

DENR USE ONLY:

Paper Report

Electronic Data - Email CD (data loaded: Yes / No)

Doc/Event #:

NC DENR

Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- Prepare one form for each individually monitored unit.
- Please type or print legibly.
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i)).
- In Accordance with NC General Statutes Chapter 89C and 89E and NC Solid Waste Management Rules 15A NCAC 13B, be sure to affix a seal to the bottom of this page, when applicable.
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

REI Consultants, Inc.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Michael Hofe

Phone: (304) 255-2500

E-mail: mhofe@reiclabs.com

| Facility name: | Facility Address: | Facility Permit # | NC Landfill Rule: (.0500 or .1600) | Actual sampling dates (e.g., October 20-24, 2005) |
|-----------------|--|-------------------|---------------------------------------|--|
| Newton Landfill | 2436 Bethany Church Road Newton, NC 28658 | 18-01 | .0500 | 3/20 - 3/21/2007 |

Environmental Status: (Check all that apply)

- Initial/Background Monitoring Detection Monitoring Assessment Monitoring Corrective Action

Type of data submitted: (Check all that apply)

- Groundwater monitoring data from monitoring wells Methane gas monitoring data
 Groundwater monitoring data from private water supply wells Corrective action data (specify) _____
 Leachate monitoring data Other(specify) _____
 Surface water monitoring data

Notification attached? All data required by NC General Statutes is included in the attached report

- No. No groundwater or surface water standards or explosive methane gas limits were exceeded.
- Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
- Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

See attached Groundwater Monitoring Report

Facility Representative Name (Print)

Title

(Area Code) Telephone Number

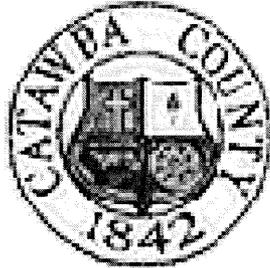
Signature

Date

Affix NC Licensed/ Professional Geologist/Engineer Seal here:

See Attached Sealed Report

Catawba County, North Carolina



Project ID:

Newton Landfill

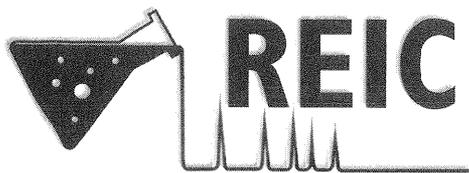
Permit: #18-01

1st Semi-Annual Groundwater Monitoring Report 2007

June 2007

Table of Contents

| | <u>Page No.</u> |
|--|-----------------|
| EXECUTIVE SUMMARY | 1 |
| INTRODUCTION | 3 |
| INVESTIGATION | 4 |
| INVESTIGATIVE RESULTS | |
| A. HYDROLOGICAL/POTENTIOMETRIC SUMMARY | 5 |
| B. ANALYTICAL SUMMARY | 8 |
| GENERAL CONCLUSIONS AND RECOMMENDATIONS | 9 |
| <i>APPENDICES</i> | |
| A. Summary of Detections | |
| B. Dissolved Metals and TSS Detections | |
| C. Sampling/Field Log Summary | |
| D. Static Water Levels and % LEL | |
| E. Sampling Locations and Topographic Contours | |
| F. Potentiometric Contour Maps | |
| G. Vertical Gradient Calculations | |



RESEARCH ENVIRONMENTAL & INDUSTRIAL CONSULTANTS, INC.

Improving the environment, one client at a time...

225 Industrial Park Rd.
Post Office Box 286
Beaver, WV 25813
800.999.0105
304.255.2500 • 304.255.2572 (fax)
website: www.reiclabs.com

Member:

- American Chemical Society
- Association of Official Analytical Chemists
- Petroleum Marketers Association
- Rural Water Association
- Mining & Reclamation Association
- American Water Works Association
- The Solid Waste Association of North America
- West Virginia Manufacturers Association
- Association of West Virginia Solid Waste Authorities
- West Virginia Oil Marketers & Grocers Association

In preparing this report, the professional services of REI Consultants, Inc. have been performed, findings obtained, and conclusions reached in accordance with present State and Federal regulations, and generally accepted review principles and practices. Questions regarding any of the information presented in this report should be directed to REIC headquarters at (304) 255-2500.

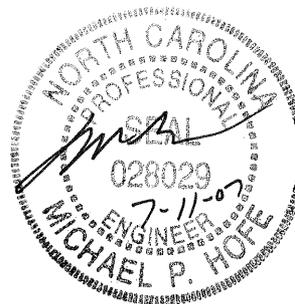
Respectfully submitted,

 7-11-07

Michael P. Hofe, PE (NC #028029)

Manager

Environmental Monitoring & Investigative Assessment Department



Executive Summary

REI Consultants, Inc., (REIC) has performed the 1st Semi-Annual 2007 monitoring program for the closed *Newton Landfill* operated by Catawba County, North Carolina. The procedural aspects of this monitoring program were determined after a review of historical records, site specific geology, consultations with the North Carolina Department of the Environment and Natural Resources (NCDENR) regulations, orders as formulated from *15A NCAC 13B*, and communications from North Carolina agency officials. During those communications it was determined that Monitoring Wells MW-1, MW-3, MW-9, MW-10A, MW-10B, MW-11, MW-13, MW-14, MW-14A, MW-15, MW-15A, MW-16, MW-16A, MW-20, MW-21, MW-23, MW-24, MW-24D, OW-1, and OW-3 were to be evaluated twice a year for particular constituents and reported in semi-annual reports relative to North Carolina groundwater standards. In addition, wells MW-7A and MW-18 are to be sampled every 18 months. NCDENR issued a letter to Catawba County dated June 3, 2004 with approval of the above monitoring network.

In March 2007, groundwater samples were obtained by REIC's environmental field technicians, utilizing the protocols established by NCDENR. Summaries of the field sampling activities are enclosed in *Appendix C* of this report. No other anomalies were experienced during this sampling with the exception of significant levels of suspended solids (*see Appendix B: "Summary of Dissolved Metals and TSS Analyses"*) contained in several groundwater specimens. The groundwater hydraulic gradients and velocities estimated from the current study are of the same magnitudes of previous investigations.

As with previous monitoring events, water levels were recorded from all monitoring wells during the 1st Semi-Annual event of 2007, as well as any existing monitoring points within the *Newton Landfill* boundaries. This information was utilized to generate the groundwater potentiometric maps for the Newton Facility. The potentiometric maps are included in *Appendix F*, and a summary of the static water level data is included as "*A Summary of Static Water Levels and %LEL*", found in *Appendix D*. An additional map indicating topographic contours and all wells at the facility is included in *Appendix E*.

Results from the 1st Semi-annual 2007 event were compared to North Carolina groundwater standards. Components determined to be above North Carolina groundwater standards are as follows:

| Component/Parameter | Monitoring Point |
|----------------------------|---|
| Acetone | MW-1 |
| Benzene | MW-1, MW-3, MW-9, MW-10A, MW-14, MW-15, MW-16, MW-20, OW-1 |
| 1,4-Dichlorobenzene | MW-9, MW-10A, MW-14 |
| 1,1-Dichloroethane | MW-1, MW-9, MW-10A, MW-14, MW-15, MW-16, MW-20 |
| 1,2-Dichloroethane | MW-11 |
| 1,1-Dichloroethene | MW-20 |
| cis-1,2-Dichloroethene | MW-9, MW-10A, MW-14, MW-15, MW-20 |
| 1,2-Dichloropropane | MW-9, MW-10A, MW-10B, MW-11, MW-20 |
| Methylene chloride | MW-9, MW-14, MW-15, MW-20, OW-1 |
| Tetrachloroethene | MW-3, MW-9, MW-10A, MW-14A, MW-16, MW-20, OW-3 |
| Trichloroethene | MW-3, MW-9, MW-10A, MW-10B, MW-13, MW-14, MW-14A, MW-15, MW-16, MW-16A, MW-20 |
| Vinyl Chloride | MW-9, MW-10A, MW-10B, MW-13, MW-14, MW-16, OW-1 |
| Nickel | MW-9 |

These findings are summarized specifically in *Appendix A* as “*Summary of 1st Semi-Annual 2007 Detections by Monitoring Well*”.

Based upon the results of the current groundwater monitoring event, and pursuant to NCDENR policy and directives, it is recommended that the *Newton Landfill* continue monitoring the modified Appendix I listing, which includes Appendix I volatiles and chromium, lead, and nickel, during the 2nd Semi-Annual Event of 2007.

Introduction

In July of 1998, REI Consultants, Inc., was contracted by Catawba County Solid Waste Authority to conduct a complete groundwater monitoring program for the closed landfill denoted as the "*Newton Landfill*", and registered with the NCDENR as Permit #18-01. REIC met with Mr. Larry Rose and Mr. Mark Poindexter of the NCDENR in August 1998, then again with Mr. Poindexter in March 1999, and discussed the requirements of the permit and subsequent Agency directives that have occurred during the past several years. Additionally, REIC reviewed records both from Catawba County's internal files and those stored at the NCDENR's Department of Records Facility in Raleigh, North Carolina. From these historical files REIC collated and generated a historical summary of the collected data for the monitoring points selected for monitoring consideration. Following the 2nd Semi-Annual monitoring event of 1998, monitoring wells MW-18, MW-19, MW-20, MW-21 and MW-22 were installed. In addition, after the 1st semi-annual 2004 event, monitoring wells MW-23, MW-24, and MW-24D were added to the program. All data from the approved monitoring network are incorporated within this report and represent what is believed to be a comprehensive collection of the groundwater quality profile for the Newton Facility.

Continuing the program in September 2006, REI Consultants, Inc. collected groundwater samples from 19 monitoring wells and two surface water sites located at the facility. The sampling was conducted to satisfy compliance with the groundwater monitoring program for the 1st Semi-Annual 2007 monitoring event.

Additionally, the groundwater potentiometric surface has been modeled and is presented in the form of a static groundwater level contour map. This map identifies the general subsurface water movement and assists in determining potential, as well as identifiable, contaminant movement. As agreed, groundwater constituent levels (relative to NC groundwater standards), the potentiometric surface, and groundwater flow rates are presented in this report.

Investigation

The groundwater and surface water monitoring points were sampled in accordance with State and Federal guidelines. Static water levels were measured prior to and during well purging to ascertain groundwater elevations and generate data to later produce a valid potentiometric map. The monitoring wells were purged using laboratory decontaminated Teflon™ bailers before sampling, and field analytical testing was employed to assure adequate purging. Copies of the field sampling reports have been provided to Catawba County in a separate report (summaries of these logs are enclosed with this report in *Appendix C*). Groundwater samples were taken as specified in REIC's Standard Operating Procedures (SOPs) that satisfy NCDENR Solid Waste regulations and guidance.

Groundwater samples were stored in pre-cleaned, preserved containers, transported in iced coolers, and delivered to the laboratory in good condition by REIC field personnel. The samples were analyzed in the laboratory referencing current EPA and NCDENR approved methodologies.

Methane measurements, as percent Lower Explosion Limit (% LEL), were recorded at each monitoring well prior to purging. Initial readings were taken at the top of casing as soon as the well caps (where installed) were removed. A second measurement was obtained after sufficient time had elapsed to allow for the equalization of any pressure differential between the well casing and the ambient surface. The methane measurements are documented in *Appendix D: "Summary of All Static Water Levels and %LEL"*.

The groundwater data are presented within this report relative to NC groundwater quality standards. Per instructions of the NCDENR Solid Waste Section representatives, the data have not been processed in a statistical manner to distinguish significant down-gradient elevations of constituents. However, constituents exceeding NC groundwater quality standards are noted in the *"1st Semi Annual 2007 Summary of Detections"* in Appendix A.

The laboratory Quality Assurance Program included all appropriate, method specific Quality Controls. All laboratory data met the required QC criteria and were subjected to stringent REIC acceptance review prior to approval for inclusion in this report. Copies of the individual laboratory reports have been provided to Catawba County in a separate report.

Investigation Results

A. HYDROLOGICAL POTENTIOMETRIC SUMMARY

Models of two potentiometric surfaces have been prepared from the field data collected during the 1st Semi-Annual 2007 groundwater sampling event. One model has been created to depict the upper-most or Shallow Aquifer and another has been produced to portray a deeper or Bedrock Aquifer.

Both models were developed from groundwater elevation data calculated from the static water levels measured during the spring 2007 sampling event. The groundwater depth measurements were obtained in the monitoring wells by REIC field personnel, prior to the execution of the purging and sampling procedures. Horizontal and vertical control for the field data was established from mapping based on NC State Plane coordinates, as provided by J. Mike Honeycutt Surveying.

Digital, grid-cell models were developed from the elevation data through the application of algorithms. The mapping area was divided into gridding cells and the algorithms were applied to determine the projected groundwater elevation at each cell node. Contour lines representing the potentiometric surfaces have been drawn between the grid-cells of discrete, integral elevation values to produce maps for the Shallow Aquifer and the Bedrock Aquifer that are contained in this report.

The potentiometric maps for each aquifer include the waste disposal area boundaries, landfill gas collection system, and streams. These features were transcribed from drawings provided by McGill Associates, P.A. An additional map that includes all wells at the facility as well as topographic contours is included in Appendix E: "Sampling Locations and Topographic Contours". Topographic contours were also provided by drawings from McGill Associates, P.A.

The Shallow Aquifer is the upper-most water-bearing zone of the Newton Landfill site. While some of the geologic material of the zone may be eluvial in origin, the lithology is essentially unconsolidated sediment of silt and sand sizes. It has been determined that 20 wells have screens set in this zone, although actual drill logs are not available for confirmation for a few of the wells at the site. The potentiometric map for this aquifer was modeled utilizing static water levels from wells screened in the upper-most aquifer, as well as from stream elevation points and topographic contours. A copy of this drawing is included in *Appendix F: "Potentiometric Contour Maps"*.

The Bedrock Aquifer is the deeper groundwater zone monitored at the landfill site. The lithology of this aquifer has typically been described as a weathered, biotite gneiss. While the Shallow and Bedrock Aquifers were analyzed separately and are shown on two different potentiometric drawings, no continuous aquitard can be distinguished between the two zones in the drilling information. Groundwater elevations from 16 deeper-screened wells were utilized to create the Bedrock Aquifer model. No stream water elevations were included in this analysis. The databases for the Shallow and Bedrock Aquifers contained separate measurement points. The wells in the deeper database were shown by drill logs to have screens set in the bedrock or are of a sufficient depth to logically be screened in the referenced zone. All of the deep wells identified in the available drill logs have screens that are set fully in the weathered rock except for two partially penetrating wells that have screens with tops exposed to sediment. In order to estimate the bedrock potentiometric contours, a hybrid algorithm was applied to the Bedrock Aquifer data that consisted of three parts inverse-distance and one part multiple linear regression. A copy of the resulting potentiometric map is contained in *Appendix F: "Potentiometric Contour Maps"*.

The horizontal component of hydraulic gradient has been estimated graphically for the Shallow and Bedrock Aquifers. In each case, flow paths were chosen which traverse the central portions of the main waste disposal area of the *Newton Landfill*. The paths were drawn on the respective potentiometric maps, following traces that are approximately normal to the hydrostatic contours, from the up-gradient western portion of the waste area to the locale of the stream along the eastern border. Other flow routes could have been chosen with varying results for the measured hydraulic gradient. The flow paths utilized in the calculation of the hydraulic gradients for the two aquifers are illustrated on drawings included in *Appendix F: "Potentiometric Contour Maps."*

Vertical gradient calculations have been prepared for seven sets of clustered wells at the Newton Facility. These calculations generally indicate discharge conditions in the vicinity of the streams and recharge in upland areas of the site. A copy of the vertical gradient analysis is included in *Appendix G*.

Lateral groundwater flow velocities have been estimated for the two aquifers using a form of Darcy's Law, as follows:

Shallow Aquifer:

$$V = \frac{KI}{n} = \frac{46 \text{ ft}}{\text{yr}}$$

where:

V = Groundwater Seepage Velocity in ft/yr.

K = Average Hydraulic Conductivity = 2.8×10^{-4} cm/sec
(Averaged from data previously provided by others).

I = Hydraulic Gradient = 0.032 ft/ft.

Following a path normal to the groundwater potentiometric contours across the main waste disposal area.

n = Effective Porosity = 0.20 (unitless).
(Typical textbook value).

Bedrock Aquifer:

$$V = \frac{KI}{n} = \frac{1100 \text{ ft}}{\text{yr}}$$

where:

V = Groundwater Seepage Velocity in ft/yr.

K = Average Hydraulic Conductivity = 2.5×10^{-3} cm/sec.
(Averaged from data previously provided by others).

I = Hydraulic Gradient = 0.042 ft/ft.

Following a path normal to the groundwater potentiometric contours across the main waste disposal area.

n = Effective Porosity = 0.10 (unitless).
(Typical textbook value).

B. ANALYTICAL SUMMARY

Analytical parameters which were detected to be above the minimum laboratory Practical Quantitation Limits are summarized in *Appendix A*, a “*Summary of Detections by Monitoring Well*”, which is included on the following pages. Values greater than the North Carolina groundwater standards are shown in red print.

All available analytical results of previous sampling events are included as a separate document under the section: “*Historical Data Summary*”. Components determined to be above North Carolina groundwater standards for the 1st Semi-Annual 2007 groundwater sampling event are as follows:

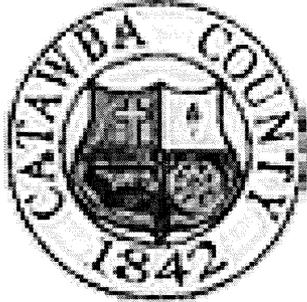
| Component/Parameter | Monitoring Point |
|------------------------|---|
| Acetone | MW-1 |
| Benzene | MW-1, MW-3, MW-9, MW-10A, MW-14, MW-15, MW-16, MW-20, OW-1 |
| 1,4-Dichlorobenzene | MW-9, MW-10A, MW-14 |
| 1,1-Dichloroethane | MW-1, MW-9, MW-10A, MW-14, MW-15, MW-16, MW-20 |
| 1,2-Dichloroethane | MW-11 |
| 1,1-Dichloroethene | MW-20 |
| cis-1,2-Dichloroethene | MW-9, MW-10A, MW-14, MW-15, MW-20 |
| 1,2-Dichloropropane | MW-9, MW-10A, MW-10B, MW-11, MW-20 |
| Methylene chloride | MW-9, MW-14, MW-15, MW-20, OW-1 |
| Tetrachloroethene | MW-3, MW-9, MW-10A, MW-14A, MW-16, MW-20, OW-3 |
| Trichloroethene | MW-3, MW-9, MW-10A, MW-10B, MW-13, MW-14, MW-14A, MW-15, MW-16, MW-16A, MW-20 |
| Vinyl Chloride | MW-9, MW-10A, MW-10B, MW-13, MW-14, MW-16, OW-1 |
| Nickel | MW-9 |

These findings are summarized specifically in *Appendix A* as “*Summary of 1st Semi-Annual 2007 Detections by Monitoring Well*”.

General Conclusions and Recommendations

Based upon the results of the current groundwater monitoring event, and pursuant to NCDENR policy and directives, it is recommended that the *Newton Landfill* continue in its current monitoring mode, with analysis of the modified Appendix I list, during the 2nd Semi-Annual Event of 2007.

APPENDIX A



Newton Landfill *1st Semi-Annual 2007 Summary of Detections*

The following summary is a complete listing of concentrations detected above laboratory Practical Quantitation Limits (PQLs) during the 1st Semi-Annual monitoring event of 2007. Concentrations detected at levels above established North Carolina groundwater standards (as denoted in bold print) are highlighted in red. Monitoring wells having specimens containing less than SWSL quantities of respective analytes are noted as blank entries.

Newton Landfill

Permit: #18-01
1st Semi Annual 2007

-Summary of Detections-



Summary of Detections by Monitoring Well

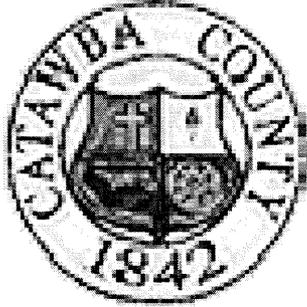
| Parameter | GW Standard ¹ | SWSL | MW-1 | MW-3 | MW-7A | MW-9 | MW-10A | MW-10B | MW-11 | MW-13 | MW-14 | MW-14A | MW-15 | MW-16 | MW-16A | MW-18 | MW-20 | MW-21 | MW-23 | MW-24 | MW-24D | OW-1 | OW-3 | CR-1 | SW-2 |
|------------------------|--------------------------|-------|--------------|---------------|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|---------------|--------------|-------|---------------|-------|-------|-------|--------|---------------|---------------|--------------|------|
| Acetone | 0.7 | 0.100 | 0.95 | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 0.001 | 0.001 | 0.010 | 0.0011 | | 0.014 | 0.008 | | | | 0.016 | | 0.019 | 0.0032 | | | 0.013 | | | | | 0.0032 | | | |
| Chloroethane | 2.800 | 0.010 | 0.301 | 0.003 | | | | | | | | | | 0.011 | | | | | | | | | | | |
| 1,4-Dichlorobenzene | 0.0014 | 0.001 | | | | 0.008 | 0.005 | | | | 0.018 | | | | | | 0.0014 | | | | | | | | |
| 1,1-Dichloroethane | 0.07 | 0.005 | 0.113 | 0.030 | | 0.458 | 0.358 | 0.050 | 0.006 | 0.038 | 0.563 | | 0.469 | 0.144 | 0.025 | | 0.708 | | | | | 0.010 | | 0.009 | |
| 1,2-Dichloroethane | 0.00038 | 0.001 | | | | | | | 0.0041 | | | | | | | | | | | | | | | | |
| 1,1-Dichloroethene | 0.007 | 0.005 | | 0.0042 | | | 0.0063 | | | 0.0038 | | | | | | | 0.011 | | | | | | | | |
| cis-1,2-Dichloroethene | 0.07 | 0.005 | | | | 0.33 | 0.114 | 0.007 | | 0.049 | 1.270 | | 0.572 | 0.018 | 0.052 | | 0.617 | | | | | | | | |
| 1,2-Dichloropropane | 0.00051 | 0.001 | | | | 0.045 | 0.031 | 0.001 | 0.001 | | | | | | | | 0.0032 | | | | | | | | |
| Ethylbenzene | 0.550 | 0.001 | 0.007 | | | 0.0108 | | | | | 0.045 | | | | | | | | | | | 0.0017 | | | |
| 2-Hexanone | 0.280 | 0.050 | 0.060 | | | | | | | | | | | | | | | | | | | | | | |
| Methylene chloride | 0.0046 | 0.001 | | 0.0021 | | 0.021 | | 0.0016 | | | 0.082 | | 0.335 | | | | 0.074 | | | | | 0.007 | | | |
| Methyl ethyl ketone | 4.20 | 0.100 | 2.30 | | | | | | | | | | | | | | | | | | | | | | |
| 4-Methyl-2-pentanone | 0.560 | 0.100 | 0.225 | | | | | | | | | | | | | | | | | | | | | | |
| Tetrachloroethene | 0.0007 | 0.001 | | 0.0018 | | 0.0057 | 0.0092 | | | | | 0.020 | | 0.0022 | | | 0.047 | | | | | | 0.002 | | |
| 1,1,1-Trichloroethane | 0.2 | 0.001 | | | | | | | | | | | | | | | 0.0015 | | | | | | | | |
| Trichloroethene | 0.0028 | 0.001 | | 0.0031 | | 0.025 | 0.015 | 0.004 | 0.0012 | 0.020 | 0.0541 | 0.0038 | 0.146 | 0.050 | 0.023 | | 0.587 | | | | | 0.002 | 0.0017 | | |
| Trichlorofluoromethane | 2.1 | 0.001 | | | | | | | 0.017 | 0.019 | | 0.0017 | 0.043 | | 0.024 | | | | | | | | | | |
| Toluene | 1 | 0.001 | 0.453 | | | 0.058 | | | | | 0.084 | | | | | | | | | | | | | | |
| Vinyl chloride | 0.000015 | 0.001 | | | | 0.019 | 0.0146 | 0.006 | | 0.0037 | 0.027 | | | 0.007 | | | | | | | | 0.0084 | | | |
| Xylenes | 0.53 | 0.003 | 0.018 | 0.005 | | 0.079 | | | | | 0.178 | | 0.054 | | | | | | | | | | | | |
| Chromium | 0.05 | 0.010 | | | | | 0.019 | | | | | | | | | | | | | | | | | | |
| Nickel | 0.1 | 0.050 | | | | 0.638 | | | | | | | | | | | | | | | | | | | |
| Lead | 0.015 | 0.010 | | | | | | | | | | | | | | | | | | | | | | | |
| TSS | | 1 | 71 | 105 | 16 | 153 | 804 | 10 | 94 | 42 | 418 | 63 | 162 | 454 | 7 | 4 | 8 | 25 | 670 | 775 | 498 | 1270 | 167 | 6 | 6 |

Footnotes:

¹ GW Standard - North Carolina groundwater standards (mg/L).
SWSL - Solid Waste Section Limits

Special Notes:
-All concentrations detected above the GWS are highlighted in red and bold text.
-All data reported in mg/L.
-Trip Blank results for all volatile analyses were ND (not detected) at the PQL.

APPENDIX B



Newton Landfill Dissolved Metals and TSS Detections

The data for dissolved metals and Total Suspended Solids (TSS) are reported on a voluntary basis and is not required by North Carolina DENR regulations. The following summary is a complete listing of concentrations detected above laboratory Practical Quantitation Limits (PQLs) during the 1st Semi-Annual monitoring event of 2007. Monitoring wells having specimens containing less than SWSL quantities of respective analytes are noted as blank entries.

Newton Landfill

Permit: #18-01
1st Semi Annual 2007

-Summary of Dissolved Metals and TSS Detections-

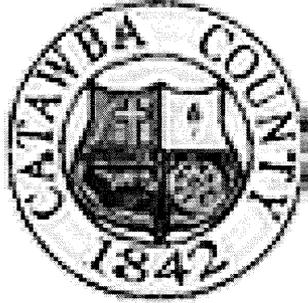


| Parameter | PQL ¹ | Summary of Detections by Monitoring Well | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|------------------|--|------|-------|-------|--------|--------|-------|-------|-------|--------|-------|-------|--------|-------|-------|-------|-------|-------|--------|------|------|------|------|--|
| | | MW-1 | MW-3 | MW-7A | MW-9 | MW-10A | MW-10B | MW-11 | MW-13 | MW-14 | MW-14A | MW-15 | MW-16 | MW-16A | MW-18 | MW-20 | MW-21 | MW-23 | MW-24 | MW-24D | OW-1 | OW-3 | CR-1 | SW-2 | |
| Chromium, Dissolved | 0.010 | | | | | 0.0129 | | | | | | | | | | | | | | | | | | | |
| Lead, Dissolved | 0.010 | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel, Dissolved | 0.050 | | | | 0.747 | | | | | | | | | | | | | | | | | | | | |
| Total Suspended Solids (TSS) | 1 | 71 | 105 | 16 | 153 | 804 | 10 | 94 | 42 | 418 | 63 | 163 | 454 | 7 | 4 | 8 | 25 | 670 | 775 | 498 | 1270 | 167 | 6 | 6 | |

Footnotes: 1. PQL - Practical Quantitation Limit (mg/L).
2. ND - Not Detected at the PQL.

Special Notes: -All data reported in mg/L.

APPENDIX C



Newton Landfill
Sampling/Field Log Summaries

Newton Landfill

Permit: #18-01
1st Semi-Annual Monitoring 2007

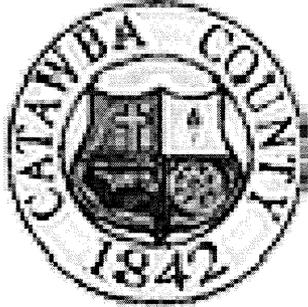
Sampling Date: 3/20-3/21/07
Sampler(s): R. Farley/A. McBride
Weather Conditions: Cloudy 55°F

-Sampling Information-



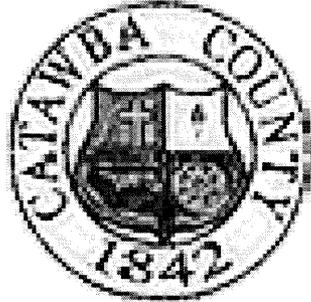
| | | Sampling Log Summaries | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|----------|----------------------------|---------------------|-----------------|---------------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|-----------------|----------------|----------------|----------------|----------------|-----------------|----------------|-----------------|-----------------|-----------------|----------------|-----------------|--|
| Property | Units | MW-1 | MW-3 | MW-7A | MW-9 | MW-10A | MW-10B | MW-11 | MW-13 | MW-14 | MW-14A | MW-15 | MW-16 | MW-16A | MW-18 | MW-20 | MW-21 | MW-23 | MW-24 | MW-24D | OW-1 | OW-3 | CR-1 | SW-2 | |
| Sampling Depth | Feet | 15.77 | 29.38 | 30.51 | 39.13 | 35.95 | 33.85 | 17.95 | 17.82 | 30.52 | 30.87 | 24.51 | 11.59 | 32.62 | 14.18 | 32.61 | 19.82 | 20.75 | 28.50 | 70.30 | 30.52 | 29.03 | ---- | ---- | |
| Static Depth | Feet | 12.93 | 28.34 | 13.88 | 35.2 | 34.86 | 33.85 | 15.25 | 16.65 | 28.28 | 29.00 | 19.34 | 7.31 | 4.32 | 13.73 | 29.21 | 19.82 | 13.55 | 20.18 | 23.18 | 27.64 | 29.03 | ---- | ---- | |
| Well Depth | Feet | 29.60 | 40.40 | 78.38 | 45.63 | 49.02 | 87.78 | 36.12 | 78.70 | 34.45 | 85.56 | 33.78 | 20.40 | 81.70 | 83.31 | 84.80 | 69.80 | 34.11 | 36.60 | 86.32 | 36.46 | 30.90 | ---- | ---- | |
| Water Column Height | Feet | 16.67 | 12.06 | 64.50 | 10.43 | 14.16 | 53.93 | 20.87 | 62.05 | 6.17 | 56.56 | 14.44 | 13.09 | 77.38 | 69.58 | 55.59 | 49.98 | 20.56 | 16.42 | 63.14 | 8.82 | 1.87 | ---- | ---- | |
| Volume Purged | Liters | 29 | 13 | 114 | 6 | 25 | 0 | 36 | 90 | 11 | 90 | 25 | 20 | 120 | 110 | 42 | 0 | 35 | 29 | 71 | 15 | 0 | ---- | ---- | |
| Purging Status | ---- | Finished | Purged Dry | Finished | Stopped | Finished | - | Finished | Finished | Finished | Finished | Finished | Finished | Finished | Finished | Purged Dry | - | Finished | Finished | Purged Dry | Finished | - | ---- | ---- | |
| | | Physical Properties | | | | | | | | | | | | | | | | | | | | | | | |
| pH | SU | 6.73 | 5.57 | 6.61 | 5.7 | 6.42 | 7.72 | 6.57 | 6.78 | 6.26 | 6.62 | 4.57 | 6.15 | 7.25 | 6.85 | 5.80 | 10.30 | 4.69 | 5.12 | 6.11 | 5.21 | 5.2 | 7.33 | 6.87 | |
| Temperature | °C | 15.5 | 17.8 | 13.4 | 17.2 | 16.7 | 16.6 | 16.2 | 13.4 | 16.0 | 15.6 | 16.3 | 12.6 | 13.5 | 13.2 | 14.7 | 16.4 | 18.5 | 15.6 | 15.5 | 16.7 | 18.4 | 12.9 | 11.8 | |
| Conductivity | umhos/cm | 2630 | 108.8 | 88.7 | 2740 | 1131 | 287 | 100.4 | 184.7 | 1697 | 60.8 | 40.5 | 373 | 224 | 69.7 | 187.6 | 107.1 | 262 | 44.5 | 55.6 | 118.8 | 47.9 | 168.6 | 169.3 | |
| Turbidity | NTU | 17.52 | >200 | 20.7 | 69.5 | >200 | 18.94 | 116 | 32.3 | >200 | 48.1 | >200 | 190 | 1.79 | 1.07 | 4.07 | 11.85 | >200 | >200 | >200 | >200 | >200 | 2.89 | 34.6 | |
| Appearance | ---- | Clear, slight odor | Cloudy, slight odor | Cloudy, no odor | Cloudy, slight odor | Cloudy, slight odor | Clear, slight odor | Cloudy, no odor | Cloudy, no odor | Cloudy, slight odor | Clear, slight odor | Cloudy, no odor | Cloudy, no odor | Clear, no odor | Clear, no odor | Clear, no odor | Clear, no odor | Cloudy, no odor | Muddy, no odor | Cloudy, no odor | Cloudy, no odor | Cloudy, no odor | Clear, no odor | Cloudy, no odor | |
| TSS | mg/L | 71 | 105 | 16 | 153 | 804 | 10 | 94 | 42 | 418 | 63 | 162 | 454 | 7 | 4 | 8 | 25 | 670 | 775 | 498 | 1270 | 167 | 6 | 6 | |

APPENDIX D



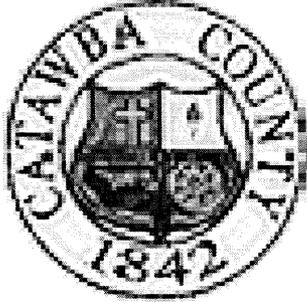
Newton Landfill
Static Water Levels and % LEL

APPENDIX E



Newton Landfill
Sampling Locations & Topographic Contours

APPENDIX F



Newton Landfill
Potentiometric Contour Maps



**SHALLOW AQUIFER
POTENTIOMETRIC MAP
WITH HYDRAULIC
GRADIENT PATH**

1ST SEMI-ANNUAL EVENT 2007
GROUNDWATER MONITORING PROGRAM

NEWTON LANDFILL
CATAWBA COUNTY NC

LEGEND

- MW-3
993.47
- MONITORING WELL ID
- GROUNDWATER ELEVATION
- MONITORING WELL / ANALYTICAL DATA
- MONITORING WELL / ELEVATION DATA ONLY
- STREAM SAMPLE
- STREAMS & PONDS
- PROPERTY LINE
- GW POTENTIOMETRIC CONTOURS
- LANDFILL GAS COLLECTION SYSTEM
- APPROXIMATE WASTE AREA BOUNDARY
- TOPOGRAPHIC CONTOURS
- PATH FOR HYDRAULIC GRADIENT CALCULATION

ALL MEASUREMENTS IN FEET
SCALE: 1" = 400'

PREPARED BY:
REI CONSULTANTS INC.
MAY 2007

**BEDROCK AQUIFER
POTENTIOMETRIC MAP
WITH HYDRAULIC
GRADIENT PATH**

1ST SEMI-ANNUAL EVENT 2007
GROUNDWATER MONITORING PROGRAM

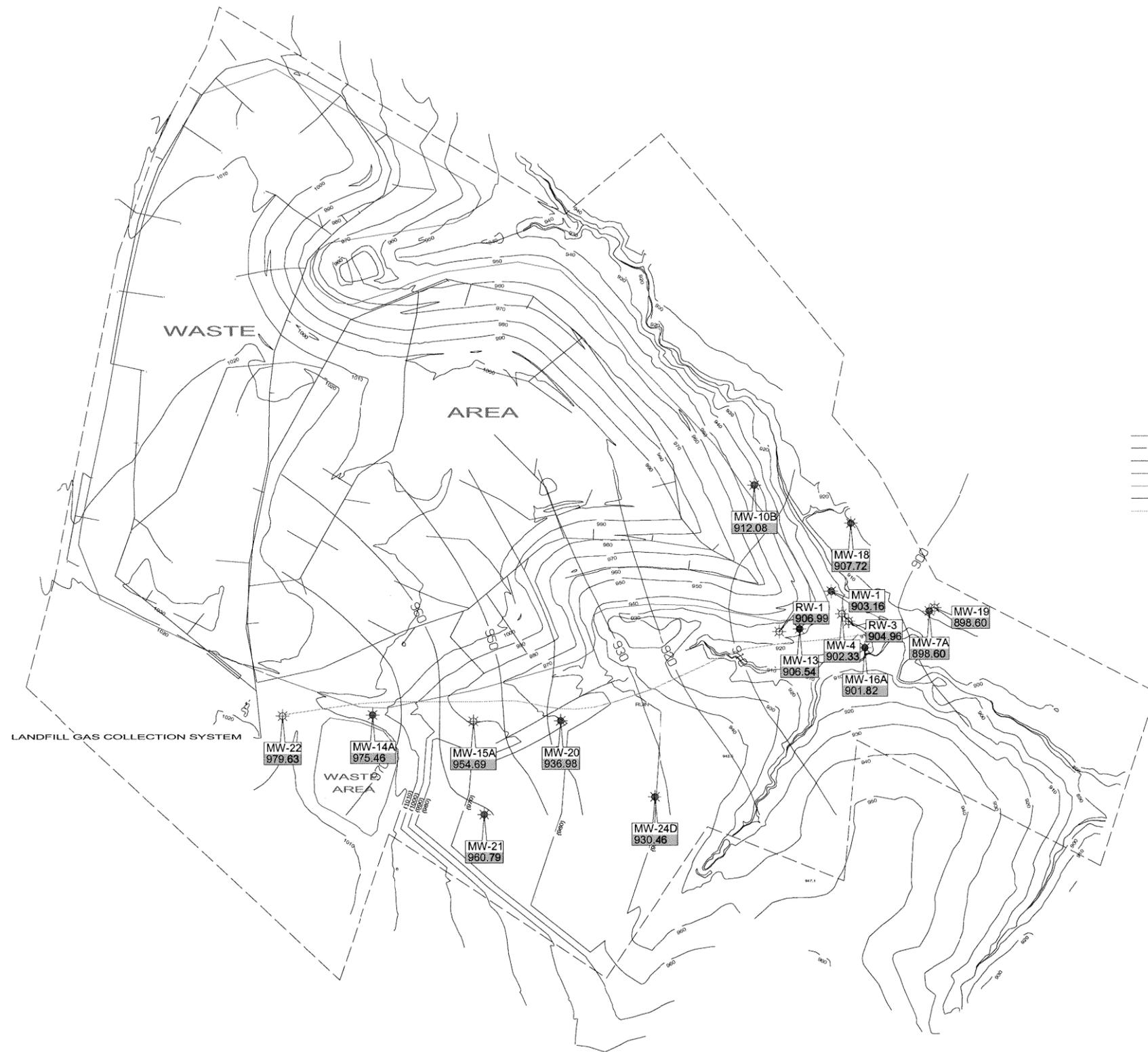
NEWTON LANDFILL
CATAWBA COUNTY NC

LEGEND

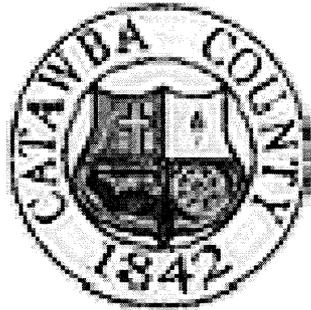
- MW-4 MONITORING WELL ID
- 902.33 GROUNDWATER ELEVATION
- ☼ MONITORING WELL / ANALYTICAL DATA
- ☼ MONITORING WELL / ELEVATION DATA ONLY
- △ STREAM SAMPLE
- STREAMS & PONDS
- - - PROPERTY LINE
- GW POTENTIOMETRIC CONTOURS
- LANDFILL GAS COLLECTION SYSTEM
- APPROXIMATE WASTE AREA BOUNDARY
- TOPOGRAPHIC CONTOURS
- PATH FOR HYDRAULIC GRADIENT CALCULATION

ALL MEASUREMENTS IN FEET
SCALE: 1" = 400'

PREPARED BY:
REI CONSULTANTS INC.
MAY 2007



APPENDIX G



Newton Landfill
Vertical Gradient Calculations

VERTICAL GRADIENT CALCULATIONS

| Well ID | Easting | Northing | Sur. El. | TOC | Material Screened | GW Depth (from TOC) | GW El. | Top Scn. Elevation | Bot. Scn. Elevation | Saturated Screen Mid-Point Elevation |
|---------|---------|----------|----------|--------|-------------------|---------------------|--------|--------------------|---------------------|--------------------------------------|
| | (Feet) | (Feet) | (Feet) | (Feet) | | (Feet) | (Feet) | (Feet) | (Feet) | (Feet) |

| | | | | | | | | | | |
|----------------|------------|-----------|--------|-----------|-----------|------------------|--------|------------|--------|--------|
| MW-2A | 1359171.20 | 699131.50 | 921.12 | 924.32 | Sediment | 18.91 | 905.41 | 911.12 | 901.12 | 906.12 |
| MW-13 | 1359184.60 | 699134.60 | 921.69 | 923.19 | Rock | 16.65 | 906.54 | 856.69 | 846.69 | 851.69 |
| COMPARISON: | | | | DH (Ft.): | DZ (Ft.): | DH/DZ (Ft./Ft.): | | CONDITION: | | |
| MW-2A TO MW-13 | | | | -1.13 | 54.43 | -0.021 | | DISCHARGE | | |

| | | | | | | | | | | |
|----------------|------------|-----------|--------|-----------|--------------|------------------|--------|-------------|--------|--------|
| MW-7 | 1359605.50 | 699187.80 | 910.31 | 913.21 | Sediment | 16.56 | 896.65 | 897.01 | 887.01 | 892.01 |
| MW-7A | 1359601.00 | 699191.40 | 909.48 | 912.48 | Rock | 13.88 | 898.60 | 843.48 | 833.48 | 838.48 |
| MW-19 | 1359617.60 | 699201.90 | 911.36 | 913.67 | Rock? No Log | 15.07 | 898.60 | 805.17 | 795.17 | 800.17 |
| COMPARISON: | | | | DH (Ft.): | DZ (Ft.): | DH/DZ (Ft./Ft.): | | CONDITION: | | |
| MW-7 TO MW-7A | | | | -1.95 | 53.53 | -0.036 | | DISCHARGE | | |
| MW-7A TO MW-19 | | | | 0 | 38.31 | 0.000 | | NO GRADIENT | | |
| MW-7 TO MW-19 | | | | -1.95 | 91.84 | -0.021 | | DISCHARGE | | |

| | | | | | | | | | | |
|------------------|------------|-----------|--------|-----------|-----------|------------------|--------|------------|--------|--------|
| MW-10A | 1359040.10 | 699576.50 | 942.61 | 944.11 | Sediment | 34.86 | 909.25 | 904.61 | 894.61 | 899.61 |
| MW-10B | 1359041.30 | 699592.60 | 942.60 | 945.93 | Rock | 33.85 | 912.08 | 868.15 | 858.15 | 863.15 |
| COMPARISON: | | | | DH (Ft.): | DZ (Ft.): | DH/DZ (Ft./Ft.): | | CONDITION: | | |
| MW-10A TO MW-10B | | | | -2.83 | 36.46 | -0.078 | | DISCHARGE | | |

| | |
|--|--|
| Abbreviations: | |
| Well ID: Well Identification Number | Top Scn. Elevation: Elevation Of Top Of Screen |
| Easting: Well Location East Coordinate | Bot. Scn. Elevation: Elevation Of Bottom Of Screen |
| Northing: Well Location North Coordinate | Saturated Screen Mid-Point Elevation: Mid-Point Elevation Of Wetted Portion Of Well Screen |
| Sur. El.: Ground Surface Elevation | DH: Difference In Groundwater Elevation (Head), Upper Screen Minus Lower Screen |
| TOC: Top Of Casing Elevation | DZ: Difference In Saturated Well Screen Mid-Point Elevations Upper Screen Minus Lower Screen |
| Material Screened: Lithology Of Materials In Screened Zone | DH/DZ: DH Divided By DZ = Vertical Gradient |
| GW Depth: Measured Depth To Groundwater From TOC | |
| GW El.: Elevation Of Groundwater | |

VERTICAL GRADIENT CALCULATIONS

| Well ID | Easting | Northing | Sur. El. | TOC | Material Screened | GW Depth (from TOC) | GW El. | Top Scn. Elevation | Bot. Scn. Elevation | Saturated Screen Mid-Point Elevation |
|---------|---------|----------|----------|--------|-------------------|---------------------|--------|--------------------|---------------------|--------------------------------------|
| | (Feet) | (Feet) | (Feet) | (Feet) | | (Feet) | (Feet) | (Feet) | (Feet) | (Feet) |

| | | | | | | | | | | |
|-------|------------|-----------|---------|---------|----------|-------|--------|--------|--------|--------|
| MW-14 | 1357834.90 | 698855.70 | 1002.13 | 1003.63 | Sediment | 28.28 | 975.35 | 979.13 | 969.13 | 972.24 |
|-------|------------|-----------|---------|---------|----------|-------|--------|--------|--------|--------|

| | | | | | | | | | | |
|--------|------------|-----------|---------|---------|--------------|-------|--------|--------|--------|--------|
| MW-14A | 1357821.20 | 698861.10 | 1002.46 | 1004.46 | Rock? No Log | 29.00 | 975.46 | 929.46 | 919.46 | 924.46 |
|--------|------------|-----------|---------|---------|--------------|-------|--------|--------|--------|--------|

| | | | | | | | | | | |
|-----------------|--|--|--|-----------|-----------|------------------|------------|--|--|--|
| COMPARISON: | | | | DH (Ft.): | DZ (Ft.): | DH/DZ (Ft./Ft.): | CONDITION: | | | |
| MW-14 TO MW-14A | | | | -0.11 | 47.78 | -0.002 | DISCHARGE | | | |

| | | | | | | | | | | |
|-------|------------|-----------|--------|--------|----------|-------|--------|--------|--------|--------|
| MW-15 | 1358150.40 | 698848.20 | 977.60 | 979.88 | Sediment | 19.34 | 960.54 | 955.60 | 945.60 | 950.60 |
|-------|------------|-----------|--------|--------|----------|-------|--------|--------|--------|--------|

| | | | | | | | | | | |
|--------|------------|-----------|--------|--------|--------------|-------|--------|--------|--------|--------|
| MW-15A | 1358139.90 | 698840.70 | 978.54 | 980.82 | Rock? No Log | 26.13 | 954.69 | 908.54 | 898.54 | 903.54 |
|--------|------------|-----------|--------|--------|--------------|-------|--------|--------|--------|--------|

| | | | | | | | | | | |
|-----------------|--|--|--|-----------|-----------|------------------|------------|--|--|--|
| COMPARISON: | | | | DH (Ft.): | DZ (Ft.): | DH/DZ (Ft./Ft.): | CONDITION: | | | |
| MW-15 TO MW-15A | | | | 5.85 | 47.06 | 0.124 | RECHARGE | | | |

| | | | | | | | | | | |
|-------|------------|-----------|--------|--------|------------------|------|--------|--------|--------|--------|
| MW-16 | 1359385.20 | 699085.70 | 905.63 | 907.13 | Sediment? No Log | 7.31 | 899.82 | 897.63 | 887.63 | 892.63 |
|-------|------------|-----------|--------|--------|------------------|------|--------|--------|--------|--------|

| | | | | | | | | | | |
|--------|------------|-----------|--------|--------|------|------|--------|--------|--------|--------|
| MW-16A | 1359395.60 | 699074.50 | 904.14 | 906.14 | Rock | 4.32 | 901.82 | 833.84 | 823.84 | 828.84 |
|--------|------------|-----------|--------|--------|------|------|--------|--------|--------|--------|

| | | | | | | | | | | |
|-----------------|--|--|--|-----------|-----------|------------------|------------|--|--|--|
| COMPARISON: | | | | DH (Ft.): | DZ (Ft.): | DH/DZ (Ft./Ft.): | CONDITION: | | | |
| MW-16 TO MW-16A | | | | -2.00 | 63.79 | -0.031 | DISCHARGE | | | |

| | |
|--|--|
| Abbreviations: | Top Scn. Elevation: Elevation Of Top Of Screen |
| Well ID: Well Identification Number | Bot. Scn. Elevation: Elevation Of Bottom Of Screen |
| Easting: Well Location East Coordinate | Saturated Screen Mid-Point Elevation: Mid-Point Elevation Of Wetted Portion Of Well Screen |
| Northing: Well Location North Coordinate | DH: Difference In Groundwater Elevation (Head), Upper Screen Minus Lower Screen |
| Sur. El.: Ground Surface Elevation | DZ: Difference In Saturated Well Screen Mid-Point Elevations Upper Screen Minus Lower Screen |
| TOC: Top Of Casing Elevation | DH/DZ: DH Divided By DZ = Vertical Gradient |
| Material Screened: Lithology Of Materials In Screened Zone | |
| GW Depth: Measured Depth To Groundwater From TOC | |
| GW El.: Elevation Of Groundwater | |

VERTICAL GRADIENT CALCULATIONS

| Well ID | Easting | Northing | Sur. El. | TOC | Material Screened | GW Depth (from TOC) | GW El. | Top Scn. Elevation | Bot. Scn. Elevation | Saturated Screen Mid-Point Elevation |
|---------|---------|----------|----------|--------|-------------------|---------------------|--------|--------------------|---------------------|--------------------------------------|
| | (Feet) | (Feet) | (Feet) | (Feet) | | (Feet) | (Feet) | (Feet) | (Feet) | (Feet) |

| | | | | | | | | | | |
|-------|------------|-----------|--------|--------|----------|-------|--------|--------|--------|--------|
| MW-24 | 1358715.00 | 698582.70 | 951.20 | 954.14 | Sediment | 20.18 | 933.96 | 927.70 | 917.70 | 922.70 |
|-------|------------|-----------|--------|--------|----------|-------|--------|--------|--------|--------|

| | | | | | | | | | | |
|--------|------------|-----------|--------|--------|--------------|-------|--------|--------|--------|--------|
| MW-24D | 1358722.10 | 698600.00 | 950.23 | 953.64 | Rock? No Log | 23.18 | 930.46 | 877.60 | 867.60 | 872.60 |
|--------|------------|-----------|--------|--------|--------------|-------|--------|--------|--------|--------|

| | | | | |
|-----------------|-----------|-----------|------------------|------------|
| COMPARISON: | DH (Ft.): | DZ (Ft.): | DH/DZ (Ft./Ft.): | CONDITION: |
| MW-24 TO MW-24D | 3.50 | 50.1 | 0.070 | RECHARGE |

| | |
|--|--|
| Abbreviations: | Top Scn. Elevation: Elevation Of Top Of Screen |
| Well ID: Well Identification Number | Bot. Scn. Elevation: Elevation Of Bottom Of Screen |
| Easting: Well Location East Coordinate | Saturated Screen Mid-Point Elevation: Mid-Point Elevation Of Wetted Portion Of Well Screen |
| Northing: Well Location North Coordinate | DH: Difference In Groundwater Elevation (Head), Upper Screen Minus Lower Screen |
| Sur. El.: Ground Surface Elevation | DZ: Difference In Saturated Well Screen Mid-Point Elevations Upper Screen Minus Lower Screen |
| TOC: Top Of Casing Elevation | DH/DZ: DH Divided By DZ = Vertical Gradient |
| Material Screened: Lithology Of Materials In Screened Zone | |
| GW Depth: Measured Depth To Groundwater From TOC | |
| GW El.: Elevation Of Groundwater | |