the Florida Groundwater Guidance Concentrations. Groundwater from the shallow monitoring wells that remained within this range were CW-4 and GC-4. Monitoring well CW-4 is located off the central southern border of Stage I of the landfill. Monitoring well GC-4 is located off the northwest corner of Stage III of the landfill.

  All wells, with the exception of CW-4 and GC-4, yielded pH values that fell consistently below the accepted values and showed wells with slightly acidic water content. According to the USDA Soil Survey of Manatee County the pH values typical of soils in the vicinity of the landfill range from 4.5 SU to 8.4 SU. The soil survey indicates that some of the soils in the area of the landfill possess a natural acidity. This reduces the concern in reference to the pH values being influenced by groundwater

contamination in connection with the landfill. Due to the agreement between the analytical pH values and those reported by the soil survey, tabular and graphic trend analysis were deemed unnecessary.

- *Total Dissolved Solids* - The acceptable maximum contaminant level (MCL) for total dissolved solids (TDS) is 550 mg/l, as indicated by the Florida Groundwater Guidance Concentrations. The TDS values for the majority of the shallow wells ranged from 32.8 mg/l to 461.0 mg/l and fell with in the MCL of 500 mg/l. A tabular representation of these quarterly TDS values over all shallow wells is presented in Table 28, Appendix D, of this report.

  Monitoring wells MW-3, CW-4 and GC-1 all experienced fluctuations in the levels of TDS and exceeded the MCL. Monitoring wells MW-3 and CW-4 are located off the southwest corner of Stage I of the landfill. Monitoring well GC-1 is located off the northwest corner of Stage III of the landfill. The shallow well MW-3 exceeded the MCL only once by 5 mg/l during Quarter 3, 1993. This was a slight exceedance and returned to within MCL by the next monitoring period. Monitoring wells CW-4 and GC-1 both exceeded the MCL consistently throughout the evaluation period. A graphical representation of the TDS values for MW-3, CW-4, and GC-1, is displayed in Graph 27, Appendix D, of this report.

- *Turbidity* - There is not a maximum contaminant level (MCL) listed in the drinking water standards for turbidity. However, a generally recognized maximum value is 1 turbidity unit (NTU) (Freeze & Cherry, 1979). All of the shallow wells at the Lena Road Landfill had turbidity levels that exceeded this MCL. The turbidity levels of the monitoring wells ranged between 0.24 NTU to 4300 NTU. It should be noted that the final quarter of 1993 (Quarter 4, 1993) showed a significant decrease in turbidity levels. The turbidity levels ranged from 0.24 NTU to 17.3 NTU over all shallow wells for Quarter 4, 1993. A tabular representation of these quarterly turbidity values over all shallow wells is provided in Table 29, Appendix D, of this report. Due to the majority of wells exhibiting high turbidity levels, a graphical display was deemed unnecessary.

- *Color* - The acceptable range for color in groundwater is 15 color units (C.U.), as indicated by the Florida Groundwater Guidance Concentrations. A large portion of the shallow monitoring wells located throughout the landfill site had color levels that exceeded the recommended range. The color levels of the monitoring wells ranged between 10 C.U and 2000 C.U.. It should be noted that the Quarters 3 and 4, 1993 did not report the color levels and therefore any further improvement cannot be measured. A tabular representation of these quarterly color values over all shallow wells is presented in Table 30, Appendix D, of this report. Due to the majority of wells exhibiting high color levels, a graphical display was deemed unnecessary.

- *Iron* - The acceptable maximum contaminant level for iron in groundwater is 0.3 milligrams per liter (mg/l), as per the Florida Groundwater Guidance Concentrations. A large portion of the shallow monitoring wells located throughout the landfill site had iron levels that exceeded the recommended value. The iron levels of the monitoring wells ranged between 0.01 mg/l to 30.3 mg/l. A tabular representation of these quarterly iron values over all shallow wells is presented in Table 31, Appendix D, of this report. Due to the majority of wells exhibiting high iron levels, a graphical display was deemed unnecessary.

- *EPA 601/602* - The analysis for organic constituents EPA Methods 601 and 602 began in mid 1993. These methods test for a variety of hydrocarbon based petroleum and solvent compounds. With such few data representations, no trends were readily recognizable. However, all parameters tested were reported to be below detection limits (BDL).

Deep Zone Monitoring Well Analysis

There are nine deep zone or artesian aquifer monitoring wells at the Lena Road Landfill. For the purposes of this annual evaluation the deep well range total depth from 140 feet to 165 feet. A listing of the deep zone wells and their total depths are as follows:

TOTAL DEPTH OF DEEP ZONE MONITORING WELLS (FEET)			
Monitoring Well	Depth	Monitoring Well	Depth
SMR-II	150.0	SA 5	153.02
SA-2	154.93	SA-6	153.04
SA-3	163.02	SA-7	152.97
SA-4	143.78	SA-8	153.38

Deep Monitoring Well Analytical Trends

The measurements for Bicarbonate, Chlorides, Sodium, and Total Dissolved Solids (TDS) were by and large below maximum contamination levels (MCL) according to state cleanup guidelines - pursuant to Chapter 17-770, Florida Administration Code (FAC) and referenced sources. The only major trend irregularity was found at monitoring well SA-6, which is discussed below. The reported values for Chromium, Iron, Lead, Mercury, and Nitrates were largely Below Detection Limits (BDL). Fluctuation in the reported values for the other parameters was slight and were not effected largely by seasonal changes.

Some data measurements were reported irregularly due to the change in permit requirements. The parameters effected were dissolved oxygen (DO) and ammonium. The DO and ammonium content of the water samples were reported during the last quarter of 1993 (Quarter 4, 1994). The results for arsenic and cadmium were reported only for Quarters 3-4, 1993. The values obtained from the shallow wells for DO and ammonium fall within acceptable ranges. The test results for arsenic and cadmium content of the shallow wells were all below detectable limits (BDL).

Deep Monitoring Wells: Areas of Concern

The following are groundwater analytical results that are either exceptions to the general trends or fall outside the maximum contaminant level (MCL) for the specific parameter.

- *pH* - The accepted range for pH values is 6.5 to 8.5, as indicated by the Florida Groundwater Guidance Concentrations. The pH values for the deep monitoring wells at the Lena Road Landfill fluctuated from 5.5 to 11.2. According to the USDA Soil Survey of Manatee County the pH values typical of soils in the vicinity of the landfill range from 4.5 SU to

8.4 SU. A tabular representation of the quarterly pH values over all shallow wells is provided in Table 32, Appendix E, of this report.

The largest variance occurred in Quarter 3, 1992. During this quarter pH values from monitor wells SA-6, SA-7, and SA-8 were 11.2, 10.7, and 10.7 respectively. These wells are located off the north and west borders of Stage II at the landfill.The graphical trend analysis for monitoring wells SA-6, SA-7, and SA-8 is presented in Graph 28, Appendix E, of this report.

- *Total Dissolved Solids* - The accepted maximum contaminant level (MCL) for total dissolved solids (TDS) is 500 mg/l, as indicated by the Florida Groundwater Guidance Concentrations. The TDS values for the majority of the deep wells fell within this accepted range. A tabular representation of these quarterly TDS values over all shallow wells is presented in Table 32, Appendix E, of this report.

  The main area of concern is deep monitoring well SA-6, whose reported values were consistently above the MCL. Monitoring well SA-6 is located off the central west border of the landfill. The graphical trend analysis for SA-6 is presented in Graph 29, Appendix E, of this report.

- *Turbidity* - There is not a maximum contaminant level (MCL) listed in the drinking water standards for turbidity. However, a generally recognized maximum value is 1 turbidity unit (NTU) (Freeze & Cherry).The maximum contaminant level for turbidity is 1 turbidity unit (NTU). Monitoring wells SA-4, SA-5, and SA-7 remained below the MCL for the majority of the evaluation period.

  Monitoring wells SMR-2, SA-2, SA-3, SA-6, and SA-8 all reported values above the MCL. A tabular representation of these quarterly turbidity values over all shallow wells is presented in Appendix E. The graphical trend analysis for monitoring wells SMR-2, SA-2, SA-3, and SA-6, is presented in Graph 30, Appendix E, of this report.

- *Color* - The color values fluctuated from 0.0 CU to 60.0 CU. The accepted value for color measurement is 15 CU, as indicated by the Florida Groundwater Guidance Concentrations. All of the deep wells experienced fluctuations in the color values. A tabular representation of the quarterly pH values over all shallow wells is provided in Table 35,

Appendix E, of this report. Due to the majority of wells exhibiting high color levels, a graphical trend analysis was deemed unnecessary.

- *EPA 601/602* - The analysis for organic constituents EPA Methods 601 and 602 began in mid 1993. These methods test for a variety of hydrocarbon based petroleum and solvent compounds. With such few data representations, no trends were readily recognizable. However, all parameters tested were reported to be below detection limits (BDL).

Upgradient/Downgradient Monitoring Well Analysis

The monitoring wells that consistently report the highest groundwater elevations are MW-2, MW-6, and CW-4. These wells are used in this report as representations of upgradient behavior. The monitoring wells that consistently report the lowest groundwater elevations include LRII-3, LRII-4, GC-1, and GC-4. These wells are used in this report as representations of upgradient behavior. The upgradient and downgradient groups of wells were compared to determine the effect, if any, is imposed on the downgradient areas. There does not appear to be a direct relation between the analytical values obtained from the upgradient and downgradient monitoring wells. The following is a listing of the general trends observed in the parameters that exhibited the most fluctuation.

- *Total Dissolved Solids* - There appears to be an overall decrease in the reported total dissolved solids values from upgradient to downgradient wells. Monitoring well GC-1 reported the largest increases.

- *Turbidity* - There appears to be an overall increase the reported turbidity values between the upgradient to downgradient wells. Monitoring wells GC-1 and GC-4 reported the largest increases.

- *Color* - There appears to be an overall increase in the reported color values from upgradient to downgradient wells. Monitoring wells GC-1 and GC-4 reported the largest increases. However, monitoring wells LRII-3 and LRII-4 consistently reported color values less than those reported by upgradient wells.

- *Iron* - There appears to be an overall increase in the reported iron values from upgradient to downgradient wells. Monitoring wells GC-1 and GC-4 reported the largest increases. However, monitoring wells LRII-3 and LRII-4 consistently reported iron values less than those reported by upgradient wells.

From these results it appears that the downgradient wells GC-1, GC-4, and other monitoring wells on the south and west of the site, are most effected by the landfill. This is in agreement with the present active status of Stage I of the landfill and the previous use of Stage III as a disposal area. The other downgradient well are located off the north of the site. This area is Stage II of the landfill and is currently inactive and no refuse is located in this area.

CONCLUSIONS

Professional Service Industries, Inc. (PSI) has performed an Annual Evaluation of the data gathered from the Groundwater Monitoring Plan for the Manatee County Solid Waste Management Facility, known as Lena Road Landfill. This report is designed to meet the annual report provision of the Florida Department of Environmental Protection (FDEP) Permit No. S041-211176 for Lena Road Landfill. Such evaluation provided an assessment of the existing landfill design and operation in relation to potential environmental impacts on groundwater. The evaluation/assessment was accomplished by analyzing data that has been compiled quarterly over the time period of January 1, 1992 to December 31, 1993. The data consists of specific parameters requested by the FDEP permit for the site.

Based on the findings of our assessment, the following are the general trends and concerns associated with the Lena Road Landfill:

- The groundwater elevation maps indicate that the general groundwater flow appears to extend to the northwest across the landfill. However, the construction of the slurry wall system that surrounds Lena Road Landfill appears to have created a general mounding effect in groundwater elevation that follows the slurry wall. Generally, the groundwater elevations indicate that on the outside of the slurry wall, the groundwater flows away from the landfill cells (Stages I, II, and III). On the inside of the landfill cells, the groundwater is flowing inward, into the middle of each cell. Hence, indicating that the slurry wall is doing what is expected of its design, i.e. creating a mounding effect along the perimeters of each cell. Thus it appears that the slurry wall system exhibits the highest groundwater elevations and forms a ridge between the area outside the landfill and the actual landfill staging areas.

- The monitoring well hydrographs show an apparent seasonal fluctuation in the groundwater elevations.

- For the shallow monitoring wells, the analytical parameters that vary from an acceptable value or range include pH, total dissolved solids, turbidity, color, and iron.

- For the deep monitoring wells, the analytical parameters that vary from an acceptable value or range include pH, total dissolved solids, and turbidity.

- The upgradient/downgradient monitoring well analysis revealed increased levels of various parameters in monitoring well to the south and west of the landfill. The analysis also revealed a general decrease in the analysis of various parameters in monitoring well to the north of the landfill.

WARRANTY

Annual Evaluation

PSI warrants that the findings and conclusions contained herein have been prepared in accordance with generally accepted environmental and engineering methods, only for the site described in this report. However, these findings and conclusions contain all of the limitations inherent to the information received by PSI from the client which are referred to in the protocol and some of which are more specifically set forth below.

Limitations and Exceptions of Assessment

Along with all the limitations set forth in various sections of the protocol, the accuracy and completeness of this report is necessarily limited by the following:

Unidentifiable Conditions

There is a possibility that even with proper application of these methodologies, there may exist on the subject site conditions that could not be identified within the scope of the assessment or which were not reasonably identifiable from the available information. PSI believes that the information obtained from the quarterly water quality reports and the groundwater monitoring plan concerning the site is reliable. However, PSI cannot and does not warrant or guarantee that the information provided by these other sources is accurate or complete. The methodologies of this evaluation are not intended to produce all inclusive or comprehensive results, but rather to provide the client with information regarding apparent suspicions of existing and potential adverse environmental conditions relating to the subject property.

Use by Third Parties

This report was prepared pursuant to the contract PSI has with the client. That contractual relationship included an exchange of information about the subject site that was unique and between PSI and the client and serves as the basis upon which this report was prepared. Because of the importance of the communication between PSI and its client, reliance or any use of this report by anyone other than the client, for whom it was prepared, is prohibited and therefore not foreseeable to PSI.

Reliance or use by any such third party without explicit authorization in the report does not make said third party beneficiary to PSI's contract with the client.

Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at the third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.

REFERENCES

Ardaman & Associates, Inc., Revised Groundwater Monitoring Plan for Lena Road Landfill, January 11, 1990.

Ardaman & Associates, Inc., Lena Road Landfill Responses to FDEP Letter on Revised Groundwater Monitoring Plan - Permit Nos. SO41-118353, SC41-095658, and SC41-095667, March 28, 1990.

Ardaman & Associates, Inc., Second Set of Responses on Revised Groundwater Monitoring Plan for Lena Road Landfill, Manatee County, Florida, FDEP Permit Numbers: SO41-118353, SC41-095658, and SC41-095667, June 26, 1990.

Freeze, R. Allan and Cherry, John A., Groundwater, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, Copyright 1979.

Manatee County Government - Public Works Department, Lena Landfill Piezometer Water Tables, Quarter 3, 1992 and Quarters 1 - 4, 1993.

P. E. LaMoreaux & Associates, Inc. Manatee County Government - Public Works Department Quarterly Groundwater Reports, Quarters 1 - 4, 1992 and Quarters 1 - 4, 1993.

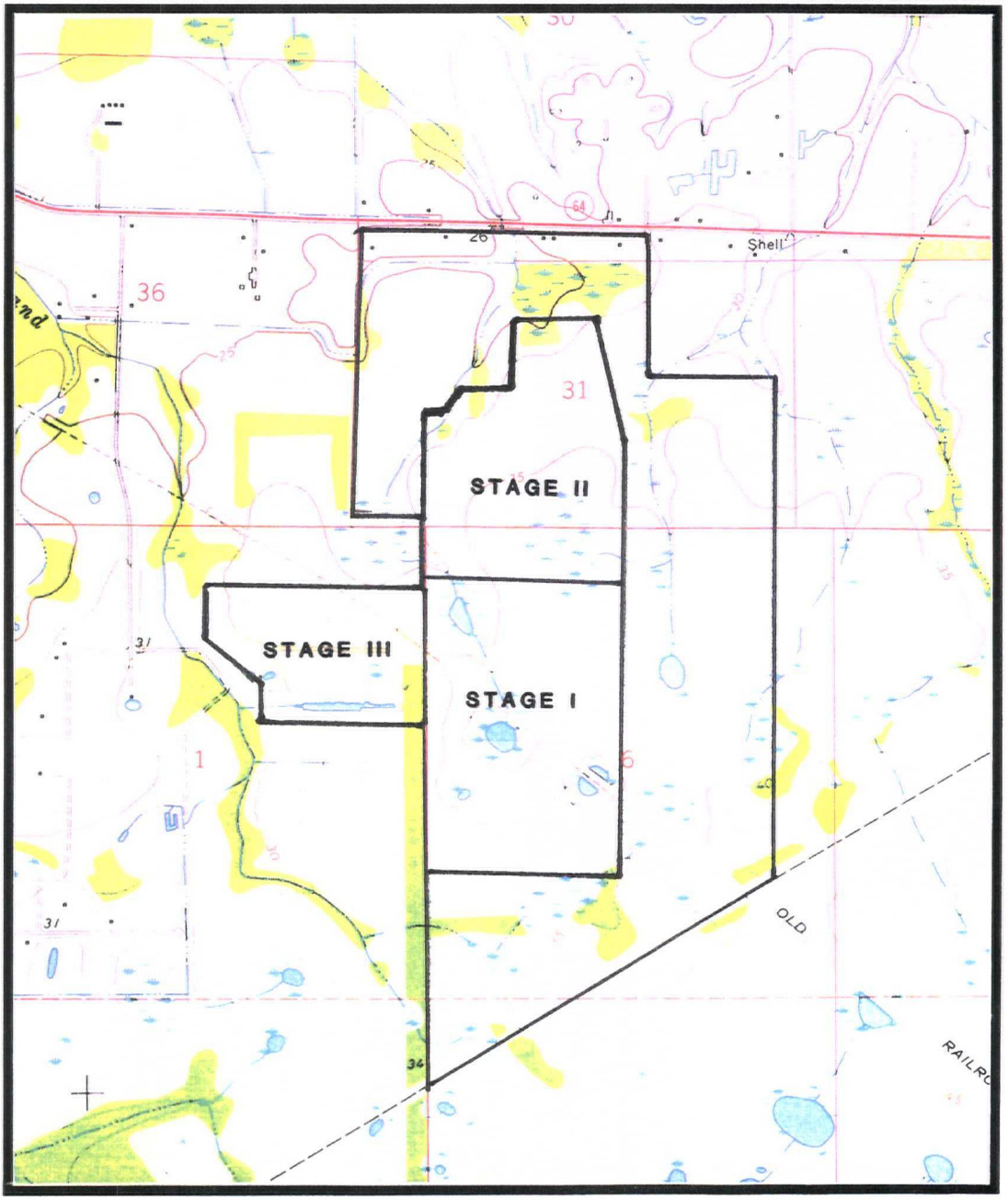
United States Department of Agriculture Soil Conservation Service, Soil Survey of Manatee County Florida, Issued April 1983.

APPENDICES

APPENDIX A

FIGURES

APPROXIMATE SITE LOCATION



NOTE: THIS MAP TAKEN FROM USGS QUADRANGLE MAP

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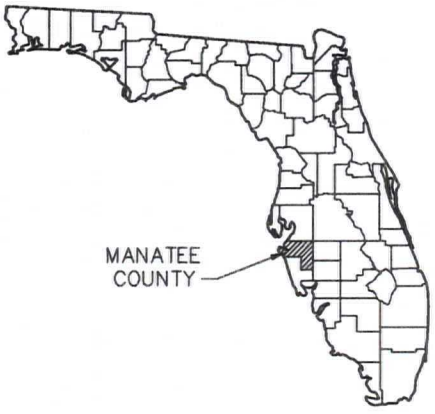
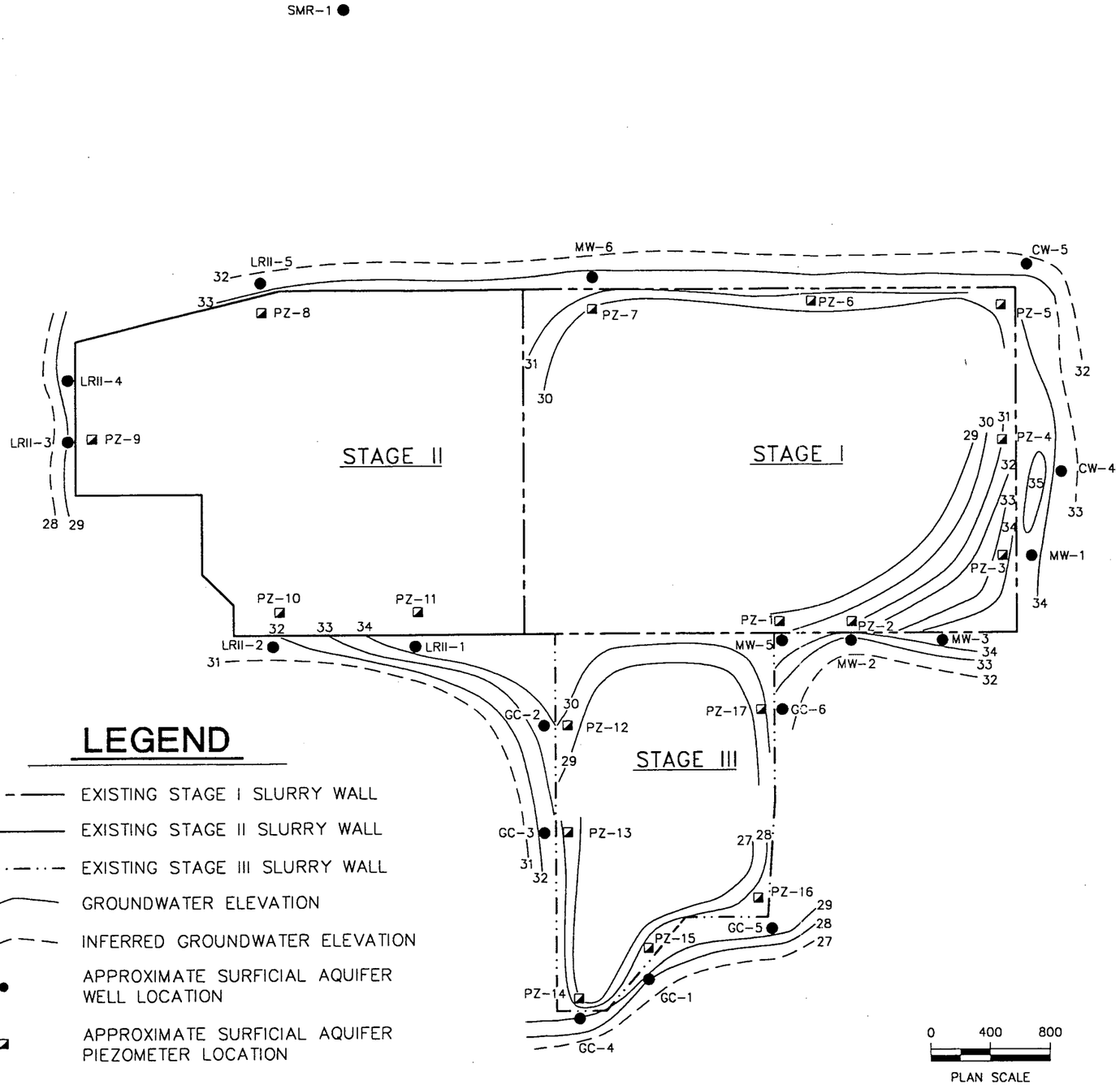
DATE: 1973
SECTION 1, TOWNSHIP 35 SOUTH, RANGE 18 EAST
SECTION 6 AND 7, TOWNSHIP 35 SOUTH, RANGE 19 EAST
SECTION 31, TOWNSHIP 34 SOUTH, RANGE 19 EAST



SITE VICINITY MAP
GROUNDWATER MONITORING PLAN ANNUAL EVALUATION
LENA ROAD LANDFILL
11401–11435 N. DALE MABRY HWY.
MANATEE COUNTY, FLORIDA

PROFESSIONAL SERVICE INDUSTRIES, INC.
13700 58th STREET NORTH
SUITE 207
CLEARWATER, FLORIDA 34620

DRAWN BY: KT	SCALE: 1" = 2000'	PROJ. NO.: 378–4L015
CHKD. BY:	DATE: 9/01/94	DWG.: FIGURE 1



LEGEND

- EXISTING STAGE I SLURRY WALL
- EXISTING STAGE II SLURRY WALL
- EXISTING STAGE III SLURRY WALL
- GROUNDWATER ELEVATION
- INFERRED GROUNDWATER ELEVATION
- APPROXIMATE SURFICIAL AQUIFER WELL LOCATION
- APPROXIMATE SURFICIAL AQUIFER PIEZOMETER LOCATION

0 400 800

PLAN SCALE

MONITOR WELL	G.W. ELEV. IN FEET
STAGE I	
MW-1	34.18
MW-2	32.11
MW-3	34.74
MW-5	N/A
MW-6	33.82
CW-4	34.96
CW-5	32.04
PZ-1	29.62
PZ-2	30.28
PZ-3	33.18
PZ-4	30.25
PZ-5	30.50
PZ-6	31.75
PZ-7	30.06
STAGE II	
LRII-1	34.25
LRII-2	31.86
LRII-3	28.51
LRII-4	29.02
LRII-5	32.57
PZ-8	N/A
PZ-9	N/A
PZ-10	N/A
PZ-11	N/A
STAGE III	
GC-1	27.15
GC-2	33.81
GC-3	32.18
GC-4	28.90
GC-5	29.44
GC-6	32.14
PZ-12	29.39
PZ-13	27.82
PZ-14	26.97
PZ-15	28.01
PZ-16	28.51
PZ-17	29.36

QUARTER 3, 1992-GROUNDWATER ELEVATION MAP

DRAWN	KT
CHECKED	LAR
APPROVED	AB
SCALE	NOTED

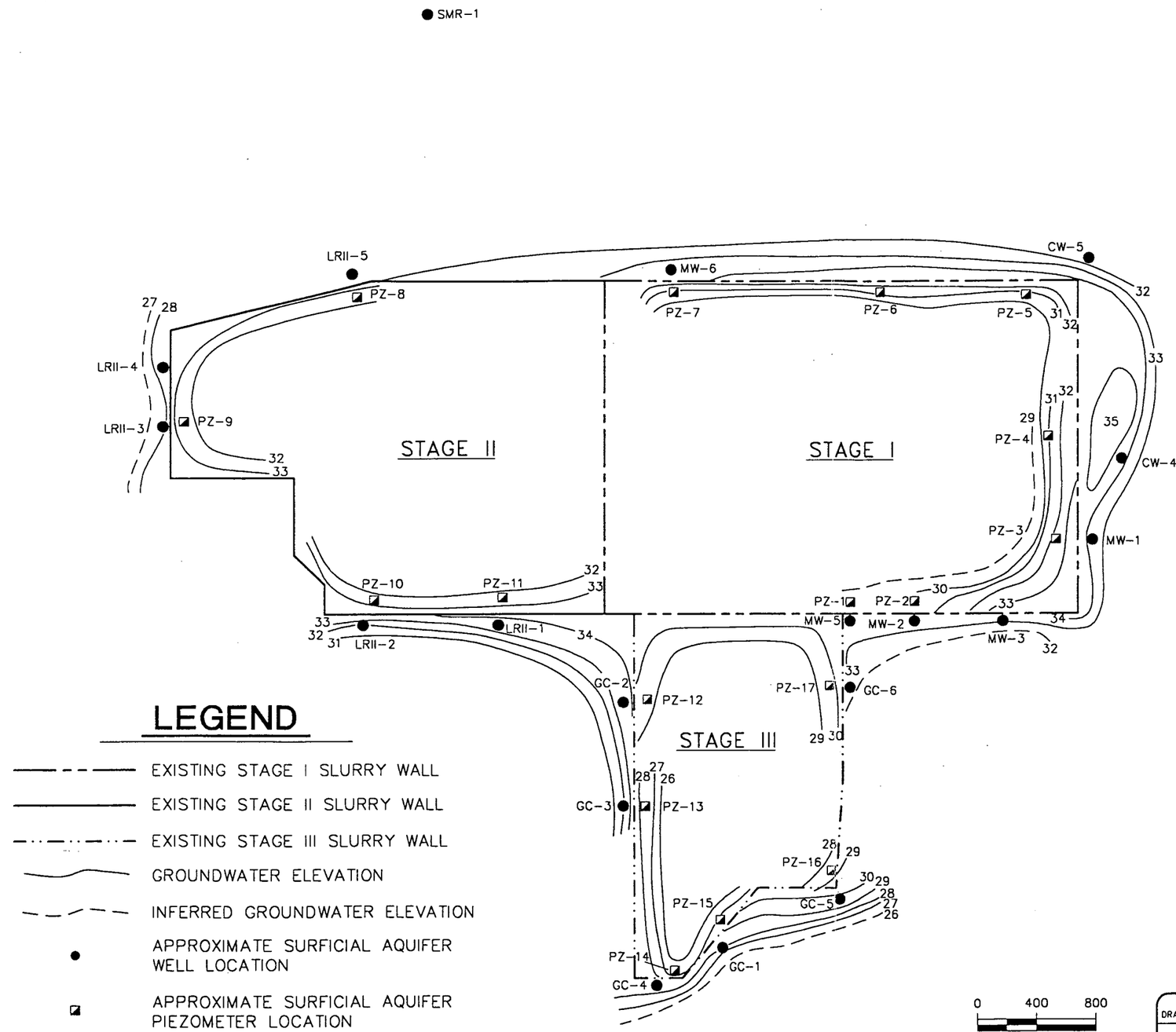
GROUNDWATER MONITORING ANNUAL EVALUATION

LENA ROAD LANDFILL

MANATEE COUNTY, FLORIDA

Jammal & Associates, Inc.
A Division of Professional Service Industries, Inc.

DATE	PROJ. NO.	
APR 94	378-4L015	FIGURE 3



MONITOR WELL	G.W. ELEV. IN FEET
STAGE I	
MW-1	33.05
MW-2	35.42
MW-3	33.42
MW-5	N/A
MW-6	33.53
CW-4	34.62
CW-5	31.29
PZ-1	29.62
PZ-2	30.34
PZ-3	32.49
PZ-4	30.35
PZ-5	30.50
PZ-6	31.41
PZ-7	30.31
STAGE II	
LRII-1	33.86
LRII-2	31.72
LRII-3	27.88
LRII-4	28.36
LRII-5	31.84
PZ-8	32.34
PZ-9	32.35
PZ-10	32.32
PZ-11	32.31
STAGE III	
GC-1	26.99
GC-2	33.50
GC-3	31.23
GC-4	28.23
GC-5	29.02
GC-6	32.27
PZ-12	29.21
PZ-13	27.51
PZ-14	26.59
PZ-15	27.37
PZ-16	28.38
PZ-17	29.11

LEGEND

- EXISTING STAGE I SLURRY WALL
- EXISTING STAGE II SLURRY WALL
- EXISTING STAGE III SLURRY WALL
- GROUNDWATER ELEVATION
- INFERRED GROUNDWATER ELEVATION
- APPROXIMATE SURFICIAL AQUIFER WELL LOCATION
- APPROXIMATE SURFICIAL AQUIFER PIEZOMETER LOCATION

QUARTER 1, 1993-GROUNDWATER ELEVATION MAP

DRAWN	KT
CHECKED	LAR
APPROVED	AB
SCALE	NOTED

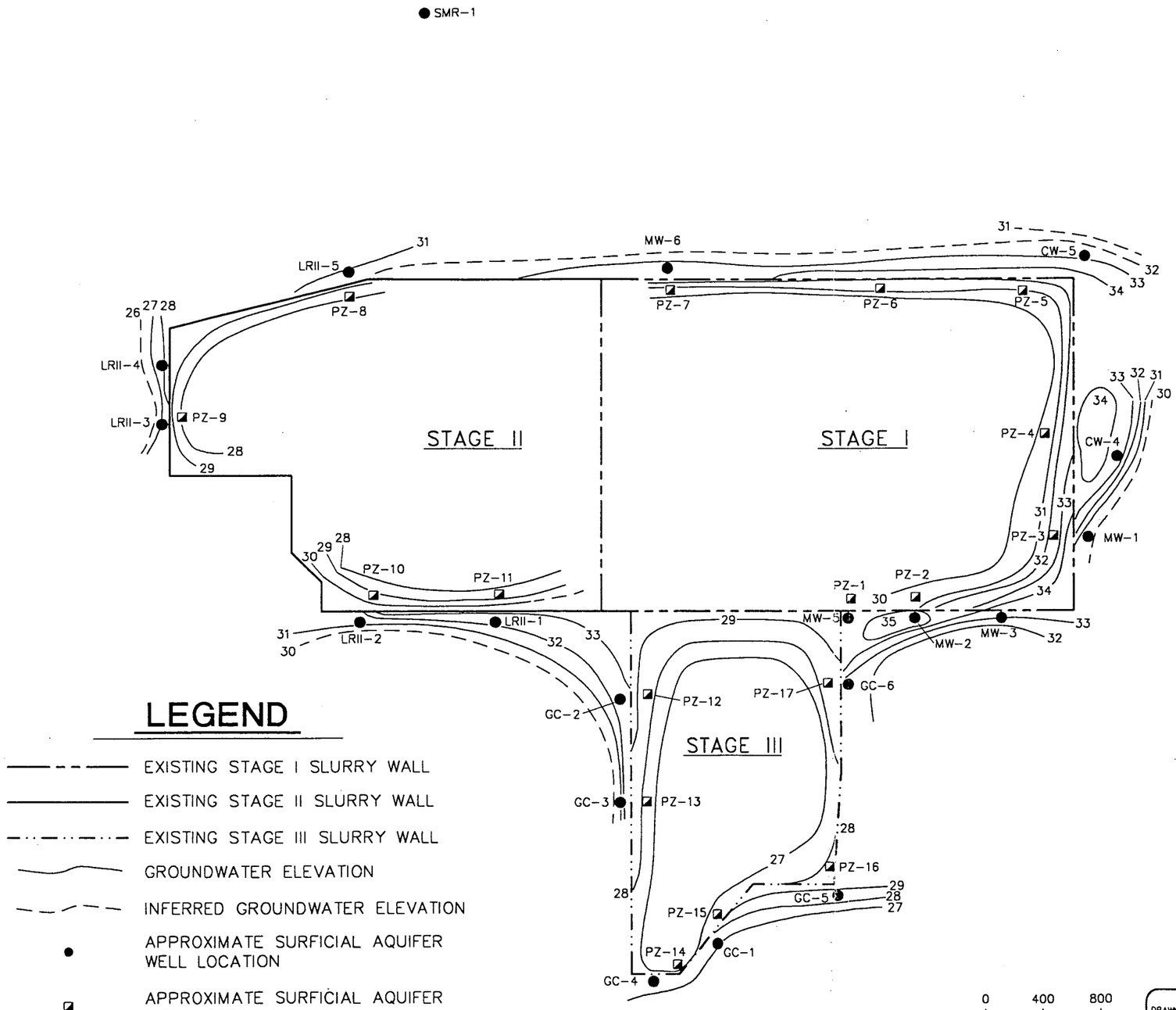
GROUNDWATER MONITORING ANNUAL EVALUATION

LENA ROAD LANDFILL

MANATEE COUNTY, FLORIDA

psi **Jammal & Associates, Inc.**
A Division of Professional Service Industries, Inc.

DATE	PROJ. NO.	
APR 94	378-4L015	FIGURE 4



MONITOR WELL	G.W. ELEV. IN FEET
STAGE I	
MW-1	30.05
MW-2	35.10
MW-3	32.28
MW-5	N/A
MW-6	33.16
CW-4	33.87
CW-5	32.40
PZ-1	DESTROYED
PZ-2	30.37
PZ-3	33.51
PZ-4	30.21
PZ-5	30.36
PZ-6	31.45
PZ-7	30.15
STAGE II	
LRII-1	32.42
LRII-2	30.86
LRII-3	26.93
LRII-4	27.48
LRII-5	31.20
PZ-8	28.96
PZ-9	28.77
PZ-10	29.02
PZ-11	28.52
STAGE III	
GC-1	26.65
GC-2	32.73
GC-3	30.16
GC-4	27.94
GC-5	28.81
GC-6	32.37
PZ-12	28.81
PZ-13	27.32
PZ-14	26.31
PZ-15	27.35
PZ-16	28.07
PZ-17	28.99

LEGEND

- EXISTING STAGE I SLURRY WALL
- EXISTING STAGE II SLURRY WALL
- EXISTING STAGE III SLURRY WALL
- GROUNDWATER ELEVATION
- INFERRED GROUNDWATER ELEVATION
- APPROXIMATE SURFICIAL AQUIFER WELL LOCATION
- APPROXIMATE SURFICIAL AQUIFER PIEZOMETER LOCATION

0 400 800

PLAN SCALE

QUARTER 2, 1993-GROUNDWATER ELEVATION MAP

DRAWN	KT
CHECKED	LAR
APPROVED	AB
SCALE	NOTED

GROUNDWATER MONITORING ANNUAL EVALUATION

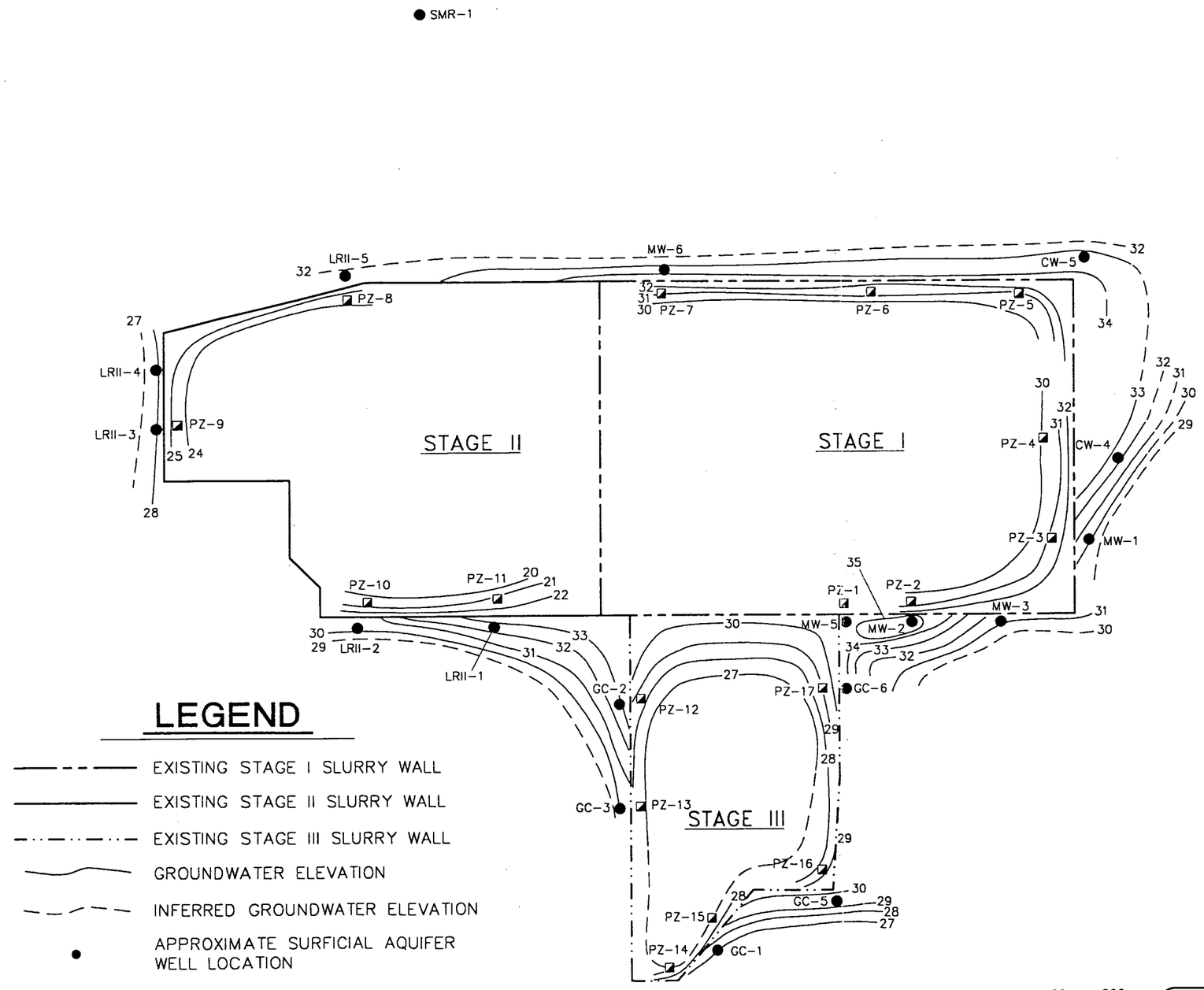
LENA ROAD LANDFILL

MANATEE COUNTY, FLORIDA

psi **Jammal & Associates, Inc.**

A Division of Professional Service Industries, Inc.

DATE	PROJ. NO.	
APR 94	378-4L015	FIGURE 5



MONITOR WELL	G.W. ELEV. IN FEET
STAGE I	
MW-1	29.43
MW-2	35.35
MW-3	30.74
MW-5	N/A
MW-6	33.94
CW-4	32.79
CW-5	33.60
PZ-1	DESTROYED
PZ-2	30.28
PZ-3	31.81
PZ-4	30.21
PZ-5	30.51
PZ-6	31.37
PZ-7	30.19
STAGE II	
LRII-1	32.10
LRII-2	30.37
LRII-3	27.09
LRII-4	27.32
LRII-5	32.30
PZ-8	24.63
PZ-9	24.64
PZ-10	20.93
PZ-11	21.80
STAGE III	
GC-1	26.61
GC-2	32.19
GC-3	29.79
GC-4	N/A
GC-5	29.60
GC-6	N/A
PZ-12	28.79
PZ-13	27.34
PZ-14	26.39
PZ-15	27.08
PZ-16	28.59
PZ-17	29.19

LEGEND

- EXISTING STAGE I SLURRY WALL
- EXISTING STAGE II SLURRY WALL
- EXISTING STAGE III SLURRY WALL
- GROUNDWATER ELEVATION
- INFERRED GROUNDWATER ELEVATION
- APPROXIMATE SURFICIAL AQUIFER WELL LOCATION
- APPROXIMATE SURFICIAL AQUIFER PIEZOMETER LOCATION

0 400 800

PLAN SCALE

QUARTER 3, 1993-GROUNDWATER ELEVATION MAP

DRAWN	KT
CHECKED	LAR
APPROVED	AB
SCALE	NOTED

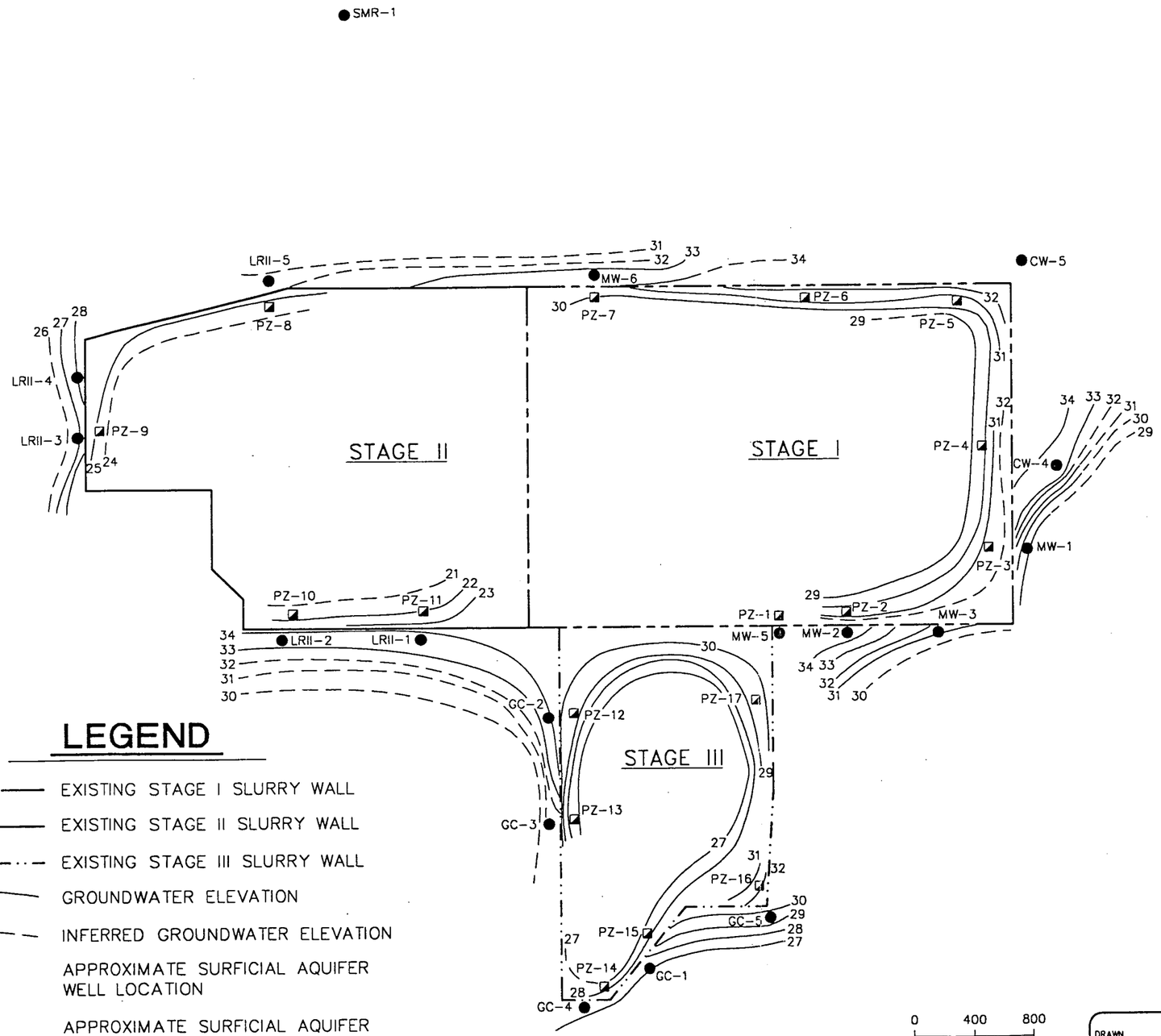
GROUNDWATER MONITORING ANNUAL EVALUATION

LENA ROAD LANDFILL

MANATEE COUNTY, FLORIDA

psi **Jammal & Associates, Inc.**
A Division of Professional Service Industries, Inc.

DATE	PROJ. NO.	
APR 94	378-4L015	FIGURE 6



MONITOR WELL	G.W. ELEV. IN FEET
STAGE I	
MW-1	28.99
MW-2	34.85
MW-3	30.57
MW-5	N/A
MW-6	33.78
CW-4	33.38
CW-5	DESTROYED
PZ-1	DESTROYED
PZ-2	30.37
PZ-3	31.18
PZ-4	29.05
PZ-5	30.51
PZ-6	31.39
PZ-7	29.94
STAGE II	
LRII-1	33.50
LRII-2	33.53
LRII-3	26.93
LRII-4	27.32
LRII-5	31.11
PZ-8	24.36
PZ-9	24.49
PZ-10	21.89
PZ-11	22.32
STAGE III	
GC-1	26.99
GC-2	33.07
GC-3	30.77
GC-4	28.90
GC-5	29.44
GC-6	N/A
PZ-12	29.39
PZ-13	27.63
PZ-14	26.66
PZ-15	27.78
PZ-16	31.59
PZ-17	29.32

LEGEND

- EXISTING STAGE I SLURRY WALL
- EXISTING STAGE II SLURRY WALL
- EXISTING STAGE III SLURRY WALL
- GROUNDWATER ELEVATION
- INFERRED GROUNDWATER ELEVATION
- APPROXIMATE SURFICIAL AQUIFER WELL LOCATION
- APPROXIMATE SURFICIAL AQUIFER PIEZOMETER LOCATION

0 400 800

PLAN SCALE

QUARTER 4, 1993-GROUNDWATER ELEVATION MAP

DRAWN	KT
CHECKED	LAR
APPROVED	AB
SCALE	NOTED

GROUNDWATER MONITORING ANNUAL EVALUATION

LENA ROAD LANDFILL

MANATEE COUNTY, FLORIDA

Jammal & Associates, Inc.

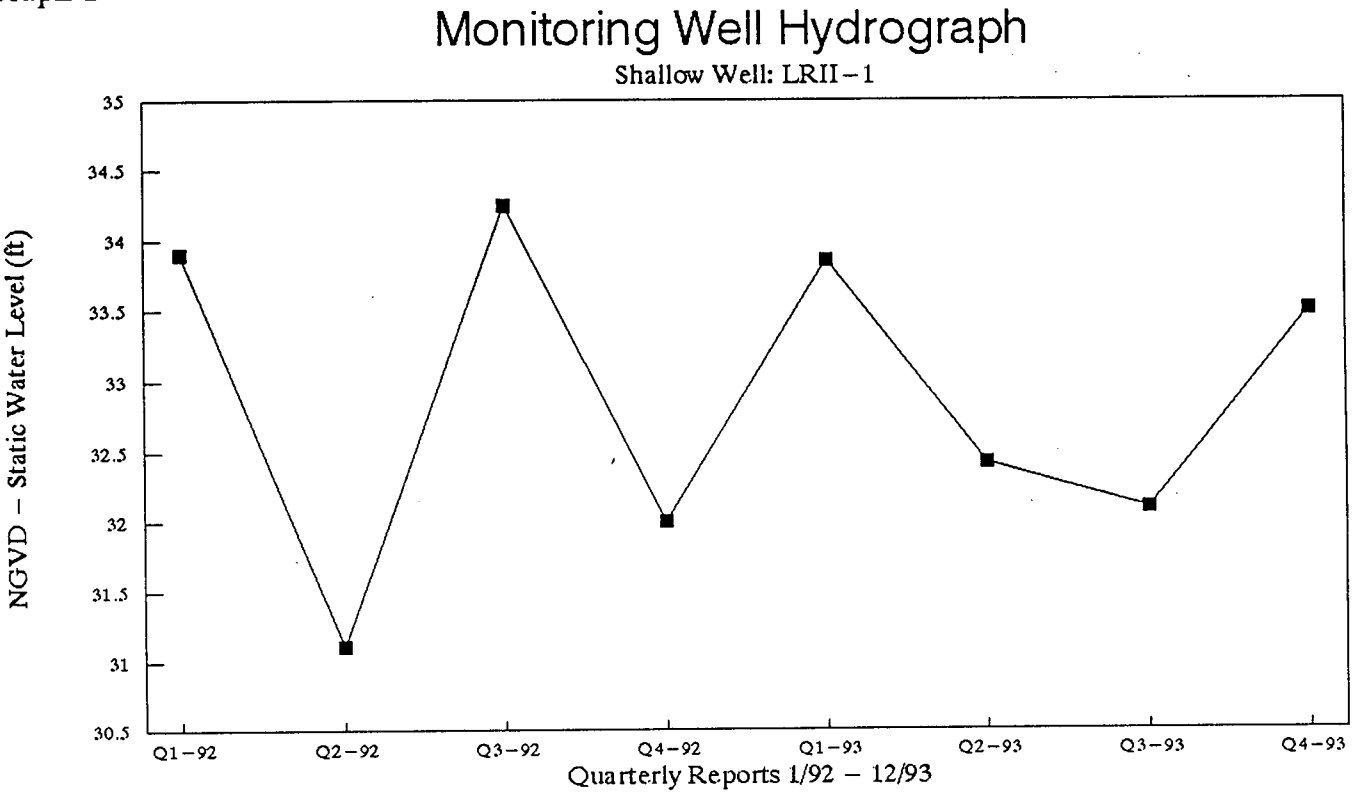
A Division of Professional Service Industries, Inc.

DATE	PROJ. NO.	
APR 94	378-4L015	FIGURE 7

APPENDIX B

MONITORING WELL HYDROGRAPHS

Graph 1



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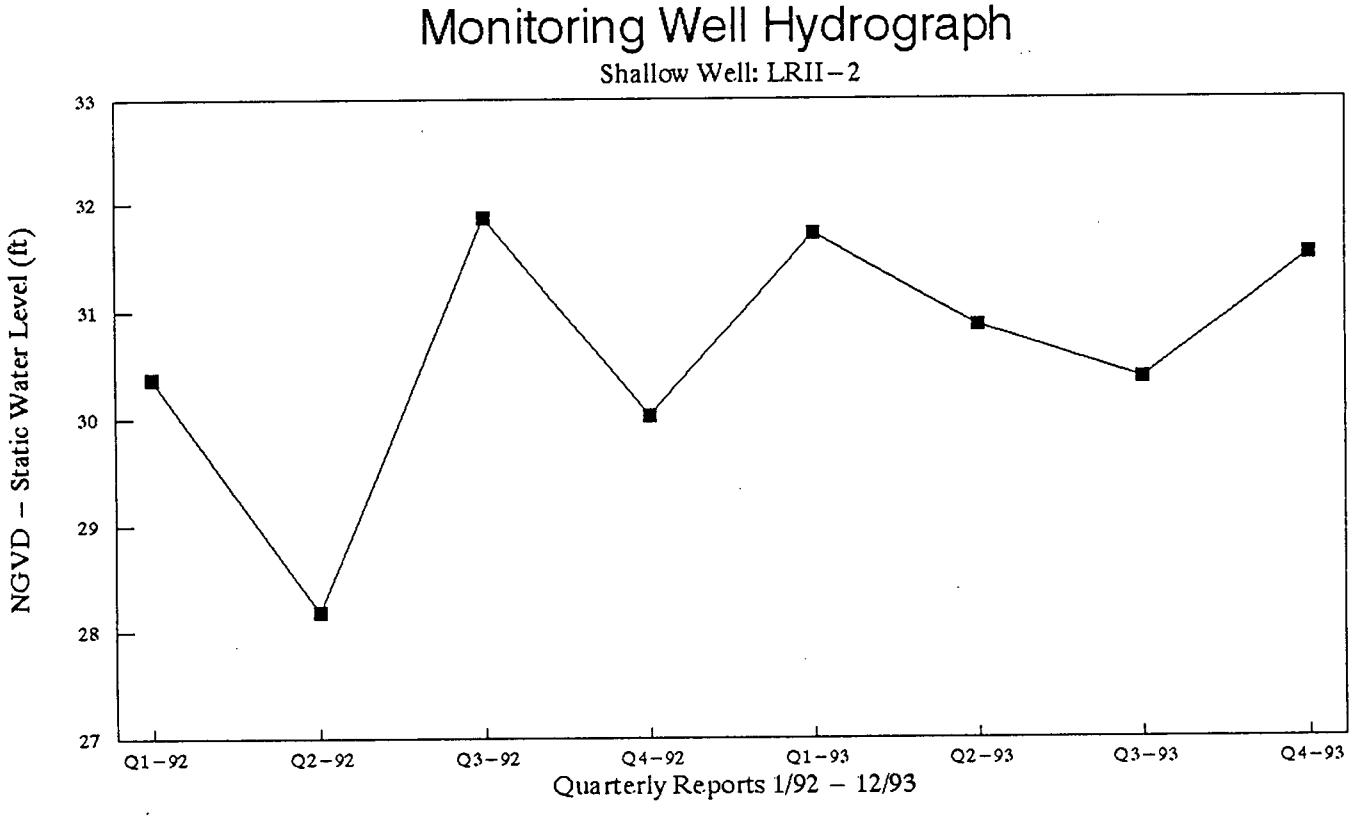
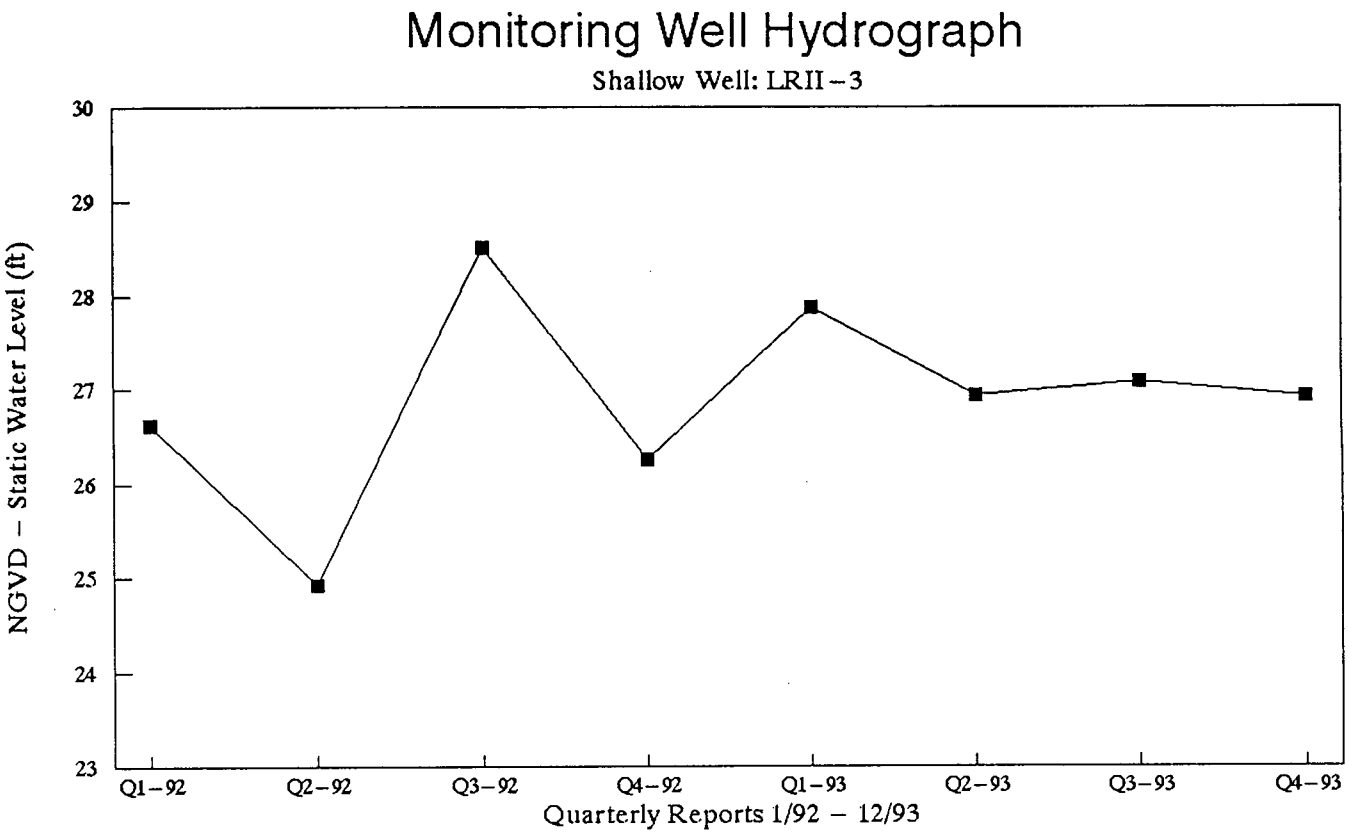
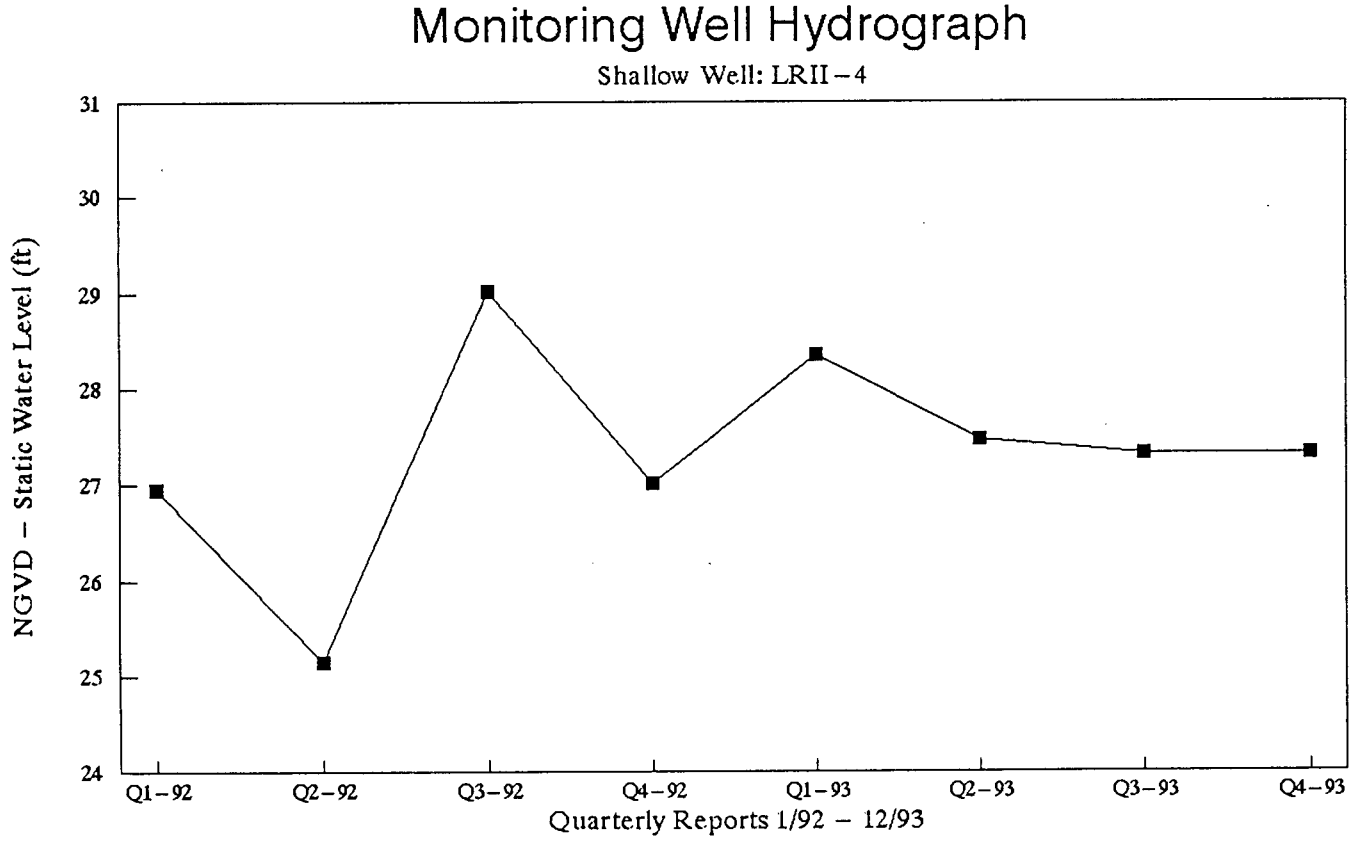


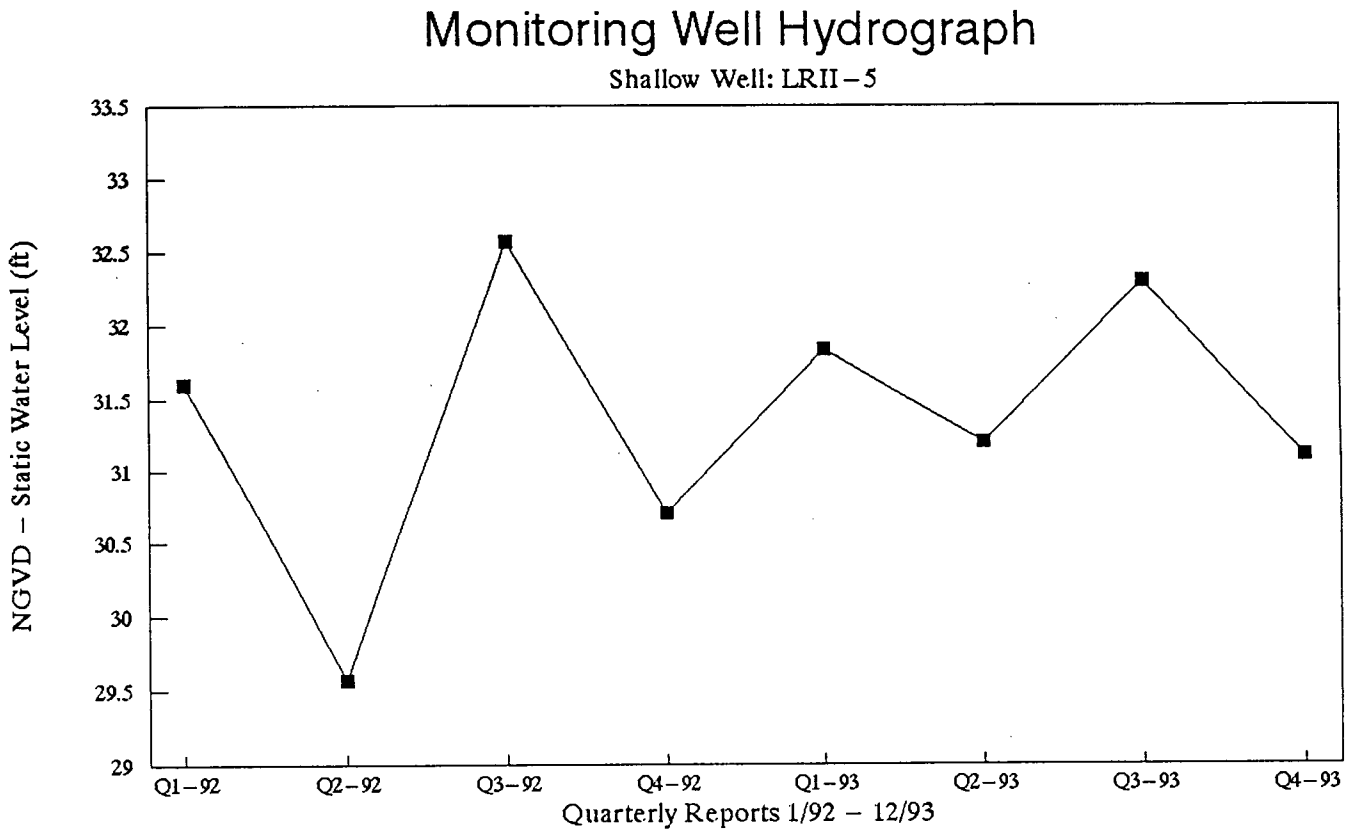
Graph 3



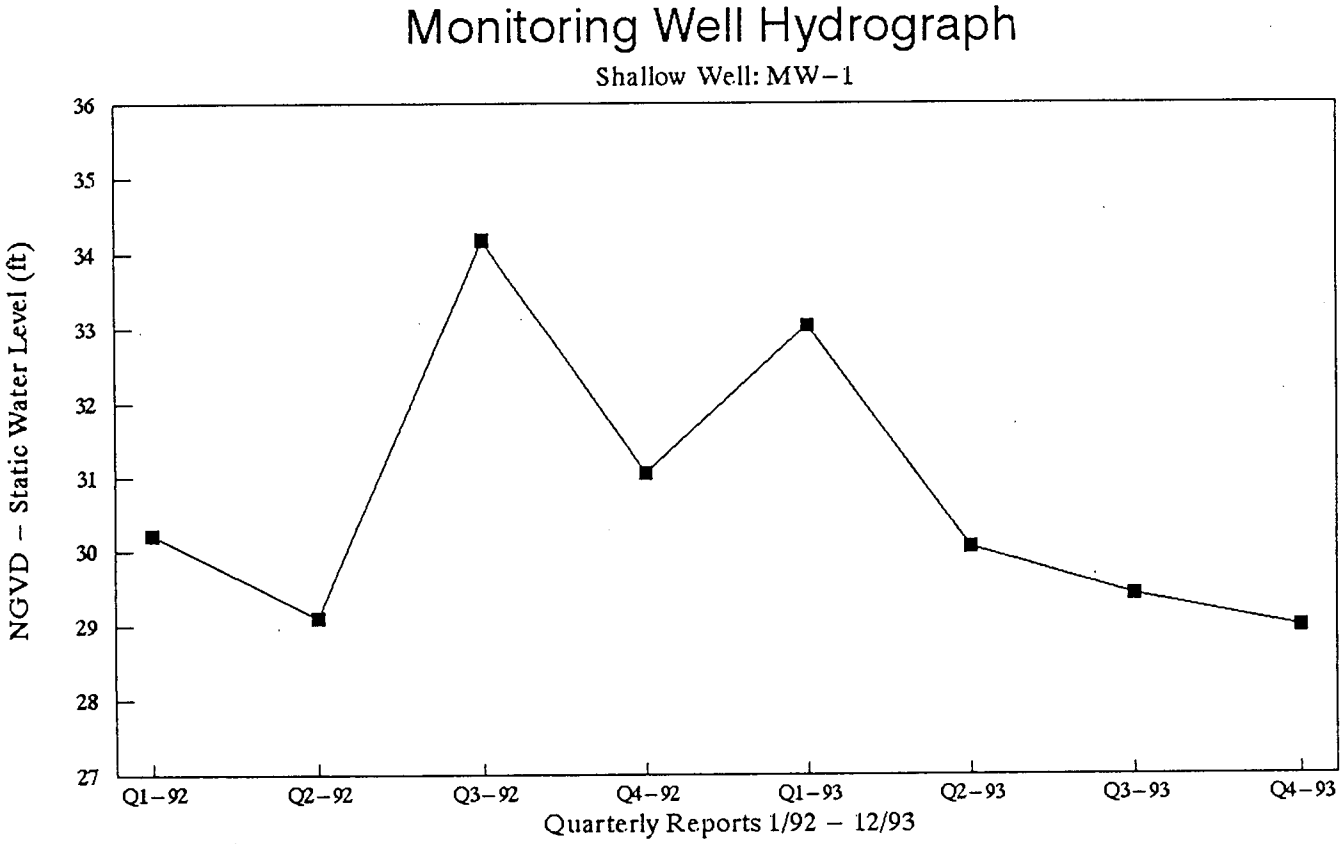
Graph 4



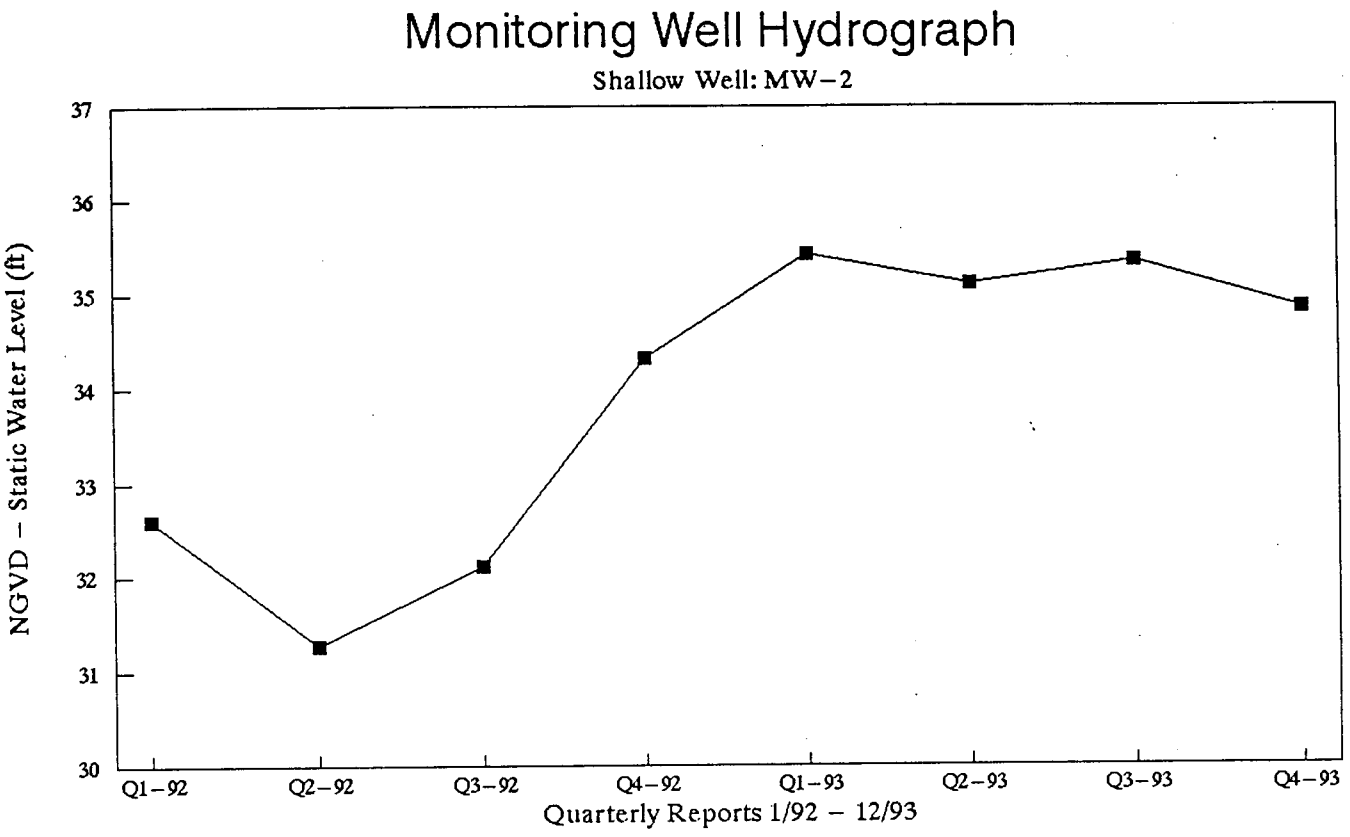
Graph 5



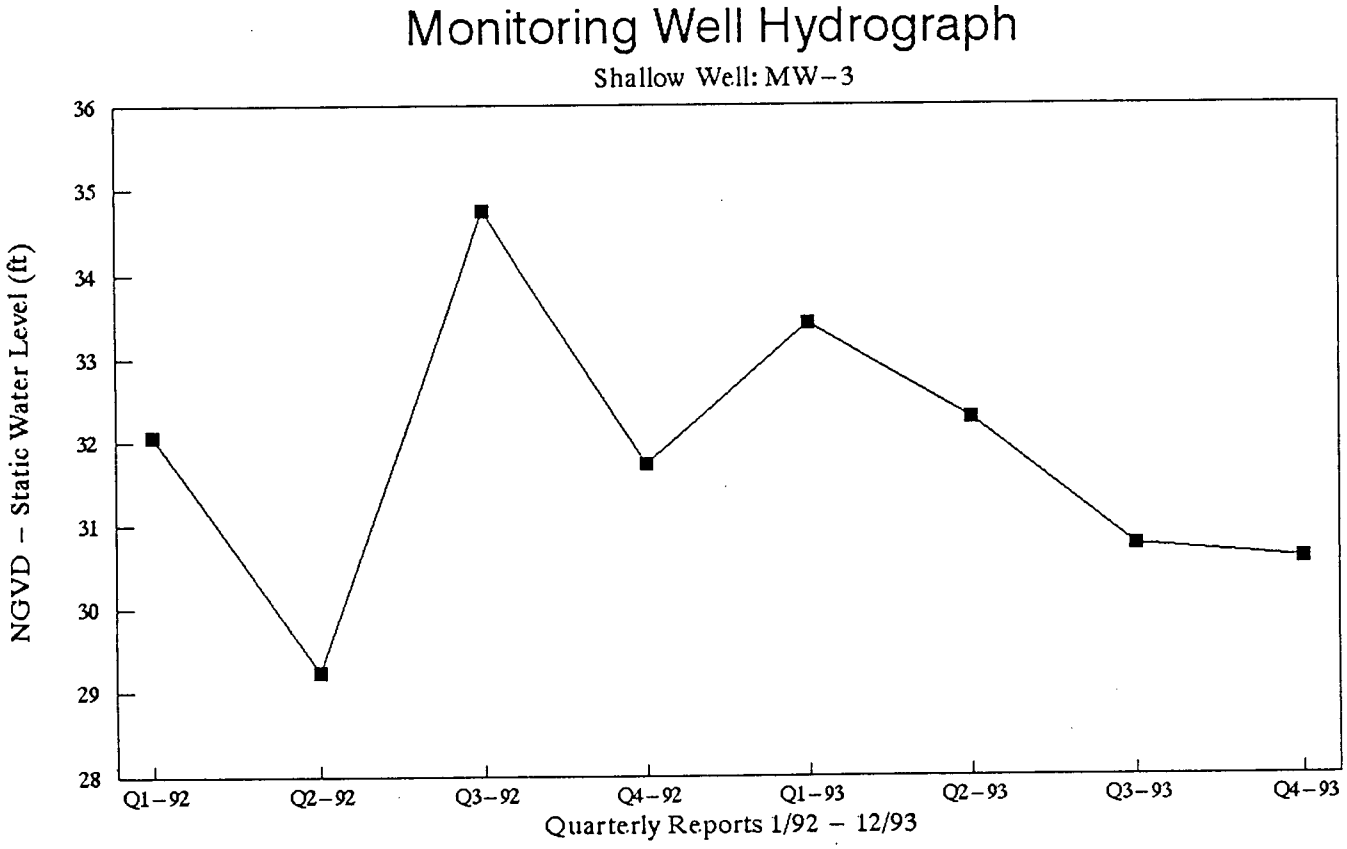
Graph 6



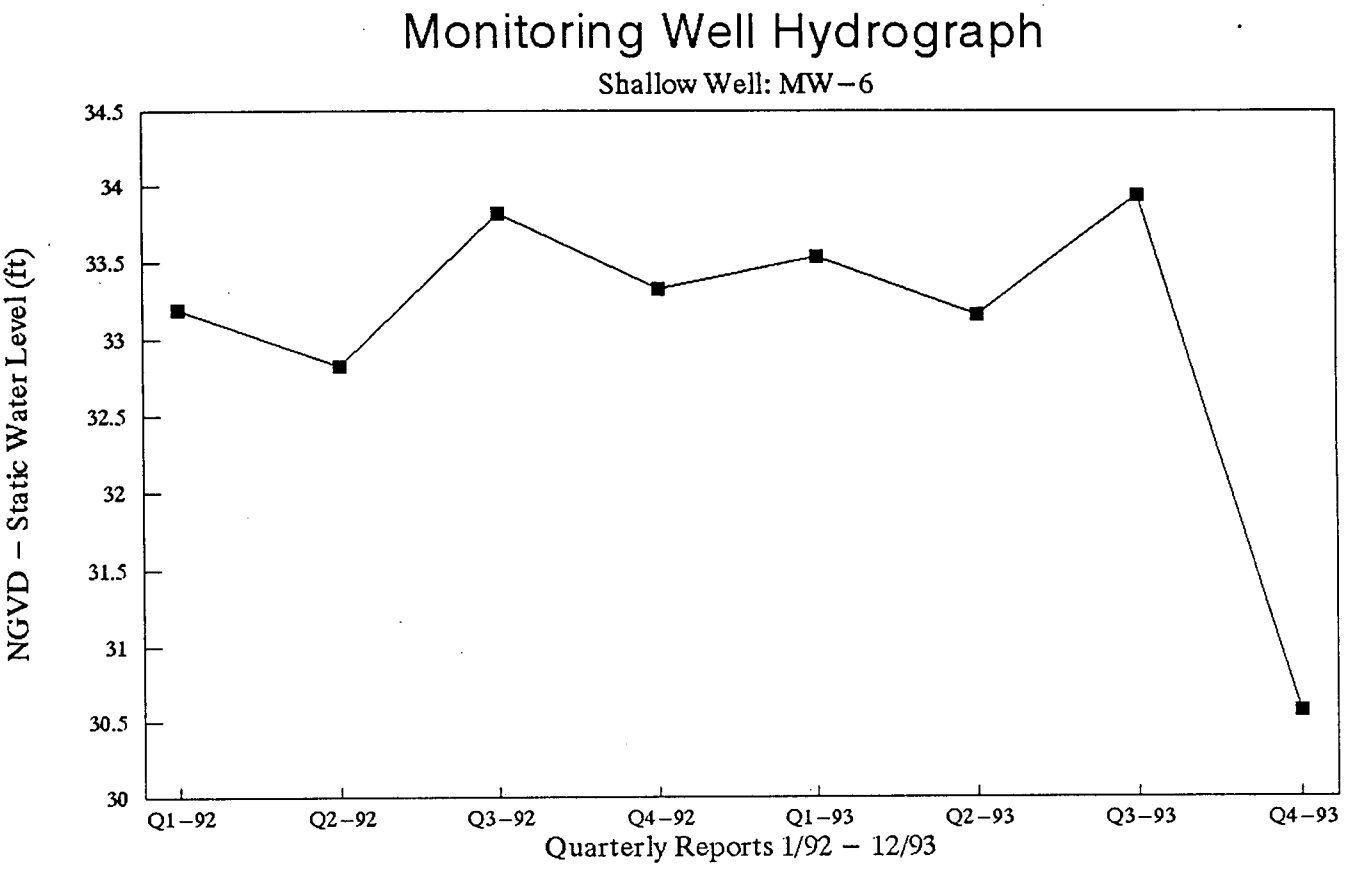
Graph 7



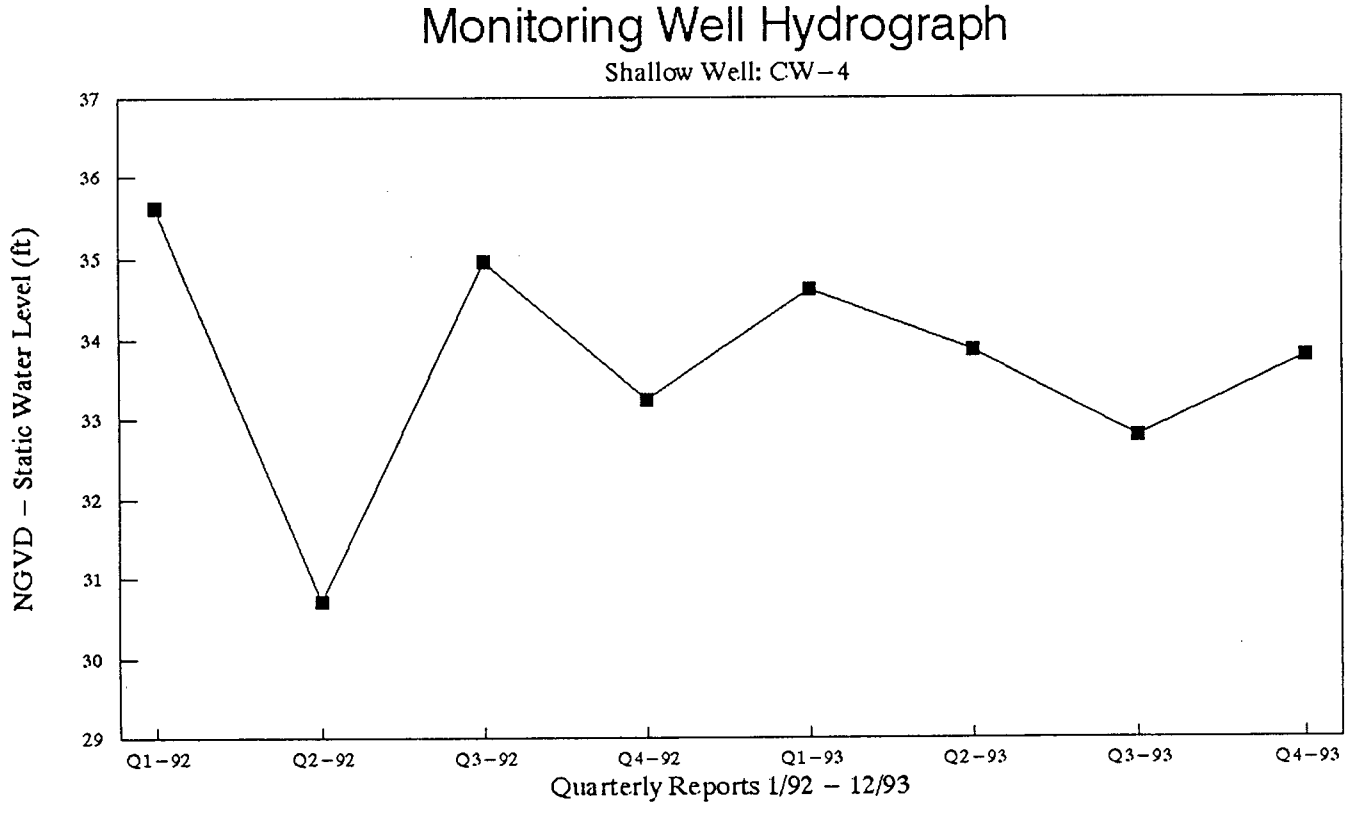
Graph 8



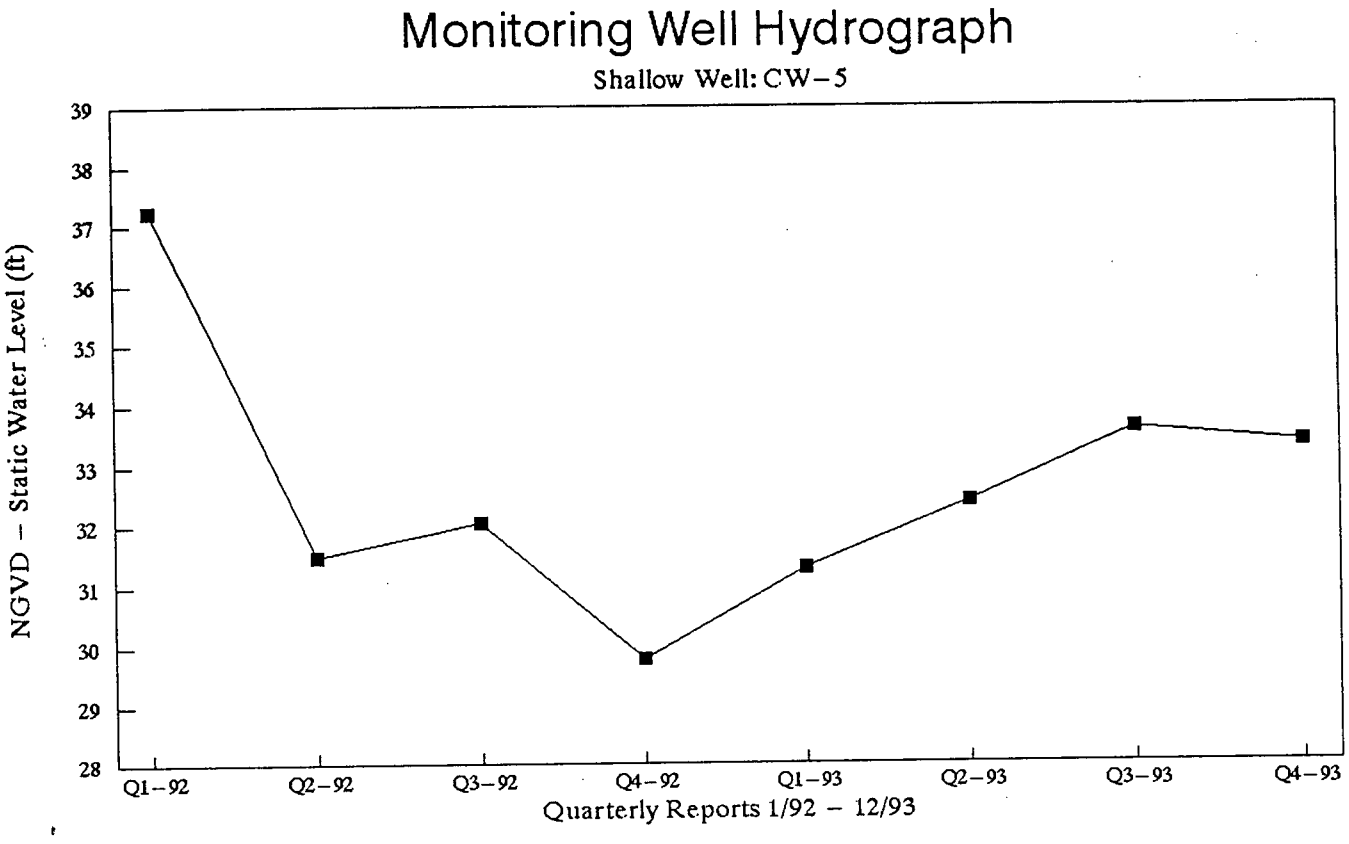
Graph 9



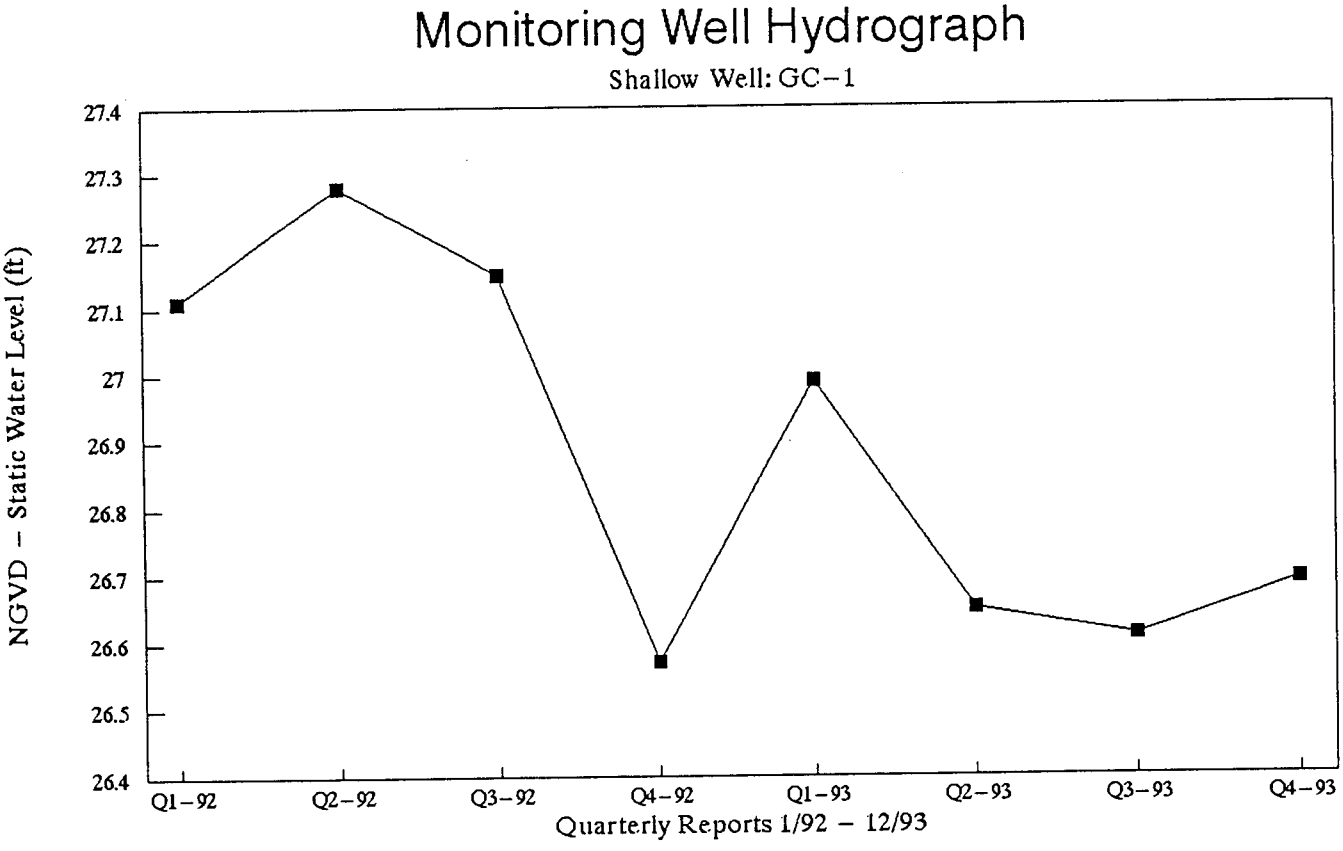
Graph 10



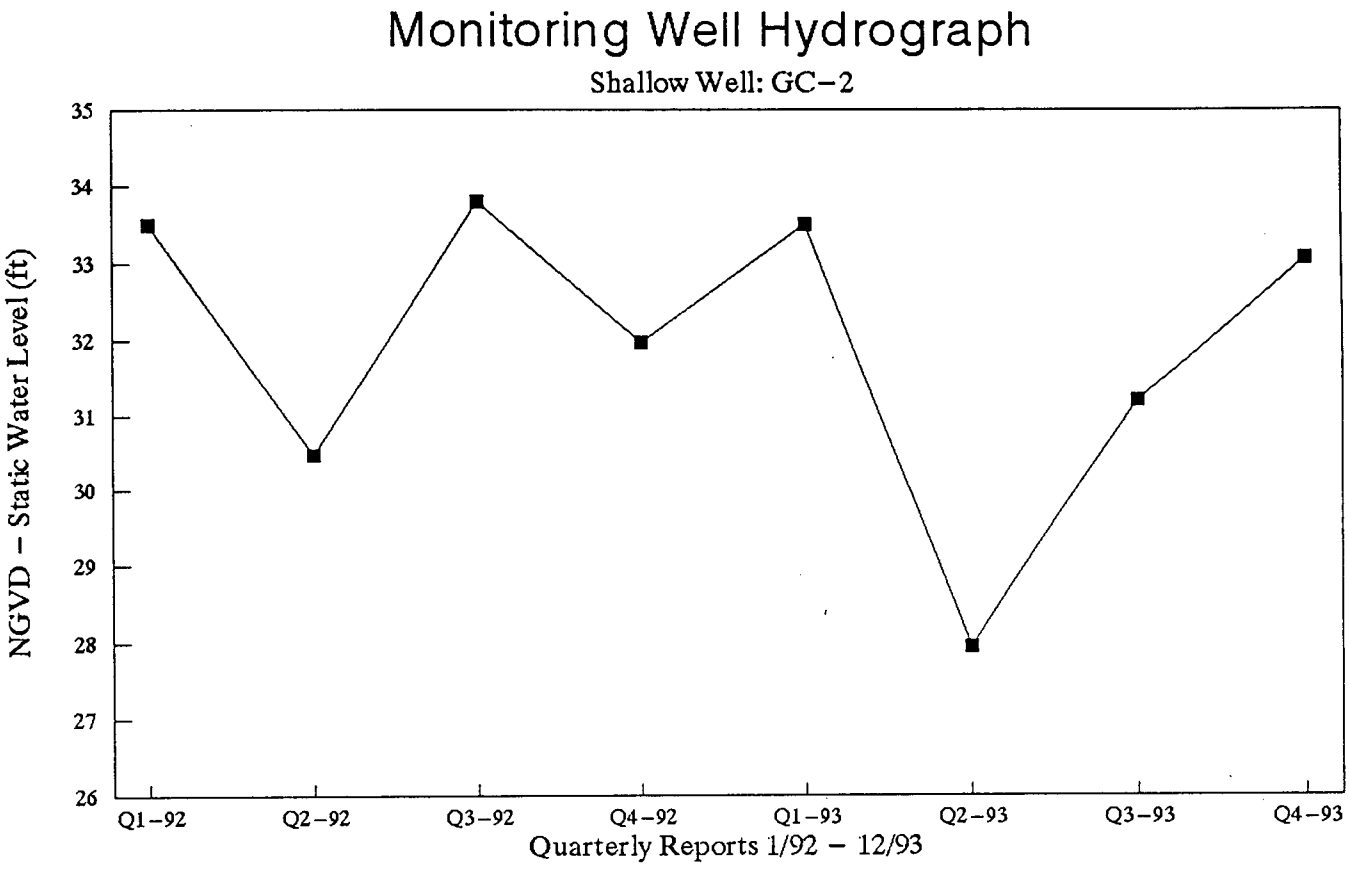
Graph 11



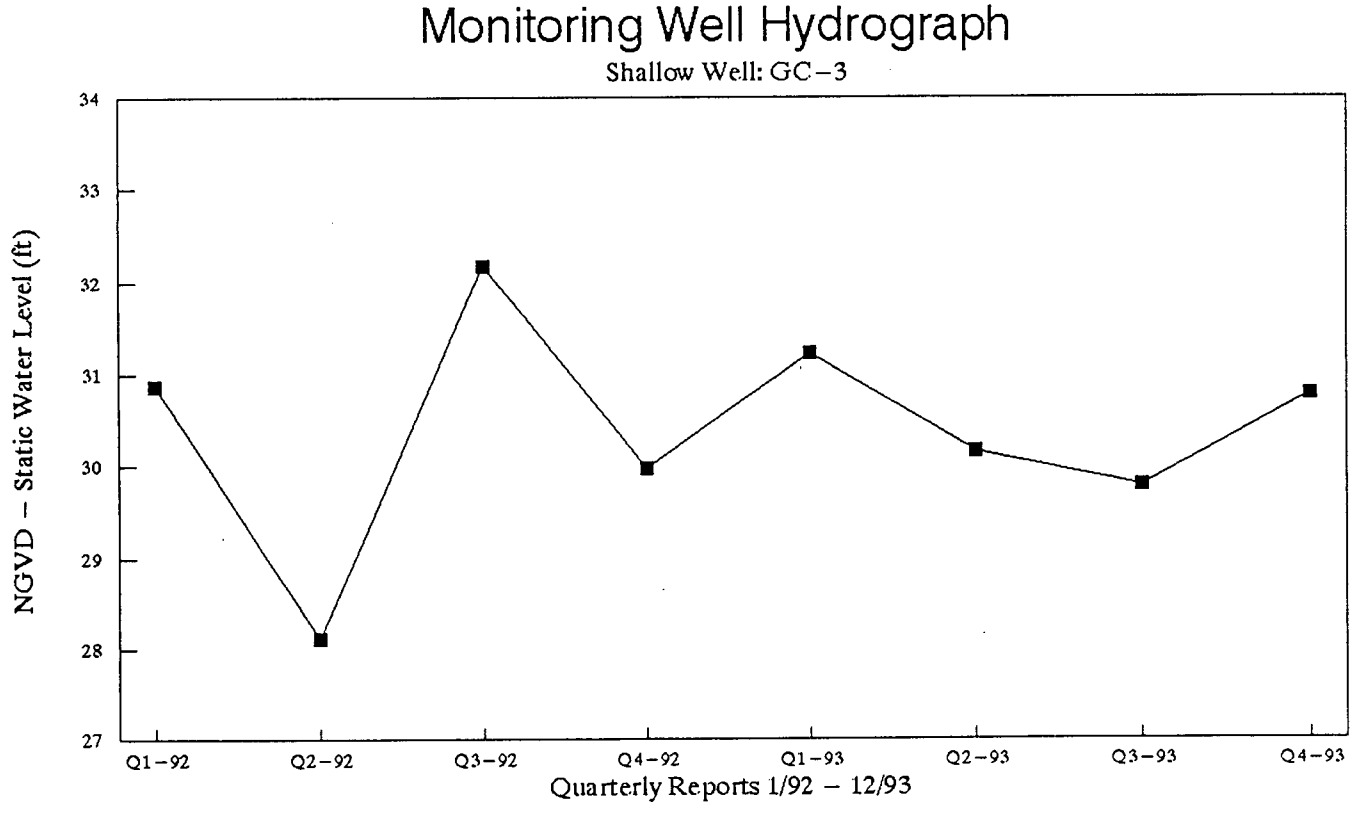
Graph 12



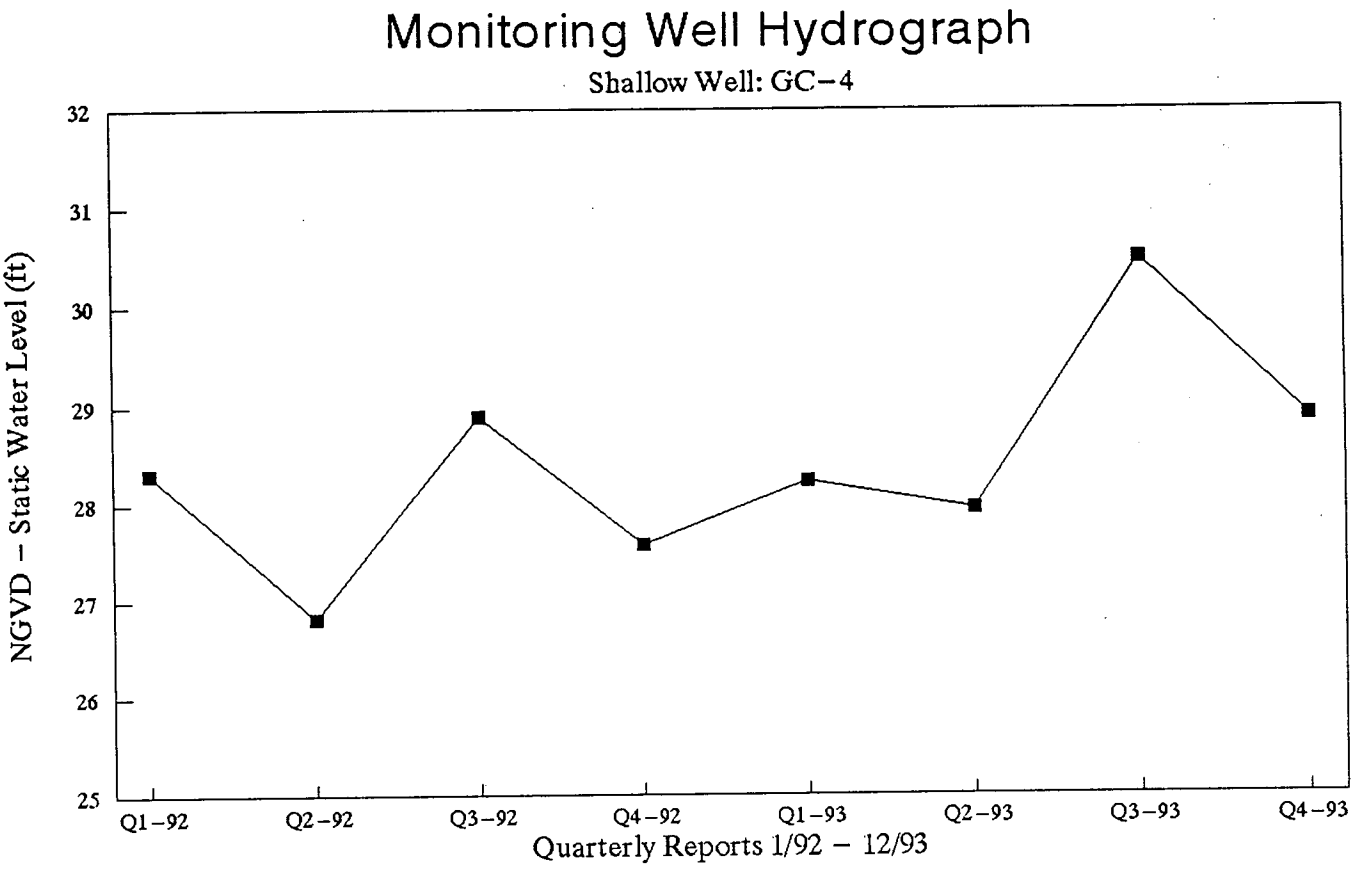
Graph 13



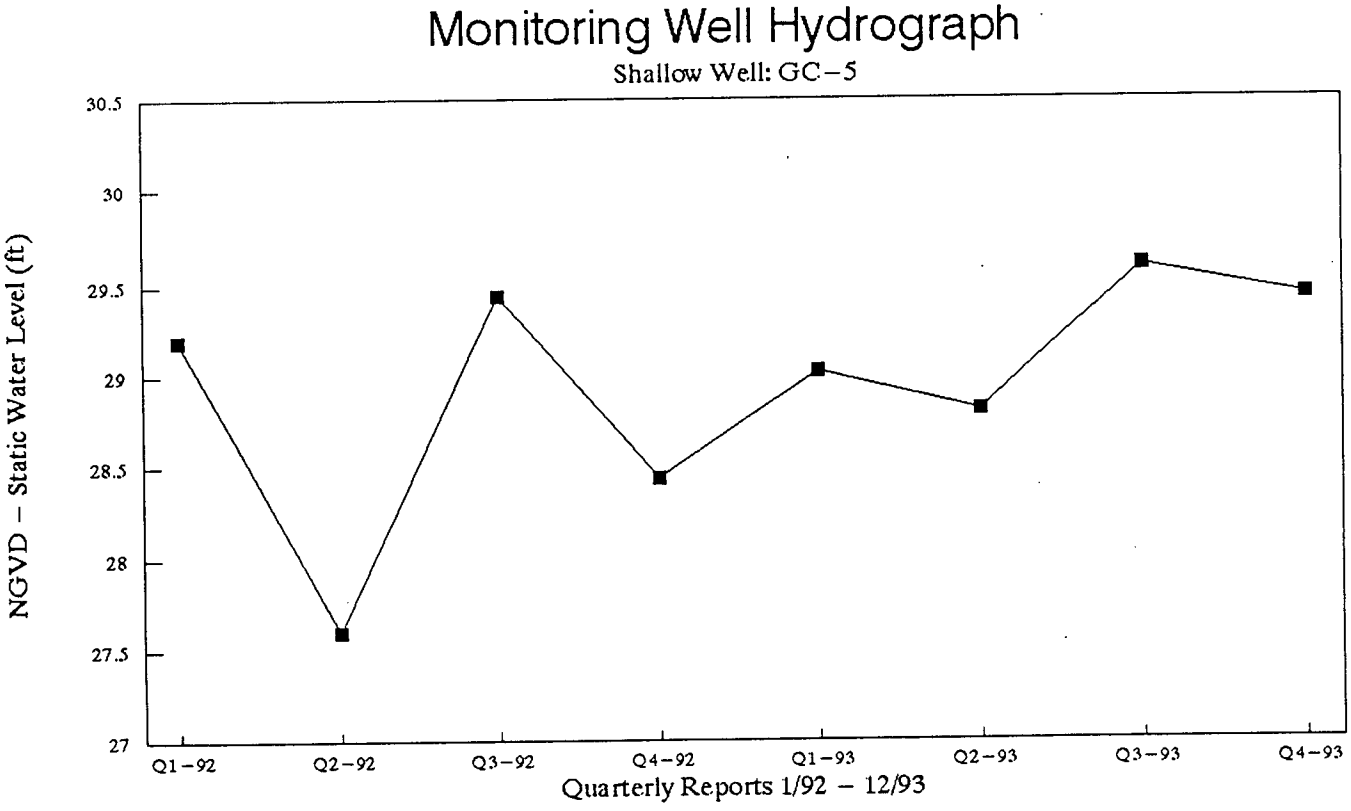
Graph 14



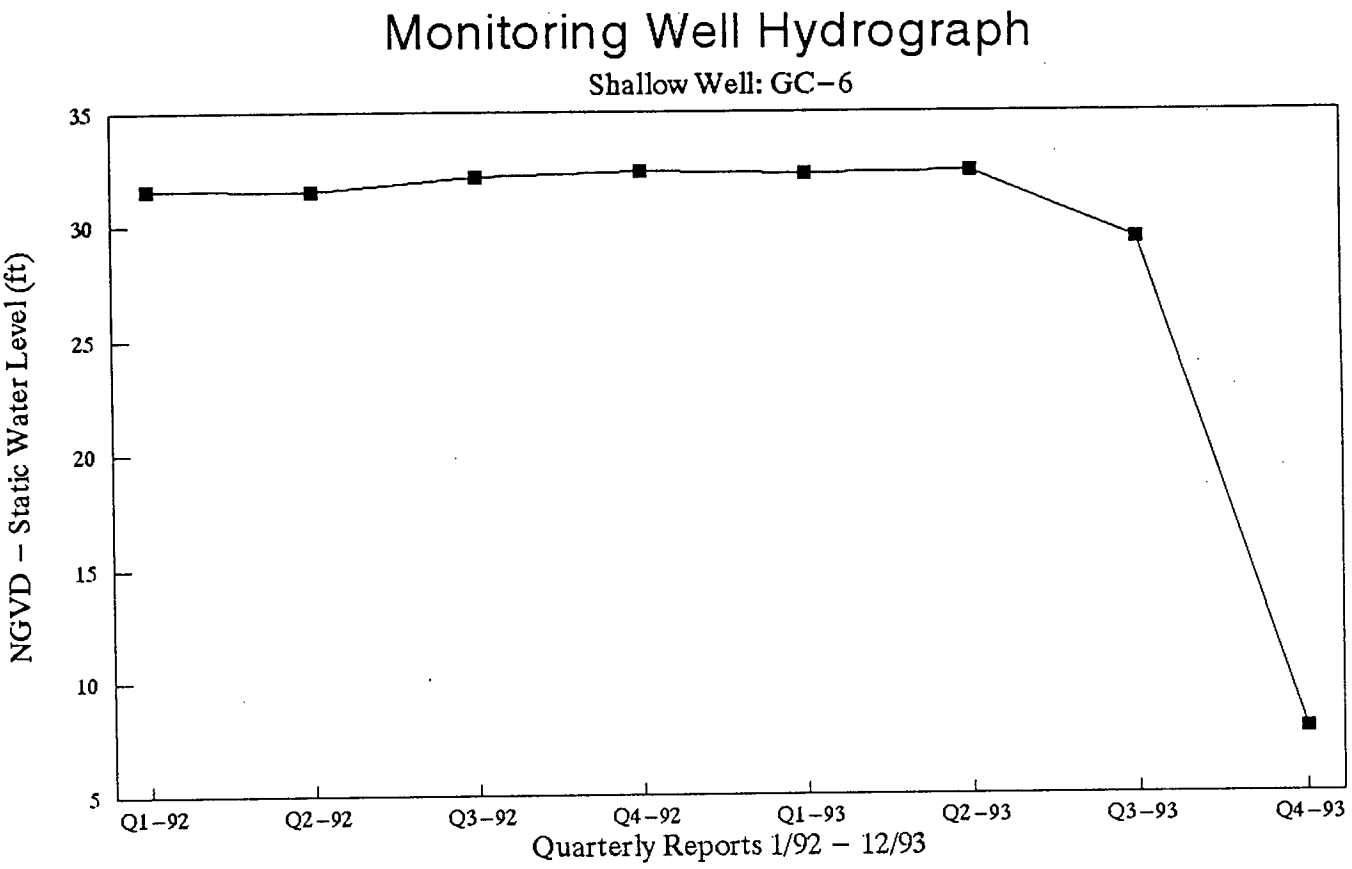
Graph 15



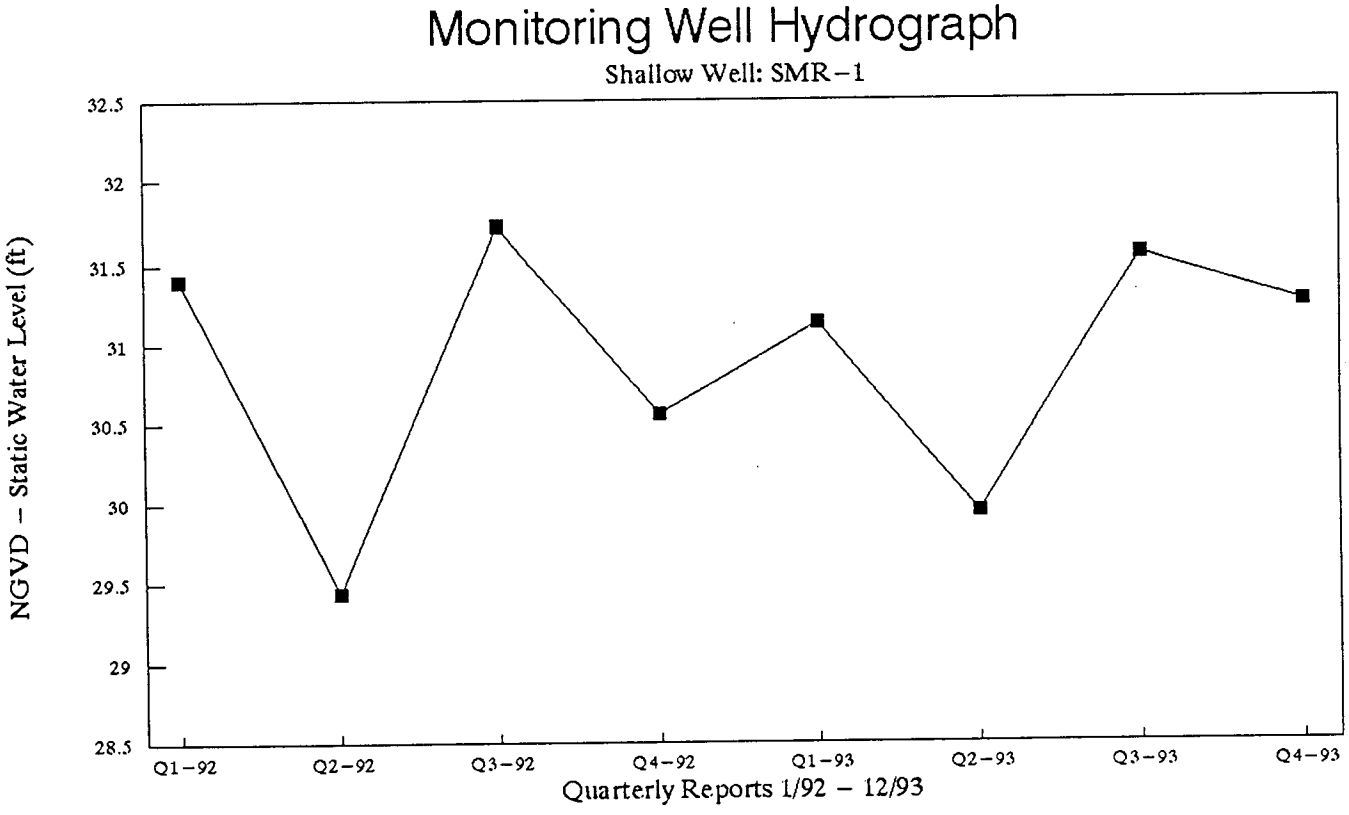
Graph 16



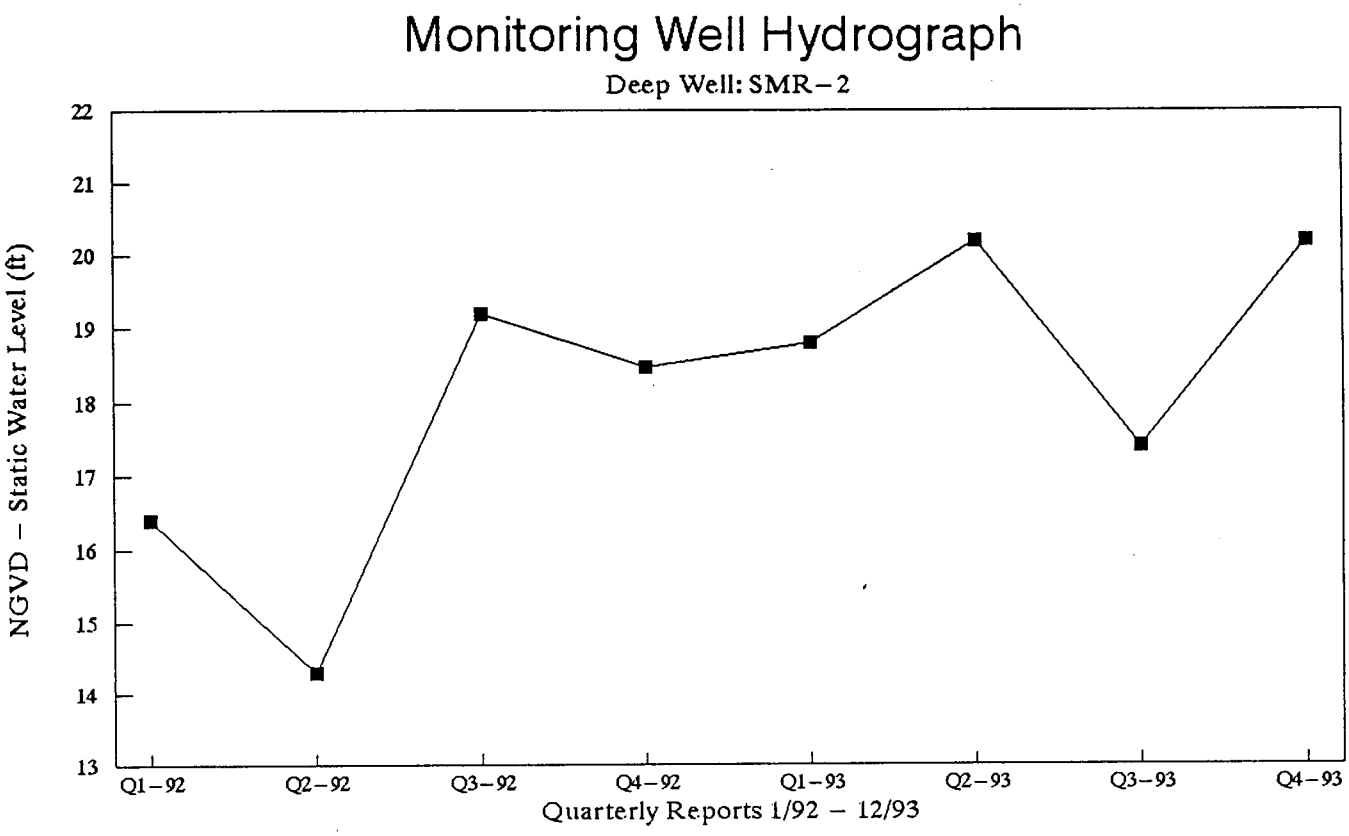
Graph 17



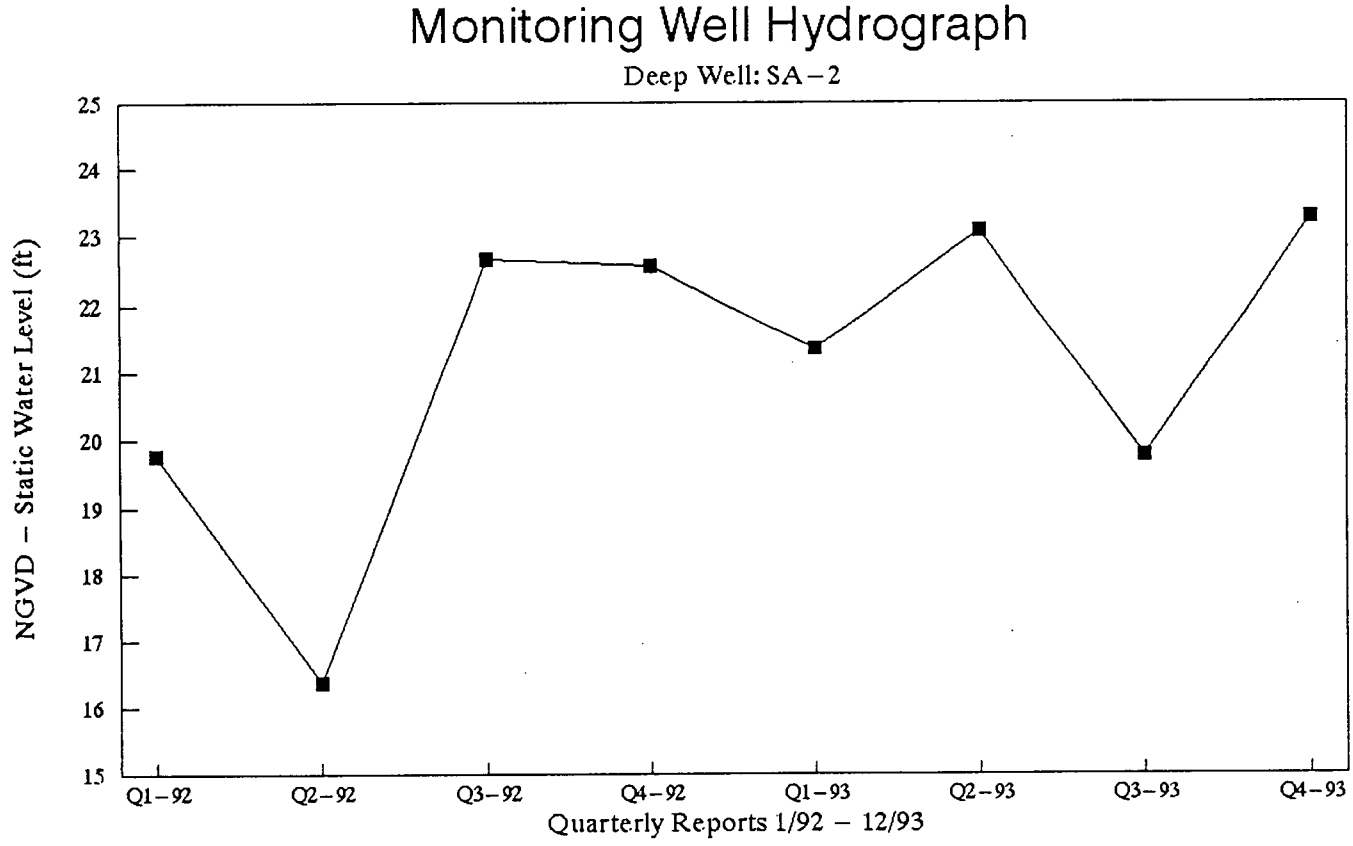
Graph 18



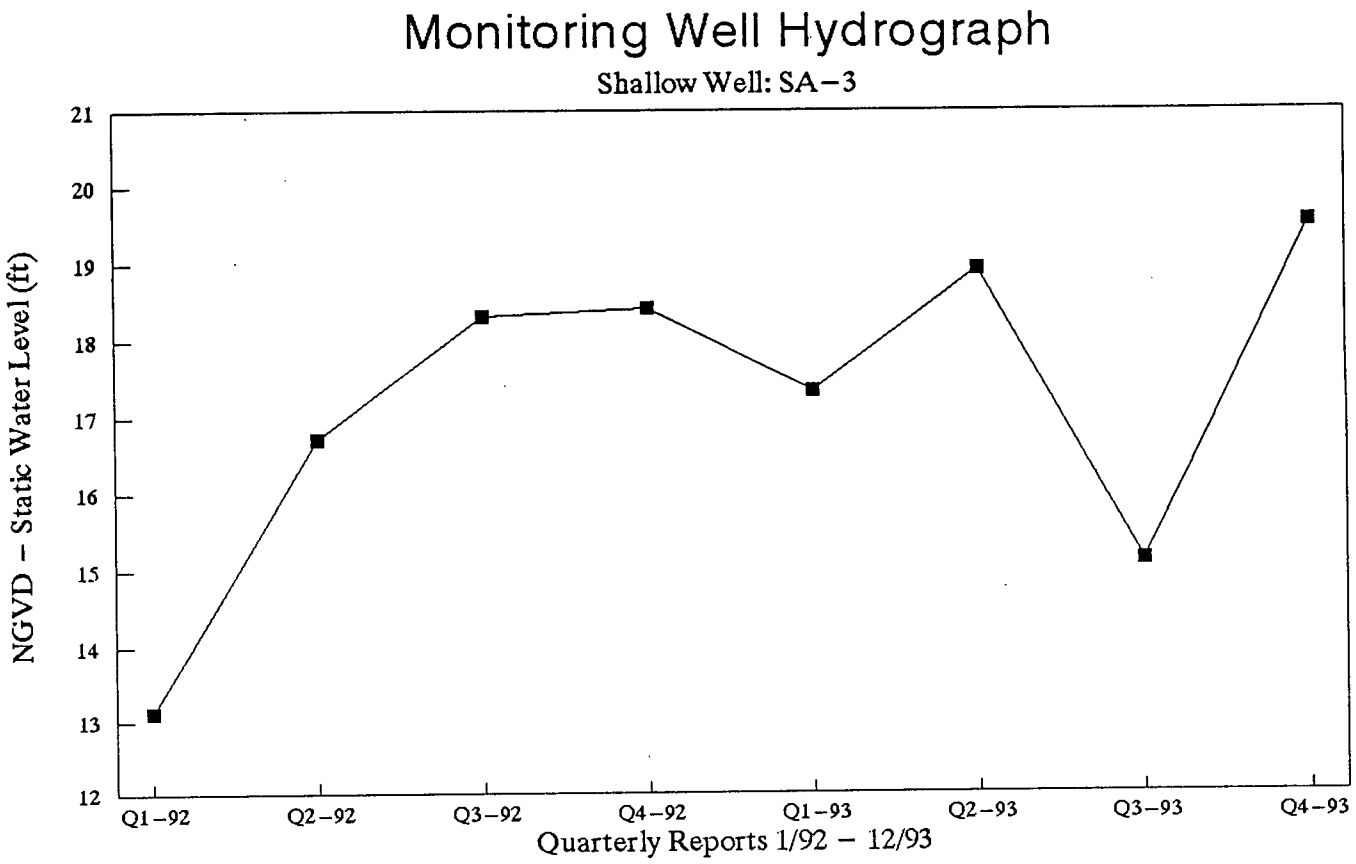
Graph 19



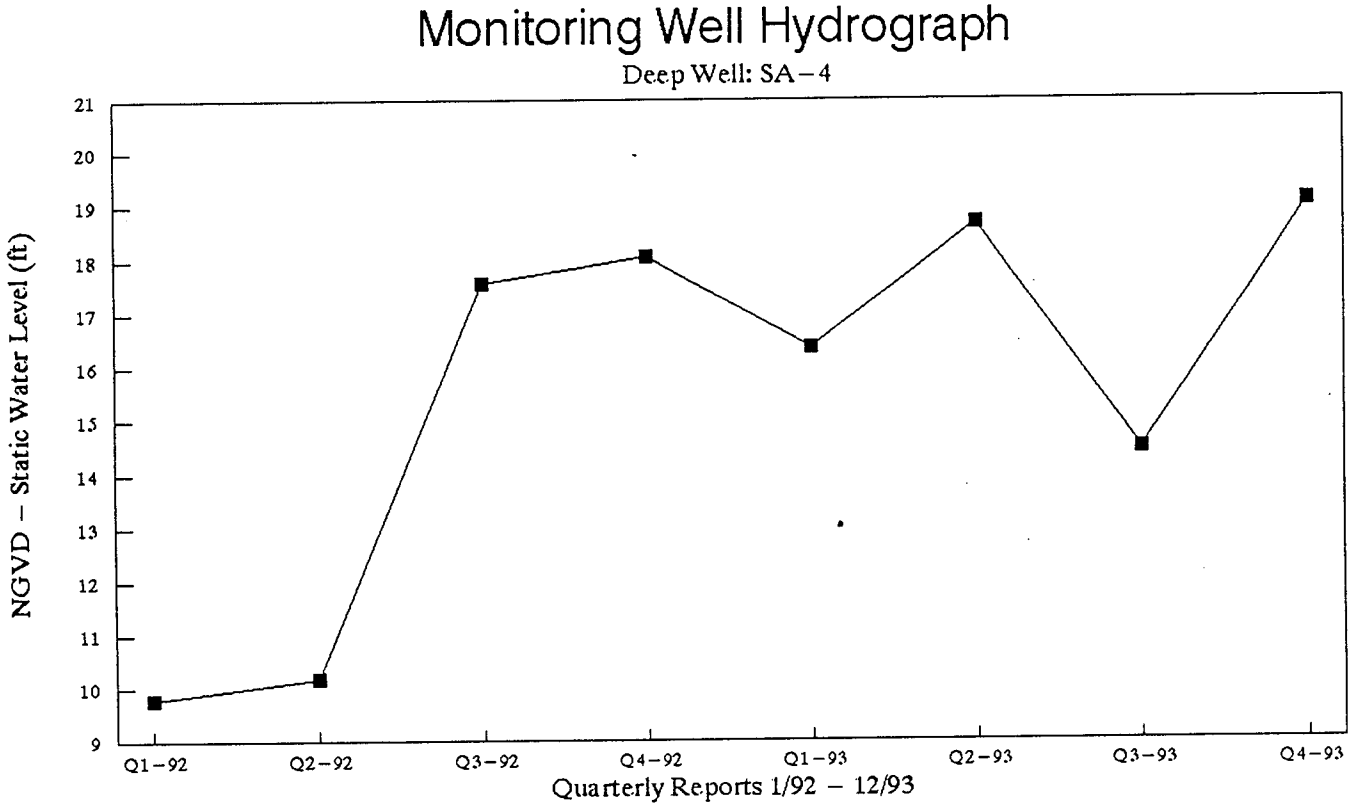
Graph 20



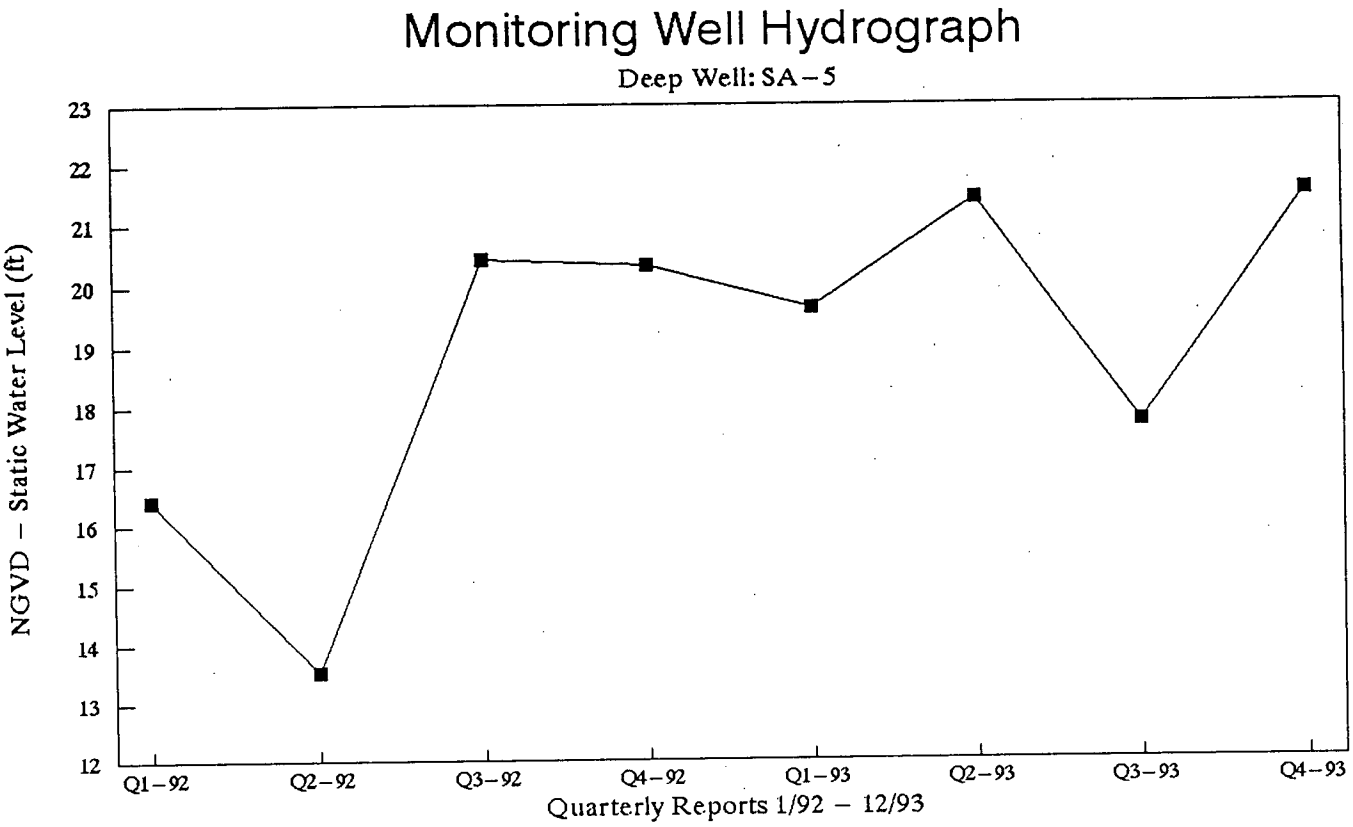
Graph 21



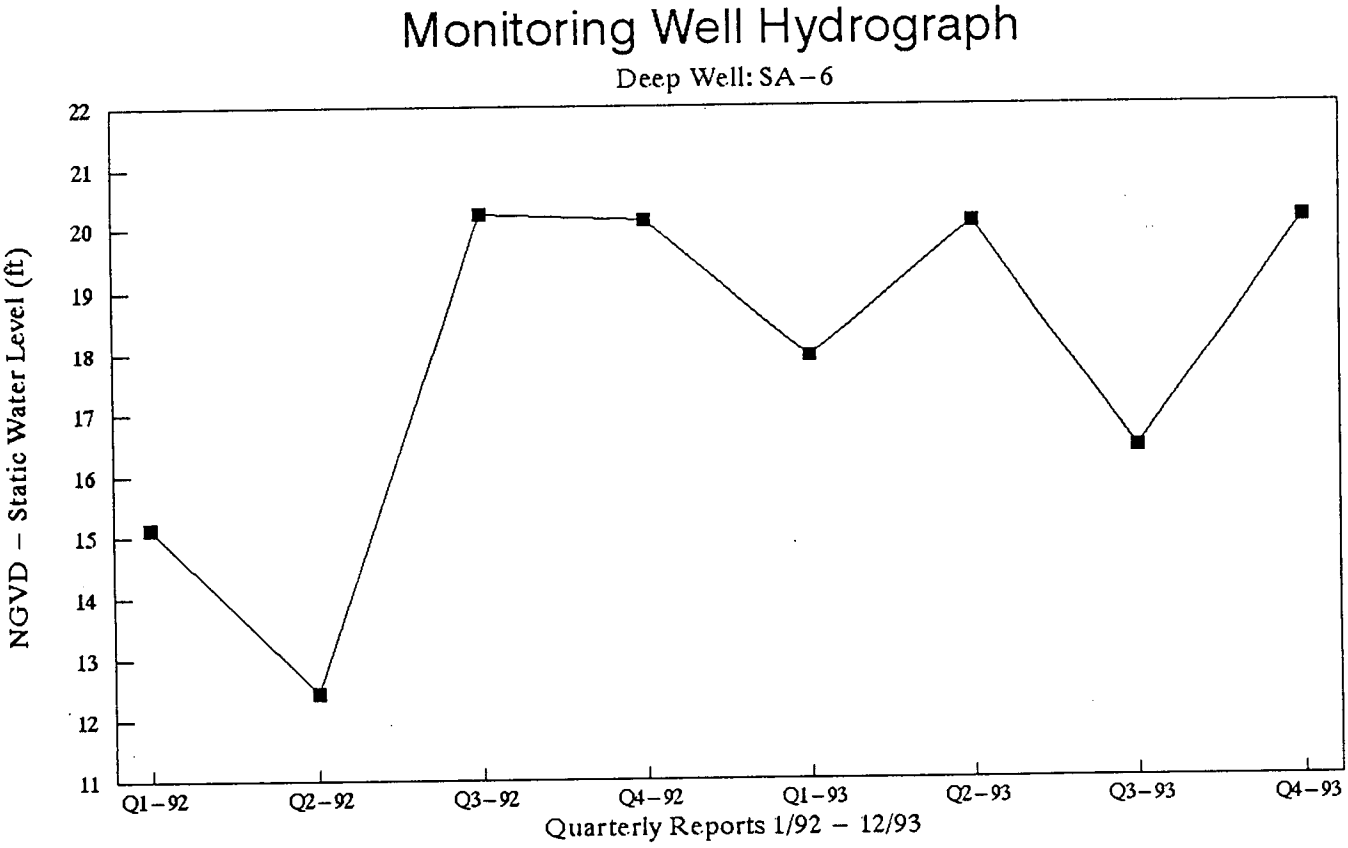
Graph 22



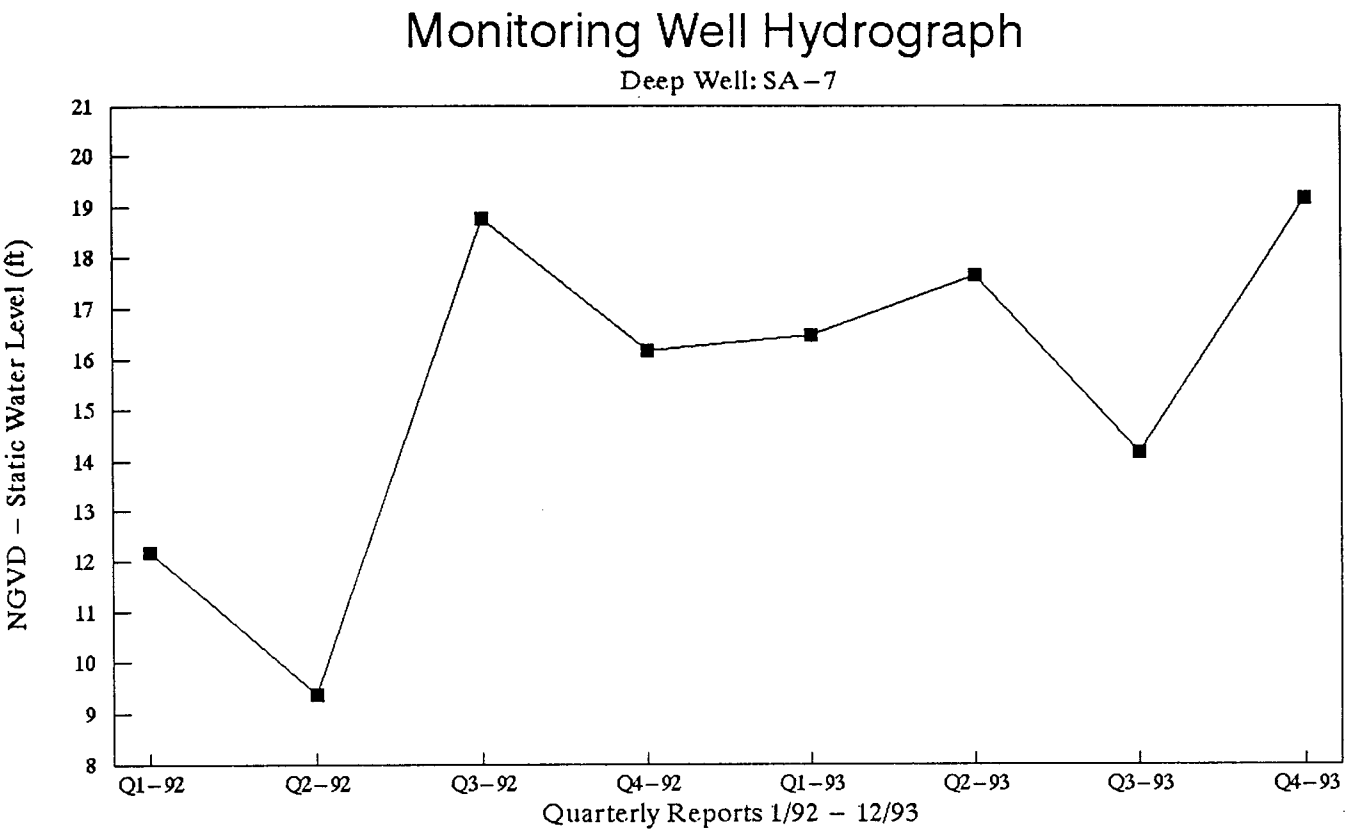
Graph 23



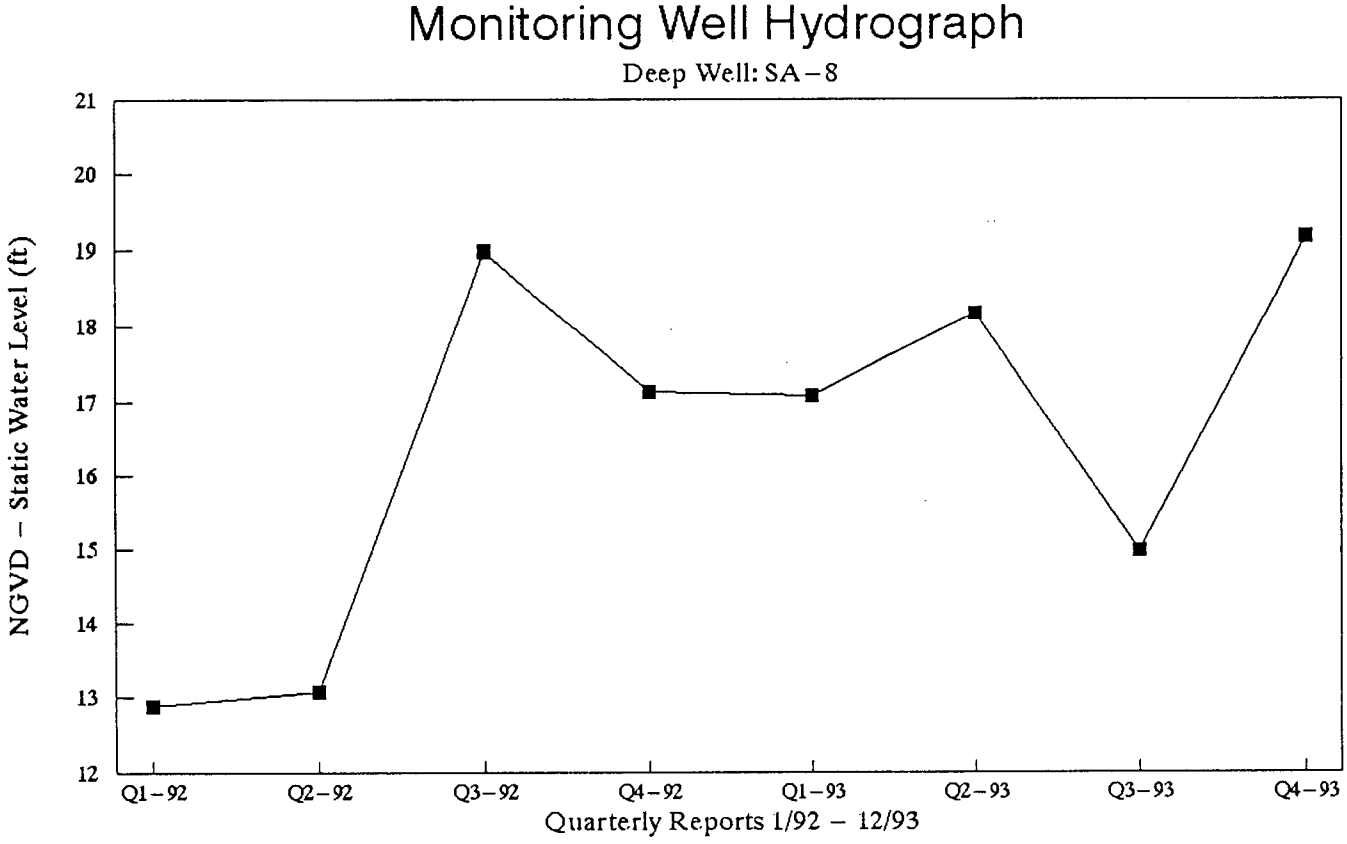
Graph 24



Graph 25



Graph 26



APPENDIX C

GROUNDWATER DATA FOR EACH MONITORING WELL

Table 1

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: LRII–1								
Total Well Depth: 21.12 ft	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	33.9	31.1	34.25	32	33.86	32.42	32.1	33.5
Conductivity (umho/cm)	675	525	521	650	1225	520	460	450
pH (S.U.)	7.4	6.2	6.1	6.2	6.3	6.5	6.3	6.2
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.2
Turbidity (NTU)	60	100	120	130	70	30	NA	5.1
Temperature (C)	23.5	24.5	19.5	22	23	22	23	26.6
Color/Sheen (C.U.)	250	50	350	114	13.2	800	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.1
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3/l)	107	85.6	109	198	134	43.4	64.8	98.8
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	27	384	28.7	27.8	26.2	8.74	27	25.6
Chromium (mg/l)	0.041	0.055	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	27.3	26.7	24.3	23.3	20.9	24.5	24	30.3
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.02	0.04	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	24.3	26.7	26.1	25.5	24.9	21.7	22.5	23.5
TDS (mg/l)	374	384	381	330	279	438	367	311
TOC (mg/l)	10.8	10.7	15.9	14.2	13.2	15.6	2.7	19.5
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 2

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: LRII–2								
Total Well Depth: 22.83 ft	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	30.37	28.18	31.86	30.03	31.72	30.86	30.37	31.53
Conductivity (umho/cm)	135	140	150	150	165	150	135	120
pH (S.U.)	6.1	5.8	5.6	6	6.1	6.5	6.2	5.9
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.2
Turbidity (NTU)	3.6	4.4	2	3.4	4	5.8	NA	0.3
Temperature (C)	23.5	23.5	26	24	NA	22	24	26.2
Color/Sheen (C.U.)	70	50	60	20	10	120	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3/l)	52	49.1	38.5	31.2	61.8	43.4	41.2	34
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	7.15	101	7.48	8.06	6.79	8.74	7.44	8.55
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	4.83	4.49	3.89	3.68	3.18	4.6	BDL	4.52
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.05	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	4.96	4.83	26.1	5.07	3.92	4.74	4.65	5.03
TDS (mg/l)	94	101	84	89	89	105	84	94
TOC (mg/l)	2.8	6.9	3.3	3.4	3.5	3.2	3.3	6.3
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 3

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: LRII–3								
Total Well Depth: 22.61 ft	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	26.63	24.93	28.51	26.25	27.88	26.93	27.09	26.93
Conductivity (umho/cm)	490	65	100	1100	100	100	110	120
pH (S.U.)	4.9	5	4.6	5	4.5	6	4.9	4.9
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.2
Turbidity (NTU)	1.2	1.6	0.25	0.4	0.25	NA	NA	0.2
Temperature (C)	23.2	24.2	27	23.5	NA	23	25	26.4
Color/Sheen (C.U.)	30	30	10	20	40	10	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3/l)	4.2	2.5	NA	7.8	11.4	7.2	7.1	5.4
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	5.6	4.51	5.77	8.5	7.92	10.6	9.28	11.8
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1.65
Iron (mg/l)	0.69	1.2	1.19	1.97	1.49	1.92	BDL	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.06	0.03	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	6.28	7.43	7.42	9.36	8.4	10.1	10.8	13.2
TDS (mg/l)	36	47	48	56	37	83	53	79
TOC (mg/l)	2.3	1.8	11.6	2.3	2.5	2.7	3.3	3.2
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 4

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: LRII–4								
Total Well Depth: 22.50 ft	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	26.94	25.15	29.02	27.02	28.36	27.48	27.32	27.32
Conductivity (umho/cm)	305	280	320	440	385	450	430	395
pH (S.U.)	6.3	6.4	6.2	6.5	6.4	6.3	6.4	6.3
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.2
Turbidity (NTU)	6.4	17	2.7	20	4.1	16	NA	0.3
Temperature (C)	24.3	23.9	26.5	23.5	NA	22.5	25	26.4
Color/Sheen (C.U.)	60	30	20	60	5	60	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.8
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3/l)	153	138	NA	170	181	174	219	186
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	7	7.91	7.91	8.1	8.06	14.2	10.5	12.2
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1.65
Iron (mg/l)	2.85	3.04	3.17	3.17	2.06	4.22	BDL	3.39
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.02	BDL	BDL	BDL	BDL	BDL	0.8
Sodium (mg/l)	10.2	8.41	9.01	9.79	8.63	10.2	10.8	12.2
TDS (mg/l)	165	159	168	203	214	259	225	236
TOC (mg/l)	3.1	6.2	6.7	2.9	2.2	16.1	0.5	3.8
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 5

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: LRII–5								
Total Well Depth: 22.78 ft	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	31.6	29.57	32.57	30.7	31.84	31.2	32.3	31.11
Conductivity (umho/cm)	290	280	278	290	245	270	266	265
pH (S.U.)	6.4	6.5	6	6.7	6.4	6.3	6.3	6.3
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.1
Turbidity (NTU)	4.2	22	3.9	13	4.5	5.5	NA	0.6
Temperature (C)	23	23	27	23.5	23	22	23	26.7
Color/Sheen (C.U.)	52	30	40	70	50	40	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.1
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	136	123	114	146	121	111	121	126
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	9.8	6.95	7.11	8.13	7.22	8.12	8.4	9.6
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	2.5	BDL	BDL
Iron (mg/l)	2.92	2.62	2.22	2.42	2.01	BDL	2.71	2.9
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.01	BDL	BDL	BDL	BDL	BDL	0.8
Sodium (mg/l)	10.2	10	8.31	10.3	8.5	8.19	7.81	8.41
TDS (mg/l)	183	178	153	197	276	160	165	180
TOC (mg/l)	8.6	7.5	11.9	9.2	7	7.1	1.2	11.3
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 6

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: MW-1								
Total Well Depth: 14.53 ft	Q1-92	Q2-92	Q3-92	Q4-92	Q1-93	Q2-93	Q3-93	Q4-93
Field Parameters								
NGVD - Static Water Level (ft)	30.22	29.1	34.18	31.05	33.05	30.05	29.43	28.99
Conductivity (umho/cm)	215	99	185	135	225	160	238	235
pH (S.U.)	4.7	5.2	5.1	5.1	5	5.2	4.8	4.9
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.1
Turbidity (NTU)	12	10	45	9	9.5	6.2	NA	5.2
Temperature (C)	22.4	24.8	26.5	24	23.5	22	28	24.9
Color/Sheen (C.U.)	60	60	60	60	70	80	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.7
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	12.4	15.6	26	17.2	15.2	29.8	6.4	18.6
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	19.2	9.87	11.7	14.8	23.3	29.1	40.6	45.2
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	4.56	2016	5.26	3.98	4.58	4.93	4.81	4.07
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.43	0.05	0.27	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	11.3	8.82	10.3	10.3	12.6	12.5	12.7	18.3
TDS (mg/l)	143	79	133	133	140	126	155	160
TOC (mg/l)	19.2	10	15.8	11.2	8.8	15.6	1	10
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 7

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: MW-2								
Total Well Depth: 13.97 ft	Q1-92	Q2-92	Q3-92	Q4-92	Q1-93	Q2-93	Q3-93	Q4-93
Field Parameters								
NGVD - Static Water Level (ft)	32.61	31.27	32.11	34.32	35.42	35.1	35.35	34.85
Conductivity (umho/cm)	355	600	185	255	240	296	315	268
pH (S.U.) ↓	6.2	6.1	5.2	5.7	5.1	5.1	5.1	4.8
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0
Turbidity (NTU)	55	22	70	11	13	8.4	NA	0.7
Temperature (C)	23.6	24.5	26.5	22	23	21	25	26.2
Color/Sheen (C.U.)	250	600	50	70	60	80	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	119	187	170	12.4	8.1	13.6	8.2	8.4
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	43.2	65.4	53.5	34.3	27.8	35.2	32.8	36.1
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	2.63	4.35	4.09	2.69	3.05	2.98	5.39	2.76
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.02	0.01	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	41.7	47.2	37.2	27	26.4	27.4	24.1	22.7
TDS (mg/l)	288	411	339	168	166	203	405	217
TOC (mg/l)	26.8	23.7	73.8	16.7	25.6	11.1	2.6	63.1
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 8

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: MW-3								
Total Well Depth: 13.97 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	32.07	29.24	34.74	31.73	33.42	32.28	30.74	30.57
Conductivity (umho/cm)	650	650	275	700	575	560	1050	1175
pH (S.U.)	5.4	5.7	4.7	5.5	5.7	5.7	5.9	5.8
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0
Turbidity (NTU)	21	75	4.8	6	46	6.1	NA	8.8
Temperature (C)	21.9	24	26	22.5	22	20	24	22.8
Color/Sheen (C.U.)	20	1200	70	100	300	200	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.9
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	30.3	44.9	3	20	23.9	26	31.2	28
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	129	115	51.2	139	120	106	121	115
Chromium (mg/l)	BDL	0.04	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	3.22	13.3	6.68	13.4	7.55	9.63	14	13.6
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.03	0.01	BDL	BDL	BDL	BDL	BDL	0.01
Sodium (mg/l)	70	59.6	25.3	61.8	53.7	60.7	59.4	66.2
TDS (mg/l)	401	436	210	395	367	391	505	435
TOC (mg/l)	39.8	12.6	37.6	14.3	14.2	13.1	4.5	10.2
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 9

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: MW-5								
Total Well Depth: 21.42 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	NA	NA	NA	NA	NA	NA	NA	NA
Conductivity (umho/cm)	NA	NA	NA	600	525	400	390	380
pH (S.U.)	NA	NA	NA	6.6	6.3	6.3	6.2	6.8
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.1
Turbidity (NTU)	NA	NA	NA	130	65	50	NA	17.3
Temperature (C)	NA	NA	NA	25	24	21.42	25	25.3
Color/Sheen (C.U.)	NA	NA	NA	140	120	400	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.2
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	NA	NA	NA	168	170	274	156	143
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	NA	NA	NA	60.3	38.3	30.2	29	25.7
Chromium (mg/l)	NA	NA	NA	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	NA	NA	NA	4.61	5.63	3.03	5.54	3.55
Lead (mg/l)	NA	NA	NA	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	NA	NA	NA	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	NA	NA	NA	BDL	BDL	BDL	BDL	0.01
Sodium (mg/l)	NA	NA	NA	37.8	34.9	29.2	34	26.5
TDS (mg/l)	NA	NA	NA	408	275	274	368	240
TOC (mg/l)	NA	NA	NA	60	23.7	16.2	2	18.1
EPA 601	NA	NA	NA	NA	*	NA	*	BDL
EPA 602	NA	NA	NA	NA	*	NA	*	BDL

Table 10

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: MW-6								
Total Well Depth: 20.72 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	33.19	32.82	33.82	33.32	33.53	33.16	33.94	30.57
Conductivity (umho/cm)	245	355	285	210	170	130	300	150
pH (S.U.)	5.2	5.1	5.1	5.5	5.5	5.6	5.4	505
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0
Turbidity (NTU)	8.4	15	11	8	14	40	NA	13.6
Temperature (C)	22.3	23.1	27.5	25	23.5	22.5	24	24.8
Color/Sheen (C.U.)	20	60	60	70	400	200	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.2
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	21	13	19	16.8	21.5	17.2	6.7	21.4
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	20.8	38.5	11	24.8	13.1	7.02	11.9	189
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	NA	11.6	4.64	9.1	5.32	4.75	4.59	6.09
Lead (mg/l)	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.02	0.01	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	NA	22.2	9.7	14.4	9.7	6.36	8.62	16.2
TDS (mg/l)	199	244	131	166	136	142	131	148
TOC (mg/l)	17	10.5	25.2	15.6	14.4	15.6	1.5	14.5
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 11

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: CW-4								
Total Well Depth: 17.91 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	35.62	30.71	34.96	33.24	34.62	33.87	32.79	33.78
Conductivity (umho/cm)	1125	1225	1325	1225	775	1220	1175	1250
pH (S.U.)	6.6	6.6	6.5	6.5	6.6	6.7	7.1	6.6
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0
Turbidity (NTU)	22	3.2	31	23	4.6	9.4	NA	1.1
Temperature (C)	20.3	22.9	26	23	22	21	34	23.6
Color/Sheen (C.U.)	35	100	60	60	200	400	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.3
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	232	47.5	256	259	253	248	207	256
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	158	109	169	269	169	159	142	193
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	4.4	4.16	4.64	4.17	2.92	4.3	4.04	4.87
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.02	0.01	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	45.3	49	48.9	50.5	22.4	48.8	47.37	52.2
TDS (mg/l)	844	867	955	899	981	1040	928	1090
TOC (mg/l)	15.7	16.5	15.5	18.6	15.5	17.6	2.2	15.6
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 12

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: CW-5								
Total Well Depth: 11.92 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	37.25	31.5	32.04	29.79	31.29	32.4	33.6	33.38
Conductivity (umho/cm)	215	260	288	275	370	350	335	W
pH (S.U.)	5.5	5.6	5.4	6	5.4	6.1	5.6	E
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	L
Turbidity (NTU)	6.2	4300, 3700	750	800	26	250	NA	L
Temperature (C)	20.4	23.8	25	23	23.5	22	25	
Color/Sheen (C.U.)	35	1600, 2000	300	30	350	400	NA	
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	D
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	E
Bicarbonate (mgCaCO3)	44.4	26.5, 41.2	29	46	133	35.8	43.6	S
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	T
Chlorides (mg/l)	32.4	27.3, 27.8	26.3	161	11.9	45.7	44.4	R
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	O
Iron (mg/l)	2.17	3.81	4.03	6.52	1.79	3.44	4.2	Y
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	E
Mercury (mg/l)	BDL	BDL	BDL	0.0002	0.0002	BDL	BDL	D
Nitrate (as N mg/l)	0.01	0.06	BDL	0.85	BDL	0.03	BDL	
Sodium (mg/l)	20	28.2	20.6	18.9	18.2	18.1	20.4	
TDS (mg/l)	165	243, 258	461	267	350	308	254	
TOC (mg/l)	14	11.7	9.2	15.2	18.7	7.6	1	
EPA 601	*	NA	*	NA	*	NA	*	
EPA 602	*	NA	*	NA	*	NA	*	

Table 13

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: GC–1								
Total Well Depth: 23.76 ft	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	27.11	27.28	27.15	26.57	26.99	26.65	26.61	26.69
Conductivity (umho/cm)	1100	1050	1150	1050	1000	1160	875	875
pH (S.U.)	6.4	6.2	6.2	6.2	6.5	6.5	7.1	6.5
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.4
Turbidity (NTU)	100	180	9.1	150	150	120	NA	0.24
Temperature (C)	20.8	21	23.5	23	21	22.5	22	22.9
Color/Sheen (C.U.)	80	800	160	300	400	400	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.1
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	479	452	343	349	354	339	326	336
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	116	97.1	157	136	136	134	110	140
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	29	21.6	20.5, .01	19.7	18.9	18.4	15.9	20.2
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.13	BDL	BDL	0.03	BDL	BDL	0.02
Sodium (mg/l)	61	59.7	54.2	52.1	50.1	51.9	49.3	120
TDS (mg/l)	726	234	623	723	667	671	566	767
TOC (mg/l)	19.5	19.6	16.9	22.9	16.6	21.7	2.2	23.4
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 14

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: GC–2								
Total Well Depth: 18.03 ft	Q1–92	Q2–92	Q3–92	Q4–92	Q1–93	Q2–93	Q3–93	Q4–93
Field Parameters								
NGVD – Static Water Level (ft)	33.51	30.48	33.81	31.96	33.5	27.94	31.19	33.07
Conductivity (umho/cm)	510	575	675	495	490	570	500	575
pH (S.U.)	7.2	5.9	6	6.1	6.4	6.32	6.2	6.3
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.3
Turbidity (NTU)	39	70	44	140	130	130	NA	21.3
Temperature (C)	23.6	24.2	25	24	22.5	22	23	24.3
Color/Sheen (C.U.)	300	20	600	600	800	300	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.1
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	151	140	117	139	147	107	103	109
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	58.4	59.7	56.5	49.2	44.8	44.4	44.9	40.2
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	36.6	31.7	13.9, 32.7	30.7	27.5	21.5	31.5	30.6
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.06	0.01	BDL	BDL	0.06	BDL	0.02
Sodium (mg/l)	25.5	26.3	26.5	26	24.2	23.2	25.9	25.7
TDS (mg/l)	393	366	333	346	283	326	338	337
TOC (mg/l)	13.2	11.4	13.4	16.4	8.5	15.5	1.1	13.3
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 15

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: GC-3								
Total Well Depth: 22.58 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	30.87	28.12	32.18	29.98	31.23	30.16	29.79	30.77
Conductivity (umho/cm)	410	445	550	440	450	530	460	480
pH (S.U.)	6.6	6.2	6.3	6.6	6.9	6.6	6.4	6.5
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.2
Turbidity (NTU)	27	10	32	30	39	50	NA	1.6
Temperature (C)	23	24.5	25	24	22	21	24	24.8
Color/Sheen (C.U.)	70	30	20	180	250	120	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.1
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	181	180	178	176	183	184	182	182
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	29.9	24.9	30.6	32.5	27.2	28.3	27.7	27.8
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	7.35	6.35	13.9, 5.79	5.91	5.93	6.69	6.33	6.71
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	6.69	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.02	0.05	BDL	BDL	BDL	BDL	BDL	0.04
Sodium (mg/l)	19.1	22.7	20.4	21.6	20.5	21.2	21.5	21.8
TDS (mg/l)	306	286	297	294	278	294	298	313
TOC (mg/l)	15	66	8.6	7.5	8.5	7	1.2	7.5
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 16

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: GC–4								
Total Well Depth: 22.18 ft	Q1–92	Q2–92	Q3–92	Q4–92	Q1–93	Q2–93	Q3–93	Q4–93
Field Parameters								
NGVD – Static Water Level (ft)	28.31	26.82	28.9	27.58	28.23	27.94	30.48	28.9
Conductivity (umho/cm)	455	460	625	445	585	50	445	460
pH (S.U.)	6.6	6.5	6.4	6.7	6.6	6.5	6.5	6.6
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.1
Turbidity (NTU)	75	120	110	70	95	90	NA	0.3
Temperature (C)	23.2	24	24.5	23	23	23	25	26.1
Color/Sheen (C.U.)	20	400	50	120	500	400	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.7
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	151	164	158	150	162	160	151	147
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	31.3	23	28.8	30.2	22.7	24.2	27.2	53.9
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	16	13.6	13.9, 12.3	17.1	12.3	14.5	13.5	12.3
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.06	0.06	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	19.2	21.4	20.6	21.6	20.2	21.7	22.9	19.5
TDS (mg/l)	318	316	312	287	329	283	286	320
TOC (mg/l)	6.8	7	9.5	9.2	7.4	7.4	0.8	11.2
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 17

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: GC–5								
Total Well Depth: 22.02 ft	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	29.19	27.6	29.44	28.44	29.02	28.81	29.6	29.44
Conductivity (umho/cm)	255	250	140	460	240	260	215	170
pH (S.U.)	5.1	5.6	5.2	6.5	5.8	5.9	5.6	5.8
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.5
Turbidity (NTU)	24	10	21	12	5.4	8.4	NA	1.7
Temperature (C)	23.4	24.5	27	25	24.5	24	28	28.7
Color/Sheen (C.U.)	50	100	120	100	140	200	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.1
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	53	83	40.7	189	99.8	106	62	66.2
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	26.7	12.2	28.8	26.1	9.59	9.55	13.2	8.62
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	NA	3.8, 3.81	1.37, 4.79	5.12	2.31	2.32	2.82	1.7
Lead (mg/l)	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.01	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	NA	15, 14.8	10.1	13.7	11.7	14	13.6	10.2
TDS (mg/l)	205	174	147	297	161	177	170	130
TOC (mg/l)	24.2	30.7	34.7	21.6	22.5	23.8	6.9	22.5
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 18

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: GC–6								
Total Well Depth: 22.40 ft	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	31.56	31.52	32.14	32.35	32.27	32.37	29.39	7.85
Conductivity (umho/cm)	450	340	290	215	195	230	245	250
pH (S.U.)	5.5	5.8	4.7	5.9	5	5.4	5.3	5.6
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.4
Turbidity (NTU)	7.6	5.8, 5.7	9.6	14	10	0.01	NA	1.9
Temperature (C)	23.9	21.5	27	25	24	23	28	27.2
Color/Sheen (C.U.)	50	140, 160	30	100	40	50	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	4.6
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	74	69.1, 68.8	1.6	18.8	2.5	7.5	3.9	BDL
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	40.6	23.3, 23.7	22.7	19.9	19.4	19.1	24.2	23.1
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	9.56	2.22, 2.19	6.38, 6.32	4.11	3.84	5.19	5.34	3.66
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.01	0.02	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	32.6	14.9	6.33	6.82	5.32	6.59	7.68	8.3
TDS (mg/l)	32.8	242, 241	190	157	116	152	214	184
TOC (mg/l)	307	16.9, 14.6	10.2	11.8	10	10.1	2.3	13.7
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 19

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Shallow Monitoring Well: SMR–1								
Total Well Depth: 22.88	**Q1–92**	**Q2–92**	**Q3–92**	**Q4–92**	**Q1–93**	**Q2–93**	**Q3–93**	**Q4–93**
Field Parameters								
NGVD – Static Water Level (ft)	31.4	29.44	31.73	30.56	31.13	29.94	31.56	31.25
Conductivity (umho/cm)	230	225	198	220	195	180	235	205
pH (S.U.)	5.7	5.8	5	5.6	5.4	5.6	5.8	7.5
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0
Turbidity (NTU)	2.6	3.2	NA	1.8	4.2	12	NA	2.7
Temperature (C)	22.7	22.5	27	23	24	21	22	24.7
Color/Sheen (C.U.)	80	100	50	140	160	150	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.9
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	38	38.6	NA	32.5	15.6	23.6	33.1	25
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	28.6	28.1	15.3	22.9	13.3	12.7	21.7	16.2
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	9.95	7.35	10.6	8.39	6.8	6.93	7.08	7.4
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	0.0003	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.02	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	23.3	25.5	17.1	22.7	16.2	14.3	22.3	18.2
TDS (mg/l)	178	190	145	171	149	149	172	195
TOC (mg/l)	15.6	10.6	14.5	20.5	33.8	20.7	1.8	16.2
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 20

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Deep Monitoring Well: SMR-2								
Total Well Depth: 150.00 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	16.4	14.3	19.2	18.47	18.8	20.2	17.4	20.2
Conductivity (umho/cm)	700	700	300	750	750	740	625	610
pH (S.U.)	7.4	7.4	7.2	7.7	7.4	7.6	7.4	5.5
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Turbidity (NTU)	0.2	.35, .4	0.2	1.6	0.1	12	NA	0.4
Temperature (C)	24.7	24	25	23.5	24.5	23	23	24.5
Color/Sheen (C.U.)	0	5	10	10	5	10	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.8
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	203	191, 196	NA	175	183	23.6	201	196
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	94.2	99.6, 89.4	98.3	93.3	90.8	91.4	90.2	93.2
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	0.0003	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	0.02	BDL	0.05	BDL	BDL	BDL	BDL
Sodium (mg/l)	61	58.5, 59	58.9	60.2	58.5	56.8	57	59.3
TDS (mg/l)	410	425, 419	700	394	412	149	390	419
TOC (mg/l)	6.4	3, 3.4	18.9	3.6	3.4	20.7	3.9	6.6
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 21

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Deep Monitoring Well: SA-2								
Total Well Depth: 154.93 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	19.77	16.37	22.67	22.57	21.37	23.07	19.77	23.27
Conductivity (umho/cm)	580	500	625	480	600	670	500	550
pH (S.U.)	6.1	7	7.2	7.2	7.4	7.2	7.4	7.4
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Turbidity (NTU)	1.9	5.7	1	0.55	11	18	NA	1.5
Temperature (C)	22.6	24.5	24.5	23.5	23	24	23.5	24.1
Color/Sheen (C.U.)	50	40	30	30	50	30	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.4
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	240	246	233	232	239	257	239	235
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	29.4	25.2	28.9	31.8	28.7	24.8	28.3	28.3
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	0.33	BDL	BDL	0.121	BDL	0.253	BDL	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	BDL	BDL	0.14	BDL	BDL	BDL	BDL
Sodium (mg/l)	27.3	29.8	54.1	35.7	29.8	29.8	29.3	54.8
TDS (mg/l)	346	328	324	344	330	394	334	346
TOC (mg/l)	11.5	9.2	15.8	11.8	10.1	10.4	4	15.4
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 22

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Deep Monitoring Well: SA – 3								
Total Well Depth: 163.02 ft	**Q1 – 92**	**Q2 – 92**	**Q3 – 92**	**Q4 – 92**	**Q1 – 93**	**Q2 – 93**	**Q3 – 93**	**Q4 – 93**
Field Parameters								
NGVD – Static Water Level (ft)	13.12	16.7	18.32	18.42	17.32	18.92	15.12	19.52
Conductivity (umho/cm)	575	550	700	700	725	730	625	675
pH (S.U.)	7.3	6.9	7	7.2	7.5	7.3	7.2	7.3
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.8
Turbidity (NTU)	5.5	0.4	33	6.6	0.7	1.4	NA	3.1
Temperature (C)	25.5	24.5	24.5	23	23	23	25	24.3
Color/Sheen (C.U.)	10	30	60	60	50	30	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	1.3
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	273	270, 271	276	268	258	183	246	259
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	23.1	19.2, 19.7	26.4	29.2	25.4	22.8	28.3	28
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	BDL	BDL	0.36	BDL	BDL	0.1	0.16	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.02	0.01	BDL	BDL	BDL	0.03	BDL	0.01
Sodium (mg/l)	27.1	31.5, 31.2	28.4	36.2	35.7	27.9	38	39
TDS (mg/l)	380	363, 355	404	416	398	377	422	338
TOC (mg/l)	11.6	8.8, 9.3	13.4	11.2	11.2	10.1	1.1	13.6
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 23

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Deep Monitoring Well: SA-4								
Total Well Depth: 143.78 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	9.78	10.18	17.58	18.08	16.38	18.68	14.48	19.08
Conductivity (umho/cm)	675	700	725	725	700	970	625	625
pH (S.U.)	7.4	7.2	7.4	7.4	7.6	7.5	7.4	7.5
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.8
Turbidity (NTU)	0.25	0.2	0.2	0.05	0.2	0.45	NA	0.18
Temperature (C)	23.1	26.8	24.5	23	23	24	24	23.3
Color/Sheen (C.U.)	5	20	10	20	30	30	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.9
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	195	202	198	197	199	199	192	199
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	60.4	66.7	67.9	64.2	57.8	59.1	54.9	64.5
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	BDL	BDL	BDL	BDL	BDL	0.151	0.159	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.06	0.01	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	64.6	64	28.7	62.6	60.6	63	62.8	65.9
TDS (mg/l)	460	456	446	436	378	446	439	449
TOC (mg/l)	14.1	19.5	8	8.6	18	9.6	0.9	16.9
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 24

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Deep Monitoring Well: SA-5								
Total Well Depth: 153.02 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NDVD - Static Water Level (ft)	16.42	13.52	20.42	20.32	19.62	21.42	17.72	21.52
Conductivity (umho/cm)	550	650	1280	775	675	710	600	600
pH (S.U.)	6.3	7.3	7.2	7.5	7.5	7.5	7.3	7.5
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Turbidity (NTU)	0.71	0.2	0.25	0.1	0.25	1.8	NA	0.2
Temperature (C)	22	25	19.5	22	24	24	24	24.7
Color/Sheen (C.U.)	10	40	10	30	5	20	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	214	210, 212	211	197	217	226	207	207
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	71	434, 431	66.9	71.6	64.7	64.3	68.7	71.5
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	0.33	BDL	BDL	BDL	BDL	BDL	0.173	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	53.6	55.1	61.7	54	54	52.6	57	54.8
TDS (mg/l)	427	434, 431	420	407	403	536	408	425
TOC (mg/l)	8.4	9.9, 12.9	8.6	8.1	7.1	41.7	0.8	8.4
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 25

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Deep Monitoring Well: SA-6								
Total Well Depth: 153.04 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	15.14	12.44	20.24	20.14	17.94	20.09	16.4	20.14
Conductivity (umho/cm)	750	825	910	1050	925	870	775	800
pH (S.U.)	7.4	7.4	7.5	11.2	7.3	7.5	7.5	7.4
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.2
Turbidity (NTU)	0.26	0.35	0.3	15	0.25	1.4	NA	0.3
Temperature (C)	24.4	24.9	24	23	NA	24	24	24.5
Color/Sheen (C.U.)	10	30	10	20	30	20	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	180	175	NA	118	217	181	173	1875
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	51.4	623	51.1	50	64.7	49.2	50.34	50
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	0.218	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	BDL	BDL	BDL	0.01	0.9	BDL	BDL
Sodium (mg/l)	48.4	48.4	47.1	37.2	43.2	44.5	44.6	47.6
TDS (mg/l)	622	623	569	447	576	767	593	627
TOC (mg/l)	6.7	6	7.6	5.9	7.1	21	0.8	7.3
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 26

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Deep Monitoring Well: SA-7								
Total Well Depth: 152.97 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	12.17	9.37	18.77	16.17	16.47	17.67	14.17	19.17
Conductivity (umho/cm)	460	460	550	405	465	520	460	420
pH (S.U.)	7.6	7.7	7.3	10.7	7.5	8	7.7	7.6
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.8
Turbidity (NTU)	0.9	.7, .65	1	0.1	0.1	0.3	NA	0.5
Temperature (C)	24.2	25	25	23.5	NA	24	24	25.1
Color/Sheen (C.U.)	30	20	20	10	5	20	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.7
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	156	156, 158	NA	64.8	144	164	156	157
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	54.4	52.8, 51.8	56.8	53.6	51.6	49	53.1	55.2
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	1.48	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (mg/l)	42.1	41.3, 40.8	40.1	37.7	39	38	9.99	16.6
TDS (mg/l)	309	315, 304	303	192	300	338	283	332
TOC (mg/l)	3.6	3.7, 2.9	3.9	4.9	3.6	4.2	0.4	3.9
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

Table 27

LENA ROAD LANDFILL QUARTERLY GROUNDWATER INDICATOR PARAMETERS Deep Monitoring Well: SA-8								
Total Well Depth: 153.38 ft	**Q1-92**	**Q2-92**	**Q3-92**	**Q4-92**	**Q1-93**	**Q2-93**	**Q3-93**	**Q4-93**
Field Parameters								
NGVD - Static Water Level (ft)	12.88	13.08	18.98	17.13	17.08	18.18	14.98	19.18
Conductivity (umho/cm)	475	475	550	340	505	530	480	470
pH (S.U.)	10.5	8.1	8.4	10.7	8.3	7.9	8.2	7.8
DO (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.6
Turbidity (NTU)	110	8.2	0.4	5.5	0.4	1.6	NA	0.3
Temperature (C)	24.3	24.5	24.5	22.5	NA	23	25	24.5
Color/Sheen (C.U.)	20	10	20	10	5	10	NA	NA
Laboratory Parameters								
Ammonium (mg/l)	NA	NA	NA	NA	NA	NA	NA	0.8
Arsenic (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Bicarbonate (mgCaCO3)	4.2	165	NA	79.8	133	164	128	156
Cadmium (mg/l)	NA	NA	NA	NA	NA	NA	BDL	BDL
Chlorides (mg/l)	55.2	49.2	54.1	50	50.8	49.3	50.6	25.2
Chromium (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron (mg/l)	BDL	1.2	0.3	BDL	BDL	BDL	0.142	BDL
Lead (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (mg/l)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as N mg/l)	0.03	BDL	BDL	0.04	BDL	BDL	BDL	BDL
Sodium (mg/l)	42.7	43.2	40.8	39.4	40.9	40.2	39.9	42.4
TDS (mg/l)	216	311	285	203	301	312	256	189
TOC (mg/l)	4.4	3.7	9.7	4	4.1	4.1	0.9	22
EPA 601	*	NA	*	NA	*	NA	*	BDL
EPA 602	*	NA	*	NA	*	NA	*	BDL

APPENDIX D

SHALLOW MONITORING WELL DATA COMPARISON

Table 28

LENA ROAD LANDFILL
SHALLOW WELL COMPARISON
TOTAL WELL DEPTH: 10 – 25 FEET

Parameter:	MW1	MW2	MW3	MW5	MW6	CW4	CW5	LRII1	LRII2	LRII3	LRII4	LRII5	GC1	GC2	GC3	GC4	GC5	GC6	SMR1
TDS (mg/l)																			
Q1–92	143	288	401	NA	199	844	165	374	94	36	165	183	726	393	306	318	205	32.8	178
Q2–92	79	411	436	NA	244	867	243, 258	384	101	47	159	178	234	366	286	316	174	242, 241	190
Q3–92	133	339	210	NA	131	955	461	381	84	48	168	153	623	333	297	312	147	190	145
Q4–92	133	168	395	408	166	899	267	330	89	56	203	197	723	346	294	287	197	157	171
Q1–93	140	166	367	275	136	981	350	279	89	37	214	276	667	283	278	329	161	116	149
Q2–93	126	203	391	274	142	1040	308	438	105	83	259	160	671	326	294	283	177	152	149
Q3–93	155	405	505	368	131	928	254	367	84	53	225	165	566	353	298	286	170	214	172
Q4–93	160	217	435	240	148	1090	NA	311	94	79	236	180	767	337	313	320	130	184	195

Table 29

LENA ROAD LANDFILL
SHALLOW WELL COMPARISON
TOTAL WELL DEPTH: 10 – 25 FEET

Parameter:	MW1	MW2	MW3	MW5	MW6	CW4	CW5	LRII1	LRII2	LRII3	LRII4	LRII5	GC1	GC2	GC3	GC4	GC5	GC6	SMR1
Turbidity (NTU)																			
Q2–92	12	55	21	NA	8.4	22	6.2	60	3.6	1.2	6.4	4.2	100	39	27	75	24	7.6	2.6
Q2–92	10	22	75	NA	15	3.2	4300, 3700	100	4.4	1.6	17	22	180	70	10	120	10	5.8, 5.7	3.2
Q3–92	45	70	4.8	NA	11	31	750	120	2	0.25	2.7	3.9	9.1	44	32	110	21	9.6	NA
Q4–92	9	11	6	130	8	23	800	130	3.4	0.4	20	13	150	140	30	70	12	14	1.8
Q1–93	9.5	13	46	65	14	4.6	26	70	4	0.25	4.1	4.5	150	130	39	95	5.4	10	4.2
Q2–93	6.2	8.4	6.1	50	40	9.6	250	30	5.8	NA	16	5.5	120	130	50	90	8.4	0.01	12
Q3–93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Q4–93	5.2	0.7	8.8	17.3	13.6	1.1	NA	5.1	0.3	0.2	0.3	0.6	0.24	21.3	1.6	0.3	1.7	1.9	2.7

Table 30

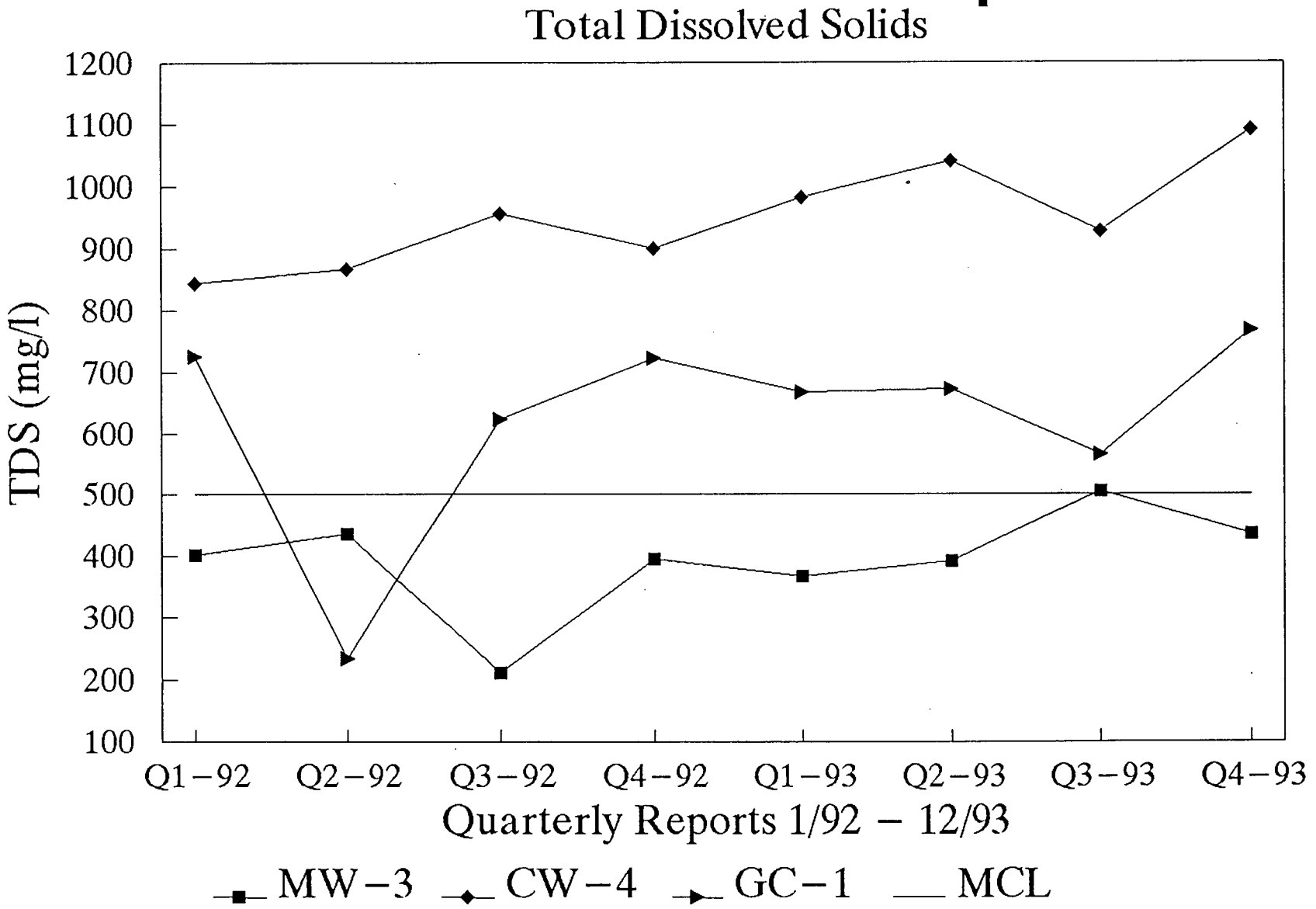
LENA ROAD LANDFILL SHALLOW WELL COMPARISON TOTAL WELL DEPTH: 10 – 25 FEET																			
Parameter:	MW1	MW2	MW3	MW5	MW6	CW4	CW5	LRII1	LRII2	LRII3	LRII4	LRII5	GC1	GC2	GC3	GC4	GC5	GC6	SMR1
Color (C.U.)																			
Q1–92	60	250	20	NA	20	35	35	250	70	30	60	52	80	300	70	20	50	50	80
Q2–92	60	600	1220	NA	60	100	1600, 2000	50	50	30	30	30	800	20	30	400	100	140, 160	100
Q3–92	60	50	70	NA	60	60	300	350	60	10	20	40	160	600	20	50	120	30	50
Q4–92	60	70	100	140	70	60	30	114	20	20	60	70	300	600	180	120	100	100	140
Q1–93	70	60	300	120	400	200	350	13.2	10	40	5	50	400	800	250	500	140	40	160
Q2–93	80	80	200	400	200	400	400	800	120	10	60	40	400	300	120	400	200	50	150
Q3–93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Q4–93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 31

LENA ROAD LANDFILL SHALLOW WELL COMPARISON TOTAL WELL DEPTH: 10 – 25 FEET																			
Parameter:	MW1	MW2	MW3	MW5	MW6	CW4	CW5	LRII1	LRII2	LRII3	LRII4	LRII5	GC1	GC2	GC3	GC4	GC5	GC6	SMR1
Iron (mg/l)																			
Q1–92	4.56	2.63	3.22	NA	NA	4.4	2.17	27.3	4.83	0.69	2.85	2.92	29	36.6	7.35	16	NA	9.56	9.95
Q2–92	2.16	4.35	13.3	NA	11.6	4.16	3.81	26.7	4.49	1.2	3.04	2.62	21.6	31.7	6.35	13.6	3.8, 3.81	2.22, 2.19	7.35
Q3–92	5.26	4.09	6.68	NA	4.64	4.64	4.03	24.3	3.89	1.19	3.17	2.22	20.5, .01	13.9, 32.7	13.9, 5.79	13.9, 12.3	1.37, 4.79	6.38, 6.32	10.6
Q4–92	3.98	2.69	13.4	4.61	9.1	4.17	6.52	23.3	3.68	1.97	3.17	2.42	19.7	30.7	5.91	17.1	5.12	4.11	8.39
Q1–93	4.58	3.05	7.55	5.63	5.32	2.92	1.79	20.9	3.18	1.49	2.06	2.01	18.9	27.5	5.93	12.3	2.31	3.84	6.8
Q2–93	4.93	2.98	9.63	3.03	4.75	4.3	3.44	24.5	4.6	1.92	4.22	BDL	18.4	21.5	6.69	14.5	2.32	5.19	6.93
Q3–93	4.81	5.39	14	5.54	4.59	4.04	4.2	24	BDL	BDL	BDL	2.71	15.9	31.5	6.33	13.5	2.82	5.34	7.08
Q4–93	4.07	2.76	13.6	3.55	6.09	4.87	NA	30.3	4.52	BDL	3.39	2.9	20.2	30.6	6.71	12.3	1.7	3.66	7.4

Graph 27

Shallow Well Comparison



APPENDIX E

DEEP MONITORING WELL DATA COMPARISON

Table 32

LENA ROAD LANDFILL DEEP WELL COMPARISON TOTAL WELL DEPTH: 140 – 165 FEET								
Parameter:	SMR–2	SA2	SA3	SA4	SA5	SA6	SA7	SA8
pH (S.U.)								
Q1–92	7.4	6.1	7.3	7.4	6.3	7.4	7.6	10.5
Q2–92	7.4	7	6.9	7.2	7.3	7.4	7.7	8.1
Q3–92	7.2	7.2	7	7.4	7.2	7.5	7.3	8.4
Q4–92	7.7	7.2	7.2	7.4	7.5	11.2	10.7	10.7
Q1–93	7.4	7.4	7.5	7.6	7.5	7.3	7.5	8.3
Q2–93	7.6	7.2	7.3	7.5	7.5	7.5	8	7.9
Q3–93	7.4	7.4	7.2	7.4	7.3	7.5	7.7	8.2
Q4–93	5.5	7.4	7.3	7.5	7.5	7.4	7.6	7.8

Table 33

LENA ROAD LANDFILL DEEP WELL COMPARISON TOTAL WELL DEPTH: 140 – 165 FEET								
Parameter:	SMR–2	SA2	SA3	SA4	SA5	SA6	SA7	SA8
TDS (mg/l)								
Q1–92	40	346	380	460	427	622	309	216
Q2–92	425, 419	328	363, 355	456	434, 431	623	315, 304	311
Q3–92	700	324	404	446	420	569	303	285
Q4–92	394	344	416	436	407	447	192	203
Q1–93	412	330	398	378	403	576	300	301
Q2–93	149	394	377	446	536	767	338	312
Q3–93	390	334	422	439	408	593	283	256
Q4–93	419	346	338	449	425	627	332	189

Table 34

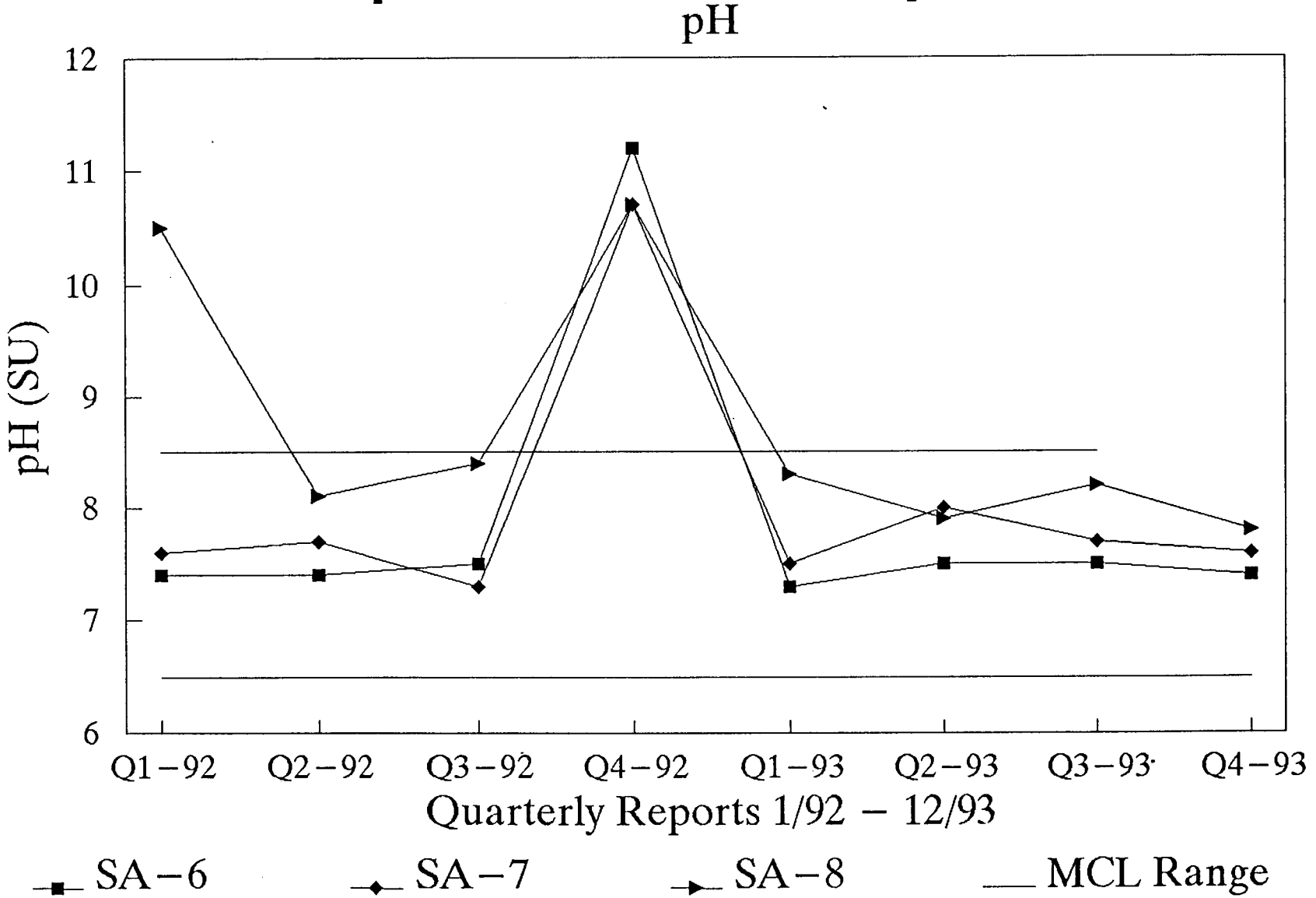
LENA ROAD LANDFILL DEEP WELL COMPARISON TOTAL WELL DEPTH: 140 – 165 FEET								
Parameter:	SMR–2	SA2	SA3	SA4	SA5	SA6	SA7	SA8
Turbidity (NTU)								
Q1–92	0.2	1.9	5.5	0.25	0.71	0.26	0.9	110
Q2–92	.35, .4	5.7	0.4	0.2	0.2	0.35	.65, .7	8.2
Q3–92	0.2	1	33	0.2	0.25	0.3	1	0.4
Q4–92	1.6	0.55	6.6	0.05	0.1	15	0.1	5.5
Q1–93	0.1	11	0.7	0.2	0.25	0.25	0.1	0.4
Q2–93	12	18	1.4	0.45	1.8	1.4	0.3	1.6
Q3–93	NA	NA	NA	NA	NA	NA	NA	NA
Q4–93	0.4	1.5	3.1	0.18	0.2	0.3	0.5	0.3

Table 35

LENA ROAD LANDFILL DEEP WELL COMPARISON TOTAL WELL DEPTH: 140 – 165 FEET								
Parameter:	SMR–2	SA2	SA3	SA4	SA5	SA6	SA7	SA8
Color (C.U)								
Q1–92	0	50	10	5	10	10	30	20
Q2–92	5	40	30	20	40	30	20	10
Q3–92	10	30	60	10	10	10	20	20
Q4–92	10	30	60	20	30	20	10	10
Q1–93	5	50	50	30	5	30	5	5
Q2–93	10	30	30	30	20	20	20	10
Q3–93	NA	NA	NA	NA	NA	NA	NA	NA
Q4–93	NA	NA	NA	NA	NA	NA	NA	NA

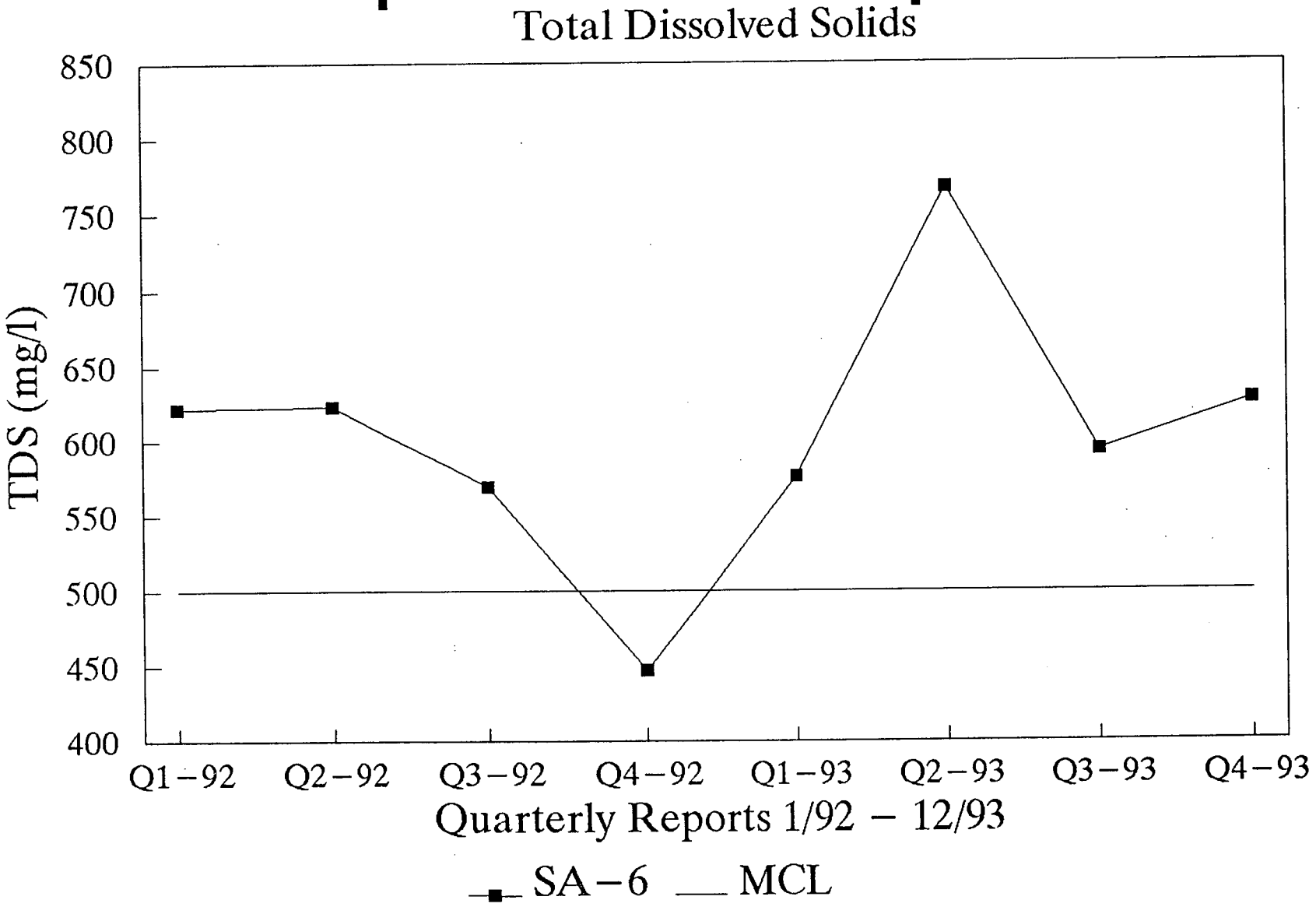
Graph 28

Deep Well Comparison



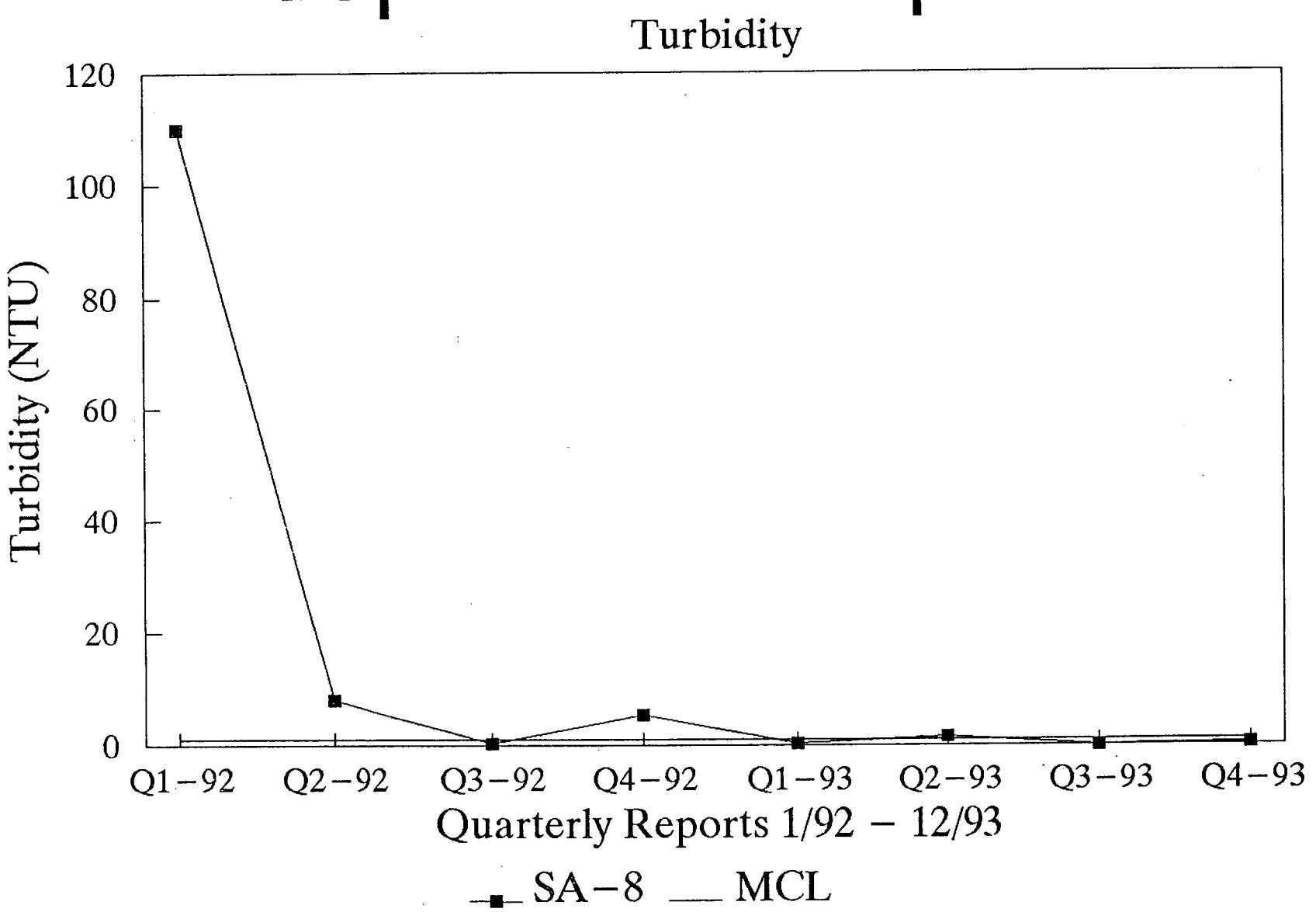
Graph 29

Deep Well Comparison



Graph 30

Deep Well Comparison



Graph 31

Deep Well Comparison