DEQ Water Quality Division

2003 Lower Umatilla Basin Groundwater Management Area Synoptic Sampling Event Report

State of Oregon Department of Environmental Quality

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Questions or comments about this document should be directed to:

Phil Richerson
Department of Environmental Quality
700 SE Emigrant Street, #330
Pendleton, OR 97801
(541) 278-4604
Richerson.Phil@deq.state.or.us

This document can be found on the Department's web site at:

http://www.deq.state.or.us/wq/groundwa/LUBGWMgmtArea.htm

For printed copies please contact the DEQ Eastern Region Office in Pendleton at (541) 276-4063.

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LIST OF ACRONYMS

ADA	Ammunition Demolition Area
DEQ	Oregon Department of Environmental Quality
DHS	Oregon Department of Human Services
EPA	United States Environmental Protection Agency
GAC	Granular Activated Carbon
GWMA	Groundwater Management Area
LUB GWMA	Lower Umatilla Basin Groundwater Management Area
NAS	National Academy of Science
NSF/ANSI	National Sanitation Foundation / American National Standards Institute
ODA	Oregon Department of Agriculture
ORS	Oregon Revised Statutes
PGE	Portland General Electric
QAPP	Quality Assurance Project Plan
RI/FS	Remedial Investigation / Feasibility Study
RPD	Relative Percent Difference
TDS	Total Dissolved Solids
USGS	United Status Geological Survey
UXO	Unexploded Ordnance

EXECUTIVE SUMMARY

Purpose of this Report

The purpose of this report is to document and describe the results of the 2003 Lower Umatilla Basin Groundwater Management Area (LUB GWMA) Synoptic Sampling Event. It focuses on two specific aspects of the data: (1) a comparison of 1992 and 2003 nitrate concentrations, and (2) the occurrence, distribution, and potential relationships of the perchlorate detected during the 2003 Event.

Methods

General water quality was evaluated by comparing reported values to applicable "standards", and evaluating potential correlations between the 14 analytes. Changes in nitrate concentrations between the two Synoptic Sampling Events were evaluated by directly comparing the results of the two Events, and by comparing those results to the trends in a subset of more frequently sampled wells. The occurrence and distribution of perchlorate was evaluated by summarizing detections by well type, evaluating potential correlations between other water quality variables and hydrogeologic variables, evaluating temporal variation in concentrations, and evaluating perchlorate detections versus general water quality.

Conclusions

Major observations and conclusions from this study regarding nitrate are:

1) Nitrate concentrations in the LUB GWMA generally increased between 1992 and 2003.
2) There is no systematic geographic pattern to changes in nitrate concentrations between 1992 and 2003.
3) More than one third of the 134 samples analyzed exceeded the 10 mg/l nitrate drinking water standard while more than half of the samples exceeded the 7 mg/l trigger level for establishing a GWMA.

Major observations and conclusions from this study regarding perchlorate are:

1) Widespread, low-level perchlorate contamination was detected. Perchlorate was detected in almost half of the 133 samples at concentrations ranging from 1.01 µg/l to 24.8 µg/l, with a median of 1.18 µg/l and an average of 2.57 µg/l.
2) There currently is no federal or Oregon drinking water standard for perchlorate. An NAS report suggests that if 100 percent of a person's perchlorate exposure is through drinking water, 24.5 µg/l perchlorate would be a "safe" level in drinking water. If additional exposures from milk or food are included, the level that would be considered "safe" in drinking water would be lower than 24.5 µg/l. In January 2006, EPA published a Preliminary Remediation Goal for perchlorate in drinking water of 24.5 µg/l.
3) Wells with elevated dissolved ion concentrations (including nitrate) are more likely to have detectable perchlorate concentrations.
4) The full extent of the area with perchlorate contamination in groundwater is not known.
5) Perchlorate concentrations typically decrease with increasing well depth within the basalt aquifer.
6) Although not evident on an area-wide basis, perchlorate concentrations typically decrease with increasing well depth at alluvial aquifer well nests.
7) The source(s) of perchlorate in the LUB GWMA remains unknown, and may include both naturally occurring and man-made sources. There does not appear to be a single source of all perchlorate detections within the LUB GWMA.

Recommendations

Based on the conclusions presented in this report, the following recommendations are made:

1) It is recommended that implementation of best management practices be continued, and where possible, expanded to reduce the nitrate loading to the region's groundwater.
2) Owners of older wells should have their casings and seals inspected to ensure no leakage from land surface or between aquifers is occurring.
3) Prior to choosing a water treatment system to remove nitrate and/or perchlorate from water, homeowners should consult with the various manufacturers and consider re-testing for perchlorate and general water chemistry by a competent and experienced lab. All water treatment systems require routine maintenance to ensure proper treatment.
4) Additional research should be conducted into the source(s) of perchlorate in the LUB GWMA.

REGISTERED PROFESSIONAL GEOLOGIST SEAL

In accordance with Oregon Revised Statutes (ORS) Chapter 672.505 to 672.705, specifically ORS 672.605 which states:

"All drawings, reports, or other geologic papers or documents, involving geologic work as defined in ORS 672.505 to 672.705 which shall have been prepared or approved by a registered geologist or a subordinate employee under the direction of a registered geologist for the use of or for delivery to any person or for public record within this state shall be signed by the registered geologist and impressed with the seal or the seal of a nonresident practicing under the provisions of ORS 672.505 to 672.705, either of which shall indicate responsibility for them.",

I hereby acknowledge that the document cited below was prepared by me.

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Document Author(s):	Phil M. Richerson
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Name of Oregon RPG:	Phil M. Richerson (G1906)
Signature of Oregon RPG:	Phil Richerson
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1.0 INTRODUCTION

This report documents and describes the results of the 2003 Lower Umatilla Basin Groundwater Management Area (LUB GWMA) Synoptic Sampling Event. It focuses on two specific aspects of the data: (1) a comparison of 1992 and 2003 nitrate[1] concentrations, and (2) the occurrence, distribution, and potential relationships of the perchlorate detected during the 2003 Event.

1.1 Establishment of the Lower Umatilla Basin Groundwater Management Area

Oregon's Groundwater Protection Act of 1989 requires the Oregon Department of Environmental Quality (DEQ) to declare a Groundwater Management Area (GWMA) if area-wide groundwater contamination, caused primarily by nonpoint source pollution, exceeds certain trigger levels. In the case of nitrate, the trigger level is 7 mg/l. Nonpoint source pollution of groundwater results from contaminants coming from diffuse land use practices, rather than from discrete sources such as a pipe or ditch. The contaminants of nonpoint source pollution can be the same as from point source pollution, and can include sediment, nutrients, pesticides, metals, and petroleum products. The sources of nonpoint source pollution can include construction sites, agricultural areas, forests, stream banks, roads, and residential areas.

The Groundwater Protection Act also requires the establishment of a local Groundwater Management Area Committee composed of affected and interested parties. The committee works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

The DEQ declared the LUB GWMA in 1990 after nitrate contamination was identified in a 352,000-acre area in the northern portions of Umatilla and Morrow counties. Figure 1-1 shows the location and boundaries of the LUB GWMA. Groundwater samples from private wells had nitrate contamination above the federal safe drinking water standard in many samples collected from the area. DEQ, the Oregon Water Resources Department, and the Oregon Health Division conducted a four-year comprehensive study of the area in the early 1990s. This study resulted in a 1995 report titled "Hydrogeology, Groundwater Chemistry, & Land Use in the Lower Umatilla Basin Groundwater Management Area". The study identified five potential sources of nitrate loading to groundwater:

1. Confined Animal Feeding Operations (i.e., dairies and feed lots), and
2. Irrigated Agriculture
3. Land Application of Food Processing Wastewater
4. Septic Systems (rural residential areas)
5. The Umatilla Chemical Depot Washout Lagoons

DEQ and the Committee finalized the LUB GWMA Action Plan in December 1997. The Action Plan details the activities to be conducted by the various agencies and organizations involved. The Umatilla and Morrow County Soil and Water Conservation Districts are the local agencies leading implementation of the Action Plan. The DEQ and the Oregon Department of Agriculture (ODA) have oversight responsibility. Local governments, private industry, and the US Army are also involved in implementation of the Action Plan.

DEQ and the Committee decided to implement the Action Plan on a voluntary basis recognizing that individuals, businesses, organizations, and governments will, if given adequate information and encouragement, take positive actions to adopt or modify practices and activities to reduce contaminant loading to groundwater.

The Action Plan recommends general activities and specific tasks to be conducted by involved agencies and groups representing the five sources of nitrate loading. The Action Plan also identifies methods and a schedule for evaluating progress in implementing the Action Plan.

[1] The federal drinking water standard refers to (and analytical methodologies quantify) nitrate concentrations as "nitrate as nitrogen" or "nitrate-nitrogen". For purposes of this report, the term nitrate is synonymous with nitrate-nitrogen.

1.2 Purpose of the 2003 Synoptic Sampling Event

In 2001, the LUB GWMA Committee identified the need to resample the 207 wells used during the 1992 Synoptic Sampling Event to characterize the regional groundwater chemistry. The purpose of the re-sampling was to provide another "snapshot" of water quality (i.e., determine what kind of groundwater contamination was present in the area, and at what concentration) and, to the extent possible, compare the results of the 1992 and 2003 sampling events. With EPA's support (i.e., they analyzed the samples), DEQ conducted the 2003 Synoptic Sampling Event in September and October 2003. For a variety of reasons, only about two-thirds of the 207 wells could be sampled.

1.3 Analyte List

Each sample was analyzed for a list of chemical constituents called the analyte list. The groundwater samples collected from the 135 wells for this project were analyzed for some common ions (bromide, calcium, chloride, fluoride, iron, magnesium, manganese, potassium, sodium, and sulfate), nutrients (nitrate, ammonia, phosphorus), and perchlorate.

Prior to the 2003 Synoptic Sampling Event, perchlorate had been detected at several locations in the region. The intent of including perchlorate in this regional sampling event was to determine if the perchlorate is confined to specific locations or if it is a more regional issue.

1.4 Purpose of This Report

A brief discussion of the results of the 2003 Synoptic Sampling Event was provided in the 2002 / 2003 Lower Umatilla Basin Groundwater Management Area Progress Report (DEQ, 2004). The purpose of this report is to provide a more thorough documentation and discussion of the results of the Synoptic Sampling Event.

1.5 Sampling Procedures

A Quality Assurance Project Plan (QAPP) developed by EPA Region 10 specifically for this sampling event identified the sampling procedures to be used (EPA, 2003). The QAPP also identified quality assurance and quality control measures, corrective actions for unexpected situations, field documentation and data reporting requirements, health & safety concerns, sampling handling and custody requirements, analytical methods requirements, quality control requirements, instrument calibration and frequency requirements, data management requirements, reporting requirements, and data review, validation, and verification requirements.

The sampling procedures followed during this project were in accordance with the Oregon Department of Environmental Quality's standard operating procedures. These procedures are described in the following documents listed in the reference section: DEQ (1986), DEQ (1991), DEQ (1995), and DEQ (1997).

1.6 Reporting of Data to Well Owners

After reviewing the analytical results, DEQ sent letters to the well owners summarizing and explaining the results from their well(s). A copy of the analytical results for the sample(s) collected from their well(s) was attached to the letter.

1.7 Software Selection

The statistical software used during this evaluation was Minitab version 14 by Minitab, Inc. and macros written by Dr. Dennis Helsel (with the United States Geological Survey (USGS)) and Dr. Edward Gilroy (retired from the USGS). The use of product names is for informational purposes only. DEQ does not advocate the use of any particular software.

2.0 METHODS

This section describes the methods used to: (1) evaluate general water quality data, (2) evaluate changes in nitrate concentrations between the two Synoptic Sampling Events, and (3) evaluate the occurrence and distribution of perchlorate.

2.1 General Water Quality Evaluation Methods

The first step in the data evaluation was to "condition" the data for censored data and duplicate samples. Data conditioning of censored data (i.e., those results reported as less than a detection limit) consisted of replacing values reported as below detection limits with ½ the value of the highest detection limit. Data conditioning of both field duplicates (i.e., when two samples were collected in the field from the same well) and laboratory duplicates (i.e., when one sample was analyzed twice) consisted of averaging the values into one value.

Once the data were conditioned, a statistical summary of each analyte was produced. The statistical summary included the number of data points, the percentage of censored data, minimum value, median value, mean value, maximum value, standard deviation, interquartile range, variance, and skewess. Also, the frequency distribution of each analyte was evaluated with the Ryan-Joiner method (using a significance level of 95%) to determine if the analytes were normally distributed or natural log distributed.

The data were evaluated for correlation between the 14 analytes using the correlation coefficient Kendall's tau. The coefficient ranges from -1 to +1. If it is positive, both variables increase. If it is negative, one variable increases as the other decreases. If it is zero, there is no correlation. Helsel and Hirsch (1992) describe the coefficient as follows:

> Kendall's Tau measures the strength of the monotonic relationship between x and y. Tau is a rank-based procedure and is, therefore, resistant to the effect of a small number of unusual values. It is well suited for variables that exhibit skewness around the general relationship. Because tau depends only on the ranks of the data and not the values themselves, it can be used even in cases where some of the data are censored, such as concentrations known only as less than the reporting limit. Tau will generally be lower than values of the traditional correlation coefficient r for linear associations of the same strength. "Strong" linear correlations of 0.9 or above correspond to tau values of about 0.7 or above.

Because data censoring was significant for some analytes, more statistically robust methods were used to evaluate some aspects of the data. The methods used are described in Helsel (2005). Specifically, the Kaplan-Meier and Maximum Likelihood methods were used to estimate the mean and median. The Kaplan-Meier method was used for analytes with <50% censoring while the Maximum Likelihood method was used for analytes with 50% to 80% censoring. In addition, an adaptation of Kendall's tau correlation coefficient that uses the Helsel-Turnbull method was used to estimate correlations between analytes with censored data.

2.2 Nitrate Evaluation Methods

As indicated in Section 1.4, one of the purposes of this report is to gain insight into changes in groundwater nitrate concentrations between the June/July 1992 and September/October 2003 LUB GWMA Synoptic Sampling Events. The difference in nitrate concentrations at any particular well between these two events can be attributed to seasonal fluctuations, analytical variability, and/or actual differences in water quality over time (i.e., a trend). The sections below describe the methods used to evaluate each of these possibilities.

Changes in Nitrate Concentrations

Changes in nitrate concentrations between the two Synoptic Sampling Events were evaluated by directly comparing the results of the two Events. Wells either exhibited an increase or decrease in nitrate. The data were evaluated three different ways; each of increasing statistical robustness but with a decreasing number of wells. The evaluations included:

- directly comparing the 1992 to 2003 results at the 118 wells with detectable nitrate,
- comparing the 1992 to 2003 results at the 90 wells exhibiting a "significant change in concentration", and

- comparing the implied 1992 to 2003 trend (i.e., the slope of a line drawn through the two data points) to the Seasonal-Kendall trend at the 34 regularly sampled wells that exhibited detectable nitrate during both events.

In addition to these evaluations, the wells exhibiting the largest increases and decreases in nitrate concentrations were evaluated. Finally, the vertical distribution of nitrate concentrations at 6 well nests was evaluated.

Seasonality Evaluation

Nitrate concentrations at 38 wells of the bi-monthly network[2] (most of which were also sampled during both Synoptic events) were evaluated in an attempt to identify and quantify seasonal fluctuations in nitrate concentrations in the GWMA. These wells were selected because there is a substantial amount of data from them: they have been sampled approximately 6 times per year since the early 1990s. These wells have been sampled at least 70 times with more than 10 measurements for each month sampled.

The seasonality evaluation consisted of (1) examining box and whisker plots of nitrate concentrations by month to identify the months of high and low nitrate concentrations and (2) using the Kruskal-Wallis test to identify a statistical difference (at a 90% significance level) in monthly nitrate values. The Kruskal-Wallis test evaluates the possibility that the median of one group of data (e.g., a month) is statistically different than the median of any another month (i.e., indicating seasonality). Results of the Kruskal-Wallis test are presented in significance levels (e.g., 90% significance level). A data set was considered to exhibit seasonality if the median of one month differed from any other month at a 90% or higher significance level.

Analytical Variability Evaluation

The relative percent difference (RPD) between the two nitrate concentrations was calculated. This value was used to evaluate the potential for analytical variability to account for the observed differences between the two Synoptic Sampling Events. The RPD formula is [(difference between 2 results) / (average of two results)] *100. The RPD is a measure of how close two values are to each other, and is used to gauge the precision of the analytical results. For example, many water quality monitoring plans require the collection and analysis of a certain percentage (commonly 10 to 15%) of "duplicate" samples. A duplicate sample is one which is collected simultaneously with another sample. If the RPD between the original and duplicate sample is less than $\pm$ 10%, the results are considered acceptable (i.e., they are essentially "the same number").

Nitrate versus Depth to Water

Nitrate concentrations were plotted versus the depth to water measured at the time of sample collection. Depth to water was measured in 61 monitoring wells (45% of the wells sampled). 58 of these 61 wells were alluvial aquifer wells; 3 were basalt aquifer wells. Depth to water was not measured in the other wells sampled because they were plumbed into a water delivery system and the well casing was not accessible. A box plot of depth to water measurements was also prepared to aid in the evaluation. Nitrate concentrations versus depth to water at 6 well nests were also evaluated. In addition, correlation coefficients were calculated to gauge potential relationships. The purpose of this evaluation was to gain potential insight into the distribution of nitrate.

Nitrate versus Total Well Depth

The potential relationship between nitrate and total well depth was evaluated by calculating correlation coefficients between (1) nitrate concentrations and alluvial well depth, (2) nitrate concentrations and basalt well depth, and (3) nitrate concentrations and all well depths. Nitrate concentrations versus depth to water at 6 well nests were also evaluated. In addition, nitrate concentrations versus basalt well depths were evaluated by plotting nitrate concentrations versus basalt well depth. The purpose of this evaluation was to gauge the potential relationship between basalt well depth and nitrate concentrations with the hope of gaining insight into the distribution of nitrate.

[2] The bi-monthly network originally consisted of 38 wells sampled every other month for analysis of nitrate. It currently consists of 35 wells.

2.3 Perchlorate Evaluation Methods

As indicated in Section 1.4, one of the purposes of this report is to gain insight into the occurrence, distribution, and significance of perchlorate detected during the 2003 Synoptic Sampling Event. In order to do this, the following types of evaluation were conducted:

Detections By Well Type

Perchlorate detections were summarized by the type of well sampled. For each type of well sampled (i.e., monitoring well, domestic well, irrigation well, industrial well, community well, stock watering well) the number and percentage of those wells with perchlorate detections was determined. Minimum, median, average, and maximum perchlorate concentrations were also quantified. The purpose of this evaluation was to be able to answer questions such as "How many irrigation wells were sampled and what was the range of concentrations detected?" Differentiating between well use and perchlorate concentrations can be useful in evaluating and communicating potential risk associated with perchlorate ingestion. However, it is not appropriate to extrapolate the observed concentration ranges to unsampled wells of similar use.

Correlation Coefficient

Perchlorate concentrations were evaluated for correlations (using the Kendall's Tau correlation coefficient discussed in Section 2.1) with other analytes including the electrical conductivity measured at the time of sampling and some hydrogeological variables. The purpose of this evaluation was to investigate possible associations with other water quality and hydrogeological variables, which might suggest possible sources of perchlorate and/or influence appropriate methods of treating drinking water that contains perchlorate.

Perchlorate Detections versus Aquifer Tapped

Perchlorate occurrence in the alluvial aquifer and basalt aquifer was evaluated. This evaluation involved identifying which aquifer each well tapped, then summarizing the percentage of wells in each aquifer that contained detectable perchlorate. The purpose of this evaluation was to gauge the occurrence of perchlorate in the two aquifers tested with the hope of gaining insight into the source(s) and distribution of perchlorate. This differentiation of perchlorate occurrence by aquifer led to additional evaluations as described below.

Perchlorate versus Nitrate in Alluvial and Basalt Wells

Perchlorate and nitrate concentrations in both alluvial and basalt wells tested were plotted on graphs to visually assess potential relationships. In addition, correlation coefficients were calculated to gauge potential relationships. The purpose of this evaluation was to gain potential insight into the source(s) and distribution of perchlorate.

Perchlorate versus Depth to Water

Perchlorate concentrations were plotted versus the depth to water measured at the time of sample collection. Depth to water was measured in 61 monitoring wells (45% of the wells sampled) including 6 alluvial aquifer well nests. 58 of these 61 wells were alluvial aquifer wells; 3 were basalt aquifer wells. Depth to water was not measured in the other wells sampled because they were plumbed into a water delivery system and the well casing was not accessible. A box plot of depth to water measurements was also prepared to aid in the evaluation. Perchlorate concentrations versus depth to water at the 6 well nests were also evaluated. In addition, correlation coefficients were calculated to gauge potential relationships. The purpose of this evaluation was to gain potential insight into the source(s) and distribution of perchlorate.

Perchlorate versus Total Well Depth

The potential relationship between perchlorate and total well depth was evaluated by calculating correlation coefficients between (1) perchlorate concentrations and alluvial well depth, (2) perchlorate concentrations and basalt well depth, and (3) perchlorate concentrations and all well depths. Perchlorate concentrations versus depth to water at the 6 well nests were also evaluated. In addition, perchlorate concentrations versus basalt well depths were evaluated by plotting perchlorate concentrations versus basalt well depth. The purpose of this

evaluation was to gauge the potential relationship between basalt well depth and perchlorate concentrations with the hope of gaining insight into the source(s) and distribution of perchlorate.

Temporal Variation of Perchlorate

Because a relatively small number of wells had previously been tested for perchlorate prior to the 2003 synoptic sampling event, the number of wells that had been sampled multiple times is small. However, the 11 wells that had been sampled multiple times were evaluated for potential temporal variations (i.e., are concentrations changing over time?). It should be noted that additional groundwater sampling has been conducted since the 2003 synoptic sampling event to better characterize the distribution of perchlorate. Data from these additional sampling events was used to better evaluate potential temporal variations in perchlorate concentrations.

Perchlorate versus General Water Quality

Stiff diagrams were generated for each of the 135 samples. Stiff diagrams are a system of plotting water quality analyses on a system of four parallel axes extending on each side of one vertical zero axis. Concentrations (in milliequivalents per liter) of four cations are plotted to the left of zero, while four anions are plotted to the right of zero. The resulting points are connected to give an irregular polygonal shape determined by the gross chemistry of the water. Comparing the shapes of Stiff diagrams is then used as an indication of water composition similarities and differences. The width of the pattern is an approximate indication of total ionic content. For this study, the cations plotted on the Stiff diagrams include sodium, calcium + potassium, magnesium + aluminum, and iron + manganese. The anions plotted include phosphate + nitrate, sulfate, chloride, and bromide + fluoride.

In addition to visually assessing the relationship between total dissolved ions and perchlorate concentrations with Stiff diagrams, a statistical evaluation of the relationship was conducted. Ideally, Total Dissolved Solids (TDS) would be used as the measure of total dissolved ions[3]. Since TDS was not quantified during this sampling event, the electrical conductivity[4] of the water was used as a gauge of the level of dissolved ions in the water. The purpose of this evaluation was to gain potential insight into the source(s) and distribution of perchlorate.

[3] TDS is a measure of the dissolved ions in a water sample, and consists of inorganic salts, small amounts of organic matter, and small amounts of soluble minerals.

[4] The electrical conductivity values used were the values measured in the field at the time of sampling. Electrical conductivity values ranged from 202 to 1,766 microseimens per centimeter (µS/cm) and averaged 740 µS/cm.

3.0 SAMPLE RESULTS

This section describes the sample results for the 2003 Synoptic Sampling Event. It includes a summary of the test results for common ions, nutrients, and perchlorate.

3.1 Overview

The groundwater samples collected during this study were analyzed for a variety of constituents including common ions, nutrients, and perchlorate. Appendix 1 provides a copy of the results. Table 3-1 is a statistical summary of the data where, for each constituent analyzed, the number of data points, the percentage of censored data, the minimum value observed, the median value, the mean value, the maximum value observed, the standard deviation, the interquartile range, the variance, and skewness is indicated. Table 3-1 also indicates whether the constituent is normally distributed or natural log distributed.

The statistics identified above were calculated using one-half the detection limit for censored data. As indicated in Section 2.1, more statistically robust methods (i.e., Maximum Likelihood Estimation and Kaplan-Meier technique) were used to estimate the median and mean concentration for those analytes with censoring. As indicated in Table 3-1, the robust methods produced mean and median values very similar to those produced using one-half the detection limit.

Finally, concentrations (or concentration ranges) from various sources are presented in Table 3-1 so that comparisons to the observed concentrations can be made. The following section discusses the sources of these comparison values. Subsequent sections present discussions of specific results.

3.2 Comparison Values

The sources of comparison values presented in Table 3-1 include Federal Drinking Water Standards[5], health advisory guidance levels[6], and naturally occurring levels[7]. Only the Federal Primary Drinking Water Standards are enforceable by law. However, not all parameters analyzed have federal drinking water standards. The other values are presented so that some evaluation of the detected concentrations can be made.

3.3 Common Ions

The occurrence of the common ions and correlation coefficients among all analytes are discussed below.

3.3.1 Common Ion Occurrence

The common ions analyzed include bromide, calcium, chloride, fluoride, iron, magnesium, manganese, potassium, sodium, and sulfate. Fluoride is the only common ion analyzed that has an enforceable drinking water standard (it also has a non-enforceable guideline). None of the samples exceeded the primary drinking water standard or guideline for fluoride (Table 3-1).

Chloride, iron, manganese, and sulfate have secondary drinking water standards (Table 3-1). No samples analyzed exceeded the chloride standard. Approximately 13% of the samples exceeded the iron standard (1 domestic well and 16 monitoring wells). Approximately 15% of the samples exceeded the manganese standard (3 domestic wells, 1 irrigation well, 1 industrial well, and 16 monitoring wells) while approximately 4% of the samples exceeded the lifetime health advisory for manganese (1 domestic well and 5 monitoring wells). One sample (from an irrigation well) exceeded the secondary drinking water standard for sulfate.

Sodium was detected above the 20 mg/l drinking water advisory level for individuals on a 500 mg/day restricted sodium diet in 91% of the samples (47 domestic wells, 1 community well, 13 irrigation wells, 3 industrial wells, 1 stock watering well, and 58 monitoring wells).

[5] Either primary or secondary drinking water standards.
[6] A Lifetime health advisory is the concentration in drinking water that is not expected to cause any adverse noncarcinogenic effects over a lifetime of exposure, with a margin of safety.
[7] Values cited in "Study of the Chemical Characteristics of Natural Water" by J.D. Hem, 1985. USGS Water Supply Paper 2254

Bromide was detected in 26% of the samples analyzed. The concentrations detected are not expected to represent a human health concern because bromide is not a priority pollutant or known carcinogen.

Calcium, magnesium, and potassium were detected in all samples analyzed, typically at concentrations within naturally occurring levels. These common ions are not expected to represent a human health concern because they are not priority pollutants or known carcinogens. Furthermore, some intake of these (and other) nutrients is required for good health.

In summary, no samples exceeded primary drinking water standards while as many as 15% of samples exceeded secondary drinking water standards. The drinking water advisory level for individuals on a restricted sodium diet was exceeded in 91% of the samples. Other common ions were detected at levels not expected to represent a human health concern.

3.3.2 Correlation Coefficient

The data were evaluated for correlation between all 14 analytes using Kendall's tau correlation coefficient. An adaptation of Kendall's tau correlation coefficient that uses the Helsel-Turnbull method was used for analytes with censored data. When rounded to two significant figures, no difference in the correlation coefficients was observed.

There is no "strong"[8] correlation between any of the 14 analytes. As illustrated in Figure 3-1, the strongest correlation between the 14 analytes is between magnesium and calcium (tau = 0.64). Manganese and iron exhibit the next strongest correlation (tau = 0.62) followed by sulfate and chloride (tau = 0.60), nitrate and calcium (tau = 0.58), nitrate and magnesium (tau = 0.57), and sulfate and magnesium (tau = 0.53). Nitrate and perchlorate (discussed in Section 5.4) exhibited the eighth strongest correlation overall (tau = 0.51). Kendall's tau calculated for these analytes using the natural logarithm of the conditioned data produced the same results.

3.4 Nutrients

The nutrients analyzed include ammonia + ammonium, nitrate, and phosphorus. The occurrence of each nutrient is discussed below. In addition, nitrate's distribution and correlation with other analytes is also discussed below.

3.4.1 Nutrient Occurrence

Nitrate is the only nutrient analyzed in this study that has a drinking water standard. Approximately 37% of the samples analyzed exceeded the nitrate standard (14 domestic wells, 10 irrigation wells, and 26 monitoring wells). Approximately 58% of the samples analyzed exceed the 7 mg/l trigger level for establishing a GWMA (27 domestic wells, 1 community well, 1 industrial well, 10 irrigation wells, and 39 monitoring wells). The elevated nitrate concentrations throughout the GWMA represent a human health threat and confirm the need for continued and, where possible, expanded implementation of best management practices to reduce the nitrate loading to the region's groundwater.

Ammonia + ammonium was detected in 24% of the samples at a maximum concentration of 1.23 mg/l. All ammonia + ammonium results are less than the 30 mg/l lifetime health advisory level for ammonia and, thus, are not expected to represent a human health concern.

Phosphorus was detected in 91% of the samples at a maximum concentration of 2.98 mg/l. The concentrations detected are not expected to represent a human health concern because phosphorus is not a priority pollutant or known carcinogen.

[8] "Strong" linear correlations (i.e., Pearson's r values) of 0.9 or above correspond to tau values of about 0.7 or above.

3.4.2 Nitrate Distribution

Figure 3-2 is map depicting nitrate results from the sampling event. A color-coded symbol is located at each well location indicating the nitrate concentration at that well. No consistent geographic pattern is evident in the nitrate concentrations. Furthermore, large differences in nitrate concentrations can occur in relatively short distances. For example, nitrate concentrations in the northwest corner of the Umatilla Chemical Depot vary greatly, and range from less than 0.05 mg/l to greater than 20 mg/l in approximately ½ mile.

Possible factors that may influence the variability in nitrate concentrations are the aquifer tapped, well construction details, proximity to and variations in nitrate sources, depth to water, seasonal variations in recharge (through irrigation or precipitation), variations in regional pumping, and proximity to surface water bodies (including unlined canals).

3.4.3 Nitrate Correlations

The data were evaluated for correlation between all 14 analytes. Figure 3-3 illustrates the six strongest correlations between nitrate and the 13 other analytes. There is no "strong" correlation between nitrate and any other analyte. As illustrated in Figure 3-3, the strongest nitrate correlation was with calcium (tau = 0.58). The next strongest nitrate correlations were with magnesium (tau = 0.57), perchlorate (tau = 0.51), chloride (tau = 0.48), sulfate (tau = 0.46), and potassium (tau = 0.26). Kendall's tau calculated for these analytes using the natural logarithm of the conditioned data produced the same results.

Perhaps it should not be surprising that there is no strong correlation between perchlorate and other analytes such as nitrate. Five sources of nitrate have been identified in the LUB GWMA (i.e., irrigated agriculture, densely located septic systems, land application of food processing wastewater, dairies and feedlots, and the Umatilla Chemical Depot bomb washout lagoons). These sources of nitrate contribute different types and/or amounts of other constituents (e.g., chloride) to groundwater.

3.5 Perchlorate

Perchlorate was detected in 46% of the 133 samples analyzed. The maximum concentration detected was 24.8 µg/l. The median concentration (i.e., the middle value detected) was 1.18 µg/l while the average concentration was 2.57 µg/l.

There currently is no federal or Oregon drinking water standard for perchlorate. There is ongoing national debate about what level of perchlorate is safe. A more thorough discussion of perchlorate is provided in Section 5.0.

4.0 NITRATE DATA EVALUATION

The purpose of this evaluation is three-fold: (1) to describe the changes in groundwater nitrate concentrations between the two LUB GWMA Synoptic Sampling Events conducted in June/July 1992 and September/October 2003, (2) assess two potential causes of the observed changes (e.g., analytical variability and seasonality), and (3) to determine if the results are consistent with area-wide nitrate trends.

Some basic information for these sampling events is as follows:

- 207 wells were sampled in 1992
- 135 wells were sampled in 2003
- 8 wells were sampled in 2003 but not in 1992
- 2 samples were not analyzed for nitrate in 1992 due to unknown reasons
- 125 wells had samples analyzed in both events
- 1 well had nitrate detected in 2003 but not in 1992
- 3 wells had nitrate detected in 1992 but not in 2003
- 3 wells had nitrate below detection limits in 1992 and 2003
- 118 wells had detectable nitrate in both events

The data were evaluated three different ways; each of increasing statistical robustness but with a decreasing number of wells. The evaluations included:

- directly comparing the 1992 to 2003 results at the 118 wells with detectable nitrate,
- comparing the 1992 to 2003 results at the 90 wells exhibiting a "significant change in concentration", and
- comparing the implied 1992 to 2003 trend (i.e., the slope of a line drawn through the two data points) to the Seasonal-Kendall trend at the 34 regularly sampled wells that exhibited detectable nitrate during both events.

In addition to these evaluations, the wells exhibiting the largest increases and decreases in nitrate concentrations were evaluated. Finally, the relationship between nitrate and depth to water or well depth was evaluated. Results of these evaluations are discussed below.

4.1 Direct Comparison of Results

All 118 wells with detectable nitrate concentrations during both events exhibited different values during the two events. Differences ranged from 0.01 mg/l to 43.41 mg/l. Nitrate concentrations were higher in 2003 than in 1992 at 78 wells (66% of wells with detectable nitrate in both events). Nitrate concentrations were lower in 2003 than in 1992 at 40 wells (34% of wells with detectable nitrate in both events).

The median and mean concentrations of the above-referenced 118 wells increased between 1992 and 2003. Specifically, the median concentration increased by 1.7 mg/l (from 6.3 to 8.0 mg/l) while the mean concentration increased by 2.7 mg/l (from 10.7 to 13.4 mg/l).

The fact that about twice as many wells exhibited increases rather than decreases combined with an increase of the median and mean suggests nitrate concentrations in the GWMA generally increased between 1992 and 2003. However, the difference in nitrate concentrations between these two events may be attributable to analytical variability, seasonal fluctuations, and/or an actual water quality trend. These issues are discussed in the following sections.

4.2 Significant Changes in Concentration

In order to evaluate the potential for analytical variability to account for the observed differences between the two Synoptic Sampling Events, the relative percent difference (RPD) between the two nitrate concentrations was calculated. The RPD between the 118 wells with detectable nitrate during both events is as follows:

- 17 wells had RPD <10% (actual difference ranged from 0.1 to 1.7 mg/l)
- 101 wells had RPD >10% (actual difference ranged from 0.03 to 43.41 mg/l)

As indicated above, some wells with a RPD >10% exhibited a small actual difference in concentration. In order to identify wells with a "significant change in concentration" (defined here as having a RPD >10% and an actual difference of more than 0.5 mg/l), wells exhibiting actual differences of less than 0.5 mg/l were removed from consideration. Removing these 11 wells from consideration leaves 90 wells with detectable nitrate concentrations during both events with the difference between the two events exhibiting a "significant difference in concentration".

Of these 90 wells, 25 wells (28%) exhibited a decrease in nitrate (ranging from 0.52 to 43.41 mg/l) while 65 wells (72%) exhibited an increase in nitrate (ranging from 0.59 to 32.4 mg/l). These observations suggest that nitrate concentrations in the GWMA generally increased between 1992 and 2003.

Figure 4-1 is a map depicting significant changes in nitrate concentrations between the two Synoptic Sampling Events. A color-coded symbol is located at each well location indicating the change in nitrate concentration at that well. As indicated in Figure 4-1 and discussed above, more wells showed a significant increase in nitrate concentration than a significant decrease in nitrate concentration. However, there does not appear to be a systematic geographic correlation with changes in nitrate concentration.

4.3 Comparing to Bi-Monthly Well Network Results

Data from the bi-monthly well network[9] were used in two ways: (1) to evaluate seasonal fluctuations in nitrate concentrations and (2) to provide a statistically robust estimate of the nitrate trend for comparison to the results of the Synoptic Sampling Events.

4.3.1 Seasonality Evaluation

Factors that can cause seasonal fluctuations of nitrate concentrations include seasonal variations in nitrate loading, seasonal variations in recharge (through irrigation or precipitation), variations in regional pumping, and proximity to surface water bodies (including unlined canals). The cause(s) of the observed seasonality were not investigated as part of this study.

Eighteen of the original 38 network wells exhibited a statistically significant level of seasonality. Figure 4-2 is an example of box and whisker plots of nitrate concentrations at two wells (UMA048 and UMA119) that exhibit statistically significant seasonality. Figure 4-2 illustrates that two wells can exhibit seasonality but have different cycles (i.e., nitrate concentrations peak at different times of the year). For example, nitrate concentrations at well UMA048 are highest in winter and lowest in summer while nitrate concentrations at well UMA119 are highest in spring and lowest in fall.

Figure 4-3 illustrates the timing and magnitude of seasonality at the 18 network wells. The following is an example of how to read Figure 4-3: well UMA029 exhibits its highest monthly median nitrate concentration (49.5 mg/l from Figure 4-3b) in January (from Figure 4-3a) and its lowest monthly median nitrate concentration (43.2 from Figure 4-3b) in July (from Figure 4-3b). Nitrate concentrations at well UMA029 fluctuate approximately 6.3 mg/l throughout the year (from Figure 4-3b).

As indicated in Figure 4-3a, the timing of the seasonality was quite variable. The months of highest and lowest median nitrate concentrations are indicated with an "H" or "L", respectively. At least one well exhibited high monthly median concentrations in each of the six months sampled. The most common month in which wells exhibited high monthly medians was March (6 of 18 wells). Similarly, at least one well exhibited low monthly median concentrations in 5 of the 6 months sampled. The most common month in which wells exhibited low monthly medians was July (5 wells).

[9] The LUB GWMA bi-monthly network originally consisted of 38 wells sampled every other month for analysis of nitrate. It currently consists of 35 wells.

The magnitude of the seasonality at these 18 wells was also quite variable, as illustrated in Figure 4-3b. Figure 4-3b illustrates the highest and lowest monthly median nitrate concentration at each well. The difference between these monthly extremes is a measure of the seasonal nitrate fluctuation. Seasonal nitrate fluctuations range from 0.3 mg/l (at UMA048) to 12 mg/l (at UMA119) (Figure 4-2 and 4-3b).

In summary, Figure 4-3a illustrates that there is no consistent timing of seasonal fluctuations at the network wells. Figure 4-3b illustrates that there is a high degree of variability in the magnitude of seasonal nitrate fluctuations.

If the well locations are plotted on a map (not included in this report), there does not appear to be any spatially consistent pattern to the seasonal highs and lows. In conclusion, there is no consistent area-wide influence of seasonality on nitrate concentrations. Therefore, it is not possible to account for seasonality when interpreting the change in observed nitrate concentrations between June/July 1992 and September 2003.

4.3.2 Trend Comparison

Thirty-four of the bi-monthly well network wells had detectable nitrate concentrations during both Synoptic Sampling Events. The trend at each of these wells was calculated using the Seasonal Kendall technique, which is widely used in water quality data evaluation. It is the most statistically robust method used in this evaluation. The Seasonal Kendall trend was then compared to the trend implied by calculating the slope between the two Synoptic Sampling Event results. Results of the comparison are discussed below and shown in Table 4-1.

For each of the 34 wells described above, Table 4-1 includes the following information from the two Synoptic Sampling Events: the June/July 1992 and September/October 2003 nitrate concentrations, the concentration change between these sampling events, whether or not there is a "significant difference" in these concentrations, and the 1992 to 2003 trend implied by drawing a line through the two data points. In addition to the Synoptic Sampling Event data, Table 4-1 includes trend analysis results using the Seasonal-Kendall technique. These results include the slope (in milligrams per liter per year (mg/l/yr)) and a significance level (in percent). Significance levels represent the degree of certainty assigned to the straight line drawn through the data. Trends with significance levels below 80% were considered "statistically insignificant" in this evaluation.

As indicated in Table 4-1, the Synoptic Sampling Event results suggest increasing trends at 20 of 34 wells and decreasing trends at 14 of 34 wells. The Seasonal-Kendall results also indicate more increasing than decreasing trends. The number of increasing and decreasing trends would also be 20 and 14, respectively, except that 5 decreasing trends and 1 increasing trend have low significance levels and are considered statistically insignificant. Therefore, the Seasonal-Kendall results indicate 19 increasing trends, 9 decreasing trends, and 6 statistically insignificant trends. It is noteworthy that the number of increasing and decreasing trends identified by these two methods is similar, but these methods do not predict the same trend direction at all locations (e.g., as described below, the Synoptic Sampling Event results suggest the opposite trend direction at some wells).

The two Synoptic Sampling Event results were compared to the Seasonal-Kendall trend direction and magnitude (see last two columns of Table 4-1). As indicated in Table 4-1, the Synoptic Sampling Event results are representative of both long term trend direction and magnitude at 14 of 34 wells. In addition, the Synoptic Sampling Event results are representative of the long term trend direction but not the magnitude at 10 more wells. The Synoptic Sampling Events results are not representative of the long term trend direction at 10 of 34 wells (e.g., the Synoptic Sampling Events results suggest increasing trends at some locations when the long term trend is actually decreasing). Most of these wells (70%) exhibit seasonality, but there is no consistency in the timing of seasonality at these wells. In summary, the Synoptic Sampling Event results are representative of the long term trend direction (if not the magnitude) at 71% (24 of 34) of the wells.

The relatively good agreement between the trends implied by comparing the Synoptic Sampling Event results to the Seasonal-Kendall trend results suggests nitrate concentrations in the GWMA generally increased between

1992 and 2003. However, the comparison of Synoptic Sampling Event results at individual locations can be misleading due to the variable nature of groundwater nitrate concentrations in the GWMA.

4.4 Largest Changes in Nitrate Concentration

Nitrate concentrations at the 10 wells exhibiting the largest increase in concentration and at the 10 wells exhibiting the largest decrease in concentration were examined further. A discussion of this examination is provided below.

4.4.1 Largest Increases in Nitrate Concentration

Largest Increase in Nitrate Concentration

When the 1992 and 2003 Synoptic Sampling Event results are compared, the largest increase in nitrate concentration (32.4 mg/l) appears to have occurred at well UMA273. The reported value from the 1992 synoptic sampling event is 0.10 mg/l. The reported value from the 2003 synoptic sampling event is 32.5 mg/l. However, the reported 1992 concentration and therefore the apparent increase in nitrate concentration at well UMA273 is suspect.

This well was sampled by Portland General Electric (PGE) in March and September from 1981 through 1997. Reported average annual nitrate values from well UMA273 are as follows:

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989
Annual Average Nitrate Concentration (mg/l)	12.0	37.5	38.5	40.0	34.5	52.0	53.0	51.0	57.0
Year	1990	1991	1992	1993	1994	1995	1996	1997	
Annual Average Nitrate Concentration (mg/l)	42.5	49.6	50.6	43.5	40.0	44.0	42.5	43.0	

As indicated above, PGE reported the nitrate concentration from well UMA273 during 1992 to be 50.6 mg/l. This concentration appears to be consistent with the other annual values reported by PGE for this well. The 17 years of PGE data suggest the 0.1 mg/l value reported by DEQ is inaccurate.

The following table illustrates that the nitrate results reported by DEQ and PGE from other PGE wells are similar.

	UMA271	UMA272	UMA273	UMA274	UMA275
June 23, 1992 nitrate concentration reported by DEQ	26.0	<0.02	0.10 Duplicate = 0.07	<0.02	32.0
Average of March and September 1992 nitrate concentrations reported by PGE	24.7	<0.1	50.6	<0.1	37.2

As indicated above, the sampling of well UMA273 during the 1992 synoptic sampling event involved collecting a duplicate sample. Nitrate results from these duplicate samples were 0.10 and 0.07 mg/l. The similarity of these results suggests that the reported nitrate values are unlikely to be a transcription error. In addition, other parameters analyzed from these samples show similar comparability. The similarity of nitrate results reported by DEQ and PGE from the other four PGE wells sampled in 1992 suggests UMA273 was not mislabeled as another PGE well. The cause of the discrepancy between nitrate values reported by DEQ and PGE for well UMA273 is unknown. Therefore, the largest apparent increase in nitrate concentrations is suspected to be an error due to an unrealistically low concentration reported by DEQ in 1992.

Second Largest Nitrate Increase

When the 1992 and 2003 Synoptic Sampling Event results were compared, the second largest increase in nitrate concentration (28.3 mg/l) occurred at well UMA203. The reported value from 1992 is 0.37 mg/l. The reported value from 2003 is 28.7 mg/l. Well UMA203 is located within the Ammunition Demolition Area of the Umatilla Chemical Depot. A brief contamination assessment history of the area is provided below.

> The U.S. Army completed a site-wide Remedial Investigation and Feasibility Study (RI/FS), to determine the nature and extent of contamination, at the Depot in 1992. Seven areas of contamination were identified. The Ammunition Demolition Area (ADA), located along the western boundary of the Depot, has been in use since 1945 for storage, demolition, disposal, and disassembly operations. The ADA was identified during the 1992 Remedial Investigation to have soil contamination consisting of metals (primarily lead, cadmium, and chromium), explosive ordnance chemicals, and unexploded ordnance. Groundwater contamination was not identified at the ADA. Due to the type of historical disposal activities at the ADA, a large degree of variability may be expected from unburned residues.
>
> The EPA Region X web site (current as of November 2005) states "the remedy, selected in July 1994, included excavation, solidification/stabilization, and on-site landfill disposal of 30,000 tons of soil contaminated with metals and explosives, off-site removal of unexploded ordnance (UXO), and implementation of institutional controls to prevent public access to the area. In early 1997, surface clearance of UXO was completed and treatment of soils was completed in 2002. Work to map subsurface UXO and refined cost estimates for clearance of subsurface UXO have also been completed. Subsurface clearance of UXO remains to be completed."

Groundwater nitrate data from the 1980's presented in a 1989 Remedial Investigation indicate some ADA wells exhibited low levels (< 3 mg/l) of nitrate while one well (Well 001) exhibited nitrate concentrations ranging from 2 to 26 mg/l. Due to a lack of groundwater nitrate data available for well UMA203, further evaluation of this apparent increase in nitrate concentration was not possible.

Changes at Umatilla Chemical Depot Ammunition Demolition Area Wells

It is interesting to note that the changes in nitrate concentrations at the 11 ADA wells exhibited considerable variability including an approximately equal number of wells exhibiting significant increases, significant decreases, and no significant change. The changes in nitrate concentrations at these 11 wells are as follows:

- 4 of 11 showed no significant change or nitrate was not detected in 2003,
- 3 of 11 showed significant decreases (1.8 mg/l, 2.8 mg/l, and 19.6 mg/l (the third largest decrease)),
- 4 of 11 showed significant increases (0.71, 4.0 mg/l, 8.5 mg/l, and 28.3 mg/l (the second largest increase).

4.4.2 Largest Decreases in Nitrate Concentration

When the 1992 and 2003 Synoptic Sampling Event results were compared, the two largest decreases in nitrate concentration (43.4 mg/l and 39.7 mg/l) occurred at wells located within the Explosives Washout Lagoon Area of the Umatilla Chemical Depot. Nitrate concentrations decreased 43.4 mg/l at well UMA225 (from 52 mg/l in 1992 to 8.59 mg/l in 2003). Similarly, the nitrate concentrations decreased 39.7 mg/l at well UMA224 (from 47 mg/l in 1992 to 7.33 mg/l in 2003). Both wells UMA225 and UMA224 are located within approximately 100 feet of one of the three extraction wells used to remediate the groundwater contaminated with explosives (described below). Additional data were not available to substantiate these apparent dramatic decreases in nitrate concentrations.

In 1994, a method was selected to clean up the Explosives Washout Lagoon Area. It included a groundwater pump and treat system that uses granular activated carbon (GAC) to reduce the level of contamination in a 350-acre explosives-contaminated groundwater plume. The Army finished building and began operating the 1500-gallon per minute system in early 1997. Explosives-laden GAC is treated by off-site thermal regeneration. The

system reinjects clean groundwater at the site, and its operation is estimated to be necessary for 27 years. Work is currently being done to optimize the system.

The pump and treat system is not designed to treat nitrate. In fact, nitrate concentrations in the treatment system influent and effluent are reportedly essentially equal suggesting no significant biological degradation. However, nitrate concentrations in the vicinity of extraction well EW-3 (including at wells UMA224 and UMA225) appear to be decreasing. If the apparent reduction in nitrate concentrations is genuine, it may be attributable to dilution by "cleaner" water entering the area influenced by the pumping well.

4.4.3 Other Wells Exhibiting Significant Changes in Nitrate Concentration

Eight of the ten wells exhibiting the largest increase, and six of the ten wells exhibiting the largest decrease are regularly sampled wells. Five of these wells are part of DEQ's bi-monthly network, and are discussed in Section 4.3.2. Eight of these wells are monitoring wells located at food processor land application sites, and are sampled quarterly. A comparison was made between the two Synoptic Sampling Event results from the food processor land application site wells versus other data collected from these wells. A discussion of this comparison is provided below.

Wells Exhibiting The Largest Significant Nitrate Increases

As indicated above, 8 of the 10 wells exhibiting the largest increase in nitrate concentrations are regularly sampled wells. 5 of these 8 are food processor land application site monitoring wells. When the 1992 and 2003 results are compared to the entire data set from these wells, the following observations are made:

- At 4 of the 5 wells, the Synoptic Sampling Event results are representative of both long term trend direction and magnitude.
- The Synoptic Sampling Event results are representative of the long term trend direction but not the magnitude at the remaining well.

Therefore, the Synoptic Sampling Event results are representative of the long term trend direction (if not the magnitude) at all 5 of the wells. These observations indicate the changes in nitrate concentrations between the two Synoptic Sampling Events at wells exhibiting the largest significant nitrate increases are generally consistent with the Seasonal Kendall trend results.

Wells Exhibiting The Largest Significant Nitrate Decreases

As indicated above, 6 of the 10 wells exhibiting the largest decrease in nitrate concentrations are regularly sampled wells. 4 of these 6 are food processor land application site monitoring wells. When the 1992 and 2003 results were compared to the entire data set from these wells, the following observations were made:

- At 1 of the 4 wells, the Synoptic Sampling Event results are representative of both long term trend direction and magnitude.
- At 2 of the 4 wells, the Synoptic Sampling Event results are representative of the long term trend direction but not the magnitude.
- The Synoptic Sampling Event results are not representative of the long term trend direction at the remaining well.

Therefore, the Synoptic Sampling Event results are representative of the long term trend direction (if not the magnitude) at 3 of the 4 wells. These observations indicate the changes in nitrate concentrations between the two Synoptic Sampling Events at wells exhibiting the largest significant nitrate decreases are generally consistent with the Seasonal Kendall trend results.

4.5 Nitrate versus Depth to Water

Figure 4-4 is a plot of nitrate concentration versus depth to water. Depth to water was measured in 61 monitoring wells (including 6 alluvial aquifer well nests) that were sampled for nitrate (45% of the wells sampled). 58 of these 61 wells were alluvial aquifer wells; three were basalt aquifer wells. Depth to water was not measured in the other wells sampled because they were plumbed into a water delivery system and the well casings were not accessible. Monitoring wells typically are screened at or near the water table. Therefore, depth to water measurements in monitoring wells are estimates of the thickness of the unsaturated zone.

The box plot of depth to water levels on the right side of Figure 4-4 indicates the water levels ranged from 3.86 to 157 feet below land surface (fbls), averaged about 54 fbls, and half of the measurements were between approximately 20 and 80 fbls.

Depth to water levels and nitrate concentrations at the 6 well nests sampled are also indicated in Figure 4-4. Nitrate was detected in all 12 of these wells. As indicated in Figure 4-4, nitrate concentrations decreased with depth in 5 of the 6 well nests.

Nitrate was detected in 59 of these 61 wells (97% of wells with water levels measured). The scattered pattern of data in Figure 4-4 suggests there is no strong relationship between nitrate concentration and depth to water. The correlation coefficients between nitrate and depth to water are indicated in Figure 4-4 and reiterated below:

- Tau = 0.02 (at 18% significance level) for nitrate vs. depth to water in all 61 wells indicating a statistically insignificant, very weak positive correlation.
- Tau = 0.05 (at 41% significance level) for nitrate vs. depth to water in the 58 alluvial wells indicating a statistically insignificant, very weak positive correlation.
- Tau = 1.0 (at 70% significance level) for nitrate vs. depth to water in the 3 basalt wells indicating a statistically insignificant, very strong positive correlation.

The overall decrease in nitrate concentrations with depth to water at the well nests indicated in Figure 4-4 is not consistent with the area-wide correlation coefficient (which indicated a statistically insignificant very weak positive relationship). Additional discussion of this inconsistency is provided in Section 4.7.

4.6 Nitrate versus Total Well Depth

Figure 4-5 is a plot of nitrate concentration versus basalt well depth. Well depths for the 12 "basalt" wells (i.e., the 7 known basalt wells, 4 presumed basalt wells, and 1 alluvial & basalt well) range from 44 to 565 feet and average 110 feet. One of the twelve "basalt" wells had no detectable perchlorate. This well was also the deepest well tested (565'). Basalt wells with detectable nitrate ranged from 44 to 175 feet deep. For those basalt wells with nitrate detected, there appears to be a relationship between decreasing nitrate concentration with increasing screen (or open hole) depth (Figure 4-5).

Figure 4-6 is a plot of nitrate concentration versus total well depth. Total well depth is known for 130 of the 137 wells tested (118 alluvial wells and 12 basalt wells).

In general, the box plots of total well depth (Figure 4-6) indicate total depth in the basalt wells is deeper than the total depth of alluvial wells. Nitrate was detected in 125 of these 132 wells (95% of wells with known total depths). The scattered pattern of data in Figure 4-6 suggests there is no strong relationship between nitrate concentration and total well depth.

Correlation coefficients suggest different relationships between different groups of wells (Figure 4-6). The correlation coefficient between nitrate concentrations and total depth of all wells is low: Kendall's Tau is low (-0.15) and statistically insignificant. The correlation coefficient of nitrate concentrations and alluvial well depths is also low (0.05) and statistically insignificant. The strongest correlation coefficient is between nitrate concentrations and basalt well depths: Kendall's Tau is moderately strong (-0.58,) and statistically significant (Figure 4-6).

The overall decrease in nitrate concentrations with well depth at the well nests as indicated in Figure 4-6 is not consistent with the area-wide correlation coefficient (which indicated a statistically insignificant very weak positive relationship). Additional discussion of this inconsistency is provided in Section 4.7.

In summary, the information described above shows the following:

- A statistically significant, moderately strong negative correlation exists between nitrate concentrations and total depth of the 12 basalt wells. This statistic corroborates the idea of decreasing nitrate concentrations with increasing basalt well depth suggested by Figure 4-5.
- A statistically insignificant, very weak positive correlation exists between nitrate concentrations and total depth of the 118 alluvial wells. This statistic suggests there is little influence of well depth on nitrate concentrations in the alluvial aquifer.
- The decrease in nitrate concentrations with depth illustrated at 5 of the 6 well nests is consistent with known nitrate sources (i.e., they are all at or near land surface) and may reflect an actual relationship of decreasing nitrate concentrations with increasing depth in the alluvial aquifer.
- A statistically insignificant, very weak negative correlation exists between nitrate concentrations and total depth of all 130 wells. These statistics suggest there is no influence of well depth on nitrate concentrations if aquifer is not taken into consideration.

4.7 Summary of Nitrate Data Evaluation

Based on (1) a direct comparison of Synoptic Sampling Event results, (2) an evaluation of "significant changes" in nitrate concentrations between the two Events, and (3) a comparison of Seasonal-Kendall trend results to Synoptic Sampling Event results, it is concluded that nitrate concentrations in the GWMA generally increased between 1992 and 2003.

There is no consistent timing of seasonal fluctuations at the network wells. In other words, nitrate concentrations do not peak at the same time of year at all wells. There is a high degree of variability in the magnitude of seasonal nitrate fluctuations so it is not possible to account for seasonality when interpreting the change in observed nitrate concentrations between June/July 1992 and September 2003.

The largest verifiable increase in nitrate concentration occurred at a well located in the Umatilla Chemical Depot Ammunition Demolition Area. There was insufficient data to determine the cause of the increase. The largest decreases in nitrate concentrations occurred at two wells within the Explosives Washout Lagoon remediation area at the Umatilla Chemical Depot. While the groundwater remediation system is not designed to treat nitrate, nitrate concentrations in the vicinity of at least one extraction well appear to be decreasing as a side effect of the remediation.

The changes in nitrate concentrations at the Umatilla Chemical Depot Ammunition Demolition Area exhibited considerable variability including an approximately equal number of wells exhibiting significant increases (including the second largest increase), significant decreases (including the third largest decrease), and no significant change.

The most robust nitrate correlations (which were moderately strong) suggest:

- Nitrate increases as conductivity, calcium, magnesium, perchlorate, chloride, or sulfate concentrations increase, and
- Nitrate concentrations decrease as basalt well depth increases.

The correlation coefficients between nitrate and depth to water or well depth in the alluvial aquifer suggest statistically insignificant weak or very weak positive correlations (i.e., concentrations increase with depth). These correlation coefficients quantify the area-wide relationship of nitrate concentration with depth. However, comparing nitrate concentrations at the six alluvial well nests allows a more localized look at changes in nitrate concentrations with depth.

Nitrate decreases as the depth to water or well depth increases in 5 of 6 well nests (nitrate concentrations were essentially equal in the other well nest). Therefore, the overall decrease of nitrate concentrations with depth at the well nests is not consistent with the area-wide correlation coefficient. However, the observed decrease in nitrate concentrations with increasing depth at the well nests is consistent with known nitrate sources and the

groundwater flow system (i.e., nitrate is leached to groundwater from sources at or near land surface where it is then diluted through advection and dispersion) and may reflect an actual relationship of decreasing nitrate concentrations with increasing well depth in the alluvial aquifer. Alluvial aquifer heterogeneity, variable nitrate loading, and variable hydraulic loading likely cause variations in the vertical distribution of nitrate across the area. This variability may be the cause of the weak correlation coefficient which does not reflect the observed decrease in nitrate concentrations at the well nests.

5.0 PERCHLORATE EVALUATION

The purpose of this evaluation was to gain insight into the occurrence, distribution, and significance of perchlorate concentrations detected during the 2003 LUB GWMA Synoptic Sampling Event. The evaluation consisted of summarizing perchlorate concentrations by well type, as well as evaluating potential relationships with other groundwater chemistry parameters and hydrogeological aspects such as total depth, depth to water, and aquifer tapped. Results of the evaluation are discussed below.

5.1 Perchlorate Background

The following background information on perchlorate includes a discussion of potential sources of perchlorate, the health risks of perchlorate, perchlorate treatment options, and continuing research topics. Sources of additional information on both nitrate and perchlorate are in Appendix 2.

5.1.1 Sources of Perchlorate

Perchlorate can be a naturally occurring chemical in the environment or it can be manufactured for industrial use. When it is man-made, it is used primarily as an oxidizer in rocket and missile fuels and explosives. It is also used in highway safety flares, air bag inflation systems, fireworks, matches, some paints and enamels, electroplating and medical procedures (ITRC, 2005). It is also found as a manufacturing byproduct and as a breakdown product in other materials. For example, it is a byproduct of the manufacturing of sodium chlorate which is used in some herbicides (ITRC, 2005). It is also a breakdown product of sodium hypochlorite, which is an industrial sanitizing solution at higher strengths (i.e., used for the disinfection of drinking water and sewage effluent) and used as household bleach at lower strengths (MDEP, 2005). Additional potential sources of perchlorate are being identified through ongoing research throughout the world.

Perchlorate can be naturally occurring. The most well known deposit is a caliche deposit in the Atacama desert of Chile. Perchlorate also occurs in geologic deposits from other parts of the world, including Canada and the U.S. It is unknown if perchlorate is found naturally in the caliche deposits of the LUB GWMA. The Chilean caliche also contains nitrate so it has been exported for use as a fertilizer, as saltpeter used in gunpowder, and as a feedstock to making nitric acid, explosives, fireworks, and other products for over 100 years.

Widespread, low levels of perchlorate have been detected in a 56 county study area in Texas and New Mexico. Researchers concluded that no single anthropogenic source could have caused the widespread occurrence of perchlorate. Furthermore, they concluded that “it is the strong opinion of this research team that atmospheric production and/or surface oxidative weathering is the source of the perchlorate” (Jackson, et.al, 2003).

Recent investigations suggest perchlorate may form through natural atmospheric reactions of marine aerosol and ozone, although the exact mechanism is unknown (ITRC, 2005). Another theory suggests that lightning may play a role in the creation of perchlorate in the atmosphere, but this theory has not been confirmed (Dasgupta, et. al., 2005 and Jackson et. al., 2003). One possible explanation for the occurrence of perchlorate in caliche deposits is that precipitation containing trace levels of perchlorate falls to the earth, with some infiltrating the soil. In arid areas with high evaporation rates, the perchlorate ion is concentrated in groundwater and can be incorporated into certain geologic formations such as playa deposits, caliche-containing soils, dry lakebeds, and evaporite deposits (Orris, 2004). The United States Geological Survey (USGS) is studying perchlorate in groundwater around the United States to help determine the extent and amount of perchlorate in the environment, determine which geologic materials contain perchlorate, and confirm the rate, concentration, and pervasiveness of perchlorate in precipitation and groundwater (ITRC, 2005). Research also continues into analytical forensic techniques which may permit the fingerprinting of detected perchlorate to determine whether the source is natural or man-made and to what extent each source type is represented (ITRC, 2005).

5.1.2 Health Risk of Perchlorate

Perchlorate disrupts iodine uptake in the thyroid gland and can therefore, interfere with thyroid hormone production. High levels of perchlorate exposure can adversely affect iodide and thyroid hormone levels, which are essential for proper physical and mental development as well as overall metabolism. Fetuses and preterm

newborns constitute the most sensitive populations although infants and developing children are also considered sensitive populations. People who have compromised thyroid function resulting from conditions that reduce thyroid hormone production and people who are iodide-deficient also constitute potentially sensitive populations (NAS, 2005).

There currently is no federal or Oregon drinking water standard for perchlorate. Some states have adopted advisory levels ranging from 1 to 18 micrograms per liter (µg/l). A few states are in the process of setting drinking water standards. There is ongoing national debate about what level of perchlorate is safe. On January 10, 2005, the National Academy of Sciences (NAS) released their report on the health affects of perchlorate exposure. Based on the NAS report, perchlorate in drinking water should not exceed 24.5 µg/l if 100 percent of a person's perchlorate exposure is through drinking water. This would be considered the highest concentration of perchlorate in drinking water that is not expected to pose any significant risk to human health. In addition to water, perchlorate has also been found in lettuce, cow milk, human breast milk, cantaloupe, and other crops. Some studies indicate it bioaccumulates in milk and some crops. If the additional exposures from these other sources are included, the level that would be considered "safe" in drinking water would be lower than 24.5 µg/l. In January 2006, EPA published a Preliminary Remediation Goal of 24.5 µg/l for perchlorate in drinking water. In March 2006, Massachusetts proposed a perchlorate drinking water standard and cleanup standard of 2 µg/l.

5.1.3 Treating Drinking Water for Perchlorate

Two types of treatment systems are currently used elsewhere to treat perchlorate in water at the levels found in this geographic area: anion exchange resins and reverse osmosis systems. Information on the full range of treatment systems for perchlorate is available at:
http://www.clu-in.org/contaminantfocus/default.focus/sec/perchlorate/cat/Treatment_Technologies/

In the reverse osmosis treatment method, water is forced through a semi-permeable polymer membrane, leaving behind dissolved salts that are unable to penetrate the membrane. The concentrate contains rejected dissolved matter, including the perchlorate. Reverse osmosis treatment systems used for removal of perchlorate in water should be certified under the National Sanitation Foundation/American National Standards Institute (NSF/ANSI) Standard 58: Reverse Osmosis Drinking Water Treatment Systems. Information on these systems is available at:
http://www.nsf.org/consumer/drinking_water/perchlorate_reduction.asp?program=WaterTre
The National Sanitation Foundation website (www.nsf.org) provides a list of reverse osmosis units that have been independently verified to reduce perchlorate.

With the anion exchange resin technique, perchlorate is replaced by an innocuous anion, usually chloride in the water. Different types of resins can be targeted specifically for the removal of perchlorate and nitrates from water. General water chemistry is useful to know, as other common ions present in water, such as sulfate, may affect the longevity of the resins. Information on this treatment method is available at:
http://purolite.biz/POU_POE_Perchlorate_Removal.pdf

Any water treatment system requires routine maintenance and testing to ensure that they are working properly.

5.1.4 Continuing Research

The wide spread, low level detection of perchlorate during the 2003 LUB GWMA sampling event spurred additional investigations into the extent of the affected area and potential effects on agriculture. Additional information on these topics is discussed below.

5.1.4.1 Extent of Affected Area

The 2003 sampling event was not designed to delineate the full extent of perchlorate occurrence. Instead, perchlorate was added to the area-wide analysis as a first screen to determine if perchlorate was generally present in the GWMA. Perchlorate was found to be present in approximately half of the samples tested. Subsequent sampling events of more limited geographic scope have been conducted to fill in some of the data

gaps, and to evaluate temporal variability in perchlorate concentrations. The full extent of the affected area is not currently known. Additional sampling outside the GWMA would be needed to determine the full extent of the affected area.

5.1.4.2 Effect on Agriculture

The effect on irrigated agriculture is an emerging research area and the meaning of the limited results collected to date is being debated. DEQ, EPA, the Oregon Department of Human Services (DHS), the Oregon Department of Agriculture, and Oregon State University are working together to help answer questions about perchlorate effects on agriculture. DHS has conducted limited sampling of milk and crops in the area but results were not available at the time of publication of this document.

5.2 Perchlorate Detections

Table 5-1 summarizes the perchlorate detections in the wells sampled. The detection limit for these samples was 1.0 µg/l. Censored data (i.e., those results reported as less than 1.0 µg/l) are not included in Table 5-1. Part (a) is a table that summarizes the perchlorate detections by well type. Part (b) is a box plot that summarizes all the perchlorate detections. As indicated in Table 5-1, perchlorate was detected at 72 wells, and was not detected at 61 wells. The minimum perchlorate concentration detected was 1.01 µg/l. The maximum perchlorate concentration detected was 24.8 µg/l. Four concentrations exceeded 8 µg/l. Half of the detections were between 1.61 and 4.91 µg/l. The median concentration was 2.56 µg/l. The average concentration was 3.87 µg/l.

It is interesting to note that each well type that had perchlorate detections exhibited very similar median perchlorate concentrations. This is despite the fact that the seven highest nitrate concentrations, and sixteen of the twenty highest perchlorate concentrations were from monitoring wells (the remaining four were from domestic wells). This may be due, in part, to the fact that monitoring wells were the most frequently sampled well type (46% of all wells). However, domestic wells were also a large percentage (40%) of wells sampled. Perhaps a larger contributing factor is that monitoring wells are typically designed to screen the shallowest portion of the water table, most often within the alluvial aquifer. These wells are also frequently low yielding wells. Other types of wells (especially irrigation wells) are commonly drilled to a depth sufficient to produce a desired quantity of water. In this area, large yielding wells are often drilled into the deeper basalt aquifer. The fact that monitoring wells exhibited the highest perchlorate concentrations would be consistent with a perchlorate source that is close to land surface, and/or associated with the alluvial rather than basalt aquifer. Alternatively, monitoring wells may be exhibiting the highest perchlorate concentrations because their screens are close to the evaporative surface of the water table.

5.3 Perchlorate Distribution

Figure 5-1 is map depicting perchlorate results from the sampling event. A color-coded symbol is located at each well location indicating the perchlorate concentration at that well. As indicated in Figure 5-1, there does not appear to be a classic “contaminant plume” emanating from a particular source. Instead, perchlorate concentrations are, for the most part, scattered throughout the study area. It is, however, interesting to note that perchlorate concentrations were generally not detected in wells located within the flood plains of the Umatilla River and Butter Creek while 23 of the 25 highest concentrations were in wells outside the flood plains. This suggests that perchlorate concentrations may be diluted by the higher volume of water moving through flood plain sediments versus other portions of the alluvial aquifer.

5.4 Perchlorate Correlations

The data were evaluated for correlation between all 14 analytes. Figure 5-2 illustrates the 6 strongest correlations between perchlorate and some other analyte.

There is no “strong” correlation between perchlorate and any other analyte. There are, however, moderately strong correlations. As illustrated in Figure 5-2, the strongest perchlorate correlations were with nitrate and chloride (tau = 0.51). The next strongest perchlorate correlations were with bromide (tau = 0.47), magnesium (tau = 0.44), sulfate (tau = 0.40), and calcium (tau = 0.35).

Perhaps it should not be surprising that there is no strong correlation between perchlorate and other analytes such as nitrate. Five sources of nitrate have been identified in the LUB GWMA (i.e., irrigated agriculture, densely located septic systems, land application of food processing wastewater, dairies and feedlots, and the Umatilla Chemical Depot bomb washout lagoons). These sources of nitrate contribute different types and/or amounts of other constituents (e.g., chloride) to groundwater. The source(s) of perchlorate in the LUB GWMA have not been confirmed.

5.5 Perchlorate versus Aquifer

Perchlorate occurrence in the alluvial and basalt aquifers was evaluated. The aquifer tapped by most wells sampled is known from well logs. The aquifer tapped by some wells is presumed from well depth and location. The aquifer tapped by one well sampled is unknown.

Approximately 120 alluvial aquifer wells were sampled while approximately 12 basalt aquifer wells were sampled. Perchlorate was detected in these wells as follows:

- perchlorate was detected in 64 of 119 (54%) of known alluvial aquifer wells
- perchlorate was detected in the 1 well presumed to tap the alluvial aquifer
- perchlorate was detected in 4 of 7 (57%) known basalt aquifer wells
- perchlorate was detected in 2 of 4 (50%) presumed basalt aquifer wells
- perchlorate was not detected in the 1 well known to tap both the alluvial and basalt aquifers
- perchlorate was detected in the 1 well of unknown aquifer

In summary, perchlorate was detected in about half of the 120 alluvial wells and half of the 12 basalt wells sampled.

5.6 Perchlorate versus Nitrate

The relationship between perchlorate and nitrate concentrations in the alluvial and basalt aquifers was evaluated in two ways: plotting perchlorate versus nitrate concentrations by aquifer, and calculating correlation coefficients on these variables. Results of these evaluations are discussed below.

5.6.1 Perchlorate versus Nitrate in Alluvial Wells

Figure 5-3 is a plot of perchlorate concentration versus nitrate concentration in the 119 alluvial wells analyzed for both perchlorate and nitrate. The correlation coefficient between perchlorate and nitrate in alluvial wells (0.45) is shown in Figure 5-3 and indicates there is a statistically significant, moderately strong positive correlation. The lack of a “strong” correlation is not surprising because (as indicated in Section 5.4) there are multiple nitrate sources and an unknown number of perchlorate sources in the LUB GWMA. It is interesting to note that no alluvial groundwater samples with less than 3 mg/l nitrate had detectable perchlorate (Figure 5-3). These observations suggest that alluvial wells with elevated nitrate concentrations are more likely to have detectable perchlorate concentrations. It is worth noting that poorly constructed wells and older wells with deteriorating seals can allow shallower (sometimes poorer quality) water to enter a well presumably tapping a deeper (sometimes better quality) portion of the aquifer system.

5.6.2 Perchlorate versus Nitrate in Basalt Wells

Figure 5-4 is a plot of perchlorate concentration versus nitrate concentration in the 12 basalt wells. The correlation coefficient between perchlorate and nitrate in basalt wells (0.63) is included in Figure 5-4 and indicate there is a statistically significant, moderately strong positive correlation. With one exception (well UMA047), perchlorate was only detected in basalt wells with > 30 mg/l nitrate (Figure 5-4). UMA047 also plots differently than other basalt wells on a Piper diagram indicating its general chemistry signature is different from other basalt wells. Wells with nitrate concentrations in excess of 30 mg/l are very likely influenced by land surface activities. This observation is consistent with a perchlorate source and a nitrate source that are close to land surface, and/or associated with the alluvial rather than basalt aquifer. This observation also suggests that basalt wells with elevated nitrate concentrations are more likely to have detectable perchlorate

concentrations. Again, it is worth noting that poorly constructed wells and older wells with deteriorating seals can allow shallower (sometimes poorer quality) water to enter a well presumably tapping a deeper (sometimes better quality) portion of the aquifer system.

5.7 Perchlorate versus Depth to Water

Figure 5-5 is a plot of perchlorate concentration versus depth to water. Depth to water was measured in 61 monitoring wells that were sampled for perchlorate (45% of the wells sampled). 58 of these 61 wells were alluvial aquifer wells; three were basalt aquifer wells. Depth to water was not measured in the other wells sampled because they were plumbed into a water delivery system and the well casings were not accessible. Monitoring wells typically are screened at or near the water table. Therefore, depth to water measurements in monitoring wells are estimates of the thickness of the unsaturated zone.

The box plot of depth to water levels on the right side of Figure 5-5 indicates the water levels ranged from 3.86 to 157 feet below land surface (fbls), averaged about 54 fbls, and half of the measurements were between approximately 20 and 80 fbls.

Perchlorate was detected in 36 of these 60 wells (60% of wells with water levels measured). The scattered pattern of data in Figure 5-5 suggests there is no strong relationship between perchlorate concentration and depth to water. The correlation coefficients between perchlorate and depth to water are indicated in Figure 5-5 and reiterated below:

- Tau = 0.19 (at 96% significance level) for perchlorate vs. depth to water in all 61 wells indicating a statistically significant, weak positive correlation.
- Tau = 0.21 (at 97% significance level) for perchlorate vs. depth to water in the 58 alluvial wells indicating a statistically significant, weak positive correlation.
- Tau = 0.33 (at 0% significance level) for perchlorate vs. depth to water in the 3 basalt wells indicating a statistically insignificant, moderately strong positive correlation.

The overall decrease in perchlorate concentrations with increasing depth at the well nests is not consistent with the area-wide correlation coefficient (which indicates a statistically significant, weak positive correlation). Additional discussion of this inconsistency is provided in Section 5.12.

5.8 Perchlorate versus Total Well Depth

Figure 5-6 is a plot of perchlorate concentration versus basalt well depth. Well depths for the 12 “basalt” wells (i.e., the 7 known basalt wells, 4 presumed basalt wells, and 1 alluvial & basalt well) range from 44 to 565 feet and average 110 feet. Six of the twelve “basalt” wells had no detectable perchlorate. These include 6 of the 8 deepest wells (including the 3 deepest). Basalt wells with detectable perchlorate ranged from 44 to 145 feet deep. For those basalt wells with perchlorate detected, there appears to be a relationship between decreasing perchlorate concentration with increasing screen depth (Figure 5-6).

Figure 5-7 is a plot of perchlorate concentration versus total well depth. Total well depth is known for 130 of the 137 wells tested (118 alluvial wells and 12 basalt wells). The perchlorate concentrations at the 6 well nests are also indicated in Figure 5-7. Perchlorate concentrations decrease with depth at 3 of the 4 well nests with detectable perchlorate.

In general, the box plots of total well depth (Figure 5-7) indicate total depth in the basalt wells is deeper than the total depth of alluvial wells. Perchlorate was detected in 69 of these 130 wells (53% of wells with known total depths). The scattered pattern of data in Figure 5-7 suggests there is no strong relationship between perchlorate concentration and total well depth.

Correlation coefficients suggest different relationships between different groups of wells (Figure 5-7). The correlation coefficient between perchlorate concentrations and total depth of all wells is lowest: Kendall’s tau is very weak (0.10) and statistically insignificant. The correlation coefficient of perchlorate concentrations and

alluvial well depths is stronger and has a higher significance levels: Kendall's tau is weak (0.15) and statistically significant. The strongest correlation coefficient is between perchlorate concentrations and basalt well depths: Kendall's tau is moderately strong (-0.50,) and statistically significant (Figure 5-7).

The overall decrease in perchlorate concentrations with increasing depth at the well nests is not consistent with the area-wide correlation coefficient (which indicates a statistically significant, weak positive correlation). Additional discussion of this inconsistency is provided in Section 5.12.

5.9 Temporal Variation of Perchlorate

Based on the limited data set of perchlorate results up through September 2003, there appears to be little or no temporal variability of perchlorate concentrations in groundwater.

For example, the Port of Morrow well MW-15 was sampled in June 2003 and also in September 2003. The June 2003 sample had a reported value of 4.1 µg/l. The September 2003 sample had a reported value of 4.12 µg/l.

The 10 wells at the Umatilla Chemical Depot Ammunition Demolition area exhibited similar results, although the detection limits between the two sampling events was significantly different (the detection limit was 5 µg/l in August 2001 and 1 µg/l in September 2003). A comparison of perchlorate results from these two sampling events indicates:

- 4 wells had undetectable perchlorate concentrations both times,
- 3 wells exhibited < 5 µg/l in 2001, then between 1 and 2 µg/l in 2003,
- 3 wells exhibited detectable perchlorate both times with the difference ranging 0.02 to 1.24 µg/l and the relative percent difference ranging from <1% to 22%.

As indicated in Section 5.1.4.1, additional groundwater sampling has been conducted since the 2003 Synoptic Sampling Event to better characterize the distribution of perchlorate. As of September 2005, 80 wells had been sampled multiple times with the following results:

- 31 wells had non-detectable perchlorate concentrations for each sampling event (frequently at various detection limits),
- 10 wells had both non-detectable and detectable concentrations (the change in "detectability" at 8 of these 10 wells was due to variable detection limits; e.g., <2.0 and 1.17)
- 39 wells had detectable perchlorate each sampling event.
    - 24 of these 39 had a relative percent difference of $\leq$ 20%
    - 33 of these 39 had a range of $\leq$ 2 µg/l
    - 17 of these 39 increased in concentration
    - 16 of these 39 decreased in concentration
    - 4 of these 39 fluctuated in concentration
    - 2 of these 39 showed no change in concentration

These additional data suggest there is no consistent temporal pattern of perchlorate concentrations.

5.10 General Water Quality versus Perchlorate Occurrence

Wells at 135 locations were sampled for major ions. Stiff diagrams were constructed with the sampling results. Stiff diagrams plot major ion concentrations on a system of four parallel axes extending to each side of a vertical zero axis. Concentrations (in milliequivalents per liter) of four cations are plotted to the left of zero, while four anions are plotted to the right of zero. A line is drawn to connect the points producing an irregular polygonal shape determined by the gross chemistry of the water. The shape of the Stiff diagram is then used as an indication of general water composition. The width of the pattern is an approximate indication of total ionic content (i.e., total dissolved solids). For this study, the cations plotted on the Stiff diagrams include sodium, calcium + potassium, magnesium + aluminum, and iron + manganese. The anions plotted include phosphate + nitrate, sulfate, chloride, and bromide + fluoride.

Figure 5-8 presents the Stiff diagrams of the 20 samples with the highest perchlorate concentrations as well as a selection of Stiff diagrams of samples without detectable levels of perchlorate. As indicated in Figure 5-8, wells with perchlorate detections have wider (or "fat") Stiff diagrams (i.e., higher levels of dissolved anions and cations) while those without perchlorate detections have thinner (or "skinny") Stiff diagrams. There are a few sample locations that are exceptions to this generalization.

The Kendall's Tau correlation coefficient between the electrical conductivity of the water and the perchlorate concentration is 0.40, and is statistically significant at a 99% significance level.

These observations suggests that wells with generally low levels of dissolved ions are more likely to have undetectable amounts of perchlorate, and that wells with elevated levels of dissolved ions are more likely to have detectable perchlorate concentrations.

5.11 Sources of Perchlorate in the LUB GWMA

The source(s) of the widespread, low-level occurrence of perchlorate in the LUB GWMA remains unknown. It is possible that both naturally occurring and man-made sources of perchlorate are contributors. Possible sources of the perchlorate detected in the LUB GWMA include:

- naturally occurring geologic deposits (e.g., caliche),
- atmospheric deposition,
- the historical use of Chilean caliche as source of nitrate fertilizer,
- incomplete combustion of ordnance in Umatilla Chemical Depot's Ammunition Demolition Area,
- activities conducted at the Boardman Bombing Range,
- activities at the Cold Springs Bombing Range (located just southeast of Cold Springs Reservoir),
- activities conducted at the Boeing Jet Engine Test Facility (located approximately 3 miles northwest of Carty Reservoir),
- the use of sodium hypochlorite as an industrial sanitizing solution, growth inhibitor in drip irrigation systems, and/or
- the use of household bleach to "shock treat" wells for bacteria

Based on current data, there does not appear to be a single source for all perchlorate detections within the LUB GWMA. Additional research is needed to identify the perchlorate source(s) in the LUB GWMA.

5.12 Summary of Perchlorate Data Evaluation

Widespread, low-level perchlorate contamination was detected in the LUB GWMA. Perchlorate was detected in almost half of the 133 samples at concentrations ranging from 1.01 µg/l to 24.8 µg/l, with a median of 1.18 µg/l and an average of 2.57 µg/l. The full extent of the affected area is not currently known. The source(s) of perchlorate in the LUB GWMA remains unknown, and may include both naturally occurring and man-made sources. However, there does not appear to be a single source of all perchlorate detections in the LUB GWMA. Available data suggest there is no consistent temporal pattern of perchlorate concentrations. Water samples with higher levels of dissolved anions and cations (indicated by higher electrical conductivity and "fat" Stiff diagrams) are more likely to have detectable perchlorate concentrations.

The most robust perchlorate correlations (which were moderately strong) suggest:

- Perchlorate increases as conductivity, calcium, magnesium, nitrate, chloride, bromide, or sulfate concentrations increase, and
- Perchlorate concentrations decrease as basalt well depth increases.

The correlation coefficients between perchlorate and depth to water or well depth in the alluvial aquifer suggest statistically significant weak positive correlations (i.e., concentrations increase with depth). These correlation coefficients quantify the area-wide relationship of perchlorate concentration with depth. However, comparing perchlorate concentrations at the six alluvial well nests allows a more localized look at changes in perchlorate concentrations with depth.

Perchlorate decreases as the depth to water or well depth increases in 3 of the 4 well nests with detectable perchlorate. Perchlorate was not detected at two well nests and increased with depth at the remaining well nest. Therefore, the overall decrease of perchlorate concentrations with depth at the well nests is not consistent with the area-wide correlation coefficient. However, the observed decrease in perchlorate concentrations with increasing depth at the well nests is consistent with suspected perchlorate sources and the groundwater flow system (i.e., perchlorate is leached to groundwater from sources at or near land surface where it is then diluted through advection and dispersion) and may reflect an actual relationship of decreasing perchlorate concentrations with increasing well depth in the alluvial aquifer.

Alluvial aquifer heterogeneity, variable perchlorate loading, and variable hydraulic loading likely cause variations in the vertical distribution of perchlorate across the area. This variability may be the cause of the weak correlation coefficient which does not reflect the observed decrease in perchlorate concentrations at the well nests.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The following conclusions are based on the sampling results and data evaluation of the 2003 Synoptic Sampling Event. These conclusions are grouped according to topic.

Common Ions (Br, Ca, Cl, Fl, Fe, Mg, Mn, K, Na, SO_4)

- No samples exceeded primary drinking water standards. Fifteen percent of samples exceeded secondary drinking water standards.
- Ninety-one percent of the samples exceeded the 20 mg/l drinking water advisory level for individuals on a restricted sodium diet.
- Other common ions were detected below levels expected to represent a human health concern.

Correlation

- There is no strong correlation between any of the 14 analytes.
- The strongest correlation is between magnesium and calcium.
- Nitrate and perchlorate exhibited the eighth strongest correlation.

Nutrients (other than nitrate)

- Ammonia + ammonium was detected in 24% of the samples. The maximum concentration was 1.23 mg/l. All ammonia + ammonium concentrations are less than the 30 mg/l lifetime health advisory level for ammonia, and thus, are not expected to represent a human health concern.
- Phosphorus was detected in 91% of the samples. The maximum concentration was 2.98 mg/l. At the concentrations detected, phosphorus is not expected to represent a human health concern because it is not a priority pollutant or known carcinogen.

Nitrate

Nitrate Occurrence and Distribution

- Approximately 37% of the samples analyzed exceeded the 10 mg/l nitrate standard while 58% of the samples exceeded the 7 mg/l trigger level for establishing a GWMA. The elevated nitrate concentrations throughout the GWMA represent a human health threat and confirm the need for continued and, where possible, expanded implementation of best management practices to reduce the nitrate loading to the region's groundwater.
- There is no consistent geographic pattern evident in the nitrate concentrations.
- Large differences in nitrate concentrations occur in relatively short distances (e.g., 20 mg/l in approximately ½ mile).

Nitrate Relationships to General Water Quality

- Nitrate does not show a "strong" correlation with any other analyte.
- The strongest nitrate correlation was with calcium. The next strongest nitrate correlations were with magnesium, perchlorate, chloride, sulfate, and potassium.

Nitrate Seasonality

- Nitrate concentrations do not show consistent timing of seasonal fluctuations throughout the network wells.
- Nitrate concentrations show a high degree of variability in the magnitude of seasonal fluctuations.
- It is not possible to account for seasonality when interpreting the change in observed nitrate concentrations between June/July 1992 and September 2003.

Changes in Nitrate Concentrations

- Based on (1) a direct comparison of results from the two Synoptic Sampling Events, (2) an evaluation of "significant changes" in nitrate concentrations between the two Events, and (3) a comparison of Seasonal-Kendall trend results to Synoptic Sampling Event results, it is concluded that nitrate concentrations in the GWMA generally increased between 1992 and 2003.
- There is no systematic geographic pattern to changes in nitrate concentrations between 1992 and 2003.
- The largest verifiable increase in nitrate concentration occurred at a well located in the Ammunition Demolition Area of the Umatilla Chemical Depot.
- The largest decreases in nitrate concentrations occurred at two wells within the Explosives Washout Lagoon remediation area at the Umatilla Chemical Depot.
- While the groundwater remediation system is not designed to treat nitrate, nitrate concentrations in the vicinity of at least one extraction well appear to be decreasing as a side effect of the remediation.
- The changes in nitrate concentrations at the Umatilla Chemical Depot Ammunition Demolition Area exhibited considerable variability including an approximately equal number of wells exhibiting significant increases (including the second largest increase), significant decreases (including the third largest decrease), and no significant change.

Nitrate Relationships to Hydrogeologic Variables

- There are statistically insignificant correlations between nitrate concentrations and depth to water suggesting there is little influence of depth to water (i.e., unsaturated zone thickness) on nitrate concentrations when considered on an area-wide basis. However, nitrate concentrations decrease with depth at 5 of 6 well nests tested. This decrease in concentration with depth is consistent with known nitrate sources and the groundwater flow system, and may reflect an actual relationship of decreasing nitrate concentrations with increasing well depth in the alluvial aquifer.
- A statistically insignificant, very weak positive correlation exists between nitrate concentrations and total depth of the 118 alluvial wells. This statistic suggests there is little influence of well depth on nitrate concentrations in the alluvial aquifer. However, nitrate concentrations decrease with depth at 5 of 6 well nests tested. This decrease in concentration with depth is consistent with known nitrate sources and the groundwater flow system, and may reflect an actual relationship of decreasing nitrate concentrations with increasing well depth in the alluvial aquifer.
- A statistically significant, moderately strong negative correlation exists between nitrate concentrations and total depth of the 12 basalt wells indicating decreasing nitrate concentrations with increasing basalt well depth.

Perchlorate

Perchlorate Occurrence and Distribution

- Perchlorate was detected in 46% of the 133 samples analyzed. Concentrations ranged from 1.01 to 24.8 µg/l, with a median concentration of 1.18 µg/l and an average of 2.57 µg/l.
- Perchlorate was detected in about half of the alluvial wells and half of the basalt wells sampled.
- There does not appear to be a classic "contaminant plume" emanating from a particular source. Instead, perchlorate concentrations are, for the most part, scattered throughout the study area.
- Perchlorate was generally not detected in wells located within the flood plains of the Umatilla River and Butter Creek while 23 of the 25 highest concentrations were in wells outside the flood plains. This suggests that perchlorate concentrations may be diluted by the higher volume of water moving through flood plain sediments versus other portions of the alluvial aquifer.
- Monitoring wells exhibited the highest perchlorate concentrations, which would be consistent with a perchlorate source that is close to land surface, and/or associated with the alluvial rather than basalt

aquifer. Alternatively, monitoring wells may be exhibiting the highest perchlorate concentrations because their screens are close to the evaporative surface of the water table.
- The full extent of the perchlorate affected area is not known.
- There is no consistent temporal variability in perchlorate concentrations.

Relationships to General Water Quality

- There is no "strong" correlation between perchlorate and any other analyte. There are moderately strong correlations of perchlorate with analytes such as nitrate and chloride.
- The lack of a "strong" correlation is not surprising because there are multiple nitrate sources and an unknown number of perchlorate sources in the LUB GWMA. However, this observation does suggest that wells with elevated nitrate concentrations are more likely to have detectable perchlorate concentrations.
- In general, water samples with higher levels of dissolved anions and cations (indicated by higher electrical conductivity and "fat" Stiff diagrams) are more likely to have detectable perchlorate concentrations. This conclusion is based on the observations that wells with perchlorate detections have "fat" Stiff diagrams (i.e., higher levels of dissolved anions and cations) while those without perchlorate detections have "skinny" Stiff diagrams, and the correlation coefficient between perchlorate and electrical conductivity is moderately strong.

Perchlorate Relationships to Hydrogeologic Variables

- There are weak correlations positive (some statistically significant) between perchlorate concentrations and depth to water or total well depth in the alluvial aquifer. However, perchlorate concentrations decrease with depth at 3 of 4 well nests with detectable perchlorate. This decrease in concentration with depth is consistent with suspected perchlorate sources and the groundwater flow system, and may reflect an actual relationship of decreasing perchlorate concentrations with increasing well depth in the alluvial aquifer.
- A statistically significant, moderately strong negative correlation exists between perchlorate concentrations and total depth of the 12 basalt wells indicating decreasing perchlorate concentrations with increasing basalt well depth.

Perchlorate Sources

- The source(s) of perchlorate in the LUB GWMA remains unknown.
- It is possible that both naturally occurring and man-made sources of perchlorate are contributors.
- Possible sources of the perchlorate detected in the LUB GWMA include:
    - naturally occurring geologic deposits (e.g., caliche),
    - atmospheric deposition,
    - the historical use of Chilean caliche as source of nitrate fertilizer,
    - demolition of ordnance in Umatilla Chemical Depot's Ammunition Demolition Area,
    - activities conducted at the Boardman Bombing Range,
    - activities conducted at the Boeing Jet Engine Test Facility (located approximately 3 miles northwest of Carty Reservoir),
    - activities at the Cold Springs Bombing Range (located southeast of Cold Springs Reservoir),
    - the use of sodium hypochlorite as an industrial sanitizing solution, growth inhibitor in drip irrigation, and/or
    - the use of household bleach to "shock treat" wells for bacteria
- There does not appear to be one single source of all perchlorate detections within the LUB GWMA.
- Additional research is needed to identify the perchlorate source(s) in the LUB GWMA.

Health Risk of Perchlorate

- Perchlorate disrupts iodine uptake in the thyroid gland and can therefore interfere with thyroid hormone production. Fetuses, preterm newborns, infants, and developing children are considered to be populations most sensitive to the effects of perchlorate.
- There currently is no federal or Oregon drinking water standard for perchlorate. An NAS report suggests that if 100 percent of a person's perchlorate exposure is through drinking water, 24.5 µg/l perchlorate would be a "safe" level in drinking water. If additional exposures from milk or food are included, the level that would be considered "safe" in drinking water would be lower than 24.5 µg/l. In January 2006, EPA published a preliminary remediation goal of 24.5 µg/l for perchlorate in drinking water.

Perchlorate Treatment

- Anion exchange resins and reverse osmosis systems are currently used elsewhere to treat perchlorate in water at the levels found in the LUB GWMA.

6.2 Recommendations

Based on the conclusions stated above, the following recommendations are made:

- It is recommended that implementation of best management practices be continued, and where possible, expanded to reduce the nitrate loading to the region's groundwater.

- Owners of older wells should have their well casings and seals inspected to ensure that no leakage from land surface or leakage between aquifers is occurring. Properly constructed wells may aid in reducing exposure to nitrate and perchlorate.

- Prior to choosing a water treatment system to remove nitrate and/or perchlorate from water, it is recommended that homeowners consult with the various manufacturers and consider re-testing for perchlorate and general water chemistry by a competent and experienced lab. All water treatment systems require routine maintenance to ensure proper treatment.

- Additional research should be conducted into the source(s) of perchlorate in the LUB GWMA.

7.0 REFERENCES

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Table 3-1
Summary of Results
2003 LUB GWMA Synoptic Sampling Event Report

Statistical Method Used on Censored Data	Parameter	Ammonia + Ammonium	Bromide	Calcium	Chloride	Fluoride	Iron	Magnesium	Manganese	Nitrate-Nitrogen	Perchlorate	Phosphorus	Potassium	Sodium	Sulfate
	Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l
	# samples (1)	134	133	135	133	133	135	135	135	134	133	135	135	135	133
	% nondetectable	76%	74%	0%	0%	0%	42%	0%	61%	4%	46%	9%	0%	0%	0%
Substitution of one-half the detection limit	*Minimum*	0.05	0.1	11.1	3.68	0.0802	0.005	5.6	0.001	0.025	0.5	0.005	2.59	6.5	0.667
	Median	0.05	0.1	64.6	27	0.269	0.017	23.3	0.001	7.77	1.14	0.0532	6.7	40.8	36.8
	Mean	0.09	0.24	70.12	46.64	0.32	0.27	26.63	0.039	12.97	2.33	0.11	7.07	48.87	54.63
	Maximum	1.23	2.09	227	229	1.48	6.52	84.9	0.950	51.1	24.8	2.98	14.6	239	253
	Standard Deviation	0.12	0.35	39.8	46.3	0.19	0.95	15.4	0.136	13.2	3.29	0.30	2.67	35.2	49.8
	Inter Quartile Range	0.02	0.10	47.8	47.0	0.17	0.07	16.8	0.008	15.3	2.25	0.08	3.93	34.2	48.9
	Variance	6.79	0.13	1580	2145	0.04	0.89	237	0.02	174	10.8	0.09	7.12	1236	2484
	Skewness	57.77	3.23	1.09	1.92	2.62	5.42	1.37	5.05	1.25	3.75	7.81	0.71	2.67	1.87
	Normal Distribution? (2)	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	Natural Log Distribution? (2)	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	No
MLE or K-M (9)	*Median*	0.05	0.07	--	--	--	0.017	--	0.0009	7.66	1.18	0.05	--	--	--
	Mean	0.08	0.23	--	--	--	0.27	--	0.126	12.95	2.57	0.11	--	--	--
	Federal Primary Drinking Water Standard (3)					4.0				10					
	Federal Secondary Drinking Water Standard (4)				250	2.0	0.3		0.05						250
	Other Comparison Values	30 (5)		approx. 300 mg/l in alluvial aquifers (6)				generally <40 (6)	0.3 (5)		1 to 24.5 ppb (7)	total phosphate generally < 10 (6)	up to 50 (6)	20 mg/l (for those on a 500 mg/day restricted sodium diet) (8)	500 (5)
	Any Problems Identified?	Probably not; less than lifetime health advisory	Probably not; not a priority pollutant or carcinogen	Probably not; within naturally occurring levels; some intake of this nutrient is required for good health	No; less than standard	No; less than standard	Yes; 1 domestic and 16 monitoring wells exceed standard; some intake of this nutrient is required for good health	Probably not; not a priority pollutant or carcinogen; some intake of this nutrient is required for good health	Yes; 3 domestic, 1 irrigation, 1 industrial, and 16 monitoring wells exceed secondary standard. 1 domestic and 5 monitoring wells exceed the lifetime health advisory; some intake of this nutrient is required for good health	Yes; 14 domestic, 26 monitoring, and 10 irrigation wells exceed standard	Perhaps; depending on how much perchlorate is in milk and food, and what the eventual standard is. See footnote (7)	Probably not; not a priority pollutant or carcinogen	Probably not; not a priority pollutant or carcinogen; some intake of this nutrient is required for good health	Perhaps: 47 domestic, 1 community, and 75 other wells exceed advisory level; some intake of this nutrient is required for good health	Probably not; only 1 well (an irrigation well) exceeded the 250 mg/l standard

Notes:
(1) 135 wells were sampled but 2 bottles opended during transit so the number of samples analyzed ranged from 133 to 135, depending on the analyte.
(2) Data distributions were evaluated using the Ryan-Joiner method with a confidence level of 95%.
(3) Primary Drinking Water Standards are legally enforceable standards that apply to public water systems for specific contaminants that can adversely affect public health.
(4) Secondary Drinking Water Standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects or aesthetic effets in drinking water.
(5) A Lifetime Health Advisory is the concentration in drinking water that is not expected to cause any adverse noncarcinogenic effects over a lifetime of exposure, with a margin of safety.
(6) Value cited in "Study and Interpretation of the Chemical Characteristics of Natural Water" by J.D. Hem, 1985. USGS Water Supply Paper 2254.
(7) There is no national or Oregon standard for perchlorate. Individual states have set their own guidance concentrations which range from 1 ug/l to 18.5 ug/l. On 1/26/06, EPA published an assessment guidance with a preliminary remediation goal of 24.5 ug/l for perchlorate in drinking water. This would be considered a “safe” level and the highest concentration of perchlorate in drinking water that is not expected to pose any significant risk to human health. In addition to perchlorate being found in water, it may also accumulate in food (including milk). If the additional exposures from these other sources are included, the level that would be considered safe in drinking water would be lower than 24.5 ug/l.
(8) A Drinking Water Advisory is a nonregulatory concentration of a contaminant in water that is likely to be without adverse effects on both health and aesthetics.
(9) Maximum Likelihood Estimation (MLE) was used on data sets with 50% to 80% censoring. The Kaplan-Meier (K-M) method was used on data sets with <50% censoring.

Table 4-1
Summary of Trend Evaluation
2003 LUB GWMA Synoptic Sampling Event Report

Well ID (1)	June/July 1992 Nitrate (mg/l)	Sept/Oct 2003 Nitrate (mg/l)	1992 to 2003 Change	Is there a "significant difference" in concentration? (2)	Slope between two Synoptic Sampling Events (mg/l/yr)	Seasonal-Kendall Trend (3)		Are Synoptic Event results representative of S-K trend DIRECTION?	Are Synoptic Event results representative of S-K trend MAGNITUDE?
						Slope (mg/l/yr)	Significance Level		
UMA028	2.40	5.88	Increased by 3.48 mg/l	Yes	0.310	0.634	99%	Yes	no
UMA029	24.0	45.9	Increased by 21.90 mg/l	Yes	1.951	0.269	80%	Yes	no
UMA033	7.70	7.09	Decreased by 0.61 mg/l	no	-0.054	-0.036	<80%	Yes	Yes
UMA034	2.40	2.00	Decreased by 0.40 mg/l	no	-0.035	0.034	85%	no	
UMA038	2.90	2.40	Decreased by 0.50 mg/l	no	-0.045	-0.066	90%	Yes	Yes
UMA046	0.48	1.96	Increased by 1.48 mg/l	Yes	0.130	-0.007	80%	no	
UMA047	2.60	3.50	Increased by 0.90 mg/l	Yes	0.080	0.072	100%	Yes	Yes
UMA048	1.50	1.65	Increased by 0.15 mg/l	no	0.013	0.030	100%	Yes	Yes
UMA056	6.30	6.46	Increased by 0.16 mg/l	no	0.014	-0.050	99%	no	
UMA058	23.0	9.21	Decreased by 13.80 mg/l	Yes	-1.227	-0.581	99%	Yes	Yes
UMA084	6.90	11.4	Increased by 4.50 mg/l	Yes	0.400	-0.416	99%	no	
UMA085	24.0	35.6	Increased by 11.60 mg/l	Yes	1.033	1.390	99%	Yes	Yes
UMA094	11.0	7.50	Decreased by 3.50 mg/l	Yes	-0.312	-0.255	99%	Yes	Yes
UMA096	31.0	19.6	Decreased by 11.40 mg/l	Yes	-1.016	-0.214	99%	Yes	no
UMA103	24.0	22.9	Decreased by 1.10 mg/l	no	-0.090	0.117	<80%	no	
UMA106	0.70	0.93	Increased by 0.23 mg/l	no	0.020	-0.001	<80%	no	
UMA109	2.30	3.19	Increased by 0.89 mg/l	Yes	0.079	0.245	99%	Yes	no
UMA110	5.40	5.28	Decreased by 0.12 mg/l	no	-0.011	-0.131	<80%	Yes	Yes
UMA112	5.10	3.84	Decreased by 1.26 mg/l	Yes	-0.112	-0.020	<80%	Yes	no
UMA116	3.30	3.26	Decreased by 0.04 mg/l	no	-0.004	0.140	99%	no	
UMA119	9.20	8.24	Decreased by 0.96 mg/l	Yes	-0.085	0.271	99%	no	
UMA122	12.0	28.4	Increased by 16.40 mg/l	Yes	1.460	1.618	99%	Yes	Yes
UMA133	18.0	13.3	Decreased by 4.70 mg/l	Yes	-0.419	-0.135	<80%	Yes	no
UMA144	2.10	9.36	Increased by 7.26 mg/l	Yes	0.647	-0.399	99%	no	
UMA156	7.90	10.8	Increased by 2.90 mg/l	Yes	0.258	0.463	99%	Yes	Yes
UMA160	0.02	18.6	Increased by 18.58 mg/l	Yes	1.654	0.007	99%	Yes	no
UMA164	3.0	4.02	Increased by 1.02 mg/l	Yes	0.091	0.166	99%	Yes	Yes
UMA168	3.80	3.28	Decreased by 0.52 mg/l	Yes	-0.046	-0.128	99%	Yes	no
UMA180	0.70	3.98	Increased by 3.28 mg/l	Yes	0.292	0.398	99%	Yes	Yes
UMA185	0.13	0.16	Increased by 0.03 mg/l	no	0.003	0.002	99%	Yes	Yes
UMA190	0.63	1.45	Increased by 0.82 mg/l	Yes	0.073	0.125	99%	Yes	Yes
UMA191	1.10	0.25	Decreased by 0.85 mg/l	Yes	-0.076	0.041	99%	no	
UMA198	9.0	31.2	Increased by 22.20 mg/l	Yes	1.977	0.967	99%	Yes	no
UMA201	12.0	16.0	Increased by 4.00 mg/l	Yes	0.356	1.124	99%	Yes	no

minimum =	-1.227	-0.581
median =	0.014	0.030
average =	0.209	0.162
maximum =	1.977	1.618
# of Increasing Trends =	20	19
# of Decreasing Trends =	14	9
# of Statistically Insignificant Trends =	--	6
TOTAL =	34	34

Synoptic event results are representative of BOTH long term trend direction and magnitude at 14 wells.
Synoptic event results are representative of long term trend direction BUT NOT magnitude at 10 wells.
Synoptic event results ARE NOT representative of long term trend direction at 10 wells.

Notes:

(1) Wells included in this table are the bi-monthy network wells which exhibited detectable nitrate concentrations during both the 1992 and 2003 Synoptic Sampling Events.

(2) A "Significant difference" between the two Synoptic Sampling Events is defined as a relative percent difference of >10% AND an absolute difference of >0.5 mg/l.

(3) The Seasonal-Kendall trend was calculated using all data available from each well; typically from late 1991 through 2004.

Table 5-1
Summary of Perchlorate Detections
2003 LUB GWMA Synoptic Sampling Event Report

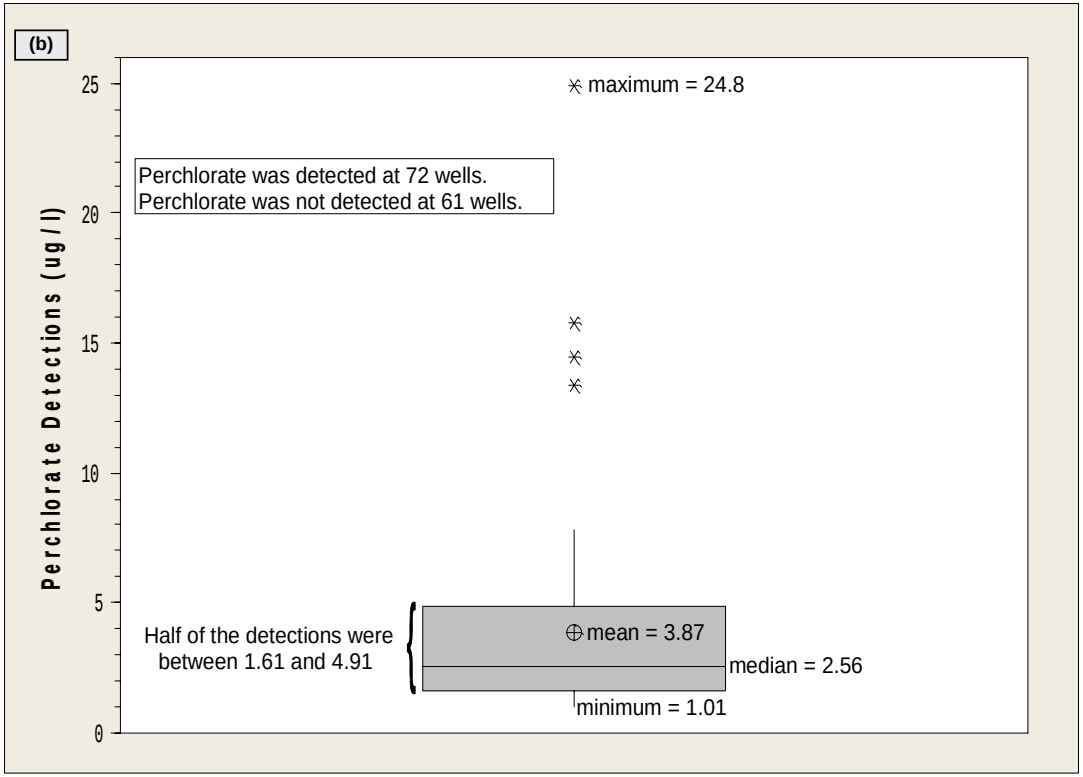
(a)

Well Type	*# Wells Sampled*	*% of Wells Sampled*	*# Wells with perchlorate analyzed (1)*	*# Wells with perchlorate detected (2)*	*% Wells with perchlorate detected*	*# Wells with perchlorate NOT detected*	*% Wells with perchlorate NOT detected*	*Minimum perchlorate detection*	*Median perchlorate detection*	*Average perchlorate detection*	*Maximum perchlorate detection*
Monitoring well	62	46%	61	37	61%	24	39%	1.10	2.89	4.97	24.8
Domestic well	54	40%	54	25	46%	29	54%	1.06	2.17	2.95	6.92
Irrigation well	14	10%	13	9	69%	4	31%	1.01	2.04	2.24	4.23
Industrial well	3	2%	3	0	0%	3	100%	--	--	--	--
Community well	1	1%	1	1	100%	0	0%	1.14	--	--	1.14
Stock Watering well	1	1%	1	0	0%	1	100%	--	--	--	--
TOTAL	**135**	**100%**	**133**	**72**	**54%**	**61**	**46%**	1.01	2.56	3.87	24.8

(1) = Samples from 1 monitoring well and 1 irrigation well were not analyzed for perchlorate because the bottle lid came off during transit.

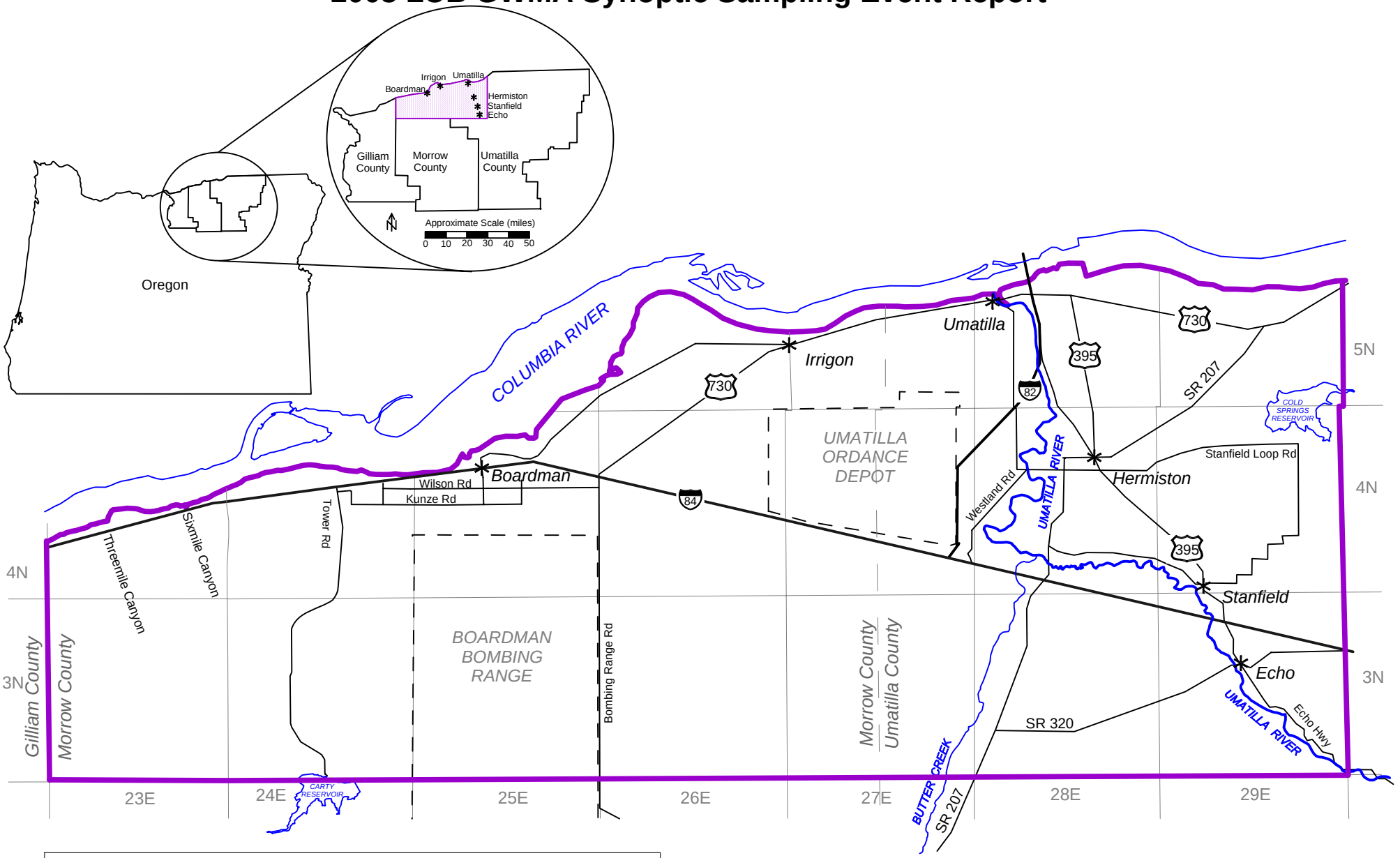
(2) = Perchlorate values in this table represent "conditioned" data (i.e., duplicate samples have been averaged into one value). Censored data (values reported below the detection limit) are not included in this table.

(b)



Boxplot Explanation:
The lower limit of the box is the 25th percentile (i.e., 25% of the data is less than this value). The upper limit of the box is the 75th percentile. The height of the box is the interquartile range (IQR) and includes half of the data. The median value is labeled and indicated by a line across the box. A plus inside a circle denotes the mean value. Heights of the two box halves depict the skewness (e.g., if the top half is larger the data is positively skewed). Vertical lines are drawn from the top and bottom of the box to the farthest data points within 1.5 times the IQR. Any data points beyond this distance are plotted individually with an asterisk.

Figure 1-1
Location and Boundaries of Lower Umatilla Basin Groundwater Management Area
2003 LUB GWMA Synoptic Sampling Event Report

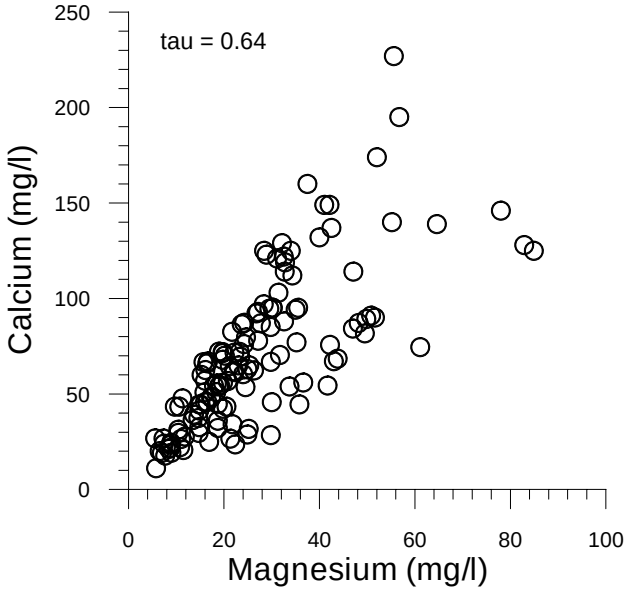


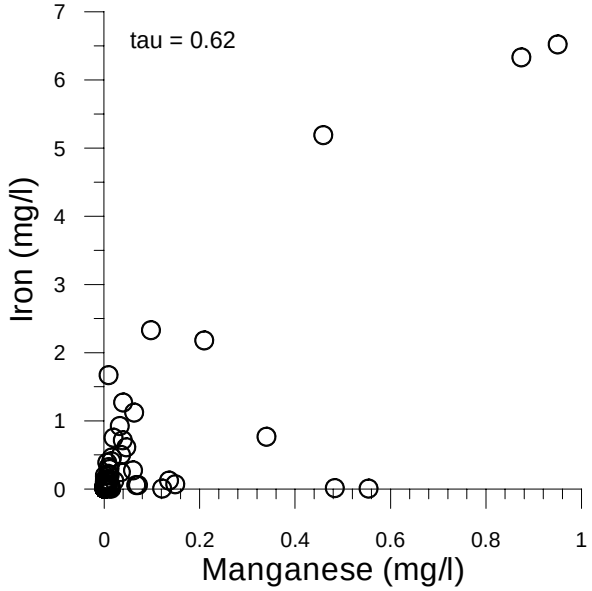
Lower Umatilla Basin Groundwater Management Area Boundaries

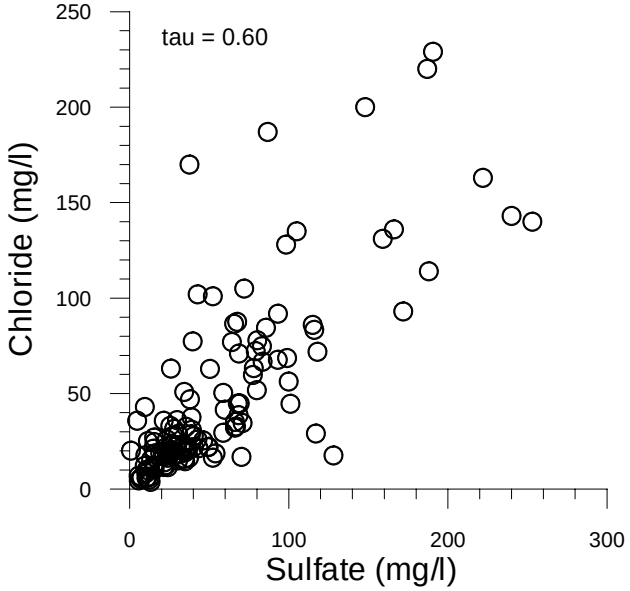
North: Columbia River
South: 2N/3N Township Boundary
East: 29E/30E Range Boundary
West: 22E/23E Range Boundary (also the Morrow / Gilliam County line)

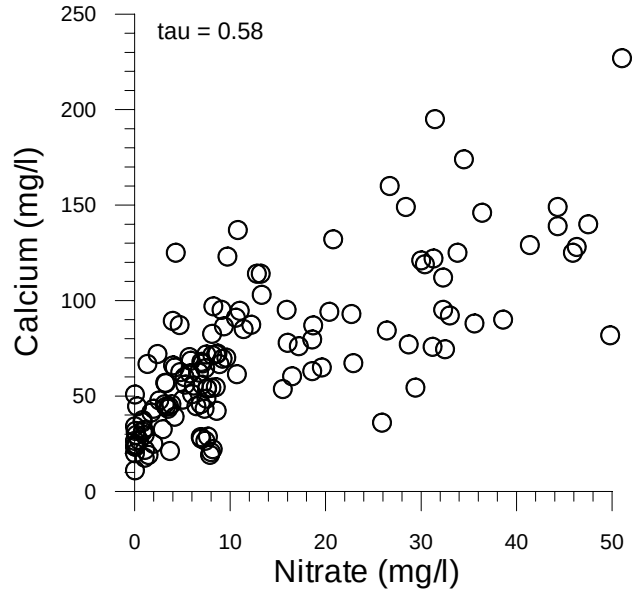
Approximate Scale (miles)
0 1 2 3

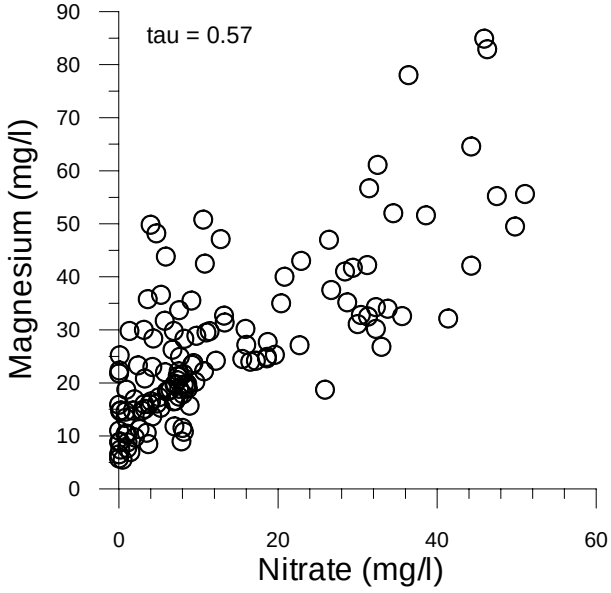
Figure 3-1
Strongest Correlations Between Analytes
2003 LUB GWMA Synoptic Sampling Event Report











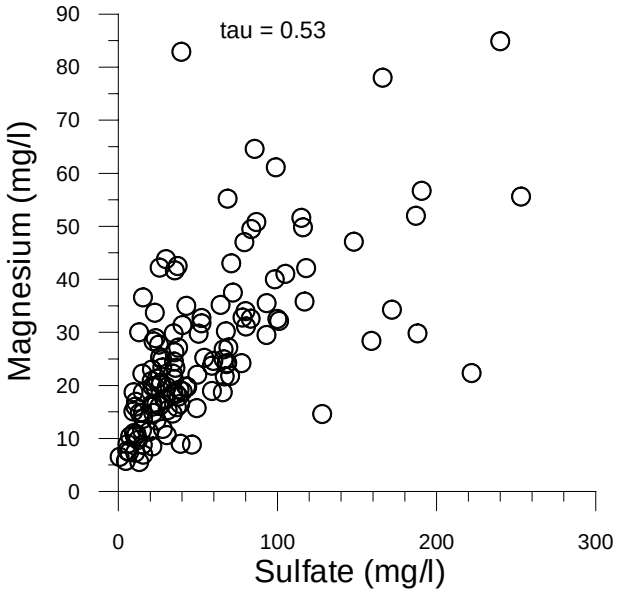
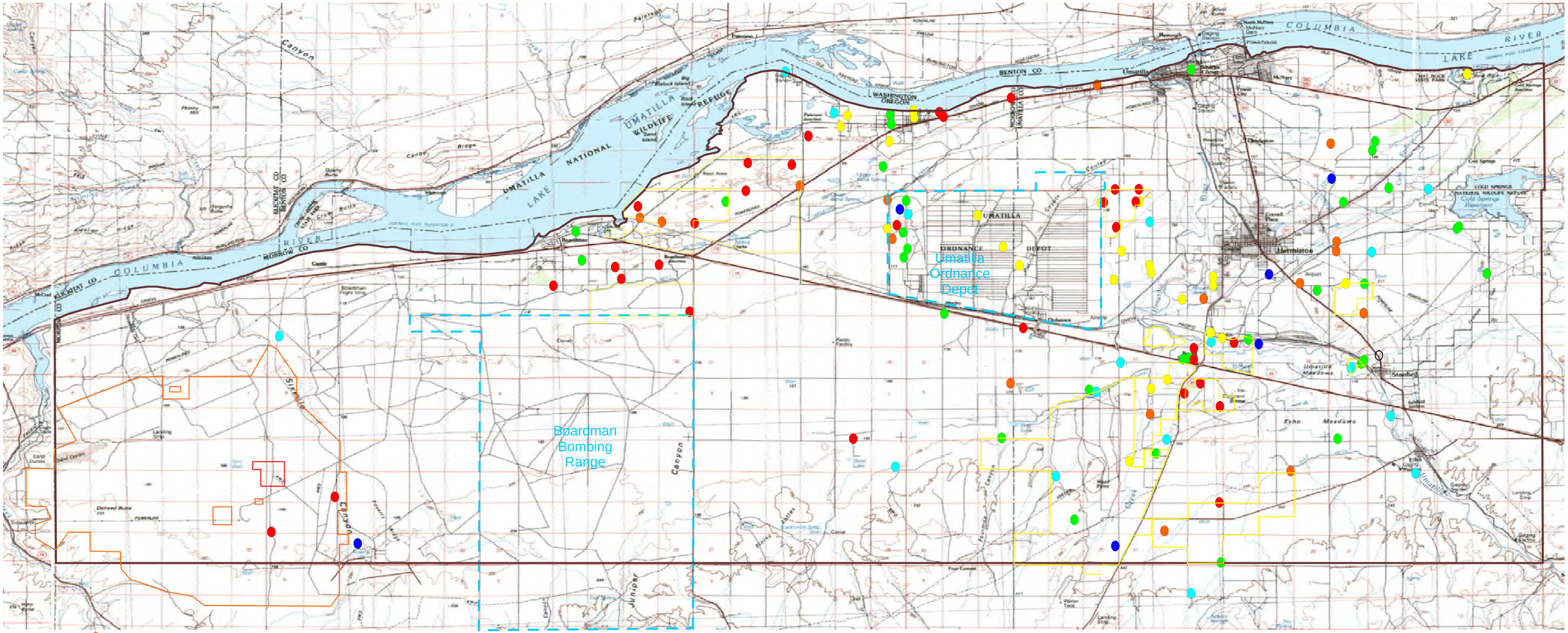


Figure 3-2
Nitrate Results
2003 LUB GWMA Synoptic Sampling Event Report



Approximate Scale (miles)
0 1 2 3

= Threemile Canyon Farm & CAFOs

= Groundwater Management Area Boundary

= Military Facility

= Food Processor Land Application Site

77 wells (57.5%) with nitrate concentrations GREATER THAN the 7 mg/l GWMA trigger level

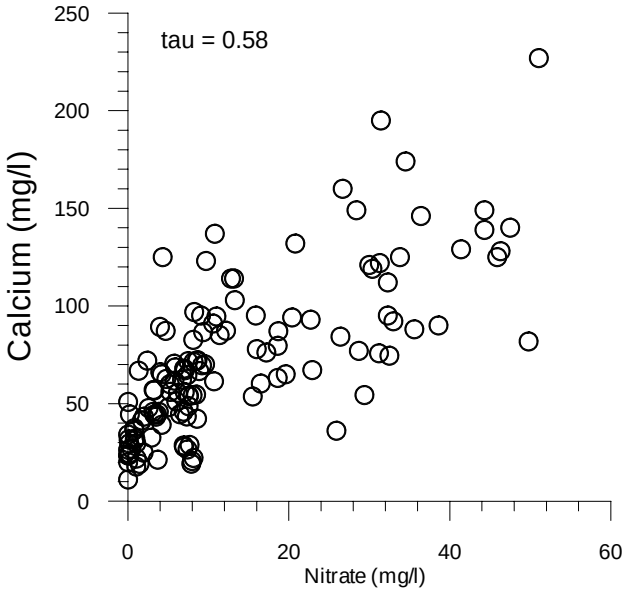
57 wells (42.5%) with nitrate concentrations LESS THAN the 7 mg/l GWMA trigger level

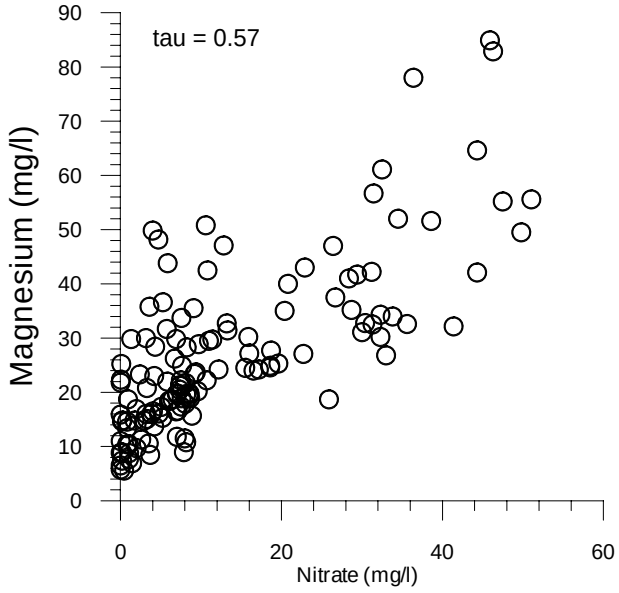
Explanation

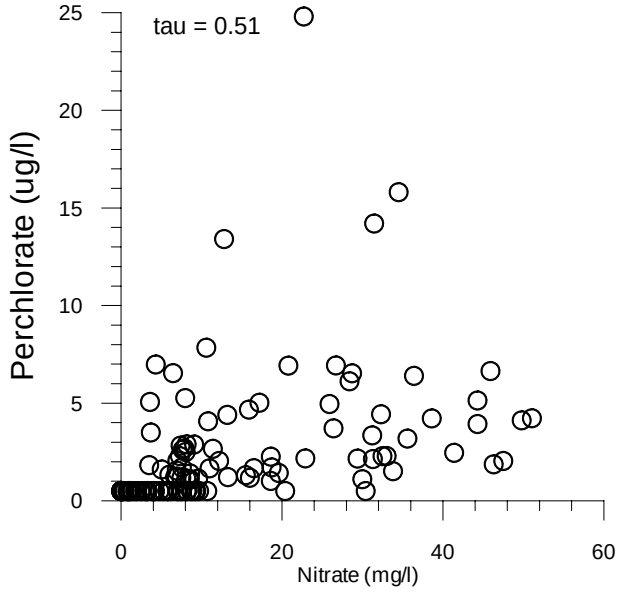
- = Well with nitrate result >20 mg/l (32 wells; 24%)
- = Well with nitrate result between 10 and 20 mg/l (18 wells; 13%)
- = Well with nitrate result between 7 and 10 mg/l (27 wells; 20%)
- = Well with nitrate result between 2 and 7 mg/l (32 wells; 24%)
- = Well with nitrate result between 0.05 and 1 mg/l (19 wells; 14%)
- = Well with nitrate result less than 0.05 mg/l (6 wells; 5%)
- = Well sampled but not analyzed because sample destroyed during transit (1 well)

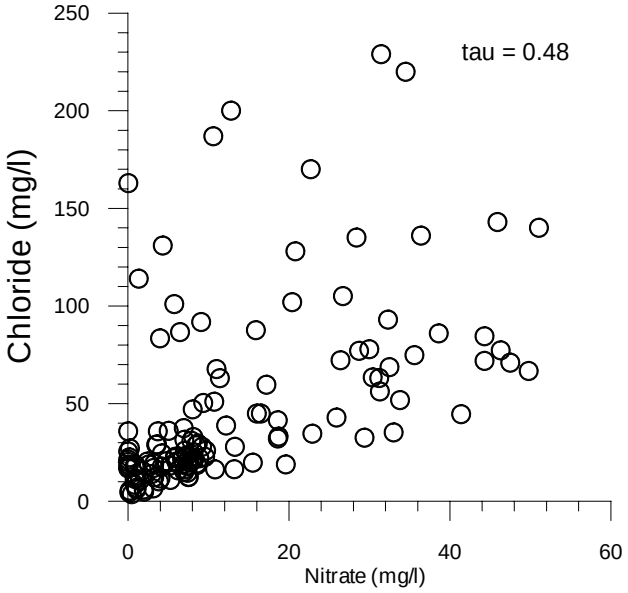
e: lub second synoptic event nitrate results.srf

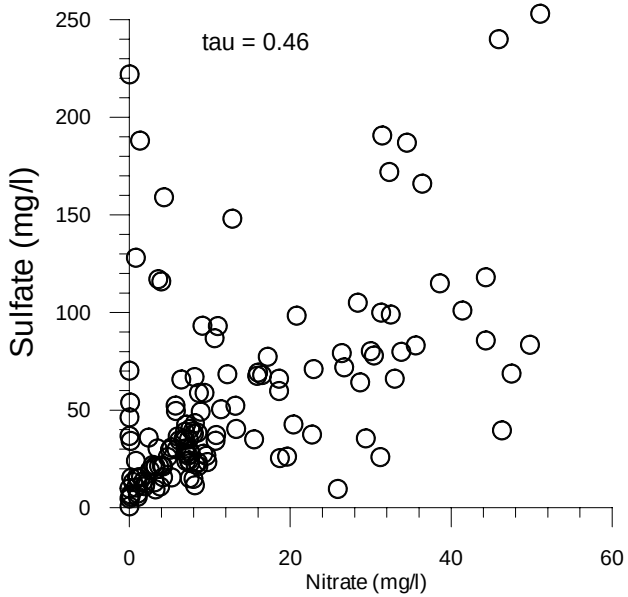
Figure 3-3
Strongest Nitrate Correlations
2003 LUB GWMA Synoptic Sampling Event Report











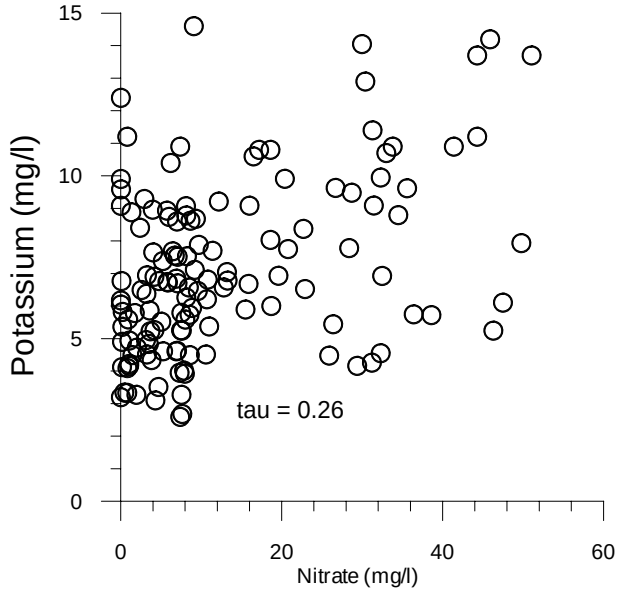
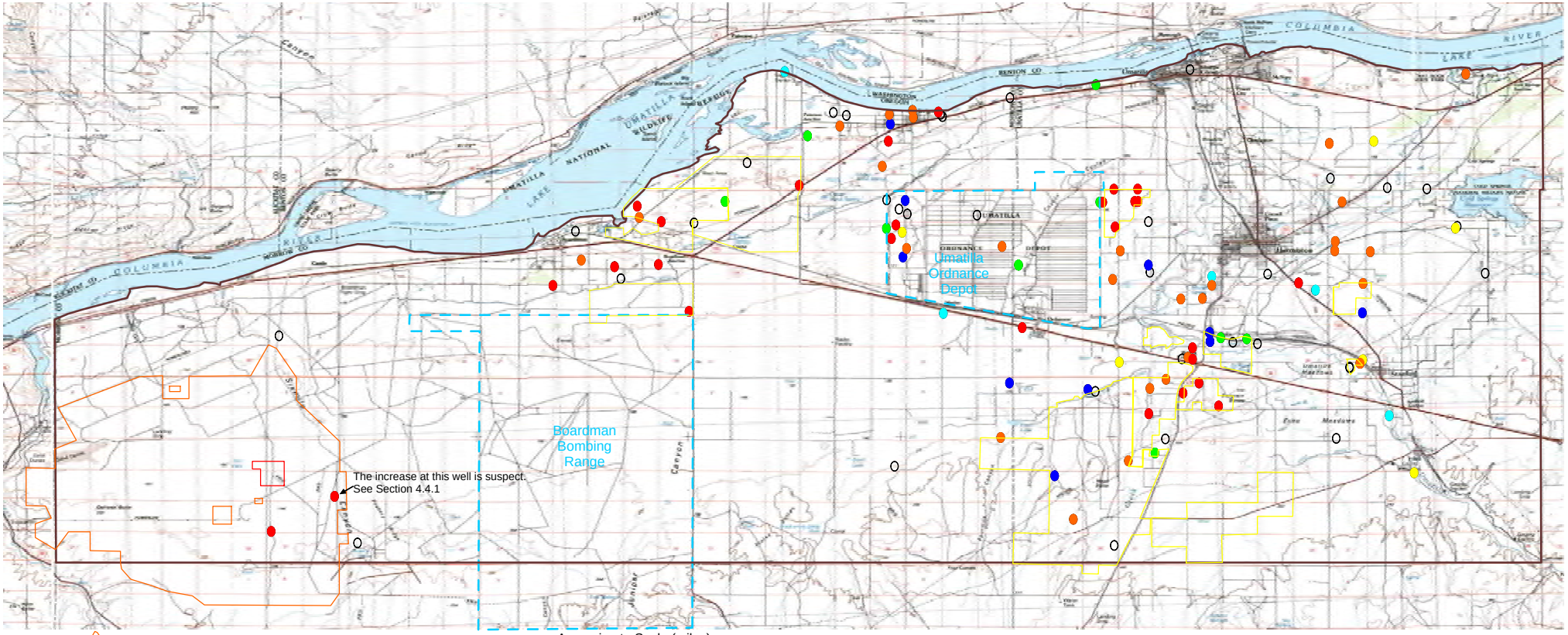


Figure 4-1
Significant Changes in Nitrate Concentrations from 1992 to 2003
2003 LUB GWMA Synoptic Sampling Event Report



= Threemile Canyon Farm & CAFOs
= Groundwater Management Area Boundary
= Military Facility
= Food Processor Land Application Site

e: lub second synoptic event nitrate change 2.srf

Approximate Scale (miles)
0 1 2 3

65 wells (52.4%) showed a significant increase in nitrate concentration
25 wells (20.2%) showed a significant decrease in nitrate concentration
34 wells (27.4%) showed no significant difference in concentration

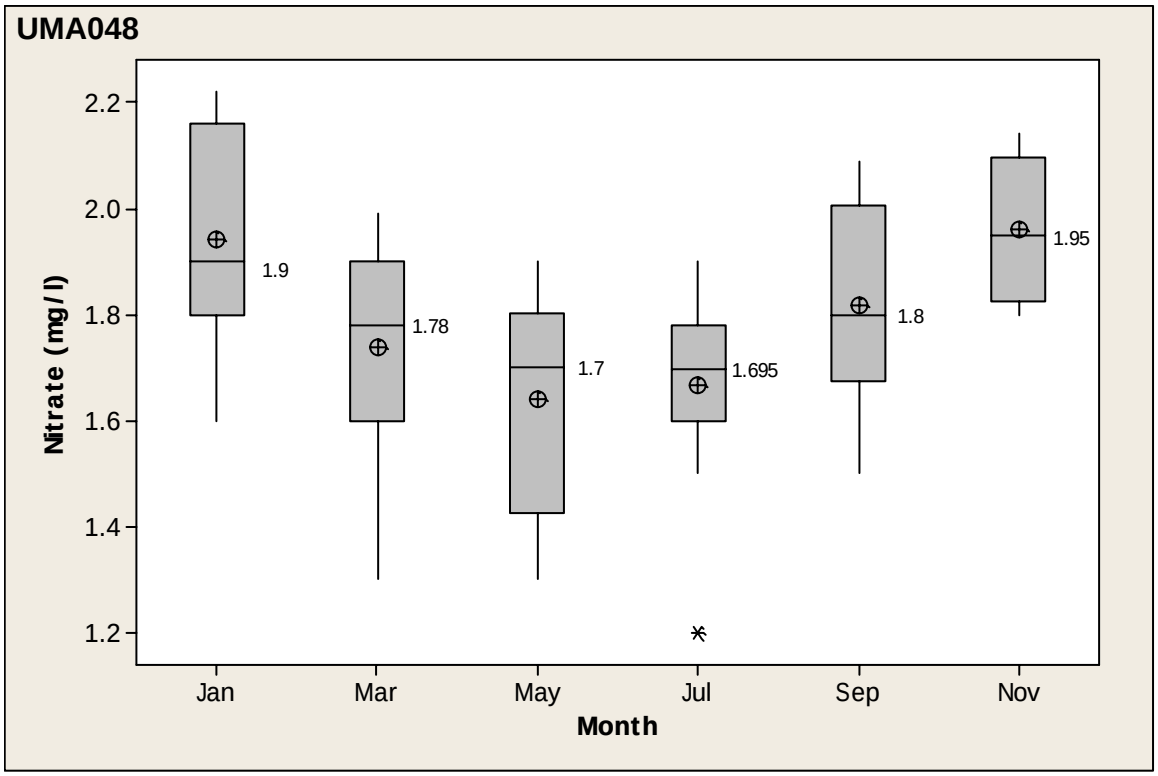
A "significant difference in concentration" is defined here as having a relative percent difference of >10% and an actual difference of more than 0.5 mg/l.

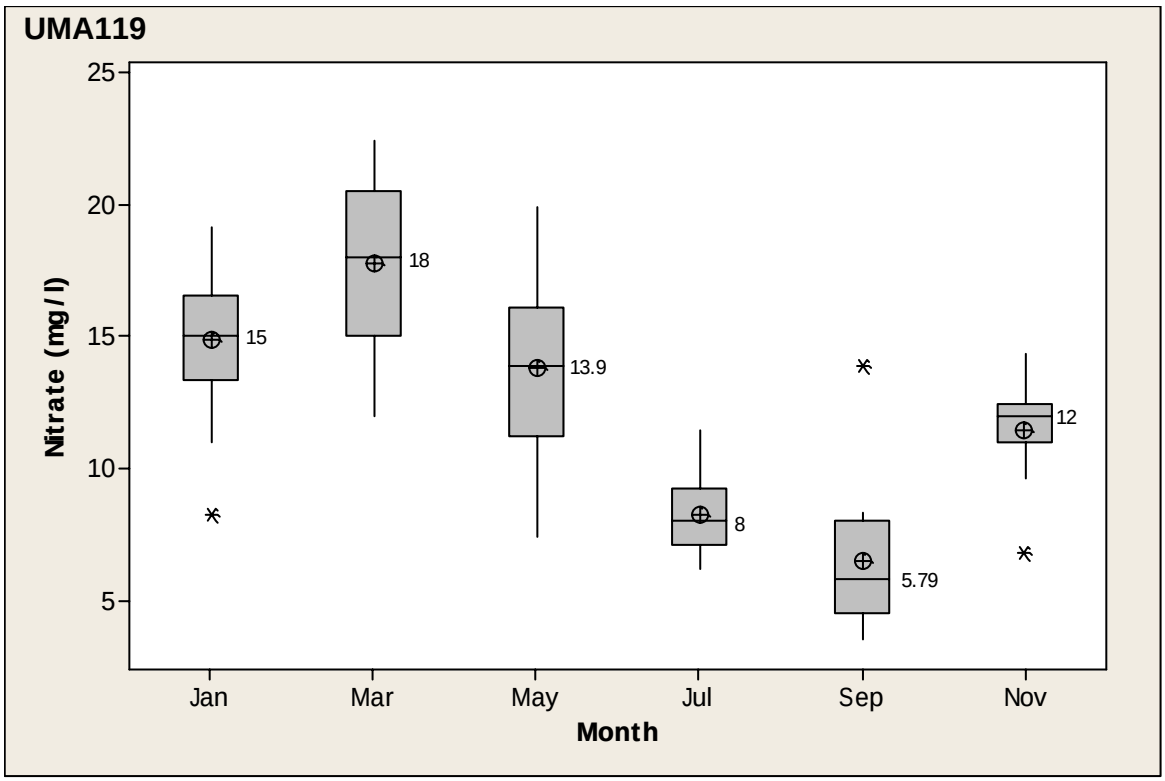
Explanation

- = Well with a significant increase of 5 to 28 mg/l nitrate between 1992 and 2003 (30 wells*; 24.2%)
- = Well with a significant increase of 1 to 5 mg/l nitrate between 1992 and 2003 (29 wells; 23.4%)
- = Well with a significant increase of 0.5 to 1 mg/l nitrate between 1992 and 2003 (6 wells; 4.8%)
- = Well with a significant decrease of 0.5 to 1 mg/l nitrate between 1992 and 2003 (5 wells; 4.0%)
- = Well with a significant decrease of 1 to 5 mg/l nitrate between 1992 and 2003 (10 wells; 8.1%)
- = Well with a significant decrease of 5 to 43 mg/l nitrate between 1992 and 2003 (10 wells; 8.1%)
- = Well without a significant change in nitrate concentration between 1992 and 2003 (34 wells; 27.4%) (including the 7 wells with trace or undetectable concentrations, the 16 wells with RPD <10%, and the 11 wells with RPD >10% but actual difference less than 0.5 mg/l).

* = The increase at one well is suspect. See Section 4.4.1

Figure 4-2
Box Plots Illustrating Seasonality
2003 LUB GWMA Synoptic Sampling Event Report

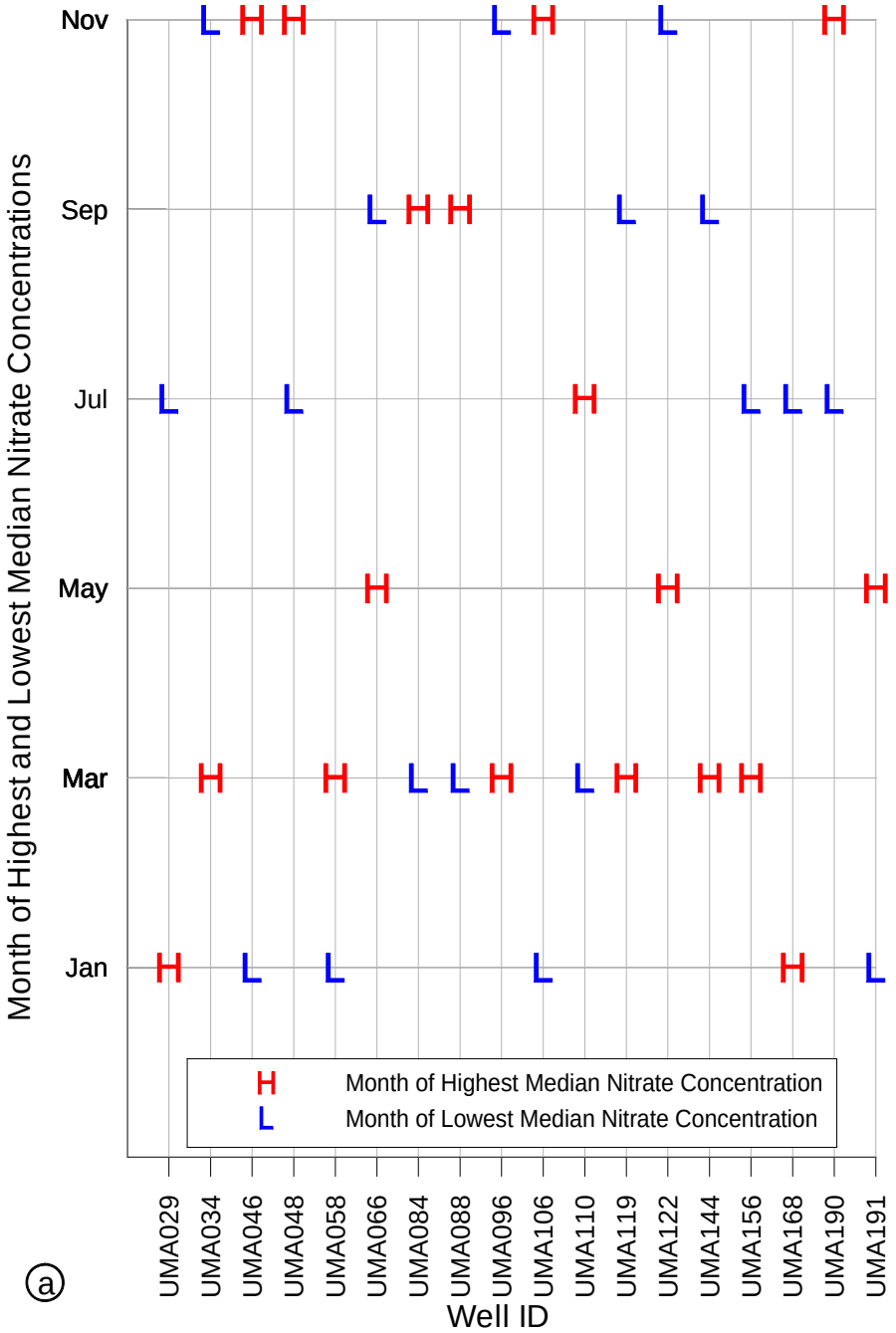


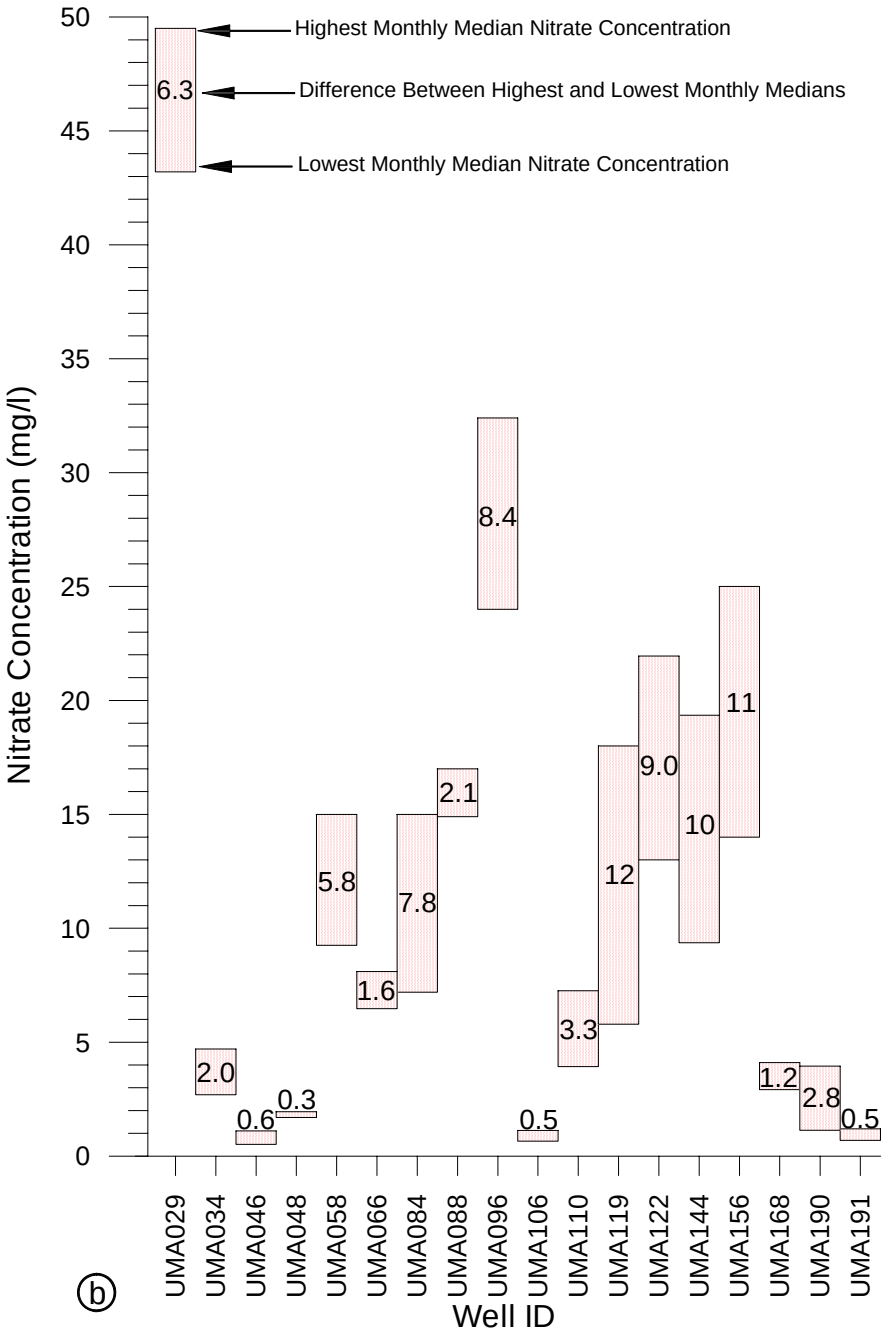


Boxplot Explanation:
The lower limit of the box is the 25th percentile (i.e., 25% of the data is less than this value).
The upper limit of the box is the 75th percentile. The height of the box is the interquartile range (IQR). The median value is labeled and indicated by a line across the box. A plus inside a circle denotes the mean value.
Heights of the two box halves depict the skewness (e.g., if the top half is larger the data is positively skewed).
Vertical lines are drawn from the top and bottom of the box to the farthest data points within 1.5 times the IQR.
Any data points beyond this distance are plotted individually with an asterisk.

e:_lub_second synoptic event_seas box.srf

Figure 4-3
Timing and Magnitude of Seasonality at 18 Wells
2003 LUB GWMA Synoptic Sampling Event Report





e: lub_second synoptic event_seasonality summary 3.grf

Figure 4-4
Nitrate vs. Depth To Water in 61 Monitoring Wells
2003 LUB GWMA Synoptic Sampling Event Report

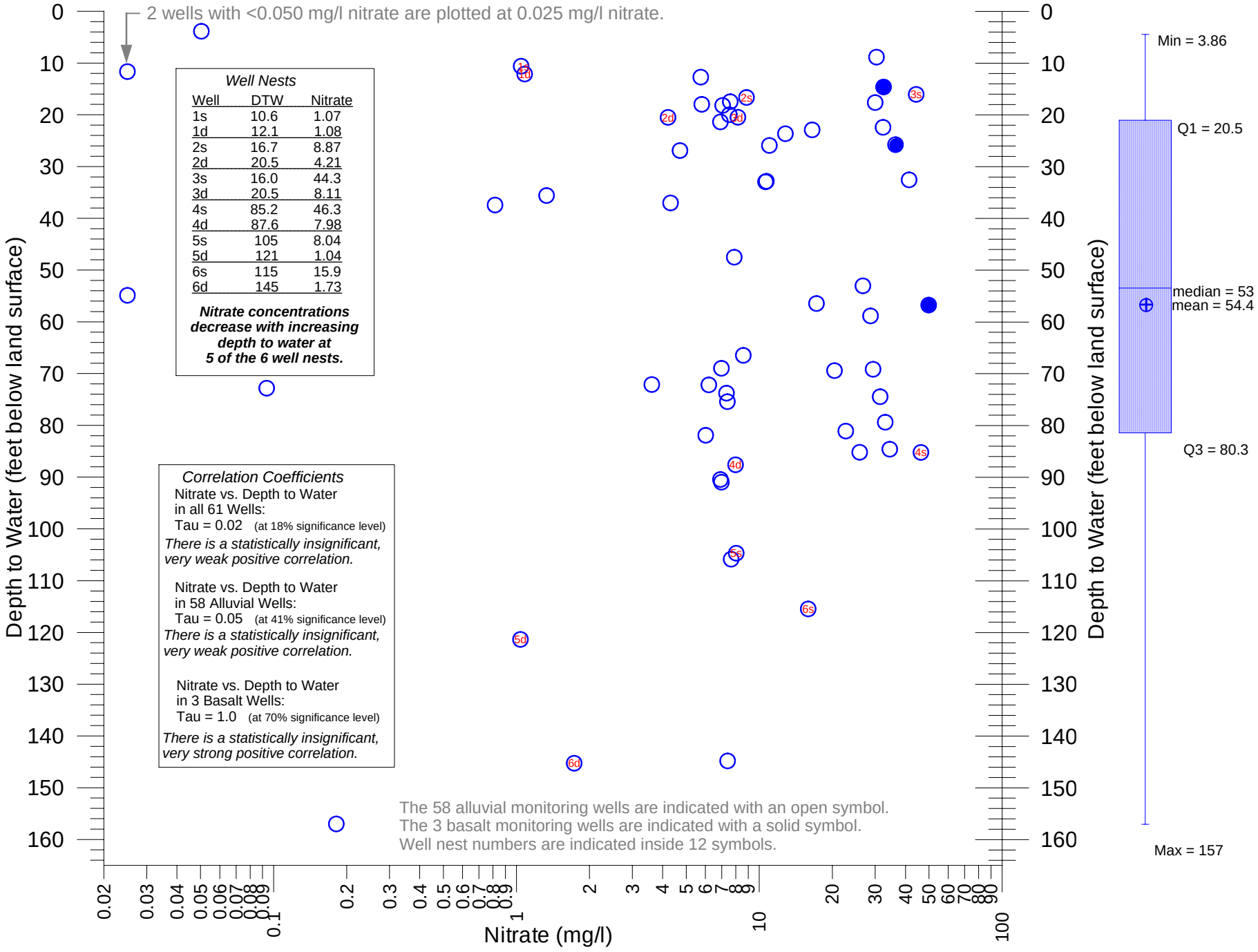


Figure 4-5
Nitrate vs Screen Depth in Basalt Wells
2003 LUB GWMA Synoptic Sampling Event Report

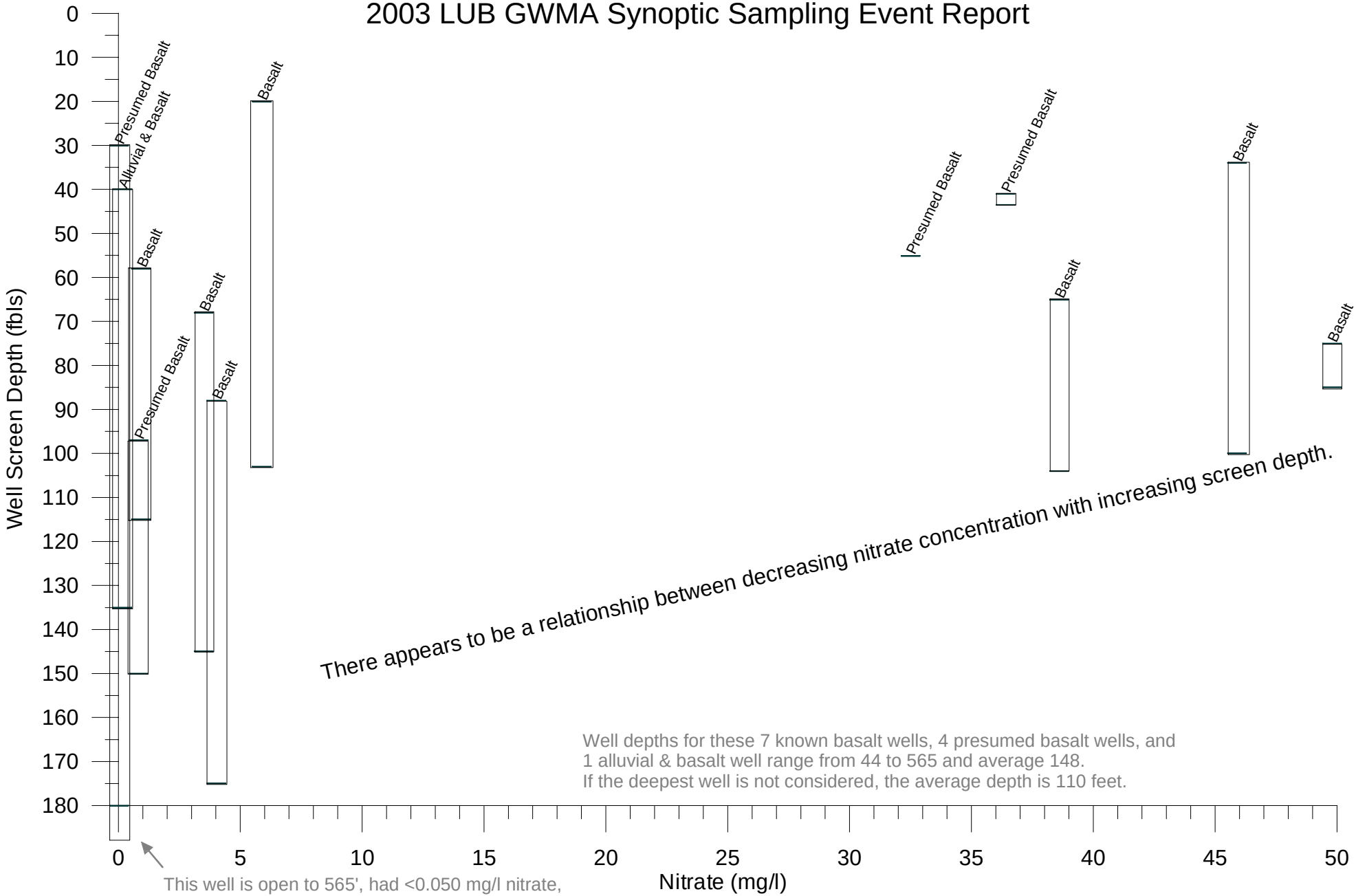
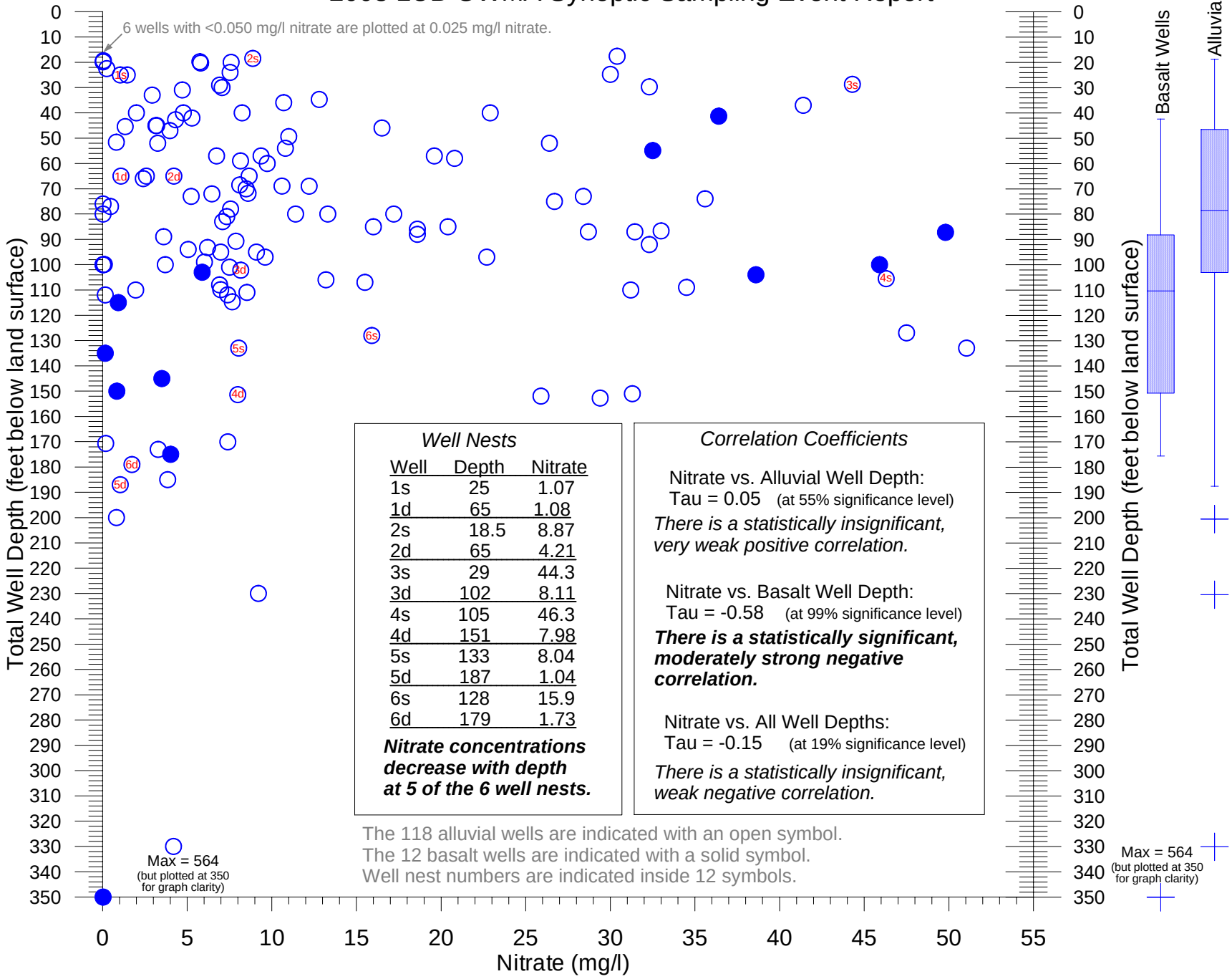


Figure 4-6
Nitrate vs. Total Well Depth
2003 LUB GWMA Synoptic Sampling Event Report



Well Nests

Well	Depth	Nitrate
1s	25	1.07
1d	65	1.08
2s	18.5	8.87
2d	65	4.21
3s	29	44.3
3d	102	8.11
4s	105	46.3
4d	151	7.98
5s	133	8.04
5d	187	1.04
6s	128	15.9
6d	179	1.73

Nitrate concentrations decrease with depth at 5 of the 6 well nests.

Correlation Coefficients

Nitrate vs. Alluvial Well Depth:
Tau = 0.05 (at 55% significance level)

There is a statistically insignificant, very weak positive correlation.

Nitrate vs. Basalt Well Depth:
Tau = -0.58 (at 99% significance level)

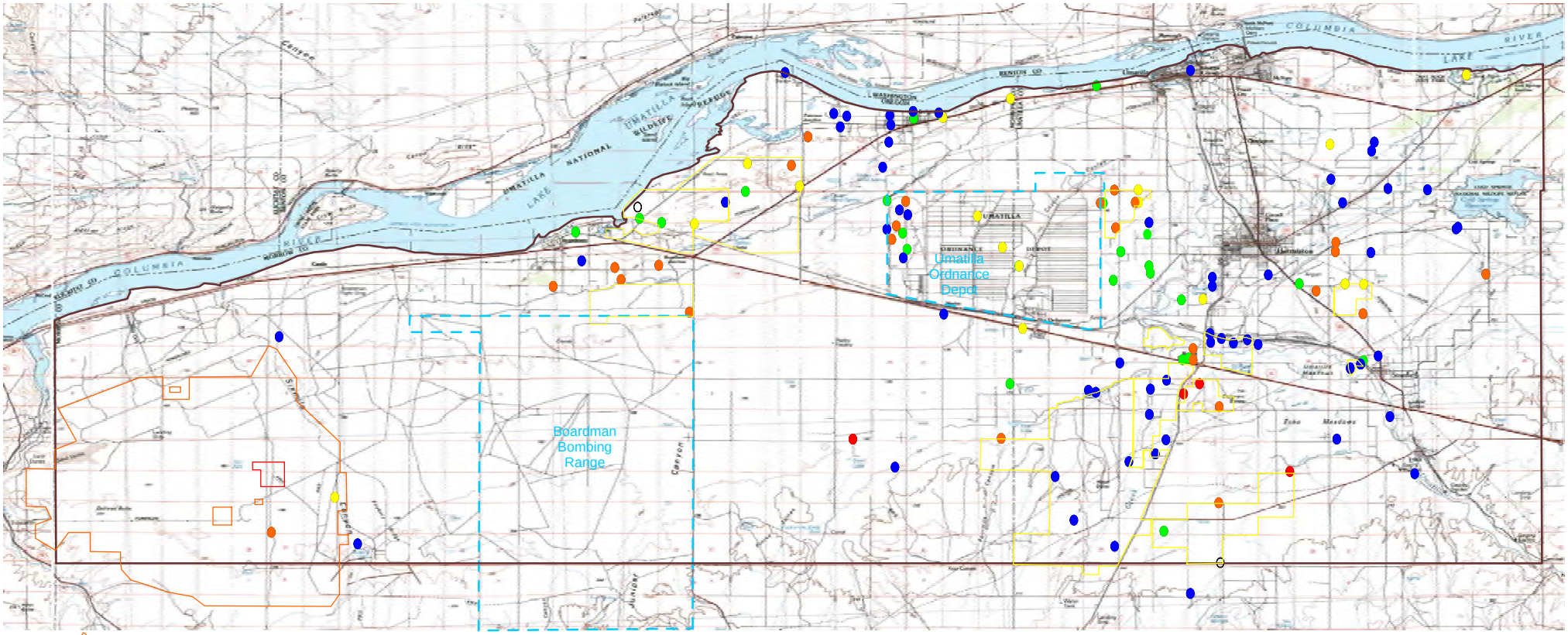
There is a statistically significant, moderately strong negative correlation.

Nitrate vs. All Well Depths:
Tau = -0.15 (at 19% significance level)

There is a statistically insignificant, weak negative correlation.

The 118 alluvial wells are indicated with an open symbol.
The 12 basalt wells are indicated with a solid symbol.
Well nest numbers are indicated inside 12 symbols.

Figure 5-1
Perchlorate Results
2003 LUB GWMA Synoptic Sampling Event Report



= Threemile Canyon Farm & CAFOs

= Groundwater Management Area Boundary

= Military Facility

= Food Processor Land Application Site

Approximate Scale (miles)

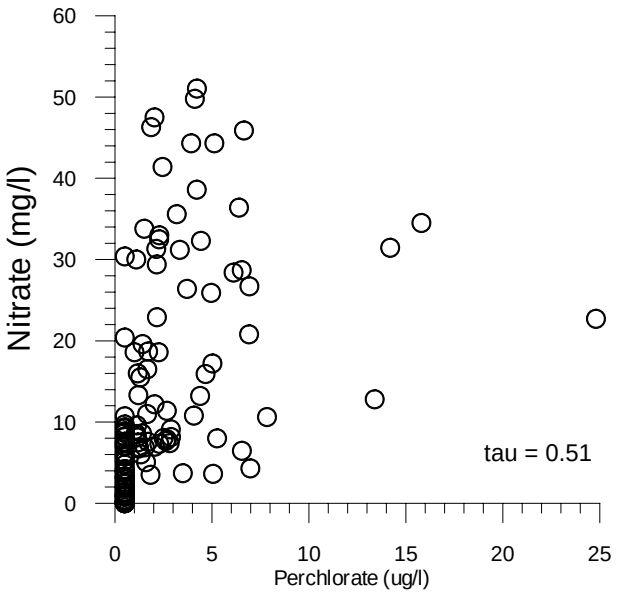
0 1 2 3

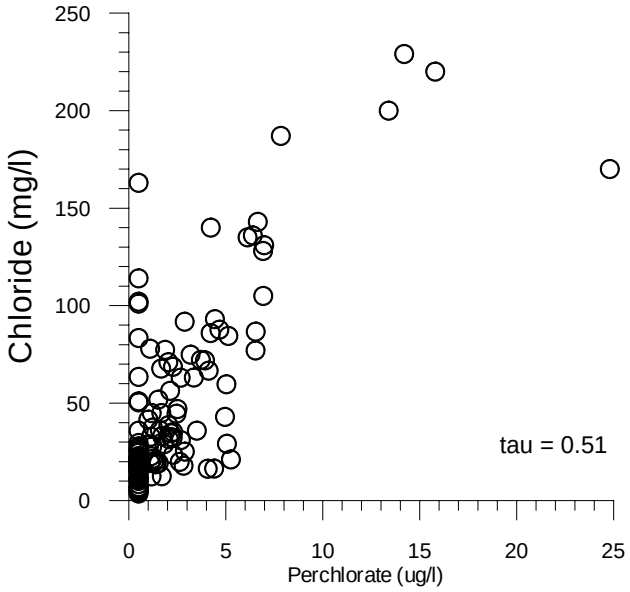
Explanation

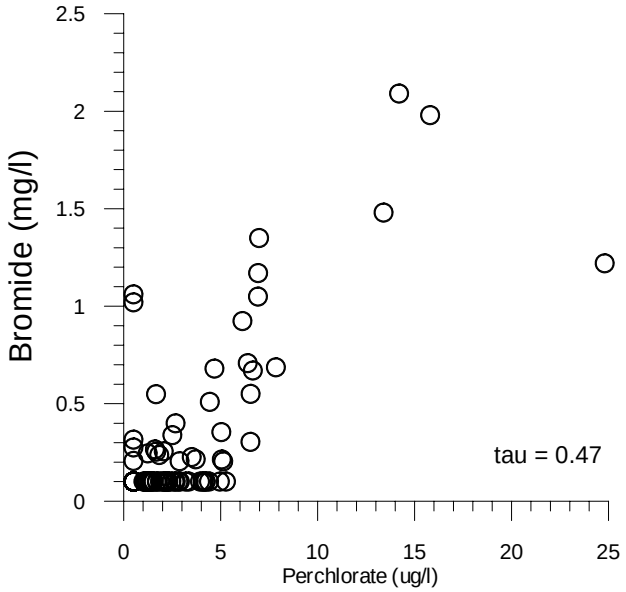
- = Well with perchlorate result >8 ug/l (4 wells; 3%)
- = Well with perchlorate result between 3 and 8 ug/l (26 wells; 19.5%)
- = Well with perchlorate result between 2 and 3 ug/l (18 wells; 13.5%)
- = Well with perchlorate result between 1 and 2 ug/l (24 wells; 18%) These results were qualified as estimates.
- = Well with perchlorate result < 1 ug/l (61 wells; 46%)
- = Well sampled but not analyzed because sample destroyed during transit (2 wells)

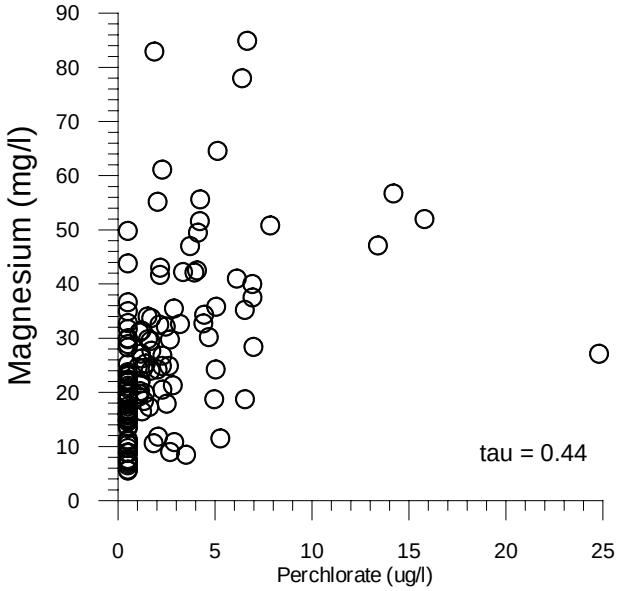
e: lub second synoptic event perchlorate results.srf

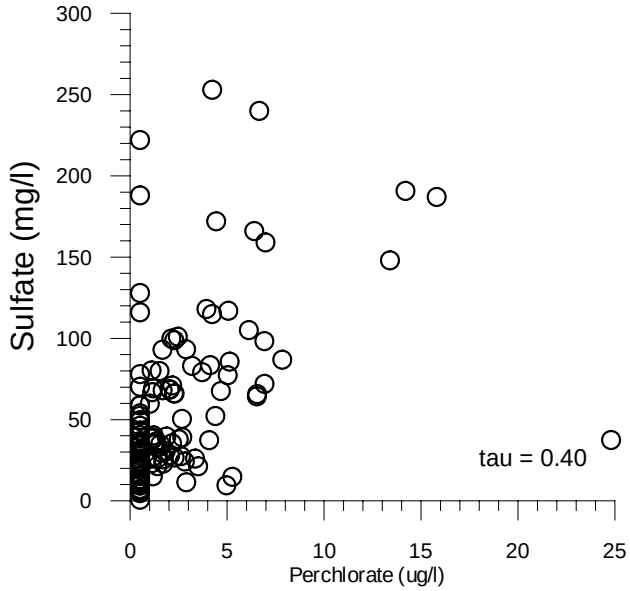
Figure 5-2
Strongest Perchlorate Correlations
2003 LUB GWMA Synoptic Sampling Event Report











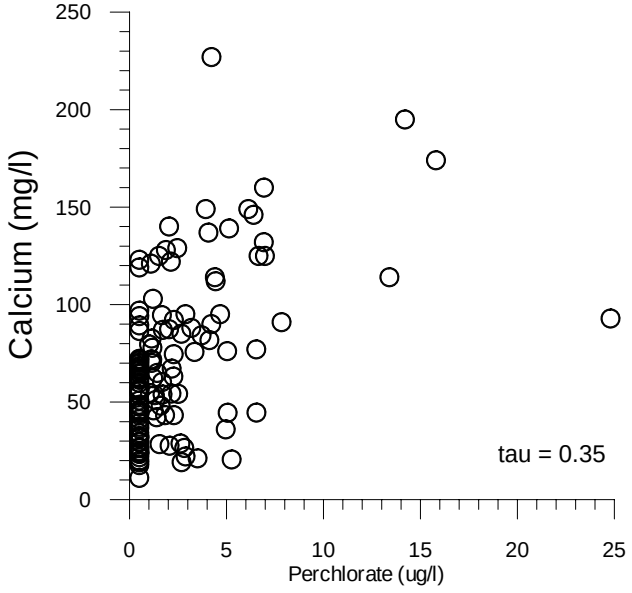


Figure 5-3
Perchlorate vs Nitrate in Alluvial Wells
2003 LUB GWMA Synoptic Sampling Event Report

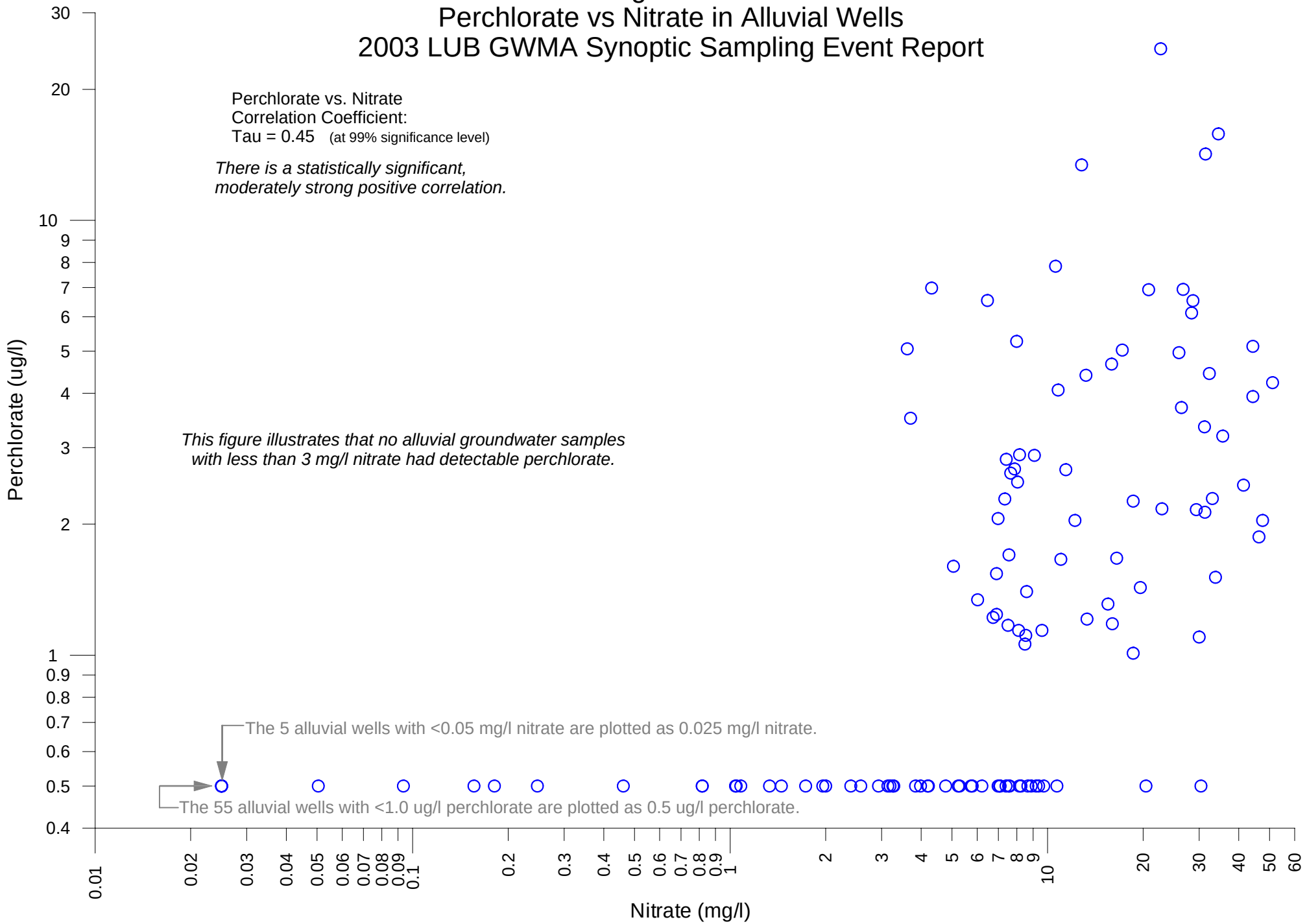


Figure 5-4
Perchlorate vs Nitrate in Basalt Wells
2003 LUB GWMA Synoptic Sampling Event Report

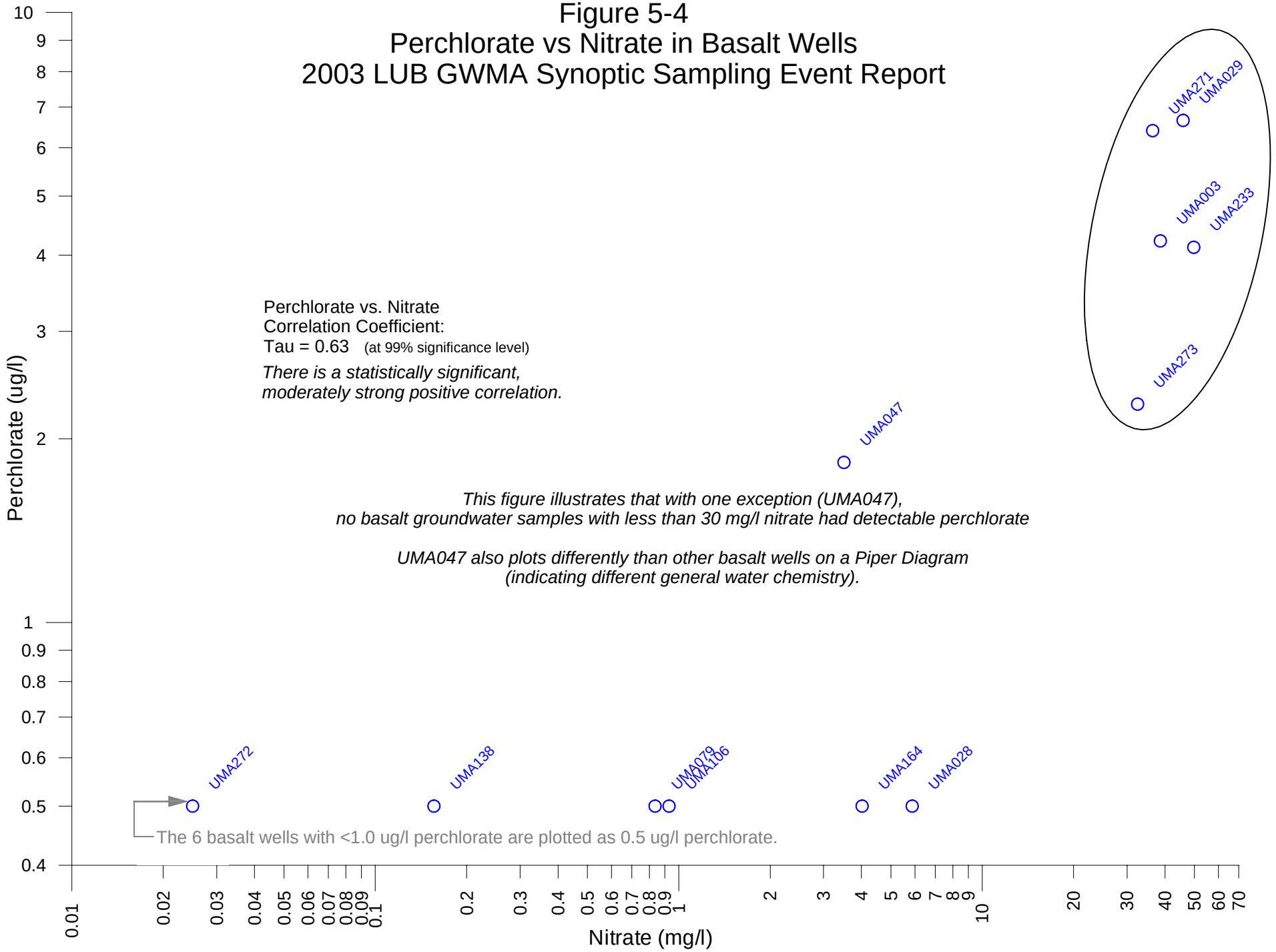
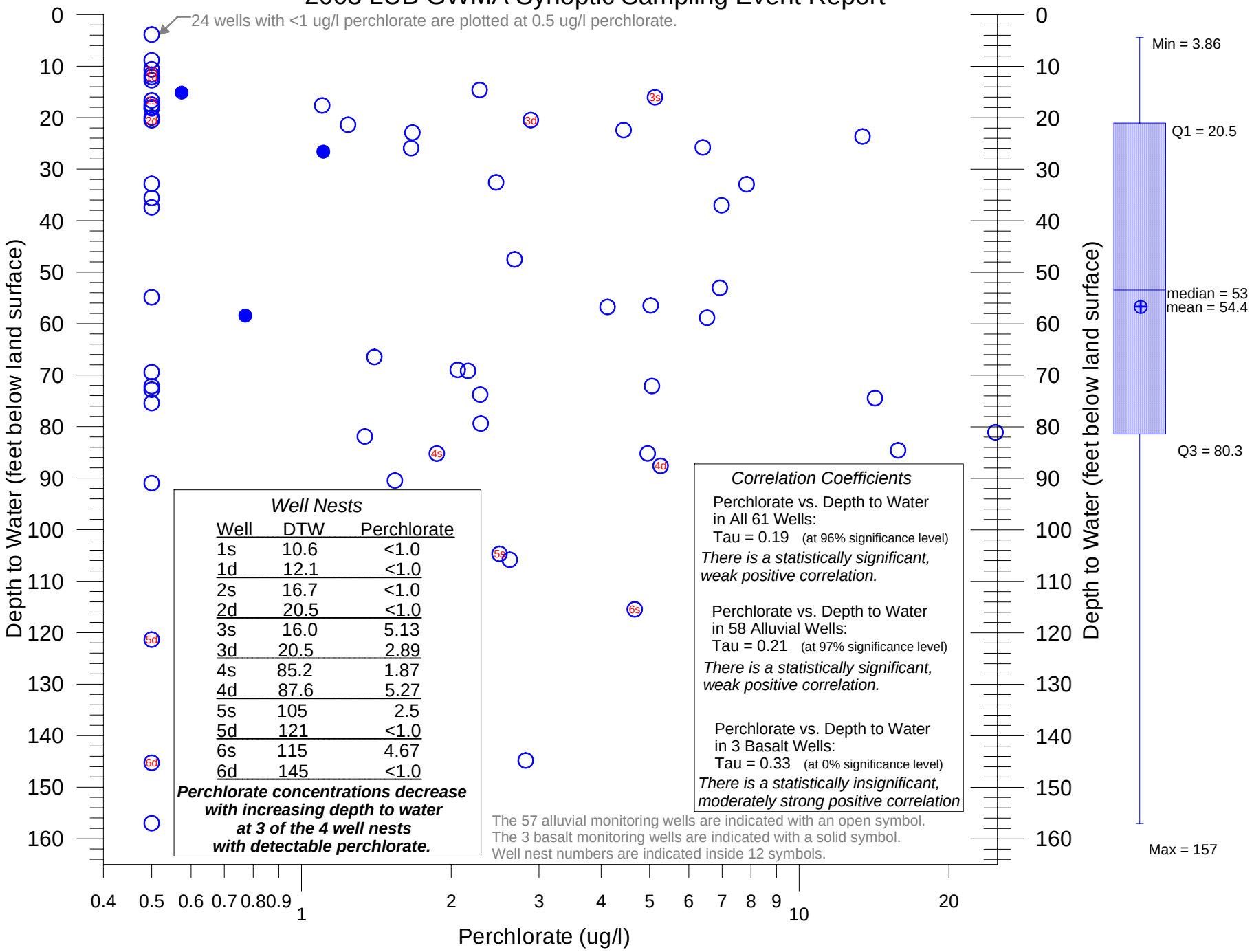


Figure 5-5
Perchlorate vs. Depth To Water in 61 Monitoring Wells
2003 LUB GWMA Synoptic Sampling Event Report



Well Nests

Well	DTW	Perchlorate
1s	10.6	<1.0
1d	12.1	<1.0
2s	16.7	<1.0
2d	20.5	<1.0
3s	16.0	5.13
3d	20.5	2.89
4s	85.2	1.87
4d	87.6	5.27
5s	105	2.5
5d	121	<1.0
6s	115	4.67
6d	145	<1.0

Perchlorate concentrations decrease with increasing depth to water at 3 of the 4 well nests with detectable perchlorate.

Correlation Coefficients

Perchlorate vs. Depth to Water in All 61 Wells:
Tau = 0.19 (at 96% significance level)
There is a statistically significant, weak positive correlation.

Perchlorate vs. Depth to Water in 58 Alluvial Wells:
Tau = 0.21 (at 97% significance level)
There is a statistically significant, weak positive correlation.

Perchlorate vs. Depth to Water in 3 Basalt Wells:
Tau = 0.33 (at 0% significance level)
There is a statistically insignificant, moderately strong positive correlation

The 57 alluvial monitoring wells are indicated with an open symbol.
The 3 basalt monitoring wells are indicated with a solid symbol.
Well nest numbers are indicated inside 12 symbols.

Figure 5-6
Perchlorate vs Screen Depth in Basalt Wells
2003 LUB GWMA Synoptic Sampling Event Report

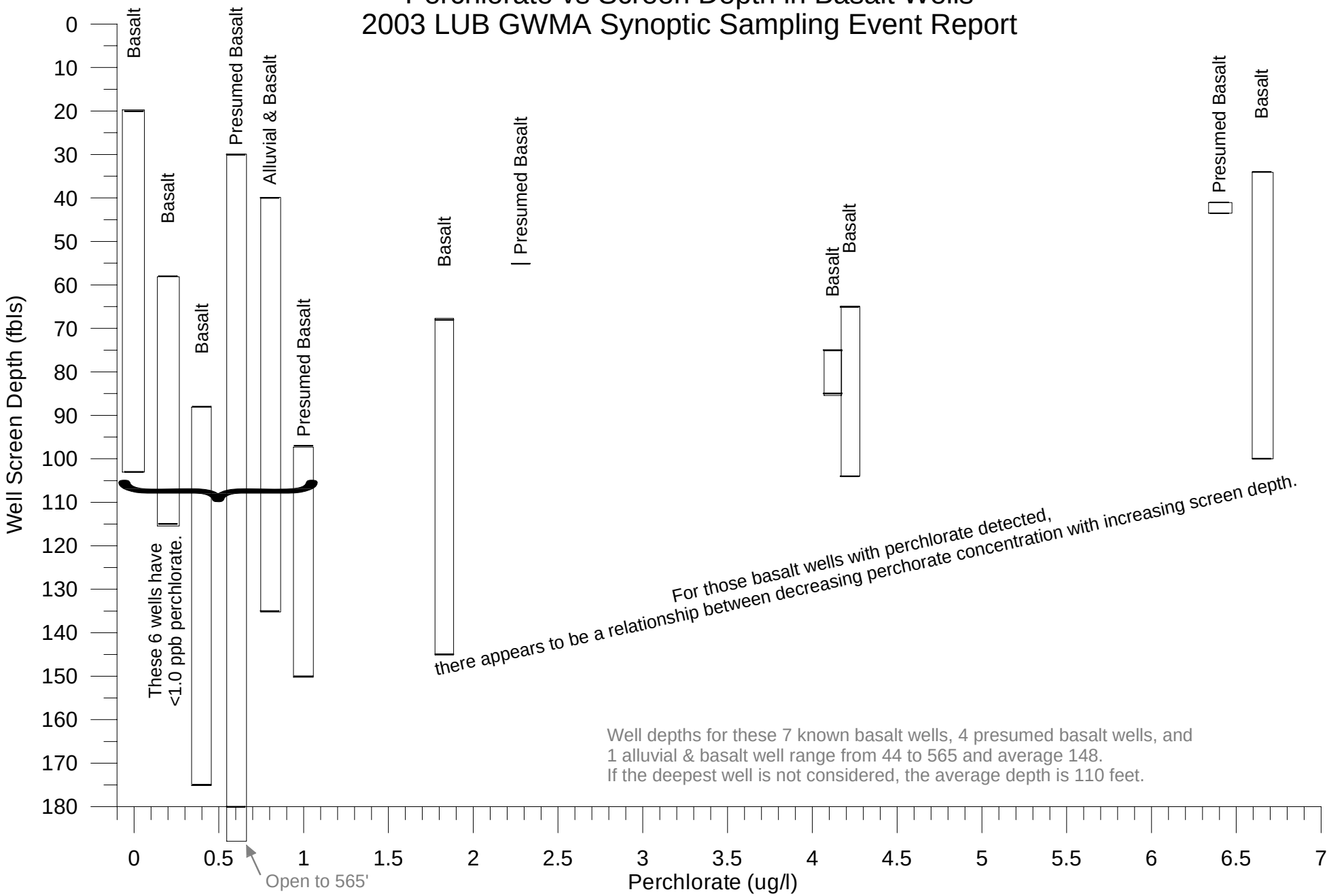
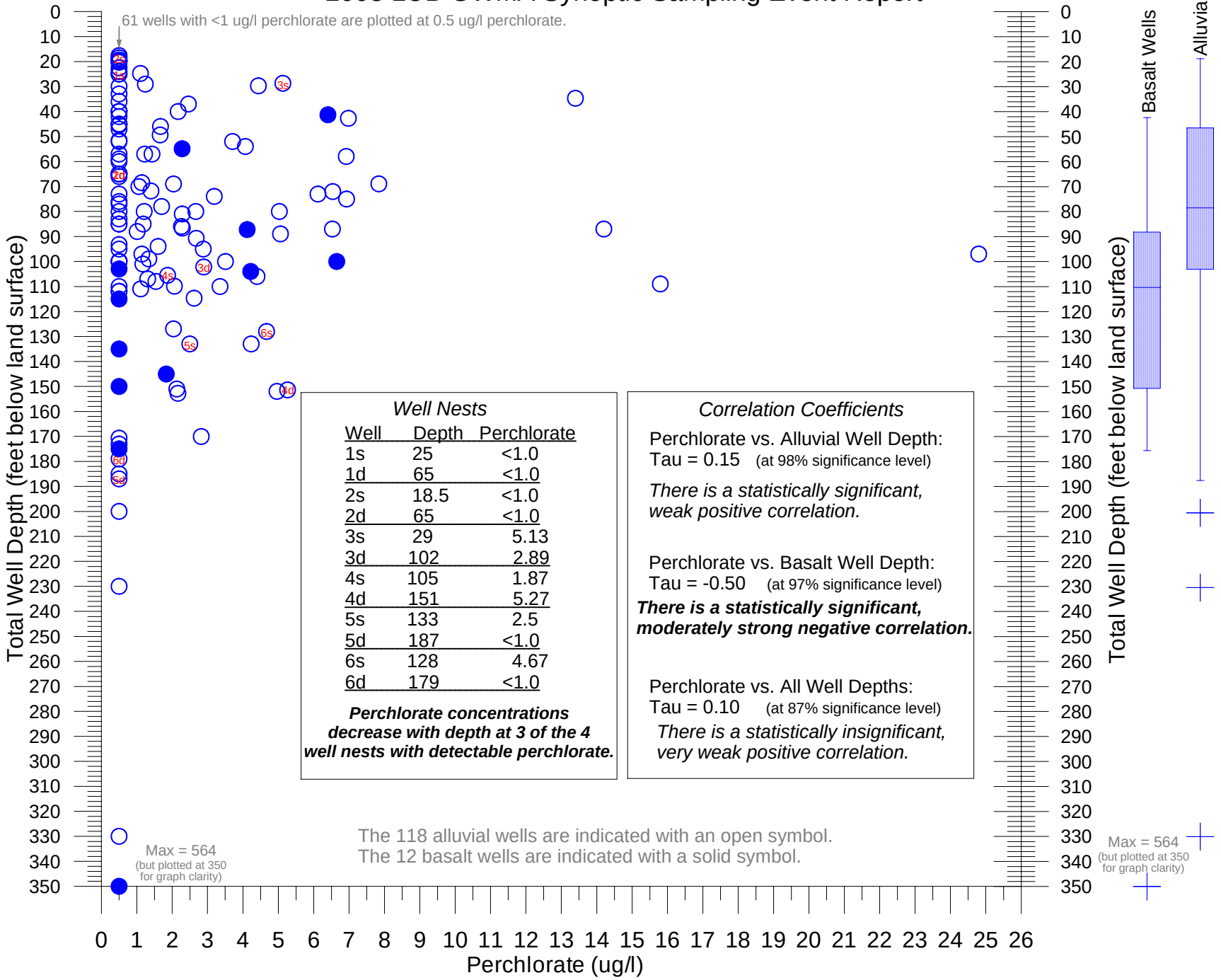


Figure 5-7
Perchlorate vs. Total Well Depth
2003 LUB GWMA Synoptic Sampling Event Report



Well Nests

Well	Depth	Perchlorate
1s	25	<1.0
1d	65	<1.0
2s	18.5	<1.0
2d	65	<1.0
3s	29	5.13
3d	102	2.89
4s	105	1.87
4d	151	5.27
5s	133	2.5
5d	187	<1.0
6s	128	4.67
6d	179	<1.0

Perchlorate concentrations decrease with depth at 3 of the 4 well nests with detectable perchlorate.

Correlation Coefficients

Perchlorate vs. Alluvial Well Depth:
Tau = 0.15 (at 98% significance level)

There is a statistically significant, weak positive correlation.

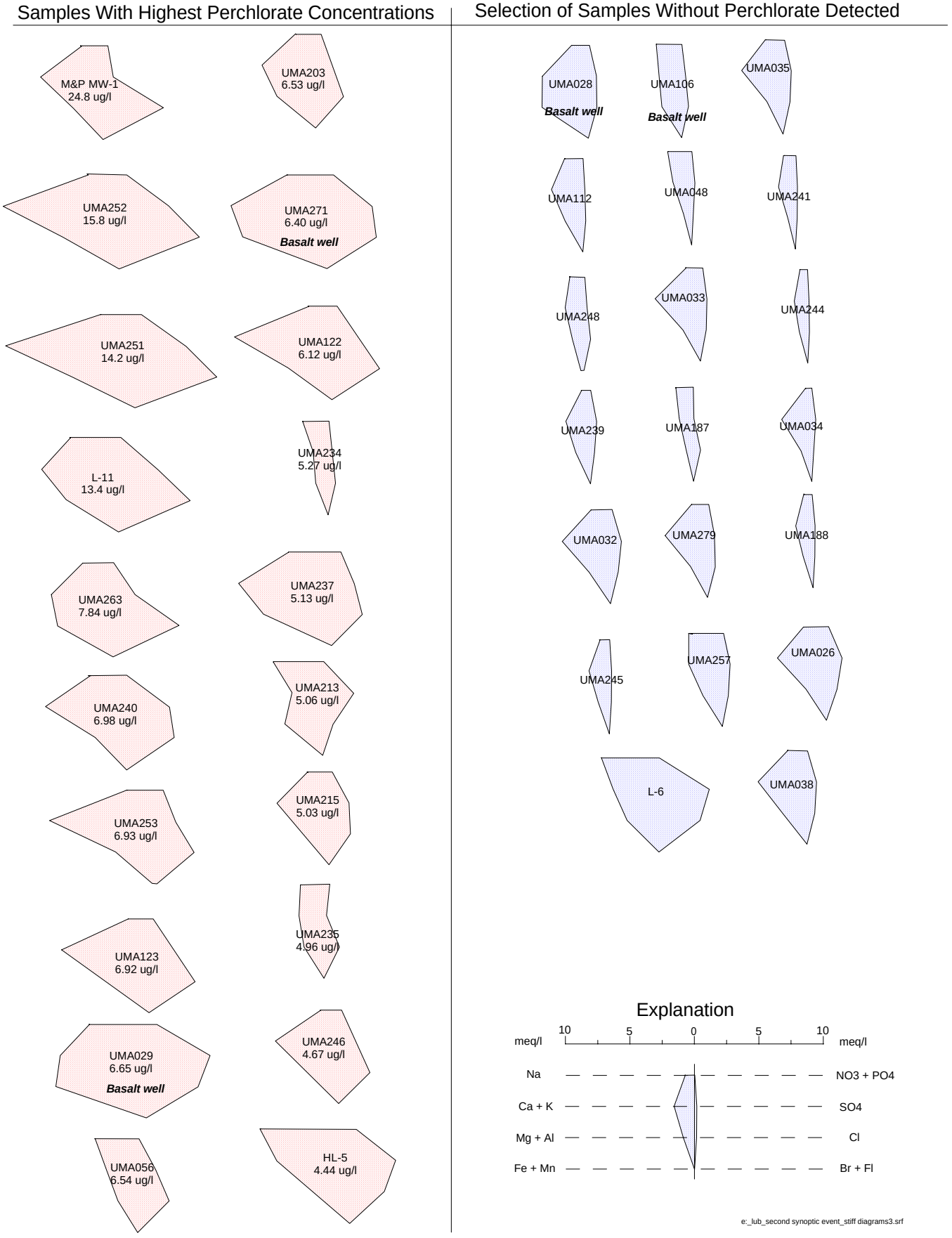
Perchlorate vs. Basalt Well Depth:
Tau = -0.50 (at 97% significance level)

There is a statistically significant, moderately strong negative correlation.

Perchlorate vs. All Well Depths:
Tau = 0.10 (at 87% significance level)

There is a statistically insignificant, very weak positive correlation.

Figure 5-8
Stiff Diagrams
2003 LUB GWMA Synoptic Sampling Event Report



Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
M&P DAIRY MW-1	3404204	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Bromide**		**1.22**	mg/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Calcium**		**92,900**	ug/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Chloride**		**170**	mg/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Fluoride**		**0.31**	mg/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Iron**		**320**	ug/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Magnesium**		**27,100**	ug/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Manganese**		**9.4**	ug/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Nitrate+Nitrite as N**		**22.7**	mg/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Perchlorate**		**24.7**	ug/L		Duplicate	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Perchlorate**		**24.9**	ug/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Phosphorus, total**		**0.0341**	mg/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Potassium**		**8,370**	ug/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Sodium**		**39,400**	ug/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
M&P DAIRY MW-1	3404204	**Sulfate**		**37.5**	mg/L	9/30/2003	Regular Sample	M&P DAIRY MW-1
UMA002	3394090	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Bromide**		**0.215**	mg/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Calcium**		**84,300**	ug/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Chloride**		**72.2**	mg/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Fluoride**		**0.344**	mg/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	Iron	U	10	ug/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Magnesium**		**47,000**	ug/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	Manganese	U	1	ug/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Nitrate+Nitrite as N**		**26.4**	mg/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Perchlorate**		**3.71**	ug/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Phosphorus, total**		**0.0204**	mg/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Potassium**		**5,440**	ug/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Sodium**		**51,200**	ug/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA002	3394090	**Sulfate**		**79.2**	mg/L	9/25/2003	Regular Sample	71202 WILSON RD UMA 002
UMA003	3384351	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	Bromide	U	0.2	mg/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Calcium**		**90,000**	ug/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Chloride**		**86**	mg/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Fluoride**		**0.523**	mg/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	Iron	U	10	ug/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Magnesium**		**51,600**	ug/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	Manganese	U	1	ug/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Nitrate+Nitrite as N**		**38.6**	mg/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Perchlorate**		**4.22**	ug/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Phosphorus, total**		**0.0161**	mg/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Potassium**		**5,720**	ug/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Sodium**		**49,000**	ug/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA003	3384351	**Sulfate**		**115**	mg/L	9/15/2003	Regular Sample	78648 EASTGARD RD UMA003
UMA026	3394089	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Calcium**		**71,200**	ug/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Calcium**		**73,200**	ug/L		Duplicate	430 NS 7TH UMA 026
UMA026	3394089	**Chloride**		**29.5**	mg/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Fluoride**		**0.268**	mg/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Iron**		**33.9**	ug/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Iron**		**34.4**	ug/L		Duplicate	430 NS 7TH UMA 026
UMA026	3394089	**Magnesium**		**18,800**	ug/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Magnesium**		**19,100**	ug/L		Duplicate	430 NS 7TH UMA 026
UMA026	3394089	Manganese	U	1	ug/L		Duplicate	430 NS 7TH UMA 026
UMA026	3394089	Manganese	U	1	ug/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Nitrate+Nitrite as N**		**8.66**	mg/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	Perchlorate	U	1	ug/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Phosphorus, total**		**0.111**	mg/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Potassium**		**8,580**	ug/L		Duplicate	430 NS 7TH UMA 026
UMA026	3394089	**Potassium**		**8,660**	ug/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Sodium**		**40,400**	ug/L		Duplicate	430 NS 7TH UMA 026
UMA026	3394089	**Sodium**		**40,900**	ug/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA026	3394089	**Sulfate**		**58.8**	mg/L	9/25/2003	Regular Sample	430 NS 7TH UMA 026
UMA028	3384302	**Ammonia (NH3+NH4) as N**		**0.209**	mg/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3384302	**Calcium**		**68,500**	ug/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3384302	Iron	U	10	ug/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3384302	**Magnesium**		**43,800**	ug/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3384302	Manganese	U	1	ug/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3384302	**Nitrate+Nitrite as N**		**5.88**	mg/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3384302	**Phosphorus, total**		**0.024**	mg/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3384302	**Potassium**		**6,720**	ug/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3384302	**Sodium**		**30,000**	ug/L	9/15/2003	Regular Sample	UMA 028 70696 QUAIL LN
UMA028	3394052	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	70696 QUAIL UMA 028
UMA028	3394052	**Chloride**		**22.8**	mg/L	9/22/2003	Regular Sample	70696 QUAIL UMA 028
UMA028	3394052	**Fluoride**		**0.193**	mg/L	9/22/2003	Regular Sample	70696 QUAIL UMA 028
UMA028	3394052	Perchlorate	U	1	ug/L	9/22/2003	Regular Sample	70696 QUAIL UMA 028
UMA028	3394052	**Sulfate**		**29.9**	mg/L	9/22/2003	Regular Sample	70696 QUAIL UMA 028
UMA029	3384301	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3384301	**Calcium**		**125,000**	ug/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3384301	Iron	U	10	ug/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3384301	**Magnesium**		**84,900**	ug/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3384301	Manganese	U	1.4	ug/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3384301	**Nitrate+Nitrite as N**		**45.9**	mg/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3384301	Phosphorus, total	U	0.01	mg/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3384301	**Potassium**		**14,200**	ug/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3384301	**Sodium**		**101,000**	ug/L	9/15/2003	Regular Sample	UMA 029 #3 MTN VIEW DR
UMA029	3394051	**Bromide**		**0.671**	mg/L	9/22/2003	Regular Sample	#3 MTN VIEW UMA 029
UMA029	3394051	**Chloride**		**143**	mg/L	9/22/2003	Regular Sample	#3 MTN VIEW UMA 029
UMA029	3394051	**Fluoride**		**0.506**	mg/L	9/22/2003	Regular Sample	#3 MTN VIEW UMA 029
UMA029	3394051	**Perchlorate**		**6.65**	ug/L	9/22/2003	Regular Sample	#3 MTN VIEW UMA 029
UMA029	3394051	**Sulfate**		**240**	mg/L	9/22/2003	Regular Sample	#3 MTN VIEW UMA 029

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA032	3384353	Ammonia (NH3+NH4) as N	U	0.1	mg/L		Duplicate	81329 W 8TH UMA032
UMA032	3384353	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Calcium**		**71,400**	ug/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Chloride**		**21.3**	mg/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Fluoride**		**0.343**	mg/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Iron**		**21.8**	ug/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Magnesium**		**19,700**	ug/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	Manganese	U	1	ug/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Nitrate+Nitrite as N**		**8.15**	mg/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	Perchlorate	U	1	ug/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Phosphorus, total**		**0.0451**	mg/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Phosphorus, total**		**0.0471**	mg/L		Duplicate	81329 W 8TH UMA032
UMA032	3384353	**Potassium**		**8,780**	ug/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Sodium**		**33,800**	ug/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA032	3384353	**Sulfate**		**43.3**	mg/L	9/16/2003	Regular Sample	81329 W 8TH UMA032
UMA033	3384305	**Ammonia (NH3+NH4) as N**		**0.105**	mg/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3384305	**Calcium**		**67,100**	ug/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3384305	**Iron**		**25.2**	ug/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3384305	**Magnesium**		**16,600**	ug/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3384305	Manganese	U	1	ug/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3384305	**Nitrate+Nitrite as N**		**7.09**	mg/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3384305	**Phosphorus, total**		**0.0271**	mg/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3384305	**Potassium**		**7,510**	ug/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3384305	**Sodium**		**26,700**	ug/L	9/16/2003	Regular Sample	UMA 033 81481 W SEVENTH
UMA033	3394055	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	81481 W SEVENTH UMA 033
UMA033	3394055	**Chloride**		**16.4**	mg/L	9/22/2003	Regular Sample	81481 W SEVENTH UMA 033
UMA033	3394055	**Fluoride**		**0.178**	mg/L	9/22/2003	Regular Sample	81481 W SEVENTH UMA 033
UMA033	3394055	Perchlorate	U	1	ug/L	9/22/2003	Regular Sample	81481 W SEVENTH UMA 033
UMA033	3394055	**Sulfate**		**23.9**	mg/L	9/22/2003	Regular Sample	81481 W SEVENTH UMA 033
UMA034	3384306	**Ammonia (NH3+NH4) as N**		**0.116**	mg/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3384306	**Calcium**		**43,300**	ug/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3384306	Iron	U	10	ug/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3384306	**Magnesium**		**9,710**	ug/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3384306	Manganese	U	1	ug/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3384306	**Nitrate+Nitrite as N**		**2**	mg/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3384306	**Phosphorus, total**		**0.0956**	mg/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3384306	**Potassium**		**4,720**	ug/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3384306	**Sodium**		**10,700**	ug/L	9/16/2003	Regular Sample	UMA 034 74503 FROBERG
UMA034	3394056	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	74503 FROBERG UMA 034
UMA034	3394056	**Chloride**		**4.93**	mg/L	9/22/2003	Regular Sample	74503 FROBERG UMA 034
UMA034	3394056	**Fluoride**		**0.321**	mg/L	9/22/2003	Regular Sample	74503 FROBERG UMA 034
UMA034	3394056	Perchlorate	U	1	ug/L	9/22/2003	Regular Sample	74503 FROBERG UMA 034
UMA034	3394056	**Sulfate**		**12.3**	mg/L	9/22/2003	Regular Sample	74503 FROBERG UMA 034
UMA036	3394088	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Calcium**		**59,900**	ug/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Chloride**		**18.2**	mg/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Fluoride**		**0.235**	mg/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	Iron	U	10	ug/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Magnesium**		**15,300**	ug/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	Manganese	U	1	ug/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Nitrate+Nitrite as N**		**5.23**	mg/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	Perchlorate	U	1	ug/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Phosphorus, total**		**0.059**	mg/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Potassium**		**7,380**	ug/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Sodium**		**30,800**	ug/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA036	3394088	**Sulfate**		**30.9**	mg/L	9/25/2003	Regular Sample	RT. 2 BOX 435 UMA 036
UMA038	3384313	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3384313	**Calcium**		**72,000**	ug/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3384313	**Iron**		**104**	ug/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3384313	**Magnesium**		**23,300**	ug/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3384313	**Manganese**		**8.6**	ug/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3384313	**Nitrate+Nitrite as N**		**2.4**	mg/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3384313	**Phosphorus, total**		**0.0471**	mg/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3384313	**Potassium**		**8,400**	ug/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3384313	**Sodium**		**34,200**	ug/L	9/16/2003	Regular Sample	UMA 038 1800 CHERRY ST
UMA038	3394062	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	1800 CHERRY UMA 038
UMA038	3394062	**Chloride**		**20.4**	mg/L	9/22/2003	Regular Sample	1800 CHERRY UMA 038
UMA038	3394062	**Fluoride**		**0.312**	mg/L	9/22/2003	Regular Sample	1800 CHERRY UMA 038
UMA038	3394062	Perchlorate	U	1	ug/L	9/22/2003	Regular Sample	1800 CHERRY UMA 038
UMA038	3394062	**Sulfate**		**35.9**	mg/L	9/22/2003	Regular Sample	1800 CHERRY UMA 038
UMA040	3384356	**Ammonia (NH3+NH4) as N**		**1.23**	mg/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Calcium**		**50,800**	ug/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Chloride**		**21.3**	mg/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Fluoride**		**0.402**	mg/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Iron**		**766**	ug/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Magnesium**		**15,900**	ug/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Manganese**		**340**	ug/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	Nitrate+Nitrite as N	U	0.02	mg/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	Perchlorate	U	1	ug/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Phosphorus, total**		**0.313**	mg/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Potassium**		**9,900**	ug/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Sodium**		**25,600**	ug/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA040	3384356	**Sulfate**		**36.8**	mg/L	9/16/2003	Regular Sample	80576 N OTTRD UMA040
UMA041	3384355	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Calcium**		**47,700**	ug/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Chloride**		**18.9**	mg/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Fluoride**		**0.229**	mg/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA041	3384355	Iron	U	10	ug/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Magnesium**		**11,300**	ug/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	Manganese	U	1	ug/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Nitrate+Nitrite as N**		**2.58**	mg/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	Perchlorate	U	1	ug/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Phosphorus, total**		**0.101**	mg/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Potassium**		**6,490**	ug/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Sodium**		**23,200**	ug/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA041	3384355	**Sulfate**		**19.2**	mg/L	9/16/2003	Regular Sample	32154 DIAGONAL RD UMA041
UMA042	3384354	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Calcium**		**114,000**	ug/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Chloride**		**16.4**	mg/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Fluoride**		**0.345**	mg/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Iron**		**38.2**	ug/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Magnesium**		**32,700**	ug/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	Manganese	U	1	ug/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Nitrate+Nitrite as N**		**13.2**	mg/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Perchlorate**		**4.34**	ug/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Perchlorate**		**4.46**	ug/L		Duplicate	32292 E LOOP RD UMA042
UMA042	3384354	**Phosphorus, total**		**0.0522**	mg/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Potassium**		**7,040**	ug/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Sodium**		**49,900**	ug/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA042	3384354	**Sulfate**		**52.2**	mg/L	9/16/2003	Regular Sample	32292 E LOOP RD UMA042
UMA045	3384357	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	**Calcium**		**45,700**	ug/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	**Chloride**		**6.57**	mg/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	**Fluoride**		**0.782**	mg/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	Iron	U	10	ug/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	**Magnesium**		**30,000**	ug/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	Manganese	U	1	ug/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	**Nitrate+Nitrite as N**		**3.14**	mg/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	Perchlorate	U	1	ug/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	Phosphorus, total	U	0.01	mg/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	**Potassium**		**4,950**	ug/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	**Sodium**		**21,100**	ug/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA045	3384357	**Sulfate**		**13**	mg/L	9/16/2003	Regular Sample	34070 E LOOP RD UMA045
UMA046	3384325	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3384325	**Calcium**		**24,900**	ug/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3384325	**Iron**		**27**	ug/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3384325	**Magnesium**		**16,900**	ug/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3384325	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3384325	**Nitrate+Nitrite as N**		**1.96**	mg/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3384325	Phosphorus, total	U	0.01	mg/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3384325	**Potassium**		**3,270**	ug/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3384325	**Sodium**		**13,500**	ug/L	9/17/2003	Regular Sample	UMA 046 32654 E HIGHLAND EXT
UMA046	3394074	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	32654 E HIGHLAND UMA 046
UMA046	3394074	**Chloride**		**5.96**	mg/L	9/23/2003	Regular Sample	32654 E HIGHLAND UMA 046
UMA046	3394074	**Fluoride**		**0.257**	mg/L	9/23/2003	Regular Sample	32654 E HIGHLAND UMA 046
UMA046	3394074	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	32654 E HIGHLAND UMA 046
UMA046	3394074	**Sulfate**		**11**	mg/L	9/23/2003	Regular Sample	32654 E HIGHLAND UMA 046
UMA047	3384333	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3384333	**Calcium**		**43,300**	ug/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3384333	Iron	U	10	ug/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3384333	**Magnesium**		**10,600**	ug/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3384333	Manganese	U	1	ug/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3384333	**Nitrate+Nitrite as N**		**3.5**	mg/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3384333	**Phosphorus, total**		**0.0309**	mg/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3384333	**Potassium**		**4,830**	ug/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3384333	**Sodium**		**35,500**	ug/L	9/18/2003	Regular Sample	UMA 047 555 OLD HINKLE RD
UMA047	3394082	**Bromide**		**0.237**	mg/L	9/24/2003	Regular Sample	550 OLD HINKLE UMA 047
UMA047	3394082	**Chloride**		**28.9**	mg/L	9/24/2003	Regular Sample	550 OLD HINKLE UMA 047
UMA047	3394082	**Fluoride**		**0.279**	mg/L	9/24/2003	Regular Sample	550 OLD HINKLE UMA 047
UMA047	3394082	Perchlorate	J	1.83	ug/L	9/24/2003	Regular Sample	550 OLD HINKLE UMA 047
UMA047	3394082	**Sulfate**		**30.4**	mg/L	9/24/2003	Regular Sample	550 OLD HINKLE UMA 047
UMA048	3384332	Ammonia (NH3+NH4) as N	NA			9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3384332	**Calcium**		**26,600**	ug/L	9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3384332	Iron	U	10	ug/L	9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3384332	**Magnesium**		**7,320**	ug/L	9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3384332	Manganese	U	1	ug/L	9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3384332	Nitrate+Nitrite as N	NA			9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3384332	Phosphorus, total	NA			9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3384332	**Potassium**		**3,440**	ug/L	9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3384332	**Sodium**		**40,800**	ug/L	9/18/2003	Regular Sample	UMA 048 OTZENBERGER
UMA048	3394081	Bromide	U	0.2	mg/L		Duplicate	OTZENBERGER UMA 048
UMA048	3394081	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	OTZENBERGER UMA 048
UMA048	3394081	**Chloride**		**5.78**	mg/L		Duplicate	OTZENBERGER UMA 048
UMA048	3394081	**Chloride**		**5.84**	mg/L	9/24/2003	Regular Sample	OTZENBERGER UMA 048
UMA048	3394081	**Fluoride**		**0.57**	mg/L	9/24/2003	Regular Sample	OTZENBERGER UMA 048
UMA048	3394081	**Fluoride**		**0.594**	mg/L		Duplicate	OTZENBERGER UMA 048
UMA048	3394081	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	OTZENBERGER UMA 048
UMA048	3394081	**Sulfate**		**10.3**	mg/L	9/24/2003	Regular Sample	OTZENBERGER UMA 048
UMA048	3394081	**Sulfate**		**10.7**	mg/L		Duplicate	OTZENBERGER UMA 048
UMA056	3384326	**Ammonia (NH3+NH4) as N**		**0.17**	mg/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD
UMA056	3384326	**Calcium**		**44,600**	ug/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD
UMA056	3384326	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD
UMA056	3384326	**Magnesium**		**18,700**	ug/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD
UMA056	3384326	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD
UMA056	3384326	**Nitrate+Nitrite as N**		**6.46**	mg/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD
UMA056	3384326	Phosphorus, total	U	0.01	mg/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA056	3384326	**Potassium**		**7,680**	ug/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD
UMA056	3384326	**Sodium**		**76,300**	ug/L	9/17/2003	Regular Sample	UMA 056 78904 N LOOP RD
UMA056	3394075	**Bromide**		**0.55**	mg/L	9/23/2003	Regular Sample	78904 N LOOP UMA 056
UMA056	3394075	**Chloride**		**86.6**	mg/L	9/23/2003	Regular Sample	78904 N LOOP UMA 056
UMA056	3394075	**Fluoride**		**0.269**	mg/L	9/23/2003	Regular Sample	78904 N LOOP UMA 056
UMA056	3394075	**Perchlorate**		**6.53**	ug/L	9/23/2003	Regular Sample	78904 N LOOP UMA 056
UMA056	3394075	**Perchlorate**		**6.55**	ug/L		Duplicate	78904 N LOOP UMA 056
UMA056	3394075	**Sulfate**		**65.7**	mg/L	9/23/2003	Regular Sample	78904 N LOOP UMA 056
UMA057	3424303	Ammonia (NH3+NH4) as N	U	0.05	mg/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	Bromide	U	0.2	mg/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Calcium**		**87,300**	ug/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Chloride**		**38.7**	mg/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Fluoride**		**0.336**	mg/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	Iron	U	10	ug/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Magnesium**		**24,200**	ug/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	Manganese	U	1	ug/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Nitrate+Nitrite as N**		**12.2**	mg/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Perchlorate**		**2.04**	ug/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Phosphorus, total**		**0.0501**	mg/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Potassium**		**9,210**	ug/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Sodium**		**32,800**	ug/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA057	3424303	**Sulfate**		**68.4**	mg/L	10/16/2003	Regular Sample	UMA 057 81166 N OH RD HERMISTON
UMA058	3384318	**Ammonia (NH3+NH4) as N**		**0.158**	mg/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384318	**Calcium**		**69,000**	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384318	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384318	**Magnesium**		**23,300**	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384318	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384318	**Nitrate+Nitrite as N**		**9.22**	mg/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384318	**Phosphorus, total**		**0.116**	mg/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384318	**Potassium**		**7,110**	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384318	**Sodium**		**72,200**	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3
UMA058	3384319	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA058	3384319	**Calcium**		**70,200**	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA058	3384319	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA058	3384319	**Magnesium**		**23,500**	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA058	3384319	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA058	3384319	**Nitrate+Nitrite as N**		**9.19**	mg/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA058	3384319	**Phosphorus, total**		**0.118**	mg/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA058	3384319	**Potassium**		**7,110**	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA058	3384319	**Sodium**		**72,800**	ug/L	9/17/2003	Regular Sample	UMA 058 SIMPLOT WELL #3 (QA)
UMA063	3384358	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Calcium**		**53,900**	ug/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Chloride**		**12.5**	mg/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Fluoride**		**0.284**	mg/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	Iron	U	10	ug/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Magnesium**		**33,700**	ug/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	Manganese	U	1	ug/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Nitrate+Nitrite as N**		**7.56**	mg/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	Perchlorate	J	1.7	ug/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Phosphorus, total**		**0.019**	mg/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Potassium**		**3,270**	ug/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Sodium**		**24,900**	ug/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA063	3384358	**Sulfate**		**22.9**	mg/L	9/17/2003	Regular Sample	28920 BRIDGE RD UMA 063
UMA065	3394087	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Bromide**		**0.205**	mg/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Calcium**		**95,100**	ug/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Chloride**		**91.8**	mg/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Fluoride**		**0.197**	mg/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	Iron	U	10	ug/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Magnesium**		**35,500**	ug/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	Manganese	U	1	ug/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Nitrate+Nitrite as N**		**9.09**	mg/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Perchlorate**		**2.88**	ug/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Phosphorus, total**		**0.0176**	mg/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Potassium**		**14,600**	ug/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Sodium**		**85,300**	ug/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA065	3394087	**Sulfate**		**93.2**	mg/L	9/24/2003	Regular Sample	34099 BEACH SHORE DR. UMA 065
UMA073	3384362	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	Bromide	U	0.2	mg/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Calcium**		**54,600**	ug/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Chloride**		**28.7**	mg/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Fluoride**		**0.234**	mg/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Iron**		**139**	ug/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Magnesium**		**19,200**	ug/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Manganese**		**1.8**	ug/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Nitrate+Nitrite as N**		**8.48**	mg/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	Perchlorate	J	1.06	ug/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Phosphorus, total**		**0.0974**	mg/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Potassium**		**6,570**	ug/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Sodium**		**43,100**	ug/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA073	3384362	**Sulfate**		**38.5**	mg/L	9/18/2003	Regular Sample	78554 ECHOLS RD UMA 073
UMA078	3384359	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Calcium**		**70,100**	ug/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Chloride**		**22.7**	mg/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Fluoride**		**0.155**	mg/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	Iron	U	10	ug/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Magnesium**		**20,200**	ug/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	Manganese	U	1	ug/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Nitrate+Nitrite as N**		**9.6**	mg/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA078	3384359	Perchlorate	J	1.14	ug/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Phosphorus, total**		**0.071**	mg/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Potassium**		**6,460**	ug/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Sodium**		**24,700**	ug/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA078	3384359	**Sulfate**		**26.6**	mg/L	9/17/2003	Regular Sample	78853 AGNEW RD UMA 078
UMA079	3384360	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	Bromide	U	0.2	mg/L		Duplicate	29206 NOBLE RD UMA 079
UMA079	3384360	Bromide	U	0.2	mg/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Calcium**		**31,300**	ug/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Chloride**		**8.34**	mg/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Chloride**		**8.59**	mg/L		Duplicate	29206 NOBLE RD UMA 079
UMA079	3384360	**Fluoride**		**0.223**	mg/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Fluoride**		**0.228**	mg/L		Duplicate	29206 NOBLE RD UMA 079
UMA079	3384360	Iron	U	10	ug/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Magnesium**		**10,400**	ug/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Manganese**		**10.9**	ug/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Nitrate+Nitrite as N**		**0.835**	mg/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	Perchlorate	U	1	ug/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	Phosphorus, total	U	0.01	mg/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Potassium**		**4,090**	ug/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Sodium**		**15,900**	ug/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA079	3384360	**Sulfate**		**10.2**	mg/L		Duplicate	29206 NOBLE RD UMA 079
UMA079	3384360	**Sulfate**		**10.5**	mg/L	9/18/2003	Regular Sample	29206 NOBLE RD UMA 079
UMA080	3384365	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Bromide**		**0.266**	mg/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Calcium**		**48,100**	ug/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Chloride**		**36.1**	mg/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Fluoride**		**0.19**	mg/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Iron**		**10**	ug/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Magnesium**		**17,300**	ug/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	Manganese	U	1	ug/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Nitrate+Nitrite as N**		**5.05**	mg/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	Perchlorate	J	1.6	ug/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Phosphorus, total**		**0.0578**	mg/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Potassium**		**5,520**	ug/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Sodium**		**22,800**	ug/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA080	3384365	**Sulfate**		**29.7**	mg/L	9/18/2003	Regular Sample	29893 BUFFALO LAN UMA 080
UMA082	3384363	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	Bromide	U	0.2	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Calcium**		**23,500**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Chloride**		**26.1**	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Fluoride**		**0.472**	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Iron**		**25.2**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Magnesium**		**8,860**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Manganese**		**12.5**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	Nitrate+Nitrite as N	U	0.02	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	Perchlorate	U	1	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Phosphorus, total**		**0.0101**	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Potassium**		**9,190**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Sodium**		**57,300**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384363	**Sulfate**		**46.2**	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082
UMA082	3384364	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	Bromide	U	0.2	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Calcium**		**23,400**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Chloride**		**24.8**	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Fluoride**		**0.483**	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Iron**		**28.4**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Magnesium**		**8,820**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Manganese**		**13.1**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	Nitrate+Nitrite as N	U	0.02	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	Perchlorate	U	1	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	Phosphorus, total	U	0.01	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Potassium**		**8,960**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Sodium**		**57,000**	ug/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA082	3384364	**Sulfate**		**46.3**	mg/L	9/18/2003	Regular Sample	260 W GETTMAN RD UMA 082 (DUPLICATE)
UMA084	3384320	Ammonia (NH3+NH4) as N	U	0.1	mg/L		Duplicate	UMA 084, 78485 LLOYD RD
UMA084	3384320	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Calcium**		**84,500**	ug/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Calcium**		**85,600**	ug/L		Duplicate	UMA 084, 78485 LLOYD RD
UMA084	3384320	Iron	U	10	ug/L		Duplicate	UMA 084, 78485 LLOYD RD
UMA084	3384320	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Magnesium**		**29,600**	ug/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Magnesium**		**29,900**	ug/L		Duplicate	UMA 084, 78485 LLOYD RD
UMA084	3384320	Manganese	U	1	ug/L		Duplicate	UMA 084, 78485 LLOYD RD
UMA084	3384320	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Nitrate+Nitrite as N**		**11.4**	mg/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Phosphorus, total**		**0.0797**	mg/L		Duplicate	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Phosphorus, total**		**0.081**	mg/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Potassium**		**7,560**	ug/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Potassium**		**7,830**	ug/L		Duplicate	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Sodium**		**42,800**	ug/L	9/17/2003	Regular Sample	UMA 084, 78485 LLOYD RD
UMA084	3384320	**Sodium**		**44,200**	ug/L		Duplicate	UMA 084, 78485 LLOYD RD
UMA084	3394069	**Bromide**		**0.4**	mg/L	9/23/2003	Regular Sample	78485 LLOYD RD UMA 084
UMA084	3394069	**Chloride**		**63**	mg/L	9/23/2003	Regular Sample	78485 LLOYD RD UMA 084
UMA084	3394069	**Fluoride**		**0.136**	mg/L	9/23/2003	Regular Sample	78485 LLOYD RD UMA 084
UMA084	3394069	**Perchlorate**		**2.67**	ug/L	9/23/2003	Regular Sample	78485 LLOYD RD UMA 084
UMA084	3394069	**Sulfate**		**50.5**	mg/L	9/23/2003	Regular Sample	78485 LLOYD RD UMA 084
UMA085	3384303	**Ammonia (NH3+NH4) as N**		**0.104**	mg/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD
UMA085	3384303	**Calcium**		**88,000**	ug/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD
UMA085	3384303	**Iron**		**42.6**	ug/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD
UMA085	3384303	**Magnesium**		**32,600**	ug/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD

Appendix 1
Sample Results
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Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA085	3384303	**Manganese**		**2**	ug/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD
UMA085	3384303	**Nitrate+Nitrite as N**		**35.6**	mg/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD
UMA085	3384303	**Phosphorus, total**		**0.0408**	mg/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD
UMA085	3384303	**Potassium**		**9,620**	ug/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD
UMA085	3384303	**Sodium**		**58,800**	ug/L	9/16/2003	Regular Sample	UMA 085 78953 ROOT RD
UMA085	3394053	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	78953 ROOT LN UMA 085
UMA085	3394053	**Chloride**		**74.8**	mg/L	9/22/2003	Regular Sample	78953 ROOT LN UMA 085
UMA085	3394053	**Fluoride**		**0.374**	mg/L	9/22/2003	Regular Sample	78953 ROOT LN UMA 085
UMA085	3394053	**Perchlorate**		**3.19**	ug/L	9/22/2003	Regular Sample	78953 ROOT LN UMA 085
UMA085	3394053	**Sulfate**		**83.1**	mg/L	9/22/2003	Regular Sample	78953 ROOT LN UMA 085
UMA086	3384352	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Calcium**		**61,800**	ug/L		Duplicate	491 COLUMBIA UMA086
UMA086	3384352	**Calcium**		**62,700**	ug/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Chloride**		**21.4**	mg/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Fluoride**		**0.457**	mg/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Iron**		**35.9**	ug/L		Duplicate	491 COLUMBIA UMA086
UMA086	3384352	**Iron**		**36**	ug/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Magnesium**		**26,200**	ug/L		Duplicate	491 COLUMBIA UMA086
UMA086	3384352	**Magnesium**		**26,300**	ug/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	Manganese	U	1	ug/L		Duplicate	491 COLUMBIA UMA086
UMA086	3384352	Manganese	U	1	ug/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Nitrate+Nitrite as N**		**6.73**	mg/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	Perchlorate	J	1.22	ug/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Phosphorus, total**		**0.029**	mg/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Potassium**		**7,540**	ug/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Potassium**		**7,560**	ug/L		Duplicate	491 COLUMBIA UMA086
UMA086	3384352	**Sodium**		**35,300**	ug/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA086	3384352	**Sodium**		**35,700**	ug/L		Duplicate	491 COLUMBIA UMA086
UMA086	3384352	**Sulfate**		**35.2**	mg/L	9/16/2003	Regular Sample	491 COLUMBIA UMA086
UMA089	3404206	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	Bromide	U	0.2	mg/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Calcium**		**123,000**	ug/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Chloride**		**25.9**	mg/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Fluoride**		**0.107**	mg/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Iron**		**198**	ug/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Magnesium**		**28,900**	ug/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Manganese**		**1.8**	ug/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Nitrate+Nitrite as N**		**9.72**	mg/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	Perchlorate	U	1	ug/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Phosphorus, total**		**0.0573**	mg/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Potassium**		**7,880**	ug/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Sodium**		**22,400**	ug/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA089	3404206	**Sulfate**		**23.4**	mg/L	9/30/2003	Regular Sample	UMA 089 78671 RUDDER LN
UMA094	3384322	**Ammonia (NH3+NH4) as N**		**0.101**	mg/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3384322	**Calcium**		**71,700**	ug/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3384322	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3384322	**Magnesium**		**22,200**	ug/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3384322	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3384322	**Nitrate+Nitrite as N**		**7.5**	mg/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3384322	**Phosphorus, total**		**0.0827**	mg/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3384322	**Potassium**		**5,250**	ug/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3384322	**Sodium**		**17,700**	ug/L	9/17/2003	Regular Sample	UMA 094 79028 AGNEW RD
UMA094	3394071	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	79028 AGNEW UMA 094
UMA094	3394071	**Chloride**		**12.4**	mg/L	9/23/2003	Regular Sample	79028 AGNEW UMA 094
UMA094	3394071	**Fluoride**		**0.153**	mg/L	9/23/2003	Regular Sample	79028 AGNEW UMA 094
UMA094	3394071	Perchlorate	J	1.17	ug/L	9/23/2003	Regular Sample	79028 AGNEW UMA 094
UMA094	3394071	**Sulfate**		**15.1**	mg/L	9/23/2003	Regular Sample	79028 AGNEW UMA 094
UMA096	3384312	**Ammonia (NH3+NH4) as N**		**0.135**	mg/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3384312	**Calcium**		**65,000**	ug/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3384312	**Iron**		**49.6**	ug/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3384312	**Magnesium**		**25,300**	ug/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3384312	**Manganese**		**1.6**	ug/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3384312	**Nitrate+Nitrite as N**		**19.6**	mg/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3384312	**Phosphorus, total**		**0.0368**	mg/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3384312	**Potassium**		**6,930**	ug/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3384312	**Sodium**		**36,800**	ug/L	9/16/2003	Regular Sample	UMA 096 28435 SOUTHSHORE DR
UMA096	3394061	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	28435 SOUTHSHORE DR
UMA096	3394061	**Chloride**		**18.9**	mg/L	9/22/2003	Regular Sample	28435 SOUTHSHORE DR
UMA096	3394061	**Fluoride**		**0.257**	mg/L	9/22/2003	Regular Sample	28435 SOUTHSHORE DR
UMA096	3394061	Perchlorate	J	1.43	ug/L	9/22/2003	Regular Sample	28435 SOUTHSHORE DR
UMA096	3394061	**Sulfate**		**26.2**	mg/L	9/22/2003	Regular Sample	28435 SOUTHSHORE DR
UMA101	3394135	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Bromide**		**0.226**	mg/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Calcium**		**21,200**	ug/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Chloride**		**35.8**	mg/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Fluoride**		**0.307**	mg/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Iron**		**14**	ug/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Magnesium**		**8,460**	ug/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	Manganese	U	1	ug/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Nitrate+Nitrite as N**		**3.7**	mg/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Perchlorate**		**3.47**	ug/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Perchlorate**		**3.54**	ug/L		Duplicate	2280 SE 19TH (UMA 101)
UMA101	3394135	Phosphorus, total	U	0.01	mg/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Potassium**		**5,220**	ug/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Sodium**		**56,000**	ug/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA101	3394135	**Sulfate**		**21.3**	mg/L	9/24/2003	Regular Sample	2280 SE 19TH (UMA 101)
UMA103	3384311	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD
UMA103	3384311	**Calcium**		**67,200**	ug/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD
UMA103	3384311	Iron	U	10	ug/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD
UMA103	3384311	**Magnesium**		**43,000**	ug/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD

Appendix 1
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Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA103	3384311	Manganese	U	1	ug/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD
UMA103	3384311	**Nitrate+Nitrite as N**		**22.9**	mg/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD
UMA103	3384311	**Phosphorus, total**		**0.011**	mg/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD
UMA103	3384311	**Potassium**		**6,520**	ug/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD
UMA103	3384311	**Sodium**		**37,500**	ug/L	9/16/2003	Regular Sample	UMA 103 81855 RAND RD
UMA103	3394060	Bromide	U	0.2	mg/L		Duplicate	81855 RAND RD UMA 103
UMA103	3394060	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	81855 RAND RD UMA 103
UMA103	3394060	**Chloride**		**33.2**	mg/L	9/22/2003	Regular Sample	81855 RAND RD UMA 103
UMA103	3394060	**Chloride**		**35.9**	mg/L		Duplicate	81855 RAND RD UMA 103
UMA103	3394060	**Fluoride**		**0.412**	mg/L	9/22/2003	Regular Sample	81855 RAND RD UMA 103
UMA103	3394060	**Fluoride**		**0.436**	mg/L		Duplicate	81855 RAND RD UMA 103
UMA103	3394060	**Perchlorate**		**2.17**	ug/L	9/22/2003	Regular Sample	81855 RAND RD UMA 103
UMA103	3394060	**Sulfate**		**69.5**	mg/L	9/22/2003	Regular Sample	81855 RAND RD UMA 103
UMA103	3394060	**Sulfate**		**72.5**	mg/L		Duplicate	81855 RAND RD UMA 103
UMA106	3384328	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3384328	**Calcium**		**32,200**	ug/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3384328	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3384328	**Magnesium**		**18,700**	ug/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3384328	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3384328	**Nitrate+Nitrite as N**		**0.929**	mg/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3384328	**Phosphorus, total**		**0.0475**	mg/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3384328	**Potassium**		**5,590**	ug/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3384328	**Sodium**		**44,500**	ug/L	9/17/2003	Regular Sample	UMA 106 33352 E PUNKIN CTR
UMA106	3394077	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	33352 E PUNKIN CTR UMA 106
UMA106	3394077	**Chloride**		**18.6**	mg/L	9/23/2003	Regular Sample	33352 E PUNKIN CTR UMA 106
UMA106	3394077	**Fluoride**		**0.375**	mg/L	9/23/2003	Regular Sample	33352 E PUNKIN CTR UMA 106
UMA106	3394077	Perchlorate	U	1	ug/L		Duplicate	33352 E PUNKIN CTR UMA 106
UMA106	3394077	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	33352 E PUNKIN CTR UMA 106
UMA106	3394077	**Sulfate**		**15.3**	mg/L	9/23/2003	Regular Sample	33352 E PUNKIN CTR UMA 106
UMA109	3384331	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3384331	**Calcium**		**56,900**	ug/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3384331	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3384331	**Magnesium**		**16,000**	ug/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3384331	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3384331	**Nitrate+Nitrite as N**		**3.19**	mg/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3384331	**Phosphorus, total**		**0.0792**	mg/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3384331	**Potassium**		**6,370**	ug/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3384331	**Sodium**		**24,500**	ug/L	9/17/2003	Regular Sample	UMA 109 81232 VETTER
UMA109	3394080	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	81232 VETTER UMA 109
UMA109	3394080	**Chloride**		**17**	mg/L	9/23/2003	Regular Sample	81232 VETTER UMA 109
UMA109	3394080	**Fluoride**		**0.174**	mg/L	9/23/2003	Regular Sample	81232 VETTER UMA 109
UMA109	3394080	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	81232 VETTER UMA 109
UMA109	3394080	**Sulfate**		**21.4**	mg/L	9/23/2003	Regular Sample	81232 VETTER UMA 109
UMA110	3384327	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3384327	**Calcium**		**56,000**	ug/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3384327	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3384327	**Magnesium**		**36,600**	ug/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3384327	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3384327	**Nitrate+Nitrite as N**		**5.28**	mg/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3384327	Phosphorus, total	U	0.01	mg/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3384327	**Potassium**		**4,610**	ug/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3384327	**Sodium**		**23,500**	ug/L	9/17/2003	Regular Sample	UMA 110 34139 E LOOP RD
UMA110	3394076	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	34139 E LOOP RD UMA 110
UMA110	3394076	**Chloride**		**10.9**	mg/L	9/23/2003	Regular Sample	34139 E LOOP RD UMA 110
UMA110	3394076	**Fluoride**		**0.494**	mg/L	9/23/2003	Regular Sample	34139 E LOOP RD UMA 110
UMA110	3394076	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	34139 E LOOP RD UMA 110
UMA110	3394076	**Sulfate**		**15.5**	mg/L	9/23/2003	Regular Sample	34139 E LOOP RD UMA 110
UMA112	3384316	**Ammonia (NH3+NH4) as N**		**0.105**	mg/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3384316	**Calcium**		**45,700**	ug/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3384316	**Iron**		**22.9**	ug/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3384316	**Magnesium**		**16,000**	ug/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3384316	Manganese	U	1	ug/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3384316	**Nitrate+Nitrite as N**		**3.84**	mg/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3384316	**Phosphorus, total**		**0.0169**	mg/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3384316	**Potassium**		**4,340**	ug/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3384316	**Sodium**		**30,800**	ug/L	9/16/2003	Regular Sample	UMA 112 76676 COL JORDAN RD
UMA112	3394065	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	76676 COL JORDAN RD UMA 112
UMA112	3394065	**Chloride**		**10.1**	mg/L	9/23/2003	Regular Sample	76676 COL JORDAN RD UMA 112
UMA112	3394065	**Fluoride**		**0.238**	mg/L	9/23/2003	Regular Sample	76676 COL JORDAN RD UMA 112
UMA112	3394065	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	76676 COL JORDAN RD UMA 112
UMA112	3394065	**Sulfate**		**10.8**	mg/L	9/23/2003	Regular Sample	76676 COL JORDAN RD UMA 112
UMA116	3384329	**Ammonia (NH3+NH4) as N**		**0.107**	mg/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	**Calcium**		**57,500**	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	**Magnesium**		**21,000**	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	**Nitrate+Nitrite as N**		**3.15**	mg/L		Duplicate	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	**Nitrate+Nitrite as N**		**3.29**	mg/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	**Phosphorus, total**		**0.0733**	mg/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	**Potassium**		**6,960**	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384329	**Sodium**		**30,200**	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR
UMA116	3384330	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3384330	**Calcium**		**55,900**	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3384330	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3384330	**Magnesium**		**20,600**	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3384330	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3384330	**Nitrate+Nitrite as N**		**3.33**	mg/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3384330	**Phosphorus, total**		**0.0684**	mg/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3384330	**Potassium**		**6,930**	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3384330	**Sodium**		**30,200**	ug/L	9/17/2003	Regular Sample	UMA 116 32915 E PUNKIN CTR (DUPLICATE)
UMA116	3394078	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA116	3394078	**Chloride**		**19.7**	mg/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116
UMA116	3394078	**Fluoride**		**0.29**	mg/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116
UMA116	3394078	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116
UMA116	3394078	**Sulfate**		**18**	mg/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116
UMA116	3394079	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116 (DUPLICATE)
UMA116	3394079	**Chloride**		**18.9**	mg/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116 (DUPLICATE)
UMA116	3394079	**Fluoride**		**0.352**	mg/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116 (DUPLICATE)
UMA116	3394079	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116 (DUPLICATE)
UMA116	3394079	**Sulfate**		**23.8**	mg/L	9/23/2003	Regular Sample	32915 E PUNKIN CTR UMA 116 (DUPLICATE)
UMA119	3384321	**Ammonia (NH3+NH4) as N**		**0.141**	mg/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3384321	**Calcium**		**96,900**	ug/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3384321	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3384321	**Magnesium**		**28,300**	ug/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3384321	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3384321	**Nitrate+Nitrite as N**		**8.24**	mg/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3384321	**Phosphorus, total**		**0.107**	mg/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3384321	**Potassium**		**7,530**	ug/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3384321	**Sodium**		**28,300**	ug/L	9/17/2003	Regular Sample	UMA 119 1335 LEMMON LN
UMA119	3394070	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	1335 LEMMON LN UMA 119
UMA119	3394070	**Chloride**		**21.5**	mg/L	9/23/2003	Regular Sample	1335 LEMMON LN UMA 119
UMA119	3394070	**Fluoride**		**0.164**	mg/L	9/23/2003	Regular Sample	1335 LEMMON LN UMA 119
UMA119	3394070	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	1335 LEMMON LN UMA 119
UMA119	3394070	**Sulfate**		**22.1**	mg/L	9/23/2003	Regular Sample	1335 LEMMON LN UMA 119
UMA122	3384317	**Ammonia (NH3+NH4) as N**		**0.132**	mg/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3384317	**Calcium**		**149,000**	ug/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3384317	**Iron**		**223**	ug/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3384317	**Magnesium**		**41,000**	ug/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3384317	**Manganese**		**8.1**	ug/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3384317	**Nitrate+Nitrite as N**		**28.4**	mg/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3384317	**Phosphorus, total**		**0.0965**	mg/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3384317	**Potassium**		**7,780**	ug/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3384317	**Sodium**		**40,800**	ug/L	9/16/2003	Regular Sample	UMA 122 29752 STARFIELD MEADOWS
UMA122	3394066	**Bromide**		**0.924**	mg/L	9/23/2003	Regular Sample	29752 STANFIELD MEADOWS UMA 122
UMA122	3394066	**Chloride**		**135**	mg/L	9/23/2003	Regular Sample	29752 STANFIELD MEADOWS UMA 122
UMA122	3394066	**Fluoride**		**0.279**	mg/L	9/23/2003	Regular Sample	29752 STANFIELD MEADOWS UMA 122
UMA122	3394066	**Perchlorate**		**6.12**	ug/L	9/23/2003	Regular Sample	29752 STANFIELD MEADOWS UMA 122
UMA122	3394066	**Sulfate**		**105**	mg/L	9/23/2003	Regular Sample	29752 STANFIELD MEADOWS UMA 122
UMA123	3384361	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Bromide**		**1.05**	mg/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Calcium**		**132,000**	ug/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Chloride**		**128**	mg/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Fluoride**		**0.234**	mg/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Iron**		**16**	ug/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Magnesium**		**40,000**	ug/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	Manganese	U	1	ug/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Nitrate+Nitrite as N**		**20.3**	mg/L		Duplicate	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Nitrate+Nitrite as N**		**21.3**	mg/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Perchlorate**		**6.8**	ug/L		Duplicate	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Perchlorate**		**7.04**	ug/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Phosphorus, total**		**0.071**	mg/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Potassium**		**7,750**	ug/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Sodium**		**36,400**	ug/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA123	3384361	**Sulfate**		**98.3**	mg/L	9/18/2003	Regular Sample	29976 STANFIELD MEADOWS RD UMA 123
UMA124	3404207	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	Bromide	U	0.2	mg/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	**Calcium**		**53,600**	ug/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	**Chloride**		**19.8**	mg/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	**Fluoride**		**0.218**	mg/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	Iron	U	10	ug/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	**Magnesium**		**24,500**	ug/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	Manganese	U	1	ug/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	**Nitrate+Nitrite as N**		**15.5**	mg/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	Perchlorate	J	1.31	ug/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	Phosphorus, total	U	0.01	mg/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	**Potassium**		**5,890**	ug/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	**Sodium**		**49,200**	ug/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA124	3404207	**Sulfate**		**35**	mg/L	9/30/2003	Regular Sample	UMA 124 1200 E AIRPORT RD
UMA132	3394137	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Calcium**		**87,000**	ug/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Chloride**		**33.1**	mg/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Fluoride**		**0.191**	mg/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Iron**		**11**	ug/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Magnesium**		**27,700**	ug/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	Manganese	U	1	ug/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Nitrate+Nitrite as N**		**18.7**	mg/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	Perchlorate	J	1.71	ug/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Phosphorus, total**		**0.112**	mg/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Potassium**		**6,000**	ug/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Sodium**		**29,900**	ug/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA132	3394137	**Sulfate**		**25.5**	mg/L	9/24/2003	Regular Sample	79554 AGNEW RD
UMA133	3384315	**Ammonia (NH3+NH4) as N**		**0.102**	mg/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3384315	**Calcium**		**103,000**	ug/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3384315	Iron	U	10	ug/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3384315	**Magnesium**		**31,400**	ug/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3384315	Manganese	U	1	ug/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3384315	**Nitrate+Nitrite as N**		**13.3**	mg/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3384315	**Phosphorus, total**		**0.0224**	mg/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3384315	**Potassium**		**6,780**	ug/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3384315	**Sodium**		**58,900**	ug/L	9/16/2003	Regular Sample	UMA 133 76992 COUNTY LINE RD
UMA133	3394064	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	76992 COUNTY LINE RD UMA 133

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA133	3394064	**Chloride**		**27.8**	mg/L	9/23/2003	Regular Sample	76992 COUNTY LINE RD UMA 133
UMA133	3394064	**Fluoride**		**0.0941**	mg/L	9/23/2003	Regular Sample	76992 COUNTY LINE RD UMA 133
UMA133	3394064	Perchlorate	J	1.21	ug/L	9/23/2003	Regular Sample	76992 COUNTY LINE RD UMA 133
UMA133	3394064	**Sulfate**		**40.3**	mg/L	9/23/2003	Regular Sample	76992 COUNTY LINE RD UMA 133
UMA136	3404205	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	Bromide	U	0.2	mg/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Calcium**		**71,900**	ug/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Chloride**		**19.3**	mg/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Fluoride**		**0.191**	mg/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	Iron	U	10	ug/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Magnesium**		**19,700**	ug/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	Manganese	U	1	ug/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Nitrate+Nitrite as N**		**8.53**	mg/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	Perchlorate	J	1.11	ug/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Phosphorus, total**		**0.0754**	mg/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Phosphorus, total**		**0.0759**	mg/L		Duplicate	UMA 136 78638 WALKER RD
UMA136	3404205	**Potassium**		**5,730**	ug/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Sodium**		**22,800**	ug/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA136	3404205	**Sulfate**		**23.2**	mg/L	9/30/2003	Regular Sample	UMA 136 78638 WALKER RD
UMA138	3394138	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Calcium**		**29,600**	ug/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Chloride**		**22.4**	mg/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Fluoride**		**0.401**	mg/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Iron**		**60.5**	ug/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Magnesium**		**14,700**	ug/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Manganese**		**70.9**	ug/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Nitrate+Nitrite as N**		**0.156**	mg/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Phosphorus, total**		**0.0182**	mg/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Potassium**		**4,900**	ug/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Sodium**		**50,300**	ug/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA138	3394138	**Sulfate**		**34.2**	mg/L	9/24/2003	Regular Sample	79786 AGNEW RD (UMA 138)
UMA144	3384308	**Ammonia (NH3+NH4) as N**		**0.259**	mg/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3384308	**Calcium**		**86,500**	ug/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3384308	**Iron**		**17**	ug/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3384308	**Magnesium**		**23,700**	ug/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3384308	Manganese	U	1	ug/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3384308	**Nitrate+Nitrite as N**		**9.36**	mg/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3384308	**Phosphorus, total**		**0.103**	mg/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3384308	**Potassium**		**8,680**	ug/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3384308	**Sodium**		**47,600**	ug/L	9/16/2003	Regular Sample	UMA 144 215 W WYOMING
UMA144	3394058	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	215 W WYOMING UMA 144
UMA144	3394058	**Chloride**		**50.4**	mg/L	9/22/2003	Regular Sample	215 W WYOMING UMA 144
UMA144	3394058	**Fluoride**		**0.257**	mg/L	9/22/2003	Regular Sample	215 W WYOMING UMA 144
UMA144	3394058	Perchlorate	U	1	ug/L	9/22/2003	Regular Sample	215 W WYOMING UMA 144
UMA144	3394058	**Sulfate**		**58.8**	mg/L	9/22/2003	Regular Sample	215 W WYOMING UMA 144
UMA156	3384324	**Ammonia (NH3+NH4) as N**		**0.139**	mg/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3384324	**Calcium**		**137,000**	ug/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3384324	Iron	U	10	ug/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3384324	**Magnesium**		**42,500**	ug/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3384324	Manganese	U	1	ug/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3384324	**Nitrate+Nitrite as N**		**10.8**	mg/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3384324	**Phosphorus, total**		**0.0334**	mg/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3384324	**Potassium**		**6,810**	ug/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3384324	**Sodium**		**28,200**	ug/L	9/17/2003	Regular Sample	UMA 156 32201 E HIGHLAND EXT
UMA156	3394073	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	32201 E HIGHLAND EXT UMA 156
UMA156	3394073	**Chloride**		**16.3**	mg/L	9/23/2003	Regular Sample	32201 E HIGHLAND EXT UMA 156
UMA156	3394073	**Fluoride**		**0.119**	mg/L	9/23/2003	Regular Sample	32201 E HIGHLAND EXT UMA 156
UMA156	3394073	**Perchlorate**		**4.07**	ug/L	9/23/2003	Regular Sample	32201 E HIGHLAND EXT UMA 156
UMA156	3394073	**Sulfate**		**37.3**	mg/L	9/23/2003	Regular Sample	32201 E HIGHLAND EXT UMA 156
UMA160	3384304	**Ammonia (NH3+NH4) as N**		**0.164**	mg/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3384304	**Calcium**		**63,100**	ug/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3384304	**Iron**		**57.5**	ug/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3384304	**Magnesium**		**24,900**	ug/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3384304	**Manganese**		**13.3**	ug/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3384304	**Nitrate+Nitrite as N**		**18.6**	mg/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3384304	**Phosphorus, total**		**0.0104**	mg/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3384304	**Potassium**		**10,800**	ug/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3384304	**Sodium**		**61,000**	ug/L	9/16/2003	Regular Sample	UMA 160 WESTERN EMPIRE @ SCALES
UMA160	3394054	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	WESTERN EMPIRE UMA 160
UMA160	3394054	**Chloride**		**32.2**	mg/L	9/22/2003	Regular Sample	WESTERN EMPIRE UMA 160
UMA160	3394054	**Fluoride**		**0.711**	mg/L	9/22/2003	Regular Sample	WESTERN EMPIRE UMA 160
UMA160	3394054	**Perchlorate**		**2.26**	ug/L	9/22/2003	Regular Sample	WESTERN EMPIRE UMA 160
UMA160	3394054	**Sulfate**		**66.1**	mg/L	9/22/2003	Regular Sample	WESTERN EMPIRE UMA 160
UMA161	3414250	Ammonia (NH3+NH4) as N	U	0.1	mg/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	Bromide	U	0.2	mg/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Calcium**		**227,000**	ug/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Chloride**		**140**	mg/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Fluoride**		**0.222**	mg/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	Iron	U	10	ug/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Magnesium**		**55,600**	ug/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	Manganese	U	1	ug/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Nitrate+Nitrite as N**		**51**	mg/L		Duplicate	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Nitrate+Nitrite as N**		**51.1**	mg/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Perchlorate**		**4.23**	ug/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Phosphorus, total**		**0.0212**	mg/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Potassium**		**13,700**	ug/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Sodium**		**59,100**	ug/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA161	3414250	**Sulfate**		**253**	mg/L	10/8/2003	Regular Sample	UMA 161 WESTERN EMPIRE CIRCLE #8 WELL
UMA163	3424304	Ammonia (NH3+NH4) as N	U	0.05	mg/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON

Appendix 1
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Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA163	3424304	Bromide	U	0.2	mg/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Calcium**		**26,800**	ug/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Chloride**		**3.68**	mg/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Fluoride**		**0.132**	mg/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Iron**		**24.1**	ug/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Magnesium**		**5,550**	ug/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	Manganese	U	1	ug/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Nitrate+Nitrite as N**		**0.461**	mg/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	Perchlorate	U	1	ug/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Phosphorus, total**		**0.0146**	mg/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Potassium**		**3,340**	ug/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Sodium**		**6,530**	ug/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA163	3424304	**Sulfate**		**13.2**	mg/L	10/16/2003	Regular Sample	UMA 163 USF&W SHOP IRIGON
UMA164	3384307	**Ammonia (NH3+NH4) as N**		**0.141**	mg/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3384307	**Calcium**		**66,100**	ug/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3384307	Iron	U	10	ug/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3384307	**Magnesium**		**16,500**	ug/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3384307	Manganese	U	1	ug/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3384307	**Nitrate+Nitrite as N**		**3.96**	mg/L		Duplicate	UMA 164 235 W WASHINGTON
UMA164	3384307	**Nitrate+Nitrite as N**		**4.08**	mg/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3384307	**Phosphorus, total**		**0.0395**	mg/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3384307	**Potassium**		**7,650**	ug/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3384307	**Sodium**		**21,500**	ug/L	9/16/2003	Regular Sample	UMA 164 235 W WASHINGTON
UMA164	3394057	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	235 W WASHINGTON UMA 164
UMA164	3394057	**Chloride**		**11.6**	mg/L	9/22/2003	Regular Sample	235 W WASHINGTON UMA 164
UMA164	3394057	**Fluoride**		**0.179**	mg/L	9/22/2003	Regular Sample	235 W WASHINGTON UMA 164
UMA164	3394057	Perchlorate	U	1	ug/L	9/22/2003	Regular Sample	235 W WASHINGTON UMA 164
UMA164	3394057	**Sulfate**		**21.5**	mg/L	9/22/2003	Regular Sample	235 W WASHINGTON UMA 164
UMA166	3424306	Ammonia (NH3+NH4) as N	U	0.05	mg/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	Bromide	U	0.2	mg/L		Duplicate	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	Bromide	U	0.2	mg/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Calcium**		**37,400**	ug/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Chloride**		**17.6**	mg/L		Duplicate	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Chloride**		**17.6**	mg/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Fluoride**		**0.341**	mg/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Fluoride**		**0.358**	mg/L		Duplicate	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Iron**		**751**	ug/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Magnesium**		**14,600**	ug/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Manganese**		**19.8**	ug/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Nitrate+Nitrite as N**		**0.817**	mg/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	Perchlorate	U	1	ug/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	Phosphorus, total	U	0.01	mg/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Potassium**		**11,200**	ug/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Sodium**		**66,000**	ug/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Sulfate**		**127**	mg/L	10/16/2003	Regular Sample	UMA 166 FORMERLY BIG RIVER FARMS
UMA166	3424306	**Sulfate**		**129**	mg/L		Duplicate	UMA 166 FORMERLY BIG RIVER FARMS
UMA168	3384314	**Ammonia (NH3+NH4) as N**		**0.164**	mg/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3384314	**Calcium**		**44,400**	ug/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3384314	**Iron**		**17**	ug/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3384314	**Magnesium**		**15,100**	ug/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3384314	Manganese	U	1	ug/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3384314	**Nitrate+Nitrite as N**		**3.28**	mg/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3384314	**Phosphorus, total**		**0.0385**	mg/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3384314	**Potassium**		**4,510**	ug/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3384314	**Sodium**		**22,900**	ug/L	9/16/2003	Regular Sample	UMA 168 76016 FRONTAGE RD
UMA168	3394063	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	76016 FRONTAGE RD UMA 168
UMA168	3394063	**Chloride**		**12.2**	mg/L	9/23/2003	Regular Sample	76016 FRONTAGE RD UMA 168
UMA168	3394063	**Fluoride**		**0.172**	mg/L	9/23/2003	Regular Sample	76016 FRONTAGE RD UMA 168
UMA168	3394063	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	76016 FRONTAGE RD UMA 168
UMA168	3394063	**Sulfate**		**9.37**	mg/L	9/23/2003	Regular Sample	76016 FRONTAGE RD UMA 168
UMA180	3384309	**Ammonia (NH3+NH4) as N**		**0.184**	mg/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384309	**Calcium**		**90,400**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384309	Iron	U	10	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384309	**Magnesium**		**49,900**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384309	**Manganese**		**122**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384309	**Nitrate+Nitrite as N**		**3.98**	mg/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384309	**Phosphorus, total**		**0.0383**	mg/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384309	**Potassium**		**8,830**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384309	**Sodium**		**99,500**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LOOP
UMA180	3384310	**Ammonia (NH3+NH4) as N**		**0.172**	mg/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3384310	**Calcium**		**88,200**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3384310	Iron	U	10	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3384310	**Magnesium**		**49,700**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3384310	**Manganese**		**121**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3384310	**Nitrate+Nitrite as N**		**3.98**	mg/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3384310	**Phosphorus, total**		**0.0344**	mg/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3384310	**Potassium**		**9,090**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3384310	**Sodium**		**101,000**	ug/L	9/16/2003	Regular Sample	UMA 180 80691 WAGON WHEEL LP (QA)
UMA180	3394059	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	WAGON WHEEL LP UMA 180
UMA180	3394059	**Chloride**		**83.4**	mg/L	9/22/2003	Regular Sample	WAGON WHEEL LP UMA 180
UMA180	3394059	**Fluoride**		**0.749**	mg/L	9/22/2003	Regular Sample	WAGON WHEEL LP UMA 180
UMA180	3394059	Perchlorate	U	1	ug/L	9/22/2003	Regular Sample	WAGON WHEEL LP UMA 180
UMA180	3394059	**Sulfate**		**116**	mg/L	9/22/2003	Regular Sample	WAGON WHEEL LP UMA 180
UMA183	3424302	Ammonia (NH3+NH4) as N	U	0.05	mg/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	Bromide	U	0.2	mg/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Calcium**		**140,000**	ug/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Chloride**		**71**	mg/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Fluoride**		**0.537**	mg/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Iron**		**16**	ug/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Magnesium**		**55,200**	ug/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	Manganese	U	1	ug/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS

Appendix 1
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Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA183	3424302	**Nitrate+Nitrite as N**		**47.5**	mg/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Perchlorate**		**2.04**	ug/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Phosphorus, total**		**0.22**	mg/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Potassium**		**6,100**	ug/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Sodium**		**48,900**	ug/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA183	3424302	**Sulfate**		**68.7**	mg/L	10/14/2003	Regular Sample	UMA 183 HANSELL BROTHERS
UMA185	3384337	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3384337	**Calcium**		**24,400**	ug/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3384337	Iron	U	10	ug/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3384337	**Magnesium**		**8,930**	ug/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3384337	Manganese	U	1	ug/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3384337	**Nitrate+Nitrite as N**		**0.156**	mg/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3384337	**Phosphorus, total**		**0.0289**	mg/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3384337	**Potassium**		**4,120**	ug/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3384337	**Sodium**		**15,500**	ug/L	9/18/2003	Regular Sample	UMA 185 75794 HWY 207
UMA185	3394086	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	75794 HWY 207 UMA 185
UMA185	3394086	**Chloride**		**4.54**	mg/L	9/24/2003	Regular Sample	75794 HWY 207 UMA 185
UMA185	3394086	**Fluoride**		**0.219**	mg/L	9/24/2003	Regular Sample	75794 HWY 207 UMA 185
UMA185	3394086	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	75794 HWY 207 UMA 185
UMA185	3394086	**Sulfate**		**5.67**	mg/L	9/24/2003	Regular Sample	75794 HWY 207 UMA 185
UMA186	3424305	Ammonia (NH3+NH4) as N	U	0.05	mg/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	Bromide	U	0.2	mg/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Calcium**		**39,100**	ug/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Chloride**		**24.5**	mg/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Fluoride**		**0.255**	mg/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	Iron	U	10	ug/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Magnesium**		**13,700**	ug/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Manganese**		**1.4**	ug/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Nitrate+Nitrite as N**		**4.19**	mg/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	Perchlorate	U	1	ug/L		Duplicate	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	Perchlorate	U	1	ug/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Phosphorus, total**		**0.0588**	mg/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Potassium**		**5,260**	ug/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Sodium**		**24,500**	ug/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA186	3424305	**Sulfate**		**15.6**	mg/L	10/16/2003	Regular Sample	UMA 186 JOHN & NELLIE MADISON
UMA187	3384336	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3384336	**Calcium**		**20,000**	ug/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3384336	**Iron**		**58.1**	ug/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3384336	**Magnesium**		**6,530**	ug/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3384336	**Manganese**		**67.2**	ug/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3384336	Nitrate+Nitrite as N	U	0.02	mg/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3384336	**Phosphorus, total**		**0.0101**	mg/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3384336	**Potassium**		**3,200**	ug/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3384336	**Sodium**		**31,500**	ug/L	9/18/2003	Regular Sample	UMA 187 MADISON RANCH
UMA187	3394085	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	74246 SAYLOR RD UMA 187
UMA187	3394085	**Chloride**		**20.1**	mg/L	9/24/2003	Regular Sample	74246 SAYLOR RD UMA 187
UMA187	3394085	**Fluoride**		**0.515**	mg/L	9/24/2003	Regular Sample	74246 SAYLOR RD UMA 187
UMA187	3394085	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	74246 SAYLOR RD UMA 187
UMA187	3394085	**Sulfate**		**0.666**	mg/L	9/24/2003	Regular Sample	74246 SAYLOR RD UMA 187
UMA190	3384335	**Ammonia (NH3+NH4) as N**		**0.104**	mg/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3384335	**Calcium**		**19,100**	ug/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3384335	**Iron**		**118**	ug/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3384335	**Magnesium**		**6,940**	ug/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3384335	**Manganese**		**21.4**	ug/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3384335	**Nitrate+Nitrite as N**		**1.45**	mg/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3384335	**Phosphorus, total**		**0.0664**	mg/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3384335	**Potassium**		**4,490**	ug/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3384335	**Sodium**		**17,000**	ug/L	9/18/2003	Regular Sample	UMA 190 ROBERT SPIKE @ DITCH
UMA190	3394084	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	ROBERT SPIKE @ DITCH UMA 190
UMA190	3394084	**Chloride**		**10.6**	mg/L	9/24/2003	Regular Sample	ROBERT SPIKE @ DITCH UMA 190
UMA190	3394084	**Fluoride**		**0.165**	mg/L	9/24/2003	Regular Sample	ROBERT SPIKE @ DITCH UMA 190
UMA190	3394084	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	ROBERT SPIKE @ DITCH UMA 190
UMA190	3394084	**Sulfate**		**15.7**	mg/L	9/24/2003	Regular Sample	ROBERT SPIKE @ DITCH UMA 190
UMA191	3384334	**Ammonia (NH3+NH4) as N**		**0.13**	mg/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3384334	**Calcium**		**44,500**	ug/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3384334	**Iron**		**15**	ug/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3384334	**Magnesium**		**14,800**	ug/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3384334	**Manganese**		**6.2**	ug/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3384334	**Nitrate+Nitrite as N**		**0.247**	mg/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3384334	**Phosphorus, total**		**0.157**	mg/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3384334	**Potassium**		**5,820**	ug/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3384334	**Sodium**		**71,400**	ug/L	9/18/2003	Regular Sample	UMA 191 ECHO SEWAGE LAGOON
UMA191	3394083	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	CITY OF ECHO SEWAGE LAGOON UMA 191
UMA191	3394083	**Chloride**		**27**	mg/L	9/24/2003	Regular Sample	CITY OF ECHO SEWAGE LAGOON UMA 191
UMA191	3394083	**Fluoride**		**0.261**	mg/L	9/24/2003	Regular Sample	CITY OF ECHO SEWAGE LAGOON UMA 191
UMA191	3394083	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	CITY OF ECHO SEWAGE LAGOON UMA 191
UMA191	3394083	**Sulfate**		**15.3**	mg/L	9/24/2003	Regular Sample	CITY OF ECHO SEWAGE LAGOON UMA 191
UMA192	3424300	**Ammonia (NH3+NH4) as N**		**0.236**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	Bromide	U	0.2	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Calcium**		**32,200**	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Chloride**		**13.6**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Fluoride**		**0.211**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	Iron	U	10	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Magnesium**		**14,700**	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	Manganese	U	1	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Nitrate+Nitrite as N**		**3.13**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	Perchlorate	U	1	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Phosphorus, total**		**0.123**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Potassium**		**9,320**	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Sodium**		**16,400**	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10
UMA192	3424300	**Sulfate**		**21.9**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA192	3424301	Ammonia (NH3+NH4) as N	U	0.05	mg/L		Duplicate	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	Ammonia (NH3+NH4) as N	U	0.05	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	Bromide	U	0.2	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Calcium**		**33,000**	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Chloride**		**14.3**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Fluoride**		**0.209**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	Iron	U	10	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Magnesium**		**14,900**	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	Manganese	U	1	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Nitrate+Nitrite as N**		**2.73**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	Perchlorate	U	1	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Phosphorus, total**		**0.128**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Potassium**		**9,260**	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Sodium**		**16,300**	ug/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA192	3424301	**Sulfate**		**21.9**	mg/L	10/14/2003	Regular Sample	UMA 192 PRIOR WELL #10 (DUPLICATE)
UMA201	3384300	Ammonia (NH3+NH4) as N	U	0.1	mg/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Calcium**		**77,700**	ug/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Calcium**		**78,000**	ug/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	Iron	U	10	ug/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	Iron	U	10	ug/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Magnesium**		**27,000**	ug/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Magnesium**		**27,300**	ug/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	Manganese	U	1	ug/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	Manganese	U	1	ug/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Nitrate+Nitrite as N**		**15.8**	mg/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Nitrate+Nitrite as N**		**16.2**	mg/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Phosphorus, total**		**0.041**	mg/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Phosphorus, total**		**0.0459**	mg/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Potassium**		**8,980**	ug/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Potassium**		**9,180**	ug/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Sodium**		**58,100**	ug/L	9/15/2003	Regular Sample	UMA 201 PORT OF MORROW OR HAY
UMA201	3384300	**Sodium**		**58,600**	ug/L		Duplicate	UMA 201 PORT OF MORROW OR HAY
UMA201	3394050	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	OR HAY PROD UMA 201
UMA201	3394050	**Chloride**		**44.9**	mg/L	9/22/2003	Regular Sample	OR HAY PROD UMA 201
UMA201	3394050	**Fluoride**		**0.223**	mg/L	9/22/2003	Regular Sample	OR HAY PROD UMA 201
UMA201	3394050	Perchlorate	J	1.18	ug/L	9/22/2003	Regular Sample	OR HAY PROD UMA 201
UMA201	3394050	**Sulfate**		**69.2**	mg/L	9/22/2003	Regular Sample	OR HAY PROD UMA 201
UMA244	3394167	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Calcium**		**18,000**	ug/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Chloride**		**6.91**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Fluoride**		**0.182**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	Iron	U	10	ug/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Magnesium**		**7,780**	ug/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	Manganese	U	1	ug/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Nitrate+Nitrite as N**		**1.07**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Phosphorus, total**		**0.0796**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Potassium**		**4,240**	ug/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Sodium**		**13,300**	ug/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394167	**Sulfate**		**5.59**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S
UMA244	3394168	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Calcium**		**17,400**	ug/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Chloride**		**6.94**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Fluoride**		**0.174**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	Iron	U	10	ug/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Magnesium**		**7,590**	ug/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	Manganese	U	1	ug/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Nitrate+Nitrite as N**		**1.02**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Phosphorus, total**		**0.0785**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Potassium**		**4,200**	ug/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Sodium**		**13,300**	ug/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA244	3394168	**Sulfate**		**5.6**	mg/L	9/24/2003	Regular Sample	STALEY MW-3S (DUPLICATE)
UMA259	3394166	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Calcium**		**21,800**	ug/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Chloride**		**11.4**	mg/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Fluoride**		**0.24**	mg/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Iron**		**26.8**	ug/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Magnesium**		**8,790**	ug/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Manganese**		**1.5**	ug/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Nitrate+Nitrite as N**		**1.08**	mg/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Phosphorus, total**		**0.062**	mg/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Potassium**		**4,940**	ug/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Sodium**		**21,600**	ug/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA259	3394166	**Sulfate**		**15.3**	mg/L	9/24/2003	Regular Sample	STALEY MW-3D
UMA260	3394165	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Calcium**		**66,700**	ug/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Chloride**		**21.9**	mg/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Fluoride**		**0.413**	mg/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Iron**		**5,190**	ug/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Magnesium**		**15,700**	ug/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Manganese**		**459**	ug/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Nitrate+Nitrite as N**		**8.87**	mg/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Phosphorus, total**		**1.57**	mg/L	9/24/2003	Regular Sample	STALEY MW-1S

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA260	3394165	**Potassium**		**5,940**	ug/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Sodium**		**147,000**	ug/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA260	3394165	**Sulfate**		**49.2**	mg/L	9/24/2003	Regular Sample	STALEY MW-1S
UMA262	3394164	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Calcium**		**65,000**	ug/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Chloride**		**17.7**	mg/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Fluoride**		**0.0802**	mg/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Iron**		**248**	ug/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Magnesium**		**23,000**	ug/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Manganese**		**34.8**	ug/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Nitrate+Nitrite as N**		**4.21**	mg/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Phosphorus, total**		**0.112**	mg/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Phosphorus, total**		**0.119**	mg/L		Duplicate	STALEY MW-1D
UMA262	3394164	**Potassium**		**6,900**	ug/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Sodium**		**21,900**	ug/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA262	3394164	**Sulfate**		**21.1**	mg/L	9/24/2003	Regular Sample	STALEY MW-1D
UMA279	3394136	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	Bromide	U	0.2	mg/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Calcium**		**62,600**	ug/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Chloride**		**20.5**	mg/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Fluoride**		**0.209**	mg/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Iron**		**85.6**	ug/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Magnesium**		**16,100**	ug/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Manganese**		**1.2**	ug/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Nitrate+Nitrite as N**		**4.74**	mg/L		Duplicate	81336 VETTER LN (UMA 279)
UMA279	3394136	**Nitrate+Nitrite as N**		**4.8**	mg/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Phosphorus, total**		**0.0908**	mg/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Potassium**		**6,770**	ug/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Sodium**		**28,600**	ug/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA279	3394136	**Sulfate**		**26**	mg/L	9/24/2003	Regular Sample	81336 VETTER LN (UMA 279)
UMA174	3384402	**Ammonia (NH3+NH4) as N**		**0.147**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Calcium**		**122,000**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Chloride**		**56.3**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Fluoride**		**0.212**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	Iron	U	10	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Magnesium**		**32,500**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	Manganese	U	1	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Nitrate+Nitrite as N**		**31.3**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Perchlorate**		**2.13**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Phosphorus, total**		**0.0231**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Potassium**		**11,400**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Sodium**		**40,800**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
UMA174	3384402	**Sulfate**		**99.9**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #1
POM Booster Well #2	3384403	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Calcium**		**125,000**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Chloride**		**51.8**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Fluoride**		**0.153**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	Iron	U	10	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Magnesium**		**34,000**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	Manganese	U	1	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Nitrate+Nitrite as N**		**33.8**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	Perchlorate	J	1.51	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Phosphorus, total**		**0.0331**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Potassium**		**10,900**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Sodium**		**36,600**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Booster Well #2	3384403	**Sulfate**		**79.9**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW BOOSTER WELL #2
POM Circle 12 well	3384404	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Calcium**		**149,000**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Chloride**		**71.9**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Fluoride**		**0.158**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	Iron	U	10	ug/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Magnesium**		**42,100**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	Manganese	U	1	ug/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Nitrate+Nitrite as N**		**44.3**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Perchlorate**		**3.93**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Phosphorus, total**		**0.0288**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Potassium**		**11,200**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Sodium**		**52,000**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
POM Circle 12 well	3384404	**Sulfate**		**118**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW CIRCLE 12 WELL
UMA177	3384400	Ammonia (NH3+NH4) as N	U	0.1	mg/L		Duplicate	PORT OF MORROW FARM WELL #2
UMA177	3384400	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	Bromide	U	0.2	mg/L		Duplicate	PORT OF MORROW FARM WELL #2
UMA177	3384400	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Calcium**		**79,600**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Chloride**		**40.9**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Chloride**		**42.2**	mg/L		Duplicate	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Fluoride**		**0.268**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Fluoride**		**0.317**	mg/L		Duplicate	PORT OF MORROW FARM WELL #2
UMA177	3384400	Iron	U	10	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Magnesium**		**24,600**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	Manganese	U	1	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Nitrate+Nitrite as N**		**18.6**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	Perchlorate	J	1.01	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Phosphorus, total**		**0.0703**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Potassium**		**8,030**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA177	3384400	**Sodium**		**44,700**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Sulfate**		**57.4**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #2
UMA177	3384400	**Sulfate**		**62.1**	mg/L		Duplicate	PORT OF MORROW FARM WELL #2
UMA178	3384401	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA178	3384401	**Calcium**		**95,100**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA178	3384401	**Iron**		**51.2**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA178	3384401	**Magnesium**		**30,200**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA178	3384401	**Manganese**		**1.2**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA178	3384401	**Nitrate+Nitrite as N**		**32.3**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA178	3384401	**Phosphorus, total**		**0.0518**	mg/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA178	3384401	**Potassium**		**9,950**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA178	3384401	**Sodium**		**53,300**	ug/L	9/17/2003	Regular Sample	PORT OF MORROW FARM WELL #3
UMA233	3384387	**Sulfate**		**83.5**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Sodium**		**50,100**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Potassium**		**7,930**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Phosphorus, total**		**0.0189**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Perchlorate**		**4.12**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Nitrate+Nitrite as N**		**49.8**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	Manganese	U	1	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Magnesium**		**49,500**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Iron**		**12**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Fluoride**		**0.528**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Chloride**		**66.7**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	**Calcium**		**81,800**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	Bromide	U	0.2	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA233	3384387	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-15
UMA231	3384385	**Sulfate**		**30.2**	mg/L		Duplicate	PORT OF MORROW MW-2
UMA231	3384385	**Sulfate**		**30.5**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	**Sodium**		**22,400**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	**Potassium**		**8,600**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	**Phosphorus, total**		**0.0303**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	Perchlorate	U	1	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	**Nitrate+Nitrite as N**		**6.98**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	Manganese	U	1	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	**Magnesium**		**19,700**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	Iron	U	10	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	**Fluoride**		**0.254**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	**Chloride**		**15**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	**Calcium**		**67,900**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	Bromide	U	0.2	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA231	3384385	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-2
UMA232	3384386	**Sulfate**		**66.1**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Sodium**		**37,600**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Potassium**		**10,700**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Phosphorus, total**		**0.0427**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Perchlorate**		**2.29**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Nitrate+Nitrite as N**		**33**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	Manganese	U	1	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Magnesium**		**26,800**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Iron**		**47.3**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Fluoride**		**0.288**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Chloride**		**35.2**	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	**Calcium**		**92,200**	ug/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	Bromide	U	0.2	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA232	3384386	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/15/2003	Regular Sample	PORT OF MORROW MW-7
UMA202	3384426	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Calcium**		**31,700**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Chloride**		**18.7**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Fluoride**		**0.66**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Iron**		**19**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Magnesium**		**25,200**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Manganese**		**2.7**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Nitrate+Nitrite as N**		**0.0936**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	Perchlorate	U	1	ug/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Phosphorus, total**		**0.128**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Potassium**		**6,770**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Sodium**		**74,200**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA202	3384426	**Sulfate**		**53.9**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 18-2 UMA 202
UMA203	3384428	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Bromide**		**0.293**	mg/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Bromide**		**0.316**	mg/L		Duplicate	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Calcium**		**77,000**	ug/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Chloride**		**75.8**	mg/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Chloride**		**78.2**	mg/L		Duplicate	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Fluoride**		**0.302**	mg/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Fluoride**		**0.355**	mg/L		Duplicate	DEPOT WELL 38-2 UMA 203
UMA203	3384428	Iron	U	10	ug/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Magnesium**		**35,200**	ug/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	Manganese	U	1	ug/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Nitrate+Nitrite as N**		**28.7**	mg/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Perchlorate**		**6.53**	ug/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Phosphorus, total**		**0.0883**	mg/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Potassium**		**9,480**	ug/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Sodium**		**35,100**	ug/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Sulfate**		**62.8**	mg/L	9/18/2003	Regular Sample	DEPOT WELL 38-2 UMA 203
UMA203	3384428	**Sulfate**		**65.7**	mg/L		Duplicate	DEPOT WELL 38-2 UMA 203
UMA204	3394129	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Bromide**		**0.254**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Calcium**		**60,300**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Chloride**		**44.9**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA204	3394129	**Fluoride**		**0.298**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	Iron	U	10	ug/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Magnesium**		**24,000**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	Manganese	U	1	ug/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Nitrate+Nitrite as N**		**16.5**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	Perchlorate	J	1.67	ug/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Phosphorus, total**		**0.0459**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Potassium**		**10,600**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Sodium**		**74,500**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA204	3394129	**Sulfate**		**68**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 46 (UMA 204)
UMA205	3394131	**Ammonia (NH3+NH4) as N**		**0.332**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Calcium**		**34,100**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Chloride**		**16.8**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Fluoride**		**0.878**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Iron**		**71.7**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Magnesium**		**21,800**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Manganese**		**149**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	Nitrate+Nitrite as N	U	0.02	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Phosphorus, total**		**0.0843**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Potassium**		**6,040**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Sodium**		**86,600**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA205	3394131	**Sulfate**		**70.2**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-5 (UMA 205)
UMA206	3384425	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Calcium**		**55,500**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Chloride**		**15.8**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Fluoride**		**0.203**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Iron**		**20.8**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Magnesium**		**18,500**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Manganese**		**1.2**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Nitrate+Nitrite as N**		**6.2**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	Perchlorate	U	1	ug/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Phosphorus, total**		**0.0976**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Potassium**		**10,400**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Sodium**		**21,700**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA206	3384425	**Sulfate**		**34.5**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 57-4 UMA 206
UMA213	3384423	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Bromide**		**0.214**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Calcium**		**44,500**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Chloride**		**29.1**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Fluoride**		**0.949**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Iron**		**17**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Magnesium**		**35,800**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	Manganese	U	1	ug/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Nitrate+Nitrite as N**		**3.61**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Perchlorate**		**5.06**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Phosphorus, total**		**0.0793**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Potassium**		**5,860**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Sodium**		**87,200**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA213	3384423	**Sulfate**		**117**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 19-2 UMA 213
UMA214	3384424	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Calcium**		**64,600**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Chloride**		**14.6**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Fluoride**		**0.197**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	Iron	U	10	ug/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Magnesium**		**21,200**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	Manganese	U	1	ug/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Nitrate+Nitrite as N**		**7.39**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	Perchlorate	U	1	ug/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Phosphorus, total**		**0.0658**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Potassium**		**10,900**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Sodium**		**27,500**	ug/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA214	3384424	**Sulfate**		**34.9**	mg/L	9/17/2003	Regular Sample	DEPOT WELL 38-3 UMA 214
UMA215	3394130	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Bromide**		**0.354**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Calcium**		**76,100**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Chloride**		**59.7**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Fluoride**		**0.3**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	Iron	U	10	ug/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Magnesium**		**24,200**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	Manganese	U	1	ug/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Nitrate+Nitrite as N**		**17.2**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Perchlorate**		**5.02**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Perchlorate**		**5.04**	ug/L		Duplicate	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Phosphorus, total**		**0.046**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Potassium**		**10,800**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Sodium**		**38,900**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA215	3394130	**Sulfate**		**77.3**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 38-4 (UMA 215)
UMA217	3394133	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Calcium**		**28,500**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Chloride**		**19.2**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Fluoride**		**0.435**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Iron**		**464**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Magnesium**		**29,800**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Manganese**		**16.2**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Nitrate+Nitrite as N**		**6.91**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	Perchlorate	J	1.54	ug/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA217	3394133	**Phosphorus, total**		**0.0585**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Potassium**		**4,610**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Sodium**		**41,800**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA217	3394133	**Sulfate**		**34.8**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 16-2 (UMA 217)
UMA218	3384427	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	Bromide	U	0.2	mg/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Calcium**		**26,500**	ug/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Chloride**		**17.9**	mg/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Fluoride**		**0.386**	mg/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	Iron	U	10	ug/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Magnesium**		**21,300**	ug/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	Manganese	U	1	ug/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Nitrate+Nitrite as N**		**7.4**	mg/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Perchlorate**		**2.82**	ug/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Phosphorus, total**		**0.0127**	mg/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Potassium**		**2,590**	ug/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Sodium**		**24,300**	ug/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA218	3384427	**Sulfate**		**24.2**	mg/L	9/18/2003	Regular Sample	DEPOT WELL MW-4 UMA 218
UMA224	3394127	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Calcium**		**43,600**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Chloride**		**22.8**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Fluoride**		**0.344**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	Iron	U	10	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Magnesium**		**20,600**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Manganese**		**15.5**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Nitrate+Nitrite as N**		**7.35**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Perchlorate**		**2.17**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Phosphorus, total**		**0.074**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Potassium**		**3,960**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Sodium**		**26,800**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224	3394127	**Sulfate**		**25.5**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Calcium**		**43,100**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Chloride**		**24.2**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Fluoride**		**0.373**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	Iron	U	10	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Magnesium**		**20,400**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Manganese**		**14.1**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Nitrate+Nitrite as N**		**7.31**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Perchlorate**		**2.4**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Phosphorus, total**		**0.0724**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Potassium**		**3,930**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Sodium**		**26,600**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA224 (duplicate)	3394128	**Sulfate**		**28**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4- (UMA 224)
UMA225	3394126	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Calcium**		**42,200**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Chloride**		**18.6**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Fluoride**		**0.268**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	Iron	U	10	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Magnesium**		**19,800**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	Manganese	U	1	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Nitrate+Nitrite as N**		**8.59**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	Perchlorate	J	1.4	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Phosphorus, total**		**0.0443**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Potassium**		**4,490**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Sodium**		**24,400**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA225	3394126	**Sulfate**		**21.4**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 4-18 (UMA225)
UMA228	3394125	Ammonia (NH3+NH4) as N	U	0.1	mg/L		Duplicate	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	Bromide	U	0.2	mg/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Calcium**		**28,800**	ug/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Chloride**		**19.9**	mg/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Fluoride**		**0.347**	mg/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Iron**		**12**	ug/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Magnesium**		**24,900**	ug/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	Manganese	U	1	ug/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Nitrate+Nitrite as N**		**7.66**	mg/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Perchlorate**		**2.56**	ug/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Perchlorate**		**2.68**	ug/L		Duplicate	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	Phosphorus, total	U	0.01	mg/L		Duplicate	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	Phosphorus, total	U	0.01	mg/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Potassium**		**2,680**	ug/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Sodium**		**19,600**	ug/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA228	3394125	**Sulfate**		**27.5**	mg/L	9/22/2003	Regular Sample	DEPOT WELL 4-16 (UMA228)
UMA276	3394132	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Calcium**		**51,000**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Chloride**		**20.4**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Fluoride**		**0.372**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	Iron	U	10	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Magnesium**		**18,400**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	Manganese	U	1	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Nitrate+Nitrite as N**		**6.02**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	Perchlorate	J	1.34	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Phosphorus, total**		**0.0295**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Potassium**		**8,740**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Sodium**		**32,000**	ug/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)
UMA276	3394132	**Sulfate**		**36.5**	mg/L	9/23/2003	Regular Sample	DEPOT WELL 57-3 (UMA 276)

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA263	3384419	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Bromide**		**0.686**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Calcium**		**91,000**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Chloride**		**187**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Fluoride**		**0.407**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Iron**		**17**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Magnesium**		**50,800**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	Manganese	U	1	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Nitrate+Nitrite as N**		**10.6**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Perchlorate**		**7.79**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Perchlorate**		**7.89**	ug/L		Duplicate	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Phosphorus, total**		**0.0107**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Potassium**		**4,510**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Sodium**		**49,800**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA263	3384419	**Sulfate**		**86.8**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-1 UMA 263
UMA264	3384421	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Calcium**		**19,200**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Chloride**		**31.1**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Fluoride**		**0.474**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Iron**		**23.3**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Magnesium**		**8,950**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	Manganese	U	1	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Nitrate+Nitrite as N**		**7.79**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Perchlorate**		**2.64**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Phosphorus, total**		**0.0302**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Potassium**		**3,960**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Sodium**		**86,000**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384421	**Sulfate**		**39.6**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264
UMA264	3384422	Ammonia (NH3+NH4) as N	U	0.1	mg/L		Duplicate	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Calcium**		**19,200**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Chloride**		**30.9**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Fluoride**		**0.454**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Iron**		**22.6**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Magnesium**		**9,000**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	Manganese	U	1	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Nitrate+Nitrite as N**		**7.96**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Perchlorate**		**2.72**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Phosphorus, total**		**0.0321**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Potassium**		**4,060**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Sodium**		**86,300**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA264	3384422	**Sulfate**		**38.7**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-2 UMA 264 DUP
UMA265	3384420	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Bromide**		**0.256**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Calcium**		**27,700**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Chloride**		**31.5**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Fluoride**		**0.306**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Iron**		**36.7**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Magnesium**		**11,800**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Manganese**		**1.3**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Nitrate+Nitrite as N**		**6.98**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Perchlorate**		**2.06**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Phosphorus, total**		**0.0152**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Potassium**		**4,620**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Sodium**		**60,700**	ug/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA265	3384420	**Sulfate**		**27.9**	mg/L	9/16/2003	Regular Sample	HERMISTON FOODS MW-5 UMA 265
UMA059	3394139	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Calcium**		**82,600**	ug/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Chloride**		**32.8**	mg/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Fluoride**		**0.24**	mg/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	Iron	U	10	ug/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Magnesium**		**21,700**	ug/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	Manganese	U	1	ug/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Nitrate+Nitrite as N**		**8.1**	mg/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	Perchlorate	J	1.14	ug/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Phosphorus, total**		**0.106**	mg/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Potassium**		**9,070**	ug/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Sodium**		**37,500**	ug/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA059	3394139	**Sulfate**		**66.9**	mg/L	9/25/2003	Regular Sample	IRRIGON SUPPLY WELL (UMA 059)
UMA266	3394143	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Calcium**		**128,000**	ug/L		Duplicate	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Calcium**		**130,000**	ug/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Chloride**		**44.6**	mg/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Fluoride**		**0.2**	mg/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Iron**		**917**	ug/L		Duplicate	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Iron**		**928**	ug/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Magnesium**		**32,100**	ug/L		Duplicate	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Magnesium**		**32,200**	ug/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Manganese**		**32.3**	ug/L		Duplicate	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Manganese**		**33**	ug/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Nitrate+Nitrite as N**		**41.4**	mg/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Perchlorate**		**2.46**	ug/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Phosphorus, total**		**0.0776**	mg/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Potassium**		**10,800**	ug/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Potassium**		**11,000**	ug/L		Duplicate	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Sodium**		**47,700**	ug/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA266	3394143	**Sodium**		**48,300**	ug/L		Duplicate	IRRIGON MW UB (UMA 266)

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA266	3394143	**Sulfate**		**101**	mg/L	9/25/2003	Regular Sample	IRRIGON MW UB (UMA 266)
UMA267	3394140	**Ammonia (NH3+NH4) as N**		**0.513**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	Bromide	U	0.2	mg/L		Duplicate	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Calcium**		**122,000**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Chloride**		**77.9**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Chloride**		**78.5**	mg/L		Duplicate	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Fluoride**		**0.231**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Fluoride**		**0.237**	mg/L		Duplicate	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Iron**		**11**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Magnesium**		**31,200**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Manganese**		**375**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Nitrate+Nitrite as N**		**30**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	Perchlorate	J	1.06	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Phosphorus, total**		**0.527**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Potassium**		**13,900**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Sodium**		**82,700**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Sulfate**		**79.6**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 (UMA 267)
UMA267	3394140	**Sulfate**		**81.2**	mg/L		Duplicate	IRRIGON MW DB-4 (UMA 267)
UMA267	3394141	**Ammonia (NH3+NH4) as N**		**0.463**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Calcium**		**120,000**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Chloride**		**77.4**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Fluoride**		**0.242**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Iron**		**18**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Magnesium**		**31,000**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Manganese**		**591**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Nitrate+Nitrite as N**		**29.9**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	Perchlorate	J	1.14	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Phosphorus, total**		**0.535**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Potassium**		**14,200**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Sodium**		**81,000**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA267	3394141	**Sulfate**		**79.8**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DB-4 QA (UMA 267)
UMA268	3394142	**Ammonia (NH3+NH4) as N**		**0.178**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Calcium**		**119,000**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Chloride**		**63.4**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Fluoride**		**0.197**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Iron**		**123**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Magnesium**		**32,800**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Manganese**		**136**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Nitrate+Nitrite as N**		**30.4**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	Perchlorate	U	1	ug/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Phosphorus, total**		**0.148**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Potassium**		**12,900**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Sodium**		**66,400**	ug/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA268	3394142	**Sulfate**		**78**	mg/L	9/25/2003	Regular Sample	IRRIGON MW DC (UMA 268)
UMA198	3384323	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3384323	**Calcium**		**75,700**	ug/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3384323	**Iron**		**55**	ug/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3384323	**Magnesium**		**42,200**	ug/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3384323	**Manganese**		**6.6**	ug/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3384323	**Nitrate+Nitrite as N**		**31.2**	mg/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3384323	**Phosphorus, total**		**0.0143**	mg/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3384323	**Potassium**		**4,260**	ug/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3384323	**Sodium**		**54,500**	ug/L	9/17/2003	Regular Sample	UMA 198 LAMB WESTON WELL #1
UMA198	3394072	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	LAMB WESTON WELL #1 UMA 198
UMA198	3394072	**Chloride**		**63.1**	mg/L	9/23/2003	Regular Sample	LAMB WESTON WELL #1 UMA 198
UMA198	3394072	**Fluoride**		**0.154**	mg/L	9/23/2003	Regular Sample	LAMB WESTON WELL #1 UMA 198
UMA198	3394072	**Perchlorate**		**3.34**	ug/L		Duplicate	LAMB WESTON WELL #1 UMA 198
UMA198	3394072	**Perchlorate**		**3.36**	ug/L	9/23/2003	Regular Sample	LAMB WESTON WELL #1 UMA 198
UMA198	3394072	**Sulfate**		**26**	mg/L	9/23/2003	Regular Sample	LAMB WESTON WELL #1 UMA 198
UMA234	3384389	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Calcium**		**20,600**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Chloride**		**21.1**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Fluoride**		**0.413**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Iron**		**37.1**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Magnesium**		**11,500**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Manganese**		**1.6**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Nitrate+Nitrite as N**		**7.98**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Perchlorate**		**5.18**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Perchlorate**		**5.35**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	Phosphorus, total	U	0.01	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Potassium**		**3,920**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Sodium**		**45,300**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA234	3384389	**Sulfate**		**14.8**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-3
UMA235	3384390	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Calcium**		**36,000**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Calcium**		**36,100**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Chloride**		**42.9**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Fluoride**		**0.394**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Iron**		**53.7**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Iron**		**55**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Magnesium**		**18,700**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Magnesium**		**18,700**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Manganese**		**1.4**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Manganese**		**1.4**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Nitrate+Nitrite as N**		**25.9**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Perchlorate**		**4.96**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA235	3384390	Phosphorus, total	U	0.01	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Potassium**		**4,460**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Potassium**		**4,490**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Sodium**		**41,300**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Sodium**		**41,500**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-4
UMA235	3384390	**Sulfate**		**9.59**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-4
UMA236	3384393	**Ammonia (NH3+NH4) as N**		**0.55**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Calcium**		**22,500**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Chloride**		**24.9**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Fluoride**		**0.326**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Iron**		**1,330**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Magnesium**		**11,000**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Manganese**		**45.7**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Nitrate+Nitrite as N**		**8.11**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Perchlorate**		**2.96**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Phosphorus, total**		**0.186**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Potassium**		**6,410**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Sodium**		**59,900**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384393	**Sulfate**		**11.4**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6
UMA236	3384394	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Calcium**		**21,800**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Chloride**		**25.3**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Fluoride**		**0.338**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Iron**		**1,210**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Magnesium**		**10,600**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Manganese**		**33.8**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Nitrate+Nitrite as N**		**8.21**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Perchlorate**		**2.82**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Phosphorus, total**		**0.165**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Potassium**		**6,110**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Sodium**		**60,300**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA236	3384394	**Sulfate**		**11.6**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-6 QA
UMA237	3384392	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Bromide**		**0.204**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Calcium**		**139,000**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Chloride**		**84.5**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Fluoride**		**0.308**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Iron**		**35.9**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Magnesium**		**64,600**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Manganese**		**5.8**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Nitrate+Nitrite as N**		**44.3**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Perchlorate**		**5.07**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Perchlorate**		**5.19**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Phosphorus, total**		**0.0754**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Potassium**		**13,700**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Sodium**		**77,200**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA237	3384392	**Sulfate**		**85.7**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-8
UMA238	3384388	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Calcium**		**128,000**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Chloride**		**77.3**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Fluoride**		**0.0853**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Iron**		**716**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Magnesium**		**82,900**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Manganese**		**39.2**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Nitrate+Nitrite as N**		**46.3**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	Perchlorate	J	1.87	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Phosphorus, total**		**0.214**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Potassium**		**5,240**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Sodium**		**25,100**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA238	3384388	**Sulfate**		**39.6**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-10
UMA239	3384405	**Ammonia (NH3+NH4) as N**		**0.252**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	Bromide	U	0.2	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Calcium**		**36,300**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Chloride**		**11.5**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Fluoride**		**0.231**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Iron**		**207**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Magnesium**		**13,400**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Manganese**		**8.5**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Nitrate+Nitrite as N**		**0.816**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	Perchlorate	U	1	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Phosphorus, total**		**0.0602**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Potassium**		**3,330**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Sodium**		**15,900**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA239	3384405	**Sulfate**		**24**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-4A
UMA240	3384406	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Bromide**		**1.35**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Calcium**		**125,000**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Chloride**		**131**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Fluoride**		**0.654**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Iron**		**201**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Magnesium**		**28,400**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Manganese**		**11.7**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Nitrate+Nitrite as N**		**4.23**	mg/L		Duplicate	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Nitrate+Nitrite as N**		**4.39**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Perchlorate**		**6.98**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Phosphorus, total**		**0.0241**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Potassium**		**3,100**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA240	3384406	**Sodium**		**65,900**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA240	3384406	**Sulfate**		**159**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-3
UMA241	3394163	Ammonia (NH3+NH4) as N	U	0.1	mg/L		Duplicate	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Bromide**		**0.316**	mg/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Calcium**		**23,900**	ug/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Chloride**		**5.42**	mg/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Fluoride**		**0.223**	mg/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Iron**		**611**	ug/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Magnesium**		**7,410**	ug/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Manganese**		**46.4**	ug/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Nitrate+Nitrite as N**		**0.181**	mg/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	Perchlorate	U	1	ug/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Phosphorus, total**		**0.204**	mg/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Potassium**		**5,360**	ug/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Sodium**		**21,200**	ug/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA241	3394163	**Sulfate**		**6.79**	mg/L	9/24/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-2
UMA242	3384407	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	Bromide	U	0.2	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Calcium**		**61,800**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Chloride**		**22.1**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Fluoride**		**0.272**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Iron**		**22.8**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Magnesium**		**22,000**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Manganese**		**1.2**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Nitrate+Nitrite as N**		**5.79**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	Perchlorate	U	1	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Phosphorus, total**		**0.108**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Potassium**		**6,740**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Sodium**		**73,800**	ug/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA242	3384407	**Sulfate**		**49.6**	mg/L	9/18/2003	Regular Sample	LAMB-WESTON MADISON RANCH MW-5
UMA243	3384391	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	Bromide	U	0.2	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Calcium**		**54,400**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Chloride**		**32.6**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Fluoride**		**0.284**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Iron**		**1,670**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Magnesium**		**41,700**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Manganese**		**9.2**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Nitrate+Nitrite as N**		**29.1**	mg/L		Duplicate	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Nitrate+Nitrite as N**		**29.7**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Perchlorate**		**2.11**	ug/L		Duplicate	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Perchlorate**		**2.21**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Phosphorus, total**		**0.0109**	mg/L		Duplicate	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Phosphorus, total**		**0.011**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Potassium**		**4,160**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Sodium**		**23,600**	ug/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA243	3384391	**Sulfate**		**35.5**	mg/L	9/16/2003	Regular Sample	LAMB-WESTON NORTH FARM MW-5
UMA271	3404201	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Bromide**		**0.708**	mg/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Calcium**		**146,000**	ug/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Chloride**		**136**	mg/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Fluoride**		**0.353**	mg/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Iron**		**24.1**	ug/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Magnesium**		**78,000**	ug/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	Manganese	U	1	ug/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Nitrate+Nitrite as N**		**36.4**	mg/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Perchlorate**		**6.4**	ug/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Phosphorus, total**		**0.0187**	mg/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Potassium**		**5,740**	ug/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Sodium**		**71,000**	ug/L	9/29/2003	Regular Sample	PGE WELL #107
UMA271	3404201	**Sulfate**		**166**	mg/L	9/29/2003	Regular Sample	PGE WELL #107
UMA272	3404200	Ammonia (NH3+NH4) as N	U	0.1	mg/L		Duplicate	PGE WELL #1
UMA272	3404200	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Bromide**		**0.275**	mg/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Bromide**		**0.277**	mg/L		Duplicate	PGE WELL #1
UMA272	3404200	**Calcium**		**11,100**	ug/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Chloride**		**35**	mg/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Chloride**		**36.6**	mg/L		Duplicate	PGE WELL #1
UMA272	3404200	**Fluoride**		**1.44**	mg/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Fluoride**		**1.51**	mg/L		Duplicate	PGE WELL #1
UMA272	3404200	**Iron**		**273**	ug/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Magnesium**		**5,740**	ug/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Manganese**		**60.5**	ug/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	Nitrate+Nitrite as N	U	0.05	mg/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	Perchlorate	U	1	ug/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Phosphorus, total**		**0.012**	mg/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Potassium**		**12,400**	ug/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Sodium**		**83,000**	ug/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Sulfate**		**4.6**	mg/L	9/29/2003	Regular Sample	PGE WELL #1
UMA272	3404200	**Sulfate**		**4.76**	mg/L		Duplicate	PGE WELL #1
UMA273	3404202	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	Bromide	U	0.2	mg/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Calcium**		**74,500**	ug/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Chloride**		**68.6**	mg/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Fluoride**		**0.353**	mg/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Iron**		**26.9**	ug/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Magnesium**		**61,100**	ug/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	Manganese	U	1	ug/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Nitrate+Nitrite as N**		**32.5**	mg/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Perchlorate**		**2.28**	ug/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Phosphorus, total**		**0.645**	mg/L	9/29/2003	Regular Sample	PGE WELL #104

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA273	3404202	**Potassium**		**6,920**	ug/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Sodium**		**67,800**	ug/L	9/29/2003	Regular Sample	PGE WELL #104
UMA273	3404202	**Sulfate**		**98.9**	mg/L	9/29/2003	Regular Sample	PGE WELL #104
UMA274	3404203	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Bromide**		**1.06**	mg/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Calcium**		**23,400**	ug/L		Duplicate	PGE WELL #101
UMA274	3404203	**Calcium**		**23,600**	ug/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Chloride**		**163**	mg/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Fluoride**		**0.484**	mg/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Iron**		**2,180**	ug/L		Duplicate	PGE WELL #101
UMA274	3404203	**Iron**		**2,180**	ug/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Magnesium**		**22,300**	ug/L		Duplicate	PGE WELL #101
UMA274	3404203	**Magnesium**		**22,400**	ug/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Manganese**		**209**	ug/L		Duplicate	PGE WELL #101
UMA274	3404203	**Manganese**		**210**	ug/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Nitrate+Nitrite as N**		**0.0504**	mg/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	Perchlorate	U	1	ug/L		Duplicate	PGE WELL #101
UMA274	3404203	Perchlorate	U	1	ug/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Phosphorus, total**		**0.0151**	mg/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Potassium**		**9,570**	ug/L		Duplicate	PGE WELL #101
UMA274	3404203	**Potassium**		**9,600**	ug/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Sodium**		**238,000**	ug/L		Duplicate	PGE WELL #101
UMA274	3404203	**Sodium**		**240,000**	ug/L	9/29/2003	Regular Sample	PGE WELL #101
UMA274	3404203	**Sulfate**		**222**	mg/L	9/29/2003	Regular Sample	PGE WELL #101
Simplot HL-3	3394175	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Bromide**		**0.548**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Calcium**		**94,600**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Chloride**		**67.7**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Fluoride**		**0.141**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Iron**		**129**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Magnesium**		**29,500**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Manganese**		**3.1**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Nitrate+Nitrite as N**		**11**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	Perchlorate	J	1.66	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Phosphorus, total**		**0.0742**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Potassium**		**5,370**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Sodium**		**43,400**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-3	3394175	**Sulfate**		**93**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-3
Simplot HL-4	3394177	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-4	3394177	**Calcium**		**87,200**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-4	3394177	**Iron**		**386**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-4	3394177	**Magnesium**		**48,200**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-4	3394177	**Manganese**		**6.4**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-4	3394177	**Nitrate+Nitrite as N**		**4.71**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-4	3394177	**Phosphorus, total**		**0.0828**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-4	3394177	**Potassium**		**3,510**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-4	3394177	**Sodium**		**220,000**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-4
Simplot HL-5	3394176	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Bromide**		**0.509**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Calcium**		**112,000**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Chloride**		**93**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Fluoride**		**0.312**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Iron**		**113**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Magnesium**		**34,300**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Manganese**		**4.1**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Nitrate+Nitrite as N**		**32.3**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Perchlorate**		**4.44**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Phosphorus, total**		**0.0401**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Potassium**		**4,550**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Sodium**		**160,000**	ug/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot HL-5	3394176	**Sulfate**		**172**	mg/L	9/26/2003	Regular Sample	SIMPLOT HL-5
Simplot L-11	3394178	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Bromide**		**1.48**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Calcium**		**114,000**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Chloride**		**200**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Fluoride**		**0.775**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Iron**		**2,330**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Magnesium**		**47,100**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Manganese**		**98.3**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Nitrate+Nitrite as N**		**12.8**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Perchlorate**		**13.4**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Phosphorus, total**		**0.573**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Potassium**		**6,570**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Sodium**		**84,500**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-11	3394178	**Sulfate**		**148**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-11
Simplot L-6	3394174	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Bromide**		**1.02**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Calcium**		**66,800**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Chloride**		**114**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Fluoride**		**0.694**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Iron**		**140**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Magnesium**		**29,800**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Manganese**		**6.2**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Nitrate+Nitrite as N**		**1.33**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	Perchlorate	U	1	ug/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Phosphorus, total**		**0.0366**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Potassium**		**8,880**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Sodium**		**102,000**	ug/L	9/26/2003	Regular Sample	SIMPLOT L-6
Simplot L-6	3394174	**Sulfate**		**188**	mg/L	9/26/2003	Regular Sample	SIMPLOT L-6
UMA058	3394067	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058
UMA058	3394067	**Chloride**		**28.2**	mg/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA058	3394067	**Fluoride**		**0.232**	mg/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058
UMA058	3394067	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058
UMA058	3394067	**Sulfate**		**27.5**	mg/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058
UMA058	3394068	Bromide	U	0.2	mg/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058 QA
UMA058	3394068	**Chloride**		**27.5**	mg/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058 QA
UMA058	3394068	**Fluoride**		**0.236**	mg/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058 QA
UMA058	3394068	Perchlorate	U	1	ug/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058 QA
UMA058	3394068	**Sulfate**		**27.8**	mg/L	9/23/2003	Regular Sample	SIMPLOT# 3 UMA 058 QA
UMA245	3384396	**Ammonia (NH3+NH4) as N**		**0.111**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Calcium**		**29,600**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Chloride**		**6.11**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Fluoride**		**0.266**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	Iron	U	10	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Magnesium**		**10,400**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	Manganese	U	1	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Nitrate+Nitrite as N**		**1.04**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	Perchlorate	U	1	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Phosphorus, total**		**0.0536**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Potassium**		**4,160**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Sodium**		**17,100**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA245	3384396	**Sulfate**		**7.32**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11D
UMA246	3384408	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Bromide**		**0.68**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Calcium**		**95,100**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Chloride**		**87.6**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Fluoride**		**0.233**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	Iron	U	10	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Magnesium**		**30,200**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	Manganese	U	1	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Nitrate+Nitrite as N**		**15.9**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Perchlorate**		**4.58**	ug/L		Duplicate	SIMPLOT MW-13S
UMA246	3384408	**Perchlorate**		**4.76**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Phosphorus, total**		**0.104**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Potassium**		**6,680**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Sodium**		**30,700**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA246	3384408	**Sulfate**		**67.6**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13S
UMA247	3384409	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	Bromide	U	0.2	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Calcium**		**41,300**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Chloride**		**15.5**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Fluoride**		**0.207**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	Iron	U	10	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Magnesium**		**14,800**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	Manganese	U	1	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Nitrate+Nitrite as N**		**1.73**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	Perchlorate	U	1	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Phosphorus, total**		**0.0528**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Potassium**		**5,780**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Sodium**		**23,400**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA247	3384409	**Sulfate**		**13.4**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-13D
UMA248	3384399	**Ammonia (NH3+NH4) as N**		**0.479**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Calcium**		**26,400**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Chloride**		**17.7**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Fluoride**		**0.242**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Iron**		**6,330**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Magnesium**		**11,000**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Manganese**		**874**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	Nitrate+Nitrite as N	U	0.02	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	Perchlorate	U	1	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Phosphorus, total**		**0.312**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Potassium**		**6,170**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Sodium**		**26,200**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA248	3384399	**Sulfate**		**9.83**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-17
UMA249	3394172	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Bromide**		**0.245**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Calcium**		**45,800**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Chloride**		**37.5**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Fluoride**		**0.377**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Iron**		**66.9**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Magnesium**		**16,500**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Manganese**		**2.3**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Nitrate+Nitrite as N**		**6.91**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	Perchlorate	J	1.24	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Phosphorus, total**		**0.206**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Potassium**		**6,840**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Sodium**		**36,700**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA249	3394172	**Sulfate**		**38.8**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-31
UMA250	3384397	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Bromide**		**0.207**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Calcium**		**94,100**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Chloride**		**102**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Fluoride**		**0.228**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Iron**		**23.1**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Magnesium**		**35,000**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Manganese**		**12.8**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Nitrate+Nitrite as N**		**20.4**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	Perchlorate	U	1	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Phosphorus, total**		**0.303**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Potassium**		**9,910**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-12

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA250	3384397	**Sodium**		**131,000**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA250	3384397	**Sulfate**		**42.7**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-12
UMA251	3384410	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Bromide**		**2.11**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Calcium**		**192,000**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Calcium**		**199,000**	ug/L		Duplicate	SIMPLOT MW-22
UMA251	3384410	**Chloride**		**225**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Fluoride**		**0.162**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Iron**		**402**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Iron**		**413**	ug/L		Duplicate	SIMPLOT MW-22
UMA251	3384410	**Magnesium**		**56,200**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Magnesium**		**57,400**	ug/L		Duplicate	SIMPLOT MW-22
UMA251	3384410	**Manganese**		**14.6**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Manganese**		**15.2**	ug/L		Duplicate	SIMPLOT MW-22
UMA251	3384410	**Nitrate+Nitrite as N**		**32.3**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Perchlorate**		**13.9**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Phosphorus, total**		**0.113**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Potassium**		**8,980**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Potassium**		**9,180**	ug/L		Duplicate	SIMPLOT MW-22
UMA251	3384410	**Sodium**		**58,500**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384410	**Sodium**		**58,600**	ug/L		Duplicate	SIMPLOT MW-22
UMA251	3384410	**Sulfate**		**176**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22
UMA251	3384411	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Bromide**		**2.07**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Calcium**		**194,000**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Chloride**		**233**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Fluoride**		**0.152**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Iron**		**413**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Magnesium**		**56,500**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Manganese**		**15.4**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Nitrate+Nitrite as N**		**30.6**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Perchlorate**		**14.5**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Phosphorus, total**		**0.113**	mg/L		Duplicate	SIMPLOT MW-22 QA
UMA251	3384411	**Phosphorus, total**		**0.114**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Potassium**		**9,110**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Sodium**		**58,400**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA251	3384411	**Sulfate**		**198**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-22 QA
UMA252	3384412	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Bromide**		**1.98**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Calcium**		**174,000**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Chloride**		**220**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Fluoride**		**0.169**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Iron**		**1,120**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Magnesium**		**52,000**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Manganese**		**62.9**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Nitrate+Nitrite as N**		**34.5**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Perchlorate**		**15.8**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Phosphorus, total**		**0.16**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Potassium**		**8,790**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Sodium**		**52,900**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA252	3384412	**Sulfate**		**187**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-14
UMA253	3384413	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Bromide**		**1.17**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Calcium**		**160,000**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Chloride**		**105**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Fluoride**		**0.18**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Iron**		**6,520**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Magnesium**		**37,500**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Manganese**		**950**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Nitrate+Nitrite as N**		**26.7**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Perchlorate**		**6.89**	ug/L		Duplicate	SIMPLOT MW-40
UMA253	3384413	**Perchlorate**		**6.97**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Phosphorus, total**		**2.98**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Potassium**		**9,630**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Sodium**		**50,400**	ug/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA253	3384413	**Sulfate**		**71.9**	mg/L	9/19/2003	Regular Sample	SIMPLOT MW-40
UMA254	3394169	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Calcium**		**55,900**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Chloride**		**25.9**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Fluoride**		**0.273**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Iron**		**498**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Magnesium**		**19,800**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Manganese**		**35.3**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Nitrate+Nitrite as N**		**7.06**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	Perchlorate	U	1	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Phosphorus, total**		**0.202**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Potassium**		**6,700**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Sodium**		**51,800**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA254	3394169	**Sulfate**		**42.6**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-44
UMA255	3394170	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Calcium**		**61,400**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Chloride**		**50.9**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Fluoride**		**0.289**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Iron**		**294**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Magnesium**		**22,200**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Manganese**		**11.2**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Nitrate+Nitrite as N**		**10.7**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	Perchlorate	U	1	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Phosphorus, total**		**0.14**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-30

Appendix 1
Sample Results
2003 LUB GWMA Synoptic Sampling Event Report

Well ID	EPA Sample ID	Analyte Name	Qualifier	Result	Unit	Date Collected	Sample Type Description	Sample Description
UMA255	3394170	**Potassium**		**6,210**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Sodium**		**58,200**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA255	3394170	**Sulfate**		**34.3**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-30
UMA256	3394173	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Calcium**		**54,000**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Chloride**		**22**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Fluoride**		**0.353**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	Iron	U	10	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Magnesium**		**18,900**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	Manganese	U	1	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Nitrate+Nitrite as N**		**7.59**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	Perchlorate	U	1	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Phosphorus, total**		**0.137**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Potassium**		**5,240**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Sodium**		**63,000**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA256	3394173	**Sulfate**		**40.4**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-25
UMA257	3394171	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	Bromide	U	0.2	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Calcium**		**48,600**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Chloride**		**18.4**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Fluoride**		**0.323**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	Iron	U	10	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Magnesium**		**17,400**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	Manganese	U	1	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Nitrate+Nitrite as N**		**7.53**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	Perchlorate	U	1	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Phosphorus, total**		**0.155**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Potassium**		**5,790**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Sodium**		**59,600**	ug/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA257	3394171	**Sulfate**		**28.9**	mg/L	9/25/2003	Regular Sample	SIMPLOT MW-24
UMA258	3384398	Ammonia (NH3+NH4) as N	U	0.1	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	Bromide	U	0.2	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Calcium**		**70,400**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Chloride**		**101**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Fluoride**		**0.203**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	Iron	U	10	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Magnesium**		**31,700**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Manganese**		**554**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Nitrate+Nitrite as N**		**5.74**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	Perchlorate	U	1	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Phosphorus, total**		**0.097**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Potassium**		**8,930**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Sodium**		**137,000**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA258	3384398	**Sulfate**		**52.3**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-20
UMA261	3384395	**Ammonia (NH3+NH4) as N**		**0.128**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Bromide**		**0.339**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Calcium**		**54,300**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Chloride**		**47**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Fluoride**		**0.174**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Iron**		**77.4**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Magnesium**		**17,900**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Manganese**		**4.1**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Nitrate+Nitrite as N**		**8.04**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Perchlorate**		**2.5**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Phosphorus, total**		**0.0986**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Potassium**		**5,580**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Sodium**		**23,400**	ug/L	9/17/2003	Regular Sample	SIMPLOT MW-11S
UMA261	3384395	**Sulfate**		**37.9**	mg/L	9/17/2003	Regular Sample	SIMPLOT MW-11S

Notes:
U = not detected at the concentration indicated
J = estimated concentration
NA = not analyzed

Appendix 2
Sources of Additional Information for Nitrate and Perchlorate
2003 Synoptic Sampling Event Report

- For more information on nitrate levels and sources in the Lower Umatilla Basin Groundwater Management Area visit the web site http://www.deq.state.or.us/wq/groundwa/LUBGWMgmtArea.htm or contact:
  Phil Richerson (ODEQ)
  (541) 278-4604
  Richerson.Phil@deq.state.or.us

- For general information on drinking water in the Lower Umatilla Basin or the health effects of nitrate, visit the web site http://oregon.gov/DHS/ph/dwp/index.shtml or contact:
  Gary Burnett (ODHS)
  (541) 276-8006 x352
  Gary.F.Burnett@state.or.us

- For general information on perchlorate, enter "perchlorate" in the search box at http://www.epa.gov/

- For general information on perchlorate in the North Morrow Perchlorate Study Area, visit the site http://www.deq.state.or.us/er/perchloratesites.htm or contact:

Sheila Monroe (ODEQ)		Christine Kelly (EPA)
(541) 298-7255 x29	or	(541) 962-7218
Monroe.Sheila@deq.state.or.us		Kelly.Christine@epamail.epa.gov

- Who do I contact regarding nitrate and perchlorate treatment technologies?
  Harry Craig (EPA)
  (503) 326-3689
  Craig.Harry@epa.gov

- Who do I contact regarding perchlorate toxicology or effects on human health?

Julius Nwosu (EPA)		David Stone (ODHS)		Gene Taylor (EPA)
(206) 553-7121	or	(971) 673-0444	or	(206) 553-1389
(800) 424-4EPA		Dave.Stone@state.or.us		Taylor.Gene@epamail.epa.gov
Nwosu.Julius@epa.gov				

- Who do I contact regarding perchlorate levels in the tested soil and water?

David Anderson (ODEQ)		Ken Marcy (EPA)
(541) 388-6146 x258	or	(206) 553-2782
Anderson.David@deq.state.or.us		Marcy.Ken@epamail.epa.gov

- Who do I contact regarding milk and crop sampling for perchlorate?
  Kate Toepel (ODHS)
  (503) 731-4504
  kathryn.toepel@state.or.us

ODEQ = Oregon Department of Environmental Quality
ODHS = Oregon Department of Human Services
EPA = United States Environmental Protection Agency