EG&G MOUND-29-01-10-06-02-9511010033

RESIDENTIAL, MUNICIPAL, AND INDUSTRIAL WELL INVESTIGATION OPERABLE UNIT 9 TECHNICAL REPORT

MOUND PLANT
MIAMISBURG, OHIO

September 1995

(Revision 1)

Department Of Energy

EG&G Mound Applied Technologies

RESIDENTIAL, MUNICIPAL, AND INDUSTRIAL WELL INVESTIGATION OPERABLE UNIT 9 TECHNICAL REPORT

MOUND PLANT
MIAMISBURG, OHIO

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Department Of Energy

EG&G Mound Applied Technologies

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

May 24, 1995

HSF-5J

Mr. Arthur Kleinrath
U.S. Department of Energy
Dayton Area Office
P.O. Box 66
Miamisburg, OH 45343-0066

RE: U.S. DOE Mound Plant
Operable Unit #9
Residential, Municipal, and Industrial
Well Investigation - Technical Report

Dear Mr. Kleinrath:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the Operable Unit #9 (OU9) Residential, Municipal, and Industrial Well Investigation - Technical Report. There are no issues or concerns which U.S. EPA is requiring U.S. DOE to address. Therefore, U.S. EPA will not be submitting any comments on this document. It is U.S. EPA's understanding that the Ohio Environmental Protection Agency will be providing comments regarding this report under separate cover.

Pursuant to our Federal Facility Agreement, a response to comments should be submitted to the regulators within forty-five (45) days of receipt of comments. If you have any questions, please call me at (312) 886-5787.

Sincerely,

Timothy J. Fischer
Remedial Project Manager

cc: Brian Nickel, OEPA
Debbie White, DOE
Monte Williams, EG&G
Jim Rigano, EG&G
Richard Neff, Geotech, DAO
William Rummel, Geotech, DAO

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OhioEPA

State of Ohio Environmental Protection Agency

Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911
(513) 285-6357
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George V. Voinovich
Governor

May 26, 1995

RE: US DOE MOUND
MONTGOMERY COUNTY
OPERABLE UNIT 9
RESIDENTIAL, MUNICIPAL AND
INDUSTRIAL WELL INVESTIGATION
TECHNICAL REPORT

Mr. Arthur Kleinrath
US DOE Miamisburg Area Office
1 Mound Road
P.O. Box 66
Miamisburg, Ohio 45343-0066

Dear Mr. Kleinrath:

The Ohio Environmental Protection Agency has reviewed the *Operable Unit 9 Residential, Municipal and Industrial Well Investigation Technical Report, April 1995.* As per the Federal Facilities Agreement, the document is a secondary document which includes only a regulatory review and comment cycle. As Ohio EPA, US EPA and DOE Mound have agreed, DOE Mound will provide comment responses and make the document and comment responses available to the public.

Should there be any questions concerning the above, please contact Lisa Anderson at (513)285-6051 or me at (513)285-6468.

Sincerely,

Lisa Anderson
for

Brian Nickel
Mound Project Manager
Office of Federal Facilities Oversight

Attachment (1)

cc: T. Fischer, USEPA Region V
M. Williams, EG&G
J. Zahora, EG&G
J. Rigano, EG&G
R. Bendula, SWDO/DDAGW
R. Vandegrift, ODH

US DOE MOUND
OPERABLE UNIT 9
RESIDENTIAL, MUNICIPAL AND INDUSTRIAL
WELL INVESTIGATION
TECHNICAL REPORT
APRIL 1995

Specific Comments:

1. Section 1.1, Page 1, , Last Paragraph:
Typographical error in the final paragraph. The word "form" should be changed to "from".

2. Section 3.1, Page 1 of 8, Paragraph 1:
This paragraph states that field parameters were collected at various different intervals prior to obtaining analytical samples, and that "a final parameter sample" was collected "immediately after the laboratory sample containers were filled". When were field parameters measured in relation to pumping, and which of the measurements in relation to pumping, and which of the measurements were actually recorded and reported? (No changes in text requested.)

3. Section 3, Page 5 of 8, Table III.3:
A) Sample number MND24-0930-0001 and 0002 do not appear on any maps (e.g. Figure 1.2, Section 1.2, page 4 of 5) in this document and also do not appear in Table II.1 (Summary of Sample Location Data) or any other maps or tables in the document. What is sample location 0930?

B) Sample number MND-0948-0002: Temperature reading of 184°C appears to be in error.

4. Section 5.2, Pages 1, 2 and 3:
In this section you state that for radionuclides without EPA Maximum Contaminant Levels (MCL's), "radiological results were compared to DOE drinking water standards". Strontium-90 has an MCL of 8 pCi/L listed in 40 CFR 141.16. Please change this list to incorporate this amount. Also be advised that there are detects of this contaminant above this level listed in Appendix B of this document.

5. Section 5.2, Pages 1, 2 and 3:
Please note that under the current 10 CFR 20 regulations, Maximum Permissible Concentration (MPC) has been replaced by Annual Limit of Intake (ALI).

6. Section 7, Page 1 of 2, Paragraph 1, Number 4:
One of the objectives of this report is stated as the determination of potential contamination of residential wells resulting from plant operations. Where is this summarized in the report?

US DOE MOUND
OPERABLE UNIT 9
RESIDENTIAL, MUNICIPAL AND INDUSTRIAL
WELL INVESTIGATION
TECHNICAL REPORT
APRIL 1995

11. Section 7, Summary:
The first paragraph of the Summary omits the fifth objective of the report which as stated in the Introduction is to "analyze residential well samples to determine if contamination had occurred". This report discusses the concentration results in reference to MCL's for drinking water. However, a comparison of the analytical results found in this study should also be made with the background chemistry established in the *OU9 Groundwater Sweeps Report*.

Responses to Specific Comments of the State of Ohio Environmental Protection Agency, May 26, 1995

1. Section 1.1, Page 1, Last Paragraph:
Typographical error in the final paragraph. The word "form" should be changed to "from."

Response: The word "form" has been changed to "from."

2. Section 3.1, Page 1 of 8, Paragraph 1:
This paragraph states that field parameters were collected at various different intervals prior to obtaining analytical samples, and that "a final parameter sample" was collected "immediately after the laboratory sample containers were filled." When were field parameters measured in relation to pumping, and which of the measurements in relation to pumping, and which of the measurements were actually recorded and reported? (No changes in text requested.)

Response: Wells equipped with pumps were purged before water samples were collected. If the volume of water in a well casing could be measured, three times the casing volume was removed. If the well volume was not known, the well was purged for fifteen minutes. Some wells would begin to go dry before either requirement was met, as shown by turbid water. Purging was discontinued in these cases.

Field parameter samples were collected when the water was turned on, and every five minutes until well purging was completed. Laboratory samples were collected when purging was completed. One final field parameter sample was collected immediately after the laboratory sample was collected.

Field measurements of water pH, conductivity, temperature, dissolved oxygen, and redox potential were recorded for every field parameter sample. These data are provided on the Groundwater Quality Sampling Records in Appendix B.

3. Section 3, Page 5 of 8, Table III.3:
A) *Sample number MND24-0930-0001 and 0002 do not appear on any maps (e.g. Figure 1.2, Section 1.2, page 4 of 5) in this document and also do not appear in Table II.1. (Summary of Sample Location Data) or any other maps or tables in the document. What is sample location 0930?*

Response: Table II.1 is in error. There are no real sample numbers MND24-0930-0001 or MND24-0930-0002. Real sample numbers begin with 0931. The two sample numbers and the data shown were invented when Table II.1 was made to show the desired table format. However, the imaginary sample numbers and data were not removed before the report was issued. The table has been corrected in the report.

B) *Sample number MND-0948-0002: Temperature reading of 184°C appears to be in error.*

Response: The value 184°C has been corrected to read 18.4 °C.

4. Section 5.2, Page 1, 2 and 3:
In this section you state that for radionuclides without EPA Maximum Contaminant Levels (MCL's), "radiological results were compared to DOE drinking water standards". Strontium-90 has an MCL of 8 pCi/L listed in 40 CFR 141.16. Please change this list to incorporate this amount. Also be advised that there are detects of this contaminant above this level listed in Appendix B of this document.

Response: The report text has been corrected to show the 8 pCi/L Maximum Contaminant Level (MCL) for Strontium-90, as listed in 40 CFR 141.6. The tables of sample results presented in Appendix C have also been corrected.

One sample result exceeds the 8 pCi/L MCL for Strontium-90. Sample MND24-0933-0001 was reported to contain 10.6 pCi/L of Strontium-90. The text of the report and the Appendix has been modified to show the detection of the isotope above the MCL.

5. Section 5.2, Pages 1, 2 and 3:
Please note that under the current 10 CFR 20 regulations, Maximum Permissible Concentration (MPC) has been replaced by Annual Limit of Intake (ALI).

Response: This change has been noted.

6. Section 7, Page 1 of 2, Paragraph 1, Number 4:
One of the objectives of this report is stated as the determination of potential contamination of residential wells resulting from plant operations. Where is this summarized in the report?

Response: The potential for contamination of residential wells resulting from Mound Plant operations has been determined by a three-step process (Section 1.2: Project Approach). During Step 1, a derivative mapping procedure was used to evaluate the potential for well and cistern contamination within a two-mile radius of the Mound. A map was made showing the degree (minimal, low, moderate, high, or extreme) of potential contamination from Mound operations (Figure 1.1). The second step included the analysis of samples collected from areas of low to extreme potential impact (Figure 1.2). The third step consisted of a review of the laboratory results, and an evaluation of the occurrence of detected contaminants (Section 6.2). Steps two and three are discussed in greater detail below. Section 7 of the report has been modified to provide more detail on the evaluation process and the conclusions of the evaluation.

All samples were analyzed for organic and inorganic parameters. Organic compounds (volatiles, semivolatiles, pesticides, and PCBs) typically occur in groundwater and cistern water due to human activity. (There are exceptions where organics, particularly semivolatile compounds, occur naturally.) Inorganic analytes (metals, radionuclides, and general chemistry parameters) are found in the natural environment, but can occur at increased levels due to human activity. Because of this difference, the occurences of organic and inorganic contaminants were evaluated differently. The spatial distributions of all organic compounds were evaluated. However, because inorganic analytes occur naturally, only the distributions of *elevated* inorganic concentrations were evaluated. Drinking water standards were used to define elevated inorganic concentrations. This assured the identification of concentrations posing a health concern, and the evaluation of the occurance of the highest concentrations.

The following conclusions were made from the evaluation of organic and inorganic analyte distributions:

a) Analyte concentrations do not increase with proximity to the Mound.

b) The number of detected or elevated analytes does not increase with proximity to the Mound.

c) The concentration and number of analytes are not consistently greater in areas with an increased potential for contamination (determined by derivative mapping).

d) Instead, the occurrence of detected or elevated analytes is sporadic. This sporadic distribution shows that the Mound Plant has had a low potential impact on the wells and cisterns sampled during this study.

7. Section 6.1.1, Pages 3-4, Table VI.2:
Several notable instances occur where undetected parameters in the first round of sampling are found in the second round of sampling. Of particular interest in the second round sampling are downgradient wells 0950 showing previously undetected As, Pb and Se; and well 0932 showing previously undetected As, Cd, Cr, Pb, Hg, Se and U-238. As for wells located upgradient of Mound, of particular interest in the second round sampling are wells 0963 showing previously undetected Uranium isotopes; well 0965 showing previously undetected Pb, Pu-238 and tritium; and well 0959 showing previously undetected Ag and Uranium isotopes. Please discuss in a comment response why this might occur.

Response: The instances presented in the above question cannot be evaluated with the available data. Data shown on Plate 1 show that every sample included analytes that were detected during only one sampling event. The detection of analytes during only the second sampling event is no more notable than the detection of analytes during only the first event.

Laboratory results for the two sampling events can vary for many reasons. These include measurement errors, ambient environmental variability, and contaminant movement through a well or cistern. Measurement errors include variations in sampling techniques (such as well purging rates) and variations in analytical processes. Changing radiological laboratories between sampling events added to the analytical variability. Ambient environmental variability includes changes in groundwater levels and recharge conditions, and changing effects of the Great Miami River on production wells. Cistern water quality will vary with the frequency of rain events, the amount of rain, and contaminants on roofs or in drains (such as paint chips and shingle materials). It is also possible that analyte measurements have varied due to the movement of contaminants from distant sources to the wells and cisterns. However, no single process has been identified that can transport contaminants to both groundwater and cistern water, at sporadic locations, in both upgradient and downgradient directions.

Caution must be used when identifying trends or significant events from too few data points. Because a statistically significant number (~30) of locations were sampled, analyte values at one location can be compared to values at other locations. However, each location was sampled only twice, giving a statistically insignificant number (2) of

measurements through time. Therefore, measurements made during the first sampling event cannot be compared, in a statistically defensible way, to measurements made during the second event.

8. Section 6.3, Pages 10-12, Table VI.4:
The mean concentration values are listed without units. If concentrations are being reported as parts per billion this should be stated in the table.

Response: Table VI.4 has been modified to show the units used for mean analyte concentrations.

9. Section 6.3, Pages 10-12, Table VI.4:
This table lists mean concentrations values for detected analytes found in the study. No comparison of these values to baseline chemistry established at Mound in the Ground Water Sweeps Report is made in this table or any section of the report. Such a comparison reveals several analytes to be above background, including all of the radionuclides. (Comment only.)

Response: There are significant limitations that must be addressed before the residential well and cistern data are compared to the baseline data presented in the groundwater sweeps report. These limitations are:

a) The construction of the residential water systems varies widely, and varies from the monitoring wells used in the sweeps study. Also, wells and cisterns without working pumps contain relatively stagnant water. This stagnant water can be affected by the materials used to construct the wells and cisterns. The effects of well materials, pump component materials, plumbing and solder, etc. cannot be readily identified from the existing data.

b) The integrity of the residential wells and cisterns cannot be assured. Some wells were loosely capped or open, and one well was surrounded by scrap and junk. Flaking paint, roofing materials, waste water, and other potential contaminants have affected some sampled cisterns. Many cistern lids were loose and easily opened without tools. Unsecured wells and cisterns could be deliberately or accidentally contaminated from the surface. These on-site situations cannot be evaluated from available information.

c) The baseline data do not apply to cisterns. Cistern water is not considered groundwater.

d) The baseline data presented in the sweeps report were determined for groundwater samples collected from the Buried Valley Aquifer (BVA). The data do not apply to residential wells completed in the bedrock aquifer.

The report has been modified to include a comparison of the average analyte concentrations for this study to the baseline values of the groundwater sweeps study. Table VI.5 presents average values for each detected analyte for each category of water sampled (BVA wells upgradient from the Mound Plant, downgradient BVA wells, bedrock wells, and cisterns). Baseline values from the sweeps report are also presented. Average analyte values were calculated in the same manner as the baseline values.

Table VI.5 shows that downgradient BVA wells contained ten analytes with average concentrations above the baseline values. These analytes are antimony, cobalt, copper, lead, molybdenum, zinc, plutonium-239/240, strontium-90, thorium-230, and uranium-235/236. However, average values for nine of the ten analytes exceeded baseline values for all types of water samples (upgradient, downgradient, bedrock, and cistern). The average value of the tenth analyte (thorium-230) exceeded the baseline value in upgradient, downgradient, and bedrock wells. Also, five of the ten analytes have greater average concentrations in upgradient BVA wells than in downgradient BVA wells. These analytes are cobalt, lead, zinc, plutonium-239/240, and thorium-230.

It can be concluded that the occurrence of analytes with average concentrations above baseline values is not unique to BVA wells sampled downgradient of Mound Plant.

10. Section 6.3, Pages 10-12, Table VI.4:
This table compares mean sample concentrations for both sampling events to a "percent difference of mean concentration". In this approach the mean is taken for all samples showing a detection of a particular analyte. No regard is made to the sample hydrogeological setting. This mean value is then compared to the "percent difference of mean concentration". This statistical comparison yields no practical insight regarding contaminant transport and could be considered confusing to the general public. A more meaningful comparison should be made. Mound could segregate sample detections according to lithology and hydrogeologic setting rather than grouping all detections together. A mean concentration could then be taken for upgradient and downgradient wells, and for those wells screened in the bedrock or Buried Valley Aquifer. Comparison of these mean values to background concentrations would better assist in determining contaminant migration source areas and preferential pathways.

Response: Contaminant concentration measurements can vary due to many factors, as discussed in response to Item 7. This variability can be measured using values of percent difference (%D is the difference between two results divided by the first result). The percent difference values in Table VI.4 provide insight to the variability of analyte measurements for the two sampling events. Measurements with higher %D values should be considered less precise than measurements with lower %D values.

The comparison of mean analyte concentrations to baseline values is provided above in response to Item 9.

11. Section 7, Summary:
The first paragraph of the Summary omits the fifth objective of the report which as stated in the Introduction is to "analyze residential well samples to determine if contamination had occurred". This report discusses the concentration results in reference to MCL's for drinking water. However, a comparison of the analytical results found in this study should also be made with the background chemistry established in the OU-9 Groundwater Sweeps Report.

Response: The first paragraph of Section 7 has been modified to include the fifth objective as stated in the introduction.

The comparison of mean analyte concentrations to baseline values is previously discussed in response to Item 9.

OhioEPA
State of Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911
(513) 285-6357
FAX (513) 285-6249

George V. Voinovich
Governor

June 2, 1995

RE: US DOE MOUND
MONTGOMERY COUNTY
OPERABLE UNIT 9
RESIDENTIAL, MUNICIPAL AND
INDUSTRIAL WELL INVESTIGATION
TECHNICAL REPORT

Mr. Arthur Kleinrath
US DOE Miamisburg Area Office
1 Mound Road
P.O. Box 66
Miamisburg, Ohio 45343-0066

Dear Mr. Kleinrath:

I am writing in regards to the Residential, Municipal and Industrial Well Investigation Technical Report for OU-9, April 1995. This document reveals the collection of an extensive data base for the water chemistry analysis of municipal and residential wells surrounding the Mound facility. It also fulfills most of the objectives as stated in the introduction. Our comments submitted to you in the letter dated May 26, 1995, specifically comments nine through eleven, are meant to assist Mound in achieving the fifth objective of this investigation, which as stated in the document is to "analyze residential well samples to determine if contamination has occurred." I believe attainment of this objective can be assisted by strengthening the format of the analytical results presented. This can be done by supplementing the report with an additional table in which water samples are compared to background values established in either the Groundwater Sweeps Report for OU-9, or another site investigation report.

You may recall that the wells used to establish background in the Groundwater Sweeps Report obtain water from the buried valley aquifer. Therefore, in order to assist in the comparison of residential wells to background values, water samples should be compared by lithology. Cisterns, which collect meteoric water, should not be averaged in with well samples in this comparison. As for residential wells which obtain water from the bedrock aquifer, a background station has yet to be established for comparison; however, such a location may exist near the bedrock high east of the

Mound facility (Fig. 1).

The question of establishing background for the bedrock aquifer gives rise to several questions. The first is whether or not any of the residential wells sampled in this study obtain water from the bedrock aquifer. To answer this question, lithology of all the sampled wells, and well construction information, including the wells' total depth, should be submitted in this report when known. This information should be submitted either as an appendix to the report or as a table in the report. A suggested format is shown as follows:

Well	Depth	Formation Monitored

In order to assist in establishing a background station, the ground water chemistry of residential wells obtaining water from the bedrock aquifer and the buried valley aquifer should be characterized and compared to the chemistry of the selected background stations. Such a comparison could be aided through the use of trilinear diagrams. The results reported in this report however, do not give results for the major anions sulfate and chloride. It may be possible that these values were sampled for but merely not reported. If they were not sampled for, these parameters could still be sampled. The values for these anion concentrations would assist Mound in determining if the ground water chemistry of selected background stations is of similar chemical character to the residential ground water chemistry being compared.

I would like to schedule a time for a site visit to Mound for reviewal of the laboratory analytical sheets and to discuss any questions or comments you may have regarding this letter.

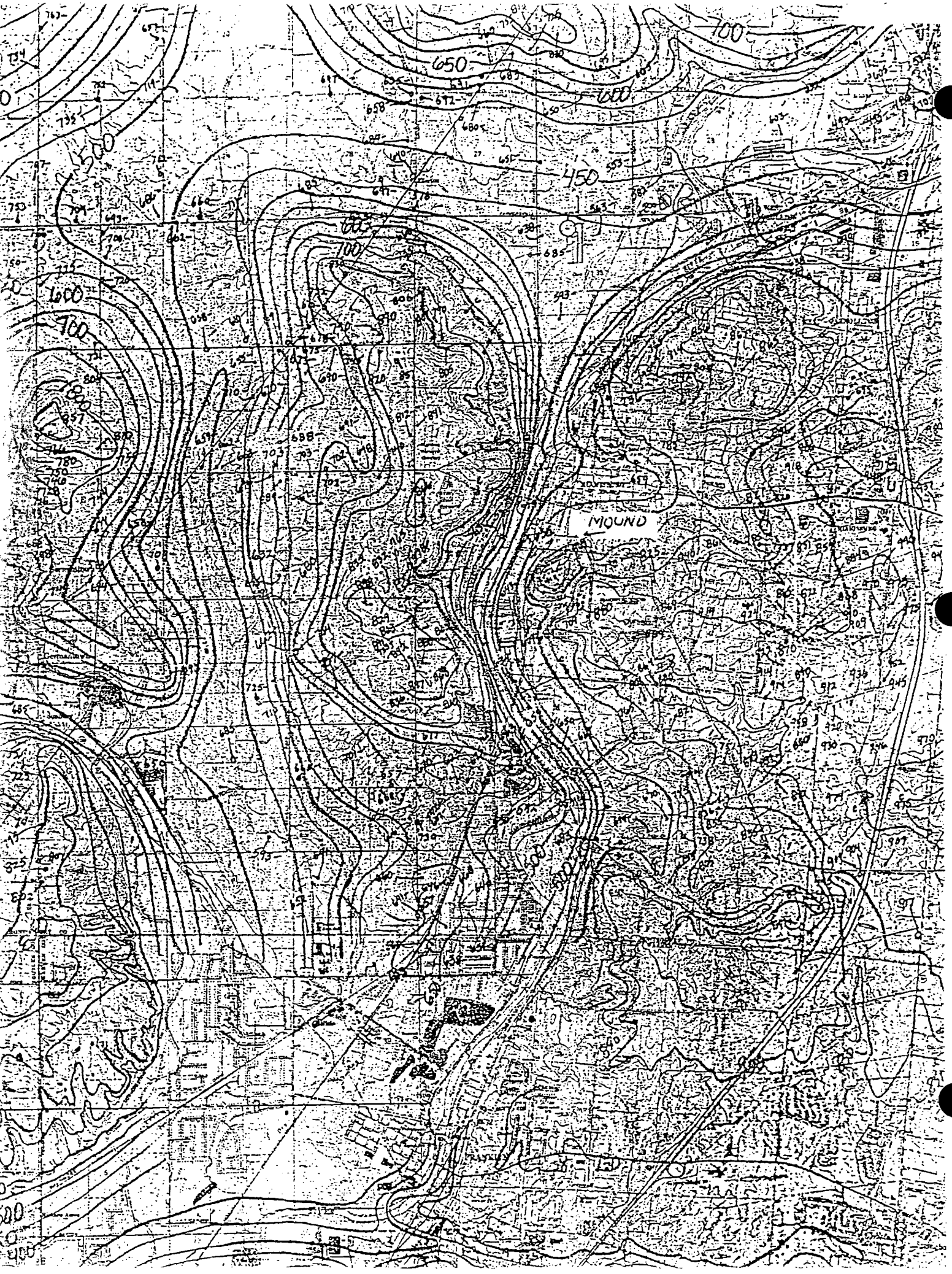
Again, I would like to emphasize that the report submitted reflects a considerable data base of useful information and has adequately addressed most of the objectives stated. I will be glad to offer any assistance I can in helping Mound interpret the ground water quality data with respect to Mound's objectives. If you have any questions please contact me at (513) 285-6468 or Matt Justice at (513) 285-6450.

Sincerely,

Brian Nickel
Mound Project Manager
Office of Federal Facilities Oversight

Attachment (1)

cc: T. Fischer, USEPA Region V
M. Williams, EG&G
J. Zahora, EG&G
A. Bray, EG&G
D. White, DOE
J. Rigano, EG&G
R. Bendula, SWDO/DDAGW
R. Vandegrift, ODH
M. Justice, OEPA
R. Beaumier, DERR/CO


MOUND

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

SEP 08 1995

Mr. Arthur W. Kleinrath
Project Engineer Team Leader
Department of Energy
Ohio Field Office
Miamisburg Area Office
P.O. Box 66
Miamisburg, Ohio 45343-0066

Dear Mr. Kleinrath:

In accordance with your request, the Agency for Toxic Substances and Disease Registry (ATSDR) has reviewed the *Residential, Municipal, and Industrial Well Investigation, Operable Unit 9, Technical Report, April 1995*. As you know, this data is of special importance for the public's health because people drink their well water and private wells are usually not routinely monitored.

When we considered whether the water from the wells and cisterns is safe for use as drinking water, we determined that some of the wells and cisterns have contaminants in them at levels of health concern. However, only one well with contaminants at levels of health concern is used as a source for drinking water. This well (0944) has high levels of lead.

When we considered whether the water from the wells and cisterns is safe for non-potable uses (such as bathing, showering, watering the garden, or washing a car), we determined that all of the wells and cisterns are safe for non-potable uses.

Lead is a widespread public health problem. When ingested, lead interferes with normal cell activity and physiological functions including growth, hearing, and neurological development in children.

ATSDR will ask the Department of Energy and the Combined Health District of Montgomery County to help us contact the owners of well 0944. We recommend that the owners reconfirm that lead is elevated in their water. If this is the case, we recommend that the owners install an appropriate water filtration system if they have not already done so, and that they become knowledgeable in the correct use and maintenance of the water filtration system.

The contaminants we identified in some of the wells and cisterns that would be a health concern if the water is used for drinking include lead, other metals, pesticides, and polyaromatic hydrocarbons (PAHs). Each of these contaminants is wide-spread in the environment and none of them are necessarily a result of activities at the Mound Plant. The radionuclides measured in the water and sediment are not at levels of health concern.

Since we do not know whether any of the wells or cisterns might, at some future date, be put back into use as a drinking water source, we are including a table (enclosed) of those wells and cisterns that have levels of contaminants that are unsafe for drinking. We wish to emphasize that, with the exception of well 0944, none of the wells or cisterns sampled is currently a health concern.

We thank you for the opportunity to comment on this important work in the CERCLA program at the Mound Plant. We hope that our assessment of this data is helpful to you and to the community near the Mound Plant. Please do not hesitate to telephone me at (404)639-6035 or write me at 1600 Clifton Road NE, Mailstop E-56, Atlanta, Georgia 30333, if you have further questions or concerns.

Sincerely yours,

William H Taylor

William H. Taylor, Ph.D.
Chemist, Energy Section B
Federal Facilities Assessment Branch
Division of Health Assessment
and Consultation

Enclosure

cc:
Tom Hut, Combined Health District of Montgomery County
Brian Nickel, OEPA
Tim Fischer, US EPA
John Weithofer, City of Miamisburg
M.E.S.H.

Contaminants Found in Private Wells and Cisterns
at Levels of Health Concern for Drinking.[a]

	lead	pesticides	other metals	PAHs
Water Samples				
well 0944	✓			
well 0946	✓			
well 0952	✓			
well 0953	✓			
cistern 0932	✓			
cistern 0933		✓		
cistern 0935		✓		
cistern 0936	✓			
cistern 0938		✓		
Sediment Samples				
cistern 0935	✓	✓	✓	✓
cistern 0937	✓	✓	✓	✓
cistern 0951	✓		✓	✓

[a] Data reviewed by ATSDR from the *Residential, Municipal, and Industrial Well Investigation, Operable Unit 9, Technical Report, Mound Plant, Miamisburg, Ohio, April 1995.*

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PREFACE

The U.S. Department of Energy (DOE), Miamisburg Area Office, oversees the operation of the Mound Plant in Miamisburg, Ohio. The plant, which started operation in 1949, is operated by EG&G Mound Applied Technologies. Currently, the facility supports the DOE weapons and energy programs by performing research, development, and production.

On 21 November 1989, the U.S. Environmental Protection Agency (EPA) placed the Mound Plant on the National Priorities List due to historical disposal practices and releases of chemicals to the environment. The National Priorities List identifies sites to be examined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund). DOE signed a CERCLA Section 120 Federal Facility Agreement with the EPA and later with the Ohio EPA. The agreement requires that DOE investigate the magnitude of chemical releases and take appropriate remedial actions. DOE assigned these duties to the Environmental Restoration (ER) Program.

The ER Program's responsibilities are divided among six operable units. Operable Unit 1 involves investigation and remediation of the historic Site Sanitary Landfill. Operable Unit 2 includes investigation and remediation of environmental problems on the Main Hill at the Mound Plant. Operable Unit 4 includes addressing releases of plutonium to the Miami-Erie Canal adjacent to the plant. Examining and remediating the South Property is assigned to Operable Unit 5. Operable 6 consists of overseeing the Decontamination and Decommissioning Program, and Operable Unit 9 involves investigating the possibility of chemical release beyond the plant boundary and items of common interest among all operable units. The ER Program has eliminated Operable Units 3, 7, and 8 by reassigning those responsibilities to the other operable units.

ACKNOWLEDGEMENTS

This work was accomplished under the direction of Mr. Arthur Kleinrath of the U.S. Department of Energy (DOE). Mr. Kleinrath is the Remedial Project Manager for the Environmental Restoration Program at the Mound Plant.

The Residential Well Investigation Team consisted of personnel form DOE Miami Area Office (policy guidance), EG&G Mound Applied Technologies (program management and technical assistance), Terran Corporation (project management, field sampling, laboratory liaison, data validation, and reporting), Weston Analytics Division (chemical analyses), IT Analytical Services (radiological analyses), CompuChem Environmental Corporation (radiological analyses), and The Labyrinth Group (data validation).

Mr. James N. Rigano is the Operable Unit 9 Manager for EG&G. Report review and consultation were provided by Mr. James N. Rigano and Dr. Daniel G. Carfagno.

Mr. Roger W. McCready was the Project Manager for Terran Corporation during the sampling and analysis program, and during the reporting phase. Mr. Mark J. Howell was the field team leader and lead report author. Mr. Joe Solch and Mr. John Garrett of Analytical Innovations, Inc., and Mr. John D. Pavlik contributed to the chemistry and data assessment activities.

1. INTRODUCTION

The residential well and cistern study was implemented as part of the Operable Unit 9 (OU-9) site-wide remedial investigation. The goal of the residential study was to evaluate possible off-site contamination of residential wells and cisterns due to historical Mound Plant operations. To achieve this goal, the U.S. Department of Energy (DOE) agreed to collect available data on drinking water supply wells and cisterns near Mound Plant. The objectives of the study were defined in the OU-9 Work Plan (DOE 1992) as follows:

1. Determine the number and location of municipal, industrial, and domestic supply wells within a two-mile radius of Mound Plant.

2. Determine the location of cisterns within a two-mile radius of Mound Plant.

3. Compile information on the completion, construction and use of the residential wells; and any previous chemical analyses conducted on the residential well water.

4. Determine the potential for contamination of residential wells resulting from plant operations.

5. Analyze residential well samples to determine if contamination had occurred.

1.1. BACKGROUND

Residential water supply wells within a 2-mile radius of Mound Plant are completed in either an alluvial aquifer or a bedrock aquifer. The alluvial aquifer consists of glacial sediments that fill a bedrock valley beneath the Great Miami River floodplain. It is also called the Buried Valley Aquifer (BVA), and is a prolific source of water. The bedrock aquifer consists of thin-bedded limestones and clayey shales. Although it supplies considerably less water than the alluvial aquifer, it is the only available water source at some locations. Detailed evaluations of the aquifers are provided in two hydrogeologic investigation reports: *Bedrock Report* (DOE 1994a) and *Buried Valley Aquifer Report* (DOE 1994d).

Six production wells were included in this investigation. The Jefferson Regional Water Authority (JRWA) and the City of Miamisburg produce drinking water from wellfields within the vicinity of Mound Plant. The city also uses a production well to fill a swimming pool at the community park on Dayton-Cincinnati Pike. Dayton Power and Light Company operates a wellfield south of the Mound to supply cooling and drinking water for their power generation plant. All of these high-capacity production wells are completed in the BVA aquifer.

The residential wells are completed in both the alluvial aquifer and the bedrock aquifer. Wells completed in the alluvium are typically screened in sandy or gravelly units. Bedrock wells are constructed with steel casing installed through the unconsolidated units and into the underlying bedrock, and an open hole extending into bedrock. Most of the wells are used for potable water supplies. Well water quality can be affected by contaminants that originate on or off of the property. Contaminants that originate off of a property can be transported to wells by ground water. Contamination that can originate on a property include heating oil spills, septic systems, lead packing for well casings, soldered piping, and well pump materials.

The residential cisterns are primarily recharged by rainfall. Rain is collected from the roofs of houses and is channeled to the cisterns through gutters, downspouts, and often underground drainage tile. It is possible that some water may seep through the cistern walls and floor, either allowing rainwater to drain from the cistern, or allowing ground water to enter the cistern. The cisterns are built of stone or concrete, and vary in size, depth and capacity. Airborne contaminants originating from locations away from a property can be washed into a cistern during rainfall events. Cistern water quality can

also be affected by contaminants originating form the property itself. Such contaminants may include roofing materials; soldered gutters, downspouts, or piping; flaking paint; or waste material dumped into the cistern.

1.2. PROJECT APPROACH

The number and location of residential wells and cisterns within a 2-mile radius of the Mound was determined by document review and public solicitation (DOE 1993a). Public information sources were used to identify well and cistern locations. The sources included the Ohio Department of Natural Resources, Ohio Environmental Protection Agency (OEPA), Miami Conservancy District, Montgomery County Combined Health District, Montgomery County Office of Taxation, and the City of Miamisburg. The public was solicited for information by newspaper advertisements and public meetings. Newspaper advertisements appeared in the *Dayton Daily News* one time, and the *Miamisburg/West Carrollton News* three times. These methods resulted in the identification of 216 wells and fourteen cisterns within a 2-mile radius of the Mound.

A derivative mapping procedure was used to select a group of wells and cisterns for sampling (DOE 1993a). The areas of potential impact resulting from Mound Plant operations were estimated using soil analyses for plutonium-238, prevailing wind directions, potential groundwater yields, and groundwater gradients. Maps were developed for each parameter to show areas of higher and lower susceptibility of contamination due to Mound Plant operations. Each parameter map was combined to form a group map that showed the areal distribution of the combined potential impact areas. The areas on the group map (derivative map) were assigned extreme, high, moderate, low or minimal susceptibilities of contamination (Figure 1.1).

Results of the well and cistern survey, and the derivative map were used to select thirty-five wells and nine cisterns for sampling (DOE 1993a). Sampling locations were chosen from each level of contamination susceptibility, with greater sampling density (samples per unit area) in zones of greater potential impact. Potable water wells and cisterns were weighted more than non-potable water sources. The U.S. Environmental Protection Agency, OEPA, and EG&G Environmental Restoration (ER) personnel approved the selected sampling locations. An EG&G Mound contractor (Weston) contacted the well and cistern owners to gain access for sampling. Eighteen residents of the City of Miamisburg granted permission to sample their wells or cisterns. Access was also granted for five municipal wells, one industrial well, and nine cisterns (Figure 1.2). Construction diagrams for the sampled wells and cisterns are provided in Appendix A.

An EG&G Mound environmental restoration contractor (Terran Corporation) contacted each property owner to schedule an initial site visit in January, 1994. The purpose of the initial visit was to familiarize the occupants with the sampling process, to inspect the well or cistern, to identify any filters or water treatment systems, to evaluate the accessibility for sampling, and to schedule the first sampling visit. Water and sediment samples were collected during two sampling events; one in January/February 1994, and one in August/September 1994. The samples were analyzed for chemical and radiological parameters in accordance with the OU-9 Quality Assurance Project Plan (QAPP). Laboratory data packages were reviewed and validated according to QAPP specifications.

1.3 SCOPE OF REPORT

This report provides documentation of the methods used during the collection and analysis of residential water and sediment samples, the methods and findings of the analytical laboratory data validation, and the results of the chemical and radiologic analyses of the collected samples. In providing this documentation, this report will demonstrate compliance with the objectives of the OU-9 Work Plan and OU-9 QAPP.

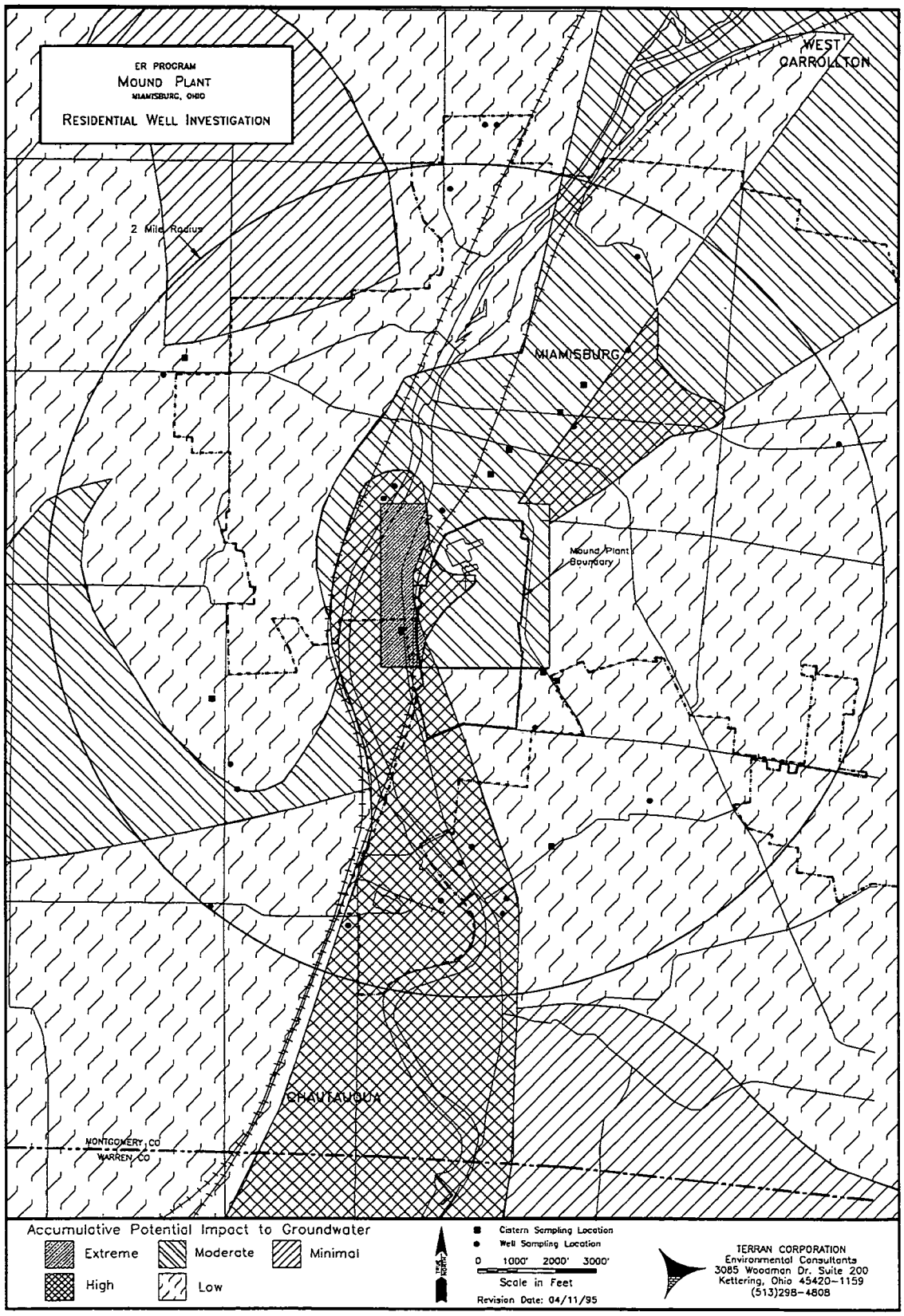

Figure 1.1. Derivative mapping results showing cumulative potential impact to ground water.

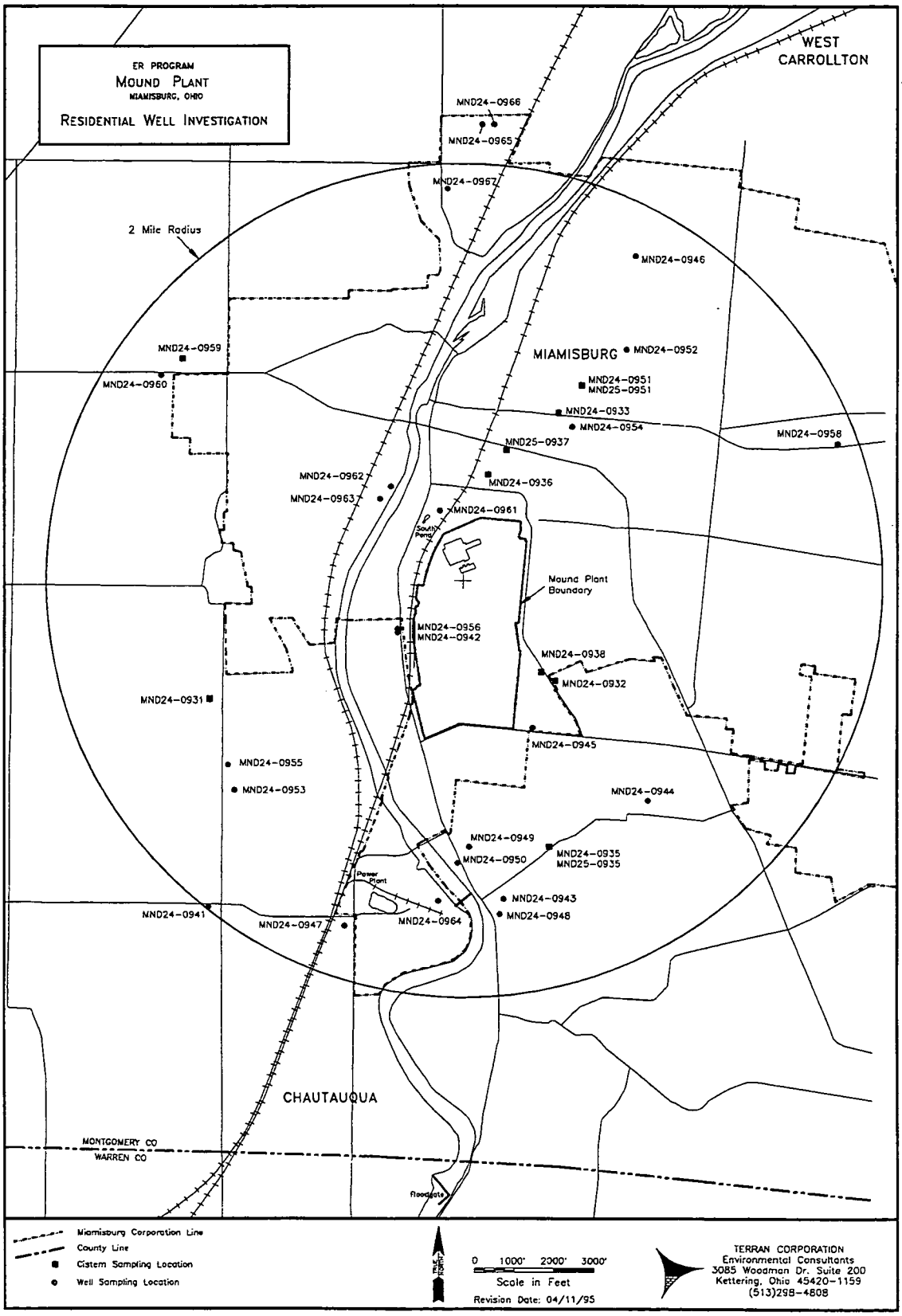

Figure 1.2. Residential well and cistern locations and two mile radius from Mound Plant.

This report includes six sections:

1.0 **Introduction:** (This section.)

2.0 **Field Program:** Section 2.0 provides a discussion of the initial site visits, documents sample collection methods, applicable Standard Operating Procedures (SOPs) used by the field team, sample identification numbering, field Quality Control (QC) sampling, and deviations from the QAPP protocol.

3.0 **Sample Analysis Program:** This section provides documentation of both field parameter measurements and laboratory analyses. Analytical methods, laboratory QC analyses, and data reporting are documented and discussed. Variances from the specified methods are identified and assessed.

4.0 **Laboratory Data Validation:** This documents the validation of laboratory data packages in accordance with the OU-9 QAPP. Deviations from the QAPP requirements are specified.

5.0 **Data Quality Assessment:** Documentation of the attainment of the OU-9 QAPP completeness goals is presented in this section. The evaluation of data useability is also discussed.

6.0 **Analytical Laboratory Results:** Qualified laboratory results are summarized in tables showing detected parameters for both sampling events. The tables also provide Maximum Contaminant Levels (MCLs), Secondary MCLs, Lifetime Health Advisories, and Department of Energy guidelines for the detected parameters.

7.0 **Summary:** Discussions of the analytical results and their variation between sampling locations and sampling events are provided. Maps are presented to show the distribution of detected parameters within the study area.

This document references other reports that provide supplemental detail of the residential sampling program. The *Residential Well/Cistern Survey Task Summary* (DOE 1993a) documents the survey of well and cistern locations and the development of the derivative map. The data validation reports for the two sampling events (DOE 1994c and 1994e) provide documentation of the data validation procedures, validation results, tabulated outlier summaries, analytical results, laboratory case narratives, and custody documents.

2. FIELD PROGRAM

Each sampling location was visited three times: once for an initial meeting with the resident or operator, and once for each of the two sampling events. Initial site visits took place during January 1994. The first sampling event occurred in January and February 1994; the second sampling event was in August and September, 1994.

2.1. INITIAL SITE VISIT

An EG&G contractor (Terran Corporation) contacted each participating well and cistern owner by telephone to arrange for an initial site visit. Visits were scheduled for thirty locations between January 13, 1994 and January 23, 1994. Because access agreements were still being obtained during this time period, one residence was not visited before the first sampling event.

Two Terran employees visited each location to meet with the resident and discuss how the sampling would take place, to determine the well or cistern configuration, and to locate the best sampling point. Site sketches were made during the visit to document the location of the best sampling point, the location and use of filters or treatment devices, and other pertinent details. Also, a date for the first sampling event was scheduled during the visit. Each resident or operator was provided with the phone numbers of EG&G Mound representatives and the Terran personnel, so they could call to re-schedule a meeting or ask questions.

2.2. FIRST SAMPLING EVENT

Terran Corporation employees collected thirty-two water samples and two sediment samples between January 31 and February 21, 1994. During the first sampling event, water samples were collected from eighteen residential wells, six production wells and eight cisterns. One cistern was dry (0937), and only a sediment sample was obtained. Only two other cisterns (0935 and 0951) had the physical construction and sufficient quantities of sediment to allow the collection of sediment samples.

2.3. SECOND SAMPLING EVENT

The second sampling event occurred from August, 25 to September 4, 1994. Thirty water samples and three sediment samples were collected. One well and one cistern were not sampled during the second event. Well number 0946 was not sampled because the property was sold and an access agreement was not obtained from the new property owner. Cistern number 0931 was not sampled because it was filled with soil sometime after the first sampling event.

2.4. SAMPLE COLLECTION METHODS

All well and cistern samples were collected in accordance with the following Standard Operating Procedures (SOPs) from the OU-9 QAPP:

1.1 General Instructions for Field Personnel
1.3 Sample Control and Documentation
1.4 Sample Containers and Preservation
1.5 Guide to the Handling, Packaging, and Shipping of Samples
1.6 General Equipment Decontamination
1.7 Personnel Decontamination - Level D Protection
2.1 Presample Purging of Wells
2.2 Field Measurements on Ground and Surface Water Samples
2.4 Sampling Commercial/Municipal/Domestic Wells
2.8 Sampling for Volatile Organics
3.1 Water Level Measurement

Water levels in the sampled wells and cisterns were measured only if permission was granted by the resident. However, due to their physical condition, some wells could not be opened without risking damage to the bolts or caps. The field crew did not attempt to open such wells in these circumstances. The physical configuration of some wells and cisterns prohibited access for water level measurements. These restrictions included obstacles at the wellhead such as porches or decks, lack of access ports in production wells, access openings that were stuck in place, and subsurface wellhead completions.

Water levels and well depths were measured with a decontaminated electric water level indicator (Slope Indicator® standard model). Well volumes were calculated for each well where water level measurements and well depths were available. Some wells presented a risk of tangling the water level indicator in the well pump wiring or plumbing. Total depths were not measured from these wells at the discretion of the field crew.

Sampling points were selected to allow the collection of a water sample that had not passed through filters, softeners, water heaters, or other treatment devices. The water stream for many samples did pass through pressure tanks, but these tanks could not be bypassed without plumbing alterations. All production wells were sampled at the wellhead before chlorination or other water treatment. A filter constructed of sand-filled concrete blocks divides the cistern at location 932. Due to access limitations, the water sample was collected from the filtered side of the cistern. Table II.1 provides a description of each sampling point, the well or cistern construction, and comments pertaining to possible sources of contamination. Additional detail of well and cistern construction, including well logs, is provided in the residential well/cistern survey report (DOE 1993a).

Three wellhead vaults at production wellfields met the criteria for confined spaces. The crew that sampled the vaults was in accordance the requirements of 29 CFR 1910.146. Dayton Power & Light Company's well #5 was selected for sampling because it was the only well that was not chlorinated at the wellhead. Therefore, a sample could be collected at the wellhead without respiratory protection.

2.4.1. Sample Identification

Sample numbers were assigned according to the OU-9 QAPP scheme. During the course of the residential well/cistern sampling program, the Mound Environmental Restoration Program implemented a sequential sample numbering scheme, resulting in a second set of sample numbers for both sampling events. Also, as required by the OU-9 Work Plan, sector designations were determined for each sample location. The sectors were based on the distance and compass bearing of a location from a reference point at Mound Plant (Figure 2.1). Table II.2 presents a correlation of the sample numbers according to the QAPP numbering scheme, the sequential numbering scheme for EG&G ER contractors, and the distance/bearing coordinate scheme.

Table II.1. Summary of Sample Location Data

Sampling Location	Sample Collection Point	Sampling Method	Well/Cistern Construction	Comments
Residential Wells				
0941	outdoor faucet, approximately 5 feet from driveway and fence	sampled directly from faucet	6-inch diameter steel casing, total depth unknown, submersible pump	
0942	outdoor faucet on rear wall of house, inside of fenced area	sampled directly from faucet	6-inch diameter steel casing with brass screen, 52 feet deep, submersible pump	
0943	cold water faucet in garage sink	sampled directly from faucet	6-inch diameter steel casing, 68 feet deep, submersible pump	
0944	outdoor faucet at rear of house, approximately 10 feet from garage	sampled directly from faucet	6-inch diameter steel casing, 120 feet deep, new well casing installed inside of old casing, annulus gravel-packed, submersible pump	possible use of lead packer between old and new well casings or screens
0945	outdoor faucet near front porch	sampled directly from faucet	6-inch diameter steel casing, 120 feet deep, submersible pump	
0946	uncapped well casing approximately 10 feet north of house	sampled with decontaminated stainless steel bailer	6-inch diameter steel casing, 90 feet deep, no pump, open casing covered with aluminum pot	possible fuel oil tank fill pipe at house, well between house and in-ground pool
0947	cold water faucet in kitchen	sampled directly from faucet	6-inch diameter steel casing, 45 feet deep, submersible pump	aboveground and possible underground petroleum storage tanks on property
0948	outdoor faucet on south side of house, in bushes	sampled directly from faucet	6-inch diameter steel casing, 95 feet deep, wellhead in below-ground vault, submersible pump	
0949	cold water faucet, 1st floor bathtub	sampled directly from faucet	unknown casing construction, casing perforated at 60 - 65 feet, unknown pump type	house built around 1812, possible lead piping
0950	outdoor faucet in front corner of house near garage	sampled directly from faucet	6-inch diameter steel casing, 50 feet deep, submersible pump	
0952	faucet in backyard at top of creek bank, near electronic bug killer on post north of garage	sampled directly from faucet	6-inch diameter steel casing, depth unknown, submersible pump	well completed near creek

Table II.1. Summary of Sample Location Data (cont.)

Sampling Location	Sample Collection Point	Sampling Method	Well/Cistern Construction	Comments
Residential Wells (cont.)				
0953	well casing extending above abandoned concrete structure, approximately 10 feet from carport	sampled with decontaminated stainless steel bailer	6-inch diameter steel casing, 54 feet deep, installed through concrete subgrade structure, no pump	concrete structure contains automotive parts and other items
0954	basin approximately 3 feet from rear deck stairs, under lid with downspout inlet	sampled with decontaminated stainless steel bailer	brick dug well, 23 feet deep, estimated 5-foot diameter, steel plate cover, receives rain water from downspout, no pump	
0955	outdoor faucet at side of house near deck	sampled directly from faucet	casing is galvanized pipe, depth unknown, pump in basement	
0956	outdoor faucet, east side of house near front porch	sampled directly from faucet	6-inch diameter steel casing, 72 feet deep, submersible pump	possible fuel oil tank fill pipe at house
0967	outdoor faucet near front door	sampled directly from faucet	6-inch diameter steel casing, 72 feet deep, submersible pump	
0958	outside faucet between front door and garage door	sampled directly from faucet	unknown construction, unknown depth, centrifugal pump in basement	fuel oil tank in basement
0960	outside faucet, south of front door	sampled directly from faucet	unknown construction, unknown depth, unknown pump type	
Production Wells				
0961	discharge pipe to South Pond	grab sample collected from discharge to South Pond	steel casing, unknown completion depth, vertical turbine pump	
0962	large diameter discharge pipe at base of well house	sampled from valve at wellhead	steel casing, unknown completion depth, vertical turbine pump	
0963	sampling tap inside wellhead enclosure	sampled from valve at wellhead	steel casing, unknown completion depth, vertical turbine pump	
0964	sampling tap inside wellhead enclosure	sampled from valve at wellhead	26-inch diameter steel casing, 120 feet deep plus 30-foot screen, vertical turbine pump	

Table II.1. Summary of Sample Location Data (cont.)

Sampling Location	Sample Collection Point	Sampling Method	Well/Cistern Construction	Comments
Production Wells (cont.)				
0965	sampling tap inside wellhead enclosure	sampled from valve at wellhead	12-inch diameter casing with 15-foot stainless steel screen, 115 feet deep, vertical turbine pump	
0966	sampling tap inside wellhead enclosure	sampled from valve at wellhead	12-inch diameter casing with 15-foot stainless steel screen, 100 feet deep, vertical turbine pump	
Cisterns				
0931	cistern access nearest decorative well, 11-feet from rear house wall	sampled with decontaminated stainless steel bailer (unable to sample sediment due to low sediment volume and mass of tree roots)	concrete block construction, dimensions 5 ft x 8 ft x 4 ft	
0932	2-inch diameter port to cistern with wooden plug, near wall of flower box, rear of house	sampled with decontaminated stainless steel bailer (no access to sample sediment)	poured cement construction with filter wall, 10,000-gallon capacity, pump in pit, dimensions unknown	possible fuel oil tank fill pipe approximately 25 feet from cistern
0933	cistern at rear of house	sampled with decontaminated stainless steel bailer (insufficient volume to sample sediment)	concrete cistern with loose cast iron lid, approximately 10 feet deep, other dimensions unknown, no pump	
0935	cistern beneath washer in utility room	stainless steel bailer (water) and Eckman™ dredge (sediment)	cement cistern with plywood cover, approximately 8 feet deep, other dimensions unknown, beneath washing machine, no pump	may receive overflow water from utility sink or washing machine
0936	cistern near side gate, south side of house	sampled with decontaminated stainless steel bailer (no sediment)	cement cistern with loose cast iron lid, 10 - 12 feet deep, other dimensions unknown, no pump	
0937	southmost cistern access from house	sediment sample collected with new polyethylene sample bottle on extendable handle. Cistern dry, no water sample	brick-lined cistern with cement ridge, estimated 10 feet deep, other dimensions unknown.	house repainted in past few years, old paint chips likely washed to cistern

Table II.1. Summary of Sample Location Data (cont.)

Sampling Location	Sample Collection Point	Sampling Method	Well/Cistern Construction	Comments
Cisterns (cont.)				
0938	cistern approximately 5 feet west of rear wall of house	sample with decontaminated stainless steel bailer (insufficient volume to sample sediment)	estimated 12-inch diameter casing installed in floor of below-grade chamber, no pump	
0951	cistern approximately 5 feet south of house	stainless steel bailer (water) and new polyethylene sample bottle on extendable handle (sediment)	unknown cistern construction, loose cast iron lid, unknown dimensions, no pump	
0959	near pump in basement, valve plumbed to 1/2-inch copper piping from pump	sampled directly from faucet (no access to check sediment)	poured-cement construction, dimensions 10 ft x 10 ft x 8 ft , pump in basement	

Table II.2. Correlation of Sample Numbers and Location Sector Coordinates

FIRST SAMPLING EVENT		SECOND SAMPLING EVENT		Sector / Distance Coordinate
OU-9 Site-Wide Sample Number	Sequential Sample Number*	OU-9 Site-Wide Sample Number	Sequential Sample Number*	
MND24-0931-0001	M901-59	Not Sampled Second Event		SW - 1.4
MND24-0932-0001	M901-47	MND24-0932-0002	M901-163	SE - 0.6
MND24-0933-0001	M901-102	MND24-0933-0002	M901-152	NE - 0.9
MND24-0935-0001	M901-71	MND24-0935-0002	M901-172	S - 1.5
MND25-0935-0001	M901-74	MND25-0935-0002	M901-175	S - 1.5
MND24-0936-0001	M901-53	MND24-0936-0002	M901-154	N - 0.5
MND25-0937-0001	M901-81	MND25-0937-0002	M901-180	N - 0.7
MND24-0938-0001	M901-134	MND24-0938-0002	M901-192	SE - 0.7
MND24-0941-0001	M901-142	MND24-0941-0002	M901-170	SW - 2.0
MND24-0942-0001	M901-144	MND24-0942-0002	M901-188	SW - 0.4
MND24-0943-0001	M901-107	MND24-0943-0002	M901-157	S - 1.5
MND24-0944-0001	M901-46	MND24-0944-0002	M901-151	SE - 1.4
MND24-0945-0001	M901-90	MND24-0945-0002	M901-155	S - 0.8
MND24-0946-0001	M901-52	Not Sampled Second Event		NE - 1.8
MND24-0947-0001	M901-98	MND24-0947-0002	M901-166	S - 1.8
MND24-0948-0001	M901-88	MND24-0948-0002	M901-210	S - 1.6
MND24-0949-0001	M901-61	MND24-0949-0002	M901-161	S - 1.3
MND24-0950-0001	M901-119	MND24-0950-0002	M901-167	S - 1.4
MND24-0951-0001	M901-101	MND24-0951-0002	M901-202	NE - 1.1
MND25-0951-0001	M901-100	MND25-0951-0002	M901-208	NE - 1.1
MND24-0952-0001	M901-91	MND24-0952-0002	M901-195	NE - 1.4
MND24-0953-0001	M901-124	MND24-0953-0002	M901-179	SW - 1.5
MND24-0954-0001	M901-104	MND24-0954-0002	M901-186	NE - 0.8
MND24-0955-0001	M901-111	MND24-0955-0002	M901-216	SW - 1.4
MND24-0956-0001	M901-146	MND24-0956-0002	M901-181	SW - 0.4
MND24-0958-0001	M901-64	MND24-0958-0002	M901-197	E - 1.9
MND24-0959-0001	M901-55	MND24-0959-0002	M901-217	NW - 1.7
MND24-0960-0001	M901-63	MND24-0960-0002	M901-205	NW - 1.8
MND24-0961-0001	M901-117	MND24-0961-0002	M901-214	NW - 0.4
MND24-0962-0001	M901-135	MND24-0962-0002	M901-227	NW - 0.6
MND24-0963-0001	M901-132	MND24-0963-0002	M901-222	NW - 0.6
MND24-0964-0001	M901-112	MND24-0964-0002	M901-196	S - 1.6
MND24-0965-0001	M901-129	MND24-0965-0002	M901-220	N - 2.2
MND24-0966-0001	M901-128	MND24-0966-0002	M901-224	N - 2.2
MND24-0967-0001	M901-131	MND24-0967-0002	M901-183	N - 1.9

* EG&G Environmental Restoration Contractor Sequential Sample Number

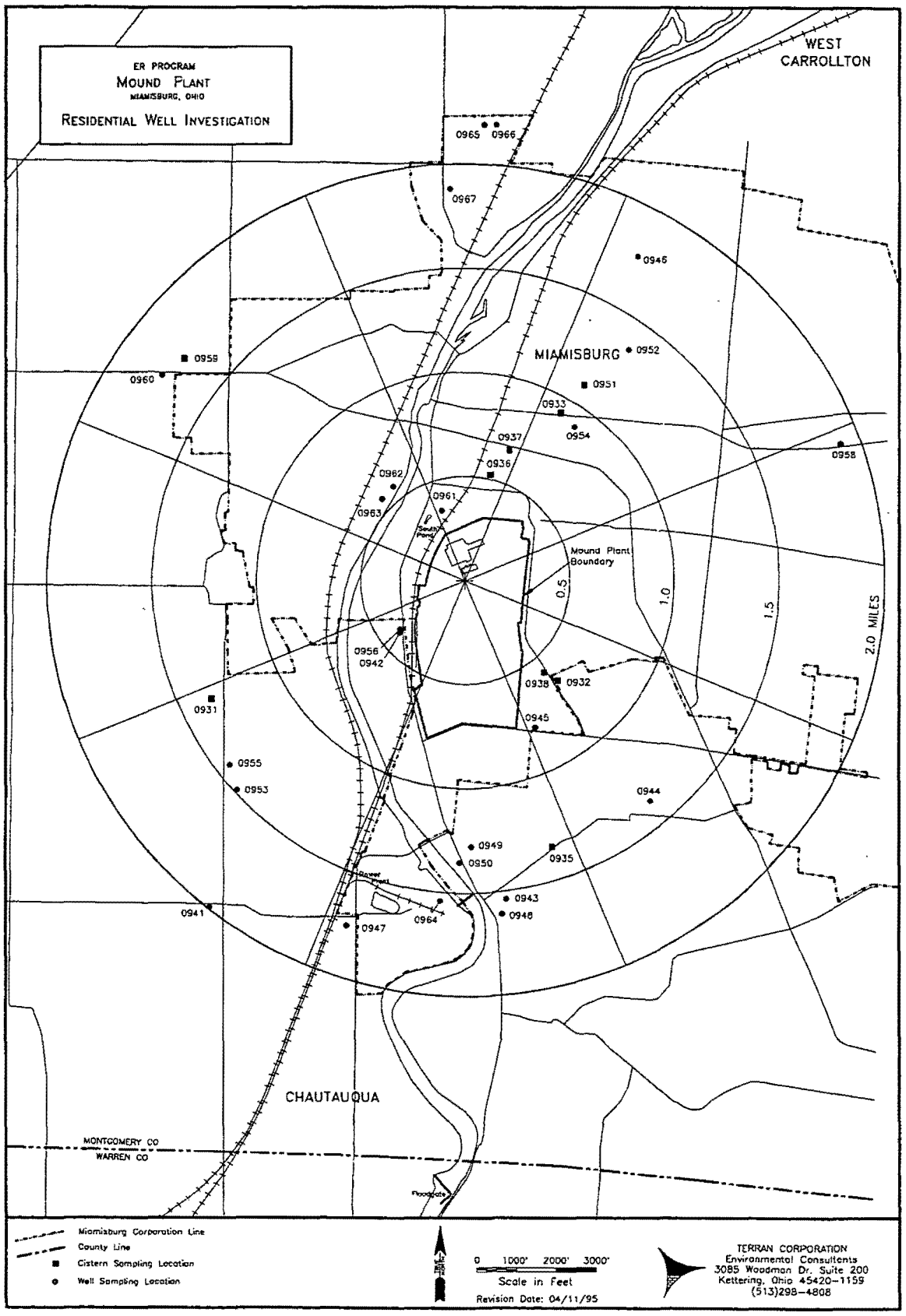

Figure 2.1. Sector grid and sampling locations.

2.4.2. Field Quality Control Samples

Table II.3 shows that field quality control samples were collected at the frequency required by the OU-9 work plan (shown below). One equipment blank was collected for every ten locations where sampling equipment was used.

Field Duplicates	number:	One for every 10 samples collected
	analysis:	Water or sediment parameter list
Trip Blanks	number:	One per cooler containing VOC
	analysis:	VOCs
Field Ambient Blanks	number:	One for every 10 samples collected
	analysis:	VOCs
Equipment Rinsate Blanks	number:	One for every 10 samples collected
	analysis:	Water or sediment parameter list
Matrix Spike/M.S. Duplicate	number:	One for every 10 samples collected
	analysis:	Water or sediment parameter list

2.4.3. Sampling Procedures

Most of the water samples were collected from an indoor or outdoor faucet. Water samples from cisterns and wells without operable pumps were collected with stainless steel bailers. New polypropylene or nylon rope was tied to the bailers before each use. Cistern sediment samples were collected with a Widco-Ekman bottom dredge, or with new, clean polyester sample bottles that were cut and fitted to the end of an extension handle. Table II.1 shows the sampling method used at each sampling point.

Residential wells were purged of three well volumes when well volumes were known. Otherwise, they were allowed to run for fifteen minutes or less if the flow rate began to decrease significantly. Production wells were typically pumped for twenty to thirty minutes before sampling. The production well at the city water park was pumped to the South Pond for fifteen minutes before the samples were collected. The shorter pumping period was necessary because the well started to fill the City swimming pool through the pool drain. Cisterns were not purged before sampling.

Preservatives were added to the sample containers in the field. The analytical laboratories provided each type of preservative in sealed glass ampules. A separate sample fraction was collected at each location to confirm that adequate amounts of preservative were added to the containers. Samples were placed on ice in a laboratory cooler and shipped to the laboratories at the end of each field day. The coolers were typically delivered overnight by Federal Express. However, during the first sampling event, severe winter weather conditions resulted in the delivery of one cooler two days after sample collection. Another cooler was lost and not delivered until one week after sample collection. Because of these delivery problems, samples that were collected on Friday, February 11 were held over the weekend before shipping, resulting in the expiration of the nitrite holding times.

Some locations were resampled due to errors made by the field team, problems encountered during shipping, or the condition of the samples upon receipt at the laboratory. These circumstances included improper sample preservation, labeling problems, broken containers, lost containers, and unacceptable sample temperatures. In each case, the resident or operator was contacted and the location was resampled. Reports of sample conditions upon receipt by the laboratories are provided on the chains-of-custody and sample discrepancy reports, which are included in the data validation reports (DOE 1994c and 1994e). Table II.4 summarizes deviations from the QAPP criteria that occurred during both sampling events.

Table II.3. Summary of Sample Collection Completeness

Analysis	Samples Collected	Number of Field Duplicates	Number of Trip Blanks	Number of Ambient Blanks	Number of Equipment Blanks	Number of MS/MSD
First Sampling Event - Water						
Volatiles	32	4 / 4	27 / 27	4 / 4	3 / 2	4 / 4
Acetonitrile/ Acrylonitrile	32	4 / 4	0 / 0	0 / 0	3 / 2	4 / 4
Semivolatiles	32	4 / 4	0 / 0	0 / 0	3 / 2	4 / 4
Pesticides/PCBs	32	4 / 4	0 / 0	0 / 0	3 / 2	4 / 4
Metals	32	4 / 4	0 / 0	0 / 0	3 / 2	4 / 4
Radionuclides	32	4 / 4	0 / 0	0 / 0	3 / 2	4 / 4
Anions	32	4 / 4	0 / 0	0 / 0	3 / 2	4 / 4
First Sampling Event - Sediment						
Volatiles	3	1 / 1	3 / 3	0 / 1	1 / 1	1 / 1
Acetonitrile/ Acrylonitrile	3	1 / 1	3 / 3	0 / 0	1 / 1	1 / 1
Semivolatiles	3	1 / 1	3 / 3	0 / 0	1 / 1	1 / 1
Pesticides/PCBs	3	1 / 1	3 / 3	0 / 0	1 / 1	1 / 1
Metals	3	1 / 1	3 / 3	0 / 0	1 / 1	1 / 1
Radionuclides	3	1 / 1	3 / 3	0 / 0	1 / 1	1 / 1
Anions	3	1 / 1	3 / 3	0 / 0	1 / 1	1 / 1
Second Sampling Event - Water						
Volatiles	30	4 / 4	23 / 23	4 / 4	1 / 1	4 / 4
Acetonitrile/ Acrylonitrile	30	4 / 4	23 / 23	0 / 0	1 / 1	4 / 4
Semivolatiles	30	4 / 4	23 / 23	0 / 0	1 / 1	4 / 4
Pesticides/PCBs	30	4 / 4	23 / 23	0 / 0	1 / 1	4 / 4
Metals	30	4 / 4	23 / 23	0 / 0	1 / 1	4 / 4
Radionuclides	30	4 / 4	23 / 23	0 / 0	1 / 1	4 / 4
Anions	30	4 / 4	23 / 23	0 / 0	1 / 1	4 / 4
Second Sampling Event - Sediment						
Volatiles	3	1 / 1	3 / 3	0 / 1	1 / 1	1 / 1
Acetonitrile/ Acrylonitrile	3	1 / 1	0 / 0	0 / 0	1 / 1	1 / 1
Semivolatiles	3	1 / 1	0 / 0	0 / 0	1 / 1	1 / 1
Pesticides/PCBs	3	1 / 1	0 / 0	0 / 0	1 / 1	1 / 1
Metals	3	1 / 1	0 / 0	0 / 0	1 / 1	1 / 1
Radionuclides	3	1 / 1	0 / 0	0 / 0	1 / 1	1 / 1
Anions	3	1 / 1	0 / 0	0 / 0	1 / 1	1 / 1

/ = QC samples collected / QC samples required by OU-9 QAPP

Table II.4. Summary of Sampling Discrepancies

Sampling Location	First Sampling Event	Second Sampling Event
Residential Wells		
0941	VOC sample not preserved to pH of 2. All analyses cancelled and site resampled.	No sampling discrepancies occurred.
0942	Sample temperature criteria and NO_2 holding time exceeded. Analyses cancelled and site resampled.	No sampling discrepancies occurred.
0943	No sampling discrepancies occurred.	No COC seals on containers. No corrective action taken.
0944	Trip Blank not listed on COC. COC modified to include sample.	No COC seals on containers. No corrective action taken.
0945	No sampling discrepancies occurred.	No COC seals on VOA vials. Trip Blank pH = 7. No corrective action taken.
0946	Trip Blank vials not labeled. Vials labeled by lab at direction of sampling contractor.	No sampling discrepancies found.
0947	No sampling discrepancies occurred.	One of two Pest/PCB bottles broken. Sufficient sample volume remained to permit analysis. No COC seals on containers. No corrective action taken.
0948	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0949	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0950	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0952	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0953	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0954	No label on SVOC container. Labeled by laboratory at direction of sampling contractor.	No sampling discrepancies occurred.
0955	Sample cooler lost during delivery. Analyses cancelled and site resampled.	No sampling discrepancies occurred.
0956	Sample temperature criteria and NO_2 holding time exceeded. Analyses cancelled and site resampled.	No sampling discrepancies occurred.
0958	No sampling discrepancies occurred.	No sampling discrepancies occurred.

Table II.4. Summary of Sampling Discrepancies (cont.)

Sampling Location	First Sampling Event	Second Sampling Event
Residential Wells (cont.)		
0960	No sampling discrepancies occurred.	Air bubbles in Trip Blank. No corrective action taken.
0967	No sampling discrepancies occurred.	No sampling discrepancies occurred.
Production Wells		
0961	No sampling discrepancies occurred.	Bubbles in Trip Blank vials. COC seal missing from one sample vial. No corrective action taken.
0962	No sampling discrepancies occurred.	No sampling discrepancies found.
0963	No sampling discrepancies occurred.	No sampling discrepancies found.
0964	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0965	Sampling contractor did not ship samples same day of collection due to delays in shipping. NO_2 hold time exceeded by 2 days. Site not resampled.	No sampling discrepancies occurred.
0966	No sampling discrepancies occurred.	No sampling discrepancies occurred.
Cisterns		
0931	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0932	Metals container mislabeled as MND25. Label corrected by laboratory at request of sampling contractor. Five VOA vials labeled as MND25-0932-4001, including two Trip Blanks. Samples segregated at laboratory at request of sampling contractor, based on presence of original laboratory labels on trip blanks	One of 2 SVOC bottles broken after receipt. Sufficient sample volume remained to permit analysis. No COC seals on containers. No corrective action taken.
0933	No label on fluoride container. Labeled by laboratory at direction of sampling contractor.	No COC seals on containers. Trip Blank pH = 7.
0935	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0936	No sampling discrepancies occurred.	No COC seals on containers. No corrective action taken.

Table II.4. Summary of Sampling Discrepancies (cont.)

Sampling Location	First Sampling Event	Second Sampling Event
Cisterns (cont.)		
0937	No sampling discrepancies occurred.	Fluoride analysis requested on bottle label, but not on COC. Added to COC by laboratory at request of sampling contractor.
0938	No sampling discrepancies occurred.	No sampling discrepancies occurred.
0951	No sampling discrepancies occurred.	Cooler arrived at 10°C. All analyses cancelled and site resampled. Air bubbles in Trip Blank, associated with second samples. No corrective action taken.
0959	Trip Blank vials not labeled. Vials labeled by laboratory at direction of sampling contractor.	Cooler arrived at 10°C. All analyses cancelled and site resampled.

COC - Chain-of-Custody

3. SAMPLE ANALYSIS PROGRAM

Samples collected during both sampling events were analyzed for the field and laboratory parameters listed in Table VII.7 of the OU-9 RI/FS Work Plan (DOE 1992), and Table I.1 of the OU-9 QAPP (DOE 1993b). The field parameters and the analytical methods used are shown in Table III.1; the complete laboratory analyte list is shown on Table III.2.

With minor exceptions, all of the samples were analyzed by the methods specified in Table VI.1 of the OU-9 QAPP. Weston's laboratory requested some variances from the required analytical methods. The variances that were granted are discussed below.

3.1. FIELD PARAMETERS

Field parameter samples were collected from pumping wells at pre-determined intervals. The first parameter sample was collected once the pump was turned on. Additional samples were collected at 5-minute intervals until three well volumes were pumped (for wells with known volumes), until 15 minutes of pumping had elapsed, or until the well began to go dry. Field parameters were collected from cisterns and wells without pumps once before the samples were collected. A final parameter sample was collected immediately after the laboratory sample containers were filled.

Measurements of temperature, pH, Eh, specific conductance, and dissolved oxygen were collected at each location as specified by the OU-9 work plan. These field parameters were measured in accordance with the OU-9 QAPP Standard Operating Procedure 2.2. All instruments were calibrated before collecting each sample in accordance with the manufacturer's specifications. Instrument model numbers and calibration data were documented on Ground Water Quality Sampling Records (Appendix 5.3 of SOP 2.2). Copies of the field forms are presented in Appendix B of this report. Field parameter results are presented in Table III.3.

3.2. LABORATORY ANALYSES

Roy F. Weston's laboratory in Lionville, Pennsylvania performed the chemical analyses of the water and sediment samples collected during both sampling events. Radiological analysis of samples collected during the first sampling event were conducted by International Technology Corporation's Oak Ridge, Tennessee laboratory. CompuChem Environmental Corporation's laboratory in Research Triangle Park, North Carolina conducted the radiologic analyses during the second sampling event.

3.2.1. Variances to Analytical Methods

The laboratory requested some variances from the specifications of the OU-9 QAPP. The allowed variances are discussed below.

VOCs (water) by Method 502.2

A variance was granted to quantitate analytes from a five-point calibration curve instead of using an average response factor as specified by the QAPP. This variance was requested because Weston's laboratory SOPs are based on the use of calibration curves, and non-standard (not SOP) procedures would have been required to follow the QAPP specifications. Method 502.2 protocol allows the use of either a calibration curve or an average response factor.

Table III.1. OU-9 Site-Wide Work Plan Residential Well Parameter List

Parameter List	Analytical Method (OU-9 QAPP)
Field	
pH	Portable Meter
Temperature	Celsius Thermometer
Redox Potential	Portable Meter
Dissolved Oxygen	Portable Meter
Specific Conductivity	Portable Meter
Water Level	Electronic Water Level Indicator
Water Analytical	
VOCs	502.2
Acetonitrile/Acrylonitrile	SW8030
Semivolatile Organic Compounds	CLP SOW Modification D
Target Analyte List Inorganics	CLP SOW Modification B
TCL Pesticides/PCBs	CLP SOW
Isotopic Plutonium (238, 239/240)	NAS, 1965
Isotopic Thorium (228, 230, 232)	NAS, 1960
Isotopic Uranium (234/235, 238)	NAS, 1962
Radium-226	ASTM D2460-70
Americium-241	ELM Am-01
Strontium-90	NAS, 1960
Tritium	R906.0
Gamma Spectrometry	Nuclear Data Inc., 1986
Nitrate/Nitrite	E353.2
Nitrite	E353.2*
Total Suspended Solids	E160.2
Total Dissolved Solids	E160.1
Alkalinity	E310.1
Fluoride	E340.2
	*Variance from QAPP - requirements.
Sediment Analytical	
VOCs	CLP SOW
Semivolatile Organic Compounds	CLP SOW Modification D
TCL Pesticides/PCBs	CLP SOW
Target Analyte List Inorganics	CLP SOW Modification B
Isotopic Plutonium (238, 239/240)	NAS, 1965
Isotopic Thorium (228, 230, 232)	NAS, 1960
Isotopic Uranium (234/235, 238)	NAS, 1962
Strontium-90	NAS, 1960
Tritium	R906.0
Gamma Spectrometry	Nuclear Data Inc., 1986
Fluoride	E340.2
Nitrate/Nitrite	E353.2

Table III.2. Parameters Analyzed in Residential Well and Cistern Samples

Volatile Organic Compounds	
Acetone	cis-1,3-Dichloropropene
Acetonitrile	trans-1,3-Dichloropropene
Acrylonitrile	Dibromochloromethane
Benzene	Dibromomethane
Bromobenzene	1,2-Diethylbenzene
Bromodichloromethane	1,3-Diethylbenzene
Bromoform	1,4-Diethylbenzene
Carbon disulfide	Ethylbenzene
Carbon tetrachloride	Methyl ethyl ketone
Chlorobenzene	Methyl isobutyl ketone
2-Chloroethylvinylether	Methylene chloride
Chloroform	Tetrachloroethene
1-Chlorohexane	1,1,1,2-Tetrachloroethane
bis(2-Chloroisopropyl)ether	1,1,2,2-Tetrachloroethane
2-Chlorotoluene	Toluene
4-Chlorotoluene	1,1,1-Trichloroethane
1,2-Dichlorobenzene	1,1,2-Trichloroethane
1,3-Dichlorobenzene	Trichloroethene
1,4-Dichlorobenzene	Trichlorofluoromethane
1,1-Dichloroethane	1,2,3-Trichloropropane
1,2-Dichloroethane	Trichlorotrifluoromethane
1,1-Dichloroethene	Vinyl acetate
cis-1,2-Dichloroethene	Vinyl chloride
trans-1,2-Dichloroethene	Xylene (total)
1,2-Dichloropropane	
Semivolatile Organic Compounds	
Acenaphthene	2,6-Dinitrotoluene
Acenaphthylene	4,6-Dinitro-2-methylphenol
Anthracene	2,4-Dinitrophenol
Benzo(a)anthracene	2,4-Dinitrotoluene
Benzo(b)fluoranthene	Fluoranthene
Benzo(k)fluoranthene	Fluorene
Benzo(g,h,i)perylene	Hexachlorobenzene
Benzo(a)pyrene	Hexachlorobutadiene
Benzoic acid	Hexachlorocyclopentadiene
Benzyl alcohol	Hexachloroethane
2-Benzyl-4-chlorophenol	Indeno(1,2,3-cd)pyrene
Bis(2-chloroethoxy)methane	Isophorone
Bis(2-chloroethyl)ether	2-Methylnaphthalene
Bis(2-ethylhexyl)phthalate	2-Methylphenol
4-Bromophenyl-phenylether	4-Methylphenol
Butylbenzylphthalate	N-Nitroso-di-n-propylamine
Carbazole	N-Nitrosodiphenylamine
4-Chloroaniline	Naphthalene
4-Chloro-3-methylphenol	2-Nitroaniline
2-Chloronaphthalene	3-Nitroaniline
2-Chlorophenol	4-Nitroaniline
4-Chlorophenyl-phenylether	Nitrobenzene

Table III.2. Parameters Analyzed in Residential Well and Cistern Samples (cont.)

Semivolatile Organic Compounds (cont.)	
Chrysene	2-Nitrophenol
Di-n-butylphthalate	4-Nitrophenol
Dibenz(a,h)anthracene	Di-n-octyl phthalate
Dibenzofuran	2,2'-Oxybis(1-chloropropane)
1,2-Dichlorobenzene	Pentachlorophenol
1,3-Dichlorobenzene	Phenanthrene
1,4-Dichlorobenzene	Phenol
3,3'-Dichlorobenzidine	Pyrene
2,4-Dichlorophenol	1,2,4-Trichlorobenzene
Diethylphthalate	2,4,5-Trichlorophenol
2,4-Dimethylphenol	2,4,6-Trichlorophenol
Dimethylphthalate	

Pesticides/PCB's	
Aldrin	4,4'-DDE
Aroclor-1232	4,4'-DDT
Aroclor-1016	Dieldrin
Aroclor-1221	Endosulfan I
Aroclor-1242	Endosulfan II
Aroclor-1248	Endosulfan sulfate
Aroclor-1254	Endrin
Aroclor-1260	Endrin ketone
α - BHC	Endrin aldehyde
β - BHC	Heptachlor epoxide
δ - BHC	Heptachlor
α- Chlordane	Lindane (γ - BHC)
γ-Chlordane	Methoxychlor
4,4'-DDD	Toxaphene

Target Analyte List Metals		
Aluminum, Total	Copper, Total	Nickel, Total
Antimony, Total	Cyanide, Total	Potassium, Total
Arsenic, Total	Iron, Total	Selenium, Total
Barium, Total	Lead, Total	Silver, Total
Beryllium, Total	Lithium, Total	Sodium, Total
Bismuth, Total	Magnesium, Total	Thallium, Total
Cadmium, Total	Manganese, Total	Tin, Total
Calcium, Total	Mercury, Total	Vanadium, Total
Chromium, Total	Molybdenum, total	Zinc, Total
Cobalt, Total		

Anions		
Alkalinity	Nitrate / Nitrite	Total Dissolved Solids
Fluoride	Nitrite, as N	Total Suspended Solids

Radionuclides		
Americium-241	Plutonium-238	Thorium-230
Bismuth-207	Plutonium-239/240	Thorium-232
Bismuth-210	Radium-226	Tritium
Cobalt-60	Strontium-90	Uranium-234
Cesium-137	Thorium-227	Uranium-235/236
Potassium-40	Thorium-228	Uranium-238

Table III.3. Field Parameter Measurements

Sample Number	pH (S.U.)	Specific Conductance (μmhos/cm)	Redox Potential (mvolts)	Temperature (°C)	Dissolved Oxygen (mg/l)
MND24-0931-0001	7.47	420	317	1.6	9.2
MND24-0931-0002	N/A	N/A	N/A	N/A	N/A
MND24-0932-0001	7.21	300	330	2.5	13.2
MND24-0932-0002	7.25	220	218	21.7	5.0
MND24-0933-0001	7.21	180	221	6.2	7.6
MND24-0933-0002	6.62	150	253	19.5	4.4
MND24-0935-0001	7.21	120	178	8.8	8.4
MND24-0935-0002	7.25	62	186	20.6	9.2
MND24-0936-0001	7.05	80	350	4.0	3.5
MND24-0936-0002	6.82	82	235	23.7	2.8
MND24-0938-0001	7.12	960	174	11.0	6.0
MND24-0938-0002	7.34	900	216	18.3	8.0
MND24-0941-0001	7.37	710	-011	13.0	2.0
MND24-0941-0002	7.20	720	-045	15.1	4.2
MND24-0942-0001	7.24	980	083	13.0	1.8
MND24-0942-0002	7.07	980	319	17.1	2.4
MND24-0943-0001	7.31	780	51	8.5	4.4
MND24-0943-0002	7.13	680	185	19.1	3.2
MND24-0944-0001	7.43	1000	050	11.5	7.1
MND24-0944-0002	7.07	880	037	16.2	4.0
MND24-0945-0001	7.15	850	118	11.3	2.8
MND24-0945-0002	7.12	920	132	15.8	5.8
MND24-0946-0001	7.55	600	256	6.8	8.8
MND24-0946-0002	N/A	N/A	N/A	N/A	N/A
MND24-0947-0001	7.54	920	123	11.1	6.8
MND24-0947-0002	7.49	820	053	17.8	2.0
MND24-0948-0001	7.62	870	175	1.7	14.5
MND24-0948-0002	7.56	620	208	18.4	3.8
MND24-0949-0001	7.44	760	20	10.7	1.6
MND24-0949-0002	7.21	680	-068	15.4	2.8
MND24-0950-0001	7.03	1000	251	10.0	8.4
MND24-0950-0002	7.12	980	274	14.5	6.8
MND24-0951-0001	7.57	840	248	5.8	11.4
MND24-0951-0002	7.35	1000	208	20.3	2.0

Table III.3. Field Parameter Measurements (cont.)

Sample Number	pH (S.U.)	Specific Conductance (μmhos/cm)	Redox Potential (mvolts)	Temperature (°C)	Dissolved Oxygen (mg/l)
MND24-0952-0001	7.26	900	009	11.1	3.8
MND24-0952-0002	7.10	880	-033	14.9	3.0
MND24-0953-0001	7.65	700	193	8.9	8.8
MND24-0953-0002	7.38	620	024	14.5	6.2
MND24-0954-0001	7.41	240	188	10.1	11.3
MND24-0954-0002	6.68	260	302	17.1	3.8
MND24-0955-0001	7.20	1000	152	9.0	7.4
MND24-0955-0002	7.46	800	271	18.3	5.2
MND24-0956-0001	7.33	940	172	13.0	2.56
MND24-0956-0002	7.18	900	178	16.3	2.0
MND24-0958-0001	7.24	840	219	13.2	4.2
MND24-0958-0002	7.12	700	218	16.1	3.2
MND24-0959-0001	6.61	90	304	9.9	8.4
MND24-0959-0002	7.01	84	270	18.1	4.2
MND24-0960-0001	6.77	800	268	8.0	5.2
MND24-0960-0002	7.31	740	238	15.4	2.6
MND24-0961-0001	7.23	1000	210	12.0	6.2
MND24-0961-0002	7.21	1000	278	15.2	12.2
MND24-0962-0001	7.34	820	113	12.0	5.8
MND24-0962-0002	7.65	770	076	15.9	4.6
MND24-0963-0001	7.36	1000	063	12.5	3.6
MND24-0963-0002	7.74	1000	-030	15.2	2.4
MND24-0964-0001	7.37	890	231	13.5	2.8
MND24-0964-0002	7.11	860	226	13.0	2.4
MND24-0965-0001	7.31	940	034	10.1	3.6
MND24-0965-0002	7.47	780	-029	15.7	2.2
MND24-0966-0001	7.44	830	103	9.5	5.0
MND24-0966-0002	7.33	780	043	14.3	3.4
MND24-0967-0001	7.26	780	164	11.0	4.2
MND24-0967-0002	7.15	800	218	18.0	3.8

S.U. - standard units
μmhos/cm - micromhos per centimeter = microsiemens per centimeter
mvolts - millivolts
°C - degrees celsius
mg/l - milligrams/liter
N/A - Not included in second sampling event.

The laboratory was granted a variance to use the calibration check standard to fulfill the requirements of both the calibration check and check standard, as specified in the OU-9 QAPP. The QAPP requires a calibration check at a frequency of 1 in 10 samples with a relative standard deviation (%RSD) of $\leq$20%, and a check standard at a frequency of 1 in 10 with a percent recovery (%R) of 60 to 140%. The laboratory SOPs require the analysis of a second source check standard with every initial calibration curve. These check standard data were used to meet the requirements of the calibration check and check standard analyses.

TAL Metals by CLP SOW, Modification B

Weston's laboratory requested a variance from the OU-9 QAPP Modification B to the CLP SOW. Modification B requires that the instrument detection limit (IDL) be used as acceptance criteria for Initial Calibration Blank (ICB) and Continuing Calibration Blank (CCB) analyses. The laboratory asserted that the IDL represents an extremely uncertain data acquisition range that encompasses instrumental signal-to-noise factors, and therefore instrument noise, not sample contamination, would be used as rejection criteria. A variance was granted to allow the following deviations from Modification B requirements:

1. Adopt the laboratory Levels of Quantitation (LOQs) as acceptance criteria for ICBs and CCBs, <u>except</u> for antimony, beryllium and thallium. Weston's LOQs were less than the Maximum Contaminant Level (MCL), MCL Goal, or lifetime health advisory levels for all metals except antimony and thallium.

2. Adopt an ICB/CCB acceptance criterion of 4 parts per billion for antimony. This level is less than the MCL of 6 ppb.

3. Adopt an ICB/CCB acceptance criterion of 2 parts per billion for beryllium. This level is less than the MCL of 4 ppb.

4. Adopt an ICB/CCB acceptance criterion of 2 parts per billion for thallium. This level is equal to the MCL of 2 ppb.

The acceptance criteria for the initial and continuing calibration blanks became:

Al	49 µg/l	Cr	10 µg/l	Hg	0.3 µg/l	V	13 µg/l
Sb	4 µg/l	Co	6 µg/l	Ni	30 µg/l	Zn	10 µg/l
As	6 µg/l	Cu	6 µg/l	K	330 µg/l	CN	16 µg/l
Ba	10 µg/l	Fe	20 µg/l	Se	6 µg/l	Mo	23 µg/l
Be	2 µg/l	Pb	3 µg/l	Ag	10 µg/l	Sn	63 µg/l
Cd	0.6 µg/l	Mg	155 µg/l	Na	89 µg/l	Bi	360 µg/l
Ca	59 µg/l	Mn	10 µg/l	Tl	2 µg/l	Li	33 µg/l

Nitrite Analysis

Weston was granted a variance to use EPA Method E353.2 (Colorimetric, Automated, Cadmium Reduction) for nitrite analysis instead of Method E354.1 (spectrophotometric), as specified by the QAPP. The laboratory was not set up to routinely perform the required method. Both methods utilize the same chemical reaction (the diazotation of sulfanilamide by nitrite and coupling with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a colored dye measured colorimetrically at 540 nm). This variance did not affect the quantitation limit.

3.2.2. <u>Contract Required Quantitation Limits</u>

The OU-9 QAPP specified lower Contract Required Quantitation Limits (CRQLs) for most residential water analyses than for water samples collected during other ER investigations. The analytical laboratories met the CRQLs for water samples in more than 99% of the analyses. The CRQLs for sediment samples were frequently higher due to dry-weight reporting requirements and matrix interferences. Proper calculation of the CRQLs by the laboratories was checked during data validation.

All quantitation limit calculations were correct, and accounted for sample dilutions, concentrations, moisture content, splits, and clean-up activities.

3.2.3. Laboratory QA/QC Analyses

The analytical laboratories performing chemical (Weston) and radiological (IT and CompuChem) analyses generally met the QA/QC requirements of the OU-9 QAPP. However, some deviations did occur. Notable deviations are discussed below; less significant deviations and additional detail are provided in the data validation reports (DOE 1994c and 1994e).

Weston's laboratory requested a variance from one quality control requirement listed on Table III.2 of the QAPP. For 502.2 analyses, both a calibration check sample and a check standard sample are required. Both types of sample have a required frequency of one for every ten samples analyzed. The acceptance criteria for the calibration check sample is a relative percent difference (RPD) $\leq$ 20%; the criteria for the check standard is 60 to 140% recovery (%R). The laboratory was given a variance from the QAPP requirement to allow the use of the calibration check standard to fulfill the requirements of both the calibration check and check standard.

IT's laboratory did not document the analysis of daily efficiency source checks for their Radium-226 analyses. Additionally, the laboratory did not document the annual efficiency calibration for Gamma Scan analyses.

CompuChem did not meet the frequency criteria for background counting of Radon frequency emanation. The QAPP requires the counting at a frequency of once per week, but CompuChem performed the background counting approximately once per month. The laboratory spiked the Laboratory Control Samples (Blank Spikes) and Matrix Spike samples at activities that were much greater than the environmental sample activities. Their applicability to the environmental samples may be questioned.

3.3. DATA REPORTING

Each laboratory provided paper copies of the analytical data packages and Electronic Data Deliverables (EDDs) for all analyses conducted. The Weston and CompuChem laboratories provided complete paper and electronic data deliverables in the formats required by the OU-9 QAPP. Although some documentation was not initially provided, all requested data was eventually provided, resulting in complete data packages. International Technology's laboratory did not provide complete analytical data packages, and were unable to provide the degree of documentation required by the OU-9 QAPP. They did, however, provide complete EDD files. The absence of documentation resulted in the qualification of sample results during data validation procedures.

4. LABORATORY DATA VALIDATION

All laboratory data packages were validated to assess data quality and to verify that method quality control requirements and project data quality objectives were met. Chemical data packages were primarily validated by Terran Corporation. Terran contracted Analytical Innovations Inc. to assist with chemical data validation, and the Labyrinth Group to validate the radiological data packages.

All of the analytical data packages for the first sampling event were validated in accordance with the OU-9 QAPP criteria. After the validation report was issued for the first sampling event, EG&G Mound implemented a 90/10 data validation scheme. The scheme required the complete validation of ten percent of the analytical data, and a completeness check and quality control check of the remaining ninety percent of the analytical data. Three chemical data packages were validated, resulting in the complete validation of nine (28%) water samples, one (33%) sediment sample, and associated field QC samples. Two radiological data packages were validated, including seventeen (53%) water samples, three (100%) sediment samples, and associated field QC samples. These samples are listed in Table IV.1.

4.1. DATA VALIDATION CRITERIA

Analytical data packages submitted by the chemical and radiological laboratories were validated in accordance with the OU-9 QAPP (Appendix H, Section 9.0, Tables III.12 and III.3, and other relevant sections), U.S. EPA guidelines (EPA 1988a, 1988b), and the appropriate analytical methods (references given in Table III.1). The EDDs received from the laboratories were in the format outlined in Appendix E of the QAPP.

Table IV.1. Samples Receiving 100% Data Validation during Second Sampling Event

Environmental Samples		Field QC Samples	
Chemical Analyses			
MND24-0932-0002	MND24-0947-0002	MND24-0950-1002	MND24-0932-3002
MND24-0935-0002	MND24-0950-0002	MND24-0932-2002	MND24-0938-3002
MND24-0938-0002	MND24-0952-0002	MND24-0938-0002	MND24-0935-4002
MND24-0941-0002	MND24-0954-0002	MND24-0941-2002	MND24-0942-0002 MS/MSD
MND24-0942-0002	MND25-0935-0002	MND24-0942-2002	MND25-0935-1002
		MND24-0950-2002	MND25-0935-2002
		MND24-0954-2002	
Radiological Analyses			
MND24-0932-0002	MND24-0947-0002	MND24-0950-1002	MND25-0935-1002
MND24-0933-0002	MND24-0949-0002	MND24-0967-1002	MND24-0935-4002
MND24-0935-0002	MND24-0950-0002		
MND24-0936-0002	MND24-0952-0002		
MND24-0938-0002	MND24-0953-0002		
MND24-0941-0002	MND24-0954-0002		
MND24-0942-0002	MND24-0956-0002		
MND24-0943-0002	MND25-0935-0002		
MND24-0944-0002	MND25-0937-0002		
MND24-0945-0002	MND25-0951-0002		

4.2. DATA VALIDATION RESULTS

Some data for all types of analyses were qualified as estimated due to various criteria in the OU-9 QAPP. The data validation team did not find errors in the laboratory's calculations, and only minor errors in data reporting. Qualified results for all detected analytes are tabulated for each sample in Appendix C. Data validation reports for both sampling events were prepared in the format required by Appendix H of the OU-9 QAPP (DOE 1994c and 1994e). The reports provide detailed explanations of the qualifiers assigned during validation, data outlier forms, analytical laboratory results, laboratory case narratives, and chains-of-custody.

The following sections summarize the type of criteria that resulted in data qualifications. Appendix D provides further detail for the data qualifiers assigned by the validation team.

4.2.1. Volatile Organic Compounds

Volatile Organic Compound (VOC) results were qualified due to the failure to meet QAPP criteria for Continuing Calibration Verification sample recoveries, relative percent differences of Laboratory Control Samples (Blank Spikes), and the detection of target analytes in method blanks. No VOC data were rejected.

4.2.2. Semivolatile Organic Compounds

The validation team qualified Semivolatile Organic Compound (SVOC) results due to the criteria for Initial Calibration Verification samples, Continuing Calibration Check samples, and the detection of target analytes in method blanks. No sample results were rejected.

4.2.3. Pesticides/PCBs

Pesticide/PCB results were qualified due to low surrogate recoveries, exceeded endrin breakdown criteria, percent differences of duplicate samples, and the detection of target analytes in method blanks. One sample was rejected due to low surrogate recoveries, however the laboratory reanalyzed the sample. The reanalyzed sample was qualified because the holding time was exceeded.

4.2.4. Target Analyte List Metals and Cyanide

Results for the analysis of Target Analyte List (TAL) metals and cyanide were qualified due to failed criteria for matrix spike and post digestion spike recoveries, serial dilutions, laboratory duplicate results, and sample holding times. Thallium results for three samples were rejected due to exceedingly low matrix spike recoveries.

4.2.5. Anions/TDS/TSS

Fluoride, nitrate/nitrite, total dissolved solid (TDS), and total suspended solid (TSS) results were qualified due to exceeded sample holding times. One nitrate/nitrite sample was qualified due to method blank contamination. No sample results were rejected.

4.2.6. Radionuclides

Radionuclide results were qualified because of the use of batch efficiencies for tritium analyses, failure to meet annual efficiency calibration criteria for radium-226, low yields for thorium, and the lack of documented daily efficiency source checks for gamma scan analytes. Thorium-230 results were rejected due to method blank results that exceeded three times the minimum detectable activities.

5. DATA QUALITY ASSESSMENT

After the data validation process was completed, the qualified laboratory results were in accordance with the OU-9 QAPP criteria. The bias and usability of the data are detailed in the data validation summaries, presented in Appendix E of this report. This section summarizes the completeness goals for the project, and presents further evaluation of data usability.

5.1. COMPLETENESS GOALS

Section 3.3 of the OU-9 QAPP defines the completeness goals for the residential well and cistern sampling program. The number of water sampling locations was set by the number of access agreements available at the start of the project. The number of sediment sampling locations was dependant on the amount of sediment in the cisterns. The presence of sediment in some cisterns could not be determined due to the presence of obstacles or the construction of the cisterns.

5.1.1. Completeness Goals for Sample Collection

The OU-9 QAPP specifies a 100% sampling completeness goal for residential wells and cisterns. Access agreements were obtained for thirty-three wells and cisterns, giving a sampling completeness goal of sixty-six water samples. Sampling completeness was affected by one cistern being dry during both sampling events, one cistern being filled with soil after the first sampling event, and the sale of one property after the first sampling event. Sediment samples could be collected from only three cisterns. Therefore, the sampling completeness for both sampling events was:

Total Number of Wells and Cisterns (2 times 33)	66	
Total Water Samples Collected	62	(94%)
Total Sediment Samples Collected	6	(100%)

5.1.2. Completeness Goals for Field Parameters

Field parameters were successfully collected at each sampling location during both sampling events. This meets the 100% completeness goal specified in the QAPP.

5.1.3. Completeness Goals for Laboratory Analyses

The OU-9 QAPP specifies a 95% completeness goal for laboratory analyses. This goal was met during this project for water and sediment samples, as shown in Table V.1.

5.2. EVALUATION OF DATA USABILITY

Drinking water standards were used to evaluate water samples collected from residential wells and cisterns. The U.S. EPA Maximum Contaminant Levels (MCLs), Secondary Maximum Contaminant Levels (SMCLs), and Lifetime Health Advisories were taken from the latest available copy of the EPA standards (EPA, 1994). For radionuclides without MCLs, radiological results were compared to the

Table V.1. Summary of Laboratory Analysis Completeness

Analysis	Number of Analytes	Number of Samples Collected	Number of Samples Rejected	Individual Analytes Rejected	Percent Complete
Groundwater Samples					
Volatiles	49	62	0	0	100
Semivolatiles	67	62	0	0	100
Pesticides/PCBs	28	62	0	0	100
Metals and Cyanide	28	62	0	3	100
Anions w/Fluoride	6	62	0	0	100
Radionuclides	18	62	0	11	99
Sediment Samples					
Volatiles	49	6	0	0	100
Semivolatiles	67	6	0	0	100
Pesticides/PCBs	28	6	0	3	98
Metals and Cyanide	28	6	0	0	100
Anions w/Fluoride	5	6	0	0	100
Radionuclides	15	6	0	3	97

Department of Energy drinking water standards. The DOE standards, calculated to be equivalent to the U.S. EPA MCLs for man-made radionuclides, were as follows:

Americium-241	1.2	pCi/L	Strontium-90	8	pCi/L
Bismuth-207	1200	pCi/L	Thorium-228	16	pCi/L
Bismuth-210	800	pCi/L	Thorium-230	12	pCi/L
Cobalt-60	400	pCi/L	Thorium-232	2	pCi/L
Cesium-137	120	pCi/L	Uranium-234	20	pCi/L
Potassium-40	280	pCi/L	Uranium-235/236	24	pCi/L
Plutonium-238	1.6	pCi/L	Uranium-238	24	pCi/L
Plutonium-239	1.2	pCi/L			

Results of the data validation gave an indication of potential bias of the numerical results for various water samples. The potential bias was evaluated for all analytes detected below the drinking water standards, to determine if the sample result could potentially exceed the standards. Some qualified results were below the concentrations of the standards, but could potentially exceed standard concentrations due to a negative bias resulting from low spike recoveries. This circumstance was identified for two pesticide/PCB samples and three metals samples. The samples are discussed below.

5.2.1. Pesticides/PCBs

Cistern sample MND24-0935-0002 was reported to have a heptachlor-epoxide concentration of 0.072 µg/l during the first sampling event. The result has a potential negative bias due to low surrogate recoveries (35 and 40%). The bias caused by the 35% surrogate recovery results in a modified concentration of 0.21 µg/l, which exceeds the 0.20 µg/l drinking water standard.

Similarly, the same parameter had a reported concentration of 0.086 µg/l during the second sampling event with a potential negative bias due to low surrogate recoveries (40 and 50%). The 40% bias results in a modified concentration of 0.22 µg/l, also exceeding the 0.20 µg/l drinking water standard. Heptachlor epoxide was detected in the sediment samples collected from the cistern during both sampling events. Results of both water samples were assessed as inconclusive.

5.2.2. Target Analyte List Metals

Sample MND24-0952-0002 had a reported manganese concentration of 43.4 µg/l that was qualified due to a low matrix spike recovery of 76%. Modifying the concentration for the negative bias results in a concentration of 57 µg/l, which exceeds the 50 µg/l SMCL.

Sample MND24-0954-0002 was reported to have aluminum present at 47.4 µg/l. When modified for an 80% matrix spike recovery, a concentration of 59 µg/l is obtained. The modified concentration exceeds the lower limit of the 50-200 µg/l SMCL.

Cistern sample MND24-0959-0001 contained lead at 4.7 µg/l. The value was qualified due to a low matrix spike recovery of 11%. When modified for a negative bias, a result of 43 µg/l is obtained, exceeding the 15 µg/l action level specified in the drinking water standard.

Modification of each of the sample results for potential negative bias result in sample concentrations greater than the drinking water standards. Therefore, each sample result was assessed as inconclusive.

5.2.3. Radionuclides

International Technology Corporation's laboratory reported an americium-241 concentration of 3.95 pCi/l for sample MND24-0954-0001. This value was approximately thirty times higher than the next highest sample. The result for field duplicate MND24-0954-0001 contained the isotope at a concentration of 0.0427 pCi/l, and the result for the second sampling event was below the 0.13 pCi/l detection limit. The 3.95 pCi/l result was considered an outlier and was rejected.

6. ANALYTICAL LABORATORY RESULTS

Analytical results for both sampling events are discussed in this section. Plate 1 presents a graphical summary of the analytes detected for each environmental sample, and sample results that exceeded the drinking water standards. Appendix C includes tables of all detected analytes, their concentrations and data qualifiers, and their drinking water standards. The drinking water standards used during this investigation are discussed in Section 5.2.

6.1. DISCUSSION OF ANALYTICAL LABORATORY RESULTS

Analytes of interest have been identified for Mound Plant and Residential Wells. The Mound Plant analytes of interest include eight volatile organic compounds, two semivolatile organic compounds, eight Resource Conservation and Recovery Act (RCRA) metals, and five radioisotopes. These analytes were selected on the basis of previous investigations and analyte toxicity. The VOCs of interest have been a historical concern in and around Mound Plant Area B (DOE 1994c). The SVOCs were detected during analysis of ground water sweep samples. The eight RCRA metals have been identified by the U.S. EPA as having greater toxicity than other metals such as aluminum. The radioisotopes are all those of previous interest of the Mound Plant site (DOE 1992).

Residential well analytes of interest include the parameters detected during this investigation at concentrations above drinking water standards (Table VI.1). These standards include Maximum Contaminant Levels (MCLs), Secondary MCLs (SMCLs), Life time Health Advisories, and Department of Energy standards. These standards are discussed below in Section 6.2.

This section identifies residential well analytes of interest and detected Mound Plant analytes of interest. Significant analytes that were detected but do not have drinking water standards are also identified. Table VI.2 presents a graphical summary of the Mound Plant analytes of interest detected in residential well and cistern samples.

Table VI.1. Residential Well Analytes of Interest

VOCs	SVOCs	Metals	Radionuclides	Anions
None	benzo(a)anthracene	aluminum	strontium-90	nitrate/nitrite
	benzo(b)fluoranthene	**arsenic***		Total Dissolved Solids
	benzo(k)fluoranthene	**cadmium***		
	benzo(a)pyrene	**chromium***		
	chrysene	iron		
	dibenz(a,h)anthracene	**lead***		
	indeno(1,2,3-cd)pyrene	manganese		
		molybdenum		
		zinc		

*Mound Plant Analyte of Interest detected in residential well or cistern above drinking water standards.

6.1.1. Volatile Organic Compounds

Cis-1,2-dichloroethane was the only volatile organic compound detected in the environmental samples. The concentrations for well sample MND24-0962 were below the MCL during both sampling events. No VOCs were detected in the sediment samples.

Table VI.2. Detection of Mound Plant Analytes of Interest for both Sampling Episodes

Analyte	0931*	0932	0933	0935	0936	0938	0941	0942	0943	0944	0945	0946*
WATER												
Volatile Organic Compounds												
cis-1,2-dichloroethene												
Semivolatile Organic Compounds												
bis(2-Ethylhexyl)phthalate												
Target Analyte List Metals												
Arsenic, Total		/ ●			● / ●		● / ●			● / ●		
Barium, Total	●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	●
Cadmium, Total		/ ●	/ ●	/ ●	● / ●					/ ●		●
Chromium, Total		/ ●			● / ●	●				● / ●		●
Lead, Total		/ ●	● / ●	/ ●	● / ●	●	/ ●	●	● / ●	● / ●	● / ●	●
Mercury, Total		/ ●			● / ●							
Selenium, Total		/ ●			/ ●			●		●		
Silver, Total					/ ●					● / ●		
Radionuclides												
Plutonium-238					● / ●							
Tritium					●	/ ●		● / ●		●		●
Uranium-234		● / ●	● / ●		●	● / ●	● / ●	● / ●	/ ●	● / ●	●	●
Uranium-235/236										●		
Uranium-238		/ ●		●	●		● / ●			● / ●		●

● - indicates an analyte detection during the first sampling event
/ ● - indicates an analyte detection during the second sampling event
* locations not sampled during second sampling event
▒ - shading indicates analyte detections above maximum contaminant levels

Table VI.2. Detection of Mound Plant Analytes of Interest for both Sampling Episodes (cont.)

Analyte	0947	0948	0949	0950	0951	0952	0953	0954	0955	0956	0958	0959
WATER												
Volatile Organic Compounds												
cis-1,2-dichloroethene												
Semivolatile Organic Compounds												
bis(2-Ethylhexyl)phthalate									● / ●			
Target Analyte List Metals												
Arsenic, Total				/ ●	/ ●	● / ●	● / ●			/ ●		
Barium, Total	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●
Cadmium, Total					/ ●		● / ●					
Chromium, Total		/ ●					● / ●		●			
Lead, Total	●			/ ●	/ ●	●	● / ●	/ ●	● / ●			● / ●
Mercury, Total												
Selenium, Total				/ ●	● / ●			●		/ ●		
Silver, Total							● / ●					/ ●
Radionuclides												
Plutonium-238												
Tritium			● / ●	●		/ ●	/ ●		/ ●	● / ●	● / ●	
Uranium-234	● / ●	● / ●	● / ●	● / ●	/ ●	● / ●	● / ●	●	● / ●	● / ●	●	/ ●
Uranium-235/236					/ ●		● / ●			/ ●		/ ●
Uranium-238	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	/ ●		● / ●			/ ●

● - indicates an analyte detection during the first sampling event
/ ● - indicates an analyte detection during the second sampling event
▒ - shading indicates analyte detections above maximum contaminant levels

Table VI.2. Detection of Mound Plant Analytes of Interest for both Sampling Episodes (cont.)

Analyte	0960	0961	0962	0963	0964	0965	0966	0967	0935	0937	0951
	WATER								SEDIMENT		
Volatile Organic Compounds											
cis-1,2-dichloroethene			● / ●								
Semivolatile Organic Compounds											
bis(2-Ethylhexyl)phthalate					●				● / ●	● / ●	●
Target Analyte List Metals											
Arsenic, Total	●		/ ●	● / ●		● / ●	/ ●		● / ●	/ ●	● / ●
Barium, Total	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●
Cadmium, Total									● / ●	● / ●	● / ●
Chromium, Total	●				●			●	● / ●	● / ●	● / ●
Lead, Total	● / ●	● / ●				/ ●			● / ●	● / ●	● / ●
Mercury, Total									● / ●	● / ●	● / ●
Selenium, Total		● / ●							●	● / ●	● / ●
Silver, Total									/ ●	● / ●	/ ●
Radionuclides											
Plutonium-238						/ ●	●		●	● / ●	
Tritium		● / ●	● / ●	● / ●	/ ●	/ ●		/ ●			/ ●
Uranium-234	● / ●	● / ●	● / ●	/ ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●
Uranium-235/236				/ ●					●	● / ●	●
Uranium-238	● / ●	● / ●	● / ●	/ ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●

● - indicates an analyte detection during the first sampling event
/ ● - indicates an analyte detection during the second sampling event
▒ - shading indicates analyte detections above maximum contaminant levels

6.1.2. Semivolatile Organic Compounds

Water samples collected from cistern 0936 contained SVOCs at concentrations above the drinking water standards. Bis(2-ethylhexyl)phthalate (an analyte of interest) and phenol were the only SVOCs detected in the remaining samples, but were below the drinking water standards. Several SVOCs, including bis(2-ethylhexyl)phthalate, were detected in each of the three cistern sediment samples. Although bis(2-ethylhexyl)phthalate is a common laboratory contaminant, the compound was detected above the action level calculated from blank analyses. The compound may actually be present in the sediment samples in association with the other detected SVOCs.

6.1.3. Pesticides/PCBs

No pesticides or PCBs were detected at levels above the drinking water standards. They were detected in four cistern water samples and each of the three cistern sediment samples.

6.1.4. Target Analyte List Metals and Cyanide

Arsenic, cadmium, chromium, and lead were detected in water samples at concentrations that exceed drinking water standards. One or more of the metals were detected at six sampling locations. They are the only analytes of interest detected above drinking water standards. Five metals that are not analytes of interest (aluminum, iron, manganese, molybdenum and zinc) were detected above the standard concentrations. Eighteen additional metals, including all of the remaining analytes of interest, were detected in well and cistern samples at concentrations below drinking water standards. Thallium, the only TAL metal not detected in the water samples, was detected in one sediment sample during one sampling event.

6.1.5. Anions/TDS/TSS

Total Dissolved Solids (TDS) was detected above the secondary MCL at sixteen sampling locations. Nitrate/nitrite concentrations exceeded the MCL in ground water samples collected from one cistern.

All other inorganic parameters (alkalinity, fluoride, nitrite, and total suspended solids) were detected below drinking water standards. Fluoride was detected in one cistern sediment sample; nitrate/nitrite were detected in all three sediment samples.

6.1.6. Radionuclides

Strontium-90 and americium-241 were the only radionuclides detected above either the U.S. EPA or DOE drinking water standards. Neither analyte is a Mound Plant analyte of interest (Table VI.2). The cistern water sample collected during the first sampling event contained 10.6 pCi/L of strontium-90, exceeding the 8.0 pCi/L MCL. Strontium-90 was not detected in the cistern water sample collected during the second sampling event. Americium-241 was reported above the drinking water standard for one sample result. However, that result was rejected during the data assessment, as discussed in Section 5.3. Thirteen isotopes, including five analytes of interest, were detected in water samples at concentrations below the standards. The same thirteen analytes were detected in the three sediment samples.

6.2. DISTRIBUTION OF DETECTED ANALYTES ABOVE DRINKING WATER STANDARDS

Figure 6.1 shows the only location with a sample containing semivolatile organic compounds above drinking water standard concentrations. The water sample was collected from a cistern located approximately one-half mile north of Mound Plant.

All locations that yielded water samples with metal concentrations exceeding the drinking water standards are shown on Figure 6.2. Of the twenty-four wells sampled, eighteen (75%) contained one

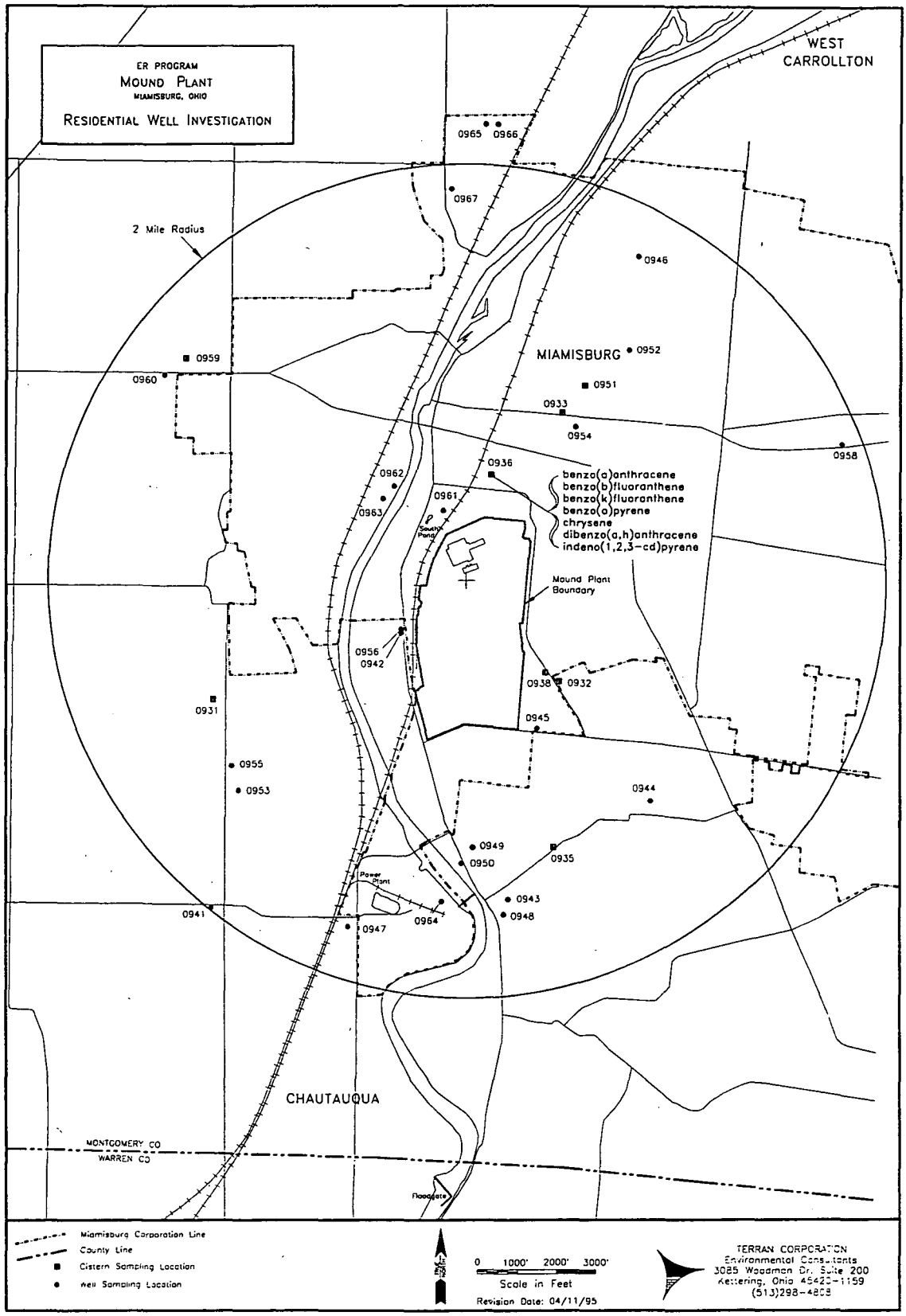

Figure 6.1. Distribution of semivolatile organic compounds exceeding drinking water standards.

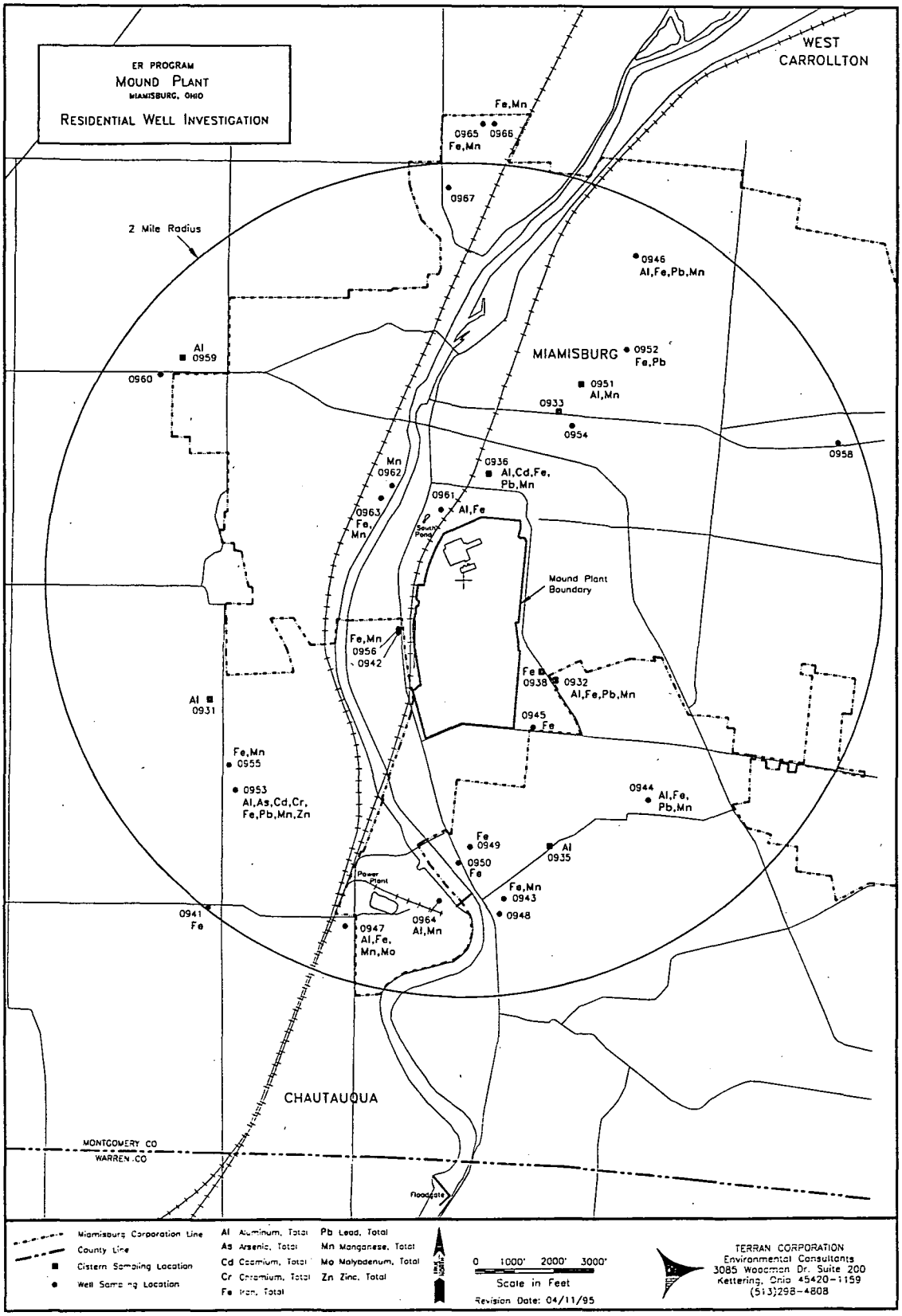

Figure 6.2. Distribution of target analyte list metals exceeding drinking water standards.

or more metals above the standard, and four (13%) contained one or more metal listed as an analyte of interest at a concentration above the standard. Of the eight cisterns yielding water samples, seven (88%) contained metals and two (25%) contained analytes (metals) of interest above the MCLs or SMCLs. The locations are scattered throughout the 2-mile radius of Mound Plant. The occurrence of metals at concentrations above drinking water standards does not increase with proximity to Mound Plant. Individual metals exceeding drinking water standard concentrations are not detected with greater frequency with proximity to Mound Plant.

Figure 6.3 shows the locations of wells or cisterns with total dissolved solids or nitrate/nitrite concentrations greater than the drinking water standards. Fourteen (58%) wells and two (25%) cisterns produced water samples containing total dissolved solids above the SMCL. Only one location, a cistern, contained nitrate/nitrite at a concentration above the MCL. The occurrence of the two parameters at concentrations above drinking water standards does not increase with proximity to Mound Plant.

The greatest number of water samples containing residential well analytes of interest in concentrations above drinking water standards were collected from areas designated as having moderate or low potential impact on ground water (Table VI.3 and Figure 1.1). This data does not suggest a correlation between the detection of analytes of interest and areas of greater susceptibility to contamination resulting from historical Mound Plant operations.

Table VI.3. Occurrence of Residential Well Analytes of Interest in Potential Impact Areas

Potential Impact Designation	Number of well and cistern samples containing residential well analytes of interest above drinking water standards			
	SVOCs	Metals	Anions	Radionuclides
extreme	0 (0%)	1 (4%)	1 (7%)	0 (0%)
high	0 (0%)	7 (29%)	5 (36%)	0 (0%)
moderate	1 (100%)	4 (17%)	2 (14%)	1 (100%)
low	0 (0%)	12 (50%)	6 (43%)	0 (0%)
minimal	no samples collected from this area			

6.3. COMPARISON OF RESULTS FROM FIRST AND SECOND SAMPLING EVENTS

Table VI.4 presents a comparison of the mean concentrations of detected analytes for the two sampling events. Appendix F contains tabulated standard deviations for each parameter analyzed during the second sampling event. The percent difference (the difference of two numbers divided by their average) between the mean concentrations typically range from 0% to 120%, and is not dependant on the mean concentrations or the type of parameter.

There is a general correlation between the number of detected analytes for the two sampling events, indicating that analytes were detected at approximately the same frequency during both sampling events. However, the analytes were not necessarily detected at the same sampling locations during both events. Instead, whether or not an analyte was detected during both sampling events was a function of the frequency of total analyte detections. Analytes detected in a low number of wells were detected at the same locations at a lower frequency than analytes detected in a large number of wells.

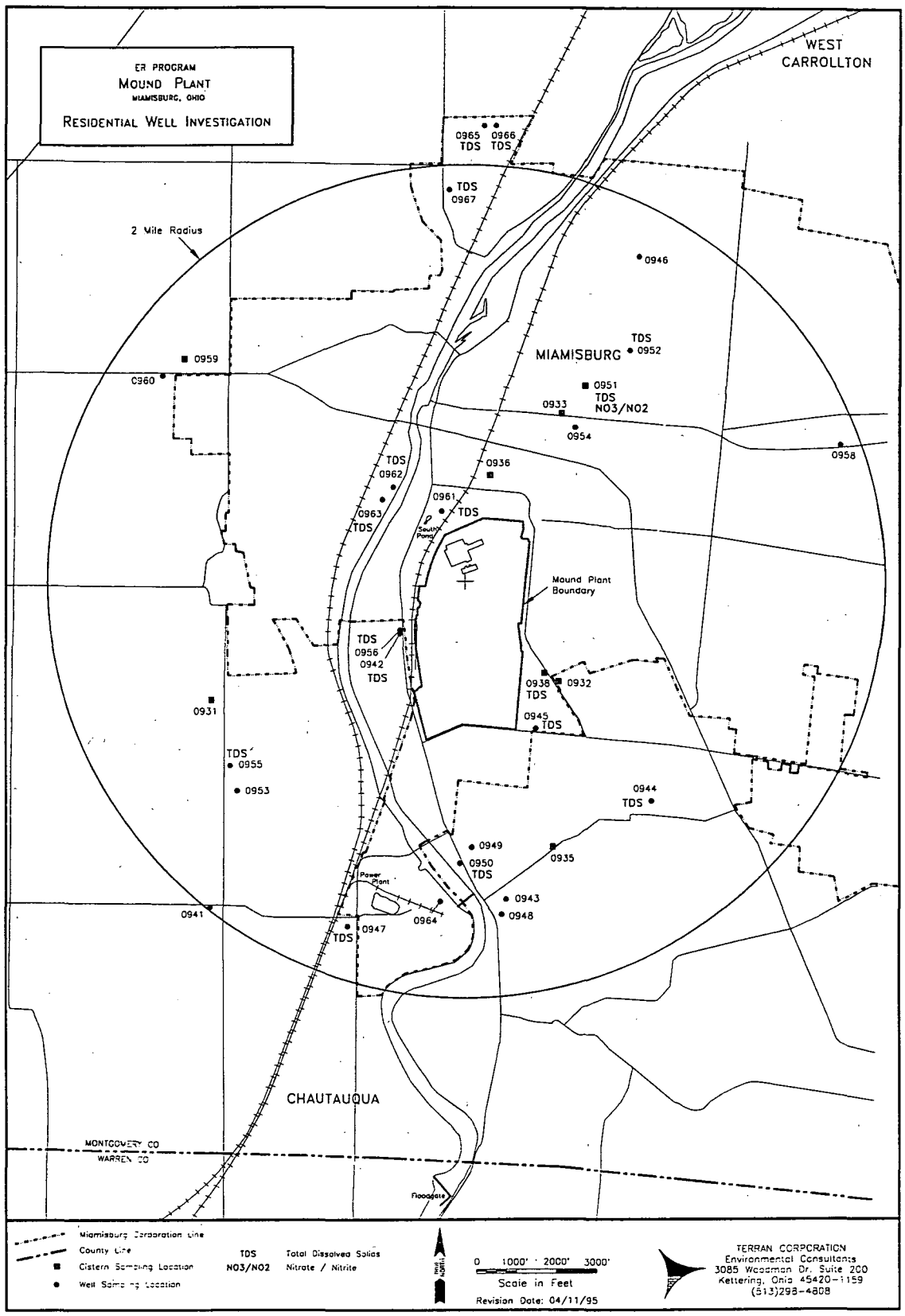

Figure 6.3. Distribution of nitrate/nitrite and total dissolved solilds exceeding drinking water standards.

Table VI.4. Comparison of Positive Results from Both Sampling Events

Detected Analyte	Number of Detections	Mean Concentration	Number of Detections	Mean Concentration	Percent Difference of Mean Concentration
	First Sampling Event		Second Sampling Event		
	Volatile Organic Compounds (µg/L)				
cis-1,2-dichloroethene	1	1.40	1	0.900	43
Semivolatile Organic Compounds (µg/L)					
acenapthylene	1	0.30	0	-	-
anthracene	0	-	1	0.500	-
benzo(a)anthracene	1	1.00	1	2.00	67
benzo(b)fluoranthene	1	2.00	1	3.00	40
benzo(k)fluoranthene	1	1.00	1	3.00	100
benzo(g,j,i)perylene	1	1.00	1	2.00	67
benzo(a)pyrene	1	1.00	1	2.00	67
bis(2-ethylhexyl)phthalate	2	0.800	1	0.5	46
carbazole	1	0.500	0	-	-
chrysene	1	2.00	2	1.80	11
dibenz(a,h)anthracene	1	0.400	2	3.30	157
fluoranthene	1	4.00	2	4.00	0
indeno(1,2,3-cd)pyrene	1	1.00	2	2.50	86
4-methylphenol	1	0.300	0	-	-
phenanthrene	1	2.00	3	3.00	40
phenol	1	0.500	2	3.00	143
pyrene	1	2.00	2	2.51	22
Pesticides/PCBs (µg/L)					
delta-BHC	1	0.019	4	0.0270	35
alpha-chlordane	2	0.241	7	0.0494	132
gamma-chlordane	2	0.272	7	0.0609	127
4,4-DDE	1	0.0380	5	0.0676	56
4,4-DDT	1	0.0280	3	0.0620	76
heptachlor epoxide	2	0.0710	2	0.0480	39
heptachlor	1	0.0560	2	0.223	120
gamma-BHC (Lindane)	1	0.0370	1	0.360	163
methoxychlor	0	-	1	0.360	-
Target Analyte List Metals (µg/L)					
Aluminum, Total	28	440	30	1090	85
Antimony, Total	4	0.928	0	-	-
Arsenic, Total	8	18.45	13	5.55	108
Barium, Total	32	110.2	30	107.0	3

Table VI.4. Comparison of Positive Results from Both Sampling Events (cont.)

Detected Analyte	Number of Detections	Mean Concentration	Number of Detections	Mean Concentration	Percent Difference of Mean Concentration
	First Sampling Event		Second Sampling Event		
Target Analyte List Metals (µg/L) (cont.)					
Beryllium, Total	5	0.420	5	0.486	15
Bismuth, Total	2	28.55	0	-	-
Cadmium, Total	3	5.60	7	2.19	88
Calcium, Total	32	79581	30	79322	0
Chromium, Total	9	16.4	5	11.48	35
Cobalt, Total	17	2.78	5	5.84	71
Copper, Total	28	9.92	30	13.3	29
Cyanide	1	6.00	0	-	-
Iron, Total	32	7682	30	2846	92
Lead, Total	15	40.3	16	28.2	35
Lithium, Total	27	32.4	22	39.9	21
Magnesium, Total	32	30481	30	31778	4
Manganese, Total	30	83.8	29	82.3	2
Mercury, Total	1	0.130	2	0.210	47
Molybdenum, Total	18	12.1	20	8.63	33
Nickel, Total	12	6.49	8	8.01	21
Potassium, Total	32	1970	30	2521	25
Selenium, Total	5	3.30	6	2.483	28
Silver, Total	2	3.80	4	1.098	110
Sodium, Total	32	28712	30	23439	20
Tin, Total	16	22.1	4	10.35	72
Vanadium, Total	22	7.57	28	11.17	38
Zinc, Total	32	1156	30	351	107
Radionuclides (pCi/L)					
Americium-241	25	0.0773	12	0.2633	109
Potassium-40	0	-	3	226.6	-
Plutonium-238	2	0.0929	2	0.245	90
Plutonium-239/240	21	0.0793	8	0.216	93
Radium-226	16	0.464	13	0.526	13
Strontium-90	12	1.908	1	0.641	99
Thorium-228	27	0.722	17	0.499	36
Thorium-230	25	1.249	16	0.438	96
Thorium-232	3	0.905	5	0.372	83
Tritium	11	849	14	922	8
Uranium-234	25	0.737	25	0.442	50

Table VI.4. Comparison of Positive Results from Both Sampling Events (cont.)

Detected Analyte	Number of Detections	Mean Concentration	Number of Detections	Mean Concentration	Percent Difference of Mean Concentration
	First Sampling Event		Second Sampling Event		
Radionuclides (pCi/L) (cont.)					
Uranium-235/236	2	0.1824	6	0.2483	31
Uranium-238	19	0.689	19	0.409	51
Anions (mg/L)					
Alkalinity	32	269	30	253	6
Fluoride	27	0.410	25	0.411	0
Nitrate/Nitrite	25	1.35	25	1.62	19
Nitrite as N	4	0.01650	25	1.62	75
Total Dissolved Solids	32	414	30	458	10
Total Suspended Solids	12	148	15	80.1	60

µg/L - micrograms per liter
pCi/L - picocuries per liter
mg/L - milligrams per liter

6.4. DETECTED ANALYTES BY HYDROGEOLOGIC SETTING, AND COMPARISON TO BASELINE CONCENTRATIONS

Three types of water samples were collected during this investigation. They were samples collected from the Buried Valley Aquifer, the bedrock aquifer, and cisterns. Average concentrations of each detected analyte were calculated for upgradient BVA wells, downgradient BVA wells, bedrock wells, and cisterns (Table VI.5). The average concentrations were calculated from the reported analyte concentrations, one-half of the quantitation limits for undetected chemical analytes, and one-half the minimum detectable activities of undetected radionuclides. This procedure is consistent with the method used to calculate baseline concentrations in the Groundwater Sweeps report (DOE 1995).

Upgradient and downgradient BVA results were compared to the BVA baseline concentrations established in the sweeps report. Downgradient BVA wells contained ten analytes with average concentrations above the baseline values. The ten analytes were antimony, cobalt, copper, lead, molybdenum, zinc, plutonium-239/240, strontium-90, thorium-230 and uranium-235/236. Nine of the analytes exceeded baseline concentrations in all wells and cisterns. The tenth analyte (thorium-230) exceeded baseline concentrations in all upgradient BVA wells, downgradient BVA wells, and bedrock wells.

Of the ten analytes present above baseline concentrations in downgradient BVA wells, five have greater average concentrations in wells completed upgradient of Mound Plant. (Wells upgradient from Mound Plant have a minimal potential for contamination due to historical plant operations.) The five analytes are cobalt, lead, zinc, plutonium-239/240 and thorium-230. The occurrence of analytes with average concentrations above baseline values is not unique to BVA wells sampled downgradient of Mound Plant.

Table VI.5. Average analyte concentration for each hydrogeologic unit and baseline concentrations from groundwater sweeps investigation

Analyte	BVA Upgradient	BVA Downgradient	Bedrock Aquifer	Cistern Water	Baseline
Volatile Organic Compounds (μg/L)					
cis-1,2-Dichloroethene		0.415			
Semivolatile Organic Compounds (μg/L)					
Acenaphthylene	ND	ND	ND	2.37	5.80
Anthracene	ND	ND	ND	2.38	5.80
Benzo(a)anthracene	ND	ND	ND	2.38	5.80
Benzo(b)fluoranthene	ND	ND	ND	2.50	5.80
Benzo(k)fluoranthene	ND	ND	ND	2.44	5.80
Benzo(g,h,i)perylene	ND	ND	ND	2.38	5.80
Benzo(a)pyrene	ND	ND	ND	2.38	5.80
bis(2-Ethylhexyl)phthalate	ND	2.420	2.310	ND	7.92
Carbazole	ND	ND	ND	2.38	5.80
Chrysene	ND	ND	ND	2.50	5.80
Dibenz(a,h)anthracene	ND	ND	ND	2.27	5.80
Fluoranthene	ND	ND	ND	2.79	5.80
Indeno(1,2,3-cd)pyrene	ND	ND	ND	2.38	5.80
4-Methylphenol	ND	ND	ND	2.37	5.80
Phenanthrene	ND	ND	ND	2.50	5.80
Phenol	ND	2.425	ND	2.38	7.80
Pyrene	ND	ND	ND	2.62	5.80
Pesticides / PCBs (μg/L)					
alpha-Chlordane	ND	ND	ND	0.0376	0.028
delta-BHC	ND	ND	ND	0.0058	0.028
gamma-Chlordane	ND	ND	ND	0.0406	0.028
4,4-DDE	ND	ND	ND	0.0204	0.055
4,4-DDT	ND	ND	ND	0.0158	0.055
Heptachlor epoxide	ND	ND	ND	0.0141	0.028
Heptachlor	ND	ND	ND	0.0080	0.028
Lindane (gamma-BHC)	ND	ND	ND	0.0069	0.028
Methoxychlor	ND	ND	ND	0.0682	0.281
Target Analyte List Metals (μg/L)					
Aluminum, Total	36.7	20.34	2242	848	122
Antimony, Total	4.68	4.789	9.0	9.4	0.539
Arsenic, Total	3.16	1.415	11.0	1.9	28.2
Barium, Total	90.9	143.06	162	29	315
Beryllium, Total	0.502	ND	0.53	0.44	0.241
Bismuth, Total	71.3	ND	ND	72	16.4
Cadmium, Total	0.992	ND	2.3	1.3	0.518
Calcium, Total	93776	89430	89736	41907	123303
Chromium, Total	4.59	4.84	15	5.9	136
Cobalt, Total	19.6	15.4	14	21	2.16
Copper, Total	10.5	11.0	18	11	3.42

Table VI.5. Average analyte concentration for each hydrogeologic unit and baseline concentrations from groundwater sweeps investigation (cont.)

Analyte	BVA Upgradient	BVA Downgradient	Bedrock Aquifer	Cistern Water	Baseline
Target Analyte List Metals (μg/L) (cont.)					
Cyanide	ND	ND	5.1	5.0	6.48
Iron, Total	1076	1441	19098	1403	3778
Lead, Total	5.78	1.95	45	61	1.44
Lithium, Total	33.5	46.3	38	34	50.3
Magnesium, Total	33541	31425	43557	17045	41402
Manganese, Total	54.0	76.8	145	44	214
Mercury, Total	ND	ND	0.10	0.12	0.050
Molybdenum, Total	7.35	13.2	12	10	6.50
Nickel, Total	17.6	16.4	18	14	152
Potassium, Total	1679	2889	3016	1129	5381
Selenium, Total	1.32	1.1	2.0	2.4	1.85
Silver, Total	ND	ND	4.3	4.4	0.786
Sodium, Total	23045	50165	16781	5669	105374
Tin, Total	24.7	22.5	28	20	34.7
Vanadium, Total	7.97	8.18	10.3	6.9	18.1
Zinc, Total	380	202	2467	268	100
Radionuclides (pCi/L)					
Americium-241	0.389	0.113	0.172	0.150	0.124
Potassium-40	135	131	160	350	156
Plutonium-238	0.0889	0.0843	0.207	0.090	0.085
Plutonium-239/240	0.0967	0.0711	0.169	0.060	0.055
Radium-226	0.279	0.387	0.485	0.500	1.02
Strontium-90	1.64	1.74	2.89	5.00	0.973
Thorium-228	0.407	0.449	0.416	0.290	0.801
Thorium-230	0.667	0.529	117	0.080	0.276
Thorium-232	0.0886	0.115	0.250	0.080	0.233
Tritium	352	834	269	350	1379
Uranium-234	0.402	0.360	0.806	0.130	0.771
Uranium-235/236	0.0491	0.0603	0.0718	0.130	0.038
Uranium-238	0.367	0.219	0.654	0.090	0.683
Anions (mg/L)					
Alkalinity	291	290	333	130	*
Fluoride	0.505	0.192	0.66	0.10	0.412
Nitrate/Nitrite	1.66	0.463	0.18	2.8	6.46
Nitrite as N	ND	ND	0.011	0.019	*
Total Dissolved Solids	494	515	494	222	843
Total Suspended Solids	5.9	6.3	158	49	33.0

BVA - Buried Valley Aquifer
pCi/L - picocuries per liter
ND - analyte not detected

μg/L - micrograms per liter (parts per billion)
mg/L - milligram per liter (parts per million)
* - no baseline value available

7. SUMMARY

The objectives of the residential well/cistern sampling program were defined in the OU-9 Work Plan as follows:

1. Determine the number and location of municipal, industrial, and domestic supply wells within a two-mile radius of Mound Plant.

2. Determine the location of cisterns within a two-mile radius of Mound Plant.

3. Compile information on the completion, construction and use of the residential wells; and any previous chemical analyses conducted on the residential well water.

4. Determine the potential for contamination of residential wells resulting from plant operations.

5. Analyze residential well samples to determine if contamination had occurred.

The objectives of the program have been achieved, as discussed in the previous sections. This report, in conjunction with the supplementary reports (residential well/cistern survey task summary and sampling program data validation reports), document the completion of the project objectives.

The number and location of wells and cisterns within a two-mile radius of Mound Plant were determined by reviewing public documents and soliciting public responses through newspaper advertisements. These information sources were also used to compile information on the construction and use of the wells and cisterns. Documentation of the attainment of the first three objectives are presented in Section 1.2. of this report, and in greater detail in the Residential Well/Cistern Survey Summary report (DOE 1993a).

The potential for well and cistern contamination was determined from a three-step process. First, areas of potential contamination were determined within a two-mile radius of the Mound. Second, two sets of samples were collected from wells and cisterns within the potential contamination areas. Third, laboratory results from the two sampling events were analyzed to evaluate the occurrence and distribution of detected contaminants.

A derivative mapping procedure was used to identify areas of lower to greater potential for contamination resulting from Mound Plant operations. This approach was approved by the U.S. EPA, the Ohio EPA, and EG&G Mound ER personnel. Well and cistern sampling locations were selected based on the degree of potential contamination, and the use of the wells and cisterns for potable water supplies. The number of sampling locations was further limited by the ability to obtain access agreements for each property.

Water and sediment samples were collected from wells and cisterns during two sampling events: January/February 1994 and August/September 1994. During the first sampling event, water samples were collected from eighteen residential wells, six production wells and eight cisterns. One cistern was dry and yielded only sediment samples. Sediment samples were collected from three cisterns. Water samples could not be collected from one well and one cistern during the second sampling event.

Sampling and analysis met the objectives of the OU-9 QAPP. The QAPP SOPs were followed during sample collection. Some variances from the analytical methods required by the QAPP were granted to the laboratory conducting chemical analyses. Analytical laboratory data were validated according to the criteria of the OU-9 QAPP, the analytical methods, and U.S. EPA guidelines. Data validation resulted in the rejection of twenty individual analytes. The analytical data were assessed for accuracy and precision. With the exception of the rejected data, the analytical results were assessed as usable.

The OU-9 QAPP completeness goals for data collection and analysis were met for water and sediment samples during both sampling events.

This report identified analyte concentrations that exceeded U.S. EPA MCLs, Secondary MCLs, and Lifetime Health Advisories; and Department of Energy drinking water standards for radionuclides (Plate 1). Mound Plant analytes of interest were identified where they exceeded drinking water standards. No volatile compounds were detected above the drinking water standards, and semivolatile compounds exceeded the standards in only one water sample. Pesticides were detected in four cistern water samples at concentrations below the standards. Nine metals were detected above drinking water limits. The nine metals include arsenic, cadmium, chromium, and lead, which are analytes of interest. Two samples contained radionuclides above drinking water standards. One cistern water sample collected during the first sampling event contained strontium-90 above the U.S. EPA MCL. Strontium-90 was below the detection limit in the sample collected during the second sampling event. One sample contained americium-241 above the DOE drinking water standard concentration. However, comparison of the results of the one sample with those of the field duplicate, other samples collected during the first sampling event, and the corresponding sample collected during the second sampling event indicate that the high americium value was an outlier. Total dissolved solids were present above the SMCL in sixteen wells and cisterns; nitrate/nitrite exceeded the MCL in only one sample.

The areal distribution of analytes occurring above drinking water standards does not indicate that analyte concentrations increase in the proximity of Mound Plant. Additionally, the number of analytes that exceed drinking water concentrations do not increase in proximity of Mound Plant. The aerial distribution of analyte concentrations, and the type of analytes detected indicate that there is a low potential of residential well and cistern contamination resulting from Mound Plant operations.

The number of water samples containing residential well analytes of interest in concentrations above drinking water standards is the greatest in areas of moderate to low potential impact to ground water resulting from historical Mound Plant operations. This does not suggest a correlation between areas of higher potential impact and the detection of elevated concentrations of the analytes of interest.

Laboratory results for wells completed in the Buried Valley Aquifer were compared to baseline values established in the Groundwater Sweeps report. Wells downgradient of Mound Plant contained ten analytes with average concentrations above baseline values. The ten analytes were antimony, cobalt, copper, lead, molybdenum, zinc, plutonium-239/240, strontium-90, thorium-230 and uranium-235/236. Five of the ten analytes have greater average concentrations in wells completed upgradient of Mound Plant. The five analytes are cobalt, lead, zinc, plutonium-239/240 and thorium-230. The occurrence of analytes with average concentrations above baseline values is not unique to BVA wells sampled downgradient of Mound Plant.

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Appendix A

APPENDIX A

BORING LOGS AND COMPLETION DIAGRAMS FOR SAMPLED WELLS AND CISTERNS

0931

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID
CIS-9

Owner	Richard A. Brewster	State Plane Coordinates		Latitude	
Address	[redacted]	North (ft.)	East (ft.)	39°37'15"	
City	[redacted]	595450	1490150	Longitude	
Location of Property	[redacted]			84°18'36"	
Well Casing Material	N/A	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	N/A	Type of Pump	Jet Pump above ground		
Length of Casing (ft.)	N/A	Well Log Resource	Survey		
Screen Length (ft.)	N/A	Well Location Verified	N/A	Date	N/A
Type of Screen	N/A	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Yes;Non-Potable		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	N/A				Cistern Information: Material: Concrete block Use: Laundry Dimensions: 8' long x 5' wide x 4' deep

GROUNDWATER

	DEPTH	HOUR	DATE
▽	N/A	N/A	N/A

TERRAN

0932

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	CIS-14		
Owner	Clifford S. & Martha E. Colson	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°37'22"
City	[redacted]	595950 / 1498900	Longitude
Location of Property	[redacted]		84°16'44"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	Unknown	Type of Pump	Above ground		
Length of Casing (ft.)	Unknown	Well Log Resource	Survey		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	70.0	In Use (Y/N); Use	Yes;Potable		
Date Drilled					
Drilled By	Unknown - ~1950				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				Cistern and Well present on this property. Cistern Information: Construction Date: 1950's Contractor: Colson Material: Cement Capacity: 10,000 gallons Pump in well pit. Use: Bathing and laundry. Limestone over 70'

GROUNDWATER

	DEPTH	HOUR	DATE
▽	Unk.	Unk.	Unk.

TERRAN

0933

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID CIS-2					
Owner	Mark & Hanna Frechette	State Plane Coordinates		Latitude	
Address	[redacted]	North (ft.)	East (ft.)	39°38'29"	
City	[redacted]	602750	1499000	Longitude	
Location of Property	[redacted]			84°16'45"	
Well Casing Material	N/A	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	N/A	Type of Pump	Unknown		
Length of Casing (ft.)	N/A	Well Log Resource	Survey		
Screen Length (ft.)	N/A	Well Location Verified	N/A	Date	N/A
Type of Screen	N/A	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	No;N/A		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	N/A				Cistern Information: Construction Date: 1900 Material: Concrete Use: Will be used for watering lawn.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	N/A	N/A	N/A

TERRAN

0935

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID CIS-13					
Owner	Martha McQueen	State Plane Coordinates		Latitude	
Address	[redacted]	North (ft.)	East (ft.)	39°36'40"	
City	[redacted]	591750	1498750	Longitude	
Location of Property	[redacted]			84°16'45"	
Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	Unknown	Type of Pump	Submersible		
Length of Casing (ft.)	Unknown	Well Log Resource	Survey		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	55.0	In Use (Y/N); Use	Yes;Potable		
Date Drilled					
Drilled By	Unknown - ~1930's				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				Cistern and Well present on this property. No lithologic information available for this well. Cistern Information: Date: 1930's Material: Cement Use: Hot water and laundry.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	Unk.	Unk.	Unk.

TERRAN

0936

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	CIS-1		
Owner	Teresa Prosser	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°38'13"
City	[redacted]	601200 / 1497200	Longitude
Location of Property	[redacted]		84°17'8"

Well Casing Material	N/A	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	N/A	Type of Pump	Unknown		
Length of Casing (ft.)	N/A	Well Log Resource	Survey		
Screen Length (ft.)	N/A	Well Location Verified	N/A	Date	N/A
Type of Screen	N/A	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Yes;Non-Potable		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	N/A				Cistern Information: Construction Date: 1918 Material: Cement Depth: 10-12 feet Use: Water for steam heat

GROUNDWATER

	DEPTH	HOUR	DATE
▽	N/A	N/A	N/A

TERRAN

0937

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID CIS-16					
Owner	Michelle & Cliff Rudy	State Plane Coordinates		Latitude	
Address	[redacted]	North (ft.)	East (ft.)	39°38'19"	
City	[redacted]	601800	1497700	Longitude	
Location of Property	[redacted]			84°17'1"	
Well Casing Material	N/A	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	N/A	Type of Pump	Unknown		
Length of Casing (ft.)	N/A	Well Log Resource	Survey		
Screen Length (ft.)	N/A	Well Location Verified	N/A	Date	N/A
Type of Screen	N/A	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	No;N/A		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	N/A				Cistern lined with brick, cement ridge, metal cover. 2 covers 10" apart.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	N/A	N/A	N/A

TERRAN

0938

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	CIS-15		
Owner	Daniel R. Shell	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°37'24"
City	[redacted]	596150 / 1498550	Longitude
Location of Property	[redacted]		84°16'49"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	Unknown	Type of Pump	Disconnected		
Length of Casing (ft.)	Unknown	Well Log Resource	Survey		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	No;N/A		
Date Drilled					
Drilled By	Unknown in 1940				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				Cistern and Well present on this property. No information given for this well. Depth of well is unknown. Cistern Information: Construction Date: 1940's Material: Cement 3 Cisterns on property.

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0941

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 325*

Owner	B. A. Benge	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°36'23"
City	[redacted]	590200 / 1490150	Longitude
Location of Property	[redacted]		84°18'35"
Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown
Casing Diameter (inches)	Unknown	Type of Pump	Unknown
Length of Casing (ft.)	Unknown	Well Log Resource	Survey
Screen Length (ft.)	Unknown	Well Location Verified	N/A — Date N/A
Type of Screen	Unknown	Well Depth Verified	N/A — Date N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Yes;Potable
Date Drilled			
Drilled By	Unknown		

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				No information given for this well. Depth of well is unknown.

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0942

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 100B				
Owner	Orville B. Sorrell	State Plane Coordinates		Latitude
Address	[redacted]	North (ft.)	East (ft.)	39°37'33"
City	[redacted]	597150	1494950	Longitude
Location of Property	[redacted]			84°17'35"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	18		
Casing Diameter (inches)	6	Type of Pump	Reda submersible 1/3 hp		
Length of Casing (ft.)	49	Well Log Resource	ODNR		
Screen Length (ft.)	3	Well Location Verified	N/A	Date	N/A
Type of Screen	Cook Brass #30	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	52.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	4/12/77				
Drilled By	William Crane				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0	Top of Casing 1' above ground surface			FILL	Top Soil
5, 10, 15, 20, 25, 30, 35, 40, 45, 50	Casing Length 49'	▽		CLAYGR	Brown Clay and Gravel
				SANDGR	Dirty Sand and Gravel (water)
				CLAYGR	Brown Clay and Gravel
	Assumed Screen Depth Pump set at 49'			SANDGR	Sand and Gravel (water)
	Bottom of Hole and Casing				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	15.6	Unk.	04/14/77

TERRAN

0943

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	182		
Owner	John P. & Rebecca J. Burkhart	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°36'27"
City	[redacted]	590400 / 1497600	Longitude
Location of Property	[redacted]		84°16'59"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	8		
Casing Diameter (inches)	6	Type of Pump	Unknown		
Length of Casing (ft.)	68	Well Log Resource	ODNR		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	68.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	6/21/91				
Drilled By	Bates Water Well Dr.				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–15				FILL	Stoney Soil
15–20				CLAY	Clay
20–40		▽ 35		SANDCL	Sand and Clay
40–50	Casing Length 68'			GRAVELSD	Sandy Gravel
50–65				GRAVEL	Wash Gravel
	Bottom of Hole and Casing				Red Gravel

GROUNDWATER

	DEPTH	HOUR	DATE
▽	35	Unk.	06/21/91

TERRAN

0944

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	321*		
Owner	Roland J. & Orvalee N. Foster	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°36'52"
City	[redacted]	592900 / 1501250	Longitude
Location of Property	[redacted]		84°16'14"
Well Casing Material	Steel	Tested Pumping Rate (GPM)	Unknown
Casing Diameter (inches)	Unknown	Type of Pump	Submersible
Length of Casing (ft.)	Unknown	Well Log Resource	Survey
Screen Length (ft.)	Unknown	Well Location Verified	N/A — Date: N/A
Type of Screen	Unknown	Well Depth Verified	N/A — Date: N/A
Total Well Depth (ft.)	100.0	In Use (Y/N); Use	Yes;Potable
Date Drilled			
Drilled By	Unknown		

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				Went through Rock - at or before 100'

GROUNDWATER

	DEPTH	HOUR	DATE
▽	Unk.	Unk.	Unk.

TERRAN

0945

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 122*				
Owner	Steven L. & Tina R. Gabbard	State Plane Coordinates		Latitude
Address	[redacted]	North (ft.)	East (ft.)	39°37'10"
City	[redacted]	594750	1498350	Longitude
Location of Property	[redacted]			84°16'51"

Well Casing Material	Steel	Tested Pumping Rate (GPM)	4		
Casing Diameter (inches)	6	Type of Pump	Above ground		
Length of Casing (ft.)	29	Well Log Resource	ODNR, Survey		
Screen Length (ft.)	91	Well Location Verified	N/A	Date	N/A
Type of Screen	Open Hole	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	120.0	In Use (Y/N); Use	Yes;Potable		
Date Drilled	9/11/84				
Drilled By	Bates Well Drilling				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–20				GRAVEL	Gravel
15–25	Casing Length 29'	▽		SHALE	Soft Slate Rock
30–120	Bottom of Casing			LIMESTON	Limestone
120	Bottom of Hole				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	20	Unk.	09/11/84

TERRAN

0946

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	32		
Owner	Doris J. Goonan	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°39'8"
City	[redacted]	606700 / 1500900	Longitude
Location of Property	[redacted]		84°16'22"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	1		
Casing Diameter (inches)	6	Type of Pump	Unknown		
Length of Casing (ft.)	90	Well Log Resource	ODNR		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	90.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	10/7/53				
Drilled By	George M. Barker				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0				CLAY	Blue Clay
5					
10					
15					
20					
25					
30					
35					
40					
45	Casing Length 90'				
50					
55					
60		∇			
65					
70					
75					
80					
85					
90	Bottom of Hole and Casing				

GROUNDWATER

	DEPTH	HOUR	DATE
∇	60	Unk.	10/07/53

TERRAN

0947

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 204					
Owner	Charles Jr. & Charles III Guthrie	State Plane Coordinates		Latitude	
Address	[redacted]	North (ft.)	East (ft.)	39°36'19"	
City	[redacted]	589700	1493600	Longitude	
Location of Property	[redacted]			84°17'51"	
Well Casing Material	Unknown	Tested Pumping Rate (GPM)	20		
Casing Diameter (inches)	6	Type of Pump	Unknown		
Length of Casing (ft.)	45	Well Log Resource	ODNR		
Screen Length (ft.)	None	Well Location Verified	N/A	Date	N/A
Type of Screen	None	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	45.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	6/8/88				
Drilled By	S. Johnson				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–10				CLAYGR	Clay and Gravel
10–15				SAND	Sand
15–40	Casing Length 45'	▽		SANDGR	Sand and Gravel
40				GRAVEL	Gravel
	Bottom of Hole and Casing				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	21	Unk.	06/08/88

TERRAN

0948

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	195*		
Owner	Eugene L. Hecker	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°36'23"
City	[redacted]	590050 / 1497500	Longitude
Location of Property	[redacted]		84°17'1"

Well Casing Material	Steel	Tested Pumping Rate (GPM)	40Bailed		
Casing Diameter (inches)	6	Type of Pump	Red Jacket submersible		
Length of Casing (ft.)	85	Well Log Resource	ODNR,Survey		
Screen Length (ft.)	10	Well Location Verified	N/A	Date	N/A
Type of Screen	Open Hole	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	95.0	In Use (Y/N); Use	Yes;Potable		
Date Drilled	9/23/70				
Drilled By	H. L. Stoltz & Sons				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–10				CLAY	Clay
10–25				GRAVEL	Gravel
25–30				GRAVEL	Dry Gravel
30–45	Casing Length 85'			GRAVEL	Gravel
45–70		▽		GRAVEL	Water Gravel
70–85				CLAY	Clay
85–95	Bottom of Casing			SHALE	Shale
95	Bottom of Hole				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	49	Unk.	09/23/70

TERRAN

0949

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 152

Owner	Leah L. Hermetz	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°36'39"
City	[redacted]	591700 / 1496750	Longitude
Location of Property	[redacted]		84°17'11"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	5 5/8	Type of Pump	Unknown		
Length of Casing (ft.)	70	Well Log Resource	ODNR		
Screen Length (ft.)	5	Well Location Verified	N/A	Date	N/A
Type of Screen	Perforated	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	70.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	7/14/54				
Drilled By	A. J. Asher				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–40	Casing Length 70'			CLAYGR	Gravelly Clay
40–45				CLAY	Hard Pan
45–50				CLAYSD	Sand Clay Mix
50–65	Casing Perferated 60' to 65'			SANDGR	Sand Gravel
65–70				LIMESTON	Lime Clay
70	Bottom of Hole and Casing				

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0950

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 293

Owner	Leah L. Hermetz	State Plane Coordinates		Latitude	
Address	[redacted]	North (ft.)	East (ft.)	39°36'35"	
City	[redacted]	591300	1496450	Longitude	
Location of Property	[redacted]			84°17'15"	
Well Casing Material	Unknown	Tested Pumping Rate (GPM)	30		
Casing Diameter (inches)	6 o.d.	Type of Pump	Sta-Rite -1/2 h.p.		
Length of Casing (ft.)	49	Well Log Resource	ODNR		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	49.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	1/16/87				
Drilled By	Tincher Well Drill.				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0				CLAY	Clay
5					
10				CLAYSD	Clay and Sand
15					
20				CLAY	Hardpan
25	Casing Length 49'	▽			
30					
35				SANDGR	Sand and Gravel
40					
45	Pump set at 44'				
	Bottom of Hole and Casing				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	28	Unk.	01/15/87

TERRAN

0951

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID
CIS-19

Owner	Bruce & Kim Crisp	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°38'36"
City		603450 / 1499550	Longitude
Location of Property			84°16'38"

Well Casing Material	N/A	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	N/A	Type of Pump	None		
Length of Casing (ft.)	N/A	Well Log Resource	Survey		
Screen Length (ft.)	N/A	Well Location Verified	N/A	Date	N/A
Type of Screen	N/A	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	No;N/A		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	N/A				No information available for this cistern.

GROUNDWATER

	DEPTH	HOUR	DATE
∇	N/A	N/A	N/A

TERRAN

0952

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	307*		
Owner	Eugene McCormick	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°38'45"
City	[redacted]	604350 / 1500700	Longitude
Location of Property	[redacted]		84°16'24"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	Unknown	Type of Pump	Submersible		
Length of Casing (ft.)	Unknown	Well Log Resource	Survey		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Yes;Non-Potable		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				No information given for this well. Depth of well is unknown.

GROUNDWATER

	DEPTH	HOUR	DATE
▽	Unk.	Unk.	Unk.

TERRAN

0953

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 139

Owner	Ovel & Helen Rader	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°36'53"
City	[redacted]	593150 / 1490800	Longitude
Location of Property	[redacted]		84°18'27"
Well Casing Material	Unknown	Tested Pumping Rate (GPM)	18
Casing Diameter (inches)	6	Type of Pump	Unknown
Length of Casing (ft.)	54	Well Log Resource	ODNR
Screen Length (ft.)	Unknown	Well Location Verified	N/A — Date: N/A
Type of Screen	Unknown	Well Depth Verified	N/A — Date: N/A
Total Well Depth (ft.)	54.0	In Use (Y/N); Use	Unknown;Unknown
Date Drilled	8/29/69		
Drilled By	Dewey Fraley		

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0				FILL	Top Soil
5				CLAY	Red Clay
10		▽		CLAY	Brown Clay
15					
20					
25	Casing Length 54'				
30				SANDGR	Sand and Gravel
35					
40				GRAVEL	Gravel
45					
50					
	Bottom of Hole and Casing				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	10	Unk.	08/29/69

TERRAN

0954

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	327*		
Owner	Ronald Shaffer	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°38'24"
City	[redacted]	602250 / 1499250	Longitude
Location of Property	[redacted]		84°16'42"

Well Casing Material	Brick lined	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	Unknown	Type of Pump	None		
Length of Casing (ft.)	Unknown	Well Log Resource	Survey		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	23.0	In Use (Y/N); Use	No;N/A		
Date Drilled					
Drilled By	Unknown - ~1892				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				No information given for this well.

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0955

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 315*

Owner	Edward & Karen Sherrill	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°36'59"
City	[redacted]	593800 / 1490650	Longitude
Location of Property	[redacted]		84°18'29"
Well Casing Material	Galvanived Pipe	Tested Pumping Rate (GPM)	Unknown
Casing Diameter (inches)	Unknown	Type of Pump	Sears 1 hp above ground
Length of Casing (ft.)	Unknown	Well Log Resource	Survey
Screen Length (ft.)	Unknown	Well Location Verified	N/A — Date N/A
Type of Screen	Unknown	Well Depth Verified	N/A — Date N/A
Total Well Depth (ft.)	110.0	In Use (Y/N); Use	Yes;Non-Potable
Date Drilled			
Drilled By	Unknown		

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				Rock at 110'

GROUNDWATER

	DEPTH	HOUR	DATE
▽	Unk.	Unk.	Unk.

TERRAN

0956

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	93A		
Owner	Orville B. Sorrell	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°37'35"
City	[redacted]	597350 / 1494950	Longitude
Location of Property	[redacted]		84°17"35"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	20		
Casing Diameter (inches)	5 5/8	Type of Pump	Unknown		
Length of Casing (ft.)	72	Well Log Resource	ODNR		
Screen Length (ft.)	None	Well Location Verified	N/A	Date	N/A
Type of Screen	None	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	72.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	9/3/64				
Drilled By	Thomas Well Drilling				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–35				NO-DATA	First 37' not logged; old well
35–70	Casing Length 72'			SANDGR	Sand and Gravel
	Bottom of Hole and Casing				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	18	Unk.	09/03/64

TERRAN

0958

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 310*					
Owner	W. Frank Williams	State Plane Coordinates		Latitude	
Address	[redacted]	North (ft.)	East (ft.)	39°38'22"	
City	[redacted]	601950	1506000	Longitude	
Location of Property	[redacted]			84°15'15"	
Well Casing Material	Steel	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	6	Type of Pump	Above ground - basement		
Length of Casing (ft.)	Unknown	Well Log Resource	Survey		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Yes;Potable		
Date Drilled					
Drilled By	Unknown - ~1950				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				No information given for this well. Depth of well is unknown.

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0959

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	CIS-11		
Owner	Lee Ray & Goldie L. Gillen	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°38'40"
City	[redacted]	604100 / 1489450	Longitude
Location of Property	[redacted]		84°18'47"

Well Casing Material	N/A	Tested Pumping Rate (GPM)	N/A		
Casing Diameter (inches)	N/A	Type of Pump	Unknown		
Length of Casing (ft.)	N/A	Well Log Resource	Survey		
Screen Length (ft.)	N/A	Well Location Verified	N/A	Date	N/A
Type of Screen	N/A	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Yes;Non-Potable		
Date Drilled					
Drilled By	Unknown in 1961				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	N/A				Cistern Information: Construction Date: 1961 Material: Cement Dimensions: 10' wide x 10' long x 8' deep.

GROUNDWATER

DEPTH	HOUR	DATE
N/A	N/A	N/A

TERRAN

0960

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 309*			
Owner	William F. Zimmerman	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°38'36"
City	[redacted]	603650 / 1488900	Longitude
Location of Property	[redacted]		84°18'54"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	Unknown	Type of Pump	Sears 1.5 hp above grd.		
Length of Casing (ft.)	Unknown	Well Log Resource	Survey		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	150.0	In Use (Y/N); Use	Yes;Potable		
Date Drilled					
Drilled By	Unknown--~late 1950's				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No casing information provided.				No information given for this well.

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0961

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 299

Owner	City of Miamisburg Production Well #3		State Plane Coordinates		Latitude
Address	10 North Main Street		North (ft.)	East (ft.)	39°38'4"
City	Miamisburg	State Ohio	Zip 45342	600250	1496000	Longitude
Location of Property	in City Park				84°17'23"
Well Casing Material	Steel	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	26	Type of Pump	Unknown		
Length of Casing (ft.)	Unknown	Well Log Resource	Weston		
Screen Length (ft.)	Unknown	Well Location Verified	Tom Tharp	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	No construction details provided for this well.				Borehole lithology is unknown.

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0962

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 303					
Owner	City of Miamisburg Production Well #11		State Plane Coordinates		Latitude
Address	10 North Main Street		North (ft.)	East (ft.)	39°38'9"
City	Miamisburg	State Ohio	Zip 45342	600850	1494750	Longitude
Location of Property	302 South Riverview Road				84°17'39"
Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	Unknown	Type of Pump	Unknown		
Length of Casing (ft.)	Unknown	Well Log Resource	Weston		
Screen Length (ft.)	Unknown	Well Location Verified	Tom Tharp	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	Well completion information is unknown.				Borehole lithology is unknown.

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0963

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 304					
Owner	City of Miamisburg Production Well #12		State Plane Coordinates		Latitude
Address	10 North Main Street		North (ft.)	East (ft.)	39°38'6"
City	Miamisburg	State Ohio	Zip 45342	600550	1494500	Longitude
Location of Property	302 South Riverview Road				84°17'42"
Well Casing Material	Unknown	Tested Pumping Rate (GPM)	Unknown		
Casing Diameter (inches)	Unknown	Type of Pump	Unknown		
Length of Casing (ft.)	Unknown	Well Log Resource	Weston		
Screen Length (ft.)	Unknown	Well Location Verified	Tom Tharp	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	0.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled					
Drilled By	Unknown				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
	Well completion information is unknown.				Borehole lithology is unknown.

GROUNDWATER

DEPTH	HOUR	DATE
Unk.	Unk.	Unk.

TERRAN

0964

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID 305B*					
Owner	DPL Hutchings Station Attention: Colleen Kramer		State Plane Coordinates		Latitude
Address	9200 Chautauqua Road		North (ft.)	East (ft.)	39°36'26"
City	Miamisburg	State Ohio	Zip 45342	590350	1495950
Location of Property	9200 Chautauqua Road				Longitude 84°17'21"
Well Casing Material	Steel	Tested Pumping Rate (GPM)	1600		
Casing Diameter (inches)	26	Type of Pump	DRLC #16967 above grd.		
Length of Casing (ft.)	120	Well Log Resource	Layne-Ohio Co.,Survey		
Screen Length (ft.)	30	Well Location Verified	N/A	Date	N/A
Type of Screen	Everdur Bronze	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	150.0	In Use (Y/N); Use	Yes;Potable		
Date Drilled	8/1/47				
Drilled By	The Layne-Ohio Co.				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–15				FILL	Top Soil and Clay
15–35		∇		SANDGR	Sand, Gravel and Boulders
35–45				CLAYGR	Clay and Boulders
45–70	38" Casing Length 102'; 26" Casing Length 120'			SANDGR	Coarse Sand and Gravel
70–85				GRAVEL	Gravel and Boulders
85–115	Pump set at 100'; Bottom of 38" Casing			SANDGR	Coarse Sand and Gravel
115–120				CLAY	Clay
120–150	Bottom of 26" Casing; Screen Depth 120'			SANDGR	Coarse Sand and Gravel, Boulders
150	Bottom of Hole				

GROUNDWATER

	DEPTH	HOUR	DATE
∇	16	Unk.	08/01/47

TERRAN

0965

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	1A		
Owner	Jefferson Regional Water Authority	State Plane Coordinates	Latitude
Address	5938 Soldiers Home Road	North (ft.) / East (ft.)	39°39'41"
City	Miamisburg	State Ohio / Zip 45342	610050 / 1497050
			Longitude
Location of Property	5938 Soldiers Home Road		84°17'12"
Well Casing Material	Unknown	Tested Pumping Rate (GPM)	528
Casing Diameter (inches)	12	Type of Pump	Layne & Bowler 500 gpm
Length of Casing (ft.)	100	Well Log Resource	ODNR
Screen Length (ft.)	15	Well Location Verified	N/A — Date N/A
Type of Screen	Cook S.S.	Well Depth Verified	N/A — Date N/A
Total Well Depth (ft.)	115.0	In Use (Y/N); Use	Unknown;Unknown
Date Drilled	1/1/82		
Drilled By	Layne-Ohio Company		

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–5				CLAYSD	Sandy Clay
5–20		∇		SANDGR	Sand and Gravel
20–55	Casing Length 100'			BLDRCBBL	Large Boulders
55–115	Pump set at 80'; Bottom of Casing; Screen Depth Assumed			SANDGR	Sand and Gravel, Boulders
115	Bottom of Hole				

GROUNDWATER

	DEPTH	HOUR	DATE
∇	18	Unk.	10/19/81

TERRAN

0966

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID
1B

Owner	Jefferson Regional Water Authority		State Plane Coordinates		Latitude
Address	5938 Soldiers Home Road		North (ft.)	East (ft.)	39°39'40"
City	Miamisburg	State Ohio	Zip 45342	610000	1497350	Longitude
Location of Property	5938 Soldiers Home Road				84°17'8"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	528		
Casing Diameter (inches)	12	Type of Pump	Layne & Bowler 500 gpm		
Length of Casing (ft.)	85	Well Log Resource	ODNR		
Screen Length (ft.)	15	Well Location Verified	N/A	Date	N/A
Type of Screen	Cook S.S.	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	100.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	1/1/82				
Drilled By	Layne-Ohio Company				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0–5				CLAYSD	Sandy Clay
5–20				SANDGR	Sand and Gravel
20–40				BLDRCBBL	Large Boulders
40–60	Casing Length 85'				
60–100	Pump set at 80' Assumed Screen Depth Bottom of Casing			SANDGR	Sand, Gravel, Boulders
100	Bottom of Hole				

GROUNDWATER

	DEPTH	HOUR	DATE
∇	20	Unk.	10/20/81

TERRAN

0967

RESIDENTIAL WELL SURVEY GEOLOGIC & WELL LOG

Well ID	14		
Owner	Boyd D. & Belinda Williams	State Plane Coordinates	Latitude
Address	[redacted]	North (ft.) / East (ft.)	39°39'24"
City	[redacted]	608400 / 1496200	Longitude
Location of Property	[redacted]		84°17'22"

Well Casing Material	Unknown	Tested Pumping Rate (GPM)	15Bailed		
Casing Diameter (inches)	5 5/8	Type of Pump	Unknown		
Length of Casing (ft.)	50	Well Log Resource	ODNR		
Screen Length (ft.)	Unknown	Well Location Verified	N/A	Date	N/A
Type of Screen	Unknown	Well Depth Verified	N/A	Date	N/A
Total Well Depth (ft.)	50.0	In Use (Y/N); Use	Unknown;Unknown		
Date Drilled	12/1/87				
Drilled By	John E. White				

Depth	Well Materials	Well Con	Lith	USCS or Rock Type	Lithologic Description
0				CLAY	Clay
5				CLAYGR	Clay and Dry Gravel
10					
15		▽			
20				CLAYGR	Clay and Gravel
25	Casing Length 50'				
30					
35					
40					
45				SANDGR	Sand and Gravel
50	Bottom of Hole and Casing				

GROUNDWATER

	DEPTH	HOUR	DATE
▽	18	Unk.	12/87

TERRAN

Appendix B

APPENDIX B

GROUNDWATER QUALITY SAMPLING RECORDS

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0931
SAMPLE ID: MND24 0931 - 0001
LOG DATE: 2/1/94
ANALYTICAL LAB CODE: WA IFT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFERR

INITIAL GROUNDWATER DEPTH (FT): 2.5
SAMPLE DEPTH (FT): 5.68
SAMPLING PERIOD: START 1330 COMPLETE 1410
SAMPLING METHOD: 8
DATE SENT: 2/1/94

COMMENTS: SAMPLED CISTERN, NO SEDIMENT, INSUFFICIENT SEDIMENT VOLUME

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.47
SPECIFIC CONDUCTANCE	Ec	umhos/cm	420
REDOX POTENTIAL	Eh	mvolts	317
TEMPERATURE	TMP	°C	1.6
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	9.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O REDOX
1325	0.0	0.0	—	—	—	START PUMPING
1330			5.64	340	0.8	10.1 366 SLIGHTLY TURBID
1351			7.47	420	1.6	9.2 317 SLIGHTLY TURBID
GAS REMOVED -			(N/A)			
1 BORE VOLUME -			(N/A)			

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MNDO1

LOCATION ID 0931 LOG DATE 2/1/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$

DEPTH OF WELL (h_2) (FT) 565

DEPTH-TO-WATER (h_1) (FT) 2.5

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, F.F, MH.

INSTRUMENT(S) USED pH, DO, TEMP, COND, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27664/1A87

Ec METER ID 720984/9394

pH METER ID 2-27664/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO ID 91DO29307

REDOX ID. 128819

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1310 1415

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.21

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.11

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 234 542

TEMP OF CALIBRATION SOLUTION (°C) 6.1 ~~542~~ MB

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/1/94	2/1/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01
LOCATION ID 0932
SAMPLE ID MND24-0932-0001
LOG DATE 1/31/94
ANALYTICAL LAB CODE WA / ITA

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TERR

INITIAL GROUNDWATER DEPTH (FT) 2.67
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1315
COMPLETE 1500
SAMPLING METHOD G, B
DATE SENT 1/31/94

COMMENTS Equip. Blank 1234 Ambient Blank 1350
SAMPLED CISTERN

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.21
SPECIFIC CONDUCTANCE	Ec	umhos/cm	300
REDOX POTENTIAL	Eh	mvolts	330
TEMPERATURE	TMP	°C	2.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	13.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO. REDOX	
1315	0.0	0.0	--	--	--	START PUMPING	
1320			5.93	320	0.9°C	12.2 464	CLEAR
1348			7.21	300	2.5°C	13.2 330	CLEAR
GAS REMOVED - (N/A)							
1 BORE VOLUME - (N/A)							

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD–006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0932 LOG DATE 1/31/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}$ $(h_1 - h_2)$ X 7.48

DEPTH OF WELL (h_2) (FT) 4.02'

DEPTH-TO-WATER (h_1) (FT) 2.67'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF, MH

INSTRUMENT(S) USED pH, D.O, TEMP, REDOX, COND

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

D.O. ID. 5566

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2030

TIME OF pH CALIBRATION 1230 1509

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.10

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.03

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A —

Eh OF CALIBRATION SOLUTION 200, 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 235, 530

TEMP OF CALIBRATION SOLUTION (°C) 2.1°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	1/31/94	1/31/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS SAMPLED CISTERN

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0933
SAMPLE ID: MND24 0933 0001
LOG DATE: 2/8/94
ANALYTICAL LAB CODE: WA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFFR.

INITIAL GROUNDWATER DEPTH (FT):
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1145 COMPLETE 1250
SAMPLING METHOD: P.P.
DATE SENT: 2/8/94

COMMENTS: SAMPLED CISTERN, INSUFFICIENT SEDIMENT VOLUME.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.21
SPECIFIC CONDUCTANCE	Ec	umhos/cm	180
REDOX POTENTIAL	Eh	mvolts	221
TEMPERATURE	TMP	°C	6.2
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	7.6

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX
1140	0.0	0.0	--	--	--	START PUMPING
1145			6.92	160	6.9	94 184 CLEAR
GALS REMOVED - (N/A)						
1 BORE VOLUME - (N/A)						

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR–LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD–006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0933 LOG DATE 2/8/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 7.44

DEPTH-TO-WATER (h_1) (FT) 4.39

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF.

INSTRUMENT(S) USED pH, COND, TEMP, D.O., REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD P.P.

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID 2970

ALKALINITY KIT ID N/A

D.O. ID. 91B029307

REDOX ID. 125519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2100

TIME OF pH CALIBRATION 1130 1255

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.01

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.01

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 680

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 235 554

TEMP OF CALIBRATION SOLUTION (°C) 29

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/8/94	2/8/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01
LOCATION ID 0935
SAMPLE ID MND240935 0001
LOG DATE 2/3/94
ANALYTICAL LAB CODE WA IIT

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TEZK

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 0945
COMPLETE 1100
SAMPLING METHOD B
DATE SENT 2/3/94
COMMENTS SAMPLED CISTERN, MS/MSD, FIELD SAMPLE

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.21
SPECIFIC CONDUCTANCE	Ec	umhos/cm	120
REDOX POTENTIAL	Eh	mvolts	178
TEMPERATURE	TMP	°C	8.8
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	8.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX
0940	0.0	0.0	—	—	—	START PUMPING
0945			7.43	120	8.7	9.8 202
GALS REMOVED			(N/A)			
1 BORE VOLUME			(N/A)			

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR–LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0935 LOG DATE 2/3/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 5.86'

DEPTH-TO-WATER (h_1) (FT) 1.65'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MO, RF

INSTRUMENT(S) USED pH, COND, TEMP. DO, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-2764/1A87

Ec METER ID 720984/9394

pH METER ID 2-2764/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO. ID G1D029307

REDOX ID 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 0915 1105

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.02

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT ~~200~~ MO 236 ~~600~~ LO 542

TEMP OF CALIBRATION SOLUTION (°C) 10.6

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	ET	
DATE(S) SHIPPED:	2/3/94	2/3/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

SEDIMENT SAMPLING FORM

FIELD DATA

SITE NAME: MND25 0935 0001	DATE: 2/3/94
PERSONNEL ONSITE: MB RT	
WEATHER CONDITIONS: SUNNY, COLD	
SITE CONDITIONS:	
SAMPLING LOCATION: ENCLOSED PATIO	

SAMPLE COLLECTION DATA

SAMPLING SEQUENCE:	QC SAMPLES
FIELD DECON. OF SAMPLING EQUIPMENT:	FIELD BLANK:
FUEL POWERED UNIT USED: N/A	RINSATE BLANK:
SAMPLE DEPTH: 5.86'	DUPLICATE SAMPLE:
SAMPLE TIME: 15 MINS. 0945	OTHER:
WATER DEPTH: 1.65'	
WATER CHARACTERISTICS: SLIGHTLY TURBID	

WAS SAMPLE COMPOSITED ? (DESCRIBE ORIGIN AND SIZE OF EACH SUBSAMPLE)	

SAMPLE COLLECTION METHOD - DESCRIBE EQUIPMENT TYPE AND CONSTRUCTION

OPEN SCOOP:	
CORING DEVICE (SPECIFY LINER, IF USED):	
PETERSON DREDGE:	
ECKMAN DREDGE:	SPRING LOADED DREDGE
PONAR DREDGE:	
OTHER:	

SAMPLE I.D.#	ANALYSIS REQUESTED	#CONTAINERS	SAMPLE MIXED ?	C-O-C SEAL NO.
MND250935 0001	VOC	1, 250 ml		
"	BNA / PPCB	1, 250 ml		
"	METALS, CN	1, 250 ml		
"	FLOR.	1, 250 ml		
"	N_3/N_2	1, 250 ml		
"	RADS	1, 500 ml		
"	TRITIUM	1, 120 ml		

CHAIN OF CUSTODY REPORT: YES/NO SIGNATURE OF SAMPLER(S): _____

REMARKS: _____

(Color, odor, etc.) _____

AUTHOR _____

VERIFICATION _____

APPROVAL _____

06/93

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01
LOCATION ID 0936
SAMPLE ID MND24 0936 -0001
LOG DATE 211194
ANALYTICAL LAB CODE WA / IT

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TERR

INITIAL GROUNDWATER DEPTH (FT) 1.54
SAMPLE DEPTH (FT) 2.5'
SAMPLING PERIOD: START 1550
COMPLETE 1620
SAMPLING METHOD B
DATE SENT 211194

COMMENTS SAMPLED CISTERN, NO SEDIMENT. OBSTACLE IN CISTERN.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.05
SPECIFIC CONDUCTANCE	Ec	umhos/cm	80
REDOX POTENTIAL	Eh	mvolts	350
TEMPERATURE	TMP	°C	4.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.5

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX
1548	0.0	0.0	—	—	—	START PUMPING
1550			6.93	80	3.0	4.2 395 SLIGHTLY TURBID
1621			7.05	80	4.0	3.5 350 SLIGHTLY TURBID
GALS REMOVED - (N/A)						
1 BORE VOLUME - (N/A)						

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE _____

LOCATION ID 0936 LOG DATE 2/1/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 25'

DEPTH-TO-WATER (h_1) (FT) 1.56'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF, MH

INSTRUMENT(S) USED pH, REDOX, COND, TEMP, D.O.

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27666/1A87

Ec METER ID 720984/19394

pH METER ID 2-27666/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

D.O. ID- 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 44-1/430 2070/2000

TIME OF pH CALIBRATION 1545 1625

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.03

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.01 4.04

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 259 531

TEMP OF CALIBRATION SOLUTION (°C) 0.1

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/1/94	2/1/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS _____

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

SEDIMENT SAMPLING FORM

FIELD DATA

SITE NAME: 0937	DATE: 2/4/94
PERSONNEL ONSITE: MB RK	
WEATHER CONDITIONS: COOL	
SITE CONDITIONS: BACK YARD	
SAMPLING LOCATION: CISTERN	

SAMPLE COLLECTION DATA

SAMPLING SEQUENCE:	QC SAMPLES
FIELD DECON. OF SAMPLING EQUIPMENT:	FIELD BLANK:
FUEL POWERED UNIT USED: NO	RINSATE BLANK: YES.
SAMPLE DEPTH:	DUPLICATE SAMPLE: YES.
SAMPLE TIME: 0930	OTHER:
WATER DEPTH:	
WATER CHARACTERISTICS: TURBID.	
WAS SAMPLE COMPOSITED ? (DESCRIBE ORIGIN AND SIZE OF EACH SUBSAMPLE)	

SAMPLE COLLECTION METHOD - DESCRIBE EQUIPMENT TYPE AND CONSTRUCTION

OPEN SCOOP:	✓
CORING DEVICE (SPECIFY LINER, IF USED):	
PETERSON DREDGE:	
ECKMAN DREDGE:	
PONAR DREDGE:	
OTHER:	

SAMPLE I.D.#	ANALYSIS REQUESTED	#CONTAINERS	SAMPLE MIXED ?	C-O-C SEAL NO.
MD250937 ~~0001~~	VOC			
	BNA / PPCB			
	METALS, CN			
	FLOR.			
	NO_3/NO_2			
	RADS.			
	TRITIUM			

CHAIN OF CUSTODY REPORT: YES/NO SIGNATURE OF SAMPLER(S): _____

REMARKS: _____

(Color, odor, etc.) _____

AUTHOR _____

VERIFICATION _____

APPROVAL _____

06/93

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0938
SAMPLE ID: MND240938SE001
LOG DATE: 2/14/94
ANALYTICAL LAB CODE: WA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFTR

INITIAL GROUNDWATER DEPTH (FT): 6.5'
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1145
COMPLETE 1200
SAMPLING METHOD: B
DATE SENT: 2/14/94

COMMENTS: SAMPLED CISTERN, INSUFFICIENT SEDIMENT VOLUME

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.12
SPECIFIC CONDUCTANCE	Ec	umhos/cm	960
REDOX POTENTIAL	Eh	mvolts	174
TEMPERATURE	TMP	°C	11.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	6.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX
1140	0.0	0.0	—	—	—	START PUMPING
1145			6.90	940	11.1	5.4 127 CLEAR
GALS REMOVED (N/A)						
1 BORE VOLUME - (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 10435 LOG DATE 2/14/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 100'+

DEPTH-TO-WATER (h_1) (FT) 9.5'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MG RF.

INSTRUMENT(S) USED pH COND TEMP DO, FEDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A.

ALKALINITY KIT ID N/A

DO. ID. 91202 9307

FEDOX ID 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 4/7/ 20501

TIME OF pH CALIBRATION 1135 1205

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.00

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.02

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 244 553

TEMP OF CALIBRATION SOLUTION (°C) 10.5

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/14/94	2/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX.	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0941
SAMPLE ID: MND24 0941 0001
LOG DATE: 2/23/94
ANALYTICAL LAB CODE: WA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TCRR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1145 COMPLETE 1200
SAMPLING METHOD: G, FAUCET
DATE SENT: 2/23/94

COMMENTS: FLOW RATE ~ 1 GAL/MIN, SAMPLED WELL
D.O. CAL 11.66Z

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.37
SPECIFIC CONDUCTANCE	Ec	umhos/cm	710
REDOX POTENTIAL	Eh	mvolts	-011
TEMPERATURE	TMP	°C	13.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX	
1125	0.0	0.0	—	—	—	START PUMPING	
1130			7.23	710	13.0	24 -015	CLEAR
1135			7.31	700	13.0	25 -051	"
1140			7.34	710	13.0	2.4 -017	"
GALS. REMOVED: 1.5							
1 BORE VOLUME: UNKNOWN							

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0941 LOG DATE 2/23/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB RF

INSTRUMENT(S) USED pH, REDOX, DO TEMP, COND

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27666/1A87

Ec METER ID 720984/9394

pH METER ID 2-27666/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO. ID. 55666

REDOX I.D. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION	447/450	2070/1950
TIME OF pH CALIBRATION	1105	1205
FOR STANDARD SOLUTION pH 7, INSTRUMENT READING	7.00	7.02
FOR STANDARD SOLUTION pH 4, INSTRUMENT READING	4.00	4.00
FOR STANDARD SOLUTION pH 10, INSTRUMENT READING	N/A	
Eh OF CALIBRATION SOLUTION	200	680
Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT	237	554
TEMP OF CALIBRATION SOLUTION (°C)	13.0	

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/23/94	2/23/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0942
SAMPLE ID: MND24 0942 0001
LOG DATE: 2/23/94
ANALYTICAL LAB CODE: WA / IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TEFR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1020 COMPLETE 1055
SAMPLING METHOD: G, FAUCET
DATE SENT: 2/23/94

COMMENTS: ~ 1 gal / MIN FLOW RATE, SAMPLED WELL
DO. CAL 11.6620

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.24
SPECIFIC CONDUCTANCE	Ec	umhos/cm	980
REDOX POTENTIAL	Eh	mvolts	083
TEMPERATURE	TMP	°C	13.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	1.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O.	COMMENTS REDOX	COMMENTS
1015	0.0	0.0	—	—	—	START PUMPING		
1020			7.00	920	13.0	2.5	143	CLEAR
1025			7.19	1000	13.0	1.7	121	"
1030			7.29	980	13.0	1.7	104	"
GALS REMOVED - 1 (15)								
1 BORE VOLUME - UNKNOWN								

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID MND2L0942 0001 LOG DATE 2/23/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

SAMPLING INFORMATION

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) .5

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF.

INSTRUMENT(S) USED PH, REDOX, D.O., TEMP, COND

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID. 5566

REDOX ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2010/2000

TIME OF pH CALIBRATION 1020 1100

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.03

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 239 556

TEMP OF CALIBRATION SOLUTION (°C) 12.0

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/23/94	2/23/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0943
SAMPLE ID: MND24 0943 0001
LOG DATE: 2/5/94
ANALYTICAL LAB CODE: WA / IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR.

INITIAL GROUNDWATER DEPTH (FT): COULDN'T TAKE
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1500 COMPLETE 1515
SAMPLING METHOD: G, FAUCET.
DATE SENT: 2/8/94

COMMENTS: SAMPLED WELL. FLOW RATE 1/2 gpm, DOES DRINK THE WATER

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.31
SPECIFIC CONDUCTANCE	Ec	umhos/cm	780
REDOX POTENTIAL	Eh	mvolts	51
TEMPERATURE	TMP	°C	8.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	4.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX
1440	0.0	0.0	—	—	—	START PUMPING
1445			7.21	790	9.0	4.2 140 RANGE
1450			7.31	780	9.0	4.4 64 "
1455			7.34	780	9.1	4.4 34 "
GALS REMOVED			(7.5)			
1 BORE VOLUME			UNKNOWN			

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE UND01

LOCATION ID DG43 LOG DATE 2/5/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 63.9

DEPTH—TO—WATER (h_1) (FT) COULDN'T TAKE

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, P.F

INSTRUMENT(S) USED pH, COND, TEMP, D.O. REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27661/1A87

Ec METER ID 720984/9394

pH METER ID 2-27661/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO ID. 91D0293107

REDOX ID 125519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 1447/1450 2070/2000

TIME OF pH CALIBRATION 1445 1520

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.00

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 235 545

TEMP OF CALIBRATION SOLUTION (°C) 8.9

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/8/94	2/8/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD—008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MNA01
LOT CONTROL NO
LOCATION ID 0944
SAMPLE TYPE F
SAMPLE ID MNA24-0944-0001
ACCEPTANCE CODE A
LOG DATE 1/31/94
LOGGER CODE TERR
ANALYTICAL LAB CODE WA/ITA

INITIAL GROUNDWATER DEPTH (FT) 27.66
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1130
COMPLETE 1150
SAMPLING METHOD G, FAUCET
DATE SENT 1/31/94

COMMENTS Q = 4.62 Gal/Min., SAMPLED WELL; DOES DRINK THE WATER

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.43
SPECIFIC CONDUCTANCE	Ec	umhos/cm	1000
REDOX POTENTIAL	Eh	mvolts	050
TEMPERATURE	TMP	°C	11.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	7.1

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	D.O	REDOX	COMMENTS
1000	0.0	0.0	—	—	—			START PUMPING
1050	231	3	7.34	1000	11°C	7.0	034	TURBID/CLOUDY
1058	268	3.7	7.44	1000	12.5°C	6.6	002	TURBID/CLOUDY
1104	296	4.1	7.43	1000	12.7°C	7.4	019	TURBID/CLOUDY
GALS REMOVED - (296)								
1 BORE VOLUME - (72.5)								

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0944 LOG DATE 1/31/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 77.04'

DEPTH-TO-WATER (h_1) (FT) 27.66'

WELL DIAMETER (FT) 0.5'

ONE BORE VOLUME (GAL) 72.5

SCREENED INTERVAL (FT) Unknown

FIELD REP MB, RF, MH

INSTRUMENT(S) USED pH, TEMP, D.O. REDOX, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

DO ID 5566

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2020

TIME OF pH CALIBRATION 1000 1200

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.04

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.01

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 226 565

TEMP OF CALIBRATION SOLUTION (°C) 2.5° C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	ITA	
DATE(S) SHIPPED:	1/31/94	1/31/94	
METHOD OF SHIPMENT:	FED Ex	FED Ex	

COMMENTS DO Meter calibrated to 9.00 ppm. It should be 11.834 ppm Problems with calibration

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MN001
LOCATION ID: 0945
SAMPLE ID: MN024 0945 0001
LOG DATE: 2/7/94
ANALYTICAL LAB CODE: W

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TEFR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1050 COMPLETE 1146
SAMPLING METHOD: G, FAUCET
DATE SENT: 2/7/94

COMMENTS: Q = 1.15 GAL/MIN, SAMPLED WELL, DOES DRINK THE WATER.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.15
SPECIFIC CONDUCTANCE	Ec	umhos/cm	850
REDOX POTENTIAL	Eh	mvolts	115
TEMPERATURE	TMP	°C	11.3
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.5

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX		
1035	0.0	0.0	—	—	—	START PUMPING		
1040			7.11	900	9.4	2.4	151	CLEAR
1045			7.24	900	11.1	2.6	105	"
1050			7.25	900	10.7	2.2	83	"
GALS REMOVED - (17)								
1 BORE VOLUME - UNKNOWN.								

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD—008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0945 LOG DATE 2/7/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 154.1

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MD, R.F, MH.

INSTRUMENT(S) USED pH, TEMP, COND, D.O. REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27666/1A87

Ec METER ID 720984/9394

pH METER ID 2-27666/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID 91D029307

REDOX I.D. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 1447/450 2070/2000

TIME OF pH CALIBRATION 1030 1150

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.00

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 246 554

TEMP OF CALIBRATION SOLUTION (°C) 1.5

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/7/94	2/7/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQO-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0946
SAMPLE ID: MND24 0946 0001
LOG DATE: 2/1/94
ANALYTICAL LAB CODE: WA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): 3.86
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1500
COMPLETE 1515
SAMPLING METHOD: B
DATE SENT: 2/1/94
COMMENTS: SAMPLED WELL, DOES NOT DRINK THE WATER

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.55
SPECIFIC CONDUCTANCE	Ec	umhos/cm	600
REDOX POTENTIAL	Eh	mvolts	256
TEMPERATURE	TMP	°C	6.8
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	8.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX
1455	0.0	0.0	—	—	—	START PUMPING
1500			7.22	740	3.5	5.9 254 CLEAR
1520			7.55	600	6.8	8.8 256 CLEAR
GALS. REMOVED - (190)						
1 BORE VOLUME - (47.4)						

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR–LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0946 LOG DATE 2/1/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 36.10

DEPTH-TO-WATER (h_1) (FT) 3.56

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) 47.4

SCREENED INTERVAL (FT) N/A

FIELD REP MB, R.F., MH.

INSTRUMENT(S) USED pH, COND, TEMP, D.O., REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27661/A87

Ec METER ID 720984/9394

pH METER ID 2-27661/A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID 91D029307

REDOX ID 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1445 1520

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.09

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 241 554

TEMP OF CALIBRATION SOLUTION (°C) -0.7

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/1/94	2/1/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0947
SAMPLE ID: MND2Y0947 0001
LOG DATE: 2/8/94
ANALYTICAL LAB CODE: WA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFZR

INITIAL GROUNDWATER DEPTH (FT): -20.0'
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1345 COMPLETE 1405
SAMPLING METHOD: G, FAUCET.
DATE SENT: 2/8/94
COMMENTS: FLOW RATE - 2 gal/MIN; SAMPLED WELL. DOES DRINK THE WATER.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.54
SPECIFIC CONDUCTANCE	Ec	umhos/cm	920
REDOX POTENTIAL	Eh	mvolts	123
TEMPERATURE	TMP	°C	11.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	6.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX
1330	0.0	0.0	—	—	—	START PUMPING
1335			7.33	940	11.2	8.4 123 CLEAR
1340			7.47	940	11.2	6.2 94 "
1345			7.50	930	11.1	4.6 115 "
GALS REMOVED - (30)						
1 BORE VOLUME - (31.3)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 094 LOG DATE 2/8/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 41.3

DEPTH-TO-WATER (h_1) (FT) – 20.0'

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) 31.3

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF

INSTRUMENT(S) USED PH, COND, DO, REDOX, TEMP.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A.

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/19394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID 91D029307

REDOX ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2100

TIME OF pH CALIBRATION 1325 1410

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.00

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.02

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 233 553

TEMP OF CALIBRATION SOLUTION (°C) 10.5

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/8/94	2/8/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0945
SAMPLE ID: MND24 0945
LOG DATE: 2/7/94
ANALYTICAL LAB CODE:

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1245 COMPLETE 1307
SAMPLING METHOD: G, FAUCET
DATE SENT: 2/7/94

COMMENTS: Q = 5 GAL/MIN, SAMPLED WELL, DOES DRINK THE WATER.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.02
SPECIFIC CONDUCTANCE	Ec	umhos/cm	870
REDOX POTENTIAL	Eh	mvolts	175
TEMPERATURE	TMP	°C	1.7
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	14.5

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX
1230	0.0	0.0	—	—	—	START PUMPING
1235			7.10	360	3.8	14.5 190 CLEAR
1240			7.10	850	3.4	14.0 184 "
1245			7.51	850	2.5	14.3 181 "
GALS. REMOVED - 175						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MN001

LOCATION ID 8945 LOG DATE 2/7/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MH, MB, RF

INSTRUMENT(S) USED TEMP, DO, REDOX COND, pH.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27661 1A87

Ec METER ID 720984 19394

pH METER ID 2-27661 1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO. ID 91D029307

REDOX ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 2/7/1450 2/7/2000

TIME OF pH CALIBRATION 1230 1310

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.01

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 300 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 245 550

TEMP OF CALIBRATION SOLUTION (°C) 5.1

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/7/94	2/7/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0949
SAMPLE ID: MND240949 0001
LOG DATE: 2/2/94
ANALYTICAL LAB CODE: WA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFCK

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1130 COMPLETE 1150
SAMPLING METHOD: G, FAUCET
DATE SENT: 2/2/94

COMMENTS: Q = 1 GAL/MIN, SAMPLED W FILL, DOES DRINK THE WATER.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.44
SPECIFIC CONDUCTANCE	Ec	umhos/cm	760
REDOX POTENTIAL	Eh	mvolts	20
TEMPERATURE	TMP	°C	10.7
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	1.6

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO. REDOX	
1115	0.0	0.0	—	—	—	START PUMPING	
1120			7.80	780	10.0	2.8 119	CLEAR
1125			7.53	770	11.4	1.4 77	CLEAR
1130			7.47	770	11.7	1.4 36	CLEAR
				~~7600~~			
GALS. REMOVED - (15)							
1 BORE VOLUME - UNKNOWN							

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR–LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0949 LOG DATE 2/2/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF.

INSTRUMENT(S) USED pH, COND TEMP DO, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27661/1A57

Ec METER ID 720984/9394

pH METER ID 2-27661/1A57

PUMP ID N/A

ALKALINITY KIT ID N/A

DO ID. 91D029307

REDOX I.D. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1115 1200

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.21

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.01 4.14

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 242 536

TEMP OF CALIBRATION SOLUTION (°C) 7.2

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/2/94	2/2/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0950
SAMPLE ID: MND24 0950 0001
LOG DATE: 2/10/94
ANALYTICAL LAB CODE: WA 1 IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): 13.31
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1030 COMPLETE 1045
SAMPLING METHOD: G
DATE SENT:

COMMENTS: SAMPLED WELL FLOW RATE 1gpm. DOES DRINK THE WATER

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.03
SPECIFIC CONDUCTANCE	Ec	umhos/cm	1000
REDOX POTENTIAL	Eh	mvolts	251
TEMPERATURE	TMP	°C	10.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	8.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX
1025	0.0	0.0	—	—	—	START PUMPING
1030			6.91	1000	12.5	12.2 341 CLEAR
1035			6.75	1000	12.1	10.2 315 "
1040			6.55	1000	12.4	10.0 254 "
GALS. REMOVED (18)						
1 BORE VOLUME (47.4)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID OG50

LOG DATE 2/10/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 45.60'

DEPTH-TO-WATER (h_1) (FT) 13.31'

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) 47.4

SCREENED INTERVAL (FT) N/A

FIELD REP MB RF

INSTRUMENT(S) USED pH DO REDOX TEMP, COND

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27661/1A87

Ec METER ID 720984/9394

pH METER ID 2-27661/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID. 91DO 29307

REDOX ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION	447/450	2070/2100
TIME OF pH CALIBRATION	1025	1035
FOR STANDARD SOLUTION pH 7, INSTRUMENT READING	7.00	7.01
FOR STANDARD SOLUTION pH 4, INSTRUMENT READING	4.01	4.01
FOR STANDARD SOLUTION pH 10, INSTRUMENT READING	N/A	
Eh OF CALIBRATION SOLUTION	700	600
Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT	235	554
TEMP OF CALIBRATION SOLUTION (°C)	6.3	

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/10/94	2/10/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOT CONTROL NO:
LOCATION ID: 0951
SAMPLE TYPE: F
SAMPLE ID: MND24 0951 0001
ACCEPTANCE CODE: A
LOG DATE: 2/5/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: WA / IT

INITIAL GROUNDWATER DEPTH (FT): 4.04
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1000
COMPLETE 1050
SAMPLING METHOD: P.P.
DATE SENT: 2/8/94
COMMENTS: SAMPLED CISTERN, SEDIMENT SAMPLE

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.57
SPECIFIC CONDUCTANCE	Ec	umhos/cm	840
REDOX POTENTIAL	Eh	mvolts	248
TEMPERATURE	TMP	°C	5.8
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	11.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX.
0940	0.0	0.0	—	—	—	START PUMPING
1000			7.38	390	5.3	9.6 308 CLEAR
GALS. REMOVED			(N/A)			
1 BORE VOLUME			- (N/A)			

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD–006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MNDO1

LOCATION ID 0951 LOG DATE 2/5/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) 7.62

DEPTH-TO-WATER (h_1) (FT) 4.04

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF.

INSTRUMENT(S) USED 2N COND, TEMP, DO FEDEX

SAMPLING INFORMATION

WITHDRAWAL METHOD P.P.

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID 2878.

ALKALINITY KIT ID N/A

DO ID 91D029307

FEDEX ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2100

TIME OF pH CALIBRATION 0950 1100

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.00

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 234 551

TEMP OF CALIBRATION SOLUTION (°C) 5.9

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/8/94	2/8/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

SEDIMENT SAMPLING FORM

FIELD DATA

SITE NAME: MND24 0951	DATE: 2/8/94
PERSONNEL ONSITE: MB RF	
WEATHER CONDITIONS: COLD FRAZING	
SITE CONDITIONS: BACK YARD	
SAMPLING LOCATION: CISTERN	

SAMPLE COLLECTION DATA

SAMPLING SEQUENCE:	QC SAMPLES
FIELD DECON. OF SAMPLING EQUIPMENT:	FIELD BLANK:
FUEL POWERED UNIT USED:	RINSATE BLANK:
SAMPLE DEPTH: 7.02'	DUPLICATE SAMPLE:
SAMPLE TIME: 1050	OTHER:
WATER DEPTH: 4.04'	
WATER CHARACTERISTICS: CLEAR	

WAS SAMPLE COMPOSITED ? (DESCRIBE ORIGIN AND SIZE OF EACH SUBSAMPLE)	

SAMPLE COLLECTION METHOD - DESCRIBE EQUIPMENT TYPE AND CONSTRUCTION

OPEN SCOOP:	✓
CORING DEVICE (SPECIFY LINER, IF USED):	
PETERSON DREDGE:	
ECKMAN DREDGE:	
PONAR DREDGE:	
OTHER:	

SAMPLE I.D.#	ANALYSIS REQUESTED	#CONTAINERS	SAMPLE MIXED ?	C-O-C SEAL NO.
MND25 0951 0001	VOC			
"	BNA / PPCB			
"	METALS, CN			
"	FLOR			
"	N_3 / N_2			
"	RADS			
"	TRITIUM			

CHAIN OF CUSTODY REPORT: YES/NO

SIGNATURE OF SAMPLER(S): _____

REMARKS: _____

(Color, odor, etc.) _____

AUTHOR _____

VERIFICATION _____

APPROVAL _____

06/93

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOT CONTROL NO:
LOCATION ID: 0952
SAMPLE TYPE: F
SAMPLE ID: MND24 0952 0001
ACCEPTANCE CODE: A
LOG DATE: 2/7/94
LOGGER CODE: TERR.
ANALYTICAL LAB CODE: NA / LT

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 0915
COMPLETE 0950
SAMPLING METHOD: G. FAUCET
DATE SENT: 2/7/94
COMMENTS: Q = 5 gal/MIN; SAMPLED WELL

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.26
SPECIFIC CONDUCTANCE	Ec	umhos/cm	900
REDOX POTENTIAL	Eh	mvolts	209
TEMPERATURE	TMP	°C	11.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS Dr. REDOX
0855	0.0	0.0	—	—	—	START PUMPING
0900			6.91	900	11.4	9.0 237 ORANGE
0905			7.23	900	11.3	3.5 73 "
0910			7.31	900	11.3	10.4 93 "
						~~3.5 mg 9 mg~~
GALS REMOVED - (175)						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD—008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0952 LOG DATE 2/7/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF, MH

INSTRUMENT(S) USED pH, DO, REDOX TEMP, COND

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID 91D029307

REDOX ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION	447/450	2070/2000
TIME OF pH CALIBRATION	0850	0955
FOR STANDARD SOLUTION pH 7, INSTRUMENT READING	7.00	7.04
FOR STANDARD SOLUTION pH 4, INSTRUMENT READING	4.01	4.01
FOR STANDARD SOLUTION pH 10, INSTRUMENT READING	N/A	N/A
Eh OF CALIBRATION SOLUTION	200	600
Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT	232	543
TEMP OF CALIBRATION SOLUTION (°C)	8.3	

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/7/94	2/7/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MN201
LOT CONTROL NO:
LOCATION ID: 0953
SAMPLE TYPE: F
SAMPLE ID: MN2240953 0001
ACCEPTANCE CODE: A
LOG DATE: 2/10/94
LOGGER CODE: TFZR
ANALYTICAL LAB CODE: WA/IT

INITIAL GROUNDWATER DEPTH (FT): 21.07
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1500
COMPLETE 1700
SAMPLING METHOD: B
DATE SENT: 2/10/94

COMMENTS: SAMPLED WELL, MS/MSD, EQUIP. BLANK, AMBIENT BLANK.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.05
SPECIFIC CONDUCTANCE	Ec	umhos/cm	700
REDOX POTENTIAL	Eh	mvolts	183
TEMPERATURE	TMP	°C	8.9
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	8.5

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX
1445	0.0	0.0	—	—	—	START PUMPING
1450			7.51	650	9.0	6.2 251 ORANGE
1455			7.59	700	8.2	9.2 194 "
1500			7.61	700	9.0	8.8 183 "
GAS REMOVED - UNKNOWN						
1 BORE VOLUME - (31.3)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR-LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MWD01

LOCATION ID 0953 LOG DATE 2/10/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}$ $(h_1 - h_2)$ X 7.48

DEPTH OF WELL (h_2) (FT) ~430'

DEPTH-TO-WATER (h_1) (FT) 21.67'

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) 31.3

SCREENED INTERVAL (FT) N/A

FIELD REP M.B. JT

INSTRUMENT(S) USED pH, COND, TEMP, DO, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27660/1A87

Ec METER ID 720984/9394

pH METER ID 2-27660/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO. I.D. 91D029307

REDOX I.D. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 407/450 2070/2100

TIME OF pH CALIBRATION 1440 1710

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.01

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.03

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 235 553

TEMP OF CALIBRATION SOLUTION (°C) 9.0

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/10/94	2/10/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0954
SAMPLE ID: MND24 0954 0001
LOG DATE: 2/8/94
ANALYTICAL LAB CODE: WA / IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFERR

INITIAL GROUNDWATER DEPTH (FT): ~10'
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1600
COMPLETE 1705
SAMPLING METHOD: B
DATE SENT: 2/8/94

COMMENTS: SAMPLED CISTERN; INSUFFICIENT SEDIMENT VOLUME.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.41
SPECIFIC CONDUCTANCE	Ec	umhos/cm	240
REDOX POTENTIAL	Eh	mvolts	188
TEMPERATURE	TMP	°C	10.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	11.3

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO. REDOX
1555	0.0	0.0	—	—	—	START PUMPING
1600			7.12	260	10.2	13.5 108 CLEAR
1705			7.41	240	10.1	11.3 188 "
GALS. REMOVED - (N/A)						
1 BORE VOLUME - (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0954 LOG DATE 2/8/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) ~ 23.5

DEPTH-TO-WATER (h_1) (FT) ~ 10'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB RF.

INSTRUMENT(S) USED pH, DO REDOX, COND, TEMP.

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27666/1A87

Ec METER ID 720984/9394

pH METER ID 2-27666/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO. ID 91D029307

REDOX ID 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2080

TIME OF pH CALIBRATION 1550 1710

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.01

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 234 548

TEMP OF CALIBRATION SOLUTION (°C) 6.7

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/8/94	2/8/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX.	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0955
SAMPLE ID: MND210955 0001
LOG DATE: 2/9/94
ANALYTICAL LAB CODE: WA / IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERP

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1300 COMPLETE 1450
SAMPLING METHOD: G, FAUCET
DATE SENT: 2/9/94

COMMENTS: FLOW RATE . 5 gal/MIN, SAMPLED WELL DOES DRINK THE WATER

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.20
SPECIFIC CONDUCTANCE	Ec	umhos/cm	1000
REDOX POTENTIAL	Eh	mvolts	152
TEMPERATURE	TMP	°C	9.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A.
DISSOLVED OXYGEN	DO	mg/l	7.1

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX
1240	0.0	0.0	—	—	—	START PUMPING
1245			7.04	1000	9.0	8.4 208 SLTURBID
1250			7.21	1000	9.5	7.8 180 "
1255			7.25	1000	9.5	7.8 141 "
GALS. REMOVED - (8)						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE UND01

LOCATION ID 0G55 LOG DATE 2/9/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF

INSTRUMENT(S) USED pH COND. D.O. TEMP. REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G.

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. I.D. 910029307

REDOX I.D. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 4/4/450 2070/2000

TIME OF pH CALIBRATION 1255 1500

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.02

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 1000

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 235 555

TEMP OF CALIBRATION SOLUTION (°C) 9.4

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/9/94	2/9/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WGD-005 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01
LOCATION ID 0956
SAMPLE ID MND240956 0001
LOG DATE 2/23/94
ANALYTICAL LAB CODE WA/IT

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TEFR

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START ~~N/A~~ 0915
COMPLETE 0945
SAMPLING METHOD G, FAUCET
DATE SENT 2/23/94

COMMENTS MS/MSD 1.5 GAL/MIN. FLOW RATE
D.O CAL 11.662, SAMPLED WEEK

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.33
SPECIFIC CONDUCTANCE	Ec	umhos/cm	940
REDOX POTENTIAL	Eh	mvolts	172
TEMPERATURE	TMP	°C	13.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.56

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX	
0855	0.0	0.0	—	—	—	START PUMPING	
0900			7.11	940	13.0	260 240	SL. TURBID
0905			7.31	960	12.0	1.54 228	"
0910			7.37	940	13.0	1.32 222	"
GALS. REMOVED - (23)							
1 BORE VOLUME - UNKNOWN							

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD—006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0956 LOG DATE 2/23/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) 5'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB R.F.

INSTRUMENT(S) USED pH, D.O, REDOX, TEMP. COND.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O ID. 55466

REDOX ID 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 0545 0955

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.04

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.01

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 234 553

TEMP OF CALIBRATION SOLUTION (°C) 8°

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/23/94	2/23/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-005 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01
LOCATION ID 0958
SAMPLE ID MND24 0958 0001
LOG DATE 2/2/94
ANALYTICAL LAB CODE WA/IT

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TFCR

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1330
COMPLETE 1355
SAMPLING METHOD G, FAUCET
DATE SENT 2/2/94

COMMENTS SAMPLED WELL @ FAUCET IN BASEMENT. AMBIENT BLANK TAKEN, DOES DRINK THE WATER

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.24
SPECIFIC CONDUCTANCE	Ec	umhos/cm	840
REDOX POTENTIAL	Eh	mvolts	219
TEMPERATURE	TMP	°C	13.2
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	4.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O.	REDOX	
1315	0.0	0.0	—	—	—	START PUMPING		
1320			7.19	840	12.9	1.8	187	CLEAR
1325			7.24	850	12.9	2.0	172	CLEAR
1330			7.23	840	13.1	2.2	180	CLEAR
GALS. REMOVED -			(15)					
1 BORE VOLUME -			UNKNOWN					

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0958 LOG DATE 2/2/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF

INSTRUMENT(S) USED pH, DO, REDOX TEMP, COND

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27661/1A87

Ec METER ID 720984/9394

pH METER ID 2-27661/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO. ID. 91D029307

REDOX ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1315 1400

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.04

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.03

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A N/A

Eh OF CALIBRATION SOLUTION 200 1000

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 232 544

TEMP OF CALIBRATION SOLUTION (°C) 10.0

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/2/94	2/2/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01
LOCATION ID 0959
SAMPLE ID MND24-0959-0001
LOG DATE 21194
ANALYTICAL LAB CODE WA/IT

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TERR

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1030 COMPLETE 1200
SAMPLING METHOD G. FAUCET
DATE SENT 21194

COMMENTS Q = 1 gal/MIN, DUPLICATE 1100, MS/MSD 1200
SAMPLED CISTERN; NO SEDIMENT, DOES NOT DRINK H2O

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	6.61
SPECIFIC CONDUCTANCE	Ec	umhos/cm	90
REDOX POTENTIAL	Eh	mvolts	304
TEMPERATURE	TMP	°C	9.9
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	8.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O REDOX
1015	0.0	0.0	--	--	--	START PUMPING
1017			6.79	90	11.8	7.4 385 CLEAR
1022			7.21	90	9.8	8.5 343 "
1027			7.45	90	9.0	9.0 321 "
GALS REMOVED - (12)						
1 BORE VOLUME - (N/A)						

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0959 LOG DATE 2/1/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}$ $(h_1 - h_2)$ X 7.48

DEPTH OF WELL (h_2) (FT) 7.75

DEPTH-TO-WATER (h_1) (FT) 1.30'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF, MH.

INSTRUMENT(S) USED pH, D.O., REDOX TEMP, COND.

SAMPLING INFORMATION

WITHDRAWAL METHOD SR, G

FILTER SIZE N/A

THERMOMETER ID 2-27661/A67

Ec METER ID 720984/9394

pH METER ID 2-27661/A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 128519

DO. ID. 5566

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1000 1210

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.11

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.01 4.14

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 234 543

TEMP OF CALIBRATION SOLUTION (°C) 9.5°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/1/94	2/1/94	
METHOD OF SHIPMENT:	FEDEX	FED EX.	

COMMENTS DO. METER CAL TO 11.4 ppm VS. 11.834 ppm PROBLEMS W/CAL

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01
LOCATION ID 0960
SAMPLE ID MND24 0960 -0001
LOG DATE 2/2/94
ANALYTICAL LAB CODE WA / IT

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TFRR

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1000
COMPLETE 1033
SAMPLING METHOD G, FAUCET
DATE SENT 2/2/94

COMMENTS SAMPLED WELL, Q = 3.33 GAL/MIN, DOES DRINK THE WATER.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	6.77
SPECIFIC CONDUCTANCE	Ec	umhos/cm	800
REDOX POTENTIAL	Eh	mvolts	268
TEMPERATURE	TMP	°C	8.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	5.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX
0945	0.0	0.0	—	—	—	START PUMPING
0950			7.18	780	6.6	5.2 207 CLEAR
0955			7.22	780	8.2	4.2 232 "
1000			7.12	780	9.2	4.6 246 "
GALS REMOVED - (50)						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR—LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0960 LOG DATE 2/2/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF

INSTRUMENT(S) USED pH, D.O, REDOX COND, TEMP.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

D.O. ID 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/440 2070/2000

TIME OF pH CALIBRATION 0950 1035

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.09

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.02

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 234 541

TEMP OF CALIBRATION SOLUTION (°C) 5.4

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/2/94	2/2/94	
METHOD OF SHIPMENT:	FED EX	FED EX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-005 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01
LOCATION ID 0961
SAMPLE ID MND24 0961 0001
LOG DATE 2/10/94
ANALYTICAL LAB CODE WA/IT

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TERR

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1150
COMPLETE 1240
SAMPLING METHOD G
DATE SENT 2/10/94

COMMENTS DUPLICATE TAKEN, SAMPLED WELL, LARGE FLOW RATE, DOES DRINK THE WATER.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.23
SPECIFIC CONDUCTANCE	Ec	umhos/cm	1000
REDOX POTENTIAL	Eh	mvolts	210
TEMPERATURE	TMP	°C	12.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	6.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX
1135	0.0	0.0	—	—	—	START PUMPING
1140			7.03	1100	11.5	7.2 210 CLEAR
1145			7.18	1000	12.0	7.4 220 "
1150			7.26	1100	12.0	7.6 230 "
GALS REMOVED - UNKNOWN						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MNDC1

LOCATION ID 0961 LOG DATE 2/10/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, RF

INSTRUMENT(S) USED pH, DO, REDOX TEMP, COND

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID 91DC 29307

REDOX ID 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION	447/450	2070/2000
TIME OF pH CALIBRATION	1130	1250
FOR STANDARD SOLUTION pH 7, INSTRUMENT READING	7.00	7.01
FOR STANDARD SOLUTION pH 4, INSTRUMENT READING	4.00	4.00
FOR STANDARD SOLUTION pH 10, INSTRUMENT READING	N/A	
Eh OF CALIBRATION SOLUTION	200	600
Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT	235	554
TEMP OF CALIBRATION SOLUTION (°C)	4.2	

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/10/94	2/10/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MN80 1
LOT CONTROL NO:
LOCATION ID: 0962
SAMPLE TYPE: F
SAMPLE ID: MN024 0962 0001
ACCEPTANCE CODE: A
LOG DATE: 2/14/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: WA / IT

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1115
COMPLETE 1130
SAMPLING METHOD: G
DATE SENT: 2/14/94

COMMENTS: SAMPLED WELL. V. LARGE FLOW RATE, DOES NOT DRINK THE WATER

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.34
SPECIFIC CONDUCTANCE	Ec	umhos/cm	820
REDOX POTENTIAL	Eh	mvolts	113
TEMPERATURE	TMP	°C	12.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	5.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX
1105	0.0	0.0	—	—	—	START PUMPING
1110			7.23	810	12.0	6.4 152 CLEAR
1115			7.27	810	12.0	6.4 110 "
1120			7.30	820	12.0	6.2 94 "
GALS. REMOVED - UNKNOWN						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR–LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD–008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0962 LOG DATE 2/14/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP M.B. R.F.

INSTRUMENT(S) USED pH, DO, REDOX, COND, TEMP.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID. 910029307

REDOX I.D. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 4471 2070/

TIME OF pH CALIBRATION 1110 1135

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.04

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 244 554

TEMP OF CALIBRATION SOLUTION (°C) 11.5

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/14/94	2/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0963
SAMPLE ID: MND01 0963 0001
LOG DATE: 2/14/94
ANALYTICAL LAB CODE: WA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TEFR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1045
COMPLETE 1100
SAMPLING METHOD: G
DATE SENT: 2/14/94

COMMENTS: SAMPLED WELL BH ON SITE TO CONDUCT H2S FOR CONFINED SPACE ENTRY, FLOW RATE ~ 1/2 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.36
SPECIFIC CONDUCTANCE	Ec	umhos/cm	1000
REDOX POTENTIAL	Eh	mvolts	063
TEMPERATURE	TMP	°C	12.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A.
DISSOLVED OXYGEN	DO	mg/l	3.6

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX	
1030	0.0	0.0	—	—	—	START PUMPING	
1035			7.17	1000	12.0	04.4 047	CLEAR
1040			7.31	1000	12.5	4.2 020	"
1045			7.32	1000	12.5	3.4 039	"
GALS. REMOVED - (8)							
1 BORE VOLUME - UNKNOWN							

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR–LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TBMS

WQD–008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0963 LOG DATE 2/14/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP WB R.F. B.H.

INSTRUMENT(S) USED pH, COND, TEMP, D.O. FEDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720954/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID. 91D029307

FEDOX ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/1450 2070/2:50

TIME OF pH CALIBRATION 1030 1105

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.04

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 241 549

TEMP OF CALIBRATION SOLUTION (°C) 1.1

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/14/94	2/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0904
SAMPLE ID: MND01 0904 0001
LOG DATE: 2/9/94
ANALYTICAL LAB CODE: WA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFRR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1000 COMPLETE 1040
SAMPLING METHOD: G. FAUCET.
DATE SENT: 2/9/94
COMMENTS: FLOW RATE ~ 0.33 gal./min., SAMPLED WELL

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.37
SPECIFIC CONDUCTANCE	Ec	umhos/cm	890
REDOX POTENTIAL	Eh	mvolts	231
TEMPERATURE	TMP	°C	13.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO.	REDOX	
0940	0.0	0.0	—	—	—	START PUMPING		
0945			7.14	920	14.5	3.2	187	CLEAR.
0950			7.31	920	14.0	2.4	120	"
0955			7.38	890	14.0	1.8	190	"
GALS. REMOVED. (S)								
1 BORE VOLUME. UNKNOWN								

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0904 LOG DATE 2/9/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB, R.F.

INSTRUMENT(S) USED pH, COND, TEMP DO, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO ID 91D029307

REDOX ID 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION	447/450	2070/2000
TIME OF pH CALIBRATION	0940	1045
FOR STANDARD SOLUTION pH 7, INSTRUMENT READING	7.00	7.01
FOR STANDARD SOLUTION pH 4, INSTRUMENT READING	4.01	4.01
FOR STANDARD SOLUTION pH 10, INSTRUMENT READING	N/A	
Eh OF CALIBRATION SOLUTION	200	600
Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT	232	550
TEMP OF CALIBRATION SOLUTION (°C)	12.5	

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/9/94	2/9/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MN201
LOT CONTROL NO:
LOCATION ID: 0965
SAMPLE TYPE: F
SAMPLE ID: MN201 0965 0001
ACCEPTANCE CODE: A
LOG DATE: 2/11/94
LOGGER CODE: TERZ
ANALYTICAL LAB CODE: WA1 IT

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1000
COMPLETE 1020
SAMPLING METHOD: G
DATE SENT: 2/11/94

COMMENTS: SAMPLED WELL. CONFINED SPACE, BH WAS PRESENT TO GIVE H&S. DOES DRINK THE WATER

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.31
SPECIFIC CONDUCTANCE	Ec	umhos/cm	940
REDOX POTENTIAL	Eh	mvolts	034
TEMPERATURE	TMP	°C	10.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.6

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO, REDOX
0951	0.0	0.0	—	—	—	START PUMPING
0956			7.20	860	10.0	3.8 038 CLEAR
1001			7.30	850	9.6	3.2 043 "
1006			7.30	890	9.3	3.2 024 "
GALS REMOVED - UNKNOWN						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND01

LOCATION ID 0G05 LOG DATE 2/11/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB RF BH

INSTRUMENT(S) USED pH, COND, D.O. REDOX TEMP.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27661/1A87

Ec METER ID 720984/9394

pH METER ID 2-27661/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID. 91D029307

REDOX ID 125519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION	447/450	2070/2000
TIME OF pH CALIBRATION	0930	1025
FOR STANDARD SOLUTION pH 7, INSTRUMENT READING	7.00	7.00
FOR STANDARD SOLUTION pH 4, INSTRUMENT READING	4.00	4.00
FOR STANDARD SOLUTION pH 10, INSTRUMENT READING	N/A	
Eh OF CALIBRATION SOLUTION	200	600
Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT	240	551
TEMP OF CALIBRATION SOLUTION (°C)	4.3	

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/11/94	2/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND01
LOCATION ID: 0960
SAMPLE ID: MND24 0960 E001
LOG DATE: 2/11/94
ANALYTICAL LAB CODE: NA/IT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 0900
COMPLETE 0925
SAMPLING METHOD: G
DATE SENT: 2/11/94

COMMENTS: SAMPLED WELL CONFINED SPACE BH WAS PRESENT TO GIVE IT A D. DOES DRINK THE WATER.

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.44
SPECIFIC CONDUCTANCE	Ec	umhos/cm	830
REDOX POTENTIAL	Eh	mvolts	103
TEMPERATURE	TMP	°C	9.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	5.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX	
0843	0.0	0.0	—	—	—	START PUMPING	
0848			7.32	840	10.8	5.4 153	CLEAR
0853			7.44	830	10.9	6.2 140	"
0858			7.49	840	9.3	5.5 151	"
GALS. REMOVED.			UNKNOWN				
1 BORE VOLUME.			UNKNOWN				

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MNDO 1

LOCATION ID 0906 LOG DATE 2/11/94

BORE VOL CALCULATION (GAL)

$\frac{c^2\pi}{4}(h_1 - h_2) \times 7.48$

SAMPLING INFORMATION

DEPTH OF WELL (h_2) (FT) N/A

DEPTH—TO—WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MD, R.F. BH.

INSTRUMENT(S) USED pH, COND, DO, REDOX, COND

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O ID. 91 D029 307

REDOX ID. 125519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447 1450 2070/2050

TIME OF pH CALIBRATION 0840 0828

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.00

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.01

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 241 599

TEMP OF CALIBRATION SOLUTION (°C) 5.7

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/11/94	2/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD—008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MN D01
LOCATION ID: 0907
SAMPLE ID: MN024 0907 0001
LOG DATE: 2/14/94
ANALYTICAL LAB CODE: NA/LT

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 0945 COMPLETE 1015
SAMPLING METHOD: G, FAUCET
DATE SENT: 2/14/94

COMMENTS: SAMPLED WELL; COULDN'T ACCESS WELL FOR DEPTH;

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.26
SPECIFIC CONDUCTANCE	Ec	umhos/cm	750
REDOX POTENTIAL	Eh	mvolts	164
TEMPERATURE	TMP	°C	11.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	4.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS D.O. REDOX
0925	0.0	0.0	—	—	—	START PUMPING
0930			7.10	750	10.1	5.4 192 CLEAR
0935			7.13	750	10.9	4.2 190 "
0940			7.23	750	9.5	3.6 155 "
GALS REMOVED - UNKNOWN						
1 BOREVOLUME - UNKNOWN						

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD–005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE UN001

LOCATION ID 1907 LOG DATE 2/14/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) .5'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB RF

INSTRUMENT(S) USED pH, COND, TEMP, D.O. REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

D.O. ID. 91D029307
REDOX I.D. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2050

TIME OF pH CALIBRATION 0930 1020

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.02

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 3.99

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 1000

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 245 553

TEMP OF CALIBRATION SOLUTION (°C) -.3

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	WA	IT	
DATE(S) SHIPPED:	2/14/94	2/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOT CONTROL NO:
LOCATION ID: 0932
SAMPLE TYPE: F
SAMPLE ID: MND24 0932 0002
ACCEPTANCE CODE: A
LOG DATE: 8/24/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: Cornerstone WA

INITIAL GROUNDWATER DEPTH (FT): ~ 4'
SAMPLE DEPTH (FT): ~ 5'
SAMPLING PERIOD: START 1400
COMPLETE 1450
SAMPLING METHOD: B
DATE SENT: 8/24/94
COMMENTS: CISTERN

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.25
SPECIFIC CONDUCTANCE	Ec	umhos/cm	220
REDOX POTENTIAL	Eh	mvolts	218
TEMPERATURE	TMP	°C	21.7
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	5.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1400			6.65	220	27.6	4.0 175 CLEAR
1450						
GALS REMOVED			(N/A)			
1 BORE VOLUME			(N/A)			

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0932 LOG DATE 8/26/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$

DEPTH OF WELL (h_2) (FT) ~5'

DEPTH-TO-WATER (h_1) (FT) ~4'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MSH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 7209 34/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 12 8519

DO ID. 9 1D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1350 1500

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.19

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.11

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 195 541

TEMP OF CALIBRATION SOLUTION (°C) 28.7 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Compuchem	WA	
DATE(S) SHIPPED:	8/26/94	8/26/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WGD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOT CONTROL NO:
LOCATION ID: 0933
SAMPLE TYPE: F
SAMPLE ID: MND24 0933 0002
ACCEPTANCE CODE: A
LOG DATE: 8/28/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: CONTRCHEM, WA

INITIAL GROUNDWATER DEPTH (FT): 5.20
SAMPLE DEPTH (FT): -7.0'
SAMPLING PERIOD: START 1140
COMPLETE 1210
SAMPLING METHOD: B
DATE SENT: 8/25/94
COMMENTS: CISTERN

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	6.62
SPECIFIC CONDUCTANCE	Ec	umhos/cm	150.
REDOX POTENTIAL	Eh	mvolts	253
TEMPERATURE	TMP	°C	19.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	4.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO REDOX
	0.0	0.0	—	—	—	START PUMPING
1135			6.48	160	19.3	3.2 238 CLEAR
GALS REMOVED (N/A)						
1 BORE VOLUME (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR—LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQO—005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0933 LOG DATE 8/25/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) 5.24'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB MJH

INSTRUMENT(S) USED pH, TEMP, D.O, REDOX, Ec.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27641/1A87

Ec METER ID 720984/9394

pH METER ID 2-27641/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 128518

DO ID. 910029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1120 1150

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.08

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.03

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 556

TEMP OF CALIBRATION SOLUTION (°C) 24.0°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Compu CHEM	WA	
DATE(S) SHIPPED:	8/25/94	8/25/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS DO 8.4 x .96 = 8.232 CAL

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0935
SAMPLE ID: MND24 0935 0002
LOG DATE: 8/29/94
ANALYTICAL LAB CODE: CONTECHEM/WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TEFR

INITIAL GROUNDWATER DEPTH (FT): ~5'
SAMPLE DEPTH (FT): ~6'
SAMPLING PERIOD: START 1330 COMPLETE 1400
SAMPLING METHOD: G, B
DATE SENT: 8/29/94

COMMENTS:

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.25
SPECIFIC CONDUCTANCE	Ec	umhos/cm	62
REDOX POTENTIAL	Eh	mvolts	186
TEMPERATURE	TMP	°C	20.6
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	9.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1315			559	54	20.7	8.6 190 CLEAR
GALS REMOVED (N/A)						
1 BORE VOLUME (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND 24

LOCATION ID 0935 LOG DATE 8/29/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) ~5'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB MSH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, EC

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27466/1A87

Ec METER ID 720954/9394

pH METER ID 2-27466/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 128519

DO ID. 91002930 7

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2020

TIME OF pH CALIBRATION 1246 1600

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.19

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.07

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 1600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 504

TEMP OF CALIBRATION SOLUTION (°C) 23.2°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTCHEM	UA	
DATE(S) SHIPPED:	8/29/94	8/29/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

SEDIMENT SAMPLING FORM

FIELD DATA

SITE NAME: 0935	DATE: 5/29/94
PERSONNEL ONSITE: MAB MJH	
WEATHER CONDITIONS: SUNNY ~ 90°F	
SITE CONDITIONS: INSIDE PATIO	
SAMPLING LOCATION: BENEATH WASHING MACHINE	

SAMPLE COLLECTION DATA

SAMPLING SEQUENCE:	QC SAMPLES
FIELD DECON. OF SAMPLING EQUIPMENT: YES.	FIELD BLANK:
FUEL POWERED UNIT USED: NO	RINSATE BLANK: YES
SAMPLE DEPTH: ~ 6'	DUPLICATE SAMPLE: YES
SAMPLE TIME: 1330	OTHER: MS/MSD.
WATER DEPTH: ~ 5'	
WATER CHARACTERISTICS: Cloudy	

WAS SAMPLE COMPOSITED ? (DESCRIBE ORIGIN AND SIZE OF EACH SUBSAMPLE)	

SAMPLE COLLECTION METHOD - DESCRIBE EQUIPMENT TYPE AND CONSTRUCTION
OPEN SCOOP:
CORING DEVICE (SPECIFY LINER, IF USED):
PETERSON DREDGE:
ECKMAN DREDGE: ✓
PONAR DREDGE:
OTHER:

SAMPLE I.D.#	ANALYSIS REQUESTED	#CONTAINERS	SAMPLE MIXED ?	C-O-C SEAL NO.
MND250935~~0002~~	VOA			
MND250935~~1002~~	METALS			
MND250935~~0002~~	SVOC			
MS	PEST/PCB			
MND250935~~0002~~	NO_2/NO_3			
MSD	FLOR			
	CN.			

CHAIN OF CUSTODY REPORT: YES/NO SIGNATURE OF SAMPLER(S): _____

REMARKS: _____

(Color, odor, etc.) _____

AUTHOR _____

VERIFICATION _____

APPROVAL _____

06/93

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOT CONTROL NO:
LOCATION ID: 0936
SAMPLE TYPE: F
SAMPLE ID: MND24 0936-0002
ACCEPTANCE CODE: A
LOG DATE: 8/25/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: CONTRACTEM/WA

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): ~6.0'
SAMPLING PERIOD: START 1430
COMPLETE 1450
SAMPLING METHOD: B
DATE SENT: 8/25/94
COMMENTS: CISTERN

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	6.82
SPECIFIC CONDUCTANCE	Ec	umhos/cm	82
REDOX POTENTIAL	Eh	mvolts	235
TEMPERATURE	TMP	°C	23.7
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1417			6.70	82	24.1	3.4 164 CLOUDY
GALS REMOVED (N/A)						
1 BORE VOLUME - (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0930 LOG DATE 8/25/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) ~ 2.5'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAR MAH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

DO ID. 5566

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1415 1455

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 6.98

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.04

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 199 553

TEMP OF CALIBRATION SOLUTION (°C) 25.7°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTR CHEM	WA	
DATE(S) SHIPPED:	8/25/94	8/25/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

SEDIMENT SAMPLING FORM

FIELD DATA

SITE NAME: 09377	DATE: 5/30/94
PERSONNEL ONSITE: MAB, MAH	
WEATHER CONDITIONS: SUNNY ~90°F	
SITE CONDITIONS: BACKYARD	
SAMPLING LOCATION: CISTERN.	

SAMPLE COLLECTION DATA

SAMPLING SEQUENCE:	QC SAMPLES
FIELD DECON. OF SAMPLING EQUIPMENT: YES	FIELD BLANK:
FUEL POWERED UNIT USED: NO	RINSATE BLANK:
SAMPLE DEPTH: ~ 20'	DUPLICATE SAMPLE:
SAMPLE TIME: 1320	OTHER:
WATER DEPTH: NO WATER	
WATER CHARACTERISTICS: N/A	

WAS SAMPLE COMPOSITED ? (DESCRIBE ORIGIN AND SIZE OF EACH SUBSAMPLE)

SAMPLE COLLECTION METHOD - DESCRIBE EQUIPMENT TYPE AND CONSTRUCTION

OPEN SCOOP: ✓

CORING DEVICE (SPECIFY LINER, IF USED):

PETERSON DREDGE:

ECKMAN DREDGE:

PONAR DREDGE:

OTHER:

SAMPLE I.D.#	ANALYSIS REQUESTED	#CONTAINERS	SAMPLE MIXED ?	C-O-C SEAL NO.
MND25 09377 0002	VOA			
	METALS			
	SVOC			
	PEST / PCB			
	NO_2 / NO_3			
	FLOR			
	CN.			

CHAIN OF CUSTODY REPORT: (YES) NO

SIGNATURE OF SAMPLER(S): _____

REMARKS: _____

(Color, odor, etc.) _____

AUTHOR _____

VERIFICATION _____

APPROVAL _____

06/93

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0938
SAMPLE ID: MND24 0938 0002
LOG DATE: 8/31/94
ANALYTICAL LAB CODE: CONTRACTOR / WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1350
COMPLETE 1415
SAMPLING METHOD: B
DATE SENT: 8/31/94

COMMENTS:

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.34
SPECIFIC CONDUCTANCE	Ec	umhos/cm	900
REDOX POTENTIAL	Eh	mvolts	216
TEMPERATURE	TMP	°C	18.3
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	8.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1340			7.55	860	18.5	8.6 214 CLEAR
GALS REMOVED (N/A)						
1 BORE VOLUME (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0938 LOG DATE 8/31/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAD, MJH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 2-2766/1A87

DO ID. 91202 9307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2020

TIME OF pH CALIBRATION 1330 1430

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.09

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.02

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 199 564

TEMP OF CALIBRATION SOLUTION (°C) 21.3 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	COMPUCHEM	WA	
DATE(S) SHIPPED:	8/31/94	8/31/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX.	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24 | LOT CONTROL NO
LOCATION ID 0941 | SAMPLE TYPE F
SAMPLE ID MND24 0941 0002 | ACCEPTANCE CODE A
LOG DATE 8/29/94 | LOGGER CODE TEFF
ANALYTICAL LAB CODE Compuchem / WA

INITIAL GROUNDWATER DEPTH (FT) N/A | SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1140 | COMPLETE 1155
SAMPLING METHOD G | DATE SENT 8/29/94
COMMENTS 1.58 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.20
SPECIFIC CONDUCTANCE	Ec	umhos/cm	720
REDOX POTENTIAL	Eh	mvolts	-045
TEMPERATURE	TMP	°C	15.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	4.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1115	0.0	0.0	—	—	—	~~DO REDOX~~ START PUMPING
1125	15.8		651	740	14.1	3.6 -035 CLEAR
1130	23.7		6.85	720	14.0	3.4 -039 CLEAR
1135	31.6		7.01	720	14.4	3.4 -053 CLEAR
GALS REMOVED (31.6)						
1 BORE VOLUME UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MN124

LOCATION ID 0941 LOG DATE 8/29/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, EC

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27444/1A87

Ec METER ID 720984/9394

pH METER ID 2-27444/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 912859

DO ID. 128519

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1115

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.15

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.09

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 566

TEMP OF CALIBRATION SOLUTION (°C) 23.2 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	COMPUCHEM	WA	
DATE(S) SHIPPED:	8/29/94	8/29/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WGD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0982 #3
SAMPLE ID: MND24 0982 0002
LOG DATE: 8/31/94
ANALYTICAL LAB CODE: CONTICHEM / WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFRR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1130 COMPLETE 1245
SAMPLING METHOD: G
DATE SENT: 8/31/94

COMMENTS: 7.31 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.07
SPECIFIC CONDUCTANCE	Ec	umhos/cm	980
REDOX POTENTIAL	Eh	mvolts	319
TEMPERATURE	TMP	°C	17.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1110	0.0	0.0	—	—	—	DO ~~REDOX~~ START PUMPING
1115	36.6		6.80	980	15.5	2.2 316 CLEAR
1120	73.1		6.91	980	15.3	3.2 310 CLEAR
1125	109.7		6.95	980	16.2	2.2 243 CLEAR
GALS REMOVED (109.7)						
1 BORE VOLUME			UNKNOWN			

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR—LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0982 LOG DATE 8/31/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) 1/3

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MSH

INSTRUMENT(S) USED pH, DO, TEMP REDOX, Ec.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2746/1A87

Ec METER ID 720984/9394

pH METER ID 2-2746/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 2-2746/1A87

DO ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1130 1245

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.04

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.01

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A.

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 202 554

TEMP OF CALIBRATION SOLUTION (°C) 22.4°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	COMPUCHEM	NA	
DATE(S) SHIPPED:	8/31/94	8/31/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0943
SAMPLE ID: MND240943 0002
LOG DATE: 8/26/94
ANALYTICAL LAB CODE: Cornerstone WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR.

INITIAL GROUNDWATER DEPTH (FT): 37.38
SAMPLING PERIOD: START 1005
SAMPLING METHOD: G
COMMENTS: 2.86 gpm, 2 FAUCETS

SAMPLE DEPTH (FT): N/A
COMPLETE: 1115
DATE SENT: 8/26/94

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.13
SPECIFIC CONDUCTANCE	Ec	umhos/cm	680
REDOX POTENTIAL	Eh	mvolts	185
TEMPERATURE	TMP	°C	19.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
0930	0.0	0.0	—	—	—	Do REDOX START PUMPING
0945	42.9		6.41	750	11.9	3.2 040 CLEAR
0950	57.2		6.88	720	11.3	3.8 009 CLEAR
0955	71.5		7.06	750	10.7	4.2 -017 CLEAR
1000	85.8		7.11	740	11.8	4.8 096 CLEAR
GALS REMOVED (85.8)						
1 BORE VOLUME (UNKNOWN)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0943 LOG DATE 8/24/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) 37.38

WELL DIAMETER (FT) 1/3

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 7209 84/9384

pH METER ID 2-2764/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 128819

DO. ID. 91D029387

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2020

TIME OF pH CALIBRATION 0930 1200

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.21

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.20

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 1000

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 541

TEMP OF CALIBRATION SOLUTION (°C) 26.7°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Centrichem	UA	
DATE(S) SHIPPED:	8/24/94	8/24/94	
METHOD OF SHIPMENT:	FedEx	FedEx	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24
LOCATION ID 0944
SAMPLE ID MND24-0944-0002
LOG DATE 8/25/94
ANALYTICAL LAB CODE Construction / WA

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TERR

INITIAL GROUNDWATER DEPTH (FT) 30.51
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 0955
COMPLETE 1010
SAMPLING METHOD G
DATE SENT 8/25/94
COMMENTS 4 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.07
SPECIFIC CONDUCTANCE	Ec	umhos/cm	880
REDOX POTENTIAL	Eh	mvolts	037
TEMPERATURE	TMP	°C	16.2
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	4.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS DO	REDOX	
0925	0.0	0.0	—	—	—	START PUMPING		
0945	60		6.46	900	14.7	3.2	023	Cloudy
0955	100		6.72	880	14.7	5.2	011	Cloudy
1000	120		6.77	880	14.5	4.6	-001	Cloudy
GALS REMOVED (120)								
1 BORE VOLUME (45.36)								

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 094f

LOG DATE 8/25/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}$ $(h_1 - h_2)$ X 7.48

DEPTH OF WELL (h_2) (FT) ~100'

DEPTH-TO-WATER (h_1) (FT) 30.51'

WELL DIAMETER (FT) 1/3'

ONE BORE VOLUME (GAL) 45.30 gal.

SCREENED INTERVAL (FT) UNKNOWN

FIELD REP MAD, MJH

INSTRUMENT(S) USED pH, TEMP, D.O REDOX, Ec.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/934f

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 12559

DO ID 910029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 0930 1038

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.11

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.06

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 200 551

TEMP OF CALIBRATION SOLUTION (°C) 24.3°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CAMECHEM	WA	
DATE(S) SHIPPED:	8/25/94	8/25/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS D.O 8.4 x .96 = 8.232 CAL

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0945
SAMPLE ID: MND24 0945 - 0002
LOG DATE: 8/25/94
ANALYTICAL LAB CODE: CONTACHEM/WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): 34.76'
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1610
COMPLETE 1630
SAMPLING METHOD: G
DATE SENT: 8/25/94

COMMENTS: 2.31gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.12
SPECIFIC CONDUCTANCE	Ec	umhos/cm	920
REDOX POTENTIAL	Eh	mvolts	132
TEMPERATURE	TMP	°C	15.8
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	5.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1530	0.0	0.0	—	—	—	DO Redox START PUMPING
1550	23.1		6.44	940	15.6	2.4 0.96 CLEAR
1600	46.2		6.94	960	15.1	4.4 0.60 CLEAR
1610	69.3		7.00	940	15.2	4.6 0.55 CLEAR
GALS REMOVED (69.3)						
1 BORE VOLUME UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0945 LOG DATE 8/28/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) _____

DEPTH-TO-WATER (h_1) (FT) 34.76'

WELL DIAMETER (FT) 1/3 1

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB MJH

INSTRUMENT(S) USED DO, REDOX, PH, TEMP, EC

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27466/1A87

Ec METER ID 720984/9394

pH METER ID 2-27466/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

DO ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1530 1050

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.09

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.03

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 1000

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 555

TEMP OF CALIBRATION SOLUTION (°C) 27.5

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTECHTEM	WA	
DATE(S) SHIPPED:	8/28/94	8/28/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS _____

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0947
SAMPLE ID: MND24 0947 0002
LOG DATE: 8/26/94
ANALYTICAL LAB CODE: Compuchem/WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): 22.84
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1545 COMPLETE 1610
SAMPLING METHOD: G
DATE SENT: 8/26/94
COMMENTS: 207 gm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.49
SPECIFIC CONDUCTANCE	Ec	umhos/cm	820
REDOX POTENTIAL	Eh	mvolts	053
TEMPERATURE	TMP	°C	17.8
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1530	0.0	0.0	—	—	—	DO REDOX START PUMPING
1535	10.35		7.25	840	20.1	4.0 008 CLEAR
1540	20.70		7.31	820	18.9	3.0 -002 CLEAR
1545	31.05		7.42	840	18.7	3.4 003 CLEAR
GALS REMOVED (31.05)						
1 BORE VOLUME UNKNOWN						

ACCEPTANCE CODES: A–ACCEPTABLE R–RECONNAISSANCE U–UNACCEPTABLE N–NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR–LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0947 LOG DATE 8/24/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27666/1A87

Ec METER ID 7209 84/ 9394

pH METER ID 2-27666/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

DO ID 91 0029 307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2020

TIME OF pH CALIBRATION 1530 1010

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.01 7.15

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.10

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 1000

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 5 See

TEMP OF CALIBRATION SOLUTION (°C) 27.5

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Cousin CHEM	WA	
DATE(S) SHIPPED:	8/24/94	8/24/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MN024
LOT CONTROL NO:
LOCATION ID: 0948
SAMPLE TYPE: F
SAMPLE ID: MN024 0948 0002
ACCEPTANCE CODE: A
LOG DATE: 9/7/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: COMPUCHEM IWA

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1150
COMPLETE 1245
SAMPLING METHOD: G
DATE SENT: 9/7/94

COMMENTS: 2.41 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.54
SPECIFIC CONDUCTANCE	Ec	umhos/cm	620
REDOX POTENTIAL	Eh	mvolts	208
TEMPERATURE	TMP	°C	18.4
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1130	13.1		7.22	640	18.5	3.2 270 CLEAR
1135	26.2		7.00	620	18.3	3.2 222 CLEAR
1140	39.3		7.51	620	18.2	2.8 233 CLEAR
GALS REMOVED (39.3)						
1 BORE VOLUME (UNKNOWN)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID DG48 LOG DATE 6/7/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED DO, TEMP, PH, Ec, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27LL/1A87

Ec METER ID 720954/9394

pH METER ID 2-27LL/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 720954/9394

DO. ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 6/7/450

TIME OF pH CALIBRATION 1115 1245

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.05

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 208 556

TEMP OF CALIBRATION SOLUTION (°C) 20.3°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	COMPUCHEM	WA	
DATE(S) SHIPPED:	6/7/94	6/7/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOT CONTROL NO:
LOCATION ID: 0649
SAMPLE TYPE: F
SAMPLE ID: MND24 0649 0002
ACCEPTANCE CODE: A
LOG DATE: 8/24/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: Confluence lab

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1230
COMPLETE 1310
SAMPLING METHOD: G
DATE SENT: 8/24/94

COMMENTS: 2.22 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.21
SPECIFIC CONDUCTANCE	Ec	umhos/cm	680
REDOX POTENTIAL	Eh	mvolts	-068
TEMPERATURE	TMP	°C	15.4
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1210	0.0	0.0	—	—	—	DO REDOX START PUMPING
1215	11.1		6.77	680	14.9	2.6 -028 CLEAR
1220	22.2		7.09	680	14.5	2.2 -071 CLEAR
1225	33.3		7.15	720	14.6	2.2 -072 CLEAR
GALS REMOVED (33.3)						
1 BORE VOLUME UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND2nf

LOCATION ID 0949 LOG DATE 8/26/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 7209 84/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

DO ID 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1215 1310

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.14

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.04

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 564

TEMP OF CALIBRATION SOLUTION (°C) 30.9 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTRCHEM	WA	
DATE(S) SHIPPED:	8/26/94	8/26/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/86)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0950
SAMPLE ID: MND24 0950 0002
LOG DATE: 8/29/94
ANALYTICAL LAB CODE: CONTECHEM / WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1020 COMPLETE 1045
SAMPLING METHOD: G
DATE SENT: 8/29/94

COMMENTS: 4 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.12
SPECIFIC CONDUCTANCE	Ec	umhos/cm	980
REDOX POTENTIAL	Eh	mvolts	274
TEMPERATURE	TMP	°C	14.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	6.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
0930	0.0	0.0	—	—	—	~~DO REDOX~~ START PUMPING
0940	40.0		6.65	980	13.8	6.2 241 CLEAR
0950	80.0		6.87	1000	13.7	6.8 234 CLEAR
1000	120.0		6.98	1000	13.7	7.4 239 CLEAR
GALS REMOVED (120)						
1 BORE VOLUME UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE UND24

LOCATION ID 0950 LOG DATE 8/29/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MB MJH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2764/1A87

Ec METER ID 720984/9394

pH METER ID 2-2764/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 2-2764/1A87

DO ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 0930 1045

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.05

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 205 554

TEMP OF CALIBRATION SOLUTION (°C) 22.2°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTCHEM	WA	
DATE(S) SHIPPED:	8/29/94	8/29/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS D.O. 8.84-.98 = 8.024

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MNDNF
LOCATION ID: 0951
SAMPLE ID: MNDNF 0951 0002
LOG DATE: 9/6/94
ANALYTICAL LAB CODE: Comprehensive WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TRR

INITIAL GROUNDWATER DEPTH (FT): ~5
SAMPLE DEPTH (FT): ~6'
SAMPLING PERIOD: START 1410 COMPLETE 1530
SAMPLING METHOD: B
DATE SENT: 9/6/94

COMMENTS:

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.35
SPECIFIC CONDUCTANCE	Ec	umhos/cm	1000
REDOX POTENTIAL	Eh	mvolts	208
TEMPERATURE	TMP	°C	20.3
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	Ds Pump X START PUMPING
GALS REMOVED (N/A)						
1 BORE VOLUME (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0957 LOG DATE 9/6/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) ~6'

DEPTH-TO-WATER (h_1) (FT) ~5'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27 66/1A87

Ec METER ID 720984/9394

pH METER ID 2-27 66/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 720984/9394

DO ID 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1330 1540

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.13

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.09

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 199 565

TEMP OF CALIBRATION SOLUTION (°C) 19.8°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Compuchem	WA	
DATE(S) SHIPPED:	9/6/94	FEDEX.	
METHOD OF SHIPMENT:	FEDEX	9/6/94	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

SEDIMENT SAMPLING FORM

FIELD DATA

SITE NAME: 0951	DATE: 9/7/94
PERSONNEL ONSITE: MAD. MJH	
WEATHER CONDITIONS: SUNNY ~ 80°F	
SITE CONDITIONS: BACK YARD	
SAMPLING LOCATION: CISTERN.	

SAMPLE COLLECTION DATA

SAMPLING SEQUENCE:	QC SAMPLES
FIELD DECON. OF SAMPLING EQUIPMENT: YES	FIELD BLANK:
FUEL POWERED UNIT USED: NO	RINSATE BLANK:
SAMPLE DEPTH: ~ 12'	DUPLICATE SAMPLE:
SAMPLE TIME: 1410	OTHER:
WATER DEPTH: ~5'	
WATER CHARACTERISTICS: Cloudy.	
WAS SAMPLE COMPOSITED ? (DESCRIBE ORIGIN AND SIZE OF EACH SUBSAMPLE)	

SAMPLE COLLECTION METHOD - DESCRIBE EQUIPMENT TYPE AND CONSTRUCTION

OPEN SCOOP:	
CORING DEVICE (SPECIFY LINER, IF USED):	
PETERSON DREDGE:	
ECKMAN DREDGE: ✓	
PONAR DREDGE:	
OTHER:	

SAMPLE I.D.#	ANALYSIS REQUESTED	#CONTAINERS	SAMPLE MIXED ?	C-O-C SEAL NO.
MND250951 0002	VOA			
	METALS			
	SVOC			
	PEST/PCB			
	NO_2 / NO_3			
	FLOR.			
	CN			

CHAIN OF CUSTODY REPORT: (YES) NO SIGNATURE OF SAMPLER(S): _____

REMARKS: _____

(Color, odor, etc.) _____

AUTHOR _____

VERIFICATION _____

APPROVAL _____

06/93

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOT CONTROL NO:
LOCATION ID: 0952
SAMPLE TYPE: F
SAMPLE ID: MND24 0952 0002
ACCEPTANCE CODE: A
LOG DATE: 8/31/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: CONTECHEM/WA

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1520
COMPLETE 1545
SAMPLING METHOD: G
DATE SENT: 8/31/94

COMMENTS: 0.38 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.10
SPECIFIC CONDUCTANCE	Ec	umhos/cm	880
REDOX POTENTIAL	Eh	mvolts	-033
TEMPERATURE	TMP	°C	14.9
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1505	0.0	0.0	—	—	—	DO REDOX START PUMPING
1510	31.9		7.02	880	15.4	2.4 -010 CLEAR
1515	63.8		7.05	870	14.5	3.4 -029 CLEAR
1520	95.7		7.04	880	14.5	3.2 -026 CLEAR
GALS REMOVED (95.7)						
1 BORE VOLUME UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE XMD24

LOCATION ID 0952 LOG DATE 8/3/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) 1/3'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2744/1A87

Ec METER ID 720984/9344

pH METER ID 2-2744/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 2-2744/1A87

DO. ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 8/7/1450 2070/2000

TIME OF pH CALIBRATION 1500 1545

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.09

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.03

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 700 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 199 556

TEMP OF CALIBRATION SOLUTION (°C) 22.1 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Construction	NA	
DATE(S) SHIPPED:	8/3/94	8/3/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX.	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24B
LOCATION ID: 093553
SAMPLE ID: MND24 093553 0002
LOG DATE: 8/30/94
ANALYTICAL LAB CODE: CONTINENTAL/WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): 20.92'
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1150
COMPLETE 1230
SAMPLING METHOD: B
DATE SENT: 8/30/94

COMMENTS:

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.38
SPECIFIC CONDUCTANCE	Ec	umhos/cm	620
REDOX POTENTIAL	Eh	mvolts	024
TEMPERATURE	TMP	°C	14.5
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	6.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1130			7.15	640	14.5	3.8 202 Cloudy
GALS REMOVED			(N/A)			
1 BORE VOLUME			(N/A)			

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0953

LOG DATE 8/30/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) 20.92'

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MSH

INSTRUMENT(S) USED pH, DO, TEMP, REDOX, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27444/1A87

Ec METER ID 720984/9394

pH METER ID 2-27444/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 2-27444/1A87

DO ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1115 1230

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.25

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.13

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 1000

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 203 531

TEMP OF CALIBRATION SOLUTION (°C) 20.7 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTECHEM	WA	
DATE(S) SHIPPED:	8/30/94	8/30/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24
LOCATION ID 0954
SAMPLE ID MND24 0954 0002
LOG DATE 8/31/94
ANALYTICAL LAB CODE CONTECHEM IWA

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TERR

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLING PERIOD: START 0945
SAMPLING METHOD B

SAMPLE DEPTH (FT) N/A
COMPLETE 1040
DATE SENT 8/31/94

COMMENTS

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	6.68
SPECIFIC CONDUCTANCE	Ec	umhos/cm	2600
REDOX POTENTIAL	Eh	mvolts	302
TEMPERATURE	TMP	°C	17.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
0945			6.66	170	19.5	7.2 300 CLEAR
GALS REMOVED (N/A)						
1 BORE VOLUME (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB SL – SUCTION LIFT PUMP BP – BLADDER PUMP
B – BAILER SP – SUBMERSIBLE PUMP O – OTHER (SPECIFY)
PP – PERISTALIC PUMP AL – AIR–LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD–008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

PAGE ___ OF ___

FACILITY CODE MND24

LOCATION ID 0954 LOG DATE 31 AUG 94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) 1/2'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, DO, TEMP, Ec, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD B

FILTER SIZE N/A

THERMOMETER ID 2-27UU/1A87

Ec METER ID 720984/G394

pH METER ID 2-27UU/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 2-27UU/1A87

DO ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 31 AUG 94 450/447, 2050/2070

TIME OF pH CALIBRATION	925	1040
FOR STANDARD SOLUTION pH 7, INSTRUMENT READING	7.00	7.04
FOR STANDARD SOLUTION pH 4, INSTRUMENT READING	4.00	4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 198/200, 552/600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT

TEMP OF CALIBRATION SOLUTION (°C) THERMOMETER = 23.2/THERMISTOR 22.8 C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Cantwell	WA	
DATE(S) SHIPPED:	8/31/94	8/31/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS D.O. meter should have calibrated to 8.4, calibration at full clockwise position goes only to 8.2. used this as calibration

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/86)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOT CONTROL NO:
LOCATION ID: 0955
SAMPLE TYPE: F
SAMPLE ID: MND24 0955 0002
ACCEPTANCE CODE: A
LOG DATE: 9/8/94
LOGGER CODE: TEPR
ANALYTICAL LAB CODE: CONUCHEM / WA

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1140
COMPLETE 1210
SAMPLING METHOD: G
DATE SENT: 9/8/94
COMMENTS: 5gal / 1 MIN 20SEC . 3.75gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.44
SPECIFIC CONDUCTANCE	Ec	umhos/cm	800
REDOX POTENTIAL	Eh	mvolts	271
TEMPERATURE	TMP	°C	18.3
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	5.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	DO / REDOX	COMMENTS
	0.0	0.0	—	—	—		START PUMPING
1130	18.75		7.16	800	20.1	4.4 / 238	CLEAR
1135	37.5		7.30	800	19.0	6.2 / 246	CLEAR
1140	56.25		7.44	800	19.4	5.4 / 258	CLEAR
GALS REMOVED (56.25)							
1 BORE VOLUME UNKNOWN.							

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0955 LOG DATE 9/8/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB MJH

INSTRUMENT(S) USED DO, TEMP, Ec, pH, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 720984/9394

DO ID. 912029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1120 1210

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.05

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.02

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 556

TEMP OF CALIBRATION SOLUTION (°C) 20.0 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Construction	WA	
DATE(S) SHIPPED:	9/8/94	9/8/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0952 MW 10
SAMPLE ID: MND24 0952 0002
LOG DATE: 8/30/94
ANALYTICAL LAB CODE: Compuchem / WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TFER

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1515 COMPLETE 1530
SAMPLING METHOD: G
DATE SENT: 8/30/94

COMMENTS: 375 gal

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.18
SPECIFIC CONDUCTANCE	Ec	umhos/cm	900
REDOX POTENTIAL	Eh	mvolts	178
TEMPERATURE	TMP	°C	16.3
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.0

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1450	0.0	0.0	—	—	—	DO/REDOX START PUMPING
1455	18.75		6.85	900	15.6	2.6 216 CLEAR
1500	37.5		7.11	880	16.1	2.4 188 CLEAR
1505	56.25		7.12	880	15.6	1.6 196 CLEAR
GALS REMOVED (56.25)						
1 BORE VOLUME UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F – FIELD R – REPLICATE
K – KNOWN A – ACID BLANK

SAMPLING METHODS:
G – GRAB
B – BAILER
PP – PERISTALIC PUMP
SL – SUCTION LIFT PUMP
SP – SUBMERSIBLE PUMP
AL – AIR-LIFT SAMPLER
BP – BLADDER PUMP
O – OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 095~~2~~06 LOG DATE 8/30/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH DO REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 2-2766/1A87

DO ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1430 1530

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.05

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.02

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 544

TEMP OF CALIBRATION SOLUTION (°C) 23.1 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTECHEM	WA	
DATE(S) SHIPPED:	8/30/94	8/30/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24
LOCATION ID 0958
SAMPLE ID MND24 0958 0002
LOG DATE 9/2/94
ANALYTICAL LAB CODE CONTRACTEM IWA

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TERR.

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLING PERIOD: START 1040
SAMPLING METHOD G

SAMPLE DEPTH (FT) N/A
COMPLETE 1100
DATE SENT 9/2/94

COMMENTS 1.02 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.12
SPECIFIC CONDUCTANCE	Ec	umhos/cm	700
REDOX POTENTIAL	Eh	mvolts	218
TEMPERATURE	TMP	°C	16.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1020	0.0	0.0	—	—	—	~~DO REDOX~~ START PUMPING
1025	8.1		6.87	720	14.8	2.8 265 CLEAR
1030	16.2		7.07	720	14.9	3.0 220 CLEAR
1035	24.3		7.10	720	15.2	2.8 184 CLEAR
GALS REMOVED (24.3)						
1 BORE VOLUME (UNKNOWN).						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0958 LOG DATE 6/2/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, DO, TEMP, REDOX, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 7209841939 4

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 2-2766/1A87

DO. ID. 5546

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 4/27/1430 2070/2000

TIME OF pH CALIBRATION 1025 1110

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.03

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 535

TEMP OF CALIBRATION SOLUTION (°C) 14.8 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Contechem	WA	
DATE(S) SHIPPED:	6/2/94	6/2/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0959
SAMPLE ID: MND24 0959 0002
LOG DATE: 9/8/94
ANALYTICAL LAB CODE: CompuChem / WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR.

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 0920 COMPLETE 1000
SAMPLING METHOD: G
DATE SENT: 9/8/94

COMMENTS:

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.01
SPECIFIC CONDUCTANCE	Ec	umhos/cm	84
REDOX POTENTIAL	Eh	mvolts	270
TEMPERATURE	TMP	°C	18.1
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	4.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	~~DO REDOX~~ START PUMPING
0915			6.75	82	19.8	4.2 200 CLEAR
GALS REMOVED (N/A)						
1 BORE VOLUME (N/A)						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0959 LOG DATE 9/8/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB MJH

INSTRUMENT(S) USED DO, pH, REDOX, EC, TEMP

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27641A87

Ec METER ID 7209 84/9394

pH METER ID 2-27641A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 7209 84/9394

DO ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 0900 1000

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.03

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.01

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 205 544

TEMP OF CALIBRATION SOLUTION (°C) 18.2 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTACHEM	WA	
DATE(S) SHIPPED:	9/8/94	9/8/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX.	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOT CONTROL NO:
LOCATION ID: 0960
SAMPLE TYPE: F
SAMPLE ID: MND24 0960 0002
ACCEPTANCE CODE: A
LOG DATE: 9/6/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: CONTECHEM/WA

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1145
COMPLETE 1230
SAMPLING METHOD: G
DATE SENT: 9/6/94
COMMENTS: 5gal / 170 gpc2 1.77gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.31
SPECIFIC CONDUCTANCE	Ec	umhos/cm	740
REDOX POTENTIAL	Eh	mvolts	238
TEMPERATURE	TMP	°C	15.4 °C
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.6

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1130	8.85		6.75	740	15.4	2.2 265 CLEAR
1135	17.70		7.15	760	15.0	2.0 255 CLEAR
1140	26.55		7.28	740	15.3	2.2 252 CLEAR
GALS REMOVED						
1 BORE VOLUME						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0960 LOG DATE 9/6/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

SAMPLING INFORMATION

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) 1/3'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, RWH

INSTRUMENT(S) USED pH, DO, TEMP, Ec, REDOX.

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 7209 84/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 7209 84/9394

DO ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1115 1235

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.04

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 204 554

TEMP OF CALIBRATION SOLUTION (°C) 17.2°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Compuchem	WA	
DATE(S) SHIPPED:	9/6/94	9/6/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24
LOCATION ID 0961
SAMPLE ID MND24 0961 0002
LOG DATE 9/8/94
ANALYTICAL LAB CODE Confirmation N/A

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TEFF

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1615
COMPLETE 1650
SAMPLING METHOD G
DATE SENT 9/8/94

COMMENTS

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.21
SPECIFIC CONDUCTANCE	Ec	umhos/cm	1000
REDOX POTENTIAL	Eh	mvolts	278
TEMPERATURE	TMP	°C	15.2
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	12.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1610			6.75	1000	15.1	5.2 345 CLEAR
1615			6.97	1000	15.1	5.4 275 CLEAR
1620			6.98	1000	15.1	5.8 282 CLEAR
GALS REMOVED			UNKNOWN			
1 BORE VOLUME			UNKNOWN			

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—005 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0961 LOG DATE 9/8/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB MJH

INSTRUMENT(S) USED pH, DO, TEMP, EC, REDOX.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 720984/9394

DO. ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1500 1650

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.10

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.05

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 564

TEMP OF CALIBRATION SOLUTION (°C) 18.1 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	Compuchem	WA	
DATE(S) SHIPPED:	8/9/94	9/8/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24 LOT CONTROL NO

LOCATION ID 0962 SAMPLE TYPE F

SAMPLE ID MND240962 0002 ACCEPTANCE CODE A

LOG DATE 9/14/94 LOGGER CODE TFRR

ANALYTICAL LAB CODE Construction/WA

INITIAL GROUNDWATER DEPTH (FT) N/A SAMPLE DEPTH (FT) N/A

SAMPLING PERIOD: START 1140 COMPLETE 1200

SAMPLING METHOD G DATE SENT 9/14/94

COMMENTS

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.65
SPECIFIC CONDUCTANCE	Ec	umhos/cm	770
REDOX POTENTIAL	Eh	mvolts	076
TEMPERATURE	TMP	°C	15.9
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	4.6

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1115			7.34	760	15.4	4.2 212 CLEAR
1120			7.51	760	15.1	4.4 123 CLEAR
1125			7.75	760	15.1	4.8 085 CLEAR
GALS REMOVED - UNKNOWN						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:

F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:

G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MWD24

LOCATION ID 0962 LOG DATE 9/14/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH, BLH

INSTRUMENT(S) USED pH, DO, REDOX, EC, TEMP.

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 720984/9394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

DO. ID. 720984/9394

REDOX ID. 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 1447/1450 2070/2020

TIME OF pH CALIBRATION 1110 1200

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.15

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.10

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 203 561

TEMP OF CALIBRATION SOLUTION (°C) 22.1°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTUCHEM	WA	
DATE(S) SHIPPED:	9/14/94	9/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS pH METERS DRIFTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 0963
SAMPLE ID: MND24 0963 0002
LOG DATE: 9/14/94
ANALYTICAL LAB CODE: CONTUCHEM / WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TRRR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1005 COMPLETE 1100
SAMPLING METHOD: G
DATE SENT: 9/14/94

COMMENTS:

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.74
SPECIFIC CONDUCTANCE	Ec	umhos/cm	1000
REDOX POTENTIAL	Eh	mvolts	-030
TEMPERATURE	TMP	°C	15.2
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
0930			7.57	1000	15.1	14 003 Cloudy
0935			7.65	1000	14.9	24 003 Cloudy
0940			7.73	1000	15.1	24 002 Cloudy
GALS PENDOUED - UNKNOWN						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0963 LOG DATE 6/14/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH, BLH

INSTRUMENT(S) USED pH, DO, Ec, TEMP, REDOX

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27666/1A87

Ec METER ID 720984/9394

pH METER ID 2-27666/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 720984/9394

DO ID. 910029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 915 1100

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.05

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.01

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 554

TEMP OF CALIBRATION SOLUTION (°C) 23.2 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTINCHEM	WA	
DATE(S) SHIPPED:	6/14/94	6/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS pH METER DRIFTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/85)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOT CONTROL NO:
LOCATION ID: 09641
SAMPLE TYPE: F
SAMPLE ID: MND24 0964 0002
ACCEPTANCE CODE: A
LOG DATE: 9/2/94
LOGGER CODE: TERR
ANALYTICAL LAB CODE: CONTINENTAL LAB

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 0915
COMPLETE 0920
SAMPLING METHOD: G
DATE SENT: 9/2/94

COMMENTS: .6 gpm

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.11
SPECIFIC CONDUCTANCE	Ec	umhos/cm	860
REDOX POTENTIAL	Eh	mvolts	226
TEMPERATURE	TMP	°C	13.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	24

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
0855	0.0	0.0	—	—	—	DO REDOX START PUMPING
0900	3.05		6.85	860	13.1	2.2 227 CLEAR
0905	6.1		6.91	860	13.1	3.0 196 CLEAR
0910	9.15		6.96	850	13.0	3.4 203 CLEAR
GALS REMOVED (9.15)						
1 BORE VOLUME - UNKNOWN.						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK.

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0964 LOG DATE 9/2/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MSH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-2766/1A87

Ec METER ID 72098419394

pH METER ID 2-2766/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 128519

DO ID 5546

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/1450 2070/2000

TIME OF pH CALIBRATION 0845 0920

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.04

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 206

TEMP OF CALIBRATION SOLUTION (°C) 16.1 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTUCHEM	WA	
DATE(S) SHIPPED:	9/2/94	9/2/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS DO 9.9 x .98 = 9.72

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 09165
SAMPLE ID: MND24 09165
LOG DATE: 9/14/94
ANALYTICAL LAB CODE: CUNNINGHAM / WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TEER

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1345 COMPLETE 1440
SAMPLING METHOD: G
DATE SENT: 9/14/94

COMMENTS:

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.47
SPECIFIC CONDUCTANCE	Ec	umhos/cm	780
REDOX POTENTIAL	Eh	mvolts	-029
TEMPERATURE	TMP	°C	15.7
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	2.2

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO REDOX START PUMPING
1330			6.85	820	14.3	2.8 -018 CLEAR
1335			7.12	800	14.2	2.6 -036 CLEAR
1340			7.48	780	13.9	2.4 -029 CLEAR
GALS REMOVED - UNKNOWN						
1 BORE VOLUME - UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB
B — BAILER
PP — PERISTALIC PUMP
SL — SUCTION LIFT PUMP
SP — SUBMERSIBLE PUMP
AL — AIR-LIFT SAMPLER
BP — BLADDER PUMP
O — OTHER (SPECIFY)

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MNDNF

LOCATION ID 0965 LOG DATE 9/14/94

BORE VOL CALCULATION (GAL)

$\frac{d^2\pi}{4}$ $(h_1 - h_2)$ X 7.48

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, WH, BLH

INSTRUMENT(S) USED pH, DO, REDOX, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27666/1A87

Ec METER ID 720984/9394

pH METER ID 2-27666/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 720984/9394

DO. ID. 910029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/1450 2070/2020

TIME OF pH CALIBRATION 1330 1440

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.07

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 191 566

TEMP OF CALIBRATION SOLUTION (°C) 23.4 °C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTRACTOR	WA	
DATE(S) SHIPPED:	9/14/94	9/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TMS

WGD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE: MND24
LOCATION ID: 09666
SAMPLE ID: MND24 09666 0002
LOG DATE: 9/14/94
ANALYTICAL LAB CODE: CONTINENTAL/WA

LOT CONTROL NO:
SAMPLE TYPE: F
ACCEPTANCE CODE: A
LOGGER CODE: TERR

INITIAL GROUNDWATER DEPTH (FT): N/A
SAMPLE DEPTH (FT): N/A
SAMPLING PERIOD: START 1450
COMPLETE:
SAMPLING METHOD: G
DATE SENT: 9/14/94

COMMENTS:

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.33
SPECIFIC CONDUCTANCE	Ec	umhos/cm	780
REDOX POTENTIAL	Eh	mvolts	043
TEMPERATURE	TMP	°C	14.3
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.4

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
	0.0	0.0	—	—	—	DO/REDOX START PUMPING
1440			6.53	800	14.0	3.4 097 CLEAR
1443			6.92	780	13.5	4.0 035 CLEAR
1450			7.22	780	13.6	6.8 043 CLEAR
GALS REMOVED - UNKNOWN						
1 BORE VOLUME - UNKNOWN.						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MUD24

LOCATION ID 09660 LOG DATE 9/14/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4}(h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) N/A

WELL DIAMETER (FT) N/A

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH, BCH

INSTRUMENT(S) USED TEMP, DO, Ec, REDOX, pH

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27666/1487

Ec METER ID 720984/9394

pH METER ID 2-27666/1487

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID. 720984/93194

DO ID 91D029307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/1450 2070/2000

TIME OF pH CALIBRATION 1440

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 195 556

TEMP OF CALIBRATION SOLUTION (°C) 24.2°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	COMPUCHEM	WA	
DATE(S) SHIPPED:	9/14/94	9/14/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD-008 (1/88)

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24
LOCATION ID 0907
SAMPLE ID MND24 0907 0002
LOG DATE 8/30/94
ANALYTICAL LAB CODE CONTECHEM/WA

LOT CONTROL NO
SAMPLE TYPE F
ACCEPTANCE CODE A
LOGGER CODE TERR

INITIAL GROUNDWATER DEPTH (FT) N/A
SAMPLE DEPTH (FT) N/A
SAMPLING PERIOD: START 1620
COMPLETE 1710
SAMPLING METHOD G
DATE SENT 8/30/94

COMMENTS

FINAL PARAMETER MEASUREMENTS:

POTENTIAL OF HYDROGEN	pH	S.U.	7.15
SPECIFIC CONDUCTANCE	Ec	umhos/cm	800
REDOX POTENTIAL	Eh	mvolts	218
TEMPERATURE	TMP	°C	18.0
ALKALINITY ($CaCO_3$)	ALK	mg/l	N/A
DISSOLVED OXYGEN	DO	mg/l	3.8

TIME	TOTAL VOLUME WITHDRAWN (GALS)	TOTAL VOLUME WITHDRAWN (Bore Volume)	pH	Ec (umhos/cm)	TEMP (°C)	COMMENTS
1600	0.0	0.0	—	—	—	DO REDOX START PUMPING
1605	12.5		7.05	670	18.1	2.6 210 CLEAR
1610	25.0		7.12	800	15.0	2.6 220 CLEAR
1615	37.5		7.12	800	15.2	2.6 221 CLEAR
GALS REMOVED (37.5)						
1 BORE VOLUME UNKNOWN						

ACCEPTANCE CODES: A—ACCEPTABLE R—RECONNAISSANCE U—UNACCEPTABLE N—NOT DETERMINED

SAMPLE TYPES:
F — FIELD R — REPLICATE
K — KNOWN A — ACID BLANK

SAMPLING METHODS:
G — GRAB SL — SUCTION LIFT PUMP BP — BLADDER PUMP
B — BAILER SP — SUBMERSIBLE PUMP O — OTHER (SPECIFY)
PP — PERISTALIC PUMP AL — AIR-LIFT SAMPLER

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQO-006 (1/88)

FORM COMPLETED BY/DATE

TECHNICAL REVIEWER/DATE

GROUNDWATER QUALITY SAMPLING RECORD

FACILITY CODE MND24

LOCATION ID 0907 LOG DATE 8/30/94

BORE VOL CALCULATION (GAL)

$$\frac{d^2\pi}{4} (h_1 - h_2) \times 7.48$$

DEPTH OF WELL (h_2) (FT) N/A

DEPTH-TO-WATER (h_1) (FT) 17.49

WELL DIAMETER (FT) 1/3'

ONE BORE VOLUME (GAL) N/A

SCREENED INTERVAL (FT) N/A

FIELD REP MAB, MJH

INSTRUMENT(S) USED pH, REDOX, DO, TEMP, Ec

SAMPLING INFORMATION

WITHDRAWAL METHOD G

FILTER SIZE N/A

THERMOMETER ID 2-27661/1A87

Ec METER ID 720984 9394

pH METER ID 2-27661/1A87

PUMP ID N/A

ALKALINITY KIT ID N/A

REDOX ID 2-27661/1A87

DO ID. 91D02 9307

CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 447/450 2070/2000

TIME OF pH CALIBRATION 1600 1715

FOR STANDARD SOLUTION pH 7, INSTRUMENT READING 7.00 7.10

FOR STANDARD SOLUTION pH 4, INSTRUMENT READING 4.00 4.04

FOR STANDARD SOLUTION pH 10, INSTRUMENT READING N/A

Eh OF CALIBRATION SOLUTION 200 600

Eh READING IN CALIBRATION SOLUTION AFTER MEASUREMENT 201 564

TEMP OF CALIBRATION SOLUTION (°C) 21.2°C

SHIPPING INFORMATION

LAB(S) SHIPPED TO:	CONTICHEM	WA	
DATE(S) SHIPPED:	8/30/94	8/30/94	
METHOD OF SHIPMENT:	FEDEX	FEDEX	

COMMENTS

COMPLETE BOLDED DATA FOR ENTRY INTO TIMS

WQD—008 (1/88)

Appendix C

APPENDIX C

QUALIFIED CONCENTRATIONS OF DETECTED ANALYTES

Field Sample No. - MND24-0931-0001
Weston Laboratory No. - 9402L459-007
IT Laboratory No.s - S4-02-002-01, S4-02-002-02

Parameter Detected	Results for First Sample Event		Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-Ethylhexyl) phthalate	4.0	U	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0	U	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0	U	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	140		ND - 430	None
Nitrate-Nitrite	0.30		ND - 15.2	10 *MCL*
Total Dissolved Solids	229		ND - 632	500 *SMCL*
Total Suspended Solids	5.0		ND - 676	None
Target Analyte List Metals (μg/L)				
Aluminum	**169**		**ND - 7,820**	**50-200 *SMCL***
Barium	29.1		ND - 475	2,000 *MCL*
Calcium	59,300	J	ND - 116,000	None
Copper	3.5		ND - 54.2	1,000 *SMCL*
Iron	199	J	ND - 124,000	300 *SMCL*
Lithium	18.6		ND - 208	None
Magnesium	7,710		ND - 65,100	None
Manganese	17.8		ND - 610	50 *SMCL*
Potassium	830		ND - 7,300	None
Sodium	12,300		ND - 221,000	None
Tin	10.5		ND - 118	None
Vanadium	5.5		ND - 13.2	None
Zinc	29.6	J	ND - 23,500	5,000 *SMCL*

Parameter Detected	Results for First Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)			
Americium-241	0.0638	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.184	ND - 0.218	1.6 *DOE*
Strontium-90	0.82	ND - 10.6	8.0 *MCL*
Thorium-228	0.554	ND - 1.8	16 *DOE*
Thorium-230	0.396	ND - 10.7	12 *DOE*

Field Sample No. - MND24-0932-0002
Weston Laboratory No. - 9409L992-001
CompuChem No. - 636168, 636169, 636170, 636171, 636172

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	4.0 U	5.0 U	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	110	100	22 - 430	None
Fluoride	0.11	ND	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.61	0.89	ND - 19	10 *MCL*
Nitrite	0.010	ND	ND - 0.086	1 *MCL*
Total Dissolved Solids	171 J	127	41 - 716	500 *SMCL*
Total Suspended Solids	ND	33	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	**79.9**	**5,020**	8.7 - 21,400	**50-200 *SMCL***
Arsenic	ND	1.8 J	ND - 84	50 *MCL*
Barium	28.9	73.8	6.7 - 487	2,000 *MCL*
Beryllium	ND	0.43	ND - 1.2	4 *MCL*
Cadmium	ND	0.6 J	ND - 13.8	5 *MCL*
Calcium	37,600	35,000 J	8,710 - 139,000	None
Chromium	ND	6.5 J	ND - 104	100 *MCL*
Cobalt	ND	3.3 J	ND - 17.9	None
Copper	1.9	18.9	ND - 54.2	1,000 *SMCL*
Iron	87.3	6,130	8.2 - 124,000	**300 *SMCL***
Lead	**ND**	**89 J**	ND - 580	**15 -Action Level at tap**
Lithium	**12.3**	**19**	ND - 208	None
Magnesium	7,590	6,610 J	959 - 65,100	None
Manganese	**3.2**	**324 J**	ND - 613	**50 *SMCL***
Mercury	ND	0.15	ND - 0.27	2 *MCL*
Nickel	2.5	4.8 J	ND - 31	100 *MCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Target Analyte List Metals (μg/L) (cont.)				
Potassium	916	1,830	56.2 - 7,930	None
Selenium	ND	1.5 J	ND - 6.1	50 *MCL*
Sodium	8,120	2,590	614 - 221,000	None
Tin	ND	6.0 J	ND - 118	None
Vanadium	2.5	14.5	ND - 31.1	None
Zinc	43	436 J	1.2 - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)				
Americium-241	0.112	0.35 J	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0999	ND	ND - 0.654	1.6 *DOE*
Radium-226	ND	0.67 J	ND - 1.35	20 *MCL*
Strontium-90	0.657	ND	ND - 10.6	8.0 *MCL*
Thorium-228	1.27	0.40 J	ND - 1.8	16 *DOE*
Thorium-230	1.31	0.11 R	ND - 10.7	12 *DOE*
Uranium-234	0.112	0.63 J	ND - 7.33	20 *DOE*
Uranium-238	ND	0.22 J	ND - 5.84	24 *MCL*

Field Sample No. - MND24-0933-0002
Weston Laboratory No. - 9408L970-002
CompuChem No. - 636021, 636024, 636027, 636030, 636033

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
General Water Quality Parameters (mg/L)				
Alkalinity	36	22	22 - 430	None
Nitrate-Nitrite	0.54	1.2	ND - 19	10 *MCL*
Total Dissolved Solids	115	95	41 - 716	500 *SMCL*
Total Suspended Solids	ND	9.0	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	45.6	30.9	8.7 - 21,400	50-200 *SMCL*
Antimony	0.85	ND	ND - 1.2	5 *MCL*
Barium	18.8 J	18.6	6.7 - 487	2,000 *MCL*
Berryllium	0.32 J	ND	ND - 1.2	4 *MCL*
Cadmium	ND	0.5	ND - 13.8	5 *MCL*
Calcium	26,800	21,700	8,710 - 139,000	None
Copper	2.9 J	3.2	ND - 54.2	1,000 *SMCL*
Iron	25.7 J	20.6	8.2 - 124,000	300 *SMCL*
Lead	5.9	3.6	ND - 580	15 -Action Level at tap
Lithium	29.3	19	ND - 208	None
Magnesium	1,500	1,580	959 - 65,100	None
Manganese	2.5 J	6.9	ND - 613	50 *SMCL*
Potassium	690	1,290	56.2 - 7,930	None
Sodium	2,260	1,650	614 - 221,000	None
Vanadium	ND	6.2	ND - 31.1	None
Zinc	145 J	239	1.2 - 23,500	5,000 *SMCL*
Pesticides/PCBs (μg/L)				
Heptachlor Epoxide	0.007	0.01	ND - 0.086	0.20 *MCL*
gamma - BHC (Lindane)	0.037 J	ND	ND - 0.037	0.20 *MCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0972	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	ND	0.11 J	ND - 0.49	1.6 *DOE*
Strontium-90	**10.6 ✓**	ND	ND - 10.6	**8.0 *MCL***
Thorium-228	0.586	0.52 J	ND - 1.8	16 *DOE*
Thorium-230	ND	0.44 R	ND - 10.7	12 *DOE*
Uranium-234	0.159	0.16 J	ND - 7.33	20 *DOE*

Field Sample No. - MND24-0935-0002
Weston Laboratory No. - 9408L011-008
CompuChem No. - 636452, 636461, 636462, 636463, 636472

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event		Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)						
bis(2-ethylhexyl) phthalate	6.0	U	5.0	U	ND - 0.9	6.0 *MCL*
diethylphthalate	6.0	U	5.0	U	ND	5,000 Lifetime H.A.
di-n-butylphthalate	6.0	U	5.0	U	ND	None
General Water Quality Parameters (mg/L)						
Alkalinity	44		22	J	22 - 430	None
Nitrite	ND		0.06	U	ND - 0.086	1 *MCL*
Nitrate/Nitrite	0.54		0.78		ND - 19	10 *MCL*
Total Dissolved Solids	88		75		41 - 716	500 *SMCL*
Target Analyte List Metals (μg/L)						
Aluminum	38.2		**127**		8.7 - 21,400	**50-200 *SMCL***
Barium	11.5		6.8		6.7 - 487	2,000 *MCL*
Cadmium	ND		1.0		ND - 13.8	5 *MCL*
Calcium	17,800	J	8,710		8,710 - 139,000	None
Copper	1.9		6.5		ND - 54.2	1,000 *SMCL*
Iron	14.9		130		8.2 - 124,000	300 *SMCL*
Lead	ND		1.7	J	ND - 580	15-Action Level at Tap
Lithium	ND		37.2		ND - 208	None
Magnesium	2,640	J	1,340		959 - 65,100	None
Manganese	1.9		7.2	J	ND - 613	50 *SMCL*
Potassium	973		672		56.2 - 7,930	None
Sodium	1,610		1,380		614 - 221,000	None
Vanadium	2.4		ND		ND - 31.1	None
Zinc	45.9	J	68.3	J	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Pesticides/PCBs (μg/L)				
Alpha-Chlordane	0.031 J	0.048 J	ND - 0.45	2.0 *MCL* (total chlordane)
Gamma-Chlordane	0.023 J	0.044 J	ND - 0.52	2.0 *MCL* (total chlordane)
Heptachlor Epoxide	0.072 J	0.086 J	ND - 0.086	0.2 *MCL*
Radionuclides (pCi/L)				
Americium-241	0.132	0.180 J	ND - 3.95	1.2 *DOE*
Plutonium-239/240	ND	0.160 J	ND - 0.490	1.6 *DOE*
Strontium-90	0.452	ND	ND - 10.6	8.0 *MCL*
Thorium-228	1.25 J	ND	ND - 1.8	16 *DOE*
Thorium-230	0.665 J	0.390 R	ND - 10.7	12 *DOE*
Uranium-238	0.0995	ND	ND - 5.84	24 *DOE*

Field Sample No. - MND25-0935-0002
Weston Laboratory No. - 9408L011-002
Compuchem No. - 636475, 636478, 636481, 636484

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event		Range of Observed Results
General Water Quality Parameters (mg/kg)					
Nitrate/Nitrite	0.49	J	1.7		0.49 - 8.3
Target Analyte List Metals (mg/kg)					
Aluminum	4,030	J	4,800		4,030 - 8,130
Arsenic	9.4	J	4.0		ND - 20.3
Barium	42.1		55.0		42.1 - 151
Beryllium	0.65		0.37		0.37 - 1.8
Cadmium	2.6	J	2.9	J	2.6 - 12.5
Calcium	47,300	J	50,300	J	20,600 -50,300
Chromium	12.4		13.1	J	11.0 - 29.6
Cobalt	6.6		8.0		6.6 - 10.7
Copper	122	J	86.6	J	31.5 - 122
Iron	14,600	J	16,500	J	13,900 - 17,800
Lead	418		251	J	251 - 2,910
Lithium	5.9		6.5	J	5.9 - 25.4
Magnesium	23,700	J	19,700	J	10,400 - 23,700
Manganese	202		245	J	202 - 501
Mercury	0.94	J	0.15		0.15 - 4.2
Nickel	11.4		13.4		10.5 - 21.6
Potassium	563		548		366 - 937
Selenium	2.0	J	ND		0.95 - 5.3
Silver	ND		0.98	J	ND - 1.8
Sodium	206		171	J	101 - 206
Tin	27		10.3	J	0.3 - 34.9
Vanadium	13.1		16.8		13.1 - 19.2
Zinc	1,190	J	966	J	900 - 4,090

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results
Pesticides/PCBs (μg/kg)			
Arochlor-1242	ND	5200 U	ND
Alpha Chlordane	1,100	13,000	ND - 13,000
Beta - BHC	ND	310	ND - 310
Gamma Chlordane	1,100	17,000	ND - 17,000
Heptachlor	270	470	ND - 470
Heptachlor Epoxide	120	360	ND - 360
gamma - BHC (Lindane)	1,400 J	ND	ND - 1,400
Semivolatile Organic Compoinds (μg/kg)			
Acenaphthylene	ND	61	ND - 350
Anthracene	ND	200	ND - 460
Benzo(a)anthracene	ND	540	ND - 2,200
Benzo(a)pyrene	ND	650	ND - 1,600
Benzo(b)fluoranthene	33	520	33 - 2,200
Benzo(g,h,i)perylene	610 U	510	ND - 1,800
Benzo(k)fluoranthene	ND	710	ND - 1,900
Benzoic acid	280	ND	ND - 280
bis-(2-Ethylhexyl)phthalate	190	330	ND - 340
di-n-butylphthalate	33	5,000 U	33 - 1,800
Carbazole	ND	150	ND - 150
Chrysene	64	840	64 - 3,200
Dibenz(a,h)anthracene	ND	260	ND - 340
Fluoranthene	49	1,100	49 - 5,800
Fluorene	ND	110	ND - 360
Indeno(1,2,3-c,d)pyrene	ND	380	ND - 1,500
Phenanthrene	34	880	34 - 3,100
Pyrene	43	1,500	43 - 5,000
Radionuclides (pCi/g)			
Cesium-137	2.96 J	1.64 J	ND - 5.67
Potassium-40	13.8 J	ND	ND - 14.7
Plutonium-238	0.0995	ND	ND - 0.654
Plutonium-239/240	0.0905	0.06 J	ND - 0.218
Radium-226	1.02 J	0.66 J	ND - 1.35

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results
Radionuclides (pCi/g) (cont.)			
Thorium-228	0.742	0.65 J	ND - 0.941
Thorium-230	1.23	0.87 R	ND - 1.99
Thorium-232	0.77	0.39 J	ND - 0.873
Uranium-234	0.913	0.6 J	ND - 1.07
Uranium-235/236	0.0767	ND J	ND - 0.19
Uranium-238	0.918	0.79 J	ND - 1.11

Field Sample No. - MND24-0936-0002 Weston Laboratory No. - 9408L970-001 CompuChem No. - 636036, 636037, 636038, 636039, 636040				
Parameter Detected	**Results for 1st Sample Evemt**	**Results for 2nd Sample Event**	**Range of Observed Results**	**Drinking Water Standard**
General Water Quality Parameters (mg/L)				
Alkalinity	24	40	22 - 430	None
Nitrate/Nitrite	0.89	0.27	ND - 19	10 *MCL*
Nitrite	ND	0.04	ND - 0.086	1 *MCL*
Total Dissolved Solids	50	55	41 - 716	500 *SMCL*
Total Suspended Solids	531	100	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	**1,660**	**5,130**	8.7 - 21,400	**50-200 *SMCL***
Arsenic	2.3 J	8.6	ND - 84	50 *MCL*
Barium	20.4	51	6.7 - 487	2,000 *MCL*
Beryllium	ND	0.6	ND - 1.2	4 *MCL*
Cadmium	2.1	**5.4**	ND - 13.8	**5 *MCL***
Calcium	12,200 J	16,000	8,710 - 139,000	None
Chromium	4.9	18.9	ND - 104	100 *MCL*
Cobalt	2.2	7.1	ND - 17.9	None
Copper	15.1	40.8	ND - 54.2	1,000 *SMCL*
Iron	**2,670 J**	**9,820**	8.2 - 124,000	**300 *SMCL***
Lead	**214 J**	**580**	ND - 580	**15 -Action Level at tap**
Lithium	18.6	19	ND - 208	None
Magnesium	1,600	4,240	959 - 65,100	None
Manganese	**52.2**	**121**	ND - 613	**50 *SMCL***
Mercury	0.13	0.27	ND - 0.27	2 *MCL*
Nickel	3.9	14.7	ND - 31.0	100 *MCL*
Potassium	319	1,290	56.2 - 7,930	None

Parameter Detected	Results for 1st Sample Evemt	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Target Analyte List Metals (μg/L) (cont.)				
Selenium	ND	3.5	ND - 6.1	50 *MCL*
Silver	ND	0.83	ND - 5.3	100 -Lifetime H.A.
Sodium	1,210	1,040	614 - 221,000	None
Tin	10.3	13.1	ND - 118	None
Vanadium	2.7	15.5	ND - 31.1	None
Zinc	680 J	1,530	1.2 - 23,500	5,000 *SMCL*
Pesticides/PCBs (μg/L)				
Alpha-Chlordane	ND	0.04	ND - 0.45	2.0 *MCL*
4,4'-DDE	0.036 J	0.16	ND - 0.16	None
4,4'-DDT	0.028 J	0.09	ND - 0.09	None
Gamma-Chlordane	ND	0.034	ND - 0.52	2.0 *MCL*
Methoxychlor	ND	0.36	ND - 0.36	40 *MCL*
Semivolatile Organic Compounds (μg/L)				
Acenaphthylene	0.3	ND	ND - 0.3	None
Anthracene	ND	0.5	ND - 0.5	None
Benzo(a)anthracene	**1.0**	**2.0**	ND - 2.0	**0.10 *MCL***
Benzo(b)fluoranthene	**2.0**	**3.0**	ND - 3.0	**0.20 *MCL***
Beno(k)fluoranthene	**1.0**	**3.0**	ND - 3.0	**0.20 *MCL***
Benzo(g,h,i)perylene	1.0	2.0	ND - 2.0	None
Benzo(a)pyrene	**1.0**	**2.0**	ND - 2.0	**0.20 *MCL***
bis(2-ethylhexyl) phthalate	4.0 U	ND	ND - 0.9	6.0 *MCL*
Carbazole	0.5	ND	ND - 0.5	None
Chrysene	**2.0**	**3.0**	ND - 3.0	**0.20 *MCL***
Dibenz(a,h)anthracene	**0.4**	**0.6**	ND - 0.6	**0.30 *MCL***
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0 U	ND	ND	None
Fluoranthene	4.0	6.0	ND - 6.0	None
Indeno(1,2,3-C,D)pyrene	**1.0**	**2.0**	ND - 2.0	**0.40 *MCL***
4-Methylphenol	0.3	ND	ND - 0.30	None
Phenanthrene	2.0	3.0	ND - 3.0	None

Parameter Detected	Results for 1st Sample Evemt	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L) (cont.)				
Phenol	0.5	ND	ND - 1.0	4,000 -Lifetime
Pyrene	2.0	5.0	ND - 5.0	21 Lifetime H.A. (estimated)
Radionuclides (pCi/L)				
Plutonium-238	0.176	0.13 J	ND - 0.654	1.6 *DOE*
Plutonium-239/240	0.113	ND	ND - 0.49	1.6 *DOE*
Radium-226	ND	0.74 J	ND - 1.35	20 *MCL*
Thorium-228	0.744	0.24 J	ND - 1.8	16 *DOE*
Thorium-230	0.531	0.20 R	ND - 10.7	12 *DOE*
Thorium-232	0.205	ND	ND - 1.99	2 *DOE*
Tritium	540	ND	ND - 2,856	20,000 *MCL*
Uranium-234	0.393	ND	ND - 7.33	20 *DOE*
Uranium-238	0.278	ND	ND - 5.84	24 *DOE*

Field Sample No. - MND25-0937-0002
Weston Laboratory No. - 9408L031-004
CompuChem No. - 636822, 636823, 636824, 636825

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event	Range of Observed Results for this Study
Volatile Organic Compounds (μg/kg)				
Acetone	190	U	ND	ND
Methylene chloride	20	U	ND	ND
Semivolatile Organic Compounds (μg/g)				
Acenaphthylene	29		150	ND - 150
Anthracene	61		160	ND - 460
Benzo(a)anthracene	270		780	ND - 2,200
Benzo(b)fluoranthene	290		780	33 - 2,200
Benzo(k)fluoranthene	380	J	710	ND - 1,900
Benzo(g,h,i)perylene	230		580	45 - 1,800
Benzo(a)pyrene	350		900	ND - 1,600
bis-(2-Ethylhexyl)phthalate	77		340	ND - 340
Chrysene	410		1,100	64 - 3,200
Dibenz(a,h)anthracene	110		220	ND - 340
di-n-Butyl Phthalate	36		640	33 - 1,800
Fluoranthene	790		2,100	49 - 5,800
Fluorene	31		63	ND - 360
Indeno(1,2,3-C,D)pyrene	230		590	ND - 1,500
Phenanthrene	410		1,100	34 - 3,100
Pyrene	750		1,700	43 - 5,000
General Water Quality Parameters (mg/kg)				
Fluoride	1.8		1.6	ND - 1.8
Nitrate/Nitrite	2.1	J	8.3	0.49 - 8.3
Target Analyte List Metals (mg/kg)				
Aluminum	8,130		6,360	4,030 - 8,130
Antimony	3.1	J	ND	ND - 6.0
Arsenic	ND	J	7.5	ND - 20.3
Barium	146		151	42.1 - 151
Beryllium	1.8		0.62	0.37 - 1.8
Cadmium	12.5	J	4.6	2.6 - 12.5
Calcium	20,600		33,800	20,600 - 50,300
Chromium	29.6		13.9	11- 29.6
Cobalt	10.7		8.3	6.6 - 10.7
Copper	118		43	31.5 - 122

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event		Range of Observed Results for this Study
Target Analyte List Metals (mg/kg) (cont.)					
Cyanide	Not Analyzed		ND		ND
Iron	21,100		17,300		13,900 - 21,100
Lead	2,910	J	767		251 - 2,910
Lithium	25.4		6.5		5.9 - 25.4
Magnesium	10,400		17,500		10,400 - 23,700
Manganese	310		501		202 - 501
Mercury	2.1	J	4.2		0.15 - 4.2
Nickel	21.6		15.3		10.5 - 21.6
Potassium	614		937		366 - 937
Selenium	3.1	J	0.95		ND - 5.3
Silver	1.7		1.8		ND - 1.8
Sodium	116		101		101 - 206
Thallium	0.85	J	ND		ND - 0.85
Tin	26.7		16.3		10.3 - 34.9
Vanadium	19.2		19.2		13.1 - 19.2
Zinc	4,090		1,190		900 - 4,090
Pesticides/PCBs (mg/kg)					
Alpha Chlordane	2.9		6.7		ND - 1,300
gamma-BHC (Lindane)	270	U	ND		ND - 1,400
Endosulfan II	5.8		ND		ND - 12.0
Heptachlor epoxide	ND		2.6		ND - 360
Methoxychlor	ND		9.3		ND - 23
Radionuclides (pCi/g)					
Americium-241	0.106		ND		ND - 0.106
Cesium-137	5.67	J	1.24	J	ND - 5.67
Potassium-40	14.7	J	ND		ND - 14.7
Plutonium-238	0.654		0.13	J	ND - 0.654
Plutonium,-239/240	0.218		ND		ND - 0.218
Radium-226	1.35	J	0.65	J	ND - 1.35
Thorium-228	0.81		0.66	J	ND - 0.941
Thorium-230	1.78		1.12	R	ND - 1.99
Thorium-232	0.873		0.63	J	ND - 0.873
Uranium-234	0.908		0.85	J	ND - 1.07
Uranium-235/236	0.0911		0.19	J	ND - 0.19
Uranium-238	1.11		0.88	J	ND - 1.11

Field Sample No. - MND24-0938-0002
Weston Laboratory No. - 9409L049-004
CompuChem No. - 637056, 637057, 637058, 637059, 637060

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event		Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)						
bis(2-ethylhexyl) phthalate	4.0	U	5.0	U	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0	U	ND		ND	5,000 Lifetime H.A.
di-n-butylphthalate	4.0	U	5.0	U	ND	None
General Water Quality Parameters (mg/L)						
Alkalinity	390		352	J	22 - 430	None
Fluoride	0.26		0.22		ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.042		0.036		ND - 19	10 *MCL*
Total Dissolved Solids	**550**		**574**		41 - 716	**500 *SMCL***
Target Analyte List Metals (μg/L)						
Aluminum	24.7	J	27.5	J	8.7 - 21,400	50-200 *SMCL*
Barium	27.2		30.6	J	6.7 - 487	2,000 *MCL*
Beryllium	0.28		ND		ND - 1.2	4 *MCL*
Bismuth	29.6		ND		ND - 29.6	None
Calcium	88,700		76,200		8,710 - 139,000	None
Chromium	3.2	J	ND		ND - 104	100 *MCL*
Copper	ND	J	2.1	J	ND - 54.2	1,000 *SMCL*
Iron	**860**	**J**	**487**	**J**	8.2 - 124,000	**300 *SMCL***
Lead	4.9	J	ND		ND - 580	15 - Action Level at tap
Lithium	57.6	J	50.8		ND - 208	None
Magnesium	65,100		59,700		959 - 65,100	None
Manganese	14.9	J	10.7	J	ND - 613	50 *SMCL*
Nickel	4.5		ND		ND - 31	100 *MCL*
Potassium	3,110	J	3,030		56.2 - 7,930	None
Sodium	12,600		14,400		614 - 221,000	None
Vanadium	ND		12.9	J	ND - 31.1	None
Zinc	14.1	J	15.9	J	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Pesticides/PCBs (μg/L)				
Alpha-Chlordane	0.45 J	0.01	ND - 0.45	2.0 *MCL* (total chlordane)
Delta-BHC	0.019 J	ND	ND - 0.019	None
Gamma-Chlordane	0.52 J	0.01	ND - 0.52	2.0 *MCL* (total chlordane)
Heptachlor	0.056 J	ND	ND - 0.056	0.4 *MCL*
Radionuclides (pCi/L)				
Plutonium-239/240	0.0813	ND	ND - 0.49	1.6 *DOE*
Radium-226	0.287 J	ND	ND - 1.35	20 *MCL*
Thorium-228	0.874	0.71 J	ND - 1.8	16 *DOE*
Thorium-230	0.492	ND	ND - 10.7	12 *DOE*
Tritium	ND	795.4	ND - 2,856	20,000 *MCL*
Uranium-234	0.556	0.51 J	ND - 7.33	20 *DOE*

Field Sample No. - MND24-0941-0002
Weston Laboratory No. - 9408L011-009
CompuChem No. - 636454, 636467, 636468, 636469, 636474

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event		Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)						
bis(2-ethylhexyl) phthalate	10.0	U	5.0	U	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0	U	5.0	U	ND	5,000 Lifetime H.A.
di-n-butylphthalate	7.0	U	5.0	U	ND	None
General Water Quality Parameters (mg/L)						
Alkalinity	360		332	J	22 - 430	None
Fluoride	1.4		1.4		ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.024		ND		ND - 19	10 *MCL*
Nitrite	0.015		ND		ND - 0.086	1 *MCL*
Total Dissolved Solids	412		454		41 - 716	500 *SMCL*
Total Suspended Solids	12		7.0		ND - 950	None
Target Analyte List Metals (μg/L)						
Aluminum	37.8		22.2		8.7 - 21,400	50-200 *SMCL*
Arsenic	23.7	J	19.5		ND - 84	50 *MCL*
Barium	475	J	487		6.7 - 487	2,000 *MCL*
Calcium	83,100	J	83,400		8,710 - 139,000	None
Cobalt	0.98		ND		ND - 17.9	None
Copper	3.9		4.9		ND - 54.2	1,000 *SMCL*
Iron	**2,280**	**J**	**2,220**		8.2 - 124,000	**300 *SMCL***
Lead	ND		2.1	J	ND - 580	15 -Action Level at tap
Lithium	36		51.5		ND - 208	None
Magnesium	45,700	J	46,500		959 - 65,100	None
Manganese	17.1	J	14.5	J	ND - 613	50 *SMCL*
Molybdenum	22.5		20.4		ND - 75.2	40 - Lifetime H.A.
Potassium	1,190	J	1,480		56.2 - 7,930	None
Sodium	10,600	J	11,000		614 - 221,000	None
Vanadium	8.8		10.8		ND - 31.1	None

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Target Analyte List Metals (μg/L) (cont.)				
Zinc	69.6 J	23.8 J	1.2 - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)				
Americium-241	0.0685	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0737	ND	ND - 0.49	1.6 *DOE*
Radium-226	0.767 J	0.79 J	ND - 1.35	20 *MCL*
Thorium-228	1.8	0.66 J	ND - 1.8	16 *DOE*
Thorium-230	10.7	0.10 R	ND - 10.7	12 *DOE*
Thorium-232	1.99	ND	ND - 1.99	2 *DOE*
Uranium-234	0.573	0.26 J	ND - 7.33	20 *DOE*
Uranium-238	0.317	0.20 J	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0942-0002
Weston Laboratory No. - 9409L049-001
CompuChem No. - 637071, 637072, 637073, 637074, 637075

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	10.0 U	5.0 U	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	7.0 U	5.0 U	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	260	274 J	22 - 430	None
Fluoride	0.14	0.12	ND - 1.4	4 *MCL*
Nitrate-Nitrite	0.74	0.42	ND - 19	10 *MCL*
Total Dissolved Solids	**556**	**580**	41 - 716	**500 SM*CL***
Total Suspended Solids	ND	5.0	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	17.9	24.8 J	8.7 - 21,400	50-200 SM*CL*
Barium	86.5 J	79.2 J	6.7 - 487	200 *MCL*
Calcium	98,600 J	88,800	8,710 - 139,000	None
Cobalt	0.50	ND	ND - 17.9	None
Copper	8.8	8.1 J	ND - 54.2	100 SM*CL*
Iron	270 J	56.2 J	8.2 - 124,000	300 SM*CL*
Lead	3.7	ND	ND - 580	15 - Action Level at tap
Lithium	28.2	29	ND - 208	None
Magnesium	31,500 J	29,200	959 - 65,100	None
Manganese	28.7 J	26.2 J	ND - 613	50 SM*CL*
Molybdenum	ND	2.1 J	ND - 75.2	40 -Lifetime H.A.
Nickel	ND	2.3 J	ND - 31	100 *MCL*
Potassium	2,330 J	2,340	56.2 - 7,930	None
Selenium	3.0	ND	ND - 6.1	50 *MCL*
Sodium	62,200 J	57,200	614 - 221,000	None
Vanadium	9.8	10.6 J	ND - 31.1	None
Zinc	34.3 J	34.3 J	1.2 - 23,500	5,000 SM*CL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0652	ND	ND - 3.95	1.2 *DOE*
Radium-226	0.405 J	ND	ND - 1.35	20 *MCL*
Thorium-228	0.922	0.71 J	ND - 1.8	16 *DOE*
Thorium-230	ND	0.72 J	ND - 10.7	12 *DOE*
Thorium-232	ND	0.41 J	ND - 1.99	2 *DOE*
Tritium	2,530 J	2,856	ND - 2,856	20,000 *MCL*
Uranium-234	0.292	0.11 J	ND - 7.33	20 *DOE*

Field Sample No. - MND24-0943-0002 Weston Laboratory No. - 9408L996-001 CompuChem No. - 636163, 636164, 636165, 636166, 636167					
Parameter Detected	**Results for 1st Sample Event**		**Results for 2nd Sample Event**	**Range of Observed Results**	**Drinking Water Standard**
Semivolatile Organic Compounds (μg/L)					
bis(2-ethylhexyl) phthalate	4.0	U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0	U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	4.0	U	ND	ND	None
Phenol	ND		1.0	ND - 1.0	4,000 -Lifetime H.A.
General Water Quality Parameters (mg/L)					
Alkalinity	340		288	22 - 430	None
Fluoride	0.32		0.32	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.079		0.47	ND - 19	10 *MCL*
Nitrite	ND		0.01	ND - 0.086	1 *MCL*
Total Dissolved Solids	412		470	41 - 716	500 *SMCL*
Total Suspended Solids	17		8.0	ND - 950	None
Target Analyte List Metals (μg/L)					
Aluminum	15.9	J	35.9	8.7 - 21,400	50-200 *SMCL*
Barium	291		181	6.7 - 487	2,000 *MCL*
Calcium	91,300		80,300	8,710 - 139,000	None
Copper	12.0	J	36.7	ND - 54.2	1,000 *SMCL*
Iron	**17,200**	**J**	**632**	8.2 - 124,000	**300 *SMCL***
Lead	4.9	J	1.9	ND - 580	15 -Action Level at tap
Lithium	18	J	36.1	ND - 208	None
Magnesium	34,900		30,300	959 - 65,100	None
Manganese	**79.5**	**J**	42.8	ND - 613	**50 *SMCL***
Molybdenum	2.5	J	1.7	ND - 75.2	40 -Lifetime H.A.
Nickel	ND		2.6	ND - 31	100 *MCL*
Potassium	1,340	J	1,530	56.2 - 7,930	None
Sodium	11,700		19,000	614 - 221,000	None
Vanadium	ND		12.6	ND - 31.1	None
Zinc	106	J	55.6	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0722	ND	ND - 3.95	1.2 *DOE*
Radium-226	0.426 J	ND	ND - 1.35	20 *MCL*
Thorium-228	0.455	0.33 J	ND - 1.8	16 *DOE*
Thorium-230	ND	0.24 R	ND - 10.7	12 *DOE*
Uranium-234	ND	0.24 J	ND - 7.33	20 *DOE*

Field Sample No. - MND24-0944-0002 Weston Laboratory No. - 9408L970-004 CompuChem No. - 636041, 636042, 636043, 636044, 636045				
Parameter Detected	**Results for 1st Sample Event**	**Results for 2nd Sample Event**	**Range of Observed Results**	**Drinking Water Standard**
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	4.0 U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	430	330	22 - 430	None
Fluoride	0.24	0.21	ND - 1.4	4 *MCL*
Nitrate/Nitrite	ND	0.02	ND - 19	10 *MCL*
Nitrite	0.026	0.05	ND - 0.086	1 *MCL*
Total Dissolved Solids	**541 J**	**620**	41 - 716	**500 *SMCL***
Total Suspended Solids	676 J	950	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	**7,820**	**21,400**	8.7 - 21,400	**50-200 *SMCL***
Arsenic	5.0 J	1.5	ND - 84	50 *MCL*
Barium	100	173	6.7 - 487	2,000 *MCL*
Beryllium	0.65	1.2	ND - 1.2	4 *MCL*
Cadmium	ND	1.0	ND - 13.8	5 *MCL*
Calcium	85,800	139,000	8.710 - 139,000	None
Chromium	26.4	23.5	ND - 104	100 *MCL*
Cobalt	17.9	16.5	ND - 17.9	None
Copper	54.2	49.2	ND - 54.2	1,000 *SMCL*
Cyanide	6.0	ND	ND - 6.0	200 *MCL*
Iron	**77,900**	**37,800**	8.2 - 124,000	**300 *SMCL***
Lead	**49 J**	**16**	ND - 580	**15 -Action Level at tap**
Lithium	27.2	65.9	ND - 208	None
Magnesium	31,100	53,400	959 - 65,100	None
Manganese	**343**	**613**	ND - 613	**50 *SMCL***
Molybdenum	27.8	**ND**	ND - 75.2	40 -Lifetime H.A.

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Target Analyte List Metals (μg/L) (cont.)				
Nickel	24.9	31.0	ND - 31.0	100 *MCL*
Potassium	3,740	7,780	56.2 - 7,930	None
Selenium	2.2 J	ND	ND - 6.1	50 *MCL*
Silver	5.3	2.2	ND - 5.3	100 -Lifetime H.A.
Sodium	9,340	11,800	614 - 221,000	None
Tin	27	15.9	ND - 118	None
Vanadium	13.2	31.1	ND - 31.1	None
Zinc	3,840	1,870	1.2 - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)				
Americium-241	0.0502	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	ND	0.49 J	ND - 0.49	1.6 *DOE*
Radium-226	0.364 J	ND	ND - 1.35	20 *MCL*
Strontium-90	0.881	ND	ND - 10.6	8.0 *MCL*
Thorium-228	1.36	0.77 J	ND - 1.8	16 *DOE*
Thorium-230	1.88	0.54 J	ND - 10.7	12 *DOE*
Thorium-232	0.519	0.22 J	ND - 1.99	2 *DOE*
Tritium	400 J	ND	ND - 2,856	20,000 *MCL*
Uranium-234	7.33	0.89	ND - 7.33	20 *DOE*
Uranium-235/236	0.27	ND	ND - 0.32	24 *DOE*
Uranium-238	5.84	1.02	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0945-0002
Weston Laboratory No. - 9408L970-005
CompuChem No. - 636046, 636047, 636048, 636049, 636050

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	4.0 U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime
di-n-butylphthalate	4.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	330	320	22 - 430	None
Fluoride	0.19	0.26	ND - 1.4	4 *MCL*
Nitrate/Nitrite	ND	0.22	ND - 19	10 *MCL*
Total Dissolved Solids	478	**560**	41 - 716	**500 *SMCL***
Total Suspended Solids	ND	8.0	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	14.4	27	8.7 - 21,400	50-200 *SMCL*
Barium	41.4	36.8	6.7 - 487	2,000 MCL
Calcium	90,700 J	79,100	8,710 - 139,000	None
Cobalt	0.54 J	ND	ND - 17.9	None
Copper	8.4 J	24.4	ND - 54.2	1,000 *SMCL*
Iron	**909 J**	**860**	8.2 - 124,000	**300 *SMCL***
Lead	2.9 J	3.5	ND - 580	15 -Action Level at tap
Lithium	46.9	65.9	ND - 208	None
Magnesium	49,200	43,500	959 - 65,100	None
Manganese	25 J	40.8	ND - 613	50 *SMCL*
Potassium	3,480	6,980	56.2 - 7,930	None
Sodium	15,100	47,300	614 - 221,000	None
Tin	6.9 J	ND	ND - 118	None
Vanadium	1.3 J	12.9	ND - 31.1	None
Zinc	75.4 J	27.6	1.2 - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)				
Americium-241	0.0973	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.105	ND	ND - 0.49	1.6 *DOE*
Radium-226	0.269 J	0.60 J	ND - 1.35	20 *MCL*
Thorium-228	0.638	ND	ND - 1.8	16 *DOE*
Thorium-230	0.459	0.55 J	ND - 10.7	12 *DOE*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L) (cont.)				
Thorium-232	ND	0.60 J	ND - 1.99	2 *DOE*
Uranium-234	0.228	ND	ND - 7.33	20 *DOE*

Field Sample No. - MND24-0946-0001 Weston Laboratory No. - 9402L459-001 IT Laboratory No.s - S4-02-002-03, S4-02-002-04				
Parameter Detected	**Results for First Sample Event**		**Range of Observed Results**	**Drinking Water Standard**
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	4.0	U	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0	U	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0	U	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	420		ND - 430	None
Fluoride	0.35		ND - 1.4	4 *MCL*
Nitrate-Nitrite	0.13		ND - 15.2	19 *MCL*
Total Dissolved Solids	412		ND - 632	500 *SMCL*
Target Analyte List Metals (μg/L)				
Aluminum	112		ND - 7,820	50-200 *SMCL*
Antimony	0.88		ND - 0.88	6 *MCL*
Barium	126		ND - 475	2,000 *MCL*
Cadmium	0.90		ND - 13.8	5 *MCL*
Calcium	88,400	J	ND - 116,000	None
Chromium	1.7		ND - 104	100 *MCL*
Cobalt	2.4		ND - 17.9	None
Copper	9.4		ND - 54.2	100 *SMCL*
Iron	858	J	ND - 124,000	300 *SMCL*
Lead	44.9	J	ND - 230	15 -Action level at tap
Lithium	18.6		ND - 208	None
Magnesium	32,500		ND - 65,100	None
Manganese	187		ND - 610	50 *SMCL*
Molybdenum	6.1		ND - 74.3	40 -Lifetime H.A.
Nickel	3.4		ND - 24.9	100 *MCL*
Potassium	546		ND - 7,300	None
Sodium	15,300		ND - 221,000	None
Tin	22.0		ND - 118	None

Parameter Detected	Results for First Sample Event	Range of Observed Results	Drinking Water Standard
Target Analyte List Metals (μg/L) (cont.)			
Vanadium	10.8	ND - 13.2	None
Zinc	3,650 J	ND - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)			
Americium-241	0.0821	ND - 3.95	1.2 *DOE*
Thorium-230	1.86	ND - 10.7	12 *DOE*
Tritium	373 J	ND - 2,530	20,000 *MCL*
Uranium-234	0.588	ND - 7.33	20 *DOE*
Uranium-238	0.554	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0947-0002
Weston Laboratory No. - 9409L992-004
CompuChem No. - 636178, 636179, 636180, 636181, 636182

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	ND	5.0 U	ND - 0.9	6.0 *MCL*
General Water Quality Parameters (mg/L)				
Alkalinity	290	250	22 - 430	None
Fluoride (mg/L)	0.42	0.37	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.10 U	ND	ND - 19	10 *MCL*
Total Dissolved Solids	**531**	**524**	41 - 716	**500 *SMCL***
Total Suspended Solids	6.0	ND	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	**54.9**	18.1	8.7 - 21,400	**50-200 *SMCL***
Antimony	0.78 J	ND	ND - 1.2	6 *MCL*
Barium	158 J	149	6.7 - 487	2,000 *MCL*
Calcium	75,500	74,800	8,710 - 139,000	None
Cobalt	2.5 J	1.4	ND - 17.9	None
Copper	13.5 J	2.2	ND - 54.2	1,000 *SMCL*
Iron	**2,140 J**	286	8.2 - 124,000	**300 *SMCL***
Lead	12.4	ND	ND - 580	15 -Action Level at tap
Lithium	208	191	ND - 208	None
Magnesium	29,200	29,400	959 - 65,100	None
Manganese	**125 J**	**119**	ND - 613	**50 *SMCL***
Molybdenum	**74.3 J**	**75.2**	ND - 75.2	**40 -Lifetime H.A.**
Nickel	16.4 J	2.3	ND - 31	100 *MCL*
Potassium	7,300	7,930	56.2 - 7,930	None
Sodium	58,500	50,900	614 - 221,000	None
Vanadium	ND	11.4	ND - 31.1	None
Zinc	2,270 J	258	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.047	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0628	ND	ND - 0.49	1.6 *DOE*
Radium-226	0.463 J	ND	ND - 1.35	20 *DOE*
Strontium-90	2.22	ND	ND - 10.6	8.0 *MCL*
Thorium-228	0.284	ND	ND - 1.8	16 *DOE*
Thorium-230	0.965	0.12 R	ND - 10.7	12 *DOE*
Uranium-234	0.417	0.45 J	ND - 7.33	20 *DOE*
Uranium-238	0.292	0.21 J	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0948-0002
Weston Laboratory No. - 9409L122-003
CompuChem No. - 637449, 637450, 637451, 637452, 637453

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)					
bis(2-ethylhexyl) phthalate	4.0	U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0	U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	4.0	U	ND	ND	None
General Water Quality Parameters (mg/L)					
Alkalinity	260		242	22 - 430	None
Fluoride	0.24		0.26	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.65		0.46	ND - 19	10 *MCL*
Total Dissolved Solids	484		411	41 - 716	500 *SMCL*
Total Suspended Solids	9.0		ND	ND - 950	None
Target Analyte List Metals (μg/L)					
Aluminum	9.5		19.6	ND - 21,400	50-200 *SMCL*
Barium	88.1		86.3	ND - 487	2,000 *MCL*
Calcium	86,000	J	74,000	8,710 - 139,000	None
Chromium	ND		1.7	ND - 104	100 *MCL*
Copper	15.9	J	46.3	ND - 54.2	1,000 *SMCL*
Iron	25.1	J	33.4	8.2 - 124,000	300 *SMCL*
Lithium	23.6		ND	ND - 208	None
Magnesium	36,700		28,700	959 - 65,100	None
Manganese	1.7	J	1.8	ND - 613	50 *SMCL*
Molybdenum	ND		3.0	ND - 75.2	40 -Lifetime H.A.
Nickel	4.0	J	2.7	ND - 31	100 *MCL*
Potassium	2,100		3,040	56.2 - 7,930	None
Sodium	39,000		19,600	ND - 221,000	None
Tin	5.8	J	ND	ND - 118	None
Vanadium	1.1	J	8.9	ND - 31.1	None
Zinc	41.9	J	78.5	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0852	ND	ND - 3.95	1.2 *DOE*
Strontium-90	ND	6.41	ND - 10.6	8.0 *MCL*
Thorium-228	0.8	ND	ND - 1.8	16 *DOE*
Thorium-230	ND	0.23	ND - 10.7	12 *DOE*
Uranium-234	0.424	0.13	ND - 7.33	20 *DOE*
Uranium-238	0.455	0.28	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0949-0002
Weston Laboratory No. - 9409L998-002
CompuChem No. - 636173, 636174, 636175, 636176, 636177

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	4.0 U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	280	340	22 - 430	None
Fluoride	0.15	0.14	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.049	ND	ND - 19	10 *MCL*
Total Dissolved Solids	418	460	41 - 716	500 *SMCL*
Total Suspended Solids	ND	8.0	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	ND	26.5	8.7 - 21,400	50-200 *SMCL*
Barium	124 J	118	6.7 - 487	2,000 *MCL*
Calcium	83,900 J	84,100	8,710 - 139,000	None
Cobalt	1.1	ND	ND - 17.9	100 *MCL*
Copper	1.8	2.9	ND - 54.2	1,000 *SMCL*
Iron	**1,300 J**	**1,280**	8.2 - 124,000	**300 *SMCL***
Lithium	17.7	43	ND - 208	None
Magnesium	27,500 J	26,900	959 - 65,100	None
Manganese	27.2	25.9	ND - 613	50 *SMCL*
Molybdenum	3.5	1.7	ND - 75.2	40 -Lifetime H.A.
Potassium	2,180	2,390	56.2 - 7,930	None
Sodium	22,400 J	21,600	614 - 221,000	None
Tin	19.7	ND	ND - 118	None
Vanadium	9.7	11.4	ND - 31.1	None
Zinc	205 J	248	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.103	0.26 J	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0548	ND	ND - 0.49	1.6 *DOE*
Radium-226	0.28 J	ND	ND - 1.35	20 *MCL*
Strontium-90	0.493	ND	ND - 10.6	8.0 *MCL*
Thorium-228	ND	0.55 J	ND - 1.8	16 *DOE*
Thorium-230	0.759	0.53 J	ND - 10.7	12 *DOE*
Tritium	1,600 J	1,417	ND - 2,856	20,000 *MCL*
Uranium-234	0.445	0.52 J	ND - 7.33	20 *DOE*
Uranium-238	0.169	0.20 J	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0950-0002
Weston Laboratory No. - 9408L011-005
CompuChem No. - 636451, 636458, 636459, 636460, 636471

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (µg/L)				
bis(2-ethylhexyl) phthalate	4.0 U	5.0 U	ND - 0.9	6.0 *MCL*
diethylphthalate	5.0 U	5.0 U	ND	5,000 Lifetime H.A.
di-n-butylphthalate	6.0 U	5.0 U	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	340	298 J	22 - 430	None
Fluoride	0.18	0.18	ND - 1.4	4 *MCL*
Nitrate/Nitrite	1.4	1.8	ND - 19	10 *MCL*
Total Dissolved Solids	**592**	**567**	41 - 716	**500 *SMCL***
Total Suspended Solids	6.0	ND	ND - 950	None
Target Analyte List Metals (µg/L)				
Aluminum	8.7	20.5	8.7 - 21,400	50-200 *SMCL*
Arsenic	ND	1.4	ND - 84	50 *MCL*
Barium	129	124	6.7 - 487	2,000 *MCL*
Calcium	104,000 J	99,500	8,710 - 139,000	None
Cobalt	0.72	ND	ND - 17.9	None
Copper	6.0	5.5	ND - 54.2	1,000 *SMCL*
Iron	**363**	17.1	8.2 - 124,000	**300 *SMCL***
Lead	ND	2.5 J	ND - 580	15 -Action Level at tap
Lithium	16.7	37.2	ND - 208	None
Magnesium	33,700 J	32,800	959 - 65,100	None
Manganese	6.2	ND	ND - 613	50 *SMCL*
Molybdenum	ND	1.9	ND - 75.2	40 -Lifetime H.A.
Potassium	2,190	2,670	56.2 - 7,930	None
Selenium	ND	2.7 J	ND - 6.1	50 *MCL*
Sodium	55,300	61,500	614 - 221,000	None
Tin	15.4 J	ND	ND - 118	None
Vanadium	13.1	10.3	ND - 31.1	None

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Target Analyte List Metals (μg/L) (cont.)				
Zinc	318 J	131 J	1.2 - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)				
Americium-241	0.119	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0372	ND	ND - 0.49	1.6 *DOE*
Radium-226	0.312 J	ND	ND - 1.35	20 *MCL*
Thorium-228	0.554	ND	ND - 1.8	16 *DOE*
Thorium-230	0.949	0.31 R	ND - 10.7	12 *DOE*
Tritium	317 J	ND	ND - 2,856	20,000 *MCL*
Uranium-234	0.351	0.12 J	ND - 7.33	20 *DOE*
Uranium-238	0.169	0.15 J	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0951-0002
Weston Laboratory No. - 9409L108-004
CompuChem No. - 637389, 637399, 637400, 637375, 637382

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
General Water Quality Parameters (mg/L)				
Alkalinity	260	352	22 - 430	None
Nitrite	ND	0.086	ND - 0.086	1 *MCL*
Fluoride	0.18	0.21	ND - 1.4	4 *MCL*
Nitrate/Nitrite	**15.2**	**19**	ND - 19	**10 *MCL***
Total Dissolved Solids	455	**655**	41 - 716	**500 *SMCL***
Target Analyte List Metals (μg/L)				
Aluminum	43.1	**199**	8.7 - 21,400	**50-200 *SMCL***
Arsenic	ND	4.5	ND - 84	50 *MCL*
Barium	39 J	63.2	6.7 - 487	2,000 *MCL*
Beryllium	0.32 J	0.08	ND - 1.2	4 *MCL*
Cadmium	ND	0.8	ND - 13.8	5 *MCL*
Calcium	87,300	116,000	8,710 - 139,000	None
Copper	1.9 J	3.4	ND - 54.2	1,000 *SMCL*
Iron	35.9 J	225	8.2 - 124,000	300 *SMCL*
Lead	ND	8.3	ND - 580	15-Action Level at tap
Lithium	31.5	ND	ND - 208	None
Magnesium	39,200	54,800	959 - 65,100	None
Manganese	1.3 J	**81.1**	ND - 613	**50 *SMCL***
Molybdenum	ND	3.7	ND - 75.2	40 -Lifetime H.A.
Nickel	2.3 J	ND	ND - 31	100 *MCL*
Potassium	225	278	56.2 - 7,930	None
Selenium	6.1	3.6	ND - 6.1	50 *MCL*
Sodium	10,500	13,700	614 - 221,000	None
Vanadium	ND	12	ND - 31.1	None
Zinc	41.9 J	81.3	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	ND	0.23 J	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0432	ND	ND - 0.49	1.6 *DOE*
Strontium-90	1.02	ND	ND - 10.6	8.0 *MCL*
Thorium-228	0.228	ND	ND - 1.8	16 *DOE*
Thorium-230	2.28	ND	ND - 10.7	12 *DOE*
Uranium-234	ND	1.62 J	ND - 7.33	20 *DOE*
Uranium-235/236	ND	0.21 J	ND - 0.32	24 *DOE*
Uranium-238	0.81	1.2 J	ND - 5.84	24 *DOE*

Field Sample No. - MND25-0951-0002
Weston Laboratory No. - 9409L108-003
CompuChem No. - 637459, 637460, 637461, 637462

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event	Range of Results Observed Result
Volatile Organic Compounds (μg/L)				
Acetone	140	U	ND	ND
Methylene chloride	15	U	ND	ND
General Water Quality Parameters (mg/kg)				
Nitrate/Nitrite	0.74	J	7.5	0.49 - 8.3
Target Analyte List Metals (mg/kg)				
Aluminum	5,480	J	4,420	4,030 - 8,130
Antimony	6.0	J	ND	ND - 6.0
Arsenic	20.3	J	17.3	ND - 20.3
Barium	77.5	J	63.3	42.1 - 151
Beryllium	0.65		0.66	0.37 - 1.8
Cadmium	4.4	J	4.1	2.6 - 12.5
Calcium	43,900	J	42,500	20,600 - 50,300
Chromium	16.3	J	11	11- 29.6
Cobalt	8.1		6.8	6.6 - 10.7
Copper	31.5		36.6	31.5 - 122
Iron	17,800	J	13,900	13,900 - 21,100
Lead	428	J	315	251 - 2,910
Lithium	14.2		9.5	5.9 - 25.4
Magnesium	19,800	J	14,800	10,400 - 23,700
Manganese	220	J	303	202 - 501
Mercury	0.45		0.26	0.15 - 4.2
Molybdenum	2.6		ND	ND - 2.6
Nickel	14.9		10.5	10.5 - 21.6
Potassium	561		366	366 - 937
Selenium	4.2	J	5.3	ND - 5.3
Silver	ND		1.3	ND - 1.8
Sodium	174		156	101 - 206
Tin	34.9		20	10.3 - 34.9

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Results Observed Result
Target Analyte List Metals (mg/kg) (cont.)			
Vanadium	16.2	15.5	13.1 - 19.2
Zinc	1,040 J	900	900 - 4,090
Pesticides/PCBs (μg/kg)			
4,4'-DDD	5.6	9.7	ND - 9.7
4,4'-DDE	3.3	7.0	ND - 7.0
4,4-DDT	1.7	ND	ND - 1.7
Endosulfan II	12	ND	ND - 12
Endrin Ketone	ND	6.5	ND - 6.5
gamma - BHC (Lindane)	270 U	ND	ND - 1,400
Methoxychlor	ND	23	ND - 23
Semivolatile Organic Compounds (μg/kg)			
Acenaphthene	52	150	ND - 150
Acenaphthylene	110	350	ND - 350
Anthracene	180	460	ND - 460
Benzo(a)anthracene	770	2,200	ND - 2,200
Benzo(b)fluoranthene	1,100	2,200	33 - 2,200
Benzo(k)fluoranthene	1,100 J	1,900	ND - 1,900
Benzo(g,h,i)perylene	720	1,800	ND - 1,800
Benzo(a)pyrene	790	1,600	ND - 1,600
bis-(2-Ethylhexyl)phthalate	53	ND	ND - 340
Carbazole	140	ND	ND - 150
Chrysene	1,300	3,200	64 - 3,200
Dibenz(a,h)anthracene	340	320	ND - 340
Dibenzofuran	91	150	ND - 150
di-n-Butyl Phthalate	38	130	33 - 1,800
Fluoranthene	1,800	5,800	49 - 5,800
Fluorene	230	360	ND - 360
Indeno(1,2,3-C,D)pyrene	710	1,500	ND - 1,500
2-Methylnapthalene	37	ND	ND - 37

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event		Range of Results Observed Result
Semivolatile Organic Compounds (μg/kg) (cont.)					
Naphthalene	48		140		ND - 140
Phenanthrene	1,300		3,100		34 - 3,100
Pyrene	2,200		5,000		43 - 5,000
Radionuclides (pCi/g)					
Cesium-137	1.52	J	ND		ND - 5.67
Potassium-40	12.2	J	10.87		ND - 14.7
Plutonium-239/240	0.0563		0.03		ND - 0.218
Radium-226	1.19	J	0.74		ND - 1.35
Uranium-234	0.816		0.71		ND - 0.913
Uranium-235/236	0.0501		ND		ND - 0.0911
Uranium-238	0.85		0.86		ND - 1.11
Thorium-228	0.764		0.42		ND - 0.81
Thorium-230	1.55		0.87	R	ND - 1.78
Thorium-232	0.842		0.54		ND - 0.873
Tritium	ND		2.8		ND - 2.8

Field Sample No. - MND24-0952-0002
Weston Laboratory No. - 9409L049-003
CompuChem No. - 637051, 637052, 637053, 637054, 637055

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event		Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)						
bis(2-ethylhexyl) phthalate	4.0	U	5.0	U	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0	U	ND		ND	5,000 Lifetime H.A.
di-n-butylphthalate	4.0	U	5.0	U	ND	None
General Water Quality Parameters (mg/L)						
Alkalinity	310		316	J	22 - 430	None
Total Dissolved Solids	**562**		**606**		41 - 716	**500 *SMCL***
Total Suspended Solids	15		ND		ND - 950	None
Target Analyte List Metals (μg/L)						
Aluminum	10.3		16.2	J	8.7 - 21,400	50-200 *SMCL*
Arsenic	16	J	8.6	J	ND - 84	50 *MCL*
Barium	45.2		45.2	J	6.7 - 487	2,000 *MCL*
Calcium	111,000	J	118,000		8,710 - 139,000	None
Cobalt	1.6	J	ND		ND - 17.9	None
Copper	12.3	J	11.9	J	ND - 54.2	1,000 *SMCL*
Fluoride (mg/L)	1.3		1.1		ND - 1.4	4 *MCL*
Iron	**5,080**	**J**	**2,490**	**J**	8.2 - 124,000	**300 *SMCL***
Lead	**15.8**	**J**	ND		ND - 580	**15 -Action Level at tap**
Lithium	31.3		21.7		ND - 208	None
Magnesium	37,600		39,400		959 - 65,100	None
Manganese	36.6	J	43.4	J	ND - 613	50 *SMCL*
Molybdenum	4.4	J	4.7	J	ND - 75.2	40 -Lifetime H.A.
Potassium	2,720		3,030		56.2 - 7,930	None
Sodium	28,000		29,100		614 - 221,000	None
Vanadium	1.5	J	11.6	J	ND - 31.1	None
Zinc	649	J	216	J	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.074	0.150 J	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.142	ND J	ND - 0.49	1.6 *DOE*
Strontium-90	1.97	ND	ND - 10.6	8.0 *MCL*
Thorium-228	0.583	0.90 J	ND - 1.8	16 *DOE*
Thorium-230	0.955	0.56 J	ND - 10.7	12 *DOE*
Tritium	ND	662.3	ND - 2,856	20,000 *MCL*
Uranium-234	0.699	0.57 J	ND - 7.33	20 *DOE*
Uranium-238	0.507	0.44 J	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0953-0002 Weston Laboratory No. - 9408L031-002 CompuChem No. - 636810, 636811, 636814, 636815, 636816				
Parameter Detected	**Results for 1st Sample Event**	**Results for 2nd Sample Event**	**Range of Observed Results**	**Drinking Water Standard**
General Water Quality Parameters (mg/L)				
Alkalinity	260	260	22 - 430	None
Fluoride	0.52	0.55	ND - 1.4	4 *MCL*
Total Dissolved Solids	352	467	41 - 716	500 *SMCL*
Total Suspended Solids	487	38	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	**1,790 J**	**127**	8.7 - 21,400	**50-200 *SMCL***
Antimony	1.2	ND	ND - 1.2	6 *MCL*
Arsenic	**84 J**	12.5	ND - 84	**50 *MCL***
Barium	267	94.8	6.7 - 487	2,000 *MCL*
Cadmium	**13.8**	**6.0**	ND - 13.8	**5 *MCL***
Calcium	83,600	78,300	8,710 - 139,000	None
Chromium	**104**	6.8	ND - 104	**100 *MCL***
Cobalt	11.8	0.92	ND - 17.9	None
Copper	33.8	11.8	ND - 54.2	1,000 *SMCL*
Iron	**124,000**	**16,000**	8.2 - 124,000	**3,000 *SMCL***
Lead	**230 J**	**310**	ND - 580	**15 -Action Level at tap**
Lithium	ND	30	ND - 208	None
Magnesium	43,600	39,200	959 - 65,100	None
Manganese	**190**	**113**	ND - 613	**50 *SMCL***
Molybdenum	12.3	ND	ND - 75.2	40 -Lifetime H.A.
Nickel	5.1 J	ND	ND - 31	100 *MCL*
Potassium	1,430 J	957	56.2 - 7,930	None
Silver	2.3	0.82	ND - 5.3	100 -Lifetime
Sodium	6,760 J	6,030	614 - 221,000	None
Tin	118	ND	ND - 118	None
Vanadium	4.9	5.7	ND - 31.1	None
Zinc	**23,500**	4,170	1.2 - 23,500	**5,000 *SMCL***

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	ND	0.32 J	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0997	ND	ND - 0.49	1.6 *DOE*
Radium-226	0.877 J	ND	ND - 1.35	20 *MCL*
Thorium-228	0.518	0.32 J	ND - 1.8	16 *DOE*
Thorium-230	1.59	0.22 R	ND - 10.7	12 *DOE*
Tritium	ND	587.5	ND - 2,856	20,000 *MCL*
Uranium-234	1.63	1.13 J	ND - 7.33	20 *DOE*
Uranium-235/236	0.0948	0.24 J	ND - 0.32	24 *DOE*
Uranium-238	ND	1.05 J	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0954-0002
Weston Laboratory No. - 9409L049-007
CompuChem No. - 637065, 637066, 637067, 637068, 637070

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	ND	5.0 U	ND - 0.9	6.0 *MCL*
di-n-butylphthalate	ND	5.0 U	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	82	86 J	22 - 430	None
Fluoride	0.11	0.11	ND - 1.4	4 *MCL*
Nitrate/Nitrite	3.1	3.4	ND - 19	10 *MCL*
Total Dissolved Solids	152	167	41 - 716	500 *SMCL*
Total Suspended Solids	7.0	ND	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	34.9	47.4 J	8.7 - 21,400	50-200 *SMCL*
Barium	48.5 J	54.4 J	6.7 - 487	2,000 *MCL*
Beryllium	0.53 J	ND	ND - 1.2	4 *MCL*
Calcium	33,100	37,400	8,710 - 139,000	None
Copper	0.96 J	1.4 J	ND - 54.2	1,000 *SMCL*
Iron	36.2 J	60.1 J	8.2 - 124,000	300 *SMCL*
Lead	ND	2.2	ND - 580	15 -Action Level at tap
Lithium	37.1	14.5	ND - 208	None
Magnesium	8,840	9,400	959 - 65,100	None
Manganese	ND	8.9 J	ND - 613	50 *SMCL*
Molybdenum	4.1 J	3.1 J	ND - 75.2	40 -Lifetime H.A.
Potassium	56.2	691	56.2 - 7,930	None
Selenium	3.1	ND	ND - 6.1	50 *MCL*
Sodium	2,630	2,460	614 - 221,000	None
Vanadium	ND	4.7 J	ND - 31.1	None
Zinc	20.3 J	42.2 J	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241*	0.0427 J	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.102	ND	ND - 0.49	1.6 *DOE*
Thorium-228	0.633	ND	ND - 1.8	16 *DOE*
Thorium-230	0.87	0.88 J	ND - 10.7	12 *DOE*
Thorium-232	ND	0.26 J	ND - 1.99	2 *DOE*
Uranium-234	0.251	ND	ND - 7.33	20 *DOE*

*Americium-241 was reported at 3.95 pCi/L for the environmental sample collected during the first sampling event. This value is considered to be erroneous. The value shown is that of the field duplicate.

Field Sample No. - MND24-0955-0002
Weston Laboratory No. - 9409L144-003
CompuChem No. - 637685, 637688, 637689, 637690, 637694

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
General Water Quality Parameters (mg/L)				
Alkalinity	360	320	22 - 430	None
Fluoride	0.25	0.28	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.12	0.23	ND - 19	10 *MCL*
Nitrite	0.015	ND	ND - 0.086	1 *MCL*
Total Dissolved Solids	**549**	**616**	41 - 716	**500 *SMCL***
Total Suspended Solids	8.0	ND	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	28.6	35.6	8.7 - 21,400	50-200 *SMCL*
Barium	76.2	57	6.7 - 487	2,000 *MCL*
Beryllium	ND	0.12	ND - 1.2	4 *MCL*
Calcium	86,700	97,100	8,710 - 139,000	None
Chromium	1.7	ND	ND - 104	100 *MCL*
Cobalt	1.4 J	ND	ND - 17.9	None
Copper	11.8	24.6	ND - 54.2	1,000 *SMCL*
Iron	**3,430**	**1,670**	8.2 - 124,000	**300 *SMCL***
Lead	4.2 J	1.9	ND - 580	15 - Action Level at tap
Lithium	50.9	27	ND - 208	None
Magnesium	40,100	48,000	959 - 65,100	None
Manganese	**610 J**	35.2	ND - 613	**50 *SMCL***
Molybdenum	4.2 J	2.3	ND - 75.2	40 -Lifetime H.A.
Nickel	3.1 J	3.7	ND - 31	100 *MCL*
Potassium	4,730	2,960	56.2 - 7,930	None
Sodium	46,400	19,300	614 - 221,000	None
Tin	6.0 J	ND	ND - 118	None
Vanadium	ND	8.0	ND - 31.1	None
Zinc	139 J	53.9	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Pesticides/PCBs (μg/L)				
gamma-BHC (Lindane)	0.021 R	ND	ND - 0.037	0.2 *MCL*
Semivolatile Organic Compounds (μg/L)				
bis-(2-Ethylhexyl)phthalate	0.7	0.5	ND - 0.90	6 *MCL*
Radionuclides (pCi/L)				
Americium-241	0.0816	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0668	0.19	ND - 0.49	1.6 *DOE*
Thorium-228	0.553	ND	ND - 1.8	16 *DOE*
Tritium	ND	378.7	ND - 2,856	20,000 *MCL*
Uranium-234	0.466	0.28	ND - 7.33	20 *DOE*
Uranium-238	0.577	0.21	ND - 5.84	24 *DOE*

Field Sample No - MND24-0956-0002
Weston Laboratory No. - 9408L031-001
CompuChem No. - 636817, 636818, 636819, 636820, 636821

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (µg/L)					
bis(2-ethylhexyl) phthalate	10.0	U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0	U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	7.0	U	ND	ND	None
General Water Quality Parameters (mg/L)					
Alkalinity	300		270	22 - 430	None
Fluoride	0.15		0.15	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.96		1.1	ND - 19	10 *MCL*
Total Dissolved Solids	**533**		**553**	41 - 716	**500 *SMCL***
Target Analyte List Metals (µg/L)					
Aluminum	21.1		18	8.7 - 21,400	50-200 *SMCL*
Arsenic	ND		1.4	ND - 84	50 *MCL*
Barium	92.2	J	87.9	6.7 - 487	2,000 *MCL*
Calcium	94,500	J	94,900	8,710 - 139,000	None
Cobalt	0.54		ND	ND - 17.9	None
Copper	15		5.5	ND - 54.2	1,000 *SMCL*
Iron	**1,220**	**J**	102	8.2 - 124,000	**300 *SMCL***
Lithium	12.7		44.4	ND - 208	None
Magnesium	29,100	J	29,600	959 - 65,100	None
Manganese	**87.3**	**J**	**52.5**	ND - 613	**50 *SMCL***
Molybdenum	2.0		ND	ND - 75.2	40 -Lifetime H.A.
Potassium	2,800	J	2,760	56.2 - 7,930	None
Selenium	ND		1.6	ND - 6.1	50 *MCL*
Sodium	62,100	J	60,100	614 - 221,000	None
Vanadium	6.5		10.2	ND - 31.1	None
Zinc	161	J	61.3	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0418	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0665	ND	ND - 0.49	1.6 *DOE*
Radium-226	0.597 J	0.57 J	ND - 1.35	20 *MCL*
Thorium-228	0.766 J	0.44 J	ND - 1.8	16 *DOE*
Thorium-230	0.417 J	0.22 R	ND - 10.7	12 *DOE*
Tritium	870 J	1,256	ND - 2,856	20,000 *MCL*
Uranium-234	0.214	0.44 J	ND - 7.33	20 *DOE*
Uranium-235/236	ND	0.26 J	ND - 0.32	24 *DOE*

Field Sample No. - MND24-0958-0002
Weston Laboratory No. - 9409L088-002
CompuChem No. - 637255, 637257, 637258, 637259, 637263

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	4.0 U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	340	318	22 - 430	None
Fluoride	1.2	1.2	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.12	0.082	ND - 19	10 *MCL*
Total Dissolved Solids	456	472	41 - 716	500 *SMCL*
Target Analyte List Metals (μg/L)				
Aluminum	ND	45.2	8.7 - 21,400	50-200 *SMCL*
Barium	108 J	100	6.7 - 487	2,000 *MCL*
Calcium	89,100 J	82,300	8,710 - 139,000	None
Copper	3.5	10.3	ND - 54.2	1,000 *SMCL*
Iron	135 J	147	8.2 - 124,000	200 *SMCL*
Lithium	28	21.7	ND - 208	None
Magnesium	46,400 J	43,200	959 - 65,100	None
Manganese	6.0	4.3	ND - 613	50 *SMCL*
Molybdenum	14.3	12.7	ND - 75.2	40 -Lifetime H.A.
Potassium	2,180	2,590	56.2 - 7,930	None
Sodium	12,000 J	10,100	614 - 221,000	None
Tin	26.7	ND	ND - 118	None
Vanadium	12.8	11.7	ND - 31.1	None
Zinc	163 J	165	1.2 - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)				
Americium-241	0.0476	0.45	ND - 3.95	1.2 *DOE*
Plutonium-239/240	ND	0.09	ND - 0.49	1.6 *DOE*
Radium-226	0.345	0.56	ND - 1.35	20 *MCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L) (cont.)				
Strontium-90	0.659	ND	ND - 10.6	8.0 *MCL*
Thorium-230	0.806	0.86	ND - 10.7	12 *DOE*
Thorium-232	ND	0.37	ND - 1.99	2 *DOE*
Tritium	250 J	369.4	ND - 2,856	20,000 *MCL*
Uranium-234	0.0481	ND	ND - 7.33	20 *DOE*

Field Sample No. - MND24-0959-0002
Weston Laboratory No. - 9409L108-001
CompuChem No. - 637393, 637394, 637370, 637377, 637384

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	4.0 U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	28	26	22 - 430	None
Nitrate-Nitrite	0.75	0.74	ND - 19	10 *MCL*
Nitrite	ND	0.036	ND - 0.086	1 *MCL*
Total Dissolved Solids	41.0	53	41 - 716	500 *SMCL*
Total Suspended Solids	ND	6.0	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	**107**	21.2	8.7 - 21,400	**50-200 *SMCL***
Barium	6.7	7.7	6.7 - 487	2,000 *MCL*
Calcium	13,200 J	12,100	8,710 - 139,000	None
Copper	14.9	34.3	ND - 54.2	1,000 *SMCL*
Iron	180 J	155	8.2 - 124,000	300 *SMCL*
Lead	4.7 J	2.5	ND - 580	15 -Action Level at tap
Magnesium	1,100	959	959 - 65,100	None
Manganese	8.7	11.9	ND - 613	50 *SMCL*
Potassium	659	819	56.2 - 7,930	None
Silver	ND	0.54	ND - 5.3	100 -Lifetime H.A.
Sodium	1,060	614	614 - 221,000	None
Tin	5.6	ND	ND - 118	None
Zinc	300 J	343	1.2 - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)				
Americium-241	0.0782	0.19	ND - 3.95	1.2 *DOE*
Strontium-90	1.02	ND	ND - 10.6	8.0 *MCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L) (cont.)				
Thorium-228	0.786 J	0.56	ND - 1.8	16 *DOE*
Thorium-230	0.59 J	0.18	ND - 10.7	12 *DOE*
Uranium-234	ND	0.23	ND - 7.33	20 *DOE*
Uranium-235/236	ND	0.32	ND - 0.32	24 *DOE*
Uranium-238	ND	0.18	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0960-0002
Weston Laboratory No. - 9409L108-007
CompuChem No. - 637397, 637398, 637374, 637381, 637388

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	4.0 U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	4.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	2.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	360	336	22 - 430	None
Fluoride	0.76	0.8	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.71	0.52	ND - 19	10 *MCL*
Total Dissolved Solids	443	489	41 - 716	500 *SMCL*
Target Analyte List Metals (μg/L)				
Aluminum	ND	26.9	8.7 - 21,400	50-200 *SMCL*
Arsenic	5.4	ND	ND - 84	50 *MCL*
Barium	123 J	128	6.7 - 487	2,000 *MCL*
Calcium	85,100 J	93,000	8,710 - 139,000	None
Chromium	1.2	ND	ND - 104	100 *MCL*
Cobalt	0.67	ND	ND - 17.9	None
Copper	5.9	3.5	ND - 54.2	1,000 *SMCL*
Iron	9.3 J	8.2	8.2 - 124,000	300 *SMCL*
Lead	3.2	2.3	ND - 580	15 -Action Level at tap
Lithium	17.7	9.7	ND - 208	None
Magnesium	37,600 J	42,300	959 - 65,100	None
Manganese	ND	1.1	ND - 613	50 *SMCL*
Molybdenum	5.6	5.1	ND - 75.2	40 -Lifetime H.A.
Potassium	1,320	1,400	56.2 - 7,930	None
Sodium	14,300 J	14,900	614 - 221,000	None
Tin	22.3	ND	ND - 118	None
Vanadium	11.8	6.6	ND - 31.1	None
Zinc	287 J	149	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0488	0.43	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0906	ND	ND - 0.49	1.6 *DOE*
Strontium-90	2.1	ND	ND - 10.6	8.0 *MCL*
Thorium-228	ND	0.51	ND - 1.8	16 *DOE*
Thorium-230	0.339	0.16	ND - 10.7	12 *DOE*
Uranium-234	0.651	0.34	ND - 7.33	20 *DOE*
Uranium-238	0.519	0.30	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0961-0002
Weston Laboratory No. - 9409L144-001
CompuChem No. - 637687, 637691, 637692, 637693, 637695

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
General Water Quality Parameters (mg/L)				
Alkalinity	340	292	22 - 430	None
Fluoride	0.18	0.2	ND - 1.4	4 *MCL*
Nitrate/Nitrite	2.6	3.0	ND - 19	10 *MCL*
Total Dissolved Solids	**632**	**716**	41 - 716	**500 *SMCL***
Total Suspended Solids	ND	5.0	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	30.2 J	**119**	8.7 - 21,400	**50-200 *SMCL***
Barium	86.8	88.8	6.7 - 487	2,000 *MCL*
Bismuth	27.5	ND	ND - 29.6	None
Calcium	116,000	110,000	8,710 - 139,000	None
Copper	ND	1.4	ND - 54.2	1,000 *SMCL*
Iron	29.9	**336**	8.2 - 124,000	**300 *SMCL***
Lead	3.4 J	2.1	ND - 580	15 -Action level at tap
Magnesium	36,500	35,500	959 - 65,100	None
Manganese	0.97	6.6	ND - 613	50 *SMCL*
Molybdenum	ND	1.1	ND - 75.2	40- Lifetime H.A.
Nickel	5.0 J	ND	ND - 31	100 *MCL*
Potassium	2,760	3,100	56.2 - 7,930	None
Selenium	2.1 J	2.0	ND - 6.1	50 *MCL*
Sodium	62,200 J	65,500	614 - 221,000	None
Tin	23.5	ND	ND - 118	None
Vanadium	ND	8.5	ND - 31.1	None
Zinc	5.3	3.1	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	ND	0.17	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0809	ND	ND - 0.654	1.6 *DOE*
Radium-226	0.169 J	0.34	41 - 1.35	20 *MCL*
Thorium-228	0.375	0.23	ND - 1.8	16 *DOE*
Tritium	347 J	1,029	ND - 2,856	20,000 *MCL*
Uranium-234	0.371	0.12	ND - 7.33	20 *DOE*
Uranium-238	0.294	0.13	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0962-0002
Weston Laboratory No. - 9409L225-008
CompuChem No. - 639371, 639367, 639368, 639369, 639370

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Volatile Organic Compound (μg/L)				
cis-1,2-Dichloroethene	1.4	0.9	ND - 1.4	70 *MCL*
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	6.0 U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	6.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	6.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	300	274	22 - 430	None
Fluoride	0.29	0.27	ND - 1.4	4 *MCL*
Nitrate/Nitrite	ND	0.11	ND - 19	10 *MCL*
Total Dissolved Solids	466	**520**	41 - 716	**500 *SMCL***
Total Suspended Solids	ND	9.0	ND - 950	None
Target Analyte List Metals (μg/L)				
Aluminum	9.6	19	8.7 - 21,400	50-200 *SMCL*
Arsenic	ND	3.6	ND - 84	50 *MCL*
Barium	181	166	6.7 - 487	2,000 *MCL*
Calcium	89,000 J	84,500	8,710 - 139,000	None
Cobalt	1.0	ND	ND - 17.9	None
Copper	ND	0.96	ND - 54.2	1,000 *SMCL*
Iron	216	294	8.2 - 124,000	300 *SMCL*
Lithium	16.7	ND	ND - 208	None
Magnesium	33,900 J	32,400	959 - 65,100	None
Manganese	**119**	**113**	ND - 613	**50 *SMCL***
Molybdenum	3.0	3.8	ND - 75.2	40 -Lifetime H.A.
Potassium	2,300	2,700	56.2 - 7,930	None
Sodium	18,200	22,600	614 - 221,000	None
Tin	16.1 J	ND	ND - 118	None
Vanadium	11.4	8.5	ND - 31.1	None

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Target Analyte List Metals (μg/L) (cont.)				
Zinc	1.2	2.6	1.2 - 23,500	5,000 *SMCL*
Radionuclides (pCi/L)				
Americium-241	0.0764	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0349	ND	ND - 0.49	1.6 *DOE*
Potassium-40	ND	230.9	56.2 - 252.5	280 *DOE*
Radium-226	0.516 J	0.42	ND - 1.35	20 *MCL*
Thorium-228	0.544	ND	ND - 1.8	16 *DOE*
Thorium-230	0.292	0.16	ND - 10.7	12 *DOE*
Tritium	1,010 J	375.6	ND - 2,856	20,000 *MCL*
Uranium-234	0.473	0.4	ND - 7.33	20 *DOE*
Uranium-238	0.469	0.32	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0963-0002
Weston Laboratory No. - 9409L225-003
CompuChem No. - 639366, 639365, 639360, 639362, 639364

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)				
bis(2-ethylhexyl) phthalate	6.0 U	ND	ND - 0.9	6.0 *MCL*
diethylphthalate	6.0 U	ND	ND	5,000 Lifetime H.A.
di-n-butylphthalate	6.0 U	ND	ND	None
General Water Quality Parameters (mg/L)				
Alkalinity	310	304	22 - 430	None
Fluoride	0.24	0.21	ND - 1.4	4 *MCL*
Nitrate/Nitrite	ND	0.03	ND - 19	10 *MCL*
Nitrite	ND	0.01	ND - 0.086	1 *MCL*
Total Dissolved Solids	**610**	**670**	41 - 716	**500 *SMCL***
Total Suspended Solids	6.0	9.0	ND - 950	None
Target Analyte List Metals (μgL)				
Aluminum	12.7	20.2	8.7 - 21,400	50-200 *SMCL*
Arsenic	6.0 J	4.3	ND - 84	50 *MCL*
Barium	140	142	6.7 - 487	2,000 *MCL*
Calcium	96,600 J	98,000	8,710 - 139,000	None
Cobalt	0.90	ND	ND - 17.9	None
Copper	1.2	0.69	ND - 54.2	1,000 *SMCL*
Iron	**1,750**	**1,550**	8.2 - 124,000	**300 *SMCL***
Lithium	16.7	ND	ND - 208	None
Magnesium	34,200 J	34,200	959 - 65,100	None
Manganese	**134**	**165**	ND - 613	**50 *SMCL***
Molybdenum	3.1	2.7	ND - 75.2	40 -Lifetime H.A.
Potassium	1,960	2,220	56.2 - 7,930	None
Sodium	50,600	58,000	614 - 221,000	None
Tin	17.6 J	ND	ND - 118	None
Vanadium	11.9	10.1	ND - 31.1	None
Zinc	3.6 J	9.5	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0836	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0347	0.11	ND - 0.490	1.6 *DOE*
Potassium-40	ND	252.5	ND - 252.5	280 *DOE*
Radium-226	0.749 J	0.73	ND - 1.35	20 *MCL*
Thorium-228	1.04	ND	ND - 1.8	16 *DOE*
Thorium-230	0.256	0.15	ND - 10.7	12 *DOE*
Tritium	1,100 J	1,107.7	ND - 2,856	20,000 *MCL*
Uranium-234	ND	0.8	ND - 7.33	20 *DOE*
Uranium-235/236	ND	0.16	ND - 0.32	24 *DOE*
Uranium-238	ND	0.53	ND - 5.84	24 *DOE*

Field Sampling No. - MND24-0964-0002
Weston Laboratory No. - 9409L088-001
CompuChem No. - 637256, 637260, 637261, 637262, 637264

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
General Water Quality Parameters (mg/L)				
Alkalinity	290	292	22 - 430	None
Fluoride	0.21	0.18	ND - 1.4	4 *MCL*
Nitrate-Nitrite	0.35	0.41	ND - 19	10 *MCL*
Total Dissolved Solids	480	489	41 - 716	500 *SMCL*
Target Analyte List Metals (μg/L)				
Aluminum	**63.3**	16.3	8.7 - 21,400	**50-200 *SMCL***
Barium	214	215	6.7 - 487	2,000 *MCL*
Calcium	92,900	95,000	8,710 - 139,000	None
Chromium	1.8	ND	ND - 104	100 *MCL*
Copper	2.0	2.2	ND - 54.2	1,000 *SMCL*
Iron	19.3	31.5	8.2 - 124,000	300 *SMCL*
Lithium	23	14.5	ND - 208	None
Magnesium	31,100	31,900	959 - 65,100	None
Manganese	**171 J**	**201**	ND - 613	**50 *SMCL***
Molybdenum	ND	2.1	ND - 75.2	40-Lifetime H.A.
Nickel	2.8 J	ND	ND - 31	100 *MCL*
Potassium	2,690	2,930	56.2 - 7,930	None
Sodium	21,000	30,900	614 - 221,000	None
Vanadium	ND	11.2	ND - 31.1	None
Zinc	10.9 J	4.8	1.2 - 23,500	5,000 *SMCL*
Semivolatile Organic Compounds (μg/L)				
bis-(2-Ethylhexyl)phthalate	0.9	ND	ND - 0.9	6 *MCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0804	ND	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0899	ND	ND - 0.49	1.6 *DOE*
Radium-226	ND	0.32	ND - 1.35	20 *MCL*
Thorium-228	0.54	ND	ND - 1.8	16 *DOE*
Thorium-230	0.565	0.75	ND - 10.7	12 *DOE*
Tritium	ND	1,044	ND - 2,856	20,000 *MCL*
Uranium-234	0.233	0.14	ND - 7.33	20 *DOE*
Uranium-238	0.252	0.14	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0965-0002
Weston Laboratory No. - 9409L225-001
CompuChem No. - 639358, 639350, 639351, 639353, 639354

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)					
bis(2-ethylhexyl) phthalate	10.0	U	ND	ND - 0.9	6.0 *MCL*
di-n-butylphthalate	5.0	U	ND	ND	None
General Water Quality Parameters (mg/L)					
Alkalinity	340		330	22 - 430	None
Fluoride	0.82		0.76	ND - 1.4	4 *MCL*
Nitrate/Nitrite	0.047		0.04	ND - 19	10 *MCL*
Total Dissolved Solids	**524**		**610**	41 - 716	**500 *SMCL***
Total Suspended Solids	5.0		ND	ND - 950	None
Minerals (μg/L)					
Aluminum	17.5	J	20.2	8.7 - 21,400	50-200 *SMCL*
Arsenic	5.2		2.3	ND - 84	50 *MCL*
Barium	61.8		60.8	6.7 - 487	2,000 *MCL*
Calcium	98,600	J	94,400	8,710 - 139,000	None
Copper	ND		0.67	ND - 54.2	1,000 *SMCL*
Iron	**1,560**	**J**	**1,480**	8.2 - 124,000	**300 *SMCL***
Lead	ND		1.3	ND - 580	15-Action Level at tap
Magnesium	40,000	J	38,700	959 - 65,100	None
Manganese	**112**		**110**	ND - 613	**50 *SMCL***
Molybdenum	13.6	J	12.6	ND - 75.2	40 -Lifetime H.A.
Potassium	1,200		1,450	56.2 - 7,930	None
Sodium	15,700	J	17,400	614 - 221,000	None
Vanadium	7.9		10.9	ND - 31.1	None
Zinc	4.2	J	2.2	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.134	ND	ND - 3.95	1.2 *DOE*
Plutonium-238	ND	0.36	ND - 0.654	1.6 *DOE*
Plutonium-239/240	ND	0.35	ND - 0.49	1.6 *DOE*
Potassium-40	ND	196.3	ND - 252.5	280 *DOE*
Radium-226	0.547 J	0.36	ND - 1.35	20 *MCL*
Thorium-228	0.588	0.16	ND - 1.8	16 *DOE*
Thorium-230	0.468	0.35	ND - 10.7	12 *DOE*
Tritium	ND	399.2	ND - 2,856	20,000 *MCL*
Uranium-234	0.367	0.17	ND - 7.33	20 *DOE*
Uranium-238	0.46	0.27	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0966-0002
Weston Laboratory No. - 9409L225-005
CompuChem No. - 639331, 639310 ,639318, 639321, 639324

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)					
bis(2-ethylhexyl) phthalate	10.0	U	ND	ND - 0.9	6.0 *MCL*
di-n-butylphthalate	5.0	U	ND	ND	None
General Water Quality Parameters (mg/L)					
Alkalinity	340		310	22 - 430	None
Fluoride	0.43		0.38	ND - 1.4	4 *MCL*
Nitrate/Nitrite	2.2		3.1	ND - 19	10 *MCL*
Total Dissolved Solids	**500**		**540**	41 - 716	**500 *SMCL***
Total Suspended Solids	ND		7.0	ND - 950	None
Target Analyte List Metals (μg/L)					
Aluminum	18	J	15.3	8.7 - 21,400	50-200 *SMCL*
Arsenic	ND		2.1	ND - 84	50 *MCL*
Barium	77.9		74.6	6.7 - 487	2,000 *MCL*
Calcium	105,000	J	100,000	8,710 - 139,000	None
Copper	3.7		1.7	ND - 54.2	1,000 *SMCL*
Iron	**790**	**J**	**1,030**	8.2 - 124,000	**300 *SMCL***
Lithium	12.5		ND	ND - 208	None
Magnesium	38,800	J	37,600	959 - 65,100	None
Manganese	**90.4**		**76.9**	ND - 613	**50 *SMCL***
Molybdenum	6.5	J	5.5	ND - 75.2	40 -Lifetime H.A.
Potassium	1,340		1,400	56.2 - 7,930	None
Sodium	14,100	J	13,900	614 - 221,000	None
Tin	ND		6.4	ND - 118	None
Vanadium	8.6		10.8	ND - 31.1	None
Zinc	2.8	J	3.3	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	ND	0.26	ND - 3.95	1.2 *DOE*
Plutonium-238	0.0097	ND	ND - 0.654	1.6 *DOE*
Plutonium-239/240	0.0608	0.23	ND - 0.49	1.6 *DOE*
Radium-226	0.314 J	0.36	ND - 1.35	20 *MCL*
Thorium-228	0.431	ND	ND - 1.8	16 *DOE*
Thorium-230	0.624	0.09	ND - 10.7	12 *DOE*
Uranium-234	0.801	0.54	ND - 7.33	20 *DOE*
Uranium-238	0.503	0.68	ND - 5.84	24 *DOE*

Field Sample No. - MND24-0967-0002
Weston Laboratory No. - 9408L031-005
CompuChem No. - 637225, 637228, 637231, 637234, 637237

Parameter Detected	Results for 1st Sample Event		Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Semivolatile Organic Compounds (μg/L)					
bis(2-ethylhexyl) phthalate	10.0	U	ND	ND - 0.9	6.0 *MCL*
di-n-butylphthalate	5.0	U	ND	ND	None
General Water Quality Parameters (mg/L)					
Alkalinity	320		292	22 - 430	None
Fluoride	0.43		0.4	ND - 1.4	4 *MCL*
Nitrate/Nitrite	1.5		2.2	ND - 19	10 *MCL*
Total Dissolved Solids	454		**544**	41 - 716	500 *SMCL*
Target Analyte List Metals (μg/L)					
Aluminum	20.2	J	16.2	8.7 - 21,400	50-200 *SMCL*
Barium	204		208	6.7 - 487	2,000 *MCL*
Calcium	99,200	J	108,000	8,710 - 139,000	None
Chromium	3.0		ND	ND - 104	100 *MCL*
Cobalt	0.51		ND	ND - 17.9	None
Copper	11.7		33.6	ND - 54.2	1,000 *SMCL*
Iron	223	J	26.9	8.2 - 124,000	300 *SMCL*
Lithium	19.7		30	ND - 208	None
Magnesium	39,200	J	42,000	959 - 65,100	None
Manganese	13		10	ND - 613	50 *SMCL*
Molybdenum	7.8	J	7.2	ND - 75.2	40 -Lifetime H.A.
Potassium	1,440		2,100	56.2 - 7,930	None
Sodium	15,700	J	17,600	614 - 221,000	None
Vanadium	8.3		13.2	ND - 31.1	None
Zinc	149	J	201	1.2 - 23,500	5,000 *SMCL*

Parameter Detected	Results for 1st Sample Event	Results for 2nd Sample Event	Range of Observed Results	Drinking Water Standard
Radionuclides (pCi/L)				
Americium-241	0.0468	0.17 J	ND - 3.95	1.2 *DOE*
Plutonium-239/240	0.0465	ND	ND - 0.49	1.6 *DOE*
Radium-226	ND	0.38	ND - 1.35	20 *MCL*
Thorium-228	0.462	0.48 J	ND - 1.8	16 *DOE*
Thorium-230	0.664	0.29 J	ND - 10.7	12 *DOE*
Tritium	ND	624.7	ND - 2,856	20,000 *MCL*
Uranium-234	0.576	0.25 J	ND - 7.33	20 *DOE*
Uranium-238	0.535	0.34 J	ND - 5.84	24 *DOE*

APPENDIX D

SUMMARY OF ANALYTICAL DATA QUALIFIERS

Table C.1. Summary of Volatiles Qualifications - First Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
942L452	MND24-0944-0001	J	CCV %R- 1,1,2,2-tetrachloroethane (53)	Potential low bias
			bis(2-chloroisopropyl) ether (58)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (189)	None
			vinyl acetate (48)	Potential low bias
			methylethyl ketone (77)	Potential low bias
			methylisobutly ketone (75)	Potential low bias
	MND24-0932-0001	J	CCV %R- 1,1,2,2-tetrachloroethane (53)	Potential low bias
			bis(2-chloroisopropyl) ether (58)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (189)	None
			vinyl acetate (48)	Potential low bias
			methylethyl ketone (77)	Potential low bias
			methylisobutly ketone (75)	Potential low bias
	MND24-0932-3001	J	CCV %R- 1,1,2,2-tetrachloroethane (53)	Potential low bias
			bis(2-chloroisopropyl) ether (58)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (189)	None
			vinyl acetate (48)	Potential low bias
			methylethyl ketone (77)	Potential low bias
			methylisobutly ketone (75)	Potential low bias
	MND24-0932-4001	J	CCV %R- 1,1,2,2-tetrachloroethane (53)	Potential low bias
			bis(2-chloroisopropyl) ether (58)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (189)	None
			vinyl acetate (48)	Potential low bias
			methylethyl ketone (77)	Potential low bias
			methylisobutly ketone (75)	Potential low bias
	MND24-0944-2001	J	CCV %R- 1,1,2,2-tetrachloroethane (53)	Potential low bias
			bis(2-chloroisopropyl) ether (58)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (189)	None
			vinyl acetate (48)	Potential low bias
			methylethyl ketone (77)	Potential low bias
			methylisobutly ketone (75)	Potential low bias
9402L459	MND24-0946-0001	UJ	Surrogate solution contaminated with spike solution, affecting all analytes.	Raised detection limit
		J	CCV %R- vinyl chloride (132)	None
			trichlorotrifluoroethane (120)	None
			1,1-dichloroethene (73)	Potential low bias
			trans-1,2-dichloroethene (77)	Potential low bias
			trichloroethene (76)	Potential low bias
			tetrachloroethene (78)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (157)	None
			vinyl acetate (158)	None
			benzene (80)	Potential low bias
		J	LCS RPD- 1,1,1-trichloroethane (125)	Possible inaccuracy
			tetrachloroethene (121)	Possible inaccuracy

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L459 (cont.)	MND24-0936-0001	UJ	Surrogate solution contaminated with spike solution, affecting all analytes.	Raised detection limit
		J	CCV %R- vinyl chloride (132) trichlorotrifluoroethane (120) 1,1-dichloroethene (73) trans-1,2-dichloroethene (77) trichloroethene (76) tetrachloroethene (78) acetone (78) carbon disulfide (157) vinyl acetate (158) benzene (80)	None None Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias None None Potential low bias
		J	LCS RPD- 1,1,1-trichloroethane (125) tetrachloroethene (121)	Possible inaccuracy Possible inaccuracy
	MND24-0946-2001	UJ	Surrogate solution contaminated with spike solution, affecting all analytes.	Raised detection limit
		J	CCV %R- vinyl chloride (132) trichlorotrifluoroethane (120) 1,1-dichloroethene (73) trans-1,2-dichloroethene (77) trichloroethene (76) tetrachloroethene (78) acetone (78) carbon disulfide (157) vinyl acetate (158) benzene (80)	None None Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias None None Potential low bias
		J	LCS RPD- 1,1,1-trichloroethane (125) tetrachloroethene (121)	Possible inaccuracy Possible inaccuracy
	MND24-0959-0001	UJ	Surrogate solution contaminated with spike solution, affecting all analytes.	Raised detection limit
		J	CCV %R- vinyl chloride (132) trichlorotrifluoroethane (120) 1,1-dichloroethene (73) trans-1,2-dichloroethene (77) trichloroethene (76) tetrachloroethene (78) acetone (78) carbon disulfide (157) vinyl acetate (158) benzene (80)	None None Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias None None Potential low bias
		J	LCS RPD- 1,1,1-trichloroethane (125) tetrachloroethene (121)	Possible inaccuracy Possible inaccuracy

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L459 (cont.)	MND24-0959-1001	UJ	Surrogate solution contaminated with spike solution, affecting all analytes.	Raised detection limit
		J	CCV %R- vinyl chloride (132)	None
			trichlorotrifluoroethane (120)	None
			1,1-dichloroethene (73)	Potential low bias
			trans-1,2-dichloroethene (77)	Potential low bias
			trichloroethene (76)	Potential low bias
			tetrachloroethene (78)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (157)	None
			vinyl acetate (158)	None
			benzene (80)	Potential low bias
		J	LCS RPD- 1,1,1-trichloroethane (125)	Possible inaccuracy
			tetrachloroethene (121)	Possible inaccuracy
	MND24-0959-2001	UJ	Surrogate solution contaminated with spike solution, affecting all analytes.	Raised detection limit
		J	CCV %R- vinyl chloride (132)	None
			trichlorotrifluoroethane (120)	None
			1,1-dichloroethene (73)	Potential low bias
			trans-1,2-dichloroethene (77)	Potential low bias
			trichloroethene (76)	Potential low bias
			tetrachloroethene (78)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (157)	None
			vinyl acetate (158)	None
			benzene (80)	Potential low bias
		J	LCS RPD- 1,1,1-trichloroethane (125)	Possible inaccuracy
			tetrachloroethene (121)	Possible inaccuracy
	MND24-0931-0001	UJ	Surrogate solution contaminated with spike solution, affecting all analytes.	Raised detection limit
		J	CCV %R- vinyl chloride (132)	None
			trichlorotrifluoroethane (120)	None
			1,1-dichloroethene (73)	Potential low bias
			trans-1,2-dichloroethene (77)	Potential low bias
			trichloroethene (76)	Potential low bias
			tetrachloroethene (78)	Potential low bias
			acetone (78)	Potential low bias
			carbon disulfide (157)	None
			vinyl acetate (158)	None
			benzene (80)	Potential low bias
		J	LCS RPD- 1,1,1-trichloroethane (125)	Possible inaccuracy
			tetrachloroethene (121)	Possible inaccuracy

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L482	MND24-0949-0001	J	CCV %R- vinyl chloride (126)	None
			1,1,2-trichloroethane (73)	Potential low bias
			bromoform (72)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,3-dichlorobenzene (72)	Potential low bias
			1,4-dichlorobenzene (73)	Potential low bias
			1,2-dichlorobenzene (72)	Potential low bias
			dibromochloromethane (78)	Potential low bias
			acetone (79)	Potential low bias
			carbon disulfide (128)	None
			vinyl acetate (150)	None
			acetonitrile (121)	None
			acrylonitrile (117)	None
	MND24-0949-2001	J	CCV %R- vinyl chloride (126)	None
			1,1,2-trichloroethane (73)	Potential low bias
			bromoform (72)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,3-dichlorobenzene (72)	Potential low bias
			1,4-dichlorobenzene (73)	Potential low bias
			1,2-dichlorobenzene (72)	Potential low bias
			dibromochloromethane (78)	Potential low bias
			acetone (79)	Potential low bias
			carbon disulfide (128)	None
			vinyl acetate (150)	None
			acetonitrile (121)	None
			acrylonitrile (117)	None
	MND24-0960-0001	J	CCV %R- vinyl chloride (126)	None
			1,1,2-trichloroethane (73)	Potential low bias
			bromoform (72)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,3-dichlorobenzene (72)	Potential low bias
			1,4-dichlorobenzene (73)	Potential low bias
			1,2-dichlorobenzene (72)	Potential low bias
			dibromochloromethane (78)	Potential low bias
			acetone (79)	Potential low bias
			carbon disulfide (128)	None
			vinyl acetate (150)	None
			acetonitrile (121)	None
			acrylonitrile (117)	None
			acetonitrile (121)	None
			acrylonitrile (117)	None
	MND24-0958-0001	J	CCV %R- vinyl chloride (126)	None
			1,1,2-trichloroethane (73)	Potential low bias
			bromoform (72)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,3-dichlorobenzene (72)	Potential low bias
			1,4-dichlorobenzene (73)	Potential low bias
			1,2-dichlorobenzene (72)	Potential low bias
			dibromochloromethane (78)	Potential low bias
			acetone (79)	Potential low bias
			carbon disulfide (128)	None
			vinyl acetate (150)	None
			acetonitrile (121)	None
			acrylonitrile (117)	None

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L482 (cont.)	MND24-0958-3001	J	CCV %R- vinyl chloride (126)	None
			1,1,2-trichloroethane (73)	Potential low bias
			bromoform (72)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,3-dichlorobenzene (72)	Potential low bias
			1,4-dichlorobenzene (73)	Potential low bias
			1,2-dichlorobenzene (72)	Potential low bias
			dibromochloromethane (78)	Potential low bias
			acetone (79)	Potential low bias
			carbon disulfide (128)	None
			vinyl acetate (150)	None
			acetonitrile (121)	None
			acrylonitrile (117)	None
	MND24-0958-2001	J	CCV %R- vinyl chloride (126)	None
			1,1,2-trichloroethane (73)	Potential low bias
			bromoform (72)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,3-dichlorobenzene (72)	Potential low bias
			1,4-dichlorobenzene (73)	Potential low bias
			1,2-dichlorobenzene (72)	Potential low bias
			dibromochloromethane (78)	Potential low bias
			acetone (79)	Potential low bias
			carbon disulfide (128)	None
			vinyl acetate (150)	None
			acetonitrile (121)	None
			acrylonitrile (117)	None
9402L500	MND24-0963-0001	J	CCV %R- vinyl chloride (123)	None
			bis(2-chloroisopropyl) ether (78)	Potential low bias
			acetone (190)	None
			carbon disulfide (151)	None
			vinyl acetate (168)	None
			methylethyl ketone (69)	Potential low bias
			methylisobutyl ketone (69)	Potential low bias
			acetonitrile (63)	Potential low bias
			acrylonitrile (54)	Potential low bias
	MND24-0935-0001	J	CCV %R- vinyl chloride (123)	None
			1,1,2-trichloroethane (73)	Potential low bias
			tetrachloroethene (78)	Potential low bias
			dibromochloromethane (79)	Potential low bias
			chlorobenzene (72)	Potential low bias
			bromoform (72)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,3-dichlorobenzene (73)	Potential low bias
			1,4-dichlorobenzene (75)	Potential low bias
			1,2-dichlorobenzene (72)	Potential low bias
			acetone (190)	None
			carbon disulfide (151)	None
			vinyl acetate (168)	None
			acetonitrile (63)	None
			acrylonitrile (54)	None

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
9402L500 (cont.)	MND24-0935-2001	J	CCV %R-	vinyl chloride (123)	None
				chloroethylvinylether (52)	Potential low bias
				bis(2-chloroisopropyl) ether (78)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
				acetonitrile (63)	Potential low bias
				acrylonitrile (54)	Potential low bias
	MND24-0963-2001	J	CCV %R-	vinyl chloride (124)	None
				2-chloroethylvinylether (51)	Potential low bias
				bis(2-chloroisopropyl) ether (78)	Potential low bias
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				acetonitrile (63)	Potential low bias
				acrylonitrile (54)	Potential low bias
	MND24-0962-0001	J	CCV %R-	vinyl chloride (126)	None
				bis(2-chloroisopropyl) ether (78)	Potential low bias
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				acetonitrile (63)	Potential low bias
				acrylonitrile (54)	Potential low bias
	MND24-0962-2001	J	CCV %R-	vinyl chloride (126)	None
				bis(2-chloroisopropyl) ether (78)	Potential low bias
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				acetonitrile (63)	Potential low bias
				acrylonitrile (54)	Potential low bias
	MND24-0950-1001	J	CCV %R-	vinyl chloride (126)	None
				bis(2-chloroisopropyl) ether (78)	Potential low bias
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				acetonitrile (63)	Potential low bias
				acrylonitrile (54)	Potential low bias

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
9402L500 (cont.)	MND24-0950-0001	J	CCV %R-	vinyl chloride (126)	None
				bis(2-chloroisopropyl) ether (78)	Potential low bias
				acetone (67)	None
				carbon disulfide (179)	Potential low bias
				vinyl acetate (147)	Potential low bias
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	None
				acetonitrile (63)	Potential low bias
				acrylonitrile (54)	Potential low bias
	MND24-0959-0001	J	CCV %R-	vinyl chloride (126)	None
				bis(2-chloroisopropyl) ether (78)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
	MND24-0959-2001	J	CCV %R-	vinyl chloride (126)	None
				bis(2-chloroisopropyl) ether (78)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
				acetonitrile (63)	Potential low bias
				acrylonitrile (54)	Potential low bias
	MND25-0935-0001	U	MB-	methylene chloride	Raised quantitation limit
9402L508	MND24-0937-4001	J	CCV %R-	vinyl chloride (123)	None
				2-chloroethylvinyl ether (52)	Potential low bias
				bis(2-chloroisopropyl) ether (76)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
				acetonitrile (121)	None
	MND24-0943-0001	J	CCV %R	-vinyl chloride (123)	None
				2-chloroethylvinyl ether (52)	Potential low bias
				bis(2-chloroisopropyl) ether (76)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias
	MND24-0943-2001	J	CCV %R-	vinyl chloride (123)	None
				2-chloroethylvinyl ether (52)	Potential low bias
				bis(2-chloroisopropyl) ether (76)	Potential low bias
				acetone (67)	Potential low bias
				carbon disulfide (179)	None
				vinyl acetate (147)	None
				methylethyl ketone (69)	Potential low bias
				methylisobutyl ketone (69)	Potential low bias

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L508 (cont.)	MND24-0943-2001 (cont.)	J	Hold time exceeded by 4 days	None
	MND24-0938-0001	J	CCV %R- vinyl chloride (123) 2-chloroethylvinyl ether (52) bis(2-chloroisopropyl) ether (76) acetone (67) carbon disulfide (179) vinyl acetate (147) methylethyl ketone (69) methylisobutyl ketone (69)	None Potential low bias Potential low bias Potential low bias None None Potential low bias Potential low bias
	MND24-0938-2001	J	CCV %R- vinyl chloride (123) 2-chloroethylvinyl ether (52) bis(2-chloroisopropyl) ether (76) acetone (67) carbon disulfide (179) vinyl acetate (147) methylethyl ketone (69) methylisobutyl ketone (69) acetonitrile (121)	None Potential low bias Potential low bias Potential low bias None None Potential low bias Potential low bias None
	MND25-0937-1001	U	MB- methylene chloride acetone	Raised quantitation limit
	MND25-0937-0001	U	MB- methylene chloride acetone	Raised quantitation limit
9402L529	MND24-0945-0001	J	CCV %R- vinyl chloride (123) 2-chloroethylvinyl ether (52) vinyl acetate (166)	None Potential low bias None
	MND24-0952-0001	J	CCV %R- vinyl chloride (123) 2-chloroethylvinyl ether (52) vinyl acetate (166)	None Potential low bias None
	MND24-0948-001	J	CCV %R- 1,1-dichloroethene (111) carbon disulfide (180) methylisobutyl ketone (123) 2-chloroethylvinyl ether (69) 1,3-diethylbenzene (121) 1,4-diethyl benzene (120) 1,2-diethyl benzene (121) trans-1,3-dichloropropene (120) bromobenzene (122) 2-chlorotoluene (122) 4-chlorotoluene (122) vinyl acetate (200)	None None None Potential low bias None None None None None None None None

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L529 (cont.)	MND24-0945-3001	J	CCV %R- vinyl chloride (80)	Potential low bias
			1,1-dichloroethene (73)	Potential low bias
			trichloroethene (80)	Potential low bias
			2-chloroethylvinyl ether (54)	Potential low bias
			cis-1,3-dichloropropene (77)	Potential low bias
			trans-1,3-dichloropropene (79)	Potential low bias
			bromobenzene (79)	Potential low bias
			2-chlorotoluene (77)	Potential low bias
			4-chlorotoluene (77)	Potential low bias
			bis(2-chloroisopropyl) ether (73)	Potential low bias
			acetone (68)	Potential low bias
			carbon disulfide (181)	None
			vinyl acetate (130)	None
			methylethyl ketone (73)	Potential low bias
			methylisobutyl ketone (70)	Potential low bias
			1,3-diethyl benzene (77)	Potential low bias
			1,4-diethyl benzene (76)	Potential low bias
			1,2-diethyl benzene (78)	Potential low bias
	MND24-0945-2001	J	CCV %R- vinyl chloride (80)	Potential low bias
			1,1-dichloroethene (73)	Potential low bias
			trichloroethene (80)	Potential low bias
			2-chloroethylvinyl ether (54)	Potential low bias
			cis-1,3-dichloropropene (77)	Potential low bias
			trans-1,3-dichloropropene (79)	Potential low bias
			bromobenzene (79)	Potential low bias
			2-chlorotoluene (77)	Potential low bias
			4-chlorotoluene (77)	Potential low bias
			bis(2-chloroisopropyl) ether (73)	Potential low bias
			acetone (68)	Potential low bias
			carbon disulfide (181)	None
			vinyl acetate (130)	None
			methylethyl ketone (73)	Potential low bias
			methylisobutyl ketone (70)	Potential low bias
			1,3-diethyl benzene (77)	Potential low bias
			1,4-diethyl benzene (76)	Potential low bias
			1,2-diethyl benzene (78)	Potential low bias
			acetonitrile (121)	None
	MND24-0945-2001-1	J	CCV %R- vinyl chloride (80)	Potential low bias
			1,1-dichloroethene (73)	Potential low bias
			trichloroethene (80)	Potential low bias
			2-chloroethylvinyl ether (54)	Potential low bias
			cis-1,3-dichloropropene (77)	Potential low bias
			trans-1,3-dichloropropene (79)	Potential low bias
			bromobenzene (79)	Potential low bias
			2-chlorotoluene (77)	Potential low bias
			4-chlorotoluene (77)	Potential low bias
			bis(2-chloroisopropyl) ether (73)	Potential low bias
			acetone (68)	Potential low bias
			carbon disulfide (181)	None
			vinyl acetate (130)	None
			methylethyl ketone (73)	Potential low bias
			methylisobutyl ketone (70)	Potential low bias
			1,3-diethyl benzene (77)	Potential low bias
			1,4-diethyl benzene (76)	Potential low bias
			1,2-diethyl benzene (78)	Potential low bias
			acetonitrile (124)	None

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L529 (cont.)	MND24-0948-2001	J	CCV %R- vinyl chloride (80)	Potential low bias
			1,1-dichloroethene (73)	Potential low bias
			trichloroethene (80)	Potential low bias
			2-chloroethylvinyl ether (54)	Potential low bias
			cis-1,3-dichloropropene (77)	Potential low bias
			trans-1,3-dichloropropene (79)	Potential low bias
			bromobenzene (79)	Potential low bias
			2-chlorotoluene (77)	Potential low bias
			4-chlorotoluene (77)	Potential low bias
			bis(2-chloroisopropyl) ether (73)	Potential low bias
			acetone (68)	Potential low bias
			carbon disulfide (181)	None
			vinyl acetate (130)	None
			methylethyl ketone (73)	Potential low bias
			methylisobutyl ketone (70)	Potential low bias
			1,3-diethyl benzene (77)	Potential low bias
			1,4-diethyl benzene (76)	Potential low bias
			1,2-diethyl benzene (78)	Potential low bias
			acetonitrile (121)	None
9402L536	MND24-0951-0001	J	CCV %R- 1,1-dichloroethene (127)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			carbon disulfide (200)	None
			vinyl acetate (191)	None
			1,2-diethyl benzene (121)	None
			acetonitrile (121)	None
	MND24-0933-0001	J	CCV %R- 1,1-dichloroethene (127)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			carbon disulfide (200)	None
			vinyl acetate (191)	None
			1,2-diethyl benzene (121)	None
			acetonitrile (121)	None
	MND24-0951-2001	J	CCV %R- 1,1-dichloroethene (127)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			carbon disulfide (200)	None
			vinyl acetate (191)	None
			1,2-diethyl benzene (121)	None
			acetonitrile (121)	None
	MND24-0947-0001	J	CCV %R- 1,1-dichloroethene (127)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			carbon disulfide (200)	None
			vinyl acetate (191)	None
			1,2-diethyl benzene (121)	None
			acetonitrile (122)	None
	MND24-0947-2001	J	CCV %R- 1,1-dichloroethene (127)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			carbon disulfide (200)	None
			vinyl acetate (191)	None
			1,2-diethyl benzene (121)	None
			acetonitrile (121)	None

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
9402L536 (cont.)	MND24-0954-0001	J	CCV %R-	1,1-dichloroethene (127)	None
				bromobenzene (121)	None
				2-chlorotoluene (121)	None
				carbon disulfide (200)	None
				vinyl acetate (191)	None
				1,2-diethyl benzene (121)	None
				acetonitrile (122)	None
	MND24-0954-2001	J	CCV %R-	1,1-dichloroethene (121)	None
				1,1,2,2-tetrachloroethane (128)	None
				bromobenzene (121)	None
				2-chlorotoluene (121)	None
				bis(2-chloroisopropyl) ether (125)	None
				acetone (128)	None
				carbon disulfide (198)	None
				vinyl acetate (199)	None
				methylethyl ketone (120)	None
				methylisobutyl ketone (124)	None
				1,2-diethyl benzene (121)	None
				acetonitrile (122)	None
	MND24-0954-1001	J	CCV %R-	1,1-dichloroethene (121)	None
				1,1,2,2-tetrachloroethane (128)	None
				bromobenzene (121)	None
				2-chlorotoluene (121)	None
				bis(2-chloroisopropyl) ether (125)	None
				acetone (128)	None
				carbon disulfide (198)	None
				vinyl acetate (199)	None
				methylethyl ketone (120)	None
				methylisobutyl ketone (124)	None
				1,2-diethyl benzene (121)	None
				acetonitrile (122)	None
	MND25-0951-0001	U	MB-	methylene chloride	Raised quantitation limit
				acetone	
9402L544	MND24-0955-0001	J	CCV %R-	1,1-dichloroethene (121)	None
				1,1,2,2-tetrachloroethane (128)	None
				bromobenzene (121)	None
				2-chlorotoluene (121)	None
				bis(2-chloroisopropyl) ether (125)	None
				acetone (127)	None
				carbon disulfide (198)	None
				vinyl acetate (191)	None
				methylethyl ketone (120)	None
				methylisobutyl ketone (124)	None
				1,2-diethylbenzene (121)	None
				acetonitrile (124)	None
	MND24-0964-0001	J	CCV %R-	1,1,2,2-tetrachloroethane (128)	None
				bis(2-chloroisopropyl) ether (125)	None
				acetone (127)	None
				carbon disulfide (217)	None
				vinyl acetate (188)	None
				methylethyl ketone (120)	None
				methylisobutyl ketone (124)	None
				acrylonitrile (80)	None

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L544 (cont.)	MND24-0941-2001	J	CCV %R- 1,1-dichloroethene (121)	None
			1,1,2,2-tetrachloroethane (128)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			bis(2-chloroisopropyl) ether (125)	None
			acetone (127)	None
			carbon disulfide (198)	None
			vinyl acetate (191)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
			1,2-diethylbenzene (121)	None
			acrylonitrile (80)	None
	MND24-0964-2001	J	CCV %R- 1,1-dichloroethene (121)	None
			1,1,2,2-tetrachloroethane (128)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			bis(2-chloroisopropyl) ether (125)	None
			acetone (127)	None
			carbon disulfide (198)	None
			vinyl acetate (191)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
			1,2-diethylbenzene (121)	None
			acrylonitrile (80)	None
9402L562	MND24-0953-0001	J	CCV %R- 1,1-dichloroethane (121)	None
			1,1,2,2-tetrachloroethane (128)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			bis(2-chloroisopropyl) ether (125)	None
			acetone (128)	None
			carbon disulfide (198)	None
			vinyl acetate (191)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
			1,2-diethyl benzene (121)	None
			acrylonitrile (80)	Potential low bias
	MND24-0953-4001	J	CCV %R- 1,1-dichloroethane (121)	None
			1,1,2,2-tetrachloroethane (128)	None
			bromobenzene (121)	None
			2-chlorotoluene (121)	None
			bis(2-chloroisopropyl) ether (125)	None
			acetone (128)	None
			carbon disulfide (198)	None
			vinyl acetate (191)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
			1,2-diethyl benzene (121)	None
			acrylonitrile (80)	Potential low bias

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L562 (cont.)	MND24-0953-2001-1	J	CCV %R- 1,1,2,2-tetrachloroethane (128)	None
			bis(2-chloroisopropyl) ether (128)	None
			acetone (127)	None
			carbon disulfide (217)	None
			vinyl acetate (188)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
			acrylonitrile (80)	Potential low bias
	MND24-0953-3001	J	CCV %R- 1,1,2,2-tetrachloroethane (128)	None
			bis(2-chloroisopropyl) ether (128)	None
			acetone (127)	None
			carbon disulfide (217)	None
			vinyl acetate (188)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
			acrylonitrile (80)	Potential low bias
	MND24-0953-2001	J	CCV %R- 1,1,2,2-tetrachloroethane (128)	None
			bis(2-chloroisopropyl) ether (128)	None
			acetone (127)	None
			carbon disulfide (217)	None
			vinyl acetate (188)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
	MND24-0961-1001	J	CCV %R- 1,1,2,2-tetrachloroethane (128)	None
			bis(2-chloroisopropyl) ether (128)	None
			acetone (127)	None
			carbon disulfide (217)	None
			vinyl acetate (188)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
	MND24-0961-0001	J	CCV %R- 1,1,2,2-tetrachloroethane (128)	None
			bis(2-chloroisopropyl) ether (128)	None
			acetone (127)	None
			carbon disulfide (217)	None
			vinyl acetate (188)	None
			methylethyl ketone (120)	None
			methylisobutyl ketone (124)	None
	MND24-0961-2001	J	CCV %R- vinyl chloride (79)	Potential low bias
			carbon disulfide (148)	None
			vinyl acetate (172)	None

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
9402L567	MND24-0967-0001	J	CCV %R-	vinyl chloride (79)	Potential low bias
				carbon disulfide (148)	None
				vinyl acetate (171)	None
	MND24-0966-0001	J	CCV %R-	1,1-dichloroethene (134)	None
				trans-1,2-dichloroethene (80)	Potential low bias
				1,2-dichloroethane (79)	Potential low bias
				trichloroethene (76)	Potential low bias
				dibromomethane (79)	Potential low bias
				2-chloroethylvinylether (59)	Potential low bias
				1,1,2-trichloroethane (71)	Potential low bias
				tetrachloroethene (77)	Potential low bias
				dibromochloromethane (73)	Potential low bias
				chlorobenzene (77)	Potential low bias
				bromoform (69)	Potential low bias
				1,1,2,2-tetrachloroethane (73)	Potential low bias
				1,2,3-trichloropropane (74)	Potential low bias
				1,3-dichlorobenzene (76)	Potential low bias
				1,4-dichlorobenzene (75)	Potential low bias
				1,2-dichlorobenzene (75)	Potential low bias
				bis(2-chloroisopropyl) ether (73)	Potential low bias
				carbon disulfide (252)	None
				vinyl acetate (171)	None
	MND24-0965-0001	J	CCV %R-	vinyl chloride (79)	Potential low bias
				carbon disulfide (148)	None
				vinyl acetate (171)	None
	MND24-0967-2001	J	CCV %R-	vinyl chloride (79)	Potential low bias
				carbon disulfide (148)	None
				vinyl acetate (171)	None
	MND24-0965-2001	J	CCV %R-	vinyl chloride (79)	Potential low bias
				carbon disulfide (148)	None
				vinyl acetate (171)	None
9402L663	MND24-0941-0001	J	CCV %R-	vinyl chloride (62)	Potential low bias
				dibromomethane (78)	Potential low bias
				bromoform (79)	Potential low bias
				1,2,3-trichloropropane (70)	Potential low bias
				bis(2-chloroisopropyl) ether (58)	Potential low bias
				acetone (69)	Potential low bias
				carbon disulfide (137)	None
				methylethyl ketone (67)	Potential low bias
				methylisobutyl ketone (66)	Potential low bias
		J	LCS-	1,1-dichloroethene (121)	Possible inaccuracy

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L663 (cont.)	MND24-0941-2001	J	CCV %R- vinyl chloride (64)	Potential low bias
			trichlorofluoroethane (121)	None
			1,1-dichloroethene (122)	None
			methylene chloride (124)	None
			trans-1,2-dichloroethene (78)	Potential low bias
			1,1,2-trichloroethane (78)	Potential low bias
			bromoform (76)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,2,3-trichloropropane (74)	Potential low bias
			1,4-dichlorobenzene (80)	Potential low bias
			1,2-dichlorobenzene (79)	Potential low bias
			bis(2-chloroisopropyl) ether (56)	Potential low bias
			acetone (69)	Potential low bias
			carbon disulfide (187)	None
			methylethyl ketone (71)	Potential low bias
			methylisobutyl ketone (69)	Potential low bias
		J	LCS- 1,1-dichloroethene (121)	Possible inaccuracy
	MND24-0942-2001	J	CCV %R- vinyl chloride (64)	Potential low bias
			trichlorofluoroethane (121)	None
			1,1-dichloroethene (122)	None
			methylene chloride (124)	None
			trans-1,2-dichloroethene (78)	Potential low bias
			1,1,2-trichloroethane (78)	Potential low bias
			bromoform (76)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,2,3-trichloropropane (74)	Potential low bias
			1,4-dichlorobenzene (80)	Potential low bias
			1,2-dichlorobenzene (79)	Potential low bias
			bis(2-chloroisopropyl) ether (56)	Potential low bias
			acetone (69)	Potential low bias
			carbon disulfide (187)	None
			methylethyl ketone (71)	Potential low bias
			methylisobutyl ketone (69)	Potential low bias
		J	LCS- 1,1-dichloroethene (121)	Possible inaccuracy
	MND24-0956-0001	J	CCV %R- vinyl chloride (64)	Potential low bias
			trichlorofluoroethane (121)	None
			1,1-dichloroethene (122)	None
			methylene chloride (124)	None
			trans-1,2-dichloroethene (78)	Potential low bias
			1,1,2-trichloroethane (78)	Potential low bias
			bromoform (76)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,2,3-trichloropropane (74)	Potential low bias
			1,4-dichlorobenzene (80)	Potential low bias
			1,2-dichlorobenzene (79)	Potential low bias
			bis(2-chloroisopropyl) ether (56)	Potential low bias
			acetone (69)	Potential low bias
			carbon disulfide (187)	None
			methylethyl ketone (71)	Potential low bias
			methylisobutyl ketone (69)	Potential low bias
		J	LCS- 1,1-dichloroethene (121)	Possible inaccuracy

Table C.1. Summary of Volatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L663 (cont.)	MND24-0956-2001	J	CCV %R- vinyl chloride (64)	Potential low bias
			trichlorofluoroethane (121)	None
			1,1-dichloroethene (122)	None
			methylene chloride (124)	None
			trans-1,2-dichloroethene (78)	Potential low bias
			1,1,2-trichloroethane (78)	Potential low bias
			bromoform (76)	Potential low bias
			1,1,2,2-tetrachloroethane (79)	Potential low bias
			1,2,3-trichloropropane (74)	Potential low bias
			1,4-dichlorobenzene (80)	Potential low bias
			1,2-dichlorobenzene (79)	Potential low bias
			bis(2-chloroisopropyl) ether (56)	Potential low bias
			acetone (69)	Potential low bias
			carbon disulfide (187)	None
			methylethyl ketone (71)	Potential low bias
			methylisobutyl ketone (69)	Potential low bias
		J	LCS- 1,1-dichloroethene (121)	Possible inaccuracy
	MND24-0956-2001-1	J	CCV %R- vinyl chloride (65)	Potential low bias
			dibromomethane (78)	Potential low bias
			bromoform (79)	Potential low bias
			1,2,3-trichloropropane (70)	Potential low bias
			bis(2-chloroisopropyl) ether (73)	Potential low bias
			acetone (69)	Potential low bias
			carbon disulfide (137)	None
			methylethyl ketone (67)	Potential low bias
			methylisobutyl ketone (66)	Potential low bias
		J	LCS- 1,1-dichloroethene (121)	Possible inaccuracy

CC - Correlation coefficient
CCV - Continuing calibration verification
LCS - Laboratory control sample
MB - Method blank
RPD - Relative percent difference
SR - Surrogate recovery
%R - Percent recovery

Table C.1. Summary of Volatiles Qualifications - Second Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9408L011	MND24-0935-4002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
		J	CCV- acetone (737)	Potential high bias
			carbon disulfide (309)	Potential high bias
			vinyl acetate (673)	Potential high bias
			methylethyl ketone (69)	Potential low bias
			benzene (76)	Potential low bias
			methylisobutyl ketone (61)	Potential low bias
			toluene (76)	Potential low bias
			ethyl benzene (69)	Potential low bias
			1,3-diethylbenzene (59)	Potential low bias
			1,4-diethylbenzene (67)	Potential low bias
			1,2-diethylbenzene (62)	Potential low bias
	MND24-0935-2002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
		J	CCV- acetone (737)	Potential high bias
			carbon disulfide (309)	Potential high bias
			vinyl acetate (673)	Potential high bias
			methylethyl ketone (69)	Potential low bias
			benzene (76)	Potential low bias
			methylisobutyl ketone (61)	Potential low bias
			toluene (76)	Potential low bias
			ethyl benzene (69)	Potential low bias
			1,3-diethylbenzene (59)	Potential low bias
			1,4-diethylbenzene (67)	Potential low bias
			1,2-diethylbenzene (62)	Potential low bias
	MND24-0950-0002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
		J	CCV- acetone (737)	Potential high bias
			carbon disulfide (309)	Potential high bias
			vinyl acetate (673)	Potential high bias
			methylethyl ketone (69)	Potential low bias
			benzene (76)	Potential low bias
			methylisobutyl ketone (61)	Potential low bias
			toluene (76)	Potential low bias
			ethyl benzene (69)	Potential low bias
			1,3-diethylbenzene (59)	Potential low bias
			1,4-diethylbenzene (67)	Potential low bias
			1,2-diethylbenzene (62)	Potential low bias
	MND24-0950-1002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
		J	CCV- acetone (737)	Potential high bias
			carbon disulfide (309)	Potential high bias
			vinyl acetate (673)	Potential high bias
			methylethyl ketone (69)	Potential low bias
			benzene (76)	Potential low bias
			methylisobutyl ketone (61)	Potential low bias
			toluene (76)	Potential low bias
			ethyl benzene (69)	Potential low bias
			1,3-diethylbenzene (59)	Potential low bias
			1,4-diethylbenzene (67)	Potential low bias
			1,2-diethylbenzene (62)	Potential low bias

Table C.1. Summary of Volatiles Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9408L011 (cont.)	MND24-0950-2002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
		J	CCV- acetone (737) carbon disulfide (309) vinyl acetate (673) methylethyl ketone (69) benzene (76) methylisobutyl ketone (61) toluene (76) ethyl benzene (69) 1,3-diethylbenzene (59) 1,4-diethylbenzene (67) 1,2-diethylbenzene (62)	Potential high bias Potential high bias Potential high bias Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias
	MND24-0935-0002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
		J	CCV- acetone (737) carbon disulfide (309) vinyl acetate (673) methylethyl ketone (69) benzene (76) methylisobutyl ketone (61) toluene (76) ethyl benzene (69) 1,3-diethylbenzene (59) 1,4-diethylbenzene (67) 1,2-diethylbenzene (62)	Potential high bias Potential high bias Potential high bias Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias Potential low bias
	MND24-0941-0002	J	SR-fluorobenzene (62)	Potential low bias
		J	CC <0.992 -2-chloroethylvinylether	Potential low bias
	MND24-0941-2002	J	SR-fluorobenzene (77)	Potential low bias
		J	CC <0.992 -2-chloroethylvinylether	Potential low bias
	MND25-0935-0002	U	MB- methylene chloride acetone	Raised quant. limit
	MND25-0935-1002	U	MB- methylene chloride acetone	Raised quant. limit

Table C.1. Summary of Volatiles Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9408L992	MND24-0932-0002	J	CC <0.992 -2-chloroethylvinylether	Potential low bias
		J	CCV- vinyl chloride (64)	Potential low bias
			trichlorofluoromethane (70)	
			trichlorotrifluoroethane (74)	Potential low bias
			trans-1,2-dichloroethene (76)	Potential low bias
			1,1-dichloroethane (79)	Potential low bias
			1,1,1-trichloroethane (68)	Potential low bias
			carbon tetrachloride (57)	Potential low bias
			trichloroethene (79)	Potential low bias
			bromodichloromethane (78)	Potential low bias
			2-chloroethylvinylether (37)	Potential low bias
			cis-1,3-dichloropropene (77)	Potential low bias
			trans-1,3-dichloropropene (71)	Potential low bias
			bromobenzene (129)	Potential high bias
			dibromochloromethane (78)	Potential low bias
			benzene (60)	Potential low bias
			toluene (63)	Potential low bias
			ethyl benzene (66)	Potential low bias
	MND24-0932-3002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
		J	CCV- vinyl chloride (64)	Potential low bias
			trichlorofluoromethane (70)	Potential low bias
			trichlorotrifluoroethane (74)	Potential low bias
			trans-1,2-dichloroethene (76)	Potential low bias
			1,1-dichloroethane (79)	Potential low bias
			1,1,1-trichloroethane (68)	Potential low bias
			carbon tetrachloride (57)	Potential low bias
			trichloroethene (79)	Potential low bias
			bromodichloromethane (78)	Potential low bias
			2-chloroethylvinylether (37)	Potential low bias
			cis-1,3-dichloropropene (77)	Potential low bias
			trans-1,3-dichloropropene (71)	Potential low bias
			bromobenzene (129)	Potential high bias
			dibromochloromethane (78)	Potential low bias
			benzene (70)	Potential low bias
			toluene (75)	Potential low bias
			ethyl benzene (80)	Potential low bias
			carbon disulfide (312)	Potential high bias
			methylethyl ketone (79)	Potential low bias

Table C.1. Summary of Volatiles Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9408L992 (cont.)	MND24-0932-2002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
		J	CCV- vinyl chloride (64)	Potential low bias
			trichlorofluoromethane (70)	Potential low bias
			trichlorotrifluoroethane (74)	Potential low bias
			trans-1,2-dichloroethene (76)	Potential low bias
			1,1-dichloroethane (79)	Potential low bias
			1,1,1-trichloroethane (68)	Potential low bias
			carbon tetrachloride (57)	Potential low bias
			trichloroethene (79)	Potential low bias
			bromodichloromethane (78)	Potential low bias
			2-chloroethylvinylether (37)	Potential low bias
			cis-1,3-dichloropropene (77)	Potential low bias
			trans-1,3-dichloropropene (71)	Potential low bias
			bromobenzene (129)	Potential high bias
			dibromochloromethane (78)	Potential low bias
			benzene (70)	Potential low bias
			toluene (75)	Potential low bias
			ethyl benzene (80)	Potential low bias
			carbon disulfide (312)	Potential high bias
			methylethyl ketone (79)	Potential low bias
	MND24-0947-0002	J	CC <0.992 -2-chloroethylvinylether	Possible inaccuracy
9409L049	MND24-0942-0002	J	CC <0.992 -vinyl acetate	Possible inaccuracy
	MND24-0942-2002	J	CC <0.992 -vinyl acetate	Possible inaccuracy
	MND24-0952-0002	J	CC <0.992 -vinyl acetate	Possible inaccuracy
	MND24-0938-0002	J	CC <0.992 -vinyl acetate	Possible inaccuracy
	MND24-0938-3002	U	MB- methylene chloride	Raised quant. limit
		J	CC <0.992 -vinyl acetate	Possible inaccuracy
	MND24-0938-2002	J	CC <0.992 -vinyl acetate	Possible inaccuracy
	MND24-0954-0002	J	CC <0.992 -vinyl acetate	Possible inaccuracy
	MND24-0954-2002	J	CC <0.992 -vinyl acetate	Possible inaccuracy

CC - Correlation coefficient
CCV - Continuing calibration verification
SR - Surrogate recovery
MB - Method blank

Table C.2. Summary of Semivolatiles Qualifications - First Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L452	MND24-0944-0001	J	LCS-4- nitrophenol (104)	None
		U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate TIC: methyl cyclopentanol	Raised detection limit
	MND24-0932-0001	J	LCS-4- nitrophenol (104)	None
		U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methyl cyclopentanol	Raised detection limit
	MND24-0932-4001	J	LCS-4- nitrophenol (104)	None
		U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methyl cyclopentanol	Raised detection limit
9402L459	MND24-0946-0001	J	LCS-4- nitrophenol (104)	None
		U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methyl-cyclopentanol	Raised detection limit
	MND24-0936-0001	J	LCS-4- nitrophenol (104)	None
		U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methyl cyclopentanol	Raised detection limit
	MND24-0959-0001	J	LCS-4- nitrophenol (104)	None
		U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methyl cyclopentanol	Raised detection limit
	MND24-0959-1001	J	LCS-4- nitrophenol (104)	None
		U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methyl cyclopentanol	Raised detection limit

Table C.2. Summary of Semivolatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L459 (cont.)	MND24-0931-0001	J	LCS-4- nitrophenol (104)	None
		U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methyl cyclopentanol	Raised detection limit
9402L482	MND24-0949-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methylcyclopentanol	Raised detection limit
	MND24-0960-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methylcyclopentanol	Raised detection limit
	MND24-0958-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate benzoic acid TIC: methylcyclopentanol	Raised detection limit
9402L500	MND24-0963-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
	MND24-0935-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
	MND24-0962-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
	MND25-0935-0001	J	CCC %D-pentachlorophenol (29) benzo(k)fluoranthene (-36)	Possible inaccuracy
		U	Poor mass spectral match benzo (g,h,i) perylene	Identification rejected
	MND24-0950-1001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
	MND24-0950-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
9402L508	MND24-0937-4001	U	MB- diethyl phthalate di-n-butyl phthalate bis(2-ethylhexyl) phthalate	Raised detection limit
		J	ICV %RSD-benzyl alcohol (27) benzoic acid (36)	None

Table C.2. Summary of Semivolatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L508	MND24-0943-0001	U	MB- diethyl phthalate di-n-butyl phthalate bis(2-ethylhexyl) phthalate	Raised detection limit
		J	ICV %RSD-benzyl alcohol (27) benzoic acid (36)	None
	MND24-0938-0001	U	MB- diethyl phthalate di-n-butyl phthalate bis(2-ethylhexyl) phthalate	Raised detection limit
		J	ICV %RSD-benzyl alcohol (27) benzoic acid (36)	None
	MND25-0937-1001	J	CCC %D-pentachlorophenol (29) benzo(k)fluoranthene (-36)	Possible inaccuracy
	MND25-0937-0001	J	CCC %D-pentachlorophenol (29) benzo(k)fluoranthene (-36)	Possible inaccuracy
9402L529	MND24-0945-0001	U	MB- diethyl phthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
		J	ICV %RSD-benzoic acid (28)	None
	MND24-0952-0001	U	MB- diethyl phthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
		J	ICV %RSD-benzoic acid (28)	None
	MND24-0948-0001	U	MB- diethyl phthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
		J	ICV %RSD-benzoic acid (28)	None
9402L536	MND24-0951-0001	J	Initial Cal.-benzoic acid (28)	None
	MND24-0933-0001	J	Initial Cal.-benzoic acid (28)	None
	MND24-0947-0001	J	Initial Cal.-benzoic acid (28)	None
	MND25-0951-0001	J	Initial Cal.-benzoic acid (28) 2,4-dinitrophenol (21)	None
		J	CCV %R-penta chlorophenol (29) benzo(k)fluoranthene (-36)	None
9402L544	MND24-0955-0001	J	Initial Cal.-benzoic acid (28)	None
	MND24-0964-0001	J	Initial Cal.-benzoic acid (28)	None
9402L562	MND24-0953-0001	J	Initial Cal.-benzoic acid (28)	None
	MND24-0953-4001	J	Initial Cal.-benzoic acid (28)	None
	MND24-0961-1001	J	Initial Cal.-benzoic acid (28)	None
	MND24-0961-0001	J	Initial Cal.-benzoic acid (28)	None

Table C.2. Summary of Semivolatiles Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L567	MND24-0967-0001	U	MB- di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
	MND24-0966-0001	U	MB- di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
	MND24-0965-0001	U	MB- di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
9402L663	MND24-0941-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
	MND24-0942-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit
	MND24-0956-0001	U	MB- diethylphthalate di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised detection limit

CCC - Continuing calibration check
CCV - Continuing calibration verification
ICV - Initial calibration verification
LCS - Laboratory control sample
MB - Method blank
MSR - Matrix spike recovery
SR - Surrogate recovery
%D - Percent difference
%R - Percent recovery
%RSD - Percent relative standard deviation

Table C.2. Summary of Semivolatiles Qualifications - Second Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
9408L011	MND24-0935-4002	U	MB-	diethylphthalate di-n-butyl phthalate bis(2-ethylhexyl) phthalate benzoic acid	Raised quant. limit
	MND25-0935-0002	U	MB-	di-n-butyl phthalate	Raised quant. limit
	MND25-0935-1002	U	MB-	di-n-butyl phthalate	Raised quant. limit
	MND24-0950-0002	U	MB-	diethylphthalate di-n-butyl phthalate bis(2-ethylhexyl) phthalate benzoic acid	Raised quant. limit
	MND24-0950-1002	U	MB-	diethylphthalate di-n-butyl phthalate bis(2-ethylhexyl) phthalate benzoic acid	Raised quant. limit
		J	CCV-	pentachlorophenol (26) benzoic acid (34)	Potential low bias
	MND24-0935-0002	U	MB-	diethylphthalate di-n-butyl phthalate bis(2-ethylhexyl) phthalate benzoic acid	Raised quant. limit
		J	CCV-	pentachlorophenol (26) benzoic acid (34)	Potential low bias
	MND24-0941-0002	U	MB-	diethylphthalate di-n-butyl phthalate bis(2-ethylhexyl) phthalate benzoic acid	Raised quant. limit
		J	CCV-	pentachlorophenol (26) benzoic acid (34)	Potential low bias
9408L992	MND24-0932-0002	U	MB-	bis(2-ethylhexyl) phthalate	Raised quant. limit
	MND24-0947-0002	U	MB-	bis(2-ethylhexyl) phthalate	Raised quant. limit
9409L049	MND24-0942-0002	J	MSR-	4-nitrophenol (114)	Potential high bias
		U	MD-	di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised quant. limit
	MND24-0952-0002	J	MSR-	4-nitrophenol (114)	Potential high bias
		U	MD-	di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised quant. limit
	MND24-0938-0002	J	MSR-	4-nitrophenol (114)	Potential high bias
		U	MD-	di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised quant. limit
	MND24-0954-0002	J	MSR-	4-nitrophenol (114)	Potential high bias
		U	MD-	di-n-butylphthalate bis(2-ethylhexyl) phthalate	Raised quant. limit

Table C.2. Summary of Semivolatiles Qualifications - Second Sampling Event

CCC - Continuing calibration check
CCV - Continuing calibration verification
ICV - Initial calibration verification
LCS - Laboratory control sample
MB - Method blank
MSR - Matrix spike recovery
SR - Surrogate recovery
%D - Percent difference
%R - Percent recovery
%RSD - Percent relative standard deviation

Table C.3. Summary of Pesticides/PCB Qualifications - First Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L452	MND24-0932-0001	J	SR-TCMX (35), DCB (35)	Potential low bias
	MND24-0932-4001	J	SR-TCMX (45), DCB (30)	Potential low bias
9402L459	MND24-0936-0001	J	SR-TCMX (40), DCB (45)	Potential low bias
	MND24-0959-1001	J	SR-TCMX (40), DCB (45)	Potential low bias
	MND24-0931-0001	R	SR-TCMX (5), DCB (0)	Rejected
	MND24-0931-0001R	J	HT-37 days extraction	Potential low bias
9402L482	MND24-0960-0001	J	SR-TCMX (40), DCB (50)	Potential low bias
	MND24-0958-0001	J	SR-TCMX (50), TCMX2 (20)	Potential low bias
9402L500	MND24-0963-0001	J	SR-TCMX (50), TCMX2 (20)	Potential low bias
	MND24-0935-0001	J	SR-TCMX (45), DCB (35) heptachlor epoxide	Assessed inconclusive
		J	%D-heptachlor epoxide (110) alpha chlordane (100) gamma chlordane (130)	Possible inaccuracy
	MND24-0962-0001	J	SR-TCMX (45), DCB (20)	Potential low bias
	MND25-0935-0001	J	MB-lindane in sample above action level	Potential false positive
	MND24-0950-1001	J	SR-TCMX (25), DCB (50)	Potential low bias
	MND24-0950-0001	J	SR-TCMX (55), DCB (55)	Potential low bias
9402L508	MND24-0937-4001	J	SR-TCMX (45), DCB (20)	Potential low bias
	MND24-0938-0001	J	SR-TCMX (40), DCB (30)	Potential low bias
	MND25-0937-1001	U	MB-lindane	Raised detection limit
		J	%D-alpha chlordane (150)	Possible inaccuracy
9402L529	MND24-0945-0001	J	SR-TCMX (45), TCMX2 (45)	Potential low bias
	MND24-0952-0001	J	SR-TCMX (55), TCMX2 (55)	Potential low bias
9402L536	MND24-0951-0001	J	SR-TCMX (30), TCMX2 (30)	Potential low bias
		J	endrin breakdown (22)	None
	MND24-0933-0001	J	endrin breakdown (22)	None
		J	%D-gamma BHC (Lindane) (110)	Possible inaccuracy
	MND24-0947-0001	J	endrin breakdown (22)	None
	MND25-0951-0001	U	MB-gamma BHC (Lindane)	Raised detection limit
		J	endrin breakdown (22)	None
	MND24-0954-0001	J	endrin breakdown (22)	None

Table C.3. Summary of Pesticides/PCB Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L536 (cont.)	MND24-0954-1001	J	endrin breakdown (22)	None
9402L544	MND24-0955-0001	U	lindane contamination during extraction	Detection rejected
	MND24-0964-0001	J	SR-TCMX (5), TCMX2 (5)	Potential low bias
9402L562	MND24-0953-0001	J	SR-TCMX (40), DCB (55)	Potential low bias
	MND24-0953-4001	J	SR-TCMX (50), DCB (55)	Potential low bias

HT - Holding time MB - Method blank
SR - Surrogate recovery %D - Percent difference

Table C.3. Summary of Pesticides/PCB Qualifications - Second Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9408L011	MND24-0935-4002	J	SR-DCB (45), DCB2(45) heptachlor epoxide	Potential low bias
	MND25-0935-0002	R	%D-beta BHC (1000)	unusable
		U	MB-arochlor-1242	Raised quant. limit
	MND25-0935-1002	R	%D-beta BHC (1000) heptachlor epoxide (59)	unusable
		U	MB-arochlor-1242	Raised quant. limit
	MND24-0950-0002	J	SR-TCMX (25), DCB (55)	Potential low bias
	MND24-0950-1002	J	SR-TCMX (50), TCMX2 (50)	Potential low bias
	MND24-0935-0002	J	SR-TCMX (50), DCB (40)	Potential low bias
	MND24-0941-0002	J	SR-TCMX (30), TCMX2 (30)	Potential low bias
9408L992	MND24-0932-0002	J	SR-TCMX (48), DCB (40)	Potential low bias
	MND24-0947-0002	J	SR-TCMX (52), TCMX2 (55)	Potential low bias
9409L049	MND24-0942-0002	J	SR-TCMX (55), TCMX2 (55)	Potential low bias
	MND24-0952-0002	J	SR-TCMX (45), TCMX2 (45)	Potential low bias
	MND24-0954-0002	J	SR-TCMX (45), TCMX2 (50)	Potential low bias

DCB - Dichlorobenzene
MB - Method blank
%D - Percent difference
SR - Surrogate recovery

Table C.4. Summary of Metals Qualifications - First Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L452	MND24-0932-0001	Hg = J	Hold time (1)	Possible inaccuracy
		As = J	MSR = 65.8	Potential low bias
		Cd = J	MSR = 178	Potential high bias
			LD = 200% RPD	Possible inaccuracy
			PDSR	Possible inaccuracy
		Pb = J	MSR = -203.5	Possible inaccuracy
		Sb = J	MSR = 123.6	Potential high bias
		Se = J	MSR = 60.0	Potential low bias
		Tl = R	MSR = 0.0	Unusable
	MND24-0932-4001	Hg = J	Hold time (1)	Possible inaccuracy
		As = J	MSR = 65.8	Potential low bias
		Cd = J	MSR = 178	Potential high bias
			LD = 200% RPD	Possible inaccuracy
		Pb = J	MSR = -203.5	Possible inaccuracy
		Sb = J	MSR = 123.6	Potential high bias
		Se = J	MSR = 60.0	Potential low bias
		Tl = R	MSR = 0.0	Unusable
	MND24-0944-0001	Hg = J	Hold time (1)	Possible inaccuracy
		As = J	MSR = 65.8	Potential low bias
		Cd = J	MSR = 178	Potential high bias
			LD = 200% RPD	Possible inaccuracy
		Pb = J	MSR = -203.5	Possible inaccuracy
		Sb = J	MSR = 123.6	Potential high bias
		Se = J	MSR = 60.0	Potential low bias
		Tl = R	MSR = 0.0	Unusable
9402L459	MND24-0931-0001	Ag = J	MSR = 83	None
		As = J	MSR = 79	Potential low bias
		Ca = J	SD = 23%D	Possible inaccuracy
		Fe = J	SD = 25%D	Possible inaccuracy
		Pb = J	PDSRR	Possible inaccuracy
			MSR = 11	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L459 (cont.)	MND24-0931-0001 (cont.)	Sb =J	PDSRR	Possible inaccuracy
		Se =J	MSR = 82	None
		Tl =J	MSR = 36	Possible low bias
			PDSRR	Possible inaccuracy
		Zn = J	SD = 22%D	Possible inaccuracy
	MND24-0936-0001	Ag =J	MSR = 83	None
		As =J	MSR = 79	Potential low bias
		Ca =J	SD = 23%D	Possible inaccuracy
		Fe =J	SD = 25%D	Possible inaccuracy
		Pb =J	PDSRR	Possible inaccuracy
		Sb =J	PDSRR	Possible inaccuracy
		Se =J	MSR = 82	None
		Tl =J	MSR = 36	Possible low bias
			PDSRR	Possible inaccuracy
		Zn = J	SD = 22%D	Possible inaccuracy
	MND24-0946-0001	Ag =J	MSR = 83	None
		As =J	MSR = 79	Potential low bias
		Ca =J	SD = 23%D	Possible inaccuracy
		Fe =J	SD = 25%D	Possible inaccuracy
		Pb =J	PDSRR	Possible inaccuracy
		Se =J	MSR = 82	None
		Tl =J	MSR = 36	Possible low bias
			PDSRR	Possible inaccuracy
		Zn = J	SD = 22%D	Possible inaccuracy
	MND24-0959-0001	Ag =J	MSR = 83	None
		As =J	MSR = 79	Potential low bias
		Ca =J	SD = 23%D	Possible inaccuracy
		Fe =J	SD = 25%D	Possible inaccuracy
		Pb = J	MSR = 11	Assessed inconclusive
			LD = 47% RPD	Assessed inconclusive
		Se =J	MSR = 82	None

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L459 (cont.)	MND24-0959-0001	Tl = J	MSR = 36	Possible low bias
			PDSRR	Possible inaccuracy
		Zn = J	SD = 22%D	Possible inaccuracy
	MND24-0959-1001	Ag = J	MSR = 83	None
		As = J	MSR = 79	Potential low bias
		Ca = J	SE - 23%D	Possible inaccuracy
		Fe = J	SD = 25%D	Possible inaccuracy
		Pb = J	MSR = 11	Potential low bias
			LD = 47% RPD	Possible inaccuracy
		Se = J	MSR = 82	None
		Tl = J	MSR = 36	Possible low bias
			PDSRR	Possible inaccuracy
		Zn = J	SD = 22%D	Possible inaccuracy
9402L482	MND24-0949-0001	Ba = J	SD = 13%D	Possible inaccuracy
		Ca = J	SD = 18%D	Possible inaccuracy
		Cd = J	MSR = 84	None
		Fe = J	SD = 17	Possible inaccuracy
		Mg = J	SD = 15	Possible inaccuracy
		Na = J	SD = 12	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
			MSR = 122	None
		Zn = J	SD = 24	Possible inaccuracy
9402L482	MND24-0958-0001	Ba = J	SD = 13%D	Possible inaccuracy
		Ca = J	SD = 18%D	Possible inaccuracy
		Cd = J	MSR = 84	None
		Fe = J	SD = 17	Possible inaccuracy
		Mg = J	SD = 15	Possible inaccuracy
		Na = J	SD = 12	Possible inaccuracy
		Sb = J	MSR = 122	None
		Zn = J	SD = 24	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L482 (cont.)	MND24-0960-0001	Ba = J	SD = 13%D	Possible inaccuracy
		Ca =J	SD = 18%D	Possible inaccuracy
		Cd =J	MSR = 84	None
		Fe =J	SD = 17	Possible inaccuracy
		Mg =J	SD = 15	Possible inaccuracy
		Na =J	SD = 12	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
			MSR = 122	None
		Tl = J	PDSR	Possible inaccuracy
		Zn = J	SD = 24	Possible inaccuracy
9402L500	MND24-0935-0001	As = J	MSR = 79	Potential low bias
			PDSR	Possible inaccuracy
		Ca = J	SD = 13	Possible inaccuracy
		Mg = J	SD = 11	Possible inaccuracy
		Pb = J	PDSR	Possible inaccuracy
		Sb = J	MSR = 124	None
		Sn = J	MSR = 117	None
		Tl = J	MSR = 85	Potential low bias
			PDSR	Possible inaccuracy
		Zn = J	SD = 15	Possible inaccuracy
	MND24-0950-0001	As = J	MSR = 79	Potential low bias
			PDSR	Possible inaccuracy
		Ca = J	SD = 13	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Mg = J	SD = 11	Possible inaccuracy
		Sb = J	MSR = 124	None
			PDSR	Possible inaccuracy
		Sn = J	MSR = 117	None
		Tl = J	MSR = 84	Potential low bias
		Zn = J	SD = 15	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L500 (cont.)	MND24-0950-1001	As = J	MSR = 79	Potential low bias
			PDSR	Possible inaccuracy
		Ca = J	SD = 13	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Mg = J	SD = 11	Possible inaccuracy
		Pb = J	PDSR	Possible inaccuracy
		Sb = J	MSR = 124	None
		Sn = J	MSR = 117	None
		Tl = J	MSR = 84	Potential low bias
		Zn = J	SD = 15	Possible inaccuracy
	MND24-0962-0001	As = J	MSR = 79	Potential low bias
			PDSR	Possible inaccuracy
		Ca = J	SD = 13	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Mg = J	SD = 11	Possible inaccuracy
		Pb = J	PDSR	Possible inaccuracy
		Sb = J	MSR = 124	None
			PDSR	Possible inaccuracy
		Sn = J	MSR = 117	None
		Tl = J	MSR = 84	Potential low bias
		Zn = J	SD = 15	Possible inaccuracy
	MND24-0963-0001	As = J	MSR = 79	Potential low bias
			PDSR	Possible inaccuracy
		Ca = J	SD = 13	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Mg = J	SD = 11	Possible inaccuracy
		Sb = J	MSR = 124	None
		Sn = J	MSR = 117	None
		Tl = J	MSR = 84	Potential low bias
			PDSR	Possible inaccuracy
		Zn = J	SD = 15	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L500 (cont.)	MND25-0935-0002	Al = J	SD = 14	Possible inaccuracy
		As = J	MSR = 13	Potential low bias
		Ca = J	LS = 28% RPD	Possible inaccuracy
		Cd = J	LS = 65% RPD	Possible inaccuracy
		Cu = J	MSR = 151	Potential high bias
		Fe = J	SD = 10	Possible inaccuracy
		Hg = J	MSR = 31	Potential low bias
		Mg = J	LD = 35% RPD	Possible inaccuracy
		Se = J	MSR = 38	Potential low bias
		Tl = J	MSR = 32	Potential low bias
			PDSR	Possible inaccuracy
		Zn = J	SD = 12	Possible inaccuracy
9402L508	MND24-0937-4001	Ag = J	MSR = 80	Potential low bias
		Al = J	MSR = 77	Potential low bias
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 85	Potential low bias
		Cr = J	MSR = 85	Potential low bias
		Cu = J	MSR = 77	Potential low bias
		Fe = J	MSR = 83	Potential low bias
		K = J	MSR = 77	Potential low bias
		Li = J	MSR = 75	Potential low bias
		Mn = J	MSR = 85	Potential low bias
		Mo = J	MSR = 72	Potential low bias
		Pb = J	MSR = 83	Potential low bias
		Sb = J	MSR = 65	Potential low bias
		Sn = J	MSR = 77	Potential low bias
		Tl = J	MSR = 37	Potential low bias
		V = J	MSR = 84	Potential low bias
		Zn = J	MSR = 66	Potential low bias

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L508 (cont.)	MND24-0938-0001	Ag = J	MSR = 80	Potential low bias
		Al = J	MSR = 77	Potential low bias
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 85	Potential low bias
		Cr = J	MSR = 85	Potential low bias
		Cu = J	MSR = 77	Potential low bias
		Fe = J	MSR = 83	Potential low bias
		K = J	MSR = 77	Potential low bias
		Li = J	MSR = 75	Potential low bias
		Mn = J	MSR = 85	Potential low bias
		Mo = J	MSR = 72	Potential low bias
		Pb = J	MSR = 83	Potential low bias
			PDSR	Possible inaccuracy
		Sb = J	MSR = 65	Potential low bias
		Sn - J	MSR = 77	Potential low bias
		Tl = J	MSR = 37	Potential low bias
		V = J	MSR = 84	Potential low bias
		Zn = J	MSR = 66	Potential low bias
	MND24-0943-0001	Ag = J	MSR = 80	Potential low bias
		Al = J	MSR = 77	Potential low bias
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 85	Potential low bias
		Cr = J	MSR = 85	Potential low bias
		Cu = J	MSR = 77	Potential low bias
		Fe = J	MSR = 83	Potential low bias
		K = J	MSR = 77	Potential low bias
		Li = J	MSR = 75	Potential low bias
		Mn = J	MSR = 85	Potential low bias
		Mo = J	MSR = 72	Potential low bias
		Pb = J	MSR = 83	Potential low bias
			PDSR	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L508 (cont.)	MND24-0943-0001 (cont.)	Sb = J	MSR = 65	Potential low bias
		Sn - J	MSR = 77	Potential low bias
		Tl = J	MSR = 37	Potential low bias
		V = J	MSR = 84	Potential low bias
		Zn = J	MSR = 66	Potential low bias
	MND25-0937-0001	As = J	MSR = 72	Potential low bias
		Cd = J	MSR = 50	Potential low bias
		Hg = J	MSR = 61	Potential low bias
		Pb = J	SD = 13 %D	Possible inaccuracy
			LD = 23% RPD	Possible inaccuracy
		Sb = J	MSR = 72	Potential low bias
		Se = J	MSR = 32	Potential low bias
		Tl = J	MSR = 73	Potential low bias
	MND25-0937-1001	As = J	MSR = 72	Potential low bias
		Cd = J	MSR = 50	Potential low bias
		Hg = J	MSR = 61	Potential low bias
		Pb = J	SD = 13 %D	Possible inaccuracy
			LD = 23% RPD	Possible inaccuracy
		Sb = J	MSR = 72	Potential low bias
		Se = J	MSR = 32	Potential low bias
		Tl = J	MSR = 73	Potential low bias
9402L529	MND24-0945-0001	Ag = J	MSR = 76	Potential low bias
		As = J	MSR = 117	None
			LD = 200% RPD	Possible inaccuracy
		Be = J	MSR = 84	Potential low bias
		Ca = J	SD = 10.1	Possible inaccuracy
		Cd = J	MSR = 68	Potential low bias
			PDSR	Possible inaccuracy
		Co = J	MSR = 82	Potential low bias
		Cr = J	MSR = 83	Potential low bias
		Cu = J	MSR = 84	Potential low bias

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L529 (cont.)	MND24-0945-0001 (cont.)	Fe = J	MSR = 5	Potential low bias
			SD = 11.4	Possible inaccuracy
			LD = 20% RPD	Possible inaccuracy
		Mn = J	MSR = 79	Potential low bias
		Mo = J	MSR = 83	Potential low bias
		Ni = J	MSR = 83	Potential low bias
		Pb = J	LD = 200% RPD	Possible inaccuracy
		Sb = J	MSR = 70	Potential low bias
		Se = J	MSR = 84	Potential low bias
		Sn = J	MSR = 84	Potential low bias
		Tl = J	PDSR	Possible inaccuracy
		V = J	MSR = 84	Potential low bias
		Zn = J	MSR = 80	Potential low bias
			SD = 16.3	Possible inaccuracy
	MND24-0948-0001	Ag = J	MSR = 76	Potential low bias
		As = J	MSR = 117	None
			LD = 200% RPD	Possible inaccuracy
		Be = J	MSR = 84	Potential low bias
		Ca = J	SD = 10.1	Possible inaccuracy
		Cd = J	MSR = 68	Potential low bias
			PDSR	Possible inaccuracy
		Co = J	MSR = 82	Potential low bias
		Cr = J	MSR = 83	Potential low bias
		Cu = J	MSR = 84	Potential low bias
		Fe = J	MSR = 5	Potential low bias
			SD = 11.4	Possible inaccuracy
			LD = 20% RPD	Possible inaccuracy
		Mn = J	MSR = 79	Potential low bias
		Mo = J	MSR = 83	Potential low bias
		Ni = J	MSR = 83	Potential low bias
		Pb = J	LD = 200% RPD	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L529 (cont.)	MND24-0948-0001 (cont.)	Sb = J	MSR = 70	Potential low bias
		Se = J	MSR = 84	Potential low bias
		Sn = J	MSR = 84	Potential low bias
		Tl = J	PDSR	Possible inaccuracy
		V = J	MSR = 84	Potential low bias
		Zn = J	MSR = 80	Potential low bias
			SD = 16.3	Possible inaccuracy
	MND24-0952-0001	Ag = J	MSR = 76	Potential low bias
		As = J	MSR = 117	None
			LD = 200% RPD	Possible inaccuracy
		Be = J	MSR = 84	Potential low bias
		Ca = J	SD = 10.1	Possible inaccuracy
		Cd = J	MSR = 68	Potential low bias
			PDSR	Possible inaccuracy
		Co = J	MSR = 82	Potential low bias
		Cr = J	MSR = 83	Potential low bias
		Cu = J	MSR = 84	Potential low bias
		Fe = J	MSR = 5	Potential low bias
			SD = 11.4	Possible inaccuracy
			LD = 20% RPD	Possible inaccuracy
		Mn = J	MSR = 79	Potential low bias
		Mo = J	MSR = 83	Potential low bias
		Ni = J	MSR = 83	Potential low bias
		Pb = J	LD = 200% RPD	Possible inaccuracy
		Sb = J	MSR = 70	Potential low bias
		Se = J	MSR = 84	Potential low bias
		Sn = J	MSR = 84	Potential low bias
		V = J	MSR = 84	Potential low bias
		Zn = J	MSR = 80	Potential low bias
			SD = 16.3	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L536	MND24-0933-0001	Ag = J	MSR = 69	Potential low bias
		Ba = J	MSR = 83	Potential low bias
		Be = J	MSR = 80	Potential low bias
		Cd = J	MSR = 58	Potential low bias
		Co = J	MSR = 77	Potential low bias
		Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 80	Potential low bias
		Fe = J	MSR = 81	Potential low bias
		Mn = J	MSR = 78	Potential low bias
		Mo = J	MSR = 79	Potential low bias
		Ni= J	MSR = 76	Potential low bias
		Pb = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 83	Potential low bias
		V = J	MSR = 81	Potential low bias
		Zn = J	MSR = 77	Potential low bias
	MND24-0947-0001	Ag = J	MSR = 69	Potential low bias
		Ba = J	MSR = 83	Potential low bias
		Be = J	MSR = 80	Potential low bias
		Cd = J	MSR = 58	Potential low bias
			PDSR	Possible inaccuracy
		Co = J	MSR = 77	Potential low bias
		Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 80	Potential low bias
		Fe = J	MSR = 81	Potential low bias
		Mn = J	MSR = 78	Potential low bias
		Mo = J	MSR = 79	Potential low bias
		Ni= J	MSR = 76	Potential low bias
		Sb = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 83	Potential low bias

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L536 (cont.)	MND24-0947-0001 (cont.)	V = J	MSR = 81	Potential low bias
		Zn = J	MSR = 77	Potential low bias
	MND24-0951-0001	Ag = J	MSR = 69	Potential low bias
		Ba = J	MSR = 83	Potential low bias
		Be = J	MSR = 80	Potential low bias
		Cd = J	MSR = 58	Potential low bias
			PDSR	Possible inaccuracy
		Co = J	MSR = 77	Potential low bias
		Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 80	Potential low bias
		Fe = J	MSR = 81	Potential low bias
		Mn = J	MSR = 78	Potential low bias
		Mo = J	MSR = 79	Potential low bias
		Ni = J	MSR = 76	Potential low bias
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 83	Potential low bias
			PDSR	Possible inaccuracy
		V = J	MSR = 81	Potential low bias
		Zn = J	MSR = 77	Potential low bias
	MND25-0951-0001	Al = J	LD = 17% RPD	Possible inaccuracy
		As = J	MSR = 24	Potential low bias
			LD = 29% RPD	Possible inaccuracy
		Ba = J	SD = 11	Possible inaccuracy
		Ca = J	SD = 12	Possible inaccuracy
			LD - 21% RPD	Possible inaccuracy
		Cd = J	LD = 24% RPD	Possible inaccuracy
		Cr = J	LD = 16% RPD	Possible inaccuracy
		Fe = J	SD = 13	Possible inaccuracy
			FD = 79%	Possible inaccuracy
		Mg = J	SD = 11	Possible inaccuracy
			LD = 30% RPD	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L536 (cont.)	MND25-0951-0001 (cont.)	Mn = J	SD = 13	Possible inaccuracy
			LD = 30% RPD	Possible inaccuracy
		Pb = J	LD = 11% PRD	Possible inaccuracy
		Sb = J	MSA CC <0.995	Possible inaccuracy
		Se = J	MSR = 13	Potential low bias
			LD = 25% RPD	Possible inaccuracy
		Tl = J	MSR = 37	Potential low bias
		Zn = J	SD = 12	Possible inaccuracy
			FD = 25% RPD	Possible inaccuracy
	MND24-0954-0001	Ag = J	MSR = 69	Potential low bias
		Ba = J	MSR = 83	Potential low bias
		Be = J	MSR = 80	Potential low bias
		Cd = J	MSR = 58	Potential low bias
		Co = J	MSR = 77	Potential low bias
		Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 80	Potential low bias
		Fe = J	MSR = 81	Potential low bias
		Mn = J	MSR = 78	Potential low bias
		Mo = J	MSR = 79	Potential low bias
		Ni= J	MSR = 76	Potential low bias
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 83	Potential low bias
		V = J	MSR = 81	Potential low bias
		Zn = J	MSR = 77	Potential low bias
	MND24-0954-1001	Ag = J	MSR = 69	Potential low bias
		Ba = J	MSR = 83	Potential low bias
		Be = J	MSR = 80	Potential low bias
		Cd = J	MSR = 58	Potential low bias
		Co = J	MSR = 77	Potential low bias
		Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 80	Potential low bias

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L536 (cont.)	MND24-0954-1001 (cont.)	Fe = J	MSR = 81	Potential low bias
		Mn = J	MSR = 78	Potential low bias
		Mo = J	MSR = 79	Potential low bias
		Ni = J	MSR = 76	Potential low bias
		Pb = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 83	Potential low bias
		V = J	MSR = 81	Potential low bias
		Zn = J	MSR = 77	Potential low bias
9402L544	MND24-0955-0001	Ag = J	MSR = 70	Potential low bias
		As = J	MSR = 75	Potential low bias
		Be = J	MSR = 85	Potential low bias
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 84	Potential low bias
		Mn = J	MSR = 75	Potential low bias
		Mo = J	MSR = 77	Potential low bias
		Ni = J	MSR = 83	Potential low bias
		Pb = J	PDSR	Possible inaccuracy
			MSR = 46	Potential low bias
		Sb = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 81	Potential low bias
		Tl = J	PDSR	Possible inaccuracy
		Zn = J	MSR = 83	Potential low bias
	MND24-0964-0001	Ag = J	MSR = 70	Potential low bias
		As - J	MSR = 75	Potential low bias
			PDSR	Possible inaccuracy
		Be = J	MSR = 85	Potential low bias
		Co = J	MSR = 84	Potential low bias
		Mn = J	MSR = 75	Potential low bias
		Mo = J	MSR = 77	Potential low bias
		Ni = J	MSR = 83	Potential low bias

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L544 (cont.)	MND24-0964-0001 (cont.)	Pb = J	MSR = 46	Potential low bias
		Sb = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 81	Potential low bias
		Zn = J	MSR = 83	Potential low bias
9402L562	MND24-0953-0001	Al = J	MSR = 130	Potential high bias
		As = J	MSR = 61	Potential low bias
			LD = 15% RPD	Possible inaccuracy
		Cn = J	MSR = 76	Potential low bias
		K = J	MSR = 72	Potential low bias
			LD = 8% RPD	Possible inaccuracy
		Na = J	SD = 12% RPD	Possible inaccuracy
		Ni = J	MSR = 85	Potential low bias
		Pb = J	LD = 15% RPD	Possible inaccuracy
		Se = J	MSR = 72	Potential low bias
		Tl = J	MSR = 23	Potential low bias
	MND24-0953-4001	Al = J	MSR = 130	Potential high bias
		As = J	MSR = 61	Potential low bias
			LD = 15% RPD	Possible inaccuracy
		Cn = J	MSR = 76	Potential low bias
		K = J	MSR = 72	Potential low bias
		Na = J	SD = 12% RPD	Possible inaccuracy
		Ni = J	MSR = 85	Potential low bias
		Pb = J	LD = 15% RPD	Possible inaccuracy
		Se = J	MSR = 72	Potential low bias
		Tl = J	MSR = 23	Potential low bias
	MND24-0961-0001	Al = J	MSR = 130	Potential high bias
		As = J	MSR = 61	Potential low bias
			LD = 15% RPD	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Cn = J	MSR = 76	Potential low bias
		K = J	MSR = 72	Potential low bias

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L562 (cont.)	MND24-0961-0001 (cont.)	Na = J	SD = 12% RPD	Possible inaccuracy
		Ni = J	MSR = 85	Potential low bias
		Pb = J	LD = 15% RPD	Possible inaccuracy
			PDSR	Possible inaccuracy
		Se = J	MSR = 72	Potential low bias
			PDSR	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
		Tl = J	MSR = 23	Possible inaccuracy
			PDSR	Possible inaccuracy
	MND24-0961-1001	Al = J	MSR = 130	Potential high bias
		As = J	MSR = 61	Potential low bias
			LD = 15% RPD	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Cn = J	MSR = 76	Potential low bias
		K = J	MSR = 72	Potential low bias
		Na = J	SD = 12% RPD	Possible inaccuracy
		Ni = J	MSR = 85	Potential low bias
		Pb = J	LD = 15% RPD	Possible inaccuracy
			PDSR	Possible inaccuracy
		Se = J	MSR = 72	Potential low bias
		Tl = J	MSR = 23	Possible inaccuracy
			PDSR	Possible inaccuracy
9402L567	MND24-0965-0001	Ag = J	MSR = 84	Potential low bias
		Al = J	LD = 44	Possible inaccuracy
		Ca = J	LD = 16	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Fe = J	LD = 13	Possible inaccuracy
		Mg = J	LD = 16	Possible inaccuracy
		Mo = J	MSR = 82	Potential low bias
		Na = J	SD = 13% RPD	Possible inaccuracy
			LD = 18	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L567 (cont.)	MND24-0965-0001 (cont.)	Sb = J	PDSR	Possible inaccuracy
		Se = J	PDSR	Possible inaccuracy
		Tl = J	MSR = 71	Potential low bias
		Zn = J	LD = 11	Possible inaccuracy
	MND24-0966-0001	Ag = J	MSR = 84	Potential low bias
		Al = J	LD = 44	Possible inaccuracy
		Ca = J	LD = 16	Possible inaccuracy
		Fe = J	LD = 13	Possible inaccuracy
		Mg = J	LD = 16	Possible inaccuracy
		Mo = J	MSR = 82	Potential low bias
		Na = J	SD = 13% RPD	Possible inaccuracy
			LD = 18	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
		Tl = J	MSR = 71	Potential low bias
			PDSR	Possible inaccuracy
		Zn = J	LD = 11	Possible inaccuracy
	MND24-0967-0001	Ag = J	MSR = 84	Potential low bias
		Al = J	LD = 44	Possible inaccuracy
		Ca = J	LD = 16	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Fe = J	LD = 13	Possible inaccuracy
		Mg = J	LD = 16	Possible inaccuracy
		Mo = J	MSR = 82	Potential low bias
		Na = J	SD = 13% RPD	Possible inaccuracy
			LD = 18	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
		Se = J	PDSR	Possible inaccuracy
		Tl = J	MSR = 71	Potential low bias
			PDSR	Possible inaccuracy
		Zn = J	LD = 11	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L663	MND24-0941-0001	As = J	MSR = 83	Potential low bias
		Ba = J	SD = 14	Possible innaccuracy
		Ca = J	SD = 10	Possible inaccuracy
		Fe = J	SD = 11	Possible inaccuracy
		K = J	MSR = 72	Potential low bias
		Mg = J	SD = 11	Possible inaccuracy
		Mn = J	SD = 10	Possible innaccuracy
		Na = J	SD = 15	Possible inaccuracy
		Sb = J	MSR = 117	None
			PDSR	Possible inaccuracy
		Tl = J	MSR = 28	Potential low bias
			PDSR	Possible inaccuracy
		Zn = J	MSR = 81	Potential low bias
	MND24-0942-0001	As = J	MSR = 83	Potential low bias
		Ba = J	SD = 14	Possible innaccuracy
		Ca = J	SD = 10	Possible inaccuracy
		Fe = J	SD = 11	Possible innaccuracy
		K = J	MSR = 72	Potential low bias
		Mg = J	SD = 11	Possible inaccuracy
		Mn = J	SD = 10	Possible innaccuracy
		Na = J	SD = 15	Possible inaccuracy
		Sb = J	MSR = 117	None
		Tl = J	MSR = 28	Potential low bias
			PDSR	Possible inaccuracy
		Zn = L	MSR = 81	Potential low bias
	MND24-0956-0001	As = J	MSR = 83	Potential low bias
		Ba = J	SD = 14	Possible inaccuracy
		Ca = J	SD = 10	Possible inaccuracy
		Fe = J	SD = 11	Possible inaccuracy
		K = J	MSR = 72	Potential low bias
		Mg = J	SD = 11	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L663 (cont.)	MND24-0956-0001 (cont.)	Mn = J	SD = 10	Possible inaccuracy
		Na = J	SD = 15	Possible inaccuracy
		Sb = J	MSR = 117	None
		Tl = J	MSR = 28	Potential low bias
			PDSR	Possible inaccuracy
		Zn = L	MSR = 81	Potential low bias

EB - Equipment blank
LD - Laboratory duplicate
MSR - Matrix spike recovery
PDSR- Past digestion spike recovery
RPD - Relative percent difference
SD - Serial dilution
%D - Percent difference

Table C.4. Summary of Metals Qualifications - Second Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
948L011	MND24-0935-0002	Ag = J	MSR = 84	Potential low bias
		Co = J	MSR = 84	Potential low bias
		Mn = J	MSR = 84	Potential low bias
		Pb = J	MSR = 79	Potential low bias
			LD = 18	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 83	Potential low bias
		Zn = J	MSR = 79	Potential low bias
	MND24-0935-4002	Ag = J	MSR = 84	Potential low bias
		Co = J	MSR = 84	Potential low bias
		Mn = J	MSR = 84	Potential low bias
		Pb = J	MSR = 79	Potential low bias
			LD = 18	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 83	Potential low bias
		Zn = J	MSR = 79	Potential low bias
	MND24-0941-0002	Ag = J	MSR = 84	Potential low bias
		Co = J	MSR = 84	Potential low bias
		Mn = J	MSR = 84	Potential low bias
		Pb = J	MSR = 79	Potential low bias
			LD = 18	Possible inaccuracy
			PDSR	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 83	Potential low bias
		Tl = J	PDSR	Possible inaccuracy
		Zn = J	MSR = 79	Potential low bias
	MND24-0950-0002	Ag = J	MSR = 84	Potential low bias
		Co = J	MSR = 84	Potential low bias
		Mn = J	MSR = 84	Potential low bias
		Pb = J	MSR = 79	Potential low bias
			LD = 18	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
948L011 (cont.)	MND24-0950-0002 (cont.)	Sb = J	PDSR	Possible inaccuracy
		Se = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 83	Potential low bias
		Tl = J	PDSR	Possible inaccuracy
		Zn = J	MSR = 79	Potential low bias
	MND24-0950-1002	Ag = J	MSR = 84	Potential low bias
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 84	Potential low bias
		Mn = J	MSR = 84	Potential low bias
		Pb = J	MSR = 79	Potential low bias
			LD = 18	Possible inaccuracy
			PDSR	Possible inaccuracy
		Sb = J	PDSR	Possible inaccuracy
		Se = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 83	Potential low bias
		Tl = J	PDSR	Possible inaccuracy
		Zn = J	MSR = 79	Potential low bias
	MND25-0935-0002	Ag = J	FD = 87	Possible inaccuracy
		Ca = J	LD = 54	Possible inaccuracy
		Cd = J	FD = 78	Possible inaccuracy
		Cn = J	MSR = 64	Potential low bias
		Cr = J	FD = 96	Possible inaccuracy
		Cu = J	MSR = 279	Potential high bias
			FD = 72	Possible inaccuracy
		Fe = J	LD = 22	Possible inaccuracy
			FD = 71	Possible inaccuracy
		Li = J	EB (AL = 114)	Raised detection level
		Mg = J	LD = 52	Possible inaccuracy
		Mn = J	LD = 42	Possible inaccuracy
		Na = U	EB (AL = 1560)	Raised detection level

Table C.4. Summary of Metals Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
948L011 (cont.)	MND25-0935-0002 (cont.)	Pb = J	MSR = 56	Potential low bias
			FD = 86	Possible inaccuracy
		Se = J	MSR = 279	Potential low bias
			LD = 200	Possible inaccuracy
		Sn = J	FD = 97	Possible inaccuracy
		Zn = J	FD = 82	Possible inaccuracy
	MND25-0935-1002	Ag = J	FD = 87	Possible inaccuracy
		Ca = J	LD = 54	Possible inaccuracy
		Cd = J	FD = 78	Possible inaccuracy
		Cn = J	MSR = 64	Potential low bias
		Cr = J	FD = 96	Possible inaccuracy
		Cu = J	MSR = 279	Potential high bias
			FD = 72	Possible inaccuracy
		Fe = J	LD = 22	Possible inaccuracy
			FD = 71	Possible inaccuracy
		Li = J	EB (AL = 114)	Raised detection level
		Mg = J	LD = 52	Possible inaccuracy
		Mn = J	LD = 42	Possible inaccuracy
		Na = U	EB (AL = 1560)	Raised dectection level
		Pb = J	MSR = 56	Potential low bias
			FD = 86	Possible inaccuracy
		Se = J	MSR = 279	Potential low bias
			LD = 200	Possible inaccuracy
		Sn = J	FD = 97	Possible inaccuracy
		Zn = J	FD = 82	Possible inaccuracy
9408L992	MND24-0932-0002	As = J	MSR = 82	Potential low bias
		Ca = J	SD = 12	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 80	Potential low bias
		Cr = J	MSR = 84	Potential low bias
		Mg = J	SD = 11	Possible inaccuracy

Table C.4. Summary of Metals Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9408L992 (cont.)	MND24-0932-0002 (cont.)	Mn = J	MSR = 79	Potential low bias
			SD = 12	Possible inaccuracy
9408L992	MND24-0932-0002	Mo = J	MSR = 81	Potential low bias
		Ni = J	MSR = 81	Potential low bias
		Pb = J	LD = 13	Possible inaccuracy
		Sb = J	MSR = 74	Potential low bias
			PDSR	Possible inaccuracy
		Se = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 79	Potential low bias
		Tl = J	MSR = 73	Potential low bias
		Zn = J	MSR = 83	Potential low bias
			SD = 13	Possible inaccuracy
	MND24-0947-2002	As = J	MSR = 82	Potential low bias
			PDSR	Possible inaccuracy
		Ca = J	SD = 12	Possible inaccuracy
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 80	Potential low bias
		Cr = J	MSR = 84	Potential low bias
		Mg = J	SD = 11	Possible inaccuracy
		Mn = J	MSR = 79	Potential low bias
			SD = 12	Possible inaccuracy
		Mo = J	MSR = 81	Potential low bias
		Ni = J	MSR = 81	Potential low bias
		Pb = J	LD = 13	Possible inaccuracy
			PDSR	Possible inaccuracy
		Sb = J	MSR = 74	Potential low bias
			PDSR	Possible inaccuracy
		Se = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 79	Potential low bias
		Tl = J	MSR = 73	Potential low bias

Table C.4. Summary of Metals Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9408L992 (cont.)	MND24-0947-2002 (cont.)	Zn = J	MSR = 83	Potential low bias
			SD = 13	Possible inaccuracy
9409L049	MND24-0938-0002	Ag = J	MSR = 75	Potential low bias
		Al = J	MSR = 80	Potential low bias
		As = J	MSR = 82	Potential low bias
			PDSR	Possible inaccuracy
		Ba = J	MSR = 77	Potential low bias
		Be = J	MSR = 77	Potential low bias
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 76	Potential low bias
		Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 81	Potential low bias
		Fe = J	MSR = 75	Potential low bias
		Mn = J	MSR = 76	Potential low bias
		Mo = J	MSR = 74	Potential low bias
		Ni = J	MSR = 75	Potential low bias
		Sb = J	MSR = 78	Potential low bias
		Se = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 60	Potential low bias
			PDSR	Possible inaccuracy
		V = J	MSR = 77	Potential low bias
		Zn = J	MSR = 80	Potential low bias
	MND24-0942-0002	Ag = J	MSR = 75	Potential low bias
		Al = J	MSR = 80	Potential low bias
		As = J	MSR = 82	Potential low bias
			PDSR	Possible inaccuracy
		Ba = J	MSR = 77	Potential low bias
		Be = J	MSR = 77	Potential low bias
		Cd = J	PDSR	Possible inaccuracy
		Co = J	MSR = 76	Potential low bias

Table C.4. Summary of Metals Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9409L049 (cont.)	MND24-0942-0002 (cont.)	Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 81	Potential low bias
		Fe = J	MSR = 75	Potential low bias
		Mn = J	MSR = 76	Potential low bias
		Mo = J	MSR = 74	Potential low bias
		Ni = J	MSR = 75	Potential low bias
		Sb = J	MSR = 78	Potential low bias
		Se = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 60	Potential low bias
			PDSR	Possible inaccuracy
		V = J	MSR = 77	Potential low bias
		Zn = J	MSR = 80	Potential low bias
	MND24-0952-0002	Ag = J	MSR = 75	Potential low bias
		Al = J	MSR = 80	Potential low bias
		As = J	MSR = 82	Potential low bias
		Ba = J	MSR = 77	Potential low bias
		Be= J	MSR = 77	Potential low bias
		Co = J	MSR = 76	Potential low bias
		Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 81	Potential low bias
		Fe = J	MSR = 75	Potential low bias
		Mn = J	MSR = 76	Assessed inconclusive
		Mo = J	MSR = 74	Potential low bias
		Ni = J	MSR = 75	Potential low bias
		Sb = J	MSR = 78	Potential low bias
		Se = J	PDSR	Possible inaccuracy
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 60	Potential low bias
			PDSR	Possible inaccuracy
		V = J	MSR = 77	Potential low bias

Table C.4. Summary of Metals Qualifications - Second Sampling Event (cont.)

Laboratory	Sample Identification	Validation	Reason	Impact
9409L049 (cont.)	MND24-0952-0002 (cont.)	Zn = J	MSR = 80	Potential low bias
	MND24-0954-0002	Ag = J	MSR = 75	Potential low bias
		Al = J	MSR = 80	Assessed inconclusive
		As = J	MSR = 82	Potential low bias
			PDSR	Possible inaccuracy
		Ba = J	MSR = 77	Potential low bias
		Be = J	MSR = 77	Potential low bias
		Co = J	MSR = 76	Potential low bias
		Cr = J	MSR = 77	Potential low bias
		Cu = J	MSR = 81	Potential low bias
		Fe = J	MSR = 75	Potential low bias
		Mn = J	MSR = 76	Potential low bias
		Mo = J	MSR = 74	Potential low bias
		Ni = J	MSR = 75	Potential low bias
		Sb = J	MSR = 78	Potential low bias
		Sn = J	MSR = 76	Potential low bias
		Tl = J	MSR = 60	Potential low bias
			PDSR	Possible inaccuracy
		V = J	MSR = 77	Potential low bias
		Zn = J	MSR = 80	Potential low bias

EB - Equipment blank

RPD - Relative percent difference

Table C.5. Summary of Anions Qualifications - First Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9402L452	MND24-0944-0001	J	Hold time-nitrate/nitrite (1) TDS (1) TSS (1)	Possible inaccuracy
	MND24-0932-0001	J	Hold time-TDS (1) TSS (1)	Possible inaccuracy
	MND24-0932-4001	J	Hold time-TDS (1) TSS (1)	Possible inaccuracy
9403L843	MND25-0935-0001	J	Hold time-nitrate/nitrite (13) fluoride (13)	Possible inaccuracy
9403L845	MND25-0937-1001	J	Hold time-nitrate/nitrite (12) fluoride (12)	Possible inaccuracy
	MND25-0937-0001	J	Hold time-nitrate/nitrite (12) fluoride (12)	Possible inaccuracy
9402L536	MND24-0947-0001	U	MB-nitrate/nitrite	Raised detection limit
	MND25-0951-0001	J	Hold time-nitrate/nitrite (8) fluoride (8)	Possible inaccuracy
9402L567	MND24-0966-0001	J	Hold time-nitrite (2)	Possible inaccuracy
	MND24-0965-0001	J	Hold time-nitrite (2)	Possible inaccuracy

MB -- Method blank

Table C.5. Summary of Anions Qualifications - Second Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified	Impact
9408L011	MND24-0935-4002	J	Hold time-alkalinity (3) TSS (1)	Possible inaccuracy
	MND24-0950-0002	J	Hold time-alkalinity (3)	Possible inaccuracy
	MND24-0950-1002	J	Hold time-alkalinity (3)	Possible inaccuracy
	MND24-0935-0002	J	Hold time-alkalinity (3)	Possible inaccuracy
		U	MB-nitrate as N	Raised quant. limit
	MND24-0941-0002	J	Hold time-alkalinity (3)	Raised quant. limit
9409L049	MND24-0942-0002	J	Hold time-alkalinity (1)	Raised quant. limit
	MND24-0952-0002	J	Hold time-alkalinity (1)	Raised quant. limit
	MND24-0938-0002	J	Hold time-alkalinity (1)	Raised quant. limit
	MND24-0954-0002	J	Hold time-alkalinity (1)	Raised quant. limit

MB - Method blank

Table C.6. Summary of Radiologic Qualifications - First Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-001	MND24-0944-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0932-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0932-4001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
S4-02-002	MND24-0931-1001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
		J	LY -	Thorium		Possible inaccuracy
	MND24-0946-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

Table C.6. Summary of Radiologic Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-002 (cont.)	MND24-0959-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
		J	LY -	Thorium		Possible inaccuracy
	MND24-0959-1001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0936-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
S4-02-003	MND24-0958-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0949-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

Table C.6. Summary of Radiologic Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-003 (cont.)	MND24-0960-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
S4-02-010	MND24-0935-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
		J	LY -	Thorium		Possible inaccuracy
	MND24-0950-1001	J	Eff. -	Tritium batch efficiency used		Possible inaccuracy
	MND24-0963-0001	J	Eff. -	Tritium batch efficiency used		Possible inaccuracy
	MND24-0950-0001	J	Eff. -	Tritium batch efficiency used		Possible inaccuracy
	MND24-0962-0001	J	Eff. -	Tritium batch efficiency used		Possible inaccuracy
S4-02-012	MND25-0935-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
S4-02-017	MND25-0945-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

Table C.6. Summary of Radiologic Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-017 (cont.)	MND24-0948-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0943-0001	J	Eff. -	Tritium batch efficiency used		Possible inaccuracy
	MND24-0937-4001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0938-0001	J	Eff. -	Tritium batch efficiency used		Possible inaccuracy
	MND24-0952-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
S4-02-018	MND25-0937-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND25-0937-1001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

Table C.6. Summary of Radiologic Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-021	MND24-0954-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
		J	FD-	Americium-241	(>3 standard deviations)	Possible inaccuracy
	MND24-0954-1001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
		J	Yield - Plutonium			
	MND24-0943-0001	J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0947-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0933-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

Table C.6. Summary of Radiologic Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-021 (cont.)	MND24-0951-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
S4-02-022	MND24-0951-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
S4-02-023	MND24-0941-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
		J	LY -	Thorium		Possible inaccuracy
	MND24-0955-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0964-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

Table C.6. Summary of Radiologic Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-024	MND24-0953-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0953-4001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0961-1001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0961-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0950-0001	J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

Table C.6. Summary of Radiologic Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-025	MND24-0966-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0965-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0967-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0963-0001	J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0938-0001	J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
	MND24-0962-0001	J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

Table C.6. Summary of Radiologic Qualifications - First Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified			Impact
S4-02-033	MND24-0956-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy
		J	LY -	Thorium		Possible inaccuracy
	MND24-0942-0001	J	Eff.-	Tritium batch efficiency used		Possible inaccuracy
		J	C -	Radium-226	Annual calibration criteria not met	Possible inaccuracy
		J	Eff. -	Potassium-40 Cobalt-60 Cesium-137 Bismuth-207 Bismuth-210	Daily efficiency source checks and annual calibration not documented.	Possible inaccuracy

C - Calibration
Eff - Efficiency
LY - Low yield

Table C.6. Summary of Radiologic Qualifications - Second Sampling Event

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
SDG-1	MND24-0933-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
	MND24-0936-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
		J	Radium-226	Insufficient background count frequency	Possible false positives
	MND24-0944-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB>2xMDA Thorium-230		Possible false positives
	MND24-0945-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB>2xMDA Thorium-230		Possible false positives
		J	Radium-226	Insufficient background count frequency	Possible false positives

Table C.6. Summary of Radiologic Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
SDG-1 (cont.)	MND24-0943-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB > 3xMDA Thorium-230		Unusable
	MND24-0932-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB > 3xMDA Thorium-230		Unusable
		J	Radium-226	Insufficient background count frequency	Possible false positives
	MND24-0949-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB > 2xMDA Thorium-230		Possible false positives
	MND24-0947-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB > 3xMDA Thorium-230		Unusable
		J	Radium-226	Insufficient background count frequency	Possible false positives

Table C.6. Summary of Radiologic Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
SDG-1 (cont.)	MND24-0950-1002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
	MND24-0950-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
	MND24-0935-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
	MND24-0935-4002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB>2xMDA Thorium-230		Possible false positives
	MND24-0941-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
		J	Radium-226	Insufficient background count frequency	Possible false positives

Table C.6. Summary of Radiologic Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
SDG-1 (cont.)	MND24-0953-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		unusable
	MND24-0956-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
		J	Radium-226	Insufficient background count frequency	Possible false positives
	MND24-0967-1002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB>2xMDA Thorium-230		Possible false positives
	MND24-0952-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB>2xMDA Thorium-230		Possible false positives

Table C.6. Summary of Radiologic Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
SDG-1 (cont.)	MND24-0938-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB > 2xMDA Thorium-230		Possible false positives
	MND24-0954-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB > 2xMDA Thorium-230		Possible false positives
	MND24-0942-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB > 2xMDA Thorium-230		Possible false positives
SDG-2	MND25-0935-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB > 3xMDA Thorium-230		Unusable
		J	Radium-226	Insufficient background count frequency	Possible false positives
		J	Yield -Thorium (102) Plutonium (104)		Possible inaccuracy
		J	LD- Thorium (36) Cesium-137 (135) Radium-226 (29)		Possible variability

Table C.6. Summary of Radiologic Qualifications - Second Sampling Event (cont.)

Laboratory Batch	Sample Identification	Validation Qualifier	Reason Qualified		Impact
SDG-2	MND25-0935-1002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
		J	Radium-226	Insufficient background count frequency	Possible false positives
		J	Yield -Thorium (102) Plutonium (104)		Possible inaccuracy
		J	LD- Thorium (36) Cesium-137 (135) Radium-226 (29)		Possible variability
	MND25-0937-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		J	MB>2xMDA Thorium-230		Possible false positives
		J	Radium-226	Insufficient background count frequency	Possible false positives
		J	LD- Thorium (36) Cesium-137 (135) Radium-226 (29)		Possible variability
	MND25-0951-0002	J	Uranium-238 Uranium-234 Uranium-235 Thorium-228 Thorium-232 Plutonium-238 Plutonium-239/240 Americium-241	Inappropriate background subtraction	Possible false positives and negatives
		R	MB>3xMDA Thorium-230		Unusable
		J	Radium-226	Insufficient background count frequency	Possible false positives
		J	LD- Thorium (36) Cesium-137 (135) Radium-226 (29)		Possible variability

Table C.6. Summary of Radiologic Qualifications - Second Sampling Event (cont.)

Eff - Efficiency
LD - Laboratory duplicate
MB - Method blank
MDA - Minimum detectable activity

Appendix E

APPENDIX E

DATA VALIDATION REPORT SUMMARIES

Table B.1. Index to Laboratory Sample Numbers for First Sampling Event

Terran Sample No.	Mound Sample No.	Weston Lab. No.	IT Lab. No.	
MND24-0931-0001	M901-59	9402L459-007	S4-02-002-01	S4-02-002-02
MND24-0932-0001	M901-47	9402L452-002	S4-02-001-03	S4-02-001-04
MND24-0933-0001	M901-102	9402L536-002	S4-02-021-08	S4-02-021-09
MND24-0935-0001	M901-71	9402L500-002	S4-02-010-01	S4-02-010-02
MND25-0935-0001	M901-74	9402L500-006	S4-02-012-01	S4-02-012-02
MND24-0936-0001	M901-53	9402L459-002	S4-02-002-09	S4-02-002-10
MND25-0937-0001	M901-81	9402L508-006	S4-02-018-01	S4-02-018-02
MND24-0938-0001	M901-134	9402L508-004	S4-02-017-12	S4-02-025-08
MND24-0941-0001	M901-142	9402L663-001	S4-02-023-01	S4-02-023-02
MND24-0942-0001	M901-144	9402L663-003	S4-02-033-03	S4-02-033-04
MND24-0943-0001	M901-107	9402L508-002	S4-02-017-09	S4-02-021-05
MND24-0944-0001	M901-46	9402L452-001	S4-02-001-01	S4-02-001-02
MND24-0945-0001	M901-90	9402L529-001	S4-02-017-01	S4-02-017-04
MND24-0946-0001	M901-52	9402L459-001	S4-02-002-03	S4-02-002-04
MND24-0947-0001	M901-98	9402L536-004	S4-02-021-06	S4-02-021-07
MND24-0948-0001	M901-88	9402L529-003	S4-02-017-07	S4-02-017-08
MND24-0949-0001	M901-61	9402L482-001	S4-02-003-03	S4-02-003-04
MND24-0950-0001	M901-119	9402L500-009	S4-02-010-05	S4-02-024-13
MND24-0951-0001	M901-101	9402L536-001	S4-02-021-10	S4-02-021-11
MND25-0951-0001	M901-100	9402L536-006	S4-02-022-01	S4-02-022-02
MND24-0952-0001	M901-91	9402L529-002	S4-02-017-13	S4-02-017-16
MND24-0953-0001	M901-124	9402L562-001	S4-02-024-01	S4-02-024-04
MND24-0954-0001	M901-104	9402L536-007	S4-02-021-01	S4-02-021-02
MND24-0955-0001	M901-111	9402L544-001	S4-02-023-03	S4-02-023-04
MND24-0956-0001	M901-146	9402L663-005	S4-02-033-01	S4-02-033-02
MND24-0958-0001	M901-64	9402L482-004	S4-02-003-01	S4-02-003-02
MND24-0959-0001	M901-55	9402L459-004	S4-02-002-05	S4-02-002-06
MND24-0960-0001	M901-63	9402L482-003	S4-02-003-05	S4-02-003-06
MND24-0961-0001	M901-117	9402L562-007	S4-02-024-11	S4-02-024-12
MND24-0962-0001	M901-135	9402L500-005	S4-02-025-09	S4-02-010-06
MND24-0963-0001	M901-132	9402L500-001	S4-02-010-04	S4-02-025-07
MND24-0964-0001	M901-112	9402L544-003	S4-02-023-09	S4-02-023-10
MND24-0965-0001	M901-129	9402L567-003	S4-02-025-03	S4-02-025-04
MND24-0966-0001	M901-128	9402L567-002	S4-02-025-01	S4-02-025-02
MND24-0967-0001	M901-131	9402L567-001	S4-02-025-05	S4-02-025-06

Table B.2. Index to Laboratory Sample Numbers for Second Sampling Event

Terran Sample No.	Mound Sample No.	Weston Lab. No.	CompuChem Lab. No.
MND24-0932-0002	M901-163	9408L992-001	636168, 636169, 636170, 636171, 636172
MND24-0933-0002	M901-152	9408L970-002	636021, 636024, 636027, 636030, 636033
MND24-0935-0002	M901-172	9408L011-008	636452, 636461, 636462, 636463, 636472
MND25-0935-0002	M901-175	9408L011-002	636475, 636478, 636481, 636484
MND24-0936-0002	M901-154	9408L970-001	636036, 636037, 636038, 636039, 636040
MND25-0937-0002	M901-180	9408L031-004	636824, 636822, 636825, 636823
MND24-0938-0002	M901-192	9409L049-004	637056, 637057, 637058, 637060, 637059
MND24-0941-0002	M901-170	9408L011-009	636454, 636467, 636468, 636469, 636474
MND24-0942-0002	M901-188	9409L049-001	637071, 637072, 637073, 637075, 637074
MND24-0943-0002	M901-157	9408L998-001	636163, 636164, 636165, 636166, 636167
MND24-0944-0002	M901-151	9408L970-004	636041, 636042, 636043, 636044, 636045
MND24-0945-0002	M901-155	9408L970-005	636046, 636047, 636048, 636049, 636050
MND24-0947-0002	M901-166	9408L992-004	636178, 636179, 636180, 636181, 636182
MND24-0948-0002	M901-210	9409L122-003	637451, 637450, 637452, 637453, 637449
MND24-0949-0002	M901-161	9408L998-002	636173, 636174, 636175, 636176, 636177
MND24-0950-0002	M901-167	9408L011-005	636451, 636458, 636459, 636460, 636471
MND24-0951-0002	M901-202	9409L108-004	637382, 637375, 637389, 637399, 637400
MND25-0951-0002	M901-208	9409L122-001	637459, 637460, 637461, 637462
MND24-0952-0002	M901-195	9409L049-003	637051, 637052, 637053, 637055, 637054
MND24-0953-0002	M901-179	9408L031-002	636810, 636811, 636814, 636816, 636815
MND24-0954-0002	M901-186	9409L049-007	637065, 637066, 637067, 637070, 6370682

Table B.2. Index to Laboratory Sample Numbers for Second Sampling Event (cont.)

Terran Sample No.	Mound Sample No.	Weston Lab. No.	CompuChem Lab. No.
MND24-0955-0002	M901-216	9409L144-003	637688, 637685, 637689, 637690, 637694
MND24-0956-0002	M901-181	9408L031-001	636817, 636818, 636819, 636821, 636820
MND24-0958-0002	M901-197	9409L088-002	637257, 637255, 637258, 637259, 637263
MND24-0959-0002	M901-217	9409L144-004	637377, 637370, 637384, 637393, 637394
MND24-0960-0002	M901-205	9409L108-007	637381, 637374, 637388, 637397, 637398
MND24-0961-0002	M901-214	9409L144-001	637691, 637687, 637692, 637693, 637695
MND24-0962-0002	M901-227	9409L225-008	639367, 639368, 639369, 639370, 639371
MND24-0963-0002	M901-222	9409L225-003	639360, 639362, 639364, 639365, 639366
MND24-0964-0002	M901-196	9409L088-001	637260, 637256, 637261, 637262, 637264
MND24-0965-0002	M901-220	9409L225-001	639351, 639350, 639353, 639354, 639358
MND24-0966-0002	M901-224	9409L225-005	639310, 639318, 639321, 639324, 639331
MND24-0967-0002	M901-183	9408L031-005	637231, 637228, 637234, 637237, 637225

REPORT OF DATA VALIDATION RESULTS
FOR CHEMICAL ANALYSES

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
FIRST GROUNDWATER AND SEDIMENT SAMPLING EVENT BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9402L452

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX
Ground Water Samples - 2
Quality Control Blanks - 4

1.3. DATE OF COLLECTION
1/31/94

1.4. CHAIN OF CUSTODY IDENTIFIER
N/A

1.5. TYPE OF ANALYSIS
Volatile Organic Compounds by Method 502.2
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 03.0)
Fluoride by Method E340.2
Alkalinity by Method E310.1
Nitrite, as N by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2
Total Suspended Solids by Method E160.2
Total Dissolved Solids by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY
All samples were received in good condition by the laboratory.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:		Laboratory ID:
MND24-0944-0001	-	9402L452 001
MND24-0932-0001	-	9402L452 002
MND24-0944-2001	-	9402L452 005
MND24-0932-2001 TB	-	9402L452 006
MND24-0932-3001	-	9402L452 003
MND24-0932-4001	-	9402L452 004

2. HOLDING TIMES - RFW9402L452

All analyses were completed within the required holding times with the exception of the following:

ANALYSIS	ANALYTE	RFW #	MOUND I.D.	DAYS OUT OF EXTRACTION TIME	DAYS OUT OF HOLD. TIME
Inorganic	Nitrate/Nitrite	9402L452-001	MND240944-0001		1
Inorganic	Nitrate/Nitrite	9402L452-REP	MND240944-0001		1
Inorganic	Nitrate/Nitrite	9402L452-001-MS	MND240944-0001		1
Inorganic	Nitrate/Nitrite	9402L452-001-MSD	MND240944-0001		1
Inorganic	TDS	9402L452-001	MND240944-0001		1
Inorganic	TSS	9402L452-001	MND240944-0001		1
Inorganic	TDS	9402L452-002	MND240932-0001		1
Inorganic	TSS	9402L452-002	MND240932-0001		1
Inorganic	TDS	9402L452-004	MND240932-4001		1
Inorganic	TSS	9402L452-004	MND240932-4001		1
Inorganic (Metals)	Mercury	9402L452-001	MND240944-0001		1
Inorganic (Metals)	Mercury	9402L452-002	MND240932-0001		1
Inorganic (Metals)	Mercury	9402L452-004	MND240932-4001		1
G.C. Volatiles (502.2)		9402L452-003-C2	MND240932-3001		1
G.C. Volatiles (502.2)		9402L452-004-C2	MND240932-4001		1
G.C. Volatiles (502.2)		9402L452-004-D1	MND240932-4001		1

G.C. Volatiles qualified as estimated (J_H).
Inorganic (Metals) qualified as estimated (J_H).
Inorganics Qualified as estimated (J_H).

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Instrument Tuning met performance criteria. No samples were qualified.

3.1.2. Calibration

Volatiles 502.2
All samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. Initial and Continuing Calibration Verification criteria set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for 7-point curve. Few compounds calibrated to 5-pointed curve and one compound to a 4-point curve (2-Chloroethylvinyl ether); all maintained linearity criteria.

Initial calibration results for confirmation columns met linearity criteria for 5-point curve at minimum, except for vinyl chloride and bis(2-Chloroisopropyl)ether.

1,1-Dichloroethane was out of range for Initial Calibration Verification of GC/PID for the primary column. Immediately following Continuing Calibration Verification sample met criteria for 1,1-Dichloroethane. No positive 1,1-Dichloroethane results reported, no samples qualified.

Numerous compounds were out of range in the Initial Calibration Verification sample for the confirmation column. Confirmation and method blank data were not qualified because associated Continuing Confirmation Verification sample data met criteria.

Several compounds were out of range for Continuing Calibration Verification of primary and confirmation columns, affecting associated samples. None of the compounds were reported with positive results. Samples qualified as J_c.

Retention Time Window criteria was met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention time windows were within required limits during analysis of all Initial and Continuing Calibration samples.

No Continuing Calibration outliers occurred. No samples qualified.

Semivolatiles
Initial and Continuing Calibration Analysis Verification met performance criteria.

3.1.3. Blanks

Volatiles 502.2
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Semivolatiles
94LE0245-MB1 SBLK
The following compounds were detected in the Method Blank, resulting in elevated quantitation limits for related samples: Benzoic Acid, Diethylphthalate, di-n-Butylphthalate, bis(2-Ethylhexyl)phthalate, and unknown compounds were detected in the method blanks. No samples were qualified.
Methylcyclopentanol (Tentatively Identified Compound) was detected in the Method Blank. Methylcyclopentanol concentrations in a related sample was greater than action level. Related sample not qualified.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2
% Recovery was out of range for the following:

MND24-0932-3001 CON (confirmation sample)	Bromochloromethane
MND24-0932-3001 DLCON (confirmation of diluted sample)	Bromochloromethane
MND24-0932-4001 CON (confirmation sample)	Bromochloromethane
MND24-0932-4001 DLCON (confirmation of diluted sample)	Bromochloromethane

The affected samples were qualified (J_K).

Volatiles 8030
All surrogate spike recoveries were within acceptable range.

Semivolatiles
All surrogate spike recoveries were within acceptable range.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2
No matrix spike or matrix spike duplicate samples for this analysis.

Volatiles 8030
No matrix spike or matrix spike duplicate samples for this analysis.

Semivolatiles
No matrix spike or matrix spike duplicate samples for this analysis.

3.1.6. Internal Standards

Semivolatiles
The Internal Standard (IS) performance for Batch 9402L452 (Semivolatiles/Water Matrix) met acceptance criteria.

3.1.7. Compound Identification

Semivolatiles
All compounds were within ±0.06 relative retention time units of the standard RT.

3.1.8. System Performance

Volatiles 502.2
Extraneous peaks in environmental samples, possibly related to column effects. Secondary columns showed frequent merging and tailing peaks. No peaks in method blanks at target compound retention times. No sample qualification required.

Volatiles 8030-Water
Evaluation of the chromatograms identified few extraneous peaks and peak splitting possibly due to a contaminated column. No sample qualification required.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems other than possible late-eluting compounds from previous analyses. No sample qualification required.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Semivolatiles
Compound quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

3.1.10. Tentatively Identified Compounds

Semivolatiles
A review of mass spectra indicated that three Tentatively Identified Compounds were detected in two samples. A spectral match was identified for 2-Methyl-Cyclopentanol in samples MND24-0932-0001 and MND24-0932-4001. A spectral match was identified for Benzophenone and 2,6-Dimethyl-Heptadecane in sample MND24-0932-4001.

3.1.11. Laboratory Control Sample

Volatiles 502.2
% Recovery was out of range for the following:

94LV1008-MB1-BS BLK	1,1,1-Trichloroethane and Tetrachloroethene.
94LV4406-MB1-BS BLK	1,1-Dichloroethene, 1,1,1-Trichloroethane, Trichloroethene, Bromodichloromethane, and 1,1,2,2-Tetrachloroethane.
94LV4407-MB1-BS BLK	Trichloroethene, Bromodichloromethane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, Bromoform, 1,1,2,2-Tetrachloroethane, Chlorobenzene, and Benzene.

1,2-Dichloroethane was omitted from the blank spiking solution and has been reported as "NS" (Not Spiked) for samples 94LV1007-MB1-BS BLK, 94LV4406-MB1-BS BLK, 94LV4407-MB1-BS BLK, and 94LV1008-MB1-BS BLK.
Surrogate Recovery outliers due to high concentrations of Chloroform.

The affected samples were qualified (J_K).
Ethylbenzene was qualified (I) due to an additional (unidentified) compound for sample 94LV4406-MB1-BS BLK and 94LV4407-MB1-BS BLK.

Volatiles 8030
All Laboratory Control Samples were within acceptable range.

Semivolatiles
94LE0245-MB1-BS
% Recovery was out of range for 4-Nitrophenol.
The affected samples were qualified (J_K).

3.2. PESTICIDES/PCBs

3.2.1. GC/ECD Performance Check

The DDT retention times fell within the quality control limits of greater than twelve minutes for all analyses.

The standard retention time values for Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) were outside of QC limits for five samples. Other DCB retention times were flagged on form 8D due to incorrect standard identification on chromatograms and quantitation reports. All other retention times fell within the QC limits.

The standard retention times for single component analytes fell within the established retention time windows.

3.2.2. Performance Evaluation Mixture

3.2.2.1. Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

The PEM retention times did not fall within the established retention time window for one column. Retention time criteria met for second column. No target compounds detected. No results qualified.

3.2.2.3. Recovery

The RPD for each single component pesticide and surrogate met the recovery criteria of $\geq$ -25.0 and $\leq$ 25.0%.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and Endrin met the acceptance criteria of $\leq$ 20.0% and $\leq$ 30.0% combined breakdown with the following exceptions:

Lab Sample I.D./Sample Number 03089411.02\PEMLA-5204

Endrin Breakdown 28.0%
Combined Breakdown 34.0%

Affected sample results were qualified (J).

3.2.3. Calibration

Calibration criteria differ between CLP SOW and Functional Guidelines for Evaluation Organic Analyses. When these cases occurred, the SOW was used as validation criteria as noted:

The SOW requires the %RSD of calibration factors to be <20%, not <10%.

The resolution between adjacent peaks in the resolution check mixture met the resolution criteria of ≥ 60.0%.

The %D of sample results reported for two GC columns met the acceptance criteria.

Calibration factors and %RSD were recalculated and meet the acceptance criteria.

3.2.4. Blanks

Method Blank
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Sulfur Cleanup Blank
Sulfur Cleanup Blank results met acceptance criteria.

3.2.5. Surrogate Spike Recoveries

% Recovery was out of range for the following:

MND24-0932-0001	TCMX-1, DCB-1, DCB-2.
MND24-0932-4001	TCMX-1, DCB-1, DCB-2.
94LE0234-MB1-BS PBLKTE	TCMX-1.

The affected samples were qualified (J_K).

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

No matrix spike or matrix spike duplicate samples for this analysis.

3.2.7. Compound Identification

The retention times of the reported compounds fell within the calculated retention time windows.

Secondary column confirmation was performed for all results greater than the PQL.

Percent difference between the two columns met performance criteria.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

GPC cleanup method not used for this batch.

3.2.8.2. Florisil Cartridge Cleanup

All percent recoveries were within acceptable range.
Calibration data not provided for instrument used for florisil cartridge check analyses.

3.2.9. System Performance

A review of primary and confirmation chromatograms did not reveal system performance problems other than minor peak tailing. No sample qualification required.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

3.2.11. Laboratory Control Sample

All Laboratory Control samples were within acceptable range.

3.3. INORGANIC METALS AND CYANIDE

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the following documents: USEPA Contract Laboratory Statement of Work for Inorganics Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All Initial and Continuing Calibration Verification samples were within control limits (Form 2A). Standards were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required quantitation limits (CRQLs).

3.3.2. Blanks

Values greater than the Instrument Detection Levels were used as acceptance criteria for Initial Calibration blanks and Continuing Calibration blanks. The blank acceptance values were an approved variance from the OU-9 QAPP.

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria, except for tin (Form III). The tin analysis for the preparation blank was given a J_B qualifier.

3.3.2.2. Calibration Blanks

Continuing calibration blanks analyzed for this batch met acceptance criteria (Form III).

3.3.3. Interference Check Sample

Results of the interference check sample met acceptance criteria (Form IV).

3.3.4. Laboratory Control Samples

All laboratory control samples met acceptance criteria (Form VII).

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis met acceptance criteria, except cadmium. The duplicate and water-quality results for cadmium were given a J_D qualifier (Form VI).

3.3.6. Matrix Spike Sample Analysis

MND24-0944-0001
Sample only analyzed for Arsenic, Cadmium, Lead, Selenium, and Thallium.
MND24-0932-4001
Sample not analyzed for Arsenic, Cadmium, Mercury, Lead, Selenium, or Thallium.

Results of the matrix spike sample analysis met acceptance criteria, except for the analytes analyzed using the furnace atomic absorption method - antimony, arsenic, cadmium, lead, selenium, and thallium. The matrix spike and water-quality sample results for the analytes not meeting the acceptance criteria were given a J_S qualifier (Forms I, V). A spike sample analysis was not required for calcium, sodium, magnesium, mercury, and cyanide.

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

Analytical results met acceptance criteria.

3.3.6.2. GFAA Metals

MND24-0944-0001
% Recovery was out of range for Arsenic, Cadmium, Selenium, and Thallium.
MND24-0932-4001
% Recovery was out of range for Antimony.

3.3.6.3. Cyanide

Matrix spike analysis not required for cyanide.

3.3.6.4. Flame AA Metals

Results of the flame atomic absorption analysis met acceptance criteria.

3.3.6.5. Automated Cold Vapor AA

Matrix spike analysis not required for mercury.

3.3.7. Furnace Atomic Absorption QC

Cadmium, lead, arsenic, selenium, antimony, and thallium did not meet furnace atomic absorption QC acceptance criteria. The water-quality results for analytes not meeting acceptance criteria were given a J_S qualifier (Form I).

3.3.8. Standard Addition Results

Standard additions were not required for this batch (Form VIII).

3.3.9. ICP Serial Dilution

ICP serial dilution results met acceptance criteria (Form IX).

3.3.10. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

3.4.1. Calibration

3.4.1.1. Alkalinity

- pH meter calibrated with 4.0 and 7.0 standards at the beginning and after every ten samples

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

- 4 point calibration verified
- correlation coefficient $\geq .995$
- continuing calibration check was run every 20 samples
- calibration check responses are within 15% of true value

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

Use of S class weights not documented.
Calibration verified within 24-hour time span.

3.4.2. Blanks

Inorganics - Anions
All Preparation Blank samples met acceptance criteria; no sample qualifiers were required.

All Calibration Blanks met acceptance criteria. No data was qualified.

3.4.3. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

All matrix spike and matrix spike duplicate recoveries were within acceptable range.

3.4.5. Sample Result Verification

Nitrate-Nitrite and Nitrite as Nitrogen concentrations were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

Recalculation of the Alkalinity data agreed with the reported results.

Recalculation of the Fluoride data agreed with the reported results.

Recalculation of the Total Dissolved Solids data and the Total Suspended Solids data agreed with the reported results.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

Volatiles - 502.2
No field duplicates were analyzed for this analysis.

Volatiles - 8030
No field duplicates were analyzed for this analysis.

Semivolatiles
No field duplicates were analyzed for this analysis.

Pesticides/PCBs
No field duplicates were analyzed for this analysis.

Inorganics - Metals
No field duplicates were analyzed for this analysis.

Inorganics - Anions
No field duplicates were analyzed for this analysis.

4.2. FIELD BLANKS (equipment blanks, etc.)

Volatiles 502.2

Trip Blanks
Trip Blank samples were within acceptable range.

Ambient Blanks
MND24-0932-3001
Outliers for Chloroform and Bromodichloromethane.
MND24-0932-3001 C1 (confirmation sample)
Outliers for Chloroform and Bromodichloromethane.
MND24-0932-3001 D1 (diluted sample)
Outlier for Chloroform.
MND24-0932-3001 C2 (confirmation of diluted sample)
Outlier for Chloroform.

Equipment Blanks
MND24-0932-4001
Outliers for Chloroform and Bromodichloromethane.
MND24-0932-4001 C1 (confirmation sample)
Outliers for Chloroform and Bromodichloromethane.
MND24-0932-4001 D1 (diluted sample)
Outlier for Chloroform.
MND24-0932-4001 C2 (confirmation of diluted sample)
Outlier for Chloroform.

Volatiles 8030

Trip Blanks
Trip Blank samples were within acceptable range.

Ambient Blanks
Ambient Blank sample was within acceptable range.

Equipment Blanks
Equipment Blank sample was within acceptable range.

Semivolatiles

Equipment Blanks
MND24-0932-4001
Outliers for the following Tentatively Identified Compounds: six unknown compounds, six Alkane compounds, Benzophenone, and Methylcyclopentanol.

Pesticides/PCBs

Equipment Blanks
Equipment Blank sample was within acceptable range.

Inorganics - Metals
The following inorganics were reported in sample MND24-0932-4001 at concentrations greater than the CRQL: aluminum, calcium, iron, magnesium, sodium, vanadium, and zinc.

Inorganics - Anions

Equipment Blank
MND24-0932-4001
Outliers for Nitrate-Nitrite and Total Dissolved Solids (TDS).

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced within the following sample analysis discussions.

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by Gas Chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list. The laboratory correctly added three compounds, but analyzed for trichlorotrifluoromethane, not trichlorotrifluoroethane.

One of the added compounds, 2-chloroethylvinylether was very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. The compound was only calibrated to a 4-point curve, not a 5 or 7-point curve. Preservation of the ground-water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinylether in them (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinylether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that 80-120% recovery be achieved. This variance affected the accuracy of low level volatile quantitations.

No VOCs were detected in water samples, except chloroform and bromodichloromethane, which were detected in sample MND24-0932-3001 and MND24-0932-4001. No VOCs were detected in the method blanks prepared for the analysis of the samples.

A total of 4 of 44 surrogate recoveries and 15 of 58 blank spike recoveries were outside QAPP control limits. The affected sample results were qualified using J_K or J_S results from daily and continuing calibration analyses were outside QAPP control limits. The water sample results affected by these quality control analyses were given a J qualifier to indicate that the results were considered to be an estimated value. The J qualifiers reflected a degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Acrylonitrile and Acetonitrile - Method 8030

All water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

No Method 8030 analytes were detected in the six water samples. No Method 8030 analytes were detected in the trip blank. No Method 8030 analytes were detected in the method blanks.

All quality control analyses met acceptance criteria. No data from this batch was qualified.

TCL Volatiles, sediments - CLP SOW
There were no sediment samples analyzed in this batch.

TCL Semivolatiles - CLP SOW
No semivolatiles were detected in the three water samples. Four semivolatiles, benzoic acid, diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate, were detected in the method blank. TIC were also reported in the method blank.

Three of the four semivolatiles, which are common analytical contaminants, were detected at concentrations below the CRQL. The fourth, benzoic acid, also was detected at concentrations below the CRQL. The water sample results for the detected semivolatiles were qualified (UJ) based on an evaluation of the method blank analytical results, however the qualified data was still considered usable.

A total of 1 of 11 spike recoveries were out of EPA control limits. No sample results were qualified. The affected samples were qualified J_K., but usable.

The non-target compounds were not found in any of the water samples at the target compound retention times, so their presence in the method blank did not affect the quality of the analytical results.

Pesticides/PCBs - CLP SOW
No pesticides or PCBs were detected in the three water samples analyzed for pesticides and PCBs. No pesticides or PCBs were detected in the method blanks.

Breakdown criteria were not met in a performance evaluation sample mixture prior to column calibration. Breakdown criteria were met following calibration. No sample results were qualified.

A total of 7 of 24 surrogate recoveries did not meet acceptance criteria. However, no data was qualified because all water sample results were nondetects, and the data is considered usable.

TAL Inorganics and Cyanide - CLP SOW
All samples were analyzed for TAL metals using Modification B of the CLP Statement of Work. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/L for antimony and 2 ug/L for beryllium and thallium. For all remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Aluminum, calcium, magnesium, sodium, and zinc were reported at concentrations above the CRQL in two of the three water samples. Arsenic, chromium, copper, iron, manganese, molybdenum, lead, selenium and vanadium were reported at concentrations above the CRQL in at least one of the three samples. In addition to these fourteen inorganics, silver, barium, beryllium, cobalt, lithium, potassium, nickel, tin, and cyanide were reported at concentrations less than the CRQL but greater than the IDL in at least one water sample.

Several of the inorganics results were given a J_S, J_D, or J_I qualifier to indicate that the results were considered to be an estimated value. They were regarded as estimated based on an evaluation of matrix spike, and duplicate sample analyses that exceeded control limits. The J qualifier reflected the degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Other Analytes

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric, Automated Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

The analytes included alkalinity, total cyanide, fluoride, nitrate-nitrite, nitrate (as nitrogen), total dissolved solids, and total suspended solids.

A J_H qualifier was given to the results of the nitrate-nitrite, total dissolved solids, and total suspended solids analyses because the analyses were performed outside of the holding time limit. All other analyses met acceptance criteria.

REPORT OF DATA VALIDATION RESULTS
FOR CHEMICAL ANALYSES

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
FIRST GROUNDWATER AND SEDIMENT SAMPLING EVENT BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9402L459

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX

Ground Water Samples - 5
Quality Control Blanks - 3

1.3. DATE OF COLLECTION

2/1/94

1.4. CHAIN OF CUSTODY IDENTIFIER

N/A

1.5. TYPE OF ANALYSIS

Volatile Organic Compounds by Method 502.2
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 03.0)
Fluoride by Method E340.2
Alkalinity by Method E310.1
Nitrite, as N by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2
Total Suspended Solids by Method E160.2
Total Dissolved Solids by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY

All samples were received in good condition by the laboratory.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:		Laboratory ID:
MND24-0946-0001	-	9402L459 001
MND24-0936-0001	-	9402L459 002
MND24-0959-0001	-	9402L459 004
MND24-0931-0001	-	9402L459 007
MND24-0959-1001	-	9402L459 005
MND24-0946-2001	-	9402L459 003
MND24-0959-2001	-	9402L459 006
MND24-0959-2001 TB	-	9402L459 008

2. HOLDING TIMES - RFW9402L459

All analyses were completed within the required holding times with the exception of the following:

ANALYSIS	RFW #	MOUND I.D.	DAYS OUT OF EXTRACTION TIME	DAYS OUT OF HOLD. TIME
G.C. Volatiles (502.2)	9402L459-001-R1	MND240946-0001		5
G.C. Volatiles (502.2)	9402L459-002-R1	MND240936-0001		5
G.C. Volatiles (502.2)	9402L459-003-R1	MND240946-2001		5
G.C. Volatiles (502.2)	9402L459-004-R1	MND240959-0001		5
G.C. Volatiles (502.2)	9402L459-005-R1	MND240959-1001		5
G.C. Volatiles (502.2)	9402L459-006-R1	MND240959-2001		5
G.C. Volatiles (502.2)	9402L459-007-C1	MND240931-0001		1
G.C. Volatiles (502.2)	9402L459-007-R1	MND240931-0001		5
G.C. Volatiles (502.2)	9402L459-008	MND240959-2001		1
G.C. Volatiles (502.2)	9402L459-008-C1	MND240959-2001		1
G.C. Volatiles (502.2)	9402L459-008-R1	MND240959-2001		5
Pesticides/PCBS	9402L459-007-R1	MND240931-0001		30

Affected 502.2 Volatile results were qualified as estimated (J_H).
Affected Pesticide/PCB results were qualified as estimated (J_H).

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

The surrogate solution used for primary analyses was contaminated with a spike solution. All affected samples were reanalyzed five days out of holding time. Original Method Blank results were used to qualify samples as if by blank contamination. Quantitation levels increased to five times the highest concentration in the Method Blank.

3.1.1. GC/MS Tuning

Instrument Tuning met performance criteria. No samples were qualified.

3.1.2. Calibration

Volatiles 502.2
All samples quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. Initial and Continuing Calibration Verification criteria set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for 7-point curve. Few compounds calibrated to 5-pointed curve and one compound to a 4-point curve (2-Chloroethylvinyl ether); all maintained linearity criteria.

Initial calibration results for confirmation columns met linearity criteria for 5-point curve at minimum, except for vinyl chloride and bis(2-Chloroisopropyl)ether.

1,1-Dichloroethane was out of range for Initial Calibration Verification of GC/PID for the primary column. Immediately following Continuing Calibration Verification sample met criteria for 1,1-Dichloroethane. No positive 1,1-Dichloroethane results reported, no samples qualified.

Numerous compounds were out of range in the Initial Calibration Verification sample for the confirmation column. Confirmation and method blank data not qualified because associated Continuing Confirmation Verification sample data met criteria.

Several compounds were out of range for Continuing Calibration Verification of primary and confirmation columns, affecting associated samples. None of the compounds reported with positive results. Samples qualified as U J_c.

Retention Time Window criteria was met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention time windows were within required limits during analysis of all Initial and Continuing Calibration samples.

No Continuing Calibration outliers occurred. No samples qualified.

Semivolatiles
Initial and Continuing Calibration Analysis Verification met performance criteria.

3.1.3. Blanks

Volatiles 502.2
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Semivolatiles
94LE0245-MB1 SBLK
The following compounds were detected in the Method Blank, resulting in elevated quantitation limits for related samples: Benzoic Acid, Diethylphthalate, di-n-Butylphthalate, bis(2-Ethylhexyl) phthalate, and unknown compounds.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2
% Recovery was out of range for the following:

MND24-0936-0001RE	Bromochloromethane
MND24-0931-0001RE	Bromochloromethane

Affected samples qualified as estimated (J_K).

Volatiles 8030
All surrogate spike recoveries were within acceptable range.

Semivolatiles
% Recovery was out of range for the following:

MND24-0959-1001	2-Fluorobiphenyl

No sample results were qualified.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2
There were no matrix spike or matrix spike duplicate samples for this analysis.

Volatiles 8030
There were no matrix spike or matrix spike duplicate samples for this analysis.

Semivolatiles
There were no matrix spike or matrix spike duplicate samples for this analysis.

3.1.6. Internal Standards

Semivolatiles
The Internal Standard (IS) performance for Batch 9402L459 (Semivolatiles/Water Matrix) met acceptance criteria.

3.1.7. Compound Identification

Semivolatiles
All compounds were within ±0.06 relative retention time units of the standard RT.

3.1.8. System Performance

Volatiles 502.2
Secondary columns showed occasional, minor baseline fluctuations. No sample qualification required.

Volatiles 8030
Evaluation of the chromatograms identified a baseline rise at high temperatures, in addition to few extraneous peaks and peak splitting possibly due to a contaminated column. No sample qualification required.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems other than the presence of identified, unknown and Tentatively Identified Compounds in Method Blanks. No sample qualification required.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Semivolatiles
Compound quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

3.1.10. Tentatively Identified Compounds

Semivolatiles
A review of mass spectra indicated that two Tentatively Identified Compounds were detected in one sample. A spectral match was identified for Hexadecanoic Acid and Benzaldehyde in sample MND24-0936-0001.

3.1.11. Laboratory Control Sample

Volatiles 502.2
% Recovery was out of range for the following:

94LV1008-MB1-BS BLK	1,1,1-Trichloroethane, Tetrachloroethene
94LV1013-MB1-BS BLK	Toluene, Ethylbenzene, Xylenes (total), Benzene
94LV1014-MB1-BS BLK	Xylenes (total)
94LV4407-MB1-BS BLK	Trichloroethene, Benzene, Bromodichloromethane, Chlorobenzene, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, Bromoform, 1,1,2,2-Tetrachloroethane

All affected sample results were qualified as estimated (J_K).

1,2-Dichloroethane was omitted from the blank spiking solution and has been reported as "NS" (Not Spiked) for samples 94LV1008-MB1-BS BLK and 94LV4407-MB1-BS BLK.
Ethylbenzene was qualified (I) due to an additional (unidentified) compound for sample 94LV4407-MB1-BS BLK.

Volatiles 8030
All Laboratory Control Samples were within acceptable range.

Semivolatiles
% Recovery was out of range for the following:

94LE0245-MB1-BS	4-Nitrophenol.

The affected sample results were qualified as estimated (J_K).

3.2. PESTICIDES/PCBs

3.2.1. GC/ECD Performance Check

The DDT retention times fell within the quality control limits of greater than twelve minutes for all analyses.

The standard retention time values for Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) were outside of QC limits for four samples. Other DCB retention times were flagged on form 8D due to incorrect standard identification on chromatograms and quantitation reports. All other retention times fell within the QC limits.

The standard retention times for single component analytes fell within the established retention time windows.

3.2.2. Performance Evaluation Mixture

3.2.2.1 Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

The PEM retention times did not fall within the established retention time window for one column. Retention times criteria met for second column. No target compounds detected. No results qualified.

3.2.2.3. Recovery

The RPD for each single component pesticide and surrogate met the recovery criteria of $\geq$ -25.0 and $\leq$ 25.0%.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and Endrin met the acceptance criteria of ≤ 20.0% and ≤ 30.0% combined breakdown.

3.2.3. Calibration

Calibration criteria differ between CLP SOW and Functional Guidelines for Evaluation Organic Analyses. When these cases occurred, the SOW was used as validation criteria as noted:

The SOW requires the %RSD of calibration factors to be <20%, not <10%.

The resolution between adjacent peaks in the resolution check mixture met the resolution criteria of ≥ 60.0%.

Reconstructed ion chromatograms were plotted off scale. However, the peak height data on the quantitation sheets did not appear clipped. Retention time windows should not be affected.

The %D of sample results reported for two GC columns met the acceptance criteria.

Calibration factors and %RSD were recalculated and meet the acceptance criteria.

3.2.4. Blanks

Method Blank
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Sulfur Cleanup Blank
Sulfur cleanup not performed on this batch.

3.2.5. Surrogate Spike Recoveries

% Recovery was out of range for the following:

MND24-0946-0001	TCMX-1
MND24-0936-0001	TCMX-1, DCB-1, DCB-2
MND24-0959-0001	TCMX-1
MND24-0959-1001	TCMX-1, DCB-1, DCB-2
94LE0234-MB1 PBLKTE	TCMX-1
MND24-0931-0001	Zero percent recovery for DCB. Sample results unusable and qualified as R.

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

There were no matrix spike or matrix spike duplicate samples for this batch.

3.2.7. Compound Identification

The retention times of the reported compounds fell within the calculated retention time windows.

Secondary column confirmation was performed for all results greater than the PQL.

Percent difference between two columns met performance criteria.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

GPC cleanup method not used for this batch.

3.2.8.2. Florisil Cartridge Cleanup

All percent recoveries were within acceptable range.

3.2.9. System Performance

A review of primary and confirmation chromatograms did not reveal system performance problems other than minor peak tailing. No sample qualification required.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

3.2.11. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.

3.3. INORGANIC METALS AND CYANIDE

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the following documents: USEPA Contract Laboratory Statement of Work for Inorganics Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All Initial and Continuing Calibration Verification samples were within control limits (Form 2A). Standards were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required detection limits (CRQLs).

3.3.2. Blanks

Values greater than the Instrument Detection Levels were used as acceptance criteria for Initial Calibration blanks and Continuing Calibration blanks. The blank acceptance values were an approved variance from the OU-9 QAPP.

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria (Form III).

3.3.2.2. Calibration Blanks

Continuing calibration blanks analyzed for this batch met acceptance criteria, except for thallium. The reported thallium concentration in five of the continuing calibration blanks was greater than the client-approved blank acceptance criteria. The affected calibration blank and water-quality sample results for thallium were given an R_B qualifier (Forms I, III).

3.3.3. Interference Check Sample

Results of the interference check sample met acceptance criteria (Form IV).

3.3.4. Laboratory Control Samples

All laboratory control samples met acceptance criteria (Form VII).

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis met acceptance criteria, except for lead and calcium. The duplicate and water-quality sample results for analytes not meeting acceptance criteria were given a J_D qualifier (Forms I, VI).

3.3.6. Matrix Spike Sample Analysis

MND24-0946-0001
Sample only analyzed for Arsenic, Cadmium, Lead, Selenium, and Thallium.
MND24-0959-0001
Sample not analyzed for Arsenic, Cadmium, Mercury, Lead, Selenium, or Thallium.

Results of the spike sample analysis met acceptance criteria, except for arsenic, lead, selenium, silver, and thallium. The spike and water-quality sample results for analytes not meeting acceptance criteria were given a J_S qualifier (Forms I, V). It was not necessary to analyze spike samples for calcium, sodium, magnesium, cyanide or mercury.

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

MND24-0959-001
% Recovery was out of range for Silver.

3.3.6.2. GFAA Metals

MND24-0946-0001
% Recovery was out of range for Arsenic, Lead, Selenium, and Thallium.

3.3.6.3. Cyanide

Matrix Spike analysis not required for Cyanide.

3.3.6.4. Flame AA Metals

Results of the flame atomic absorption analysis met acceptance criteria.

3.3.6.5. Automated Cold Vapor AA

Matrix Spike analysis not required for Mercury.

3.3.7. Furnace Atomic Absorption QC

The furnace atomic absorption QC results met acceptance criteria, except for the following samples:

MND24-0931-0001: antimony, lead, thallium.
MND24-0936-0001: antimony, thallium.
MND24-0946-0001: thallium.
MND24-0959-0001: lead, thallium.
MND24-0959-1001: lead, thallium.

The water-quality results for analytes not meeting acceptance criteria were given a J_S qualifier (Form I).

3.3.8. Standard Addition Results

Standard additions for lead were performed on Sample MND24-0959-0001 (Form VIII).

3.3.9. ICP Serial Dilution

ICP serial dilution results met acceptance criteria, except for calcium, iron, and zinc. The serial dilution and water-quality sample results for analytes not meeting acceptance criteria were given a J_I qualifier (Forms I, IX).

3.3.10. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

3.4.1. Calibration

3.4.1.1. Alkalinity

- The pH meter was calibrated with 4.0 and 7.0 standards at the beginning and after every ten samples

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

- 4 point calibration verified
- correlation coefficient $\geq .995$
- continuing calibration check was run every 20 samples
- calibration check responses are within 15% of true value

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

Use of S class weights not documented.
Daily calibration of balance not documented. Calibration verified within 48-hour time span.

3.4.2. Blanks

Inorganics - Anions
All Preparation Blank samples met acceptance criteria; no sample qualifiers were required. Raw data for Nitrite-N was not provided with this analysis package.

All Calibration Blanks met acceptance criteria. No data was qualified.

3.4.3. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

All matrix spike and matrix spike duplicate recoveries were within acceptable range.

3.4.5. Sample Result Verification

Nitrate-Nitrite and Nitrite as Nitrogen concentrations were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

Recalculation of the Alkalinity data agreed with the reported results.

Recalculation of the Fluoride data agreed with the reported results.

Recalculation of the Total Dissolved Solids data and the Total Suspended Solids data agreed with the reported results.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

Volatiles - 502.2
MND24-0959-0001
MND24-0959-1001
All parameters were below detectión limit (BDL) - all RPD values were within QC limits.

Volatiles - 8030
MND24-0959-0001
MND24-0959-1001
All parameters were below detection limit (BDL) - all RPD values were within QC limits.

Semivolatiles
MND24-0959-0001
MND24-0959-1001
RPD values were out of range for Diethylphthalate, di-n-Butylphthalate, and bis(2-Ethylhexyl)phthalate - however, all reported concentrations were still below the detection limit. These parameters were also detected in the method blanks.
No outliers form required.

Pesticides/PCBs
MND24-0959-0001
MND24-0959-1001
All parameters were below detection limit (BDL) - all RPD values were within QC limits.

Inorganics - Metals
MND24-0959-0001
MND24-0959-1001
RPD values were out of range for Potassium and Lead.
RPD values could not be calculated for Lithium or Tin because concentrations were not detectable in one sample.

Inorganics - Anions
MND24-0959-0001
MND24-0959-1001
All RPD values were within QC limits.

4.2. FIELD BLANKS (equipment blanks, etc.)

Volatiles 502.2
Trip Blank samples were within acceptable range.

Volatiles 8030
Trip Blank samples were within acceptable range.

Semivolatiles
No field blank samples were analyzed for this batch.

Pesticides/PCBs
No field blank samples were analyzed for this batch.

Inorganics - Metals
No field blank samples were analyzed for this batch.

Inorganics - Anions
No field blank samples were analyzed for this batch.

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced within the following sample analysis discussions.

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by Gas Chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list. The laboratory correctly added three compounds, but analyzed for trichlorotrifluoromethane, not trichlorotrifluoroethane.

One of the added compounds, 2-chloroethylvinylether was very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. The compound was only calibrated to a 4-point curve, not a 5 or 7-point curve. Preservation of the ground-water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinylether in them (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinylether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that 80-120% recovery be achieved. This variance affected the accuracy of low level volatile quantitations.

A total of 2 of 64 surrogate recoveries and 15 of 61 blank spike recoveries were outside QAPP control limits. Several results from daily and continuing calibration analyses were outside QAPP control limits. The water sample results affected by these quality control analyses were given a J_c qualifier to indicate that the results were considered to be an estimated value. The J qualifier reflected a degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

A surrogate solution used for water-sample analysis was contaminated, so the water-samples were reanalyzed. The reanalysis however, occurred outside of the holding time limit. Consequently, all of the reanalyzed data was given a J_h qualifier, and the primary result quantitation limits were increased. There were no VOCs reported in the original analysis, and the data was considered usable.

Acrylonitrile and Acetonitrile - Method 8030

All water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

No Method 8030 analytes were detected in the eight water samples. No Method 8030 analytes were detected in the trip blank. No Method 8030 analytes were detected in the method blanks.

All quality control analyses met acceptance criteria. No data from this batch was qualified.

TCL Volatiles, sediments - CLP SOW
There were no sediment samples analyzed in this batch.

TCL Semivolatiles - CLP SOW
No TCL semivolatiles were detected in the five water samples. Four semivolatiles, benzoic acid, diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate, were detected in the method blank. Unknown and Tentatively Identified Compounds were reported in the water samples and method blank.

Diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate, which are common analytical contaminants, were detected at concentrations below the CRQL. Benzoic acid, also was detected at concentrations below the CRQL. The water sample results for the detected semivolatiles were qualified (UJ) based on an evaluation of the method blank analytical results, however the qualified data was still considered usable.

A total of 1 of 56 surrogate recoveries, and 1 of 11 spike recoveries were out of EPA control limits. Affected samples were qualified (J_K), but usable.

The TIC were not found in any of the water samples at the target compound retention times, so their presence in the method blank did not affect the quality of the analytical results.

Pesticides/PCBs - CLP SOW
One sample was extracted a second time and reanalyzed out of holding time. All results were qualified as estimated (J_H).

No pesticides or PCBs were detected in the five water samples analyzed for pesticides and PCBs, except for 4,4'-DDE (0.036 ug/L) and 4,4-DDD (0.028 ug/L) reported in sample MND24-0936-0001. No pesticides or PCBs were detected in the method blanks.

A total of 13 of 40 surrogate recoveries did not meet acceptance criteria. All affected data were qualified as estimated (J_K). Surrogate recoveries in one sample were zero percent for DCB. Sample results were unusable and qualified as R.

TAL Inorganics and Cyanide - CLP SOW
All samples were analyzed for TAL metals using Modification B of the CLP Statement of Work. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/L for antimony and 2 ug/L for beryllium and thallium. For all remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Aluminum, calcium, iron, and zinc were reported at concentrations above the CRQL in five of the five water samples. Arsenic, cadmium, lead, magnesium, manganese, sodium, and vanadium were reported at concentrations above the CRQL in at least one of the five samples. In addition to these eleven inorganics, barium, cobalt, chromium, lithium, potassium, nickel, molybdenum, tin, and mercury were reported at concentrations less than the CRQL but greater than the IDL in at least one water sample.

The concentration of lead in sample MND24-0946-0001 was determined using the Method of Standard Additions.

Several of the inorganics results were given a J qualifier to indicate that the results were considered to be an estimated value. They were regarded as estimated based on an evaluation of matrix spike, duplicate sample, and serial dilution analyses that exceeded control limits. Affected samples were qualified using J_S, J_D, and J_I as appropriate. The J qualifier reflected the degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Other Analytes

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric, Automated Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

The analytes included alkalinity, total cyanide, fluoride, nitrate-nitrite, nitrate (as nitrogen), total dissolved solids, and total suspended solids.

All quality control analyses met acceptance criteria. No samples were qualified.

REPORT OF DATA VALIDATION RESULTS
FOR CHEMICAL ANALYSES

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
FIRST GROUNDWATER AND SEDIMENT SAMPLING EVENT BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9402L482

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX
Ground Water Samples - 3
Quality Control Blanks - 3

1.3. DATE OF COLLECTION
2/2/94

1.4. CHAIN OF CUSTODY IDENTIFIER
N/A

1.5. TYPE OF ANALYSIS
Volatile Organic Compounds by Method 502.2
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 03.0)
Fluoride by Method E340.2
Alkalinity by Method E310.1
Nitrite, as N by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2
Total Suspended Solids by Method E160.2
Total Dissolved Solids by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY
All samples were received in good condition by the laboratory.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:		Laboratory ID:
MND24-0949-0001	-	9402L482 001
MND24-0960-0001	-	9402L482 003
MND24-0958-0001	-	9402L482 004
MND24-0949-2001	-	9402L482 002
MND24-0958-2001	-	9402L482 006
MND24-0958-3001	-	9402L482 005

2. HOLDING TIMES - RFW9402L482

All analyses were completed within the required holding times with the exception of the following:

ANALYSIS	RFW #	MOUND I.D.	DAYS OUT OF EXTRACTION TIME	DAYS OUT OF HOLD. TIME
Pesticides/PCBs	9402L482-003-R1	MND240960-0001	29	

Sample results were qualified as estimated (J_H).

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Instrument Tuning met performance criteria. No samples were qualified.

3.1.2. Calibration

Volatiles 502.2
All samples quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. Initial and Continuing Calibration Verification criteria set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for 7-point curve. Few compounds calibrated to 5-pointed curve and one compound (2-Chloroethylvinyl ether) to a 4-point curve; all compounds met linearity criteria.

Initial calibration results for confirmation columns met linearity criteria for 5-point curve at minimum, except for vinyl chloride and bis(2-Chloroisopropyl)ether.

1,1-Dichloroethane was out of range for Initial Calibration Verification of GC/PID for the primary column. Immediately following Continuing Calibration Verification, sample met criteria for 1,1-Dichloroethane. No positive 1,1-Dichloroethane results were reported. No samples were qualified.

Numerous compounds were out of range in the Initial Calibration Verification sample for the confirmation column. Confirmation and method blank data not qualified because associated Continuing Confirmation Verification sample data met criteria.

Several compounds were out of range for Continuing Calibration Verification of primary column, affecting associated samples. None of the compounds reported with positive results. Affected samples were qualified as J_c. Confirmation samples qualified (J_c) for bromodichloromethane.

Retention Time Window criteria was met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention time windows were within required limits during analysis of all Initial and Continuing Calibration samples.

Continuing Calibration Verification recoveries did not meet 85-115% control limits. All samples were affected. Acetonitrile and Acrylonitrile results qualified as U J_c.

Semivolatiles
Initial and Continuing Calibration Analysis Verification met performance criteria.

3.1.3. Blanks

Volatiles 502.2
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Semivolatiles
94LE0245-MBA SBLK
The following compounds were detected in the Method Blank, resulting in elevated quantitation limits for related samples: Benzoic Acid, Diethylphthalate, di-n-Butylphthalate, bis(2-Ethylhexyl)phthalate, and an unknown compound. Quantitation levels were increased for related sample results.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2
% Recovery was out of range for the following:

MND24-0958-3001CON (confirmation sample) Bromochloromethane

Sample MND24-0958-3001CON was analyzed on the confirmation column. No samples were qualified.

Volatiles 8030
All surrogate spike recoveries were within acceptable range.

Semivolatiles
% Recovery was out of range for the following:

MND24-0949-0001 2-Fluorobiphenyl
Affected samples were qualified as J_k for the appropriate analysis.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2
There were no matrix spike or matrix spike duplicate samples for this analysis.

Volatiles 8030
There were no matrix spike or matrix spike duplicate samples for this analysis.

Semivolatiles
There were no matrix spike or matrix spike duplicate samples for this analysis.

3.1.6. Internal Standards

Semivolatiles
The Internal Standard (IS) performance for Batch 9402L482 (Semivolatiles/Water Matrix) met acceptance criteria.

3.1.7. Compound Identification

Semivolatiles
All compounds were within ±0.06 relative retention time units of the standard RT.

3.1.8. System Performance

Volatiles 502.2
Occasional low resolution on peaks with retention times of less than 9 minutes. No sample qualification required.

Volatiles 8030-Water
Evaluation of the chromatograms identified a baseline rise at high temperatures, in addition to few extraneous peaks and peak splitting possibly due to a contaminated column. No sample qualification required.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems other than the presence of Tentatively Identified Compounds (TICs) in Method Blanks. No sample qualification required.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Semivolatiles
Compound quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

3.1.10. Tentatively Identified Compounds

Semivolatiles
A review of mass spectra indicated that one Tentatively Identified Compound was detected in one sample. A spectral match was identified for 2-(4-Phenoxyphenoxy), Benzoate Ethanol in sample MND24-0960-0001.

3.1.11. Laboratory Control Sample

Volatiles 502.2
% Recovery was out of range for the following:

94LV4408-MBA-BS BLK	Bromodichloromethane, Trichloroethene, cis-1,3-Dichloropropene, Benzene, trans-1,3-Dichloropropene, Bromoform, 1,1,2,2-Tetrachloroethane

Affected sample were qualified as J_K.
Ethylbenzene was qualified (I) due to an additional unidentified compound for sample 94LV4408-MBA-BS BLK.

Volatiles 8030
All Laboratory Control Samples were within acceptable range.

Semivolatiles
% Recovery was out of range for the following:

94LE0245-MBA-BS	4-Nitrophenol

The affected samples were qualified (J_K).

3.2. PESTICIDES/PCBs

3.2.1. GC/ECD Performance Check

The DDT retention times fell within the quality control limits of greater than twelve minutes for all analyses.

The standard retention time values for Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) were outside of QC limits for five samples. Other DCB retention times were flagged on form 8D due to incorrect standard identification on chromatograms and quantitation reports. All other retention times fell within the QC limits.

The standard retention times for single component analytes fell within the established retention time windows.

3.2.2. Performance Evaluation Mixture

3.2.2.1. Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

The PEM retention times fell within the established retention time windows.

3.2.2.3. Recovery

The RPD for each single component pesticide and surrogate met the recovery criteria of ≥ -25.0 and ≤ 25.0%.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and Endrin met the acceptance criteria of ≤ 20.0% and ≤ 30.0% combined breakdown with the following exceptions:

Lab Sample I.D./Sample Number 03089411.02\PEMLA-5204

Endrin Breakdown 28.0%
Combined Breakdown 34.0%

Affected sample results were qualified (J).

3.2.3. Calibration

Calibration criteria differ between CLP SOW and Functional Guidelines for Evaluation Organic Analyses. When these cases occurred, the SOW was used as validation criteria as noted:

The SOW requires the %RSD of calibration factors to be <20%, not <10%.

The resolution between adjacent peaks in the resolution check mixture met the resolution criteria of ≥ 60.0%.

Reconstructed ion chromatograms were plotted off scale. However, the peak height data on the quantitation sheets did not appear clipped. Retention time windows should not be affected.

The %D of sample results reported for two GC columns met the acceptance criteria.

Calibration factors and %RSD were recalculated and meet the acceptance criteria.

3.2.4. Blanks

Method Blank
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Sulfur Cleanup Blank
Sulfur cleanup not performed on this batch.

3.2.5. Surrogate Spike Recoveries

% Recovery was out of range for the following:

MND24-0960-0001	TCMX-1, TCMX-2, DCB-1, DCB-2
MND24-0958-0001	TCMX-1, TCMX-2
94LE0234-MBA-BS PBLKTE	TCMX-1

The affected samples were qualified J_K.

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

There were no matrix spike or matrix spike duplicate samples for this analysis.

3.2.7. Compound Identification

The retention times of the reported compounds fell within the calculated retention time windows.

Secondary column confirmation was performed for all results greater than the PQL.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

GPC cleanup method not used for this batch.

3.2.8.2. Florisil Cartridge Cleanup

All percent recoveries were within acceptable range.

3.2.9. System Performance

Secondary columns exhibited occasional non-linear baselines and infrequent baseline shifts. Peaks present in multi-peak standards misidentified as DCB standard, DCB peaks properly identified in remaining samples. No sample qualification required.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

3.2.11. Laboratory Control Sample

All Laboratory Control samples were within acceptable range.

3.3. INORGANIC METALS AND CYANIDE

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the following documents: USEPA Contract Laboratory Statement of Work for Inorganics Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All Initial and Continuing Calibration Verification samples were within control limits (Form 2A). Standards were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required quantitation limits (CRQLs).

3.3.2. Blanks

Values greater than the Instrument Detection Levels were used as acceptance criteria for Initial Calibration blanks and Continuing Calibration blanks. The blank acceptance values were an approved variance from the OU-9 QAPP.

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria (Form III).

3.3.2.2. Calibration Blanks

Continuing calibration blanks analyzed for this batch met acceptance criteria, except for the following:

Continuing Calibration Blank #1:	aluminum
Continuing Calibration Blank #3:	aluminum

For both of these analyses, the magnitude of the blank result exceeded the magnitude of the client-approved blank acceptance criteria. The calibration blank and water-quality sample results for aluminum were given an R qualifier (Forms I, III).

3.3.3. Interference Check Sample

Results of the interference check sample met acceptance criteria (Form IV).

3.3.4. Laboratory Control Samples

All laboratory control samples met acceptance criteria (Form VII).

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis met acceptance criteria, except for sodium. The duplicate and water-quality sample results for sodium were given a J_D qualifier (Forms I, VI).

3.3.6. Matrix Spike Sample Analysis

Results of the spike sample analysis met acceptance criteria, except for antimony and cadmium. The spike and water-quality sample results for antimony and cadmium were given a J_S qualifier (Forms I, V). A spike sample analysis was not required for calcium, sodium, magnesium, and mercury.

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

Results of the ICP analysis met acceptance criteria.

3.3.6.2. GFAA Metals

MND24-0949-0001
% Recovery was out of range for Cadmium and Antimony.

3.3.6.3. Cyanide

Results of the cyanide analysis met acceptance criteria.

3.3.6.4. Flame AA Metals

Results of the flame atomic absorption analysis met acceptance criteria.

3.3.6.5. Automated Cold Vapor AA

A matrix spike analysis was not required for Mercury.

3.3.7. Furnace Atomic Absorption QC

The furnace atomic absorption QC results met acceptance criteria, except for antimony. The water-quality results for antimony were given a J_S qualifier (Form I).

3.3.8. Standard Addition Results

Standard additions were not required for this batch (Form VIII).

3.3.9. ICP Serial Dilution

ICP serial dilution results met acceptance criteria for 22 of the 28 analytes. The following six analytes did not meet acceptance criteria: barium, calcium, iron, magnesium, sodium, and zinc. The serial dilution and water-quality sample results for these six analytes were given a J_1 qualifier (Forms I, IX).

3.3.10. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

3.4.1. Calibration

3.4.1.1. Alkalinity

- The pH meter was calibrated with 4.0 and 7.0 standards at the beginning and after every ten samples.

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

- 4 point calibration verified
- correlation coefficient $\geq .995$
- continuing calibration check was run every 20 samples
- calibration check responses are within 15% of true value

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

Use of S class weights not documented.
Daily calibration of balance not documented. Calibration verified within 48-hour time span.

3.4.2. Blanks

Inorganics - Anions
All Preparation Blank samples met acceptance criteria; no sample qualifiers were required.

All Calibration Blanks met acceptance criteria. No data was qualified.

3.4.3. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

All matrix spike and matrix spike duplicate recoveries were within acceptable range.

3.4.5. Sample Result Verification

Nitrate-Nitrite and Nitrite as Nitrogen concentrations were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

Recalculation of the Alkalinity, Fluoride, Total Dissolved Solids, and Total Suspended Solids data agreed with the reported results.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

Volatiles - 502.2
No field duplicates were analyzed for this analysis.

Volatiles - 8030
No field duplicates were analyzed for this analysis.

Semivolatiles
No field duplicates were analyzed for this analysis.

Pesticides/PCBs
No field duplicates were analyzed for this analysis.

Inorganics - Metals
No field duplicates were analyzed for this analysis.

Inorganics - Anions
No field duplicates were analyzed for this analysis.

4.2. FIELD BLANKS (equipment blanks, etc.)

Volatiles 502.2

Trip Blanks
Trip Blank samples were within acceptable range.

Ambient Blanks
MND24-0958-3001
Outliers for Chloroform and Bromodichloromethane.
MND24-0958-3001 C1 (confirmation sample)
Outliers for Chloroform and Bromodichloromethane.

Volatiles 8030

Trip Blanks
Trip Blank samples were within acceptable range.

Ambient Blanks
Ambient Blank sample was within acceptable range.

Semivolatiles
No field blank samples were analyzed for this batch.

Pesticides/PCBs
No field blank samples were analyzed for this batch.

Inorganics - Metals
No field blank samples were analyzed for this batch.

Inorganics - Anions
No field blank samples were analyzed for this batch.

5. OVERALL ASSESSMENT OF DATA

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced within the following sample analysis discussions.

TCL Volatiles - Method 502.2

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by Gas Chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list. The laboratory correctly added three compounds, but analyzed for trichlorotrifluoromethane, not trichlorotrifluoroethane.

The added compound 2-chloroethylvinyl ether is very unstable, which is indicated by a disclaimer on the manufacturer's certificate of analysis. The compound could be calibrated to only a 4-point curve, not a 5 or 7-point curve. Preservation of the ground water samples by the addition of HCL could eliminate the presence of 2-chloroethylvinyl ether (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinyl ether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns. The close elution of ethylbenzene with another compound caused integration problems for all confirmation column blank spikes. However, ethylbenzene was not quantitated by the primary column for any samples.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that 80-120% recovery be achieved. This variance may affect the accuracy of low level volatile quantitations.

Several samples were qualified (J_c) due to Daily Calibration Verification and Continuing Calibration Verification standards that were outside of QAPP control limits.

Acrylonitrile and Acetonitrile - Method 8030

All ground water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

One Continuing Calibration Verification sample failed to meet the acceptance criteria. All sample quantitation limits were qualified as estimated due to calibration criteria (J_c), but usable.

TCL Volatiles, sediments - CLP SOW

No sediment samples were included in this batch.

TCL Semivolatiles - CLP SOW

The laboratory analyzed each sample for all semivolatile target compounds listed in the OU-9 QAPP. Sample extract concentrations were modified from Method OLM01.8 to achieve the lower reporting limits required by the QAPP.

One sample was extracted a second time out of holding time and analyzed. All sample results were qualified as estimated (J_H), but usable.

One laboratory blank contained common laboratory contaminants (diethylphthalate, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate) and one target compound (benzoic acid) at concentrations below the CRQL. The detection limits for these compounds were increased accordingly.

Spike recoveries were out of range for surrogate spike, matrix spike, and laboratory control samples. Because only one surrogate failed the recovery criteria in each sample, no sample results required qualification.

A review of mass spectra indicated one sample contained a Tentatively Identified Compound, 2-(4-Phenoxyphenoxy),benzoate ethanol. Numerous other unidentified compounds were detected but did not meet spectral identification criteria.

Two groundwater samples failed FGFEOA surrogate recovery criteria. Sample results were qualified as estimated (J_K).

Pesticides/PCBs - CLP SOW

Calibration criteria differed between the CLP SOW and the Functional Guidelines for Evaluating Organic Analyses. The method criteria were used in these cases.

Breakdown criteria were not met in a Performance Evaluation Sample mixture prior to column calibration. Breakdown criteria were met following calibration. No sample results were qualified.

The laboratory misidentified a standard (DCB) peak on some chromatograms, resulting in standard retention times that failed the standard RT criteria on Form 8D. The validators marked the correct peaks and their retention times, thereby reducing the number of RT outliers. No sample results required qualification for retention time criteria.

Surrogate recoveries were below QC limits for two water samples and a method blank (excluding reanalyzed samples). All associated positive results and quantitation limits were qualified as estimated (J) but useable.

TAL Inorganics and Cyanide - CLP SOW

All samples were analyzed for Target Analyte List metals by Modification B of the CLP Statement of Work. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/l for antimony and 2 parts per billion for beryllium and thallium. For all remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance should not reduce the quality of the resulting data.

Two Continuing Calibration Blanks failed the blank acceptance criteria for aluminum. All affected sample results were qualified as unusable (R).

Sample MND24-0949-0001 failed the Serial Dilution percent difference (%D) criteria for six metals. All affected sample results were qualified as estimated (J_I). Matrix spike results for this sample failed to meet the acceptance criteria for cadmium and antimony. All affected sample results were qualified as estimated (J_S) but usable.

Duplicate sample results were out of range for sodium. Sodium results for all three samples were qualified as estimated (J_D) but usable.

Other Analytes

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric, Automated Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

The analyses performed included alkalinity, total cyanide, fluoride, nitrate-nitrite, nitrate (as nitrogen), total dissolved solids, and total suspended solids. All analyses of other analytes met acceptance criteria, with the exception summarized below.

All anion results met OU-9 QAPP criteria.

REPORT OF DATA VALIDATION RESULTS
FOR CHEMICAL ANALYSES

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
FIRST GROUNDWATER AND SEDIMENT SAMPLING EVENT BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9402L500 and 9403L843 (Nitrate, Nitrite, and Fluoride)

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX
Ground Water Samples - 7
Sediment Samples - 1
Quality Control Blanks - 4

1.3. DATE OF COLLECTION
2/3/94

1.4. CHAIN OF CUSTODY IDENTIFIER
N/A

1.5. TYPE OF ANALYSIS
Volatile Organic Compounds (ground water only) by Method 502.2
Volatile Organic Compounds (sediments only) by CLP SOW Modification D (OLM01.8)
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 03.0)
Fluoride by Method E340.2
Alkalinity (ground water only) by Method E310.1
Nitrite, as N (ground water only) by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2 - *Sample MND25-0935-0001 was extracted incorrectly and reanalyzed out of holding time (Batch 9403L843). Nitrate-Nitrite results will be qualified as estimated. (J_H).*
Total Suspended Solids (ground water only) by Method E160.2
Total Dissolved Solids (ground water only) by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY
All samples were received in good condition by the laboratory.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:		Laboratory ID:
MND24-0963-0001	-	9402L500 001
MND24-0935-0001	-	9402L500 002
MND24-0935-0001 MS	-	9402L500 002 MS
MND24-0935-0001 MSD	-	9402L500 002 MSD
MND24-0962-0001	-	9402L500 005
MND24-0950-0001	-	9402L500 009
MND24-0950-1001	-	9402L500 008
MND24-0963-2001	-	9402L500 004
MND24-0935-2001	-	9402L500 003
MND24-0962-2001	-	9402L500 007
MND24-0950-2001	-	9402L500 010
MND25-0935-0001	-	9402L500 006

The sediment sample was relogged for anion analyses as follows:

MND25-0935-0001	-	9403L843 001

2. HOLDING TIMES - RFW9402L500

All analyses were completed within the required holding times with the exception of the following:

ANALYSIS	RFW #	MOUND I.D.	DAYS OUT OF EXTRACTION TIME	DAYS OUT OF HOLD. TIME
G.C. Volatiles (8030)	9402L500-008-R1	MND240950-1001	20	
Pesticides/PCBs	9402L500-002-R1	MND240965-0001	21	
Pesticides/PCBs	9402L500-002- R1	MND240935-0001	28	
Pesticides/PCBs	9402L500-002-MS-R1	MND240935-0001	28	
Pesticides/PCBs	9402L500-002-MSD-R1	MND240935-0001	28	
Pesticides/PCBs	9402L500-006-R1	MND250935-0001	21	7
Pesticides/PCBs	9402L500-006-R2	MND250935-0001		7
Pesticides/PCBs	9402L500-008-Z1	MND250935-0001		7
Pesticides/PCBs	9402L500-001-Z2	MND250935-0001		7
Pesticides/PCBs	9402L500-008-R1	MND240950-0001	28	
Nitrate/Nitrite	9403L843-001	MND250935-0001		39

All Pesticide/PCB results were qualified as estimated (J_H).
The Nitrate/Nitrite sample results were rejected (R qualifier).

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Instrument tuning met performance criteria. No samples qualified.

3.1.2. Calibration

Volatiles 502.2
All samples quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. Initial and Continuing Calibration Verification criteria set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for 7-point curve. Few compounds were calibrated to 5-pointed curve and one compound (2-Chloroethylvinyl ether) to a 4-point curve; all compounds met linearity criteria.

Initial calibration results for confirmation columns met linearity criteria for 5-point curve at minimum, except for vinyl chloride and bis(2-Chloroisopropyl)ether.

1,1-Dichloroethane was out of range for Initial Calibration Verification of GC/PID for the primary column. Immediately following Continuing Calibration Verification the sample met criteria for 1,1-Dichloroethane. No positive 1,1-Dichloroethane results were reported. No samples were qualified.

Numerous compounds were out of range in the Initial Calibration Verification sample for the confirmation column. Confirmation and method blank data were not qualified because associated Continuing Confirmation Verification sample data met criteria.

Several compounds were out of range for Continuing Calibration Verification of primary and confirmation columns, affecting associated samples. None of the compounds reported with positive results. Affected samples were qualified as J_c.

Retention Time Window criteria were met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention time windows were within required limits during analysis of all Initial and Continuing Calibration samples.

Continuing Calibration Verification recoveries did not meet 85-115% control limits. Eleven samples were affected. Acrylonitrile and acetonitrile results qualified as J_c.

Volatiles CLP SOW - Sediment
Instrument calibration met performance criteria. No samples qualified.

Semivolatiles
Two compounds were out of range in the Initial Calibration Analysis Verification. The outlier compounds were Benzoic acid and Dibenz(a,4)anthracene which affected the following seven samples:

Machine No. IN50J

94LE0389-MB1
94LE0389-MB1-BS

Machine No. 5100M

94LE0261-MB1-BS
94LE0298-MB1
94LE0298-MB1-BS
MND24-0935-0001-MS
MND24-0935-0001-MSD

The affected sample results were qualified (J_c) with the exception of 94LE0261-MB1-BS, 94LE0298-MB1 and 94LE0298-MB1-BS.

Three compounds were out of range in the Continuing Calibration Analysis Verification. The outlier compounds were Benzo(k)fluoranthene, Pentachlorophenol and Hexachlorobenzene which affected the following ten samples:

Machine No. 5100M

94LE0261-MB1-BS
94LE0298-MB1
94LE0298-MB1-BS
MND24-0935-0001-MS
MND24-0935-0001-MSD

Machine No. 5100SP

94LE0316-MB1
94LE0316-MB1-BS
MND25-0935-0001
MND25-0935-0001-MS
MND25-0935-0001-MSD

The affected sample results were qualified (J_c) with the exception of 94LE0261-MB1-BS, 94LE0298-MB1 and 94LE0298-MB1-BS.

3.1.3. Blanks

Volatiles 502.2 - Water
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030 - Water
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles CLP SOW - Sediments
94LVX025-MB1 VBLK
Methylene chloride and acetone were detected in the Method Blank, resulting in elevated quantitation limits for these compounds. Affected sample results were qualified (UJ_B).7845

Semivolatiles
94LE0245-MB1 SBLK
The following compounds were detected in the Method Blank, resulting in elevated quantitation limits for related samples: Benzoic Acid, Diethylphthalate, di-n-Butylphthalate, bis(2-Ethylhexyl)phthalate, an unknown compound and Methylcyclopentanol (Tentatively Identified Compound).
94LE0316-MB1 SBLK
The following compound was detected in the Method Blank, resulting in an elevated quantitation limit for related samples: Aldol Condensate (Tentatively Identified Compound).
An unknown compound was detected in the Method Blank only. No samples were qualified.
94LE0389-MB1 SBLK
Three unknown compounds were detected in the Method Blank.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2 - Water
All surrogate spike recoveries were within acceptable range.

Volatiles 8030 - Water
All surrogate spike recoveries were within acceptable range.

Volatiles CLP SOW - Sediments
All surrogate spike recoveries were within acceptable range.

Semivolatiles
MND24-0935-0001 MSD (matrix spike duplicate)
% Recovery was out of range for 2-Fluorobiphenyl.
MND24-0950-1001 (field duplicate)
% Recovery was out of range for Nitrobenzene.
MND24-0950-0001
% Recovery was out of range for 2-Fluorobiphenyl.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2 - Water
All matrix spike and matrix spike duplicate recoveries were within acceptable range.

Volatiles 8030 - Water
All matrix spike and matrix spike duplicate recoveries were within acceptable range.

Volatiles CLP SOW - Sediments
All matrix spike and matrix spike duplicate recoveries were within acceptable range.

Semivolatiles
MND24-0935-0001 MS
% Recovery was out of range for 1,4-Dichlorobenzene, 1,2,4-Trichlorobenzene, and 4-Nitrophenol.

MND24-0935-0001 MSD
% Recovery was out of range for 1,4-Dichlorobenzene, 1,2,4-Trichlorobenzene, and 4-Nitrophenol.
RPD was out of range for 1,4-Dichlorobenzene, 1,2,4-Trichlorobenzene, and 4-Chloro-3-Methylphenol.
MND25-0935-0001 MSD
% Recovery was out of range for Pentachlorophenol.

3.1.6. Internal Standards

Volatiles
The Internal Standard (IS) performance for Batch 9402L500 (Volatiles/Sediment Matrix) met acceptance criteria.

Volatiles CLP SOW - Sediment

Chlorobenzene-D5 did not meet acceptance criteria.
Sample MND25-0935-0001-MS qualified as estimated (J_l).

Semivolatiles
The Internal Standard (IS) performance for Batch 9402L500 (Semivolatiles/Water Matrix) met acceptance criteria.

3.1.7. Compound Identification

Volatiles CLP SOW - Sediment
All retention times met the acceptance criteria with the following exceptions:

MND25-0935-0001	Acetone	Retention Time Out (0.7)
	2-Butanone	Retention Time Out (0.08)
MND25-0935-0001-MS	Acetone	Retention Time Out (0.07)
	Acetonitrile	Retention Time Out (0.17)
MND25-0935-0001-MSD	Acetonitrile	Retention Time Out (0.14)
	2-Butanone	Retention Time Out (0.10)

All mass spectra of the sample compound and laboratory generated standard met the acceptance criteria.

Semivolatiles
All compounds were within ±0.06 relative retention time units of the standard RT.

3.1.8. System Performance

Volatiles 502.2
Extraneous peaks occurred in environmental samples, possibly related to column effects. Secondary columns showed frequent merging and tailing peaks. No peaks in method blanks at target compound retention times. No sample qualification required.

Volatiles 8030-Water
Evaluation of the chromatograms identified a baseline rise at high temperatures, in addition to few extraneous peaks and peak splitting possibly due to a contaminated column. No sample qualification required.

Volatiles CLP SOW-Sediment
Evaluation of the chromatograms identified high background levels, few extraneous peaks and peak splitting. No sample qualification required.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems. No sample qualification required.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Semivolatiles
Compound quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

3.1.10. Tentatively Identified Compounds

Semivolatiles
A review of mass spectra indicated that one Tentatively Identified Compound was detected in two samples. A spectral match was identified for 2-Methyl-Cyclopentanol in samples MND24-0962-0001 and MND24-0950-1001.

3.1.11. Laboratory Control Sample

Volatiles 502.2 - Water
94LV4409-MB1-BS BLK
% Recovery was out of range for Bromodichloromethane, Trichloroethene, Benzene, cis-1,3-Dichloropropene, Chlorobenzene, trans-1,3-Dichloropropene, Bromoform, and 1,1,2,2-Tetrachloroethane for confirmation column. None of the compounds were identified in the samples. No sample qualification required.
Ethylbenzene was qualified (I) due to an additional unidentified compound for sample 94LV4409-MB1-BS BLK.

Volatiles 8030 - Water
All Laboratory Control Samples were within acceptable range.

Volatiles CLP SOW - Sediments
All Laboratory Control Samples were within acceptable range.

Semivolatiles
94LE0245-MB1-BS
% Recovery was out of range for 4-Nitrophenol.
94LE0389-MB1-BS
% Recovery was out of range for 4-Nitrophenol and 2,4-Dinitrotoluene.
The affected samples were qualified (J_K).

3.2. PESTICIDES/PCBs

3.2.1. GC/ECD Performance Check

The DDT retention times fell within the quality control limits of greater than twelve minutes for all analyses.

The standard retention time values for Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) were outside of QC limits for ten samples. Other DCB

retention times were flagged on form 8D due to incorrect standard identification on chromatograms and quantitation reports. All other retention times fell within the QC limits.

The standard retention times for single component analytes fell within the established retention time windows.

3.2.2. Performance Evaluation Mixture

3.2.2.1 Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

The PEM retention times fell within the established retention time windows.

3.2.2.3. Recovery

The RPD for each single component pesticide and surrogate met the recovery criteria of ≥ -25.0 and ≤ 25.0%.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and Endrin met the acceptance criteria of ≤ 20.0% and ≤ 30.0% combined breakdown with the following exception:

Lab Sample I.D./Sample Number 03089411.02\PEMLA-5204

Endrin Breakdown 28.0%
Combined Breakdown 34.0%

Affected sample results were qualified (J).

3.2.3. Calibration

Calibration criteria differ between CLP SOW and Functional Guidelines for Evaluation Organic Analyses. When these cases occurred, the SOW was used as validation criteria as noted:

The SOW requires the %RSD of calibration factors to be <20%, not <10%.

The resolution between adjacent peaks in the resolution check mixture met the resolution criteria of ≥ 60.0%.

The %D of sample results reported for two GC columns did not met the acceptance criteria. The affected samples were: MND25-0935-0001, MND25-0935-0001-RE.

Calibration factors and %RSD were recalculated and meet the acceptance criteria.

3.2.4. Blanks

Method Blank
94LE0306-MB1 PBLKUY
Gamma-BHC (Lindane) was detected in the Method Blank. Gamma-BHC concentrations in related water samples were less than five times the method blank concentration, and were not qualified. Gamma-BHC concentrations in the sediment samples were greater than five times the blank concentration and were qualified as estimated (J_B) for the following samples:

MND25-0935-0001
MND25-0935-0001-MS
MND25-0935-0001-MSD

Sulfur Cleanup Blank
Sulfur cleanup not performed on this batch.

3.2.5. Surrogate Spike Recoveries

% Recovery was out of range for the following:

94LE0306-MB1 PBLKXL	TCMX-2
MND24-0963-0001	TCMX-1, TCMX-2
MND24-0935-0001	TCMX-1, TCMX-2, DCB-1, DCB-2
MND24-0935-0001MS	TCMX-1, TCMX-2, DCB-1, DCB-2
MND24-0935-0001MSD	TCMX-1, TCMX-2, DCB-1, DCB-2
MND24-0962-0001	TCMX-1, TCMX-2
MND24-0950-1001	TCMX-1, TCMX-2, DCB-1, DCB-2
MND25-0950-0001	TCMX-1, TCMX-2.
94LE0234-MB1 PBLK	TCMX-1

All associated positive results and quantitation levels were qualified as estimated (J_K) but usable.

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

MND24-0935-0001 MS
% Recovery was out of range for Lindane, Heptachlor, Aldrin, Dieldrin, and Endrin.
MND24-0935-0001 MSD

RPD was out of range for Lindane, Heptachlor, Aldrin, Dieldrin, Endrin, and 4,4'-DDT.
MND24-0935-0001 MS RE
% Recovery was out of range for Lindane.
MND24-0935-0001 MSD RE
RPD was out of range for Lindane.
Matrix spike and matrix spike duplicate recoveries were not reported for MND25-0935-0001 (sediment) due to the requirement of a ten-fold dilution and many interferences.

3.2.7. Compound Identification

The retention times of the reported compounds fell within the calculated retention time windows.

Secondary column confirmation was performed for all results greater than the PQL.

The percent difference between the two columns failed acceptance criteria for gamma-BHC for three samples.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

All percent recoveries were within acceptable range.

3.2.8.2. Florisil Cartridge Cleanup

All percent recoveries were within acceptable range.

3.2.9. System Performance

Secondary columns exhibited occasional non-linear baselines and infrequent baseline shifts. Peaks present in multi-peak standards misidentified as DCB standard, DCB peaks properly identified in remaining samples. No sample qualification required.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

3.2.11. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.
Sediment sample 94LE0306-MB1-BS PBLKUY not quantified for gamma-BHC due to matrix interference.

3.3. INORGANIC METALS AND CYANIDE

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the following documents: USEPA Contract Laboratory Statement of Work for Inorganics Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All Initial and Continuing Calibration Verification samples were within control limits (Form 2A). Standards were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required quantitation limits (CRQLs).

3.3.2. Blanks

Values greater than the Instrument Detection Levels were used as acceptance criteria for Initial Calibration blanks and Continuing Calibration blanks. The blank acceptance values were an approved variance from the OU-9 QAPP.

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria (Form III).

3.3.2.2. Calibration Blanks

Initial and Continuing calibration blanks analyzed for this batch met acceptance criteria (Form III). The cadmium value (-3.5) reported on Form III should have been -3.0, based on the raw data. The potassium value (-129.5) reported on Form III should have been -125.5, based on the raw data.

3.3.3. Interference Check Sample

Results of the interference check sample met acceptance criteria (Form IV).

3.3.4. Laboratory Control Sample

All laboratory control samples met acceptance criteria (Form VII).

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis met acceptance criteria, except for aluminum, cadmium, calcium, magnesium, and mercury. The duplicate and water-quality sample results for analytes not meeting acceptance criteria were given a J_D qualifier (Forms I, VI).

3.3.6. Matrix Spike Sample Analysis

Results of the spike sample analysis met acceptance criteria, except for antimony, arsenic, copper, mercury, selenium, thallium, and tin. The spike and water-quality sample results for analytes not meeting acceptance criteria were given a J_S qualifier (Forms I, V). It was not necessary to analyze spike samples for calcium, sodium, or magnesium.

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

MND24-0935-0001
% Recovery was out of range for Tin.
MND25-0935-0001
% Recovery was out of range for Copper.

3.3.6.2. GFAA Metals

MND24-0935-0001
% Recovery was out of range for Antimony and Thallium.
MND25-0935-0001
% Recovery was out of range for Arsenic, Selenium, and Thallium.

3.3.6.3. Cyanide

A matrix spike analysis was not required for cyanide.

3.3.6.4. Flame AA Metals

Analytical results met acceptance criteria.

3.3.6.5. Automated Cold Vapor AA

MND25-0935-0001
% Recovery was out of range for Mercury.

3.3.7. Furnace Atomic Absorption QC

The furnace atomic absorption QC results met acceptance criteria, except for the following samples:

MND24-0935-0001: arsenic, lead, thallium.
MND24-0950-0001: arsenic, cadmium, antimony.
MND24-0950-1001: arsenic, cadmium, lead.
MND24-0962-0001: arsenic, cadmium, lead, antimony.
MND24-0959-1001: arsenic, cadmium, thallium.
MND25-0935-0001: thallium.

The water-quality results for analytes not meeting acceptance criteria were given a J_S qualifier (Form I).

3.3.8. Standard Addition Results

Standard additions for arsenic were performed on Sample MND24-0950-0001 (Form VIII).

3.3.9. ICP Serial Dilution

ICP serial dilution results met acceptance criteria, except for calcium, magnesium, and zinc. The serial dilution and water-quality sample results for analytes not meeting acceptance criteria were given a J_I qualifier (Forms I, IX).

3.3.10. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

3.4.1. Calibration

3.4.1.1. Alkalinity

- pH meter calibrated with 4.0 and 7.0 standards at the beginning and after every ten samples

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

- 4 point calibration verified
- correlation coefficient ≥.995
- continuing calibration check was run every 20 samples
- calibration check responses are within 15% of true value

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

Use of S class weights not documented.
Calibration verified within 24-hour time span.

3.4.2. Blanks

Inorganics - Anions
All Preparation Blank samples met acceptance criteria; no sample qualifiers were required. Check List for this analysis was not provided.

Inorganics - Anions - Sediments
All Preparation Blank samples met acceptance criteria; no sample qualifiers were required. Analyzed for Nitrate-Nitrite and Fluoride only.
Relogged as 9403L843.

All Calibration Blanks met acceptance criteria. No data was qualified.

3.4.3. Laboratory Control Sample

Inorganics - Anions
All Laboratory Control Samples were within acceptable range.

Inorganics - Anions - Sediments
All Laboratory Control Samples were within acceptable range.
Relogged as 9403L843.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

Inorganics - Anions
MND25-0935-0001 MS
% Recovery was out of range for Nitrate-Nitrite and Fluoride.
MND25-0935-0001 MSD
% Recovery was out of range for Nitrate-Nitrite and Fluoride.
Affected samples were qualified (J_S).

Inorganics - Anions - Sediments
All matrix spike and matrix spike duplicate recoveries were within acceptable range.
Relogged as 9403L843. Some analyte holding times were exceeded for batch 9403L843 and sample results were qualified (R).

3.4.5. Sample Result Verification

Nitrate-Nitrite and Nitrite as Nitrogen concentrations were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

Recalculation of the Alkalinity data agreed with the reported results.

Recalculation of the Fluoride data agreed with the reported results.

Recalculation of the Total Dissolved Solids data and the Total Suspended Solids data agreed with the reported results.

Recalculation of the Percent Solids data agreed with the reported results.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

Volatiles - 502.2 - Water
MND24-0950-0001
MND24-0950-1001
All parameters were below detection limit (BDL) - all RPD values were within QC limits.

Volatiles - 8030 - Water
MND24-0950-0001
MND24-0950-1001
All parameters were below detection limit - all RPD values were within QC limits.

Volatiles CLP SOW - Sediments
No field duplicates were analyzed for this analysis.

Semivolatiles
MND24-0950-0001
MND24-0950-1001
RPD values were out of range for Diethylphthalate, di-n-Butylphthalate, and bis(2-Ethylhexyl)phthalate - however, all reported concentrations were still below the detection limit. These parameters were also detected in the Method Blanks. No samples results were qualified.

Pesticides/PCBs
MND24-0950-0001
MND24-0950-1001
All parameters were below detection limit - all RPD values were within QC limits.

Inorganics - Metals
MND24-0950-0001
MND24-0950-0001
RPD values were out of range for Aluminum, Copper, Iron, Manganese, and Zinc.
RPD values were not calculated for Cobalt because concentrations were not detectable in one sample.

Inorganics - Anions
MND24-0950-0001
MND24-0950-1001
All RPD values were within QC limits.

Inorganics - Anions - Sediments
No field duplicates for this analysis, relogged as 9403L843.

4.2. FIELD BLANKS (equipment blanks, etc.)

Volatiles 502.2 - Water
Trip Blank samples were within acceptable range.

Volatiles 8030 - Water
Trip Blank samples were within acceptable range.

Volatiles CLP SOW - Sediments
No field blank samples were analyzed for this analysis.

Semivolatiles
No field blank samples were analyzed for this analysis.

Pesticides/PCBs
No field blank samples were analyzed for this analysis.

Inorganics - Metals
There were no field blanks in this batch.

Inorganics - Anions
No field blank samples were analyzed for this analysis.

Inorganics - Anions - Sediments
No field blank samples were analyzed for this analysis.

5. OVERALL ASSESSMENT OF DATA

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced within the following sample analysis discussions.

TCL Volatiles - Method 502.2

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by Gas Chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list. The laboratory correctly added three compounds, but analyzed for trichlorotrifluoromethane, not trichlorotrifluoroethane.

The added compound 2-Chloroethylvinyl ether is very unstable, which is indicated by a disclaimer on the manufacturer's certificate of analysis. The compound could be calibrated to only a 4-point curve, not a 5 or 7-point curve. Preservation of the ground water samples by the addition of HCL could have eliminated 2-Chloroethylvinyl ether if it were present (see laboratory narrative). These conditions reduced the ability of the laboratory to quantitate low levels of this compound. 2-Chloroethylvinyl ether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns. The close elution of ethylbenzene with another compound caused integration problems for all confirmation column blank spikes. However, ethylbenzene was not quantitated by the primary column for any samples.

The presence of cis-1,2-Dichloroethene was quantified on the confirmation column using a single-point comparison. The point used was from the Daily Calibration Verification analyzed prior to the analysis of the sample. However, several standards used for initial calibration of the confirmation chromatograph did not contain this compound. The confirmation result was qualified as estimated (J_c).

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that 80-120% recovery be achieved. This variance may have affected the accuracy of low level volatile quantitations.

Several samples were qualified (J_c) due to Daily Calibration Verification and Continuing Calibration Verification standards that were outside of QAPP control limits.

The analytical data package contained a few typographical mistakes that were confirmed and corrected by the validators.

Acrylonitrile and Acetonitrile - Method 8030

All ground water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

All acrylonitrile and acetonitrile data are usable.

TCL Volatiles (sediments) - CLP SOW
The laboratory analyzed the sediment sample for all target compounds listed in the OU-9 QAPP.

Laboratory blanks contained methylene chloride and acetone, resulting in an increased quantitation levels for these compounds.

One internal standard was outside of the recovery limits for the matrix spike. Quantitation levels of the affected compounds were qualified as estimated (J_I) but usable.

TCL Semivolatiles - CLP SOW
The laboratory analyzed each sample for all semivolatile target compounds listed in the OU-9 QAPP. Sample extract concentrations were modified from Method OLM01.8 to achieve the lower reporting limits required by the QAPP.

The laboratory quantitated benzo(g,h,i)perylene in sample MND25-0935-0001. However the mass spectra failed compound identification criteria. The sample result was changed by the validator to 610 U.

Initial calibration data for two instruments contained separate outliers for two compounds: benzoic acid and dibenz(a,h)anthracene. Continuing calibration data for the instruments contained outliers for three separate compounds: hexachlorobenzene, pentachlorophenol, and benzo(k)fluoroanthene. All affected sample results were qualified as estimated (J_C) but usable.

One laboratory blank contained common laboratory contaminants (Diethylphthalate, di-n-Butylphthalate, and bis(2-Ethylhexyl)phthalate and one target compound (benzoic acid) at concentrations below the CRQL. The quantitation limits for these compounds were increased accordingly.

Spike recoveries were out of range for surrogate spike, matrix spike, and laboratory control samples. Because only one surrogate failed the recovery criteria in each sample, no sample results required qualification.

A review of mass spectra indicated that samples MND24-0950-1001 and MND24-0962-0001 contained a Tentatively Identified Compound. The compound, 2-methyl-Cyclopentanol, is probably a laboratory contaminant. Numerous other unidentified compounds were detected but did not meet spectral identification criteria.

Pesticides/PCBs - CLP SOW
Calibration criteria differed between the CLP SOW and the Functional Guidelines for Evaluating Organic Analyses. The method criteria were used in these cases.

Seven samples were re-extracted and re-analyzed out of holding time. All results are qualified as estimated. (UJ_H or J_H).

Breakdown criteria were not met in a Performance Evaluation Sample mixture prior to column calibration. Breakdown criteria were met following calibration. No sample results were qualified.

Gamma-BHC (Lindane) was detected in a method blank, and most likely occurred as a result of cross contamination during sample extraction. The quantitation level for gamma-BHC was calculated as five times the method blank concentration, but was still less than the reported concentration in the sediment sample (MND25-0935-0001). However, cross contamination of water and sediment samples may not have occurred to the same degree. As a result of the blank contamination, the gamma-BHC result is qualified as J_B for the sediment sample due to major problems.

The laboratory misidentified a standard (DCB) peak on some chromatograms, resulting in standard retention times that failed the standard RT criteria on Form 8D. The validators marked the correct peaks and their retention times, thereby reducing the number of RT outliers.

Seven of twenty-four matrix spike recoveries were below QC limits. Surrogate recoveries were below QC limits for all water samples (excluding reanalyzed samples). All associated positive results and quantitation limits were qualified as estimated (J_K) but usable.

TAL Inorganics and Cyanide - CLP SOW

All samples were analyzed for Target Analyte List metals by Modification B of the CLP Statement of Work. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/l for antimony and 2 ug/l for beryllium and thallium. For all remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the resulting data.

The concentrations of cadmium and potassium in the Initial Calibration Blank were incorrectly determined by the laboratory. The validator calculated the correct values based on the raw data. The cadmium concentration was changed from -3.5 B to -3.0 U, and potassium changed from 129.5 to -125.5. (The B qualifier indicated that cadmium was detected at a concentration less than the CRQL but greater than the IDL.)

The %D of serial dilution data failed QC criteria for samples MND24-0935-0001 (calcium, magnesium and zinc) and MND25-0935-0001 (aluminum, iron and zinc). The affected data were qualified as estimated (J_I) but usable.

Matrix spike recoveries failed QC criteria for samples MND24-0935-0001 (arsenic, antimony, tin and thallium) and MND25-0935-0001 (arsenic, copper, mercury, selenium and thallium). The affected data were qualified as estimated (J_S) but usable.

Duplicate results failed QC criteria for sample MND25-0935-0001 (aluminum, cadmium, calcium, magnesium and mercury). The affected data were qualified as estimated (J_D) but usable.

Other Analytes

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric, Automated Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

The analyses performed included alkalinity, total cyanide, fluoride, nitrate-nitrite, nitrate (as nitrogen), total dissolved solids, and total suspended solids. All analyses of other analytes met acceptance criteria, with the exception summarized below.

One Nitrate/Nitrite sample was extracted at an incorrect concentration, resulting in a 1/2x dilution. The results were qualified as estimated (J), but were still be usable. The sample was reanalyzed as batch 9402L843, but was analyzed thirty-nine days out of holding time. The reanalyzed sample results are qualified as unusable (R_H).

REPORT OF DATA VALIDATION RESULTS
FOR CHEMICAL ANALYSES

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
FIRST GROUNDWATER AND SEDIMENT SAMPLING EVENT BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9402L508 and 9403L843 (Nitrate, Nitrite, and Fluoride).

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX
Ground Water Samples - 4
Sediment Samples - 2
Quality Control Blanks - 3

1.3. DATE OF COLLECTION
2/4/94

1.4. CHAIN OF CUSTODY IDENTIFIER
N/A

1.5. TYPE OF ANALYSIS
Volatile Organic Compounds (ground water only) by Method 502.2
Volatile Organic Compounds (sediments only) by CLP SOW Modification D (OLM01.8)
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 03.0)
Fluoride by Method E340.2 *(Sediment sample not analyzed for TAL inorganics)*
Alkalinity (ground water only) by Method E310.1
Nitrite, as N (ground water only) by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2 - *Sample MND24-0937-0001,1001 was extracted incorrectly and reanalyzed out of holding time. Nitrate-Nitrite results were qualified as estimated (J).*
Total Suspended Solids (ground water only) by Method E160.2
Total Dissolved Solids (ground water only) by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY
All samples were received in good condition by the laboratory.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:		Laboratory ID:
MND24-0938-0001	-	9402L508 004
MND24-0943-0001	-	9402L508 002
MND24-0943-0001 MS	-	9402L508 002 MS
MND24-0943-0001 MSD	-	9402L508 002 MSD
MND24-0938-2001	-	9402L508 007
MND24-0943-2001	-	9402L508 003
MND24-0937-4001	-	9402L508 001
MND25-0937-0001	-	9402L508 006
MND25-0937-1001	-	9402L508 005

Sediment samples were relogged for TAL metals analyses as follows:

MND25-0937-0001	-	9407L268 002
MND25-0937-1001	-	9407L268 001

Sediment samples were relogged for anion analyses as follows:

MND25-0937-0001	-	9403L845 002
MND25-0937-1001	-	9403L845 001

2. HOLDING TIMES - RFW9402L508

All analyses were completed within the required holding times with the exception of the following:

ANALYSIS	RFW #	MOUND I.D.	DAYS OUT OF EXTRACTION TIME	DAYS OUT OF HOLD. TIME
G.C. Volatiles (8030)	9402L508-003	MND250943-2001		4
Pesticides-PCBs	9402L508-004-R1	MND240938-0001	27	
Pesticides-PCBs	9402L508-005-R1	MND250937-1001	20	5
Pesticides-PCBs	9402L508-005-Z1	MND250937-1001		5
Pesticides-PCBs	9402L508-006-R1	MND250937-0001	20	5
Pesticides-PCBs	9402L508-006-Z1	MND250937-1001		5
TAL Mercury	9407L268-001	MND25-0937-1001		137
TAL Mercury	9407L268-002	MND25-0937-0001		136
Nitrate/Nitrite	9403L845-001	MND25-0937-1001		38
Nitrate/Nitrite	9403L845-002	MND25-0937-0001		38

Trip blank results for 8030 analysis qualified as estimated (J_H).
Pesticide/PCB samples qualified as estimated (J_H).
Nitrate/Nitrite samples were qualified as unusable (R).

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Instrument tuning met performance criteria. No samples qualified.

3.1.2. Calibration

Volatiles 502.2
All samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. Initial and Continuing Calibration Verification criteria set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for 7-point curve. Few compounds calibrated to 5-pointed curve and one compound (2-Chloroethylvinyl ether) to a 4-point curve. All compounds met linearity criteria.

Initial calibration results for confirmation columns met linearity criteria for 5-point curve at minimum, except for vinyl chloride and bis(2-Chloroisopropyl)ether.

1,1-Dichloroethane was out of range for Initial Calibration Verification of GC/PID for the primary column. Immediately following Continuing Calibration Verification sample met criteria for 1,1-Dichloroethane. No positive 1,1-Dichloroethane results reported. No samples were qualified.

Numerous compounds were out of range in the Initial Calibration Verification sample for the confirmation column. Confirmation and method blank data was not qualified because associated Continuing Confirmation Verification sample data met criteria.

Several compounds were out of range for Continuing Calibration Verification of primary and confirmation columns, affecting associated samples. None of the compounds reported with positive results. Affected samples were qualified as J_c.

Continuing Calibration Verification sample not analyzed for Standard Mix 2 at end of analytical day. No Mix 2 compounds were reported above detection levels. Samples MND24-0943-0001 MS and MND24-0943-0001 MSD were qualified as J_c for Mix 2 compounds.

Sample MND24-0937-4001-CON was quantitated above the highest calibration point. Sample result was qualified as estimated (J_C).

Retention Time Window criteria was met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention time windows were within required limits during analysis of all Initial and Continuing Calibration samples.

Continuing Calibration Verification recovery did not meet 85-115% control limits for one sample. Two samples were affected. Acetonitrile results qualified as J_c.

Volatiles CLP SOW - Sediment
Instrument calibration met performance criteria. No samples qualified.

Semivolatiles
One compound was out of range in the Initial Calibration Analysis Verification. The outlier compound was Benzoic acid which affected the following five samples:

Machine No. IN50J

94LE0292-MB1
94LE0292-MB1-BS
MND24-0937-4001
MND24-0943-0001
MND24-0938-0001

The affected sample results were qualified (J_c).

Three compounds were out of range in the Continuing Calibration Analysis Verification. The outlier compounds were Benzo(k)fluoranthene, Benzoic acid and Pentachlorophenol which affected the following nine samples:

Machine No. IN50J

94LE0292-MB1
94LE0292-MB1-BS
MND24-0937-4001
MND24-0943-0001
MND24-0938-0001
94LE0316-MB1
94LE0316-MB1-BS
MND25-0937-0001
MND25-0937-1001

The affected sample results were qualified (J_c).

3.1.3. Blanks

Volatiles 502.2 - Water
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030 - Water
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles CLP SOW - Sediments
94LVX025-MB1 VBLK
The following compounds were detected in the Method Blank, resulting in elevated quantitation limits for related samples: Methylene Chloride and Acetone. Affected sample results were qualified as estimated (J_H).

Semivolatiles
94LE0292-MB1 SBLK
The following compounds were detected in the Method Blank, resulting in elevated quantitation limits for related samples: Diethylphthalate, di-n-Butylphthalate, bis(2-Ethylhexyl)phthalate.
Unknown compound were detected in Method Blanks. No samples results were qualified. 94LE0316-MB1 SBLK
Unknown compounds were detected in Method Blanks, resulting in an elevated quantitation limits for related samples: Aldol Condensate (Tentatively Identified Compound), and an unknown Tentatively Identified Compound.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2 - Water
MND24-0937-4001CON (confirmation sample of equipment blank)
% Recovery was out of range for Bromochloromethane. The sample result was qualified as estimated (J_K).

Volatiles 8030 - Water
All surrogate spike recoveries were within acceptable range.

Volatiles CLP SOW - Sediments
All surrogate spike recoveries were within acceptable range.

Semivolatiles
MND24-0943-0001
Surrogate recovery was out of range for 2-Fluorobiphenyl. No samples results qualified.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2 - Water
MND24-0943-0001 MS
Percent Recovery was out of range for Xylenes (total). Affected samples qualified as J_S.
Matrix Spike Recovery outliers were not noted in Case Narrative for the analysis.

Volatiles 8030 - Water
All matrix spike and matrix spike duplicate recoveries were within acceptable range.

Volatiles CLP SOW - Sediments
No matrix spike or matrix spike duplicate samples for this analysis.

Semivolatiles
No matrix spike or matrix spike duplicate samples for this analysis.

3.1.6. Internal Standards

Volatiles
The Internal Standard (IS) performance for Batch 9402L508 (Volatiles/Sediment Matrix) met acceptance criteria.

Volatiles CLP SOW - Sediment
Internal standard data met performance criteria. No samples qualified.

Semivolatiles
The Internal Standard (IS) performance for Batch 9402L508 (Semivolatiles/Water Matrix) met acceptance criteria.

3.1.7. Compound Identification

Volatiles CLP SOW - Sediment
Retention times
All retention times meet the acceptance criteria with the following exceptions:

MND25-0937-0001	Acetone	Retention Time Out (0.1)
MND25-0937-1001	Acetone	Retention Time Out (0.1)
	4-Methyl-2-Pentanone	Retention Time Out (0.18)

All mass spectra of the sample compound and laboratory generated standard met the acceptance criteria.

Semvolatiles
All compounds were within ±0.06 relative retention time units of the standard RT.

3.1.8. System Performance

Volatiles 502.2
Few unidentified peaks in method blanks, but not at target compound retention times. No sample qualification required.

Volatiles 8030-Water
Evaluation of the chromatograms identified an abrupt RIC baseline shift, baseline rise at high temperatures, few extraneous peaks possibly due to a contaminated column and peak splitting. No sample qualification required.

Volatiles CLP SOW-Sediment
Evaluation of the chromatograms identified high background levels, few extraneous peaks and peak splitting. No sample qualification required.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems other than the presence of identified and unknown compounds in Method Blanks. No sample qualification required.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Semivolatiles
Compound quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

3.1.10. Tentatively Identified Compounds

Semivolatiles
A review of mass spectra indicated that three Tentatively Identified Compounds were detected in two samples. A spectral match was identified for 2-(4-Phenoxyphenoxy)-, Benzoate Ethanol in samples MND24-0937-0001 and MND24-0943-0001. A spectral match was identified for Benzophenone and 2-Cyclohexene-1-one in sample MND24-0937-0001.

3.1.11. Laboratory Control Sample

Volatiles 502.2 - Water
94LV4409-MB1-BS BLK - (Confirmation column)
% Recovery was out of range for Bromochloromethane, Trichloroethene, Benzene, cis-1,3-Dichloropropene, Chlorobenzene, trans-1,3-Dichloropropene, Bromoform, and 1,1,2,2-Tetrachloroethane. Affected samples qualified as estimated (J_S).
Ethylbenzene was qualified (I) due to an additional unidentified compound for sample 94LV4409-MB1-BS BLK.

Volatiles 8030 - Water
All Laboratory Control Samples were within acceptable range.

Volatiles CLP SOW - Sediments
All Laboratory Control Samples were within acceptable range.

Semivolatiles
94LE0292-MB1-BS
Percent Recovery was out of range for 4-Nitrophenol. Affected samples qualified as estimated (J_K).

3.2. PESTICIDES/PCBs

3.2.1. GC/ECD Performance Check

The DDT retention times fell within the quality control limits of greater than twelve minutes for all analyses.

The standard retention time values for Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) were outside of QC limits for two samples. All other retention times fell within the QC limits.

The standard retention times for single component analytes fell within the established retention time windows.

3.2.2. Performance Evaluation Mixture

3.2.2.1. Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

The PEM retention times fell within the established retention time windows.

3.2.2.3. Recovery

The RPD for each single component pesticide and surrogate met the recovery criteria of ≥ -25.0 and ≤ 25.0%.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and Endrin met the acceptance criteria of ≤ 20.0% and ≤ 30.0% combined breakdown with the following exceptions:

Lab Sample I.D./Sample Number 03089411.02\PEMLA-5204

Endrin Breakdown 28.0%
Combined Breakdown 34.0%

Affected sample results were qualified (J).

3.2.3. Calibration

Calibration criteria differ between CLP SOW and Functional Guidelines for Evaluation Organic Analyses. When these cases occurred, the SOW was used as validation criteria as noted:

The SOW requires the %RSD of calibration factors to be <20%, not <10%.

The resolution between adjacent peaks in the resolution check mixture met the resolution criteria of ≥ 60.0%.

Reconstructed ion chromatograms were plotted off scale. However, the peak height data on the quantitation sheets did not appear clipped. Retention time windows should not be affected.

The %D of sample results reported for two GC columns did not meet the acceptance criteria. The affected samples were: MND25-0937-1001, MND25-0937-1001-RE, and MND25-0937-0001.

Calibration factors and %RSD were recalculated and met the acceptance criteria.

3.2.4. Blanks

Method Blank
Gamma-BHC (Lindane) was detected in Method Blank 94LE0306-MB1, raising the quantitation limit.
The sediment samples were cross contaminated with Gamma-BHC during sample extraction. Sample results were qualified as below quantitation limit (U-J_B).

Sulfur Cleanup Blank
Sulfur cleanup not performed on this batch.

3.2.5. Surrogate Spike Recoveries

% Recovery was out of range for the following:

MND24-0937-4001	TCMX-1, TCMX-2, DCB-1, DCB-2.
MND24-0937-4001RE	DCB-1, DCB-2.
MND24-0938-0001	TCMX-1, TCMX-2, DCB-1, DCB-2.
94LE0282-MB1 PBLKTF	TCMX-1, TCMX-2.
94LE0442-MB1 PBLKXL	TCMX-2.

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

No matrix spike or matrix spike duplicate samples were included in this batch.

3.2.7. Compound Identification

The retention times of the reported compounds fell within the calculated retention time windows.

Secondary column confirmation was performed for all results greater than the PQL.

The percent difference between the two columns failed acceptance criteria for alpha chlordane. Results qualified as J_P.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

All percent recoveries were within acceptable range.

3.2.8.2. Florisil Cartridge Cleanup

All percent recoveries were within acceptable range.

3.2.9. System Performance

Occasional extraneous peaks possibly due to column contamination by 'dirty' environmental samples. No samples qualified.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

3.2.11. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.
Sediment sample 94LE0306-MB1-BS PBLKUY not quantified for gamma-BHC due to matrix interference.

3.3. INORGANIC METALS AND CYANIDE

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the following documents: USEPA Contract Laboratory Statement of Work for Inorganics Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All Initial and Continuing Calibration Verification samples were within control limits (Form 2A). Standards were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required detection limits (CRQLs).

3.3.2. Blanks

Values greater than the Instrument Detection Levels were used as acceptance criteria for Initial Calibration blanks and Continuing Calibration blanks. The blank acceptance values were an approved variance from the OU-9 QAPP.

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria (Form III).

3.3.2.2. Calibration Blanks

Arsenic was reported in the initial calibration blank. Sample results were qualified appropriately (J_B or UJ_B). All other calibration blanks met acceptance criteria for this batch (Form III).

3.3.3. Interference Check Sample

Results of the interference check sample met acceptance criteria (Form IV).

3.3.4. Laboratory Control Sample

All laboratory control samples met acceptance criteria (Form VII).

3.3.5. Duplicate Sample Analysis

MND25-0937-0001
% RPD was out of range for lead and magnesium. Sample results were qualified as estimated (J_D).
All other duplicate sample analyses met acceptance criteria (Form VI).

3.3.6. Matrix Spike Sample Analysis

MND24-0937-4001
Sample not analyzed for Arsenic, Cadmium, Lead, Mercury, Selenium, Thallium, or Cyanide.
MND24-0943-0001
Sample was noly analyzed for Arsenic, Cadmium, Lead, Selenium, and Thallium.

Results of the spike sample analysis met acceptance criteria for 7 of the 28 analytes. Results of the analysis of 16 of 28 analytes exceeded acceptance criteria.

The analytes exceeding acceptance criteria were aluminum, antimony, chromium, cobalt, copper, iron, manganese, potassium, silver, thallium, vanadium, zinc, lithium, molybdenum, and tin.

MND25-0937-0001
Results of the spike sample analysis met acceptance criteria for 21 of the 27 analytes. Results of the analysis of 6 of 27 analytes exceeded acceptance criteria. The analytes exceeding acceptance criteria were arsenic, antimony, cadmium, mercury, selenium, and thallium.

The spike and water-quality sample results for the analytes not meeting the acceptance criteria were given a J_S qualifier (Forms I, V). Spike sample analyses were not necessary for calcium, sodium, magnesium, and cyanide.

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

MND24-0937-4001
% Recovery was out of range for Aluminum, Chromium, Cobalt, Copper, Iron, Manganese, Silver, Vanadium, Zinc, Molybdenum, and Tin.

MND25-0937-0001
% Recovery was out of range for Cadmium.

3.3.6.2. GFAA Metals

MND24-0937-4001
% Recovery was out of range for Antimony.
MND24-0973-0001
% Recovery was out of range for Lead and Thallium.
MND25-0937-0001
% Recovery was out of range for Selenium and Thallium.

3.3.6.3. Cyanide

Matrix spike analysis was not required for cyanide.

3.3.6.4. Flame AA Metals

MND24-0937-4001
% Recovery was out of range for Potassium and Lithium.

All other analytical results met acceptance criteria.

3.3.6.5. Automated Cold Vapor AA

Matrix spike analysis is not required for mecury analysis of groundwater.

MND25-0937-0001
% Recovery out of range for Mercury.

3.3.7. Furnace Atomic Absorption QC

The furnace atomic absorption QC results for all groundwater samples met acceptance criteria except for Cadmium and Lead. The water-quality results for Cadmium and Lead were given a J_S.

MND25-0937-0001
The furnace atomic absorption QC results met acceptance criteria, except for Selenium and Thallium. The analytical results for selenium and thallium were given a J_S qualifier (Form I).

3.3.8. Standard Addition Results

Standard additions were performed for lead on Sample MNDS24-0937-4001 (Form VIII).

Standard additions were not required for any other samples in this batch. (Form VIII).

3.3.9. ICP Serial Dilution

ICP serial dilution results met acceptance criteria (Form IX) for groundwater samples.

MND25-0937-0001
% Difference was out of range for lead. Sample results were qualified (J_I).

3.3.10. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

3.4.1. Calibration

3.4.1.1. Alkalinity

- pH meter calibrated with 4.0 and 7.0 standards at the beginning and after every ten samples

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

- 4 point calibration verified
- correlation coefficient ≥.995
- continuing calibration check was run every 20 samples
- calibration check responses are within 15% of true value

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

Use of S class weights not documented.
Calibration verified within 24-hour time span.

3.4.2. Blanks

Inorganics - Anions
94LN2026-MB1
Nitrate-Nitrite was detected in the Preparation Blank only. No samples qualified for this parameter.
Check List for this analysis was not provided.

Inorganics - Anions - Sediments
All Preparation Blank samples met acceptance criteria; no sample qualifiers were required.
Relogged as 9403L845.

All Calibration Blanks met acceptance criteria. No data was qualified.

3.4.3. Laboratory Control Sample

Inorganics - Anions
All Laboratory Control Samples were within acceptable range.

Inorganics - Anions - Sediments
All Laboratory Control Samples were within acceptable range.
Relogged as 9403L845.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

Inorganics - Anions
All matrix spike and matrix spike duplicate samples were within acceptable range.

Inorganics - Anions - Sediments
No matrix spike and matrix spike duplicate samples for this analysis.
Relogged as 9403L845.

3.4.5. Sample Result Verification

Nitrate-Nitrite and Nitrite as Nitrogen concentrations were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

Recalculation of the Alkalinity data agreed with the reported results.

Recalculation of the Fluoride data agreed with the reported results.

Recalculation of the Total Dissolved Solids data and the Total Suspended Solids data agreed with the reported results.

Recalculation of the Percent Solids data agreed with the reported results.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

Volatiles - 502.2 - Water
No field duplicates were analyzed for this analysis.

Volatiles - 8030 - Water
No field duplicates were analyzed for this analysis.

Volatiles CLP SOW - Sediments
MND25-0937-0001
MND25-0937-1001
RPD values were out of range for Acetone, but below elevated detection limits due to detection in the associated Method Blank.

Semivolatiles
MND25-0937-0001
MND25-0937-1001 (sediment)
No limits for RPD are established for sediments.
RPD values range from 0% to 90%.

Pesticides/PCBs
MND25-0937-0001
MND25-0937-1001 (sediment)
No limits for RPD are established for sediments.
RPD values range from 0% to 17% - however, RPD could not be calculated for Endosulfan II and 4,4'-DDE (RE) because compound concentrations were below detection levels for one of the samples.

Inorganics - Metals
No field duplicates were analyzed for this analysis.

Inorganics - Anions
MND25-0937-0001
MND25-0937-1001 (sediment)
All RPD values were within QC limits.

Inorganics - Anions - Sediments
MND25-0937-0001
MND25-0937-1001 (sediment)
RPD = 88% for Nitrate-Nitrite, QC limits for sediment samples are 50%.
Relogged as 9403L845.

4.2. FIELD BLANKS (equipment blanks, etc.)

Volatiles 502.2 - Water

Trip Blanks
Trip Blank samples were within acceptable range.

Equipment Blanks
MND24-0937-4001
Outliers for Chloroform and Bromodichloromethane.
MND24-0937-4001 C1 (confirmation sample)
Outliers for Chloroform and Bromodichloromethane.
MND24-0937-4001 D1 (diluted sample)
Outliers for Chloroform and Bromodichloromethane.

Volatiles 8030 - Water

Trip Blanks
Trip Blank samples were within acceptable range.

Equipment Blanks
Equipment Blank sample was within acceptable range.

Volatiles CLP SOW - Sediments
No field blank samples were analyzed for this analysis.

Semivolatiles

Equipment Blanks
MND24-0937-4001
Outliers for the following Tentatively Identified Compounds: Tetrachloroethane, four unknown compounds, and two Alkane compounds.

Pesticides/PCBs

Equipment Blanks
Equipment Blank sample was within acceptable range.

Inorganics - Metals
The following inorganics were reported in sample MND24-0937-4001 at concentrations greater than the CRQL: aluminum, copper, lead, and zinc.

Inorganics - Anions

Equipment Blanks
MND24-0937-4001
Outliers for Nitrate-Nitrite and Total Dissolved Solids (TDS).

Inorganics - Anions - Sediments
No field blank samples were analyzed for this analysis.

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced within the following sample analysis discussions.

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by Gas Chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list. The laboratory correctly added three compounds, but analyzed for trichlorotrifluoromethane, not trichlorotrifluoroethane.

One of the added compounds, 2-chloroethylvinylether was very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. The compound was only calibrated to a 4-point curve, not a 5 or 7-point curve. Preservation of the ground-water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinylether in them (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinylether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of ≥ 0.992 be achieved for a 5-point calibration curve. The ≥ 0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that 80-120% recovery be achieved. This variance affected the accuracy of low level volatile quantitations.

No VOCs were detected in the ground-water samples. Chloroform and bromodichloromethane were detected in the field QC sample MND24-0937-4001. No VOCs were detected in the trip blank. No VOCs were detected in the method blanks prepared for the analysis of the samples.

A total of 1 of 30 surrogate recoveries and 8 of 47 blank spike recoveries were outside QAPP control limits. Several results from daily and continuing calibration analyses were outside QAPP control limits. The water sample results affected by these quality control analyses were given a J_c qualifier to indicate that the results were considered to be an estimated value. The J qualifier reflected a degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Acrylonitrile and Acetonitrile - Method 8030

All water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

No Method 8030 analytes were detected in the water samples. No Method 8030 analytes were detected in the trip blank. No Method 8030 analytes were detected in the method blanks.

Several analytical results were given a J_c qualifier based on a continuing calibration analysis that exceeded acceptance criteria. The results for the trip blank, sample MND24-0943-2001, were given a J qualifier, because the sample analysis occurred after the holding time limit expired.

TCL Volatiles, sediments - CLP SOW

There were two sediment samples analyzed in this batch. No TCL volatiles were reported in the sediment samples. Acetone and methylene chloride were reported in the method blank, resulting in elevated quantitation levels. A J_H qualifier was given to the sample and blank analytical results based on the detection of these compounds in the blank, however all data from this analysis was considered usable.

All surrogate recoveries, matrix spike recoveries, and blank spike recoveries met acceptance criteria.

TCL Semivolatiles - CLP SOW

No TCL semivolatiles were detected in the water samples. Three common analytical contaminants, diethyphthalate, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate, were detected in the method blank. Unknown and Tentatively Identified Compounds were reported in the water samples and method blank.

Several TCL semivolatiles were reported in the sediment samples. Fluoranthene and pyrene were reported in sample MND25-0937-0001 at concentrations above the CRQL. Thirteen compounds were reported in the samples at concentrations greater than the IDL but less than the CRQL.

Several results from daily and continuing calibration analyses were outside QAPP control limits. The water sample results affected by these quality control analyses were given a J_c qualifier to indicate that the results were considered to be an estimated value. The J_c qualifier reflected a degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

A total of 1 of 72 surrogate spike recoveries and 1 of 11 blank spike recoveries were out of EPA control limits. Affected sample results were qualified as estimated (J_K) but usable.

The TIC were not found in any of the water samples at the target compound retention times, so their presence in the method blank did not affect the quality of the analytical results.

Pesticides and PCBs - CLP SOW

Pesticides were detected in the water and sediment samples. Pesticides and unidentified compounds were detected in the method blanks. Gamma-BHC (Lindane), was detected in one method blank, and most likely occurred as a result of cross contamination during sample extraction. The quantitation level for gamma-BHC, calculated as five times the method blank concentration, increased the quantitation limit for the sediment sample. However, cross contamination of water and sediment samples did not necessarily occur to the same degree. As a result of the blank contamination, the gamma-BHC was given a U-J_B qualifier for the samples in this batch, due to major problems. The qualifier indicated that the concentrations of detected analytes were considered estimated quantities.

Breakdown criteria were not met in a Performance Evaluation Sample mixture prior to column calibration. Breakdown criteria were met following calibration. No sample results were qualified.

Three samples re-extracted and re-analyzed significantly out of holding time. Affected sample results were qualified as estimated (J_H).

Several of the pesticide samples were re-extracted and re-analyzed out of extraction and holding time limits. The results of these analyses were not considered usable.

Thirteen of sixty-eight surrogate recoveries failed acceptance criteria. The affected analytical results were given a J_K qualifier, and considered to be estimated values. The data from this analysis was considered usable.

TAL Inorganics and Cyanide - CLP SOW

The two sediment samples included in this batch were originally collected on 2/4/94 and submitted with the samples of Batch #9402L508. The samples were not extracted and analyzed until July 1994 due to misread Chain-of-Custody. The samples were analyzed as Batch #9407L268.

All remaining samples were analyzed for TAL metals using Modification B of the CLP Statement of Work. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/L for antimony and 2 ug/L for beryllium and thallium. For all remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Calcium, magnesium, iron, lead, and sodium were reported at concentrations above the CRQL in two of the three water samples. The third water sample, a field blank, contained aluminum, copper, lead, and zinc at concentrations above the CRQL. Barium and manganese were reported at concentrations above the CRQL in one at least water sample. In addition, chromium, lithium, molybdenum, bismuth, potassium, nickel and beryllium were reported at concentrations less than the CRQL but greater than the IDL in at least one water sample.

Molybdenum and bismuth were the only analytes not reported in the sediment samples. The sediment samples were not analyzed for cyanide because the holding time was exceeded. Selected sediment analytical results were qualified (J_B) due to the detection of arsenic in the initial calibration blank. The analytical results for mercury were estimated (J_H) for the sediment samples due to grossly exceeded holding times.

The concentration of lead in sample MND24-0937-0400 was determined by the method of standard additions.

Several of the inorganics results were given J_I, J_S, or J_D qualifiers to indicate that the results were considered to be estimated values. They were regarded as estimated based on serial dilution, duplicate analyses, or matrix spike analyses that exceeded control limits. The J qualifier reflected the degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Other Analytes

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric, Automated Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

The analytes included alkalinity, total cyanide, fluoride, nitrate-nitrite, nitrate (as nitrogen), total dissolved solids, and total suspended solids.

Two samples MND25-0937-1001 and MND25-0937-0001 were re-extracted and re-analyzed for nitrates-nitrogen and fluoride. The re-extraction and re-analysis occurred outside of the holding time limit. Consequently, those analytical results were given an R qualifier to indicate that the results were considered to be unusable.

REPORT OF DATA VALIDATION RESULTS
FOR CHEMICAL ANALYSES

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
FIRST GROUNDWATER AND SEDIMENT SAMPLING EVENT BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9402L529

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX
Ground Water Samples - 5
Quality Control Blanks - 4

1.3. DATE OF COLLECTION
2/7/94

1.4. CHAIN OF CUSTODY IDENTIFIER
N/A

1.5. TYPE OF ANALYSIS
Volatile Organic Compounds by Method 502.2
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 03.0)
Fluoride by Method E340.2
Alkalinity by Method E310.1
Nitrite, as N by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2
Total Suspended Solids by Method E160.2
Total Dissolved Solids by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY
All samples were received in good condition by the laboratory.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:		Laboratory ID:
MND24-0948-0001	-	9402L529 003
MND24-0945-0001	-	9402L529 001
MND24-0945-0001 MS	-	9402L529 001 MS
MND24-0945-0001 MSD	-	9402L529 001 MSD
MND24-0952-0001	-	9402L529 002
MND24-0948-2001	-	9402L529 007
MND24-0945-2001	-	9402L529 005
MND24-0945-2001-1	-	9402L529 006
MND24-0945-3001	-	9402L529 004

2. HOLDING TIMES - RFW9402L529

All analyses were completed within the required holding times, except for sample MND24-0945-3001. For this sample, the confirmation analysis occurred after the holding time limit. Analytical results for this sample were qualified (J_H).

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Instrument Tuning met performance criteria. No samples were qualified.

3.1.2. Calibration

Volatiles 502.2
All samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. Initial and Continuing Calibration Verification criteria set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for 7-point curve. Few compounds calibrated to 5-pointed curve and one compound to a 4-point curve (2-Chloroethylvinyl ether); all maintained linearity criteria.

Initial calibration results for confirmation columns met linearity criteria for 5-point curve at minimum, except for vinyl chloride and bis(2-Chloroisopropyl)ether.

1,1-Dichloroethane was out of range for Initial Calibration Verification of GC/PID for the primary column. Immediately following Continuing Calibration Verification sample met criteria for 1,1-Dichloroethane. No positive 1,1-Dichloroethane results reported, no samples qualified.

Numerous compounds were out of range in the Initial Calibration Verification sample for the confirmation column. Confirmation and method blank data were not qualified because associated Continuing Confirmation Verification sample data met criteria.

Several compounds were out of range for Continuing Calibration Verification of primary column, affecting associated samples. None of the compounds reported with positive results. Samples qualified as J_c. Confirmation samples qualified (J_c) for bromodichloromethane and chloroform.

Continuing Calibration Verification sample not analyzed for Standard Mix 2 at end of analytical day. No Mix 2 compounds were reported above detection levels. Samples MND24-0945-0001 and MND24-0952-0001 were qualified as J_C for Mix 2 compounds.

Retention Time Window criteria was met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention time windows were within required limits during analysis of all Initial and Continuing Calibration samples.

Continuing Calibration Verification recoveries did not meet 85-115% control limits. Five samples were affected. Acetonitrile results qualified as J_c.

One set of Continuing Calibration Verification sample data was not available due to instrument malfunction. Affected samples not reanalyzed. Acrylonitrile and acetonitrile results qualified as J_c.

Semivolatiles
One compound was out of range in the Initial Calibration Analysis Verification. The outlier compound was Benzoic acid which affected the following seven samples:

Machine No. IN50J

94LE0292-MB1
94LE0292-MB1-BS
MND24-0945-0001
MND24-0945-0001-MS
MND24-0945-0001-MSD
MND24-0952-0001
MND24-0948-0001

The affected sample results were qualified with a J_C qualifier.

Two compounds were out of range in the Continuing Calibration Analysis Verification. The outlier compounds were Benzo(k)fluoranthene and Benzo(g,h,i)perylene which affected the following two samples:

Machine No. IN50J

94LE0292-MB1
94LE0292-MB1-BS

The affected sample results were qualified with a J_C qualifier.

3.1.3. Blanks

Volatiles 502.2
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Semivolatiles
94LE0292-MB1 SBLK
The following compounds were detected in the Method Blank, resulting in elevated quantitation limits for related samples: Diethylphthalate, di-n-Butylphthalate, bis(2-Ethylhexyl)phthalate.
An unknown compound was detected in the Method Blank. No samples qualified for this parameters.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2
% Recovery was out of range for the following:

MND24-0945-3001CON (confirmation sample)	Bromochloromethane and Fluorobenzene
94LV4410-MB1 BLK	Fluorobenzene
94LV4410-MB1-BS BLK	Fluorobenzene

The affected samples were qualified (J_K).

Volatiles 8030
All surrogate spike recoveries were within acceptable range.

Semivolatiles
All surrogate spike recoveries were within acceptable range.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2
MND24-0945-0001 MS
% Recovery was out of range for 1,2-Dichloroethane.
MND24-0945-0001 MSD
% Recovery was out of range for 1,2-Dichloroethane.

The affected samples were qualified (J_S).

Volatiles 8030
All matrix spike and matrix spike duplicate recoveries were within acceptable range.

Semivolatiles
MND24-0945-0001 MS
% Recovery was out of range for 4-Nitrophenol.
MND24-0945-0001 MSD
% Recovery was out of range for 1,4-Dichlorobenzene, 1,2,4-Trichlorobenzene, and 4-Nitrophenol.

3.1.6. Internal Standards

Semivolatiles
The Internal Standard (IS) performance for Batch 9402L529 (Semivolatiles/Water Matrix) met acceptance criteria.

3.1.7. Compound Identification

Semivolatiles
All compounds were within ±0.06 relative retention time units of the standard RT.

3.1.8. System Performance

Volatiles 502.2
Occasional low resolution on peaks with retention times of less than 9 minutes. Occasional merged peaks in standards at retention times of approximately 37 minutes. No sample qualification required.

Volatiles 8030-Water
Evaluation of the chromatograms identified a baseline rise at high temperatures, in extraneous peaks possibly due to a contaminated column, resolution loss and peak splitting. No sample qualification required.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems, however, there was an unknown compound detected in a method blank. No sample qualification required.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Semivolatiles
Compound quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

3.1.10. Tentatively Identified Compounds

Semivolatiles
A review of mass spectra indicated that one Tentatively Identified Compound was detected in one sample. A spectral match was identified for 2-(4-Phenoxyphenoxy)-, Benzoate Ethanol in sample MND24-0945-0001.

3.1.11. Laboratory Control Sample

Volatiles 502.2
% Recovery was out of range for the following:

94LV1014-MB1-BS-BLK	Total Xylenes
94LV4410-MB1-BS BLK	1,1-Dichloroethene, Xylenes (total), Benzene, Toluene, Chlorobenzene, Bromodichloromethane, Trichloroethene, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, Bromoform, and 1,1,2,2-Tetrachloroethane.

The affected samples were qualified (J_K).
Ethylbenzene was qualified (I) due to an additional (unidentified) compound for sample 94LV4410-MB1-BS BLK.

Volatiles 8030
All Laboratory Control Samples were within acceptable range.

Semivolatiles
94LE0292-MB1-BS
% Recovery was out of range for 4-Nitrophenol.

The affected samples were qualified (J_K).

3.2. PESTICIDES/PCBs

3.2.1. GC/ECD Performance Check

The DDT retention times fell within the quality control limits of greater than twelve minutes for all analyses.

The standard retention times for single component analytes fell within the established retention time windows.

3.2.2. Performance Evaluation Mixture

3.2.2.1 Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

The PEM retention times fell within the established retention time windows.

3.2.2.3. Recovery

The RPD for each single component pesticide and surrogate met the recovery criteria of ≥ -25.0 and ≤ 25.0%.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and Endrin met the acceptance criteria of ≤ 20.0% and ≤ 30.0% combined breakdown.

3.2.3. Calibration

Calibration criteria differ between CLP SOW and Functional Guidelines for Evaluation Organic Analyses. When these cases occurred, the SOW was used as validation criteria as noted:

The SOW requires the %RSD of calibration factors to be <20%, not <10%.

The resolution between adjacent peaks in the resolution check mixture met the resolution criteria of ≥ 60.0%.

Reconstructed ion chromatograms were plotted off scale. However, the peak height data on the quantitation sheets did not appear clipped. Retention time windows should not be affected.

The %D of sample results reported for two GC columns met the acceptance criteria.

Calibration factors and %RSD were recalculated and meet the acceptance criteria.

3.2.4. Blanks

Method Blank
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Sulfur Cleanup Blank
Sulfur cleanup not performed on this batch.

3.2.5. Surrogate Spike Recoveries

% Recovery was out of range for the following:

MND24-0945-0001	TCMX-1, TCMX-2.
MND24-0945-0001 MS	TCMX-1, TCMX-2.
MND24-0952-0001	TCMX-1, TCMX-2.
94LE0282-MB1 PBLKTF	TCMX-1, TCMX-2.

The affected samples were qualified (J_K).

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

MND24-0945-0001 MS
% Recovery was out of range for Lindane.
MND24-0945-0001 MSD
RPD was out of range for Lindane and Heptachlor.

The affected samples were qualified (J_S).

3.2.7. Compound Identification

The retention times of the reported compounds fell within the calculated retention time windows.

Secondary column confirmation was performed for all results greater than the PQL.

Percent difference between the two columns met performance criteria.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

GPC cleanup method not used for this batch.

3.2.8.2. Florisil Cartridge Cleanup

All percent recoveries were within acceptable range.
Calibration data not provided for instrument used for florisil cartridge check analyses.

3.2.9. System Performance

Possible late eluting compounds due to column contamination from samples analyzed in batch 9402L508. Some baseline shifting resulted. No peaks in method blanks at target compound retention times. No samples qualified.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

3.2.11. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.

3.3. INORGANIC METALS AND CYANIDE

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the following documents: USEPA Contract Laboratory Statement of Work for Inorganics Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All Initial and Continuing Calibration Verification samples were within control limits (Form 2A). Standards were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required detection limits (CRQLs).

3.3.2. Blanks

Values greater than the Instrument Detection Levels were used as acceptance criteria for Initial Calibration blanks and Continuing Calibration blanks. The blank acceptance values were an approved variance from the OU-9 QAPP.

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria (Form III).

3.3.2.2. Calibration Blanks

Continuing Calibration blanks analyzed for this batch met acceptance criteria (Form III).

3.3.3. Interference Check Sample

Results of the interference check sample met acceptance criteria (Form IV).

3.3.4. Laboratory Control Sample

All laboratory control samples met acceptance criteria (Form VII).

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis met acceptance criteria, except for arsenic, iron, lead, and sodium. The duplicate and water-quality sample results for the analytes not meeting the acceptance were given a J_D qualifier (Forms I, VI).

3.3.6. Matrix Spike Sample Analysis

Results of the spike sample analysis indicated that 9 of 28 analytes met acceptance criteria. The 16 of 28 analytes that did not meet acceptance criteria were antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, manganese, nickel, selenium, silver, vanadium, zinc, molybdenum, and tin. The duplicate and water-quality sample results for the analytes not meeting the acceptance criteria were given a J_S qualifier (Forms I, V). Spike sample analysis was not required for calcium, magnesium or sodium.

3.3.6.1. ICP Metals

MND24-0945-0001
% Recovery was out of range for Beryllium, Chromium, Cobalt, Copper, Iron, Manganese, Nickel, Silver, Vanadium, Zinc, Molybdenum, and Tin.

3.3.6.2. GFAA Metals

MND24-0945-0001
% Recovery was out of range for Antimony, Arsenic, Cadmium, and Selenium.

3.3.6.3. Cyanide

Analytical results met acceptance criteria.

3.3.6.4. Flame AA Metals

Results of the flame atomic absorption analysis met acceptance criteria.

3.3.6.5. Automated Cold Vapor AA

Analytical results met acceptance criteria.

3.3.7. Furnace Atomic Absorption QC

The furnace atomic absorption QC results met acceptance criteria, except for lead and cadmium. The water-quality results for lead and cadmium were given a J_S qualifier (Form I).

3.3.8. Standard Addition Results

Standard additions were performed on Sample MND24-0952-0001 for lead (Form VIII).

3.3.9. ICP Serial Dilution

ICP serial dilution results met acceptance criteria, except for calcium, iron, and zinc. The serial dilution and water-quality sample results for analytes not meeting acceptance criteria were given a J_I qualifier (Forms I, IX).

3.3.10. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

3.4.1. Calibration

3.4.1.1. Alkalinity

- pH meter calibrated with 4.0 and 7.0 standards at the beginning and after every ten samples

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

- 4 point calibration verified
- correlation coefficient ≥.995
- continuing calibration check was run every 20 samples
- calibration check responses are within 15% of true value

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

Use of S class weights not documented.
Daily calibration of balance not documented. Calibration verified within 48-hour time span.

3.4.2. Blanks

All Preparation Blank samples met acceptance criteria; no sample qualifiers were required.

All Calibration Blanks met acceptance criteria. No data was qualified.

3.4.3. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

MND24-0945-0001 MS
% Recovery was out of range for Nitrate-Nitrite.
MND24-0945-0001 MSD
% Recovery was out of range for Nitrate-Nitrite.
The affected samples were qualified (J_S).

3.4.5. Sample Result Verification

Nitrate-Nitrite and Nitrite as Nitrogen concentrations are calculated automatically from absorbance measurements. No data is available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

Recalculation of the Alkalinity data agrees with the reported results.

Recalculation of the Fluoride data agrees with the reported results.

Recalculation of the Total Dissolved Solids data and the Total Suspended Solids data agrees with the reported results.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

Volatiles - 502.2
No field duplicates were analyzed for this analysis.

Volatiles - 8030
No field duplicates were analyzed for this analysis.

Semivolatiles
No field duplicates were analyzed for this analysis.

Pesticides/PCBs
No field duplicates were analyzed for this analysis.

Inorganics - Metals
No field duplicates were analyzed for this analysis.

Inorganics - Anions
No field duplicates were analyzed for this analysis.

4.2. FIELD BLANKS (equipment blanks, etc.)

Volatiles 502.2

Trip Blanks
Trip Blank samples were within acceptable range.

Ambient Blanks
MND24-0945-3001
Outliers for Chloroform and Bromodichloromethane.
MND24-0945-3001 C1 (confirmation sample)
Outliers for Chloroform and Bromodichloromethane.
MND24-0945-3001 D1 (diluted sample)
Outlier for Chloroform.

Volatiles 8030

Trip Blanks
Trip Blank samples were within acceptable range.

Ambient Blanks
Ambient Blank samples were within acceptable range.

Semivolatiles
No field blank samples were analyzed for this analysis.

Pesticides/PCBs
No field blank samples were analyzed for this analysis.

Inorganics - Metals
There were no field blanks in this batch.

Inorganics - Anions

No field blank samples were analyzed for this analysis.

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced within the following sample analysis discussions.

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by Gas Chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list. The laboratory correctly added three compounds, but analyzed for trichlorotrifluoromethane, not trichlorotrifluoroethane.

One of the added compounds, 2-chloroethylvinyl ether was very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. The compound was only calibrated to a 4-point curve, not a 5 or 7-point curve. Preservation of the ground-water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinyl ether in them (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinyl ether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that 80-120% recovery be achieved. This variance affected the accuracy of low level volatile quantitations.

No VOCs were detected in water samples, except chloroform and bromodichloromethane, which were detected in sample MND24-0945-3001. No VOCs were detected in the method blanks prepared for the analysis of the samples.

A total of 4 of 38 surrogate recoveries, 2 of 32 matrix spike recoveries, and 12 of 63 blank spike recoveries were outside QAPP control limits. The affected sample results were qualified using J_K or J_S, as appropriate. Several results from daily and continuing calibration analyses were outside QAPP control limits. The water sample results affected by these quality control analyses were given a J_c qualifier to indicate that the results were considered to be an estimated value. The J qualifiers reflected a degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Acrylonitrile and Acetonitrile - Method 8030

All water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

No Method 8030 analytes were detected in the seven water samples. No Method 8030 analytes were detected in the trip blank. No Method 8030 analytes were detected in the method blanks.

Several continuing calibration analyses contained results that exceeded the QAPP control limits. The affected samples were given a J_c qualifier to indicate that the results were considered to be an

estimated value. The J_c qualifier reflected the degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

TCL Volatiles, sediments - CLP SOW
There were no sediment samples analyzed in this batch.

TCL Semivolatiles - CLP SOW
No semivolatiles were detected in the seven water samples. Three semivolatiles, diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate, were detected in the method blank. Non target compounds were also reported in the method blank.

The three semivolatiles, which are common analytical contaminants, were detected at concentrations below the CRQL. The water sample results for the detected semivolatiles were qualified (J) based on an evaluation of the method blank analytical results, however the qualified data was still considered usable.

A total of 4 of 22 matrix spike recoveries, and 1 of 11 blank spike recoveries were out of EPA control limits. The affected samples were qualified using J_S or J_K, as appropriate. There were several analyte results exceeding acceptance criteria for initial and continuing calibration analyses. All affected samples were given a J_c qualifier to indicate that the qualified value was considered to be estimated.

The non target compounds were not found in any of the water samples, so their presence in the method blank did not affect the quality of the analytical results.

Pesticides/PCBs - CLP SOW
No pesticides or PCBs were detected in the three water samples analyzed for pesticides and PCBs. No pesticides or PCBs were detected in the method blanks.

A total of 8 of 28 surrogate and 1 of 12 matrix spike recoveries did not meet acceptance criteria. The affected sample results were qualified using J_K or J_S, as appropriate.

TAL Inorganics and Cyanide - CLP SOW
All samples were analyzed for TAL metals using Modification B of the CLP Statement of Work. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/L for antimony and 2 ug/L for beryllium and thallium. For all remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Calcium, magnesium, sodium, and zinc were reported at concentrations above the CRQL in all three of the water samples. Arsenic, manganese, iron, and lead were reported at concentrations above the CRQL in at least one of the three samples. In addition to these eight inorganics, aluminum, barium, copper, cobalt, lithium, potassium, nickel, tin, molybdenum, and vanadium were reported at concentrations less than the CRQL but greater than the IDL in at least one water sample.

The lead concentration in sample MND24-0952-0001 was determined using the method of standard additions.

Several of the inorganics results were given a J_S, J_D, or J_I qualifier to indicate that the results were considered to be an estimated value. They were regarded as estimated based on an evaluation of matrix spike, duplicate sample, and serial dilution analyses that exceeded control limits. The J

qualifier reflected the degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Other Analytes

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric, Automated Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

The analytes included alkalinity, total cyanide, fluoride, nitrate-nitrite, nitrate (as nitrogen), total dissolved solids, and total suspended solids. All analyses of other analytes met acceptance criteria, except for a nitrate-nitrite matrix spike. The matrix spike and associated water sample results were considered estimated, and given a J_s qualifier.

REPORT OF DATA VALIDATION RESULTS
FOR CHEMICAL ANALYSES

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
FIRST GROUNDWATER AND SEDIMENT SAMPLING EVENT BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9402L536 and 9403L844 (Nitrate, Nitrite, and Fluoride only).

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX

Ground Water Samples - 5
Sediment Samples - 1
Quality Control Blanks - 3

1.3. DATE OF COLLECTION

2/8/94

1.4. CHAIN OF CUSTODY IDENTIFIER

N/A

1.5. TYPE OF ANALYSIS

Volatile Organic Compounds (ground water only) by Method 502.2
Volatile Organic Compounds (sediments only) by CLP SOW Modification D (OLM01.8)
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 03.0)
Fluoride by Method E340.2
Alkalinity (ground water only) by Method E310.1
Nitrite, as N (ground water only) by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2 - *Sample MND25-0951-0001 was extracted incorrectly and reanalyzed out of holding time (Batch 9403L844). Nitrate-Nitrite results will be qualified as estimated (J).*
Total Suspended Solids (ground water only) by Method E160.2
Total Dissolved Solids (ground water only) by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY

All samples were received in good condition by the laboratory.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:		Laboratory ID:
MND24-0947-0001	-	9402L536 004
MND24-0951-0001	-	9402L536 006
MND24-0933-0001	-	9402L536 002
MND24-0954-0001	-	9402L536 007
MND24-0954-1001	-	9402L536 009
MND24-0947-2001	-	9402L536 005
MND24-0951-2001	-	9402L536 003
MND24-0954-2001	-	9402L536 008
MND25-0951-0001	-	9402L536 001

The sediment sample was relogged for anion analyses as follows:

MND25-0951-0001	-	9403L844 001

2. HOLDING TIMES - RFW9402L536

All analyses were completed within the required holding times with the exception of the following:

ANALYSIS	RFW #	MOUND I.D.	DAYS OUT OF EXTRACTION TIME	DAYS OUT OF HOLD. TIME
Pesticides/PCBs	9402L536-006-R1	MND25-0951-0001	16	1
Pesticides/PCBs	9402L536-006-Z1	MND25-0951-0001		1
G.C. Volatiles (502.2)	9402L536-008-C1	MND24-0954-2001		2
Nitrate/Nitrite	9403L844-001	MND25-0951-0001		34

All affected Pesticide/PCB results were qualified as estimated (J_H).
The Nitrate/Nitrite sample results were rejected (R qualifier).

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Instrument tuning met performance criteria. No samples qualified.

3.1.2. Calibration

Volatiles 502.2
All samples quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. Initial and Continuing Calibration Verification criteria set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for 7-point curve. Few compounds were calibrated to 5-pointed curve and one compound (2-Chloroethylvinyl ether) to a 4-point curve; all compounds met linearity criteria.

Initial calibration results for confirmation columns met linearity criteria for 5-point curve at minimum, except for vinyl chloride and bis(2-Chloroisopropyl)ether.

1,1-Dichloroethane was out of range for Initial Calibration Verification of GC/PID for the primary column. Immediately following Continuing Calibration Verification, the sample met criteria for 1,1-Dichloroethane. No positive 1,1-Dichloroethane results were reported. No samples were qualified.

Numerous compounds were out of range in the Initial Calibration Verification sample for the confirmation column. Method Blank and Method Blank Spike Samples were qualified (U J_c) for these compounds.

Several compounds were out of range for Continuing Calibration Verification of primary and confirmation columns, affecting associated samples. None of the compounds reported with positive results. Affected samples were qualified as J_c.

Retention Time Window criteria was met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention time windows were within required limits during analysis of all Initial and Continuing Calibration samples.

Continuing Calibration Verification recoveries did not meet 85-115% control limits. Ten samples were affected. Acetonitrile results qualified as J_c.

One set of Continuing Calibration Verification sample data not available due to instrument malfunction. Affected samples were not reanalyzed. Acrylonitrile and acetonitrile results qualified as J_c.

Volatile CLP SOW - Sediments
Instrument calibration met performance criteria. No samples qualified.

Semivolatiles
Two compounds were out of range in the Initial Calibration Analysis Verification. The outlier compounds were Benzoic acid and 2,4-Dinitrophenol which affected the following five samples:

Machine No. 5100SP

MND25-0951-0001

Machine No. IN50J
94LE0309-MB1
MND24-0951-0001
MND24-0933-0001
MND24-0947-0001

The affected sample results were qualified (J_c).

Two compounds were out of range in the Continuing Calibration Analysis Verification. The outlier compounds were Benzo(k)fluoranthene and Pentachlorophenol which affected the following three samples:

Machine No. 5100SP
94LE0316-MB1
94LE0316-MB1-BS
MND25-0951-0001

The affected sample results were qualified (J_c).

3.1.3. Blanks

Volatiles 502.2 - Water
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030 - Water
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles CLP SOW - Sediments
94LVX025-MB1 VBLK
Methylene chloride and acetone were detected in the Method Blank, resulting in elevated quantitation limits for related samples.
94LVX026-MB1 VBLK
Methylene chloride and acetone were detected in the Method Blank, resulting in elevated quantitation limits for these samples.

Methylene Chloride concentrations in some related samples were greater than the action level. The affected samples were qualified (UJ_B).

Semivolatiles
94LE0309-MB1 SBLK
An unidentified compound was detected in method blank 94LE0316-MB1 SBLK.
94LE0316-MB1 SBLK
Unidentified compounds (including Aldol condensate) were detected in the Method Blank, resulting in an elevated quantitation limits for related samples.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2 - Water
% Recovery was out of range for the following:

MND24-0954-2001CON (confirmation sample of trip blank)	Bromochloromethane.
94LV4414-MB1 BLK (for the confirmation column)	Bromochloromethane.
94LV4414-MB1-BS BLK (for the confirmation column)	
Bromochloromethane.	

Volatiles 8030 - Water
All surrogate spike recoveries were within acceptable range.

Volatiles CLP SOW - Sediments
All surrogate spike recoveries were within acceptable range.

Semivolatiles
All surrogate spike recoveries were within acceptable range.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2 - Water
There were no matrix spike or matrix spike duplicate samples for this analysis.

Volatiles 8030 - Water
There were no matrix spike or matrix spike duplicate samples for this analysis.

Volatiles CLP SOW - Sediments
All matrix spike and matrix spike duplicate recoveries were within acceptable range.

Semivolatiles
There were no matrix spike or matrix spike duplicate samples for this analysis.

3.1.6. Internal Standards

Volatiles CLP SOW - Sediment
Internal standard data met performance criteria. No samples qualified.

Semivolatiles
The Internal Standard (IS) performance for Batch 9402L536 (Semivolatiles/Water Matrix) met acceptance criteria.

3.1.7. Compound Identification

Volatiles CLP SOW - Sediment
All retention times met the acceptance criteria with the following exceptions:

MND25-0951-0001	Acetone	
MND25-0951-0001-MS	Acetonitrile	Chloroform
MND25-0951-0001-MSD	Acetonitrile	Chloroform

All mass spectra of the sample compound and laboratory generated standard met the acceptance criteria.

Semivolatiles
All compounds were within ±0.06 relative retention time units of the standard RT.

3.1.8. System Performance

Volatiles 502.2
The review of primary and secondary chromatograms did not reveal system performance problems other than minor peak tailing. No sample qualification required.

Volatiles 8030-Water
Evaluation of the chromatograms identified a baseline rise at high temperatures, in addition to few extraneous peaks and peak splitting possibly due to a contaminated column. No sample qualification required.

Volatiles CLP SOW-Sediment
Evaluation of the chromatograms identified high background levels, few extraneous peaks and peak splitting. No sample qualification required.

Semivolatiles
A review of chromatograms and mass spectra revealed Tentatively Identified Compounds in Method Blanks and possible late-eluting compounds in soil data. No sample qualification required.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Semivolatiles
Compound quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

3.1.10. Tentatively Identified Compounds

Semivolatiles
A review of mass spectra indicated that four Tentatively Identified Compounds were detected in four samples. A spectral match was identified for 2-Methyl-Cyclopentanol in samples MND24-0954-0001 and MND24-0954-1001. A spectral match was identified for Benzo(J)Fluoranthene in sample MND25-0951-0001. A spectral match was identified for 3-Methyl-Acetate-2-Butanol in sample MND25-0951-0001. A spectral match was identified for Cyclohexanol in sample MND24-0933-0001.

3.1.11. Laboratory Control Sample

Volatiles 502.2 - Water
% Recovery was out of range for the following:

94LV1014-MB1-BS BLK	Total Xylenes
94LV1015-MB1-BS BLK	Total Xylenes

% Recovery was out of range for the following confirmation column. None of the compounds were identified in the samples. No sample qualification required.

94LV4411-MB1-BS BLK	trans-1,3-Dichloroethene, Trichloroethene, Bromoform, Bromodichloromethane, and 1,1,2,2-Tetrachloroethane.
94LV4414-MB1-BS BLK	Trichloroethene, 1,1,2,2-Tetrachloroethane, and 1,2-Dichloroethane.

Ethylbenzene was qualified (I) due to an additional (unidentified) compound for samples 94LV4419-MB1-BS BLK and 94LV4414-MB1-BS BLK.

Volatiles 8030 - Water
All Laboratory Control Samples were within acceptable range.

Volatiles CLP SOW - Sediments
All Laboratory Control Samples were within acceptable range.

Semivolatiles
94LE0309-MB1-BS
% Recovery was out of range for 4-Nitrophenol.
The affected samples were qualified (J_K).

3.2. PESTICIDES/PCBs

3.2.1. GC/ECD Performance Check

The DDT retention times fell within the quality control limits of greater than twelve minutes for all analyses.

The standard retention time values for Tetrachloro-m-xylene (TCX) and Decachlorobiphenyl (DCB) were outside of QC limits for two samples. All other retention times fell within the QC limits.

The standard retention times for single component analytes fell within the established retention time windows.

3.2.2. Performance Evaluation Mixture

3.2.2.1 Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

The PEM retention times fell within the established retention time windows.

3.2.2.3. Recovery

The RPD for the PEM analyzed before calibration did not meet the acceptance criteria for Beta-BHC. The PEM sample analyzed immediately after calibration met all criteria. The compound was not detected in the associated samples. No samples were qualified.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and Endrin met the acceptance criteria of ≤ 20.0% and ≤ 30.0% combined breakdown with the following exceptions:

Lab Sample I.D./Sample Number 03089408.73\PEMDD-5204

Endrin Breakdown 22.0%

Lab Sample I.D./Sample Number 03089411.02\PEMLA-5204

Endrin Breakdown 28.0%
Combined Breakdown 34.0%

Affected sample results were qualified (J).

3.2.3. Calibration

Calibration criteria differ between CLP SOW and Functional Guidelines for Evaluation Organic Analyses. When these cases occurred, the SOW was used as validation criteria as noted:

The SOW requires the %RSD of calibration factors to be <20%, not <10%.

The resolution between adjacent peaks in the resolution check mixture met the resolution criteria of ≥ 60.0%.

Reconstructed ion chromatograms were plotted off scale. However, the peak height data on the quantitation sheets did not appear clipped. Retention time windows were not affected.

The %D of sample results reported for two GC columns did not met the acceptance criteria for gamma-BHC. The affected samples (MND24-0933-0001 and MND25-0951-0001) were qualified as J_p.

Calibration factors and %RSD were recalculated and meet the acceptance criteria.

3.2.4. Blanks

Method Blank
94LE0306-MB1 PBLKUY
Gamma-BHC (Lindane) was detected in the Method Blank, resulting in elevated quantitation limit for related samples.

Sulfur Cleanup Blank
Sulfur cleanup not performed on this batch.

3.2.5. Surrogate Spike Recoveries

% Recovery was out of range for the following:

MND24-0951-0001	TCMX-1, TCMX-2
MND24-0933-0001	DCB-1
MND24-0954-0001	TCMX-1
MND24-0954-1001	TCMX-1
94LE0310-MB1 PBLKTH	TCMX-1, TCMX-2
94LE0310-MB1-BS PBLKTH	TCMX-1, TCMX-2
MND25-0951-0001	DCB-1
94LE0442-MB1 PBLKXL	TCMX-2

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

No matrix spike or matrix spike duplicate samples were analyzed in this batch.

3.2.7 Compound Identification

The retention times of the reported compounds fell within the calculated retention time windows.

Secondary column contamination was performed for all results greater than the PQL.

The percent difference between the two columns failed acceptance criteria for gamma-BHC for samples MND24-0933-0001 and MND25-0951-0001.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

All percent recoveries were within acceptable range.

3.2.8.2. Florisil Cartridge Cleanup

All percent recoveries were within acceptable range.

3.2.9. System Performance

Many strong peaks in environmental sample chromatograms possibly due to column contamination. Gamma-BHC (Lindane) present in method blanks possibly due to cross contamination during extraction.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

3.2.11. Laboratory Control Sample

94LE0310-MB1-BS PBLKTH
% Recovery was out of range for Lindane, Heptachlor, and Aldrin.
Sediment sample 94LE0306-MB1-BS PBLKUY not quantified for gamma-BHC due to matrix interference.

3.3. INORGANIC METALS AND CYANIDE

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the following documents: USEPA Contract Laboratory Statement of Work for Inorganics Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All Initial and Continuing Calibration Verification samples were within control limits (Form 2A). Standards were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required quantitation limits (CRQLs).

3.3.2. Blanks

Values greater than the Instrument Detection Levels were used as acceptance criteria for Initial Calibration blanks and Continuing Calibration blanks. The blank acceptance values were an approved variance from the OU-9 QAPP.

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria (Form III).

3.3.2.2. Calibration Blanks

Initial and Continuing Calibration blanks analyzed for this batch met acceptance criteria (Form III).

3.3.3. Interference Check Sample

Results of the interference check sample met acceptance criteria (Form IV).

3.3.4. Laboratory Control Sample

All laboratory control samples met acceptance criteria (Form IV).

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis for water samples met acceptance criteria (Form VI).

Results of the duplicate sample analysis for soil samples met acceptance criteria for 17 of 28 analytes. Results for 9 of 28 analytes did not meet acceptance criteria. The analytes not meeting acceptance criteria were aluminum, arsenic, cadmium, calcium, chromium, lead, magnesium, manganese, and selenium. The duplicate and sediment sample results for analytes not meeting acceptance criteria were given a J qualifier (Forms I, VI). Duplicate analyses for mercury and cyanide were not required for this sample.

3.3.6. Matrix Spike Sample Analysis

Results of the matrix spike sample analysis for water samples met acceptance criteria for 8 of 28 analytes. Results for 15 of 28 analytes did not meet acceptance criteria. The analytes not meeting acceptance criteria were barium, beryllium, cadmium, chromium, cobalt, copper, iron, manganese, nickel, silver, thallium, vanadium, zinc, molybdenum, and tin. The matrix spike and water-quality sample results for analytes not meeting acceptance criteria were given a J_S qualifier (Forms I, V). It was not necessary to analyze matrix spike samples for calcium, sodium, magnesium, mercury, or cyanide.

Results of the matrix spike sample analysis for soil samples met acceptance criteria, except for arsenic, selenium, and thallium. The matrix spike and soil-quality results for analytes not meeting acceptance criteria were given a J_S qualifier (Forms I, VI).

The following four sections detail the matrix spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

MND24-0951-0001
% Recovery was out of range for Barium, Beryllium, Chromium, Cobalt, Copper, Iron, Manganese, Nickel, Silver, Vanadium, Zinc, Molybdenum, and Tin.

3.3.6.2. GFAA Metals

MND24-0951-0001
% Recovery was out of range for Cadmium and Thallium.
MND25-0951-0001
% Recovery was out of range for Arsenic, Selenium, and Thallium.

3.3.6.3. Cyanide

A matrix spike analysis was not required for cyanide.

3.3.6.4. Flame AA Metals

Results of the matrix spike analysis met acceptance criteria.

3.3.6.5. Automated Cold Vapor AA

A matrix spike analysis was not required for mercury.

3.3.7. Furnace Atomic Absorption QC

The furnace atomic absorption QC results met acceptance criteria, except for the following:

MND24-0933-0001: lead.
MND24-0947-0001: cadmium, antimony.
MND24-0951-0001: cadmium, antimony, thallium.
MND24-0954-1001: selenium.

The water-quality results for analytes not meeting acceptance criteria were given a J_S qualifier (Form I).

3.3.8. Standard Addition Results

Standard additions were performed on the following samples (Form VIII):

MND24-0947-0001: lead.
MND25-0951-0001: lead, antimony.
MND25-0951-1001: selenium.

3.3.9. ICP Serial Dilution

ICP serial dilution results for water samples met acceptance criteria, except for barium, calcium, magnesium, and zinc. The serial dilution and water-quality sample results for analytes not meeting acceptance criteria were given a J_I qualifier (Forms I, IX).

ICP serial dilution results for soil samples met acceptance criteria, except for barium, calcium, iron, magnesium, manganese, and zinc. The serial dilution and soil-quality sample results for analytes not meeting acceptance criteria were given a J_I qualifier (Forms I, IX).

3.3.10. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

3.4.1. Calibration

3.4.1.1. Alkalinity

- pH meter calibrated with 4.0 and 7.0 standards at the beginning and after every ten samples

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

- 4 point calibration verified
- correlation coefficient $\geq .995$
- continuing calibration check was run every 20 samples

- calibration check responses are within 15% of true value

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

Use of S class weights not documented.
Daily calibration of balance not documented. Calibration verified within 48-hour time span.

3.4.2. Blanks

Inorganics - Anions
94LNT041-MB2
Nitrate-Nitrite was detected in the Preparation Blank, resulting in an elevated quantitation limit for sample MND24-0947-0001.
Nitrate-Nitrite concentrations in some samples were greater than the action level. These related samples were not qualified.

Inorganics - Anions - Sediments
All Preparation Blank samples met acceptance criteria; no sample qualifiers were required.
Relogged as 9403L844.

All Calibration Blanks met acceptance criteria. No data was qualified.

3.4.3. Laboratory Control Sample

Inorganics - Anions
All Laboratory Control Samples were within acceptable range.

Inorganics - Anions - Sediments
All Laboratory Control Samples were within acceptable range.
Relogged as 9403L844.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

Inorganics - Anions
All matrix spike and matrix spike duplicate samples were within acceptable range.

Inorganics - Anions - Sediments
No matrix spike and matrix spike duplicate samples for this analysis.
Relogged as 9403L844.

3.4.5. Sample Result Verification

Nitrate-Nitrite and Nitrite as Nitrogen concentrations were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

Analytical results for the Nitrate/Nitrite sample that was extracted at a 1/2x dilution were qualified (J).

Recalculation of the Alkalinity data agreed with the reported results.

Recalculation of the Fluoride data agreed with the reported results.

Recalculation of the Total Dissolved Solids data and the Total Suspended Solids data agreed with the reported results.

Recalculation of the Percent Solids data agreed with the reported results.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

Volatiles - 502.2 - Water
MND24-0954-0001
MND24-0954-1001
All parameters were below detection limit (BDL) - all RPD values were within QC limits.

Volatiles - 8030 - Water
MND24-0954-0001
MND24-0954-1001
All parameters were below detection limit (BDL) - all RPD values were within QC limits.

Volatiles CLP SOW - Sediments
No field duplicates of sediments were collected with this batch.

Semivolatiles
MND24-0954-0001
MND24-0954-1001
All parameters were below detection limit (BDL) - all RPD values were within QC limits.

Pesticides/PCBs
MND24-0954-0001
MND24-0954-1001
All parameters were below detection limit (BDL) - all RPD values were within QC limits.

Inorganics - Metals
MND24-0954-0001
MND24-0954-0001
RPD values were out of range for Iron and Zinc.
RPD values were not calculated for Manganese, Nickel, Selenium, or Vanadium because concentrations were not detectable in one sample.

Inorganics - Anions
MND24-0954-0001
MND24-0954-1001
All RPD values were within QC limits.

Inorganics - Anions - Sediments
No field duplicates of sediment samples were collected with this batch.

4.2. FIELD BLANKS (equipment blanks, etc.)

Volatiles 502.2 - Water
Trip Blank samples were within acceptable range.

Volatiles 8030 - Water
Trip Blank samples were within acceptable range.

Volatiles CLP SOW - Sediments
No field blank samples were analyzed for this analysis.

Semivolatiles
No field blank samples were collected for this batch.

Pesticides/PCBs
No field blank samples were collected for this batch.

Inorganics - Metals
There were no field blanks in this batch.

Inorganics - Anions
No field blank samples were collected for this batch.

Inorganics - Anions - Sediments
No field blank samples were collected for this batch.

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced within the following sample analysis discussions.

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by Gas Chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list. The laboratory correctly added three compounds, but analyzed for trichlorotrifluoromethane, not trichlorotrifluoroethane.

One of the added compounds, 2-chloroethylvinyl ether was very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. The compound was only calibrated to a 4-point curve, not a 5 or 7-point curve. Preservation of the ground-water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinyl ether in them (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinyl ether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that 80-120% recovery be achieved. This variance affected the accuracy of low level volatile quantitations.

No VOCs were detected in the eight water samples. No VOCs were detected in the trip blank. No VOCs were detected in the method blanks prepared for the analysis of the samples. No system performance problems were evident based on an analysis of primary and secondary chromatograms.

Several VOC results were given a J_c qualifier to indicate that the results were considered to be an estimated value. They were regarded as estimated based on an evaluation of surrogate recovery, blank spike recovery, and instrument calibration verification analyses. The J_c qualifier reflected a degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

The confirmation analysis of sample MND24-0954-2001 was performed after the holding time limit expired. However because there were no target compounds detected in the original sample MND24-0954-0001, no data were affected. No qualifiers were applied to water samples based on the confirmation analysis of sample MND24-0954-0001.

Acrylonitrile and Acetonitrile - Method 8030

All ground water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

No Method 8030 analytes were detected in the eight water samples. No Method 8030 analytes were detected in the trip blank. No Method 8030 analytes were detected in the method blanks.

Several analytical results were given a J_c qualifier, based on continuing calibration results outside of control limits. All data from the Method 8030 analysis however, are usable.

TCL Volatiles, sediments - CLP SOW

One sediment sample was analyzed in this batch. Two common analytical contaminants, methylene chloride (15 ug/L) and acetone (28 ug/L), were detected in the sediment sample. Both of these volatiles however, were also detected in the method blanks. The affected sediment sample results were given a UJ_B qualifier, based on the presence of the two analytes in the method blank. The UJ_B qualifier indicated that the results were considered estimated, and that the detection of the analytes in the sediment sample was related to a laboratory process rather than environmental conditions. All of the analytical results for this analysis were considered usable.

All quality control analyses met acceptance criteria. No samples were qualified based on quality control results.

TCL Semivolatiles - CLP SOW

No TCL semivolatiles were detected in the five water samples, however several Tentatively Identified compounds (TICs) were detected. No TCL semivolatiles were detected in the method blanks, however several nontarget TICs were detected. Nine TCL semivolatiles were reported in the sediment sample at concentrations above the CRQL. Eleven TCL semivolatiles were reported in the sediment sample at concentrations above the IDL but below the CRQL.

All quality control analyses met acceptance criteria, with the exception of one water blank spike, two initial calibration, and one continuing calibration analyses. The spike and calibration contained results for five compounds that were outside of control limits and affected sample results were given a J_c qualifier. The J_c qualifier indicated that the qualified sample results were considered estimated, however the analytical data was usable.

Pesticides/PCBs - CLP SOW

Pesticides were detected in the three water samples. Pesticides were also detected in the method blanks. One of the pesticides, gamma-BHC (Lindane), was detected in the method blanks, and most likely occurred as a result of cross contamination during sample extraction. The quantitation level for gamma-BHC, calculated as five times the method blank concentration, was less than the reported concentration in the sediment sample. However, cross contamination of water and sediment samples did not necessarily occur to the same degree. As a result of the blank contamination, the gamma-BHC was given a J_B qualifier for the samples in this batch, due to major problems. The J_B qualifier indicated that the concentrations of detected analytes were considered estimated quantities.

Sediment sample MND25-0951-0001 was re-extracted out of holding time and analyzed. All results are near two times the quantitation level. All are qualified as estimated (UJ_H or J_H).

The sediment sample required a 2:1 dilution due to high levels of TIC.

A total of 11 of 52 surrogate recoveries did not meet acceptance criteria, while 3 of 17 blank spike recoveries did not meet acceptance criteria. A laboratory control sample did not meet acceptance criteria for Lindane, Heptachlor, and Aldrin. Water sample results affected by these quality control analyses were given a J_K qualifier. Soil-matrix spike data was unusable due to the presence of many interferences.

TAL Inorganics and Cyanide - CLP SOW

All samples were analyzed for TAL metals using Modification B of the CLP Statement of Work. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/L for antimony and 2 ug/L for beryllium and thallium. For all remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Calcium, aluminum, and zinc were reported at concentrations above the CRQL in all five of the water samples. Arsenic, beryllium, iron, lead, magnesium, manganese, molybdenum, sodium, and selenium were reported at concentrations above the CRQL in at least one of the three samples. In addition to these inorganics, antimony, barium, copper, cobalt, lithium, potassium, and nickel were reported at concentrations less than the CRQL but greater than the IDL in at least one water sample.

Silver, thallium, and bismuth were the only inorganics analyzed for and not detected in the sediment sample. The cyanide analysis was not performed on the sediment sample.

The lead concentrations in samples MND24-0947-0001 and MND25-0951-0001 were determined using the method of standard additions.

Several of the inorganics results were given a J_S, J_D, or J_I qualifier to indicate that the results were considered to be an estimated value. They were regarded as estimated based on an evaluation of matrix spike, duplicate sample, and serial dilution analyses that exceeded control limits. The J qualifier reflected the degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Other Analytes

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric, Automated Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

The analyses performed included alkalinity, total cyanide, fluoride, nitrate-nitrite, nitrate (as nitrogen), total dissolved solids, and total suspended solids. All analyses of other analytes met acceptance criteria, with the exception summarized below.

Nitrate-Nitrite was detected above the quantitation limit in one method blank. The detection limit of one sample was elevated to five times the blank concentration, resulting in a non-detect for that sample (U).

One Nitrate-Nitrite sample was extracted at an incorrect concentration, resulting in a 1/2x dilution. The results were given a J qualifier, but the data was considered usable. The sample was reanalyzed as Batch #9402L844, but was analyzed 39 days beyond the holding time limit. The reanalyzed samples were given an R qualifier, and considered unusable.

REPORT OF DATA VALIDATION RESULTS
FOR CHEMICAL ANALYSES

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
FIRST GROUNDWATER AND SEDIMENT SAMPLING EVENT BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9402L544

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX
Ground Water Samples - 2
Quality Control Blanks - 1

1.3. DATE OF COLLECTION
2/9/94

1.4. CHAIN OF CUSTODY IDENTIFIER
N/A

1.5. TYPE OF ANALYSIS
Volatile Organic Compounds by Method 502.2
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 03.0)
Fluoride by Method E340.2
Alkalinity by Method E310.1
Nitrite, as N by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2
Total Suspended Solids by Method E160.2
Total Dissolved Solids by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY
All samples were received in good condition by the laboratory.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:		Laboratory ID:
MND24-0955-0001	-	9402L544 001
MND24-0964-0001	-	9402L544 003
MND24-0964-2001	-	9402L544 005

2. HOLDING TIMES - RFW9402L544

All analyses were completed within the required holding times with the exception of the following:

ANALYSIS	RFW #	MOUND I.D.	DAYS OUT OF EXTRACTION TIME	DAYS OUT OF HOLD. TIME
G.C. Volatiles (502.2)	9402L544-005-C1	MND240964-2001		2

All results for 9402L544-005-C1 were "NA". No qualifiers were applied.

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Instrument Tuning met performance criteria. No samples were qualified.

3.1.2. Calibration

Volatiles 502.2
All samples quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. Initial and Continuing Calibration Verification criteria set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for 7-point curve. Few compounds calibrated to 5-pointed curve and one compound to a 4-point curve (2-Chloroethylvinyl ether); all maintained linearity criteria.

Initial calibration results for confirmation columns met linearity criteria for 5-point curve at minimum, except for vinyl chloride and bis(2-Chloroisopropyl)ether.

1,1-Dichloroethane was out of range for Initial Calibration Verification of GC/PID for the primary column. Immediately following Continuing Calibration Verification sample met criteria for 1,1-Dichloroethane. No positive 1,1-Dichloroethane results reported, no samples qualified.

Numerous compounds were out of range in the Initial Calibration Verification sample for the confirmation column. Confirmation and method blank data was not qualified because associated Continuing Confirmation Verification sample data met criteria.

Several compounds were out of range for Continuing Calibration Verification of primary and confirmation columns, affecting associated samples. None of the compounds were reported with positive results. Affected samples were qualified as J_c.

Retention Time Window criteria was met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention time windows were within required limits during analysis of all Initial and Continuing Calibration samples.

Continuing Calibration Verification recoveries did not meet 85-115% control limits. Six samples affected. Acrylonitrile and acetonitrile results were qualified as J_c.

One set of Continuing Calibration Verification sample data not available due to instrument malfunction. Sample MND24-0955-0001 not reanalyzed; acrylonitrile

and acetonitrile results were qualified as J_c. The remaining samples were reanalyzed the following day and did not require qualification.

Semivolatiles
One compound was out of range in the Initial Calibration Analysis Verification. The outlier compound was Benzoic acid which affected the following four samples:

Machine No. IN50J

94LE0309-MB1
94LE0309-MB1-BS
MND24-0955-0001
MND24-0964-0001-MS

The affected sample results were qualified (J).

3.1.3. Blanks

Volatiles 502.2
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Semivolatiles
94LE0309-MB1 SBLK
An unknown Tentatively Identified Compound was detected in the Method Blank, resulting in elevated quantitation limit for related samples.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2
% Recovery was out of range for the following:

MND24-0964-2001CON (confirmation sample)	Bromochloromethane.
94LV4414-MB1 BLK	Bromochloromethane.
94LV4414-MB1-BS BLK	Bromochloromethane.

The affected samples were qualified (J_K).

Volatiles 8030
All surrogate spike recoveries were within acceptable range.

Semivolatiles
All surrogate spike recoveries were within acceptable range.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2
No matrix spike or matrix spike duplicate samples for this analysis.

Volatiles 8030
No matrix spike or matrix spike duplicate samples for this analysis.

Semivolatiles
There were no matrix spike or matrix spike duplicate samples for this analysis.

3.1.6. Internal Standards

Semivolatiles
The Internal Standard (IS) performance for Batch 9402L544 (Semivolatiles/Water Matrix) met acceptance criteria.

3.1.7. Compound Identification

Semivolatiles
All compounds were within ±0.06 relative retention time units of the standard RT.

3.1.8. System Performance

Volatiles 502.2
The review of primary and secondary chromatograms did not reveal system performance problems other than minor peak tailing. No sample qualification required.

Volatiles 8030-Water
Evaluation of the chromatograms identified a baseline rise at high temperatures, in extraneous peaks possibly due to a contaminated column, resolution loss and peak splitting. No sample qualification required.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems. No sample qualification required.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Semivolatiles
Compound quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

3.1.10. Tentatively Identified Compounds

Semivolatile
A review of mass spectra indicated that one Tentatively Identified Compound, Cyclohexanol was detected in one sample MND24-0964-0001.

3.1.11. Laboratory Control Sample

Volatiles 502.2
% Recovery was out of range for the following:

94LV1015-MB1-BS BLK	Total Xylenes
94LV4414-MB1-BS BLK	Trichloroethene, 1,2-Dichloroethane, and 1,1,2,2-Tetrachloroethane

The affected samples were qualified (J_K).

Ethylbenzene was qualified (I) due to an additional unidentified compound for sample 94LV4414-MB1-BS BLK.

Volatiles 8030
All Laboratory Control Samples were within acceptable range.

Semivolatiles
94LE0309-MB1-BS
% Recovery was out of range for 4-Nitrophenol.
The affected samples were qualified (J_K).

3.2. PESTICIDES/PCBs

3.2.1. GC/ECD Performance Check

The DDT retention times fell within the quality control limits of greater than twelve minutes for all analyses.

The standard retention times for single component analytes fell within the established retention time windows.

3.2.2. Performance Evaluation Mixture

3.2.2.1 Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

The PEM retention times fell within the established retention time windows.

3.2.2.3. Recovery

The RPD for the PEM did not meet the acceptance criteria for Beta-BHC. The compound was not detected in the associated samples. The next PEM sample (after calibration) met all criteria. No samples were qualified.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and Endrin met the acceptance criteria of $\leq$ 20.0% and $\leq$ 30.0% combined breakdown.

3.2.3. Calibration

Calibration criteria differ between CLP SOW and Functional Guidelines for Evaluation Organic Analyses. When these cases occurred, the SOW was used as validation criteria as noted:

The SOW requires the %RSD of calibration factors to be <20%, not <10%.

The resolution between adjacent peaks in the resolution check mixture met the resolution criteria of ≥ 60.0%.

Reconstructed ion chromatograms were plotted off scale. However, the peak height data on the quantitation sheets did not appear clipped. Retention time windows were not affected.

The %D of sample results reported for two GC columns met the acceptance criteria.

Calibration factors and %RSD were recalculated and met the acceptance criteria.

3.2.4. Blanks

Method Blank
All Method Blank samples met acceptance criteria; no sample qualifiers were required. Unknown compounds were detected in the method blank.

Sulfur Cleanup Blank
Sulfur cleanup not performed on this batch.

3.2.5. Surrogate Spike Recoveries

% Recovery was out of range for

MND24-0964-0001	TCMX-1, TCMX-2.
94LE0310-MB1 PBLKTH	TCMX-1, TCMX-2.
94LE0310-MB1-BS PBLKTH	TCMX-1, TCMX-2.

The affected samples were qualified (J_K).

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

No matrix spike or matrix spike duplicate samples for this analysis.

3.2.7. Compound Identification

The retention times of the reported compounds fell within the calculated retention time windows.

The reported Lindane concentration was attributed to possible cross contamination during extraction. (See Method blank 94LE0306) The quantitation limit for this compound was adjusted to 220 ug/L and the sample result was qualified (U J_B).

Secondary column confirmation was performed for all results greater than the PQL.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

GPC cleanup method not used for this batch.

3.2.8.2. Florisil Cartridge Cleanup

All percent recoveries were within acceptable range.
Calibration data not provided for instrument used for florisil cartridge check analyses.

3.2.9. System Performance

Many strong peaks in environmental sample chromatograms possibly due to column contamination. No peaks in method blanks at target compound retention times. No samples qualified.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

3.2.11. Laboratory Control Sample

94LE0310-MB1-BS PBLKTH
% Recovery was out of range for Lindane, Heptachlor, and Aldrin.
The affected sample results were qualified (J_S).

3.3. INORGANIC METALS AND CYANIDE

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the following documents: USEPA Contract Laboratory Statement of Work for Inorganics Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All Initial and Continuing Calibration Verification samples were within control limits (Form 2A). Standards were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required detection limits (CRQLs).

3.3.2. Blanks

Values greater than the Instrument Detection Levels were used as acceptance criteria for Initial Calibration blanks and Continuing Calibration blanks. The blank acceptance values were an approved variance from the OU-9 QAPP.

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria (Form III).

3.3.2.2. Calibration Blanks

Continuing calibration blanks analyzed for this batch met acceptance criteria (Form III).

3.3.3. Interference Check Sample

Results of the interference check sample met acceptance criteria (Form IV).

3.3.4. Laboratory Control Samples

All laboratory control samples met acceptance criteria (Form VII).

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis met acceptance criteria (Form VI).

3.3.6. Matrix Spike Sample Analysis

Results of the spike sample analysis of 10 of the 28 analytes met acceptance criteria. Results of the spike sample analysis of 13 of the 28 analytes did not meet acceptance criteria. The analytes not meeting acceptance criteria were arsenic, beryllium, cobalt, lead, manganese, silver, nickel, zinc, molybdenum, and tin. The spike and water-quality sample results for the analytes not meeting the acceptance criteria were given a J_S qualifier (Forms I, V). A spike sample analysis was not required for calcium, sodium, magnesium, mercury, and cyanide.

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

MND24-0964-0001
% Recovery was out of range for Beryllium, Cobalt, Manganese, Nickel, Silver, Zinc, Molybdenum, and Tin.

3.3.6.2. GFAA Metals

MND24-0964-0001
% Recovery was out of range for Arsenic and Lead.

3.3.6.3. Cyanide

Matrix spike analysis was not required for cyanide.

3.3.6.4. Flame AA Metals

Results of the flame atomic absorption analysis met acceptance criteria.

3.3.6.5. Automated Cold Vapor AA

Matrix spike was not required for mercury.

3.3.7. Furnace Atomic Absorption QC

The furnace atomic absorption QC results met acceptance criteria, except for cadmium, lead, antimony, and thallium. The water-quality results for cadmium, lead antimony, and thallium were given a J_S qualifier (Form I).

3.3.8. Standard Addition Results

Standard additions were not required for this batch (Form VIII).

3.3.9. ICP Serial Dilution

ICP serial dilution results met acceptance criteria, except for sodium. The serial dilution and water-quality sample results for analytes not meeting acceptance criteria were given a J_l qualifier (Forms I, IX).

3.3.10. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

3.4.1. Calibration

3.4.1.1. Alkalinity

- pH meter calibrated with 4.0 and 7.0 standards at the beginning and after every ten samples

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

- 4 point calibration verified
- correlation coefficient ≥.995
- continuing calibration check was run every 20 samples
- calibration check responses are within 15% of true value

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

Use of S class weights not documented.
Daily calibration of balance not documented. Calibration verified within 48-hour time span.

3.4.2. Blanks

All Preparation Blank samples met acceptance criteria; no sample qualifiers were required.

All Calibration Blanks met acceptance criteria. No data was qualified.

3.4.3. Laboratory Control Sample

All Laboratory Control Samples were within acceptable range.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

All matrix spike and matrix spike duplicate recoveries were within acceptable range.

3.4.5. Sample Result Verification

Nitrate-Nitrite and Nitrite as Nitrogen concentrations were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

Recalculation of the Alkalinity data agreed with the reported results.
Recalculation of the Fluoride data agreed with the reported results.
Recalculation of the Total Dissolved Solids data and the Total Suspended Solids data agreed with the reported results.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

Volatiles - 502.2
No field duplicates were analyzed for this analysis.

Volatiles - 8030
No field duplicates were analyzed for this analysis.

Semivolatiles
No field duplicates were analyzed for this analysis.

Pesticides/PCBs
No field duplicates were analyzed for this analysis.

Inorganics - Metals
No field duplicates were analyzed for this analysis.

Inorganics - Anions
No field duplicates were analyzed for this analysis.

4.2. FIELD BLANKS (equipment blanks, etc.)

Volatiles 502.2
Trip Blank samples were within acceptable range.

Volatiles 8030
Trip Blank samples were within acceptable range.

Semivolatiles
No field blank samples were analyzed for this analysis.

Pesticides/PCBs
No field blank samples were analyzed for this analysis.

Inorganics - Metals
There were no field blanks in this batch.

Inorganics - Anions
No field blank samples were analyzed for this analysis.

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced within the following sample analysis discussions.

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by Gas Chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list. The laboratory correctly added three compounds, but analyzed for trichlorotrifluoromethane, not trichlorotrifluoroethane.

One of the added compounds, 2-chloroethylvinylether was very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. The compound was only calibrated to a 4-point curve, not a 5 or 7-point curve. Preservation of the ground-water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinylether in them (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinylether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that 80-120% recovery be achieved. This variance affected the accuracy of low level volatile quantitations.

No VOCs were detected in the water samples. No VOCs were detected in the trip blank. No VOCs were detected in the method blanks prepared for the analysis of the samples.

A total of 3 of 18 surrogate recoveries and 4 of 31 blank spike recoveries were outside QAPP control limits. The affected sample results were qualified (J_K). Several results from daily and continuing calibration analyses were outside QAPP control limits. The water sample results affected by these quality control analyses were given a J_c qualifier to indicate that the results were considered to be an estimated value. The J qualifier reflected a degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Sample MND24-0941-001 was not analyzed for VOCs because the pH of the sample when measured in the lab was greater than 2.

Acrylonitrile and Acetonitrile - Method 8030

All water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

No Method 8030 analytes were detected in the water samples. No Method 8030 analytes were detected in the trip blank. No Method 8030 analytes were detected in the method blanks.

Several analytical results were given a J_C qualifier based on a laboratory-documented instrument malfunction associated with calibration.

TCL Volatiles, sediments - CLP SOW
There were no sediment samples analyzed in this batch.

TCL Semivolatiles - CLP SOW
No TCL semivolatiles were detected in the water samples. No TCL semivolatiles were detected in the method blank. Non-target compounds were reported in the water samples and method blank.

Several results from daily and continuing calibration analyses were outside QAPP control limits. The water sample results affected by these quality control analyses were given a J_c qualifier to indicate that the results were considered to be an estimated value. The J_c qualifier reflected a degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

A total of 1 of 11 blank spike recoveries were out of EPA control limits. The affected sample results were qualified (J_K).

The non-target compounds were not found in any of the water samples at the target compound retention times, so their presence in the method blank did not affect the quality of the analytical results.

Pesticides/PCBs - CLP SOW
A pesticide, gamma-BHC (Lindane), was detected in one of the samples. No pesticides were detected in the method blank. The reported quantity of Lindane may have occurred as a result of cross contamination during sample extraction. As a result of the possible contamination, the sample result was given a U J_B qualifier. The U J_B qualifier indicated that the concentrations of detected analytes were considered estimated quantities.

A total of 6 of 16 surrogate recoveries and 3 of 6 blank spike recoveries did not meet acceptance criteria. The affected sample results were given a J_K or J_S qualifier, as appropriate.

TAL Inorganics and Cyanide - CLP SOW
All samples were analyzed for TAL metals using Modification B of the CLP Statement of Work. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/L for antimony and 2 ug/L for beryllium and thallium. For all remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Aluminum, calcium, magnesium, manganese, sodium, and zinc were reported at concentrations above the CRQL in both of the water samples. Iron, lead, zinc, and barium were reported at concentrations above the CRQL in one water sample. In addition, cobalt, chromium, copper, lithium, potassium, nickel, molybdenum, and tin were reported at concentrations less than the CRQL but greater than the IDL in at least one water sample.

Several of the inorganics results were given a J_S qualifier to indicate that the results were considered to be an estimated value. They were regarded as estimated based on matrix spike analyses that exceeded control limits. The J qualifier reflected the degree of analytical precision outside of the QAPP-specified control limits for the qualified analytes, but the qualified results were regarded as usable.

Other Analytes

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric, Automated Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

The analytes included alkalinity, total cyanide, fluoride, nitrate-nitrite, nitrate (as nitrogen), total dissolved solids, and total suspended solids.

All quality control analyses met acceptance criteria. No samples were qualified.

REPORT OF DATA VALIDATION RESULTS

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
SECOND GROUNDWATER AND SEDIMENT SAMPLING EVENT
BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9408L011

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX

Ground Water Samples - 4
Sediment Samples - 2
Quality Control Blanks - 4

1.3. DATE OF COLLECTION

August 29, 1994

1.4. CHAIN OF CUSTODY IDENTIFIER

9408L011

1.5. TYPE OF ANALYSIS

Volatile Organic Compounds (water samples only) by Method 502.2
~~Volatile Organic Compounds (sediment samples) by CLP SOW Modification D (OLM01.8)~~
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 3.0)
Fluoride by Method E340.2
Alkalinity (groundwater samples only) by Method E310.1
Nitrite, as N (groundwater samples only) by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2
Total Suspended Solids (groundwater samples only) by Method E160.2
Total Dissolved Solids (groundwater samples only) by Method E160.1
Percent Moisture (sediment samples only)

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY

All samples were received in good condition by the laboratory. Temperature blanks ranged from 4° to 6° Celsius. The pH of samples MND24-0935-2002, MND24-0950-2002, and MND24-0941-2000 (trip blanks) exceeded 2.0, indicating that the samples were not properly preserved.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:	Laboratory ID:
MND24-0935-4002	9408L011-001
MND25-0935-0002	9408L011-002
MND25-0935-1002	9408L011-003
MND24-0935-2002	9408L011-004
MND24-0950-0002	9408L011-005
MND24-0950-1002	9408L011-006
MND24-0950-2002	9408L011-007
MND24-0935-0002	9408L011-008
MND24-0941-0002	9408L011-009
MND24-0941-2002	9408L011-010

2. HOLDING TIMES - RFW9408L011

All analyses were completed within the required holding times except for the following:

Sediment samples were not extracted for Pesticide/PCB analysis within the 7-day holding time required for ground water. The samples were extracted eleven days after extraction. No sample results were qualified.

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Analytical instruments were calibrated in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

3.1.2. Calibration

Volatiles 502.2
All samples were quantitated from a curve in accordance with USEPA Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. This criteria was met for all compounds except for vinyl acetate on the confirmation column. Initial and Continuing Calibration Verification criteria were set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for a 7-point curve. Few compounds were calibrated to 5-point curves; 2-chloroethylvinylether was calibrated to a 4-point curve. All compounds met linearity criteria, except for 2-chloroethylvinylether on two calibration runs. All 2-choroethylvinylether results were qualified as estimated (J_C).

Initial calibration results for confirmation columns met linearity criteria for a 5-point curve at minimum, except for vinyl acetate. Several compounds were out of range for Daily and Continuing Calibration Verification of the primary and confirmation columns. Sample results for compounds with low recoveries were qualified as estimated (J_C). Sample results for compounds with high recoveries were not qualified because the compounds were reported as non-detect (U).

Retention Time Window criteria were met for this batch.

Volatiles 8030
All samples were quantitated from a 5-point calibration curve in accordance with USEPA Method 8030. Initial calibration linearity criteria required a correlation coefficient ≥0.992, and %recoveries ranging from 85 to 115%. With one exception, all calibration results met acceptance criteria with respect to calibration curve linearity, correlation coefficient values, and percent recoveries. The correlation coefficient for vinyl acetate for the confirmation column was 0.9865.

Retention times for sample analyses were within control limits. No sample result qualification was required.

Volatiles CLP SOW - Sediments
Analytical instruments were calibrated in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

Instrument calibration met performance criteria except for vinyl acetate. The Relative Standard Deviation of the initial calibration factors for vinyl acetate was 20.8%, exceeding the 20.5% criteria. The %Difference for the Initial Calibration

Semivolatiles
Three of one-hundred-twelve surrogate recoveries failed to meet the recovery criteria. However, EPA CLP surrogate recovery were met. Not more than one surrogate recovery was out of range for the base/neutral or acid fractions. All recoveries were >10%. No sample results required qualification.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2
No MS/MSD samples were analyzed by this method.

Volatiles 8030
Matrix Spike/Matrix Spike Duplicate results met acceptance criteria.

Volatiles CLP SOW - Sediments
The matrix spike results for toluene, acrylonitrile, and acetonitrile did not meet performance criteria for sample MND25-0935-0002 MSD. No sample results were qualified.

Semivolatiles - Sediments
Three of twenty-two matrix spike recoveries exceed the QC limits. Sample MND25-0935-0002 MS had high phenol and 2,4-dinitrophenol recoveries; sample MND24-0935-0002 MSD had a high pentachlorophenol recovery. The %RPD was out of range for acenapthene. This data and the Laboratory Control Sample (blank spike) data show high recoveries of acid-extractable compounds. No sample results were qualified on the basis of these recoveries because the recoveries resulted in a positive bias, and because the compound recoveries do not appear to be consistently out of range for the batch.

The MS/MSD samples were extracted outside of their holding time and reported. The recoveries were qualified as estimated (J_H).

3.1.6. Internal Standards

Volatiles CLP SOW - Sediments
All internal standard results met performance criteria.

Semivolatiles
All internal standard results met performance criteria except for sediment sample MND25-0935-0002 MSD. Area limits were high for chrysene-d12 and perylene-d12. Retention times met the performance criteria. Analysis of the MS sample fulfilled the requirement to reanalyze the sample. Sample results associated with the two standards were qualified as estimated (J_I).

3.1.7. Compound Identification

Volatiles 502.2
All Retention Time Window criteria were met during the analyses.

Volatiles 8030
All Retention Time Window criteria were met during the analyses.

Volatiles CLP SOW - Sediments
Retention Times: all retention times met performance criteria.
Mass Spectra: detected compounds met the mass spectral matching criteria except for 2-butanone (methylethylketone). Due to the poor spectral matches and the reported presence of the compound in the samples, the affected sample results have been qualified as presumptively present (N).

Semivolatiles
Retention Times: all retention times met performance criteria.
Mass Spectra: several detected compounds did not meet mass spectral matching criteria. Poorer spectral matches resulted in a compound being considered as unidentified.

System monitoring compound 2,4,6-tribromophenol was quantitated to an acenapthene-d10 internal standard, not a phenanthrene-d10 internal standard as specified in the method.

3.1.8. System Performance

Volatiles 502.2
Few unidentified peaks were present in the method blank samples, but not at target compound retention times. No sample qualification was required.

Volatiles 8030
An evaluation of the chromatograms indicated some extraneous peaks which did not affect compound quantitation. No sample result qualification was required.

Volatiles CLP SOW - Sediments
Evaluation of the chromatograms and mass spectra did not reveal system problems.

Semivolatiles
Evaluation of the chromatograms and mass spectra did not reveal system problems, other than the GPC calibration did not achieve sulfur resolution of 90%.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Compound Quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

Contract Required Quantitation Limits were achieved for all analyses except for the following:

Volatiles CLP SOW - Sediments
Target compounds were reported at approximately 3x the CRQLs, with the exception of acetone, reported at 6x the CRQL

Semivolatiles
Water quantitation limits were met except for 2,4,5-trichlorophenol and 3-nitroanaline, which were reported at 13 ug/l, not 5 ug/l.

Sediment quantitation limits were typically 1000 ug/kg, not 330 ug/kg. Sample MND25-0935-0002 and the MS/MSD fractions required two-fold dilutions due to high contaminant levels in the sample.

3.1.10. Tentatively Identified Compounds

Volatiles CLP SOW - Sediments
No Tentatively Identified Compounds were present in the samples or method blanks.

Semivolatiles
Tentatively Identified Compounds (TICs) compounds and unknown compounds were detected in all samples except for MND24-0950-0002. Sediment samples contained a large number of unidentified compounds, including chlorinated unknowns, aldol, unresolved hydrocarbons, PAH, and alkanes. The water samples contained 2 to 4 unknown compounds.

3.1.11. Laboratory Control Sample

Volatiles 502.2
Eleven Laboratory Control Sample recoveries in three blank spike samples were outside of the QAPP control limits.

94LV1101-MB1 BS
%Recovery was out of range for chlorobenzene, benzene, cis-1,3-dichloropropene, and trans-1,3-dichloropropene. The recovery for benzene was low (79%) and the associated benzene result for sample MND24-0947-0002 was qualified as estimated (J_L).

BLKLV2104-MB1 CON, TBLKGALV21C5-MB1 CON
The two remaining LCSs were confirmation samples. None of the compounds that were out of range were detected in the primary analyses. No sample results were qualified.

Volatiles 8030
All Laboratory Control Sample results met the OU-9 QAPP acceptance criteria.

Volatiles CLP SOW - Sediments
Laboratory Control Sample results met performance criteria.

Semivolatiles
All Laboratory Control Sample results met the OU-9 QAPP acceptance criteria except for the following:

94LE1940-MB1 BSD (water)
Relative Percent Difference was out of range for 1,4-dichlorobenzene and %Recovery was out for 4-nitrophenol. Because the recovery was high, and because no compounds other than phthalates were detected in the water samples, no sample results were qualified.

94LE1886-MB1 BSD (sediment)
%Recoveries were out of range for 4-nitrophenol (a base/neutral extractable compound), and for 2,4-dinitrotoluene and pentachlorophenol (acid extractable compounds). This data and the Matrix Spike and Matrix Spike Duplicate data show high recoveries of acid extractable compounds. No sample results were qualified on the basis of these recoveries because the recoveries resulted in a positive bias, and because the compound recoveries do not appear to be consistently out of range for the batch.

3.2. PESTICIDES/PCBs

Pesticide analyses were conducted in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis and the OU-9 Quality Assurance Project Plan.

3.2.1. GC/ECD Performance Check

The standard retention times for the single component analytes fell within the established retention time windows.

All recoveries met the $\leq$25% criteria.

3.2.2. Performance Evaluation Mixture

3.2.2.1 Resolution

All pesticide and surrogate peaks met the resolution criteria on each column.

3.2.2.2. Retention Time

All Performance Evaluation Mixture compounds eluted within the established retention time windows.

3.2.2.3. Recovery

All Performance Evaluation Mixture compound recoveries met the Relative Percent Difference criteria.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and endrin met the acceptance criteria of $\leq$20% and $\leq$30% combined breakdown. Roundoff in percent breakdown calculations could result in up to a 2% error in reported breakdown values. All summary sheets were checked and no breakdown values exceeded the QC criteria, even if roundoff error were maximized.

3.2.3. Calibration

Resolution Check Sample results met QC criteria of $\geq$60% resolution. All compounds on one column were 100% resolved.

The initial calibration of the single-component and multi-component analytes met QC criteria. Calibration factors were determined for the correct number of peaks for each multi-component compound.

Calibration factors and %RSD were recalculated and met the acceptance criteria. Retention time windows were correctly calculated.

3.2.9. System Performance

Peak heights for four Performance Evaluation Mixture samples were less than the 10% of full scale criteria specified in the Statement of Work. The chromatograph baseline was >20% full scale criteria at the elution of DCB on four samples. The deviations did not appear to significantly impact the data, and no sample results were not qualified.

3.2.10. Compound Quantitation and Reported CRQLs

CRQLs were not reported for endrin. The 0.020 ug/l quantitation limit is above the 0.010 ug/l CRQL. All other compounds were reported at the CRQL.

3.2.11. Laboratory Control Sample

Some LCS results were manually entered in the laboratory data package; all of the manual entries were verified.

Several %Recoveries and Relative Percent Difference results were outside of the QC criteria for the water samples.

3.3. INORGANIC METALS AND CYANIDE

Two water samples and five sediment samples were analyzed for inorganic metals and cyanide in accordance with the USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, and the EG&G Mound OU-9 Quality Assurance Project Plan (including Modification B to the CLP SOW).

The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/l for antimony and 2 ug/l for beryllium and thallium. For all the remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defied as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the CLP SOW and the OU-9 QAPP.

All Initial and Continuing Calibration Verification samples were within control limits with one exception: CCV-5 exceeded acceptance criteria for Titanium, possibly affecting the spike sample. Titanium results were qualified as estimated (J_K).

The validators could not reproduce the calculated linear regression parameters given for GFAA standards. Correlation coefficients and slope criteria did not agree exactly, but were typically close.

Samples were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required quantitation limits (CRQLs).

3.3.2. Blanks

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria.

3.3.2.2. Calibration Blanks

Initial and Continuing Calibration Blanks for this batch met acceptance criteria.

3.3.3. Interference Check Sample

Results of the Interference Check Sample met acceptance criteria.

3.3.4. Laboratory Control Sample

All Laboratory Control Sample results met acceptance criteria.

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis for the water samples met acceptance criteria except for lead.

Duplicate sample results for the sediment samples met acceptance criteria except for calcium, iron, magnesium, manganese, and selenium.

The affected sample results were qualified as estimated (J_D).

3.3.6. Matrix Spike Sample Analysis

Some results of the ground water spike sample exceeded the QC criteria. The analytes that were out of range were antimony, cadmium, cobalt, lead, manganese, selenium, silver, thallium, tin, and zinc.

Some results of the sediment spike sample exceeded the QC criteria. The analytes that were out of range were copper, lead, selenium, and cyanide.

Spike sample analyses are not required for calcium, sodium, magnesium, mercury, and cyanide.

The spike and water-quality results for the analytes not meeting the acceptance criteria were qualified as estimated (J_S).

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.4.1. ICP Metals

Water %Recoveries were out of range for cobalt, manganese, silver, tin, and zinc.

Sediment %Recoveries were out of range for copper.

3.3.6.2. GFAA Metals

Water %Recoveries were out of range for antimony and lead. Selenium and thallium were also out of range for sample MND24-0950-002. Cadmium was also out of range for sample MND24-0950-1002 (field duplicate).

Sediment %Recoveries were out of range for lead and selenium.

3.3.6.3. Cyanide

All sediment sample recoveries were out of range for cyanide.

3.3.6.4. Flame AA Metals

3.3.6.5. Automated Cold Vapor AA

3.3.7. Standard Addition Results

The Method of Standard Additions was performed for arsenic in sediment sample MND25-0935-1002 (field duplicate). Sample results met performance criteria.

3.3.8. ICP Serial Dilution

ICP serial dilution results met acceptance criteria.

3.3.9. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

The laboratory followed analytical methods derived from the USEPA Methods for Chemical Analysis of Water and Wastes and Standard Methods for the Examination of Water and Wastewater 16 ed.

3.4.1. Calibration

All calibration verification checks were within the required controlled limits of 90-110%. Calibration verification was performed using independent standards.

3.4.1.1. Alkalinity

Continuing Calibration Verification checks were performed every 10 samples or less using an alkalinity standard solution. CCV results varied by no more than 10% from the true value. No sample results were qualified.

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

Fluoride instruments were calibrated using a six-point instrument calibration curve. Nitrite and Nitrate-Nitrite instrumentation was calibrated using a nine-point calibration curve. Calibration curves

exhibited correlation coefficients $\geq$ 0.995. Continuing calibration checks were run every 20 samples and the results met the acceptance criteria.

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

The use of S class weights was not documented. Calibration was verified within a 24-hour time period.

3.4.2. Blanks

All preparation blank results were below the required detection limits except for the following samples:

94LAL040-MB1:	Alkalinity was present at the reporting limit, but below the contractual detection limit.
94LN2112-MB2:	Nitrite (as N) was present above the reporting limit. Nitrite results for one sample were qualified as non-detect (U_B).

3.4.3. Laboratory Control Sample

All Laboratory Control standard results met acceptance criteria.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

Matrix Spike/Matrix Spike Duplicate recoveries met the OU-9 QAPP performance criteria.

3.4.5. Sample Result Verification

Nitrate/Nitrite and Nitrite as N concentration were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

One field duplicate sample was collected for each matrix (ground water and sediment).

Volatiles 502.2
No target compounds were detected in the original or field duplicate samples.

Volatiles 8030
No target compounds were detected in the original or field duplicate samples.

Volatiles CLP SOW - Sediments
No target compounds, other than common laboratory contaminants, were detected in the original or field duplicate samples. Following qualification of the laboratory contaminant results, the original and duplicate sample results do not differ.

Semivolatiles
No target compounds, other than common laboratory contaminants, were detected in the original or field duplicate ground water samples. The environmental sediment sample (MND25-0935-0002) and the field duplicate sample results were within the 55% Relative Percent Difference criteria. Some compounds that were not detected in the environmental sample were quantitated at $\leq$0.10 CRQL in the field duplicate. No sample results were qualified.

Pesticides/PCBs
No target compounds were detected in the environmental ground water sample/field duplicate sample. The environmental sediment sample (MND24-0935-0002) and the field duplicate sample results were within the 35% Relative Percent Difference criteria.

Inorganics - Metals
Two metals concentrations exceeded the $\leq$25% RPD criteria for the ground water environmental/field duplicate samples. The %RPD for iron was 25.7 and the sample results were not qualified. The results for selenium was 70.0 %RPD, causing the sample results to be qualified as estimated (J_D).

Seven %RPD values were out of range for the sediment environmental sample/duplicate sample pair. The metals that were out of range were cadmium, chromium, copper, iron, silver, zinc, and tin. Affected sample results were qualified as estimated (J_D).

Inorganics - Anions
Results of the environmental water and sediment samples and their respective field duplicate samples were within the %Relative Percent Difference criteria.

4.2. FIELD BLANKS (equipment blanks, etc.)

One Equipment Blank and three Trip Blanks were collected with this batch. The Trip Blank samples were analyzed only for 502.2 volatiles.

Volatiles 502.2
No target compounds were detected in the equipment blank sample.

Methylene chloride, a common laboratory contaminant was detected in each of the three trip blanks at concentrations ranging from 2.6 to 3.5 ug/l. Methylene chloride was verified by confirmation analyses. No other samples contained this compound so no data qualification was required.

Volatiles 8030
No target compounds were detected in the equipment blank sample.

Volatiles CLP SOW - Sediments
Sediment sampling equipment rinseate blank MND24-0935-4002 contained the target compound phenol at 1 ug/l, less than the 5 ug/l CRQL. The associated sediment samples did not contain detectable phenol concentrations.

Semivolatiles
Sediment sampling equipment rinseate blank MND24-0935-4002 contained the target compound phenol at 1 ug/l, less than the 5 ug/l CRQL. The associated sediment samples did not contain detectable phenol concentrations.

The equipment blank also contained the target compound benzoic acid, and the common laboratory contaminants diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate. These compounds were detected in laboratory method blanks and are qualified as not detected (U_B).

Pesticides/PCBs
No target compounds were detected in the equipment blank sample.

Inorganics - Metals
The equipment rinsate blank collected from the sediment sampling dredge contained twelve metals. Aluminum, lead, and zinc were detected at levels greater than the CRDL. Barium, calcium, copper, iron, lithium, magnesium, manganese, potassium, and sodium were detected below the CRDL. Lead and lithium sample results for MND25-0935-0002 and MND25-0935-1002 were qualified as non-detect at their CRDLs.

Inorganics - Anions
The equipment rinsate blank collected from the sediment sampling dredge did not contain any contaminants except for Total Dissolved Solids. However, sediment samples were not analyzed for TDS and no data were qualified.

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced in the following sample analysis discussion

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by gas chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list, which were also correctly analyzed. However, laboratory reports for samples collected in January and February, 1994 mislabeled trichlorotrifluoroethane as trichlorotrifluoromethane. The labeling was corrected for the samples included in this batch.

The laboratory reported that the compound 2-chloroethylvinylether is very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. This compound was calibrated only to a 4-point curve, not a 5- or 7-point curve as used for all other compounds. Preservation of ground water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinylether (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinylether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that a 80-120% recovery be achieved.

No VOCs were detected in the ground water samples or the equipment blank sample. Methylene chloride was detected and confirmed in each trip blank. No VOCs were reported in the method blanks prepared for the analysis of the samples.

Five of forty surrogate recoveries and eleven of forty-eight blank spike recoveries failed the QAPP criteria. Several results from daily and continuing calibration analyses failed QAPP criteria. The water sample results affected by these quality control analyses were qualified as estimated (J) for compounds with low recoveries. Compounds exhibiting high recoveries were not qualified if the compounds were detected. All results are considered useable.

Volatiles CLP SOW - Sediments

All sediment samples were analyzed for CLP volatiles using the GC/MS analysis and quality control procedures specified in OLM1.8. All positive results were confirmed by separate analysis.

Two common contaminants, methylene chloride and acetone, were reported in the laboratory blanks and environmental samples. 2-butanone (methyl ethyl ketone), also a common laboratory contaminant, was detected in all environmental samples but not the laboratory blanks.

Two of eighteen surrogate recoveries failed the QAPP criteria. All blank spike recoveries met the QAPP criteria. The water sample results affected by the surrogate recoveries were qualified as estimated (J) for compounds with low recoveries. Compounds exhibiting high recoveries were not qualified if the compounds were detected. All results are considered useable.

Acrylonitrile and Acetonitrile - Method 8030

All water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a photoionization detector. No confirmation analyses were required because neither target compound was detected.

No Method 8030 analytes were detected in the water samples. No Method 8030 analytes were detected in the trip blank or the method blanks.

Semivolatiles

No TCL semivolatiles were detected in the water samples. The sediment samples, one sample with a MS/MSD fractions and a field duplicate sample, contained several TCL compounds. Benzoic acid, a target compound, and the common analytical contaminants, diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate, were detected in the method blank. Sample results were qualified as non-detects (U_B).

Internal Standard areas were out of range for one standard, affecting one sample. Affected sample results were qualified as estimated (J_I). Two compounds failed to meet calibration criteria, affecting five samples. Affected sample results were qualified as estimated (J_C).

Numerous unknown and Tentatively Identified Compounds were reported in the sediment samples, fewer unknown compounds were reported in the water sample and blanks. The sediment samples contained unidentified hydrocarbons, PAH, aldol condensate, and several chlorinated unknowns.

Three of one-hundred-twelve surrogate recoveries were outside of QC limits. One of twenty-two water blank spike recoveries and three of eleven sediment blank spike recoveries did not meet the control limits. Three of twenty-two sediment MS/MSD recoveries failed performance criteria. No sample results were qualified.

Pesticides/PCBs

Alpha-chlordane and gamma-chlordane were detected at more than 10,000 ug/l in sample MND25-0935-0002. These levels were present in the environmental sample, the MS/MSD samples, and the field duplicate sample. Heptachlor and heptachlor epoxide were also detected in lower (300-500 ug/l range) concentrations in the samples. Each of the contaminants except heptachlor was detected at low levels in the corresponding cistern water sample.

The high contaminant concentrations of the sediment samples required 100x and 1000x sample dilutions. The surrogate and matrix spike surrogates were diluted out of the samples and the surrogate recoveries could not be evaluated. Several surrogate recoveries were outside of control limits, resulting in the qualification of all ground water sample results as estimated (J_K).

Laboratory Control Sample recoveries did not meet QC requirements for the re-extracted sample. Sample data were qualified as estimated (J_L).

Method blank sample chromatograms revealed numerous extraneous peaks of varying height, but only one target compound (Arochlor 1242) was reported above reporting limits.

Sample results for this batch are considered estimated but useable.

TAL Inorganics and Cyanide - CLP SOW

Two water samples and five sediment samples were analyzed for TAL metals using the OU-9 QAPP Modification B to the CLP SOW. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/l for antimony and 2 ug/l for beryllium and

thallium. For all the remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Preparation Blank 94L1482-MB1 contained aluminum above the reporting level. All of the affected samples contained aluminum at concentrations greater than 10x the Preparation Blank level. No sample results were qualified for that blank. The Equipment Blank for the sediment sampling dredge contained detectable quantities of twelve metals. Results for sediment samples MND25-0935-0002 and MND25-0935-1002 (field duplicate) were qualified to show non-detects for lead and lithium (J_B).

Nine metals were out of range on the Matrix Spike analyses. The metals were copper, cobalt, cyanide, lead, manganese, selenium, silver, tin, and zinc. Affected sample results were given a J qualifier to indicate that the results are considered to be estimated values.

The Relative Percent Differences between duplicate analyses met QC criteria for all but two samples. Sample MND24-0935-4002 (equipment rinseate blank) was out of range for lead. Sediment sample MND25-0935-0002 was out of range for calcium, iron, manganese, magnesium, and selenium.

All other QC criteria were met for this batch.

Other Analytes

The analytes included Alkalinity, Total Cyanide, Fluoride, Nitrate-Nitrite, Nitrate (as nitrogen), Total Dissolved Solids, and Total Suspended Solids.

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

Alkalinity samples were analyzed three days past their hold times. Total Dissolved Solids was conducted out of hold for one sample. The affected results were qualified as estimated (J_H) but usable.

Matrix Spike and Matrix Spike Duplicate results met performance criteria.

One Preparation Blank contained Nitrite above the reporting limit, affecting one sample which was qualified as non-detect (U_B).

REPORT OF DATA VALIDATION RESULTS

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
SECOND GROUNDWATER AND SEDIMENT SAMPLING EVENT
BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9408L992

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX

Ground Water Samples - 2
Quality Control Blanks - 2

1.3. DATE OF COLLECTION

8/26/94

1.4. CHAIN OF CUSTODY IDENTIFIER

9408L992

1.5. TYPE OF ANALYSIS

Volatile Organic Compounds by Method 502.2
Acrylonitrile and Acetonitrile by Method 8030
~~Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)~~
Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 3.0)
Fluoride by Method E340.2
Alkalinity by Method E310.1
Nitrite, as N by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E353.2
Total Suspended Solids by Method E160.2
Total Dissolved Solids by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY

Samples were received at less than 4°C. One of 2 SVOC bottles, 1 of 2 Pest/PCB bottles, and 1 of 6 VOA vials were broken during shipping.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:	Laboratory ID:
MND24-0932-0002	9408L992-001
MND24-0932-3002	9408L992-002
MND24-0932-2002	9408L992-003
MND24-0947-0002	9408L992-004

2. HOLDING TIMES - RFW9408L992

All analyses were completed within the required holding times except for the following:

ANALYSIS	RFW#	MOUND I.D.	DAYS OUT OF EXTRACTION HOLD TIME	DAYS OUT OF ANALYSIS HOLD TIME
Pesticides-PCBs	9408L992-001 R1 (re-extracted and re-analyzed)	MND24-0932-0002	22	

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Analytical instruments were calibrated in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

3.1.2. Calibration

Volatiles 502.2
All samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. This criteria was met for all compounds except for 2-chloroethylvinylether. Initial and Continuing Calibration Verification criteria were set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria for a 7-point curve. Few compounds were calibrated to 5-point curves; 2-chloroethylvinylether was calibrated to a 4-point curve. All compounds met linearity criteria, except for 2-chloroethylvinylether on two calibration runs. All 2-choroethylvinylether results were qualified as estimated (J_C).

Initial calibration results for confirmation columns met linearity criteria for a 5-point curve at minimum. Several compounds were out of range for Daily and Continuing Calibration Verification of the primary and confirmation columns. Sample results for compounds with low recoveries were qualified as estimated (J_C). Sample results for compounds with high recoveries were not qualified because the compounds were reported as non-detect (U).

Retention Time Window criteria were met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention Time Windows were within the required limits during analysis of all Initial and Continuing Calibration samples.

No Continuing Calibration outliers occurred. No samples were qualified.

Semivolatiles
Analytical instruments were calibrated in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All calibration criteria were met. No sample results required qualification.

3.1.3. Blanks

Volatiles 502.2
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Volatiles 8030
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Semivolatiles
The laboratory Method Blank 94LE1847-MB1 contained bis(2-ethylhexyl)phthalate. Affected sample results were qualified as non-detect (U_B).

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2
One sample result yielded a high surrogate recovery for bromochloromethane. The affected sample (a blank spike on the confirmation column) results were qualified as estimated J_K

Volatiles 8030
All surrogate spike recoveries met acceptance criteria.

Semivolatiles
All surrogate spike recoveries met acceptance criteria.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

No Matrix Spike/Matrix Spike Duplicate samples were collected in this batch.

3.1.6. Internal Standards

Semivolatiles
Internal Standard data met QA/QC criteria for all samples.

3.1.7. Compound Identification

Volatiles 502.2
All Retention Time Window criteria were met during the analyses.

Volatiles 8030
All Retention Time Window criteria were met during the analyses.

Semivolatiles
Target compound identifications were determined from comparison to a mass-spectral library. Spectral matching criteria were met when comparing sample spectra to library standard spectra.

All compounds were within ±0.06 relative retention time units of the standard retention time, with the exception of n-nitroso-di-n-propylamine. This compound was identified by the system and quantitated. However, the compound was not within 0.06 retention time units of the 50-nanogram standard, and is therefore considered to be a Tentatively Identified Compound.

3.1.8. System Performance

Volatiles 502.2
Few unidentified peaks were present in the method blank samples, but not at target compound retention times. No sample qualification was required.

Trichloroethane was detected in several Initial Calibration Verification standards. Sample analytical results were not affected. No sample qualification was required.

Volatiles 8030
Evaluation of the chromatograms identified some extraneous peaks in sample, standard, and blank analyses. However, sample results did not require qualification.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Compound Quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

Volatiles - 502.2
Contract Required Quantitation Limits were achieved for all analyses.

Volatiles - 8030
CRQLs were achieved for all analyses.

Semivolatiles
CRQLs were met for all analytes except for 2,4,5-trichlorophenol. QAPP Method Modification D requires a 5 ug/l quantitation level; 12 to 13 ug/l were reported.

3.1.10. Tentatively Identified Compounds

Semivolatiles
No Tentatively Identified Compounds (TICs) compounds were detected in samples .

Seven unidentified compounds were detected in sample MND24-0932-0002 and three unidentified compounds were detected in sample MND24-0947-0002.

3.1.11. Laboratory Control Sample

Volatiles 502.2
%Recoveries were met for all LCS (Blank Spike) samples except for the following:

BLKLV2104-MB1 CON (confirmation analysis)
%Recovery was out of range for 1,1,1-trichloroethane, chlorobenzene, and total xylenes. These compounds were not quantitated on the associated sample analyses. Only the LCS results were qualified.
94LV1101-MB1 BS

%Recovery was out of range for chlorobenzene, benzene, cis-1,3-dichloropropene, and trans-1,3-dichloropropene. The recovery for benzene was low (79%) and the associated benzene result for sample MND24-0947-0002 was qualified as estimated (J_L).

Volatiles 8030
All Laboratory Control Sample results met the OU-9 QAPP acceptance criteria.

Semivolatiles
All Laboratory Control Sample results met the OU-9 QAPP acceptance criteria except for 4-nitrophenol (91%). This compound was not detected on sample chromatograms. No sample results were qualified.

3.2. PESTICIDES/PCBs

Pesticide analyses were conducted in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis and the OU-9 Quality Assurance Project Plan.

3.2.1. GC/ECD Performance Check

The standard retention times for the single component analytes fell within the established retention time windows.

All recoveries met the $\leq$25% criteria.

3.2.2. Performance Evaluation Mixture

3.2.2.1 Resolution

All pesticide and surrogate peaks met the 90% resolution criteria on each column.

3.2.2.2. Retention Time

All Performance Evaluation Mixture compounds eluted within the established retention time windows.

3.2.2.3. Recovery

All Performance Evaluation Mixture compound recoveries met the Relative Percent Difference criteria.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and endrin met the acceptance criteria of $\leq$20% and $\leq$30% combined breakdown. The breakdown calculations were verified and no significant variances were identified.

3.2.3. Calibration

Resolution Check Sample results met QC criteria of $\geq$60% resolution. All compounds on one column were 100% resolved. Six compounds on the

second column were 100%, endosulfan I was 96% resolved, and endosulfan sulfate was 67% resolved.

The initial calibration of the single-component and multi-component analytes met QC criteria. Calibration factors were determined for the correct number of peaks for each multi-component compound.

Calibration factors and %RSD were recalculated and met the acceptance criteria. Retention time windows were correctly calculated.

3.2.4. Blanks

The instrument blanks chromatograms are very clean and exhibit only very small non-surrogate peaks.

The method blank chromatograms exhibit many peaks of small to high peak height. Because of the high number of peaks in the blank, it is likely that some peaks will fall within established analyte retention time windows. Many analytes were quantitated at levels below the reporting limit. However, no analytes were quantitated above the reporting limit and no compounds were reported in the method blanks.

3.2.5. Surrogate Spike Recoveries

Fifteen of thirty-two surrogate recoveries had low recoveries that were outside of the QC limits. Sample results for samples with two or more low surrogate recoveries were qualified as estimated (J_K).

The samples were inadvertently spiked with twice the required surrogate concentration for a normal water extraction. The spike concentrations were still within the calibration range of the instrument. This removes the ability to use surrogate recoveries to evaluate the ability to quantitate lower level contaminants, but should otherwise have no significant impact on the data. No data were qualified for this error.

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

No Matrix Spike/Matrix Spike Duplicate samples were included in this batch.

3.2.7. Compound Identification

Surrogate compounds eluted within the established retention time windows for each sample within this batch.

The %Difference between the two columns met the criteria for all analytes.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

GPC cleanup was not required for samples in this batch.

3.2.8.2. Florisil Cartridge Cleanup

All recoveries were within the QC limits.

3.2.9. System Performance

No system performance problems were noted.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

The CRQLs have been met as reported in a revised laboratory data package.

3.2.11. Laboratory Control Sample

The %Recovery of samples 94LE1844-MBS-1, 94LE2050-MBS-1, and 94LE2050-MBSD-1 were all within the required limits. The Relative Percent Differences between 94LE2050-MBS-1 and 94LE2050-MBSD-1 results were all outside of the required limits. The results of samples associated with 94LE2050 were qualified as estimated (J_L).

3.3. INORGANIC METALS AND CYANIDE

Two water samples were analyzed for inorganic metals and cyanide in accordance with the USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, and the EG&G Mound OU-9 Quality Assurance Project Plan (including Modification B to the CLP SOW).

The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/l for antimony and 2 ug/l for beryllium and thallium. For all the remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defied as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the CLP SOW and the OU-9 QAPP.

All Initial and Continuing Calibration Verification samples were within control limits with one exception: CCV-5 exceeded acceptance criteria for Titanium, possibly affecting the spike sample. Titanium results were qualified as estimated (J_K).

Samples were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required quantitation limits (CRQLs).

3.3.2. Blanks

3.3.2.1. Preparation Blanks

The preparation blank analyzed for this batch met acceptance criteria.

3.3.2.2. Calibration Blanks

Initial and Continuing Calibration Blanks for this batch met acceptance criteria.

3.3.3. Interference Check Sample

Results of the Interference Check Sample met acceptance criteria.

3.3.4. Laboratory Control Sample

All Laboratory Control Sample results met acceptance criteria.

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis met acceptance criteria except for lead. The affected sample results were qualified as estimated due to blank contamination (J_D).

3.3.6. Matrix Spike Sample Analysis

Results of the spike sample analysis met acceptance criteria for 13 of the 28 analytes. Results of the analysis of 10 of 28 analytes exceeded the QC criteria. The analytes that were out of range were antimony, arsenic, chromium, cobalt, manganese, nickel, thallium, tin, molybdenum, and zinc. The spike and water-quality results for the analytes not meeting the acceptance criteria were given a J_K qualifier.

Spike sample analyses are not required for calcium, sodium, magnesium, mercury, and cyanide.

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

%Recovery was out of range for chromium, cobalt, manganese, nickel, tin, molybdenum, and zinc.

3.3.6.2. GFAA Metals

%Recovery was out of range for antimony, arsenic, and thallium.

3.3.6.3. Cyanide

Matrix Spike analysis not required for this compound.

3.3.6.4. Flame AA Metals

Matrix Spike results met QC criteria for this method.

3.3.6.5. Automated Cold Vapor AA (Mercury)

Matrix Spike analysis not required for this compound.

3.3.7. Standard Addition Results

Method of Standard Addition analyses were not required for samples in this batch.

3.3.8. ICP Serial Dilution

ICP serial dilution results met acceptance criteria except for calcium, magnesium, manganese, and zinc. Results not meeting the QC criteria were qualified as estimated (J).

3.3.9. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

The laboratory followed analytical methods derived from the USEPA Methods for Chemical Analysis of Water and Wastes and Standard Methods for the Examination of Water and Wastewater 16 ed.

3.4.1. Calibration

All calibration verification checks were within the required controlled limits of 90-110%. Calibration verification was performed using independent standards.

3.4.1.1. Alkalinity

Continuing Calibration Verification checks were performed every 10 samples or less using an alkalinity standard solution. CCV results varied by no more than 10% from the true value. No sample results were qualified.

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

Fluoride instruments were calibrated using a six-point instrument calibration curve. Nitrite and Nitrate-Nitrite instrumentation was calibrated using a nine-point calibration curve. Calibration curves exhibited correlation coefficients $\geq$ 0.995. Continuing calibration checks were run every 20 samples and the results were within 15% of true value.

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

The use of S class weights was not documented. Calibration was verified within a 24-hour time period.

3.4.2. Blanks

All preparation blank results were below the required detection limits with the exception of Alkalinity for sample 94LAL038-MB1 which was at the reporting limit, but below the contractual detection limit.

3.4.3. Laboratory Control Sample

All Laboratory Control standard results met acceptance criteria.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

No Matrix Spike/Matrix Spike Duplicate samples were analyzed in this batch.

3.4.5. Sample Result Verification

Nitrate/Nitrite and Nitrite as N concentration were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

No field duplicates were collected with this batch.

4.2. FIELD BLANKS (equipment blanks, etc.)

One Ambient Blank and one Trip Blank were collected with this batch. These blank samples were analyzed only for 502.2 volatiles.

Volatiles 502.2
No target compounds were detected in the ambient blank sample.

Methylene chloride, a common laboratory contaminant, and chloroform were detected in the trip blank at 3.6 and 0.63 ug/l. Both compounds were verified by confirmation analysis. No other samples contained either compound so no data qualification was required.

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced in the following sample analysis discussion

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by gas chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list, which were also correctly analyzed. However, laboratory reports for samples collected in January and February, 1994 mislabeled trichlorotrifluoroethane as trichlorotrifluoromethane. The labeling was corrected for the samples included in this batch.

The laboratory reported that the compound 2-chloroethylvinylether is very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. This compound was calibrated only to a 4-point curve, not a 5- or 7-point curve as used for all other compounds. Preservation of ground water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinylether (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinylether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. The $\geq$0.992 linearity criteria was met for a 7-point curve with very few exceptions. Initial and Continuing Calibration Verification criteria required that a 80-120% recovery be achieved.

No VOCs were detected in the ground water samples or the ambient blank sample. Methylene chloride and chloroform were detected and confirmed in the trip blank. No VOCs were reported in the method blanks prepared for the analysis of the samples.

One of twenty-two surrogate recoveries and nine of forty-eight blank spike recoveries failed the QAPP criteria. Several results from daily and continuing calibration analyses failed QAPP criteria. The water sample results affected by these quality control analyses were qualified as estimated (J) for compounds with low recoveries. Compounds exhibiting high recoveries were not qualified if the compounds were detected. All results are considered useable.

Acrylonitrile and Acetonitrile - Method 8030

The water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a Photoionization Detector. No confirmation analyses were required because no target compounds were detected. No 8030 analytes were reported above quantitation limits in the ground water samples, field blanks, or method blanks. All quality control analyses met acceptance criteria. No data from this batch were qualified.

Semivolatiles

No TCL semivolatiles were detected in the water samples. One common analytical contaminant, bis(2-ethylhexyl)phthalate, was detected in the method blank. Sample results were qualified as non-detects (U_B).

Unknown compounds were reported in the water sample and method blanks. No Tentatively Identified Compounds were reported.

All surrogate recoveries met the QC requirements. No sample results were qualified.

One of eleven blank spike recoveries did not meet the control limits. However, the compound was not detected in the samples. No sample results were qualified.

Pesticides/PCBs

No target compounds were detected in the environmental samples.

Several surrogate recoveries were outside of control limits, resulting in the qualification of affected sample results as estimated (J_K). Due to the low surrogate recoveries, one sample was re-extracted outside of the holding time and re-analyzed. The data for this analysis was also reported, but qualified for holding time (J_H).

Laboratory Control Sample recoveries did not meet QC requirements for the re-extracted sample. Sample data were qualified as estimated (J_L).

Method blank sample chromatograms revealed numerous extraneous peaks of varying height, but no target compounds were quantitated above reporting limits.

Sample results for this batch are considered estimated but useable.

TAL Inorganics and Cyanide -- CLP SOW

Two water samples were analyzed for TAL metals using the OU-9 QAPP Modification B to the CLP SOW. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/l for antimony and 2 ug/l for beryllium and thallium. For all the remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Aluminum, bismuth, calcium, iron, lead, lithium, magnesium, manganese, potassium, sodium, vanadium, and zinc were reported above the CRQL in one or both of the samples.

Results of the duplicate analysis met acceptance criteria except for lead. Matrix Spike results failed QC criteria for nine metals. ICP Serial Dilution results were met for all metal except calcium, magnesium, manganese, and zinc. Affected sample results were given a J qualifier to indicate that the results are considered to be estimated values.

Other Analytes

The analytes included Alkalinity, Total Cyanide, Fluoride, Nitrate-Nitrite, Nitrate (as nitrogen), Total Dissolved Solids, and Total Suspended Solids.

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

Alkalinity samples were analyzed one day past their hold times. The results were qualified as estimated (J_H) but usable.

REPORT OF DATA VALIDATION RESULTS

RESIDENTIAL WELL/CISTERN SURVEY OPERABLE UNIT 9
SECOND GROUNDWATER AND SEDIMENT SAMPLING EVENT
BOA# 52263, TASK ORDER # 42727

1. CASE SUMMARY

1.1. BATCH NUMBER: RFW9409L049

1.2. NUMBER OF SAMPLES AND TYPE OF MATRIX

Ground Water Samples - 4
Quality Control Blanks - 4

1.3. DATE OF COLLECTION

8/31/94

1.4. CHAIN OF CUSTODY IDENTIFIER

9409L049

1.5. TYPE OF ANALYSIS

Volatile Organic Compounds by Method 502.2
Acrylonitrile and Acetonitrile by Method 8030
Semivolatile Organic Compounds by CLP SOW Modification D (OLM01.8)
~~Target Compound List Pesticides/PCBs by CLP SOW (OLM01.8)~~
Target Analyte List Inorganics and Cyanide by CLP SOW Modification B (ILM 3.0)
Fluoride by Method E340.2
Alkalinity by Method E310.1
Nitrite, as N by Method E353.2 (method variance approved by EG&G Mound 2/11/94)
Nitrate-Nitrite by Method E351.2
Total Suspended Solids by Method E160.2
Total Dissolved Solids by Method E160.1

1.6. CONDITION OF SAMPLES WHEN RECEIVED BY THE LABORATORY

All samples were received in good condition by the laboratory. Temperature blanks were at 3° and 4° Celsius.

1.7. CLIENT SAMPLE IDS APPLICABLE TO THE REPORT

Client ID:	Laboratory ID:
MND24-0942-0002, MS/MSD	9409L049-001
MND24-0942-2002	9409L049-002
MND24-0952-0002	9409L049-003
MND24-0938-0002	9409L049-004
MND24-0938-3002	9409L049-005
MND24-0938-2002	9409L049-006
MND24-0954-0002	9409L049-007
MND24-0954-2002	9409L049-008

2. HOLDING TIMES - RFW9409L049

All analyses were completed within the required holding times except for the following:

ANALYSIS	RFW SAMPLE No.	CLIENT SAMPLE No.	DAYS OUT OF EXTRACTION HOLD TIME	DAYS OUT OF ANALYSIS HOLD TIME
SVOCs	9409L049-001 MS	MND24-0942-0002 MS	24	
SVOCs	9409L049-001 MSD	MND24-0942-0002 MSD	24	
ALKALINITY	ALL SAMPLES	ALL SAMPLES		1

The MS/MSD recoveries for the semivolatile samples were qualified as estimated (J_H) due to holding times.

3. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

3.1. VOLATILES AND SEMIVOLATILES

3.1.1. GC/MS Tuning

Semivolatiles
Analytical instruments were calibrated in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

3.1.2. Calibration

Volatiles 502.2
All samples were quantitated from a curve in accordance with USEPA Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration linearity criteria requires a correlation coefficient ≥0.992 for a 5-point curve. This criteria was met for all compounds except for vinyl acetate. Initial and Continuing Calibration Verification criteria were set at 80-120% recovery control limits.

Initial calibration results for primary columns met linearity criteria, except for vinyl acetate on two separate calibration runs. Initial calibration results for confirmation columns met linearity criteria for a 5-point curve at minimum, except for 2-chloroethylvinyl ether. All vinyl acetate results were qualified as estimated (J_C).

Several compounds were out of range for Daily and Continuing Calibration Verification on both the primary and confirmation columns. Sample results for compounds with low recoveries were qualified as estimated (J_C). Sample results for compounds with moderately high recoveries were not qualified because the compounds were reported as non-detect (U).

Retention Time Window criteria were met for this batch.

Volatiles 8030
All samples quantitated from a 5-point curve in accordance with USEPA Method 8030. Initial calibration linearity criteria required correlation coefficient ≥0.992. Initial Calibration Verification met 85-115% recovery control limits.

Initial Calibration results for primary columns met linearity criteria for 5-point curve. Retention Time Windows were within the required limits during analysis of all Initial and Continuing Calibration samples.

No Continuing Calibration outliers occurred. No samples were qualified.

Semivolatiles
Analytical instruments were calibrated in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis (CLP SOW) and the Operable Unit 9 Quality Assurance Project Plan (OU-9 QAPP).

All calibration criteria were met. No sample results required qualification.

3.1.3. Blanks

Volatiles 502.2
No target compounds were detected in laboratory blanks, field blanks, or trip blanks. Blanks were analyzed at required frequency. No sample qualifiers were required.

Volatiles 8030
All Method Blank samples met acceptance criteria; no sample qualifiers were required.

Semivolatiles
The laboratory Method Blank 94LE1891-MB1 contained bis(2-ethylhexyl)phthalate. Laboratory Method Blank 94LE2163 contained bis(2-ethylhexyl)phthalate, diethylphthalate, and di-n-butyl phthalate. Affected sample results were qualified as non-detect (U_B).

Bis(2-ethylhexyl)phthalate and diethylphthalate were also reported in environmental samples that did not have associated blank contamination. Because of the blank contamination of other samples in the batch, and because these phthalates are common laboratory contaminants, the phthalate results were qualified as not detected (U) based on professional judgement.

3.1.4. Surrogate Spike Recoveries

Volatiles 502.2
Four surrogate (fluorobenzene) spike recoveries were outside of QC requirements for the confirmation column. All surrogate recoveries met performance criteria for the primary column. As a result, sample 94LV1101-MB1S results for the target compounds associated with fluorobenzene were qualified as estimated (J_K). No primary sample results required qualification.

Volatiles 8030
All surrogate spike recoveries met acceptance criteria.

Semivolatiles
All but one surrogate spike recovery met acceptance criteria. The calculated Phenol-D_5 recovery for sample MND24-0942-0002 MS was 6.3%. When the concentrations of both Phenol-D_5 and Phenol-D_2 are combined, the resulting Total Deuterated Phenol recovery is 56%. The laboratory narrative attributes the low Phenol-D_5 recovery to deuterium exchange with Phenol-D_2 before extraction. No sample results were qualified.

3.1.5. Matrix Spike/Matrix Spike Duplicate Recoveries

Volatiles 502.2
Total Xylene recoveries were above quality control limits for the Matrix Spike and Matrix Spike Duplicate samples. No samples were qualified based on these recoveries.

Volatiles 8030
Matrix Spike/Matrix Spike Duplicates results met acceptance criteria.

Semivolatiles
Three of twenty-two matrix spike recoveries exceed the QC limits. Samples

MND24-0942-0002 MS and MSD had high 4-nitrophenol recoveries; sample MND24-0942-0002 MSD also had a low pyrene %Recovery and high RPD. Neither 4-nitrophenol nor pyrene were detected in the environmental sample, no low level peaks were apparent on the chromatograph at the respective retention times. The Mass Spectra did not detect quantitation ions of either compound. No sample results were qualified.

The MS/MSD samples were extracted outside of their holding time and reported. The recoveries were qualified as estimated (J_H).

3.1.6. Internal Standards

Semivolatiles
Internal Standard data met QA/QC criteria for all samples.

3.1.7. Compound Identification

Volatiles 502.2
All Retention Time Window criteria were met during the analyses.

Volatiles 8030
All Retention Time Window criteria were met during the analyses.

Semivolatiles
Target compound identifications were determined from comparison to a mass-spectral library. Spectral matching criteria were met when comparing sample spectra to library standard spectra.

All compounds were within ±0.06 relative retention time units of the standard retention time.

3.1.8. System Performance

Volatiles 502.2
Evaluation of the chromatograms identified increased noise and loss of peak definition during calibration of low-level standards. Otherwise, peaks were well defined and did not exhibit excessive tailing or resolution loss. Isolated abrupt baseline shifts did occur, but did not affect data quality. Occasional methylene chloride peaks were present.

Volatiles 8030
Evaluation of the chromatograms identified some extraneous peaks in sample, standard, and blank analyses. However, sample results did not require qualification.

Semivolatiles
A review of chromatograms and mass spectra did not reveal system performance problems.

3.1.9. Compound Quantitation and Contract Required Quantitation Limits (CRQLs)

Compound Quantitation reflected all sample dilutions, clean-up activities, and dry weight factors where applicable.

Volatiles - 502.2
Contract Required Quantitation Limits were achieved for analyses.

Volatiles - 8030
CRQLs were achieved for all analyses.

Semivolatiles
CRQLs were met for all analytes except for 2,4,5-trichlorophenol. QAPP Method Modification D requires a 5 ug/l quantitation level; 12 to 13 ug/l were reported.

3.1.10. Tentatively Identified Compounds

Semivolatiles
Tentatively Identified Compounds (TICs) compounds were detected in samples MND24-0952-0002 (eight alkanes) and MND24-0954-0002 (adipate). The TICs were quantitated from the nearest eluting internal standard.

Unidentified compounds were detected in samples MND24-0952-0002 (three compounds), MND24-0938-0002 (one compound), and MND24-0954-0002 (one compound).

3.1.11. Laboratory Control Sample

Volatiles 502.2
Recoveries for five compounds did not meet QC criteria for the Laboratory Control (blank spike) Sample for the confirmation column. Confirmation column results were qualified as estimated (J_L).

Volatiles 8030
All Laboratory Control Sample results met the OU-9 QAPP acceptance criteria.

Semivolatiles
All Laboratory Control Sample results met the OU-9 QAPP acceptance criteria except for 4-nitrophenol (114%). Affected sample results were qualified as estimated due to surrogate recovery (J_L).

3.2. PESTICIDES/PCBs

Pesticide analyses were conducted in accordance with the USEPA Contract Laboratory Program Statement of Work for Organic Analysis and the OU-9 Quality Assurance Project Plan.

3.2.1. GC/ECD Performance Check

The standard retention times for the single component analytes fell within the established retention time windows.

All recoveries met the $\leq$25% criteria.

3.2.2. Performance Evaluation Mixture

3.2.2.1 Resolution

All pesticide and surrogate peaks met the resolution criteria on each column.

3.2.2.2. Retention Time

All Performance Evaluation Mixture compounds eluted within the established retention time windows.

3.2.2.3. Recovery

All Performance Evaluation Mixture compound recoveries met the Relative Percent Difference criteria.

3.2.2.4. DDT/Endrin Breakdown

The percent breakdown of DDT and endrin met the acceptance criteria of $\leq$20% and $\leq$30% combined breakdown. The breakdown calculations were verified and no significant variances were identified.

3.2.3. Calibration

Resolution Check Sample results met QC criteria of $\geq$60% resolution. All compounds on one column were 100% resolved. Six compounds on the second column were 100%, endosulfan I was 96% resolved, and endosulfan sulfate was 67% resolved.

The initial calibration of the single-component and multi-component analytes met QC criteria. Calibration factors were determined for the correct number of peaks for each multi-component compound.

Calibration factors and %RSD were recalculated and met the acceptance criteria. Retention time windows were correctly calculated.

3.2.4. Blanks

The instrument blanks chromatograms are very clean and exhibit only very small non-surrogate peaks.

The method blank chromatograms exhibit many peaks of small to high peak height. Because of the high number of peaks in the blank, it is likely that some peaks will fall within established analyte retention time windows. Many analytes were quantitated at levels below the reporting limit. However, no analytes were quantitated above the reporting limit and no compounds were reported in the method blanks.

3.2.5. Surrogate Spike Recoveries

Eleven of thirty-two surrogate recoveries had low recoveries that were outside of the QC limits. Sample results for samples with two or more low surrogate recoveries were qualified as estimated (J_K).

3.2.6. Matrix Spike/Matrix Spike Duplicate Recoveries

The Relative Percent Difference value for lindane (19%) exceeded the 15% QC limit for water. No sample results were qualified.

3.2.7. Compound Identification

Surrogate compounds eluted within the established retention time windows for each sample within this batch.

The %Difference between the two columns met the criteria for all analytes.

3.2.8. Pesticide Cleanup Checks

3.2.8.1. GPC Recoveries

GPC cleanup was not required for samples in this batch.

3.2.8.2. Florisil Cartridge Cleanup

All recoveries were within the QC limits.

3.2.9. System Performance

No system performance problems were noted.

3.2.10. Compound Quantitation and Reported CRQLs

Recalculation of the concentrations of the single component pesticides and surrogates agree with reported results.

All CRQLs have been met except for Endrin, which is reported at 0.020 ug/l, not 0.010 ug/l.

3.2.11. Laboratory Control Sample

Laboratory Control Sample results met the required QC criteria.

3.3. INORGANIC METALS AND CYANIDE

Two water samples were analyzed for inorganic metals and cyanide in accordance with the USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, and the EG&G Mound OU-9 Quality Assurance Project Plan (including Modification B to the CLP SOW).

The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/l for antimony and 2 ug/l for beryllium and thallium. For all the remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defied as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

3.3.1. Calibration and CRQL

Analytical instruments were calibrated in accordance with the CLP SOW and the OU-9 QAPP.

All Initial and Continuing Calibration Verification samples were within control limits.

Samples were analyzed using atomic absorption (AA) and inductively-coupled plasma (ICP) to verify contract-required quantitation limits (CRQLs).

3.3.2. Blanks

3.3.2.1. Preparation Blanks

The following metals were detected in the Preparation Blank at levels below the CRDL: aluminum, calcium, iron, lithium, potassium, sodium, and zinc.

3.3.2.2. Calibration Blanks

Continuing Calibration Blanks for this batch met acceptance criteria.

3.3.3. Interference Check Sample

Results of the Interference Check Sample met acceptance criteria.

3.3.4. Laboratory Control Sample

All Laboratory Control Sample results met acceptance criteria.

3.3.5. Duplicate Sample Analysis

Results of the duplicate sample analysis met acceptance criteria for all metals.

3.3.6. Matrix Spike Sample Analysis

Results of the spike sample analysis met acceptance criteria for 17 metals in sample MND24-0942-0002. The analytes that were out of range were aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, iron, manganese, nickel, thallium, tin, molybdenum, silver, vanadium and zinc. The spike and water-quality results for the analytes not meeting the acceptance criteria were given a J_s qualifier.

Spike sample analyses are not required for calcium, sodium, magnesium, mercury, and cyanide.

The following four sections detail the spike sample outliers with respect to analytical method.

3.3.6.1. ICP Metals

%Recovery was out of range for chromium, cobalt, manganese, nickel, tin, molybdenum, vanadium, and zinc.

3.3.6.2. GFAA Metals

%Recovery was out of range for aluminum, antimony, arsenic, barium, beryllium, copper, iron, silver, and thallium.

3.3.6.3. Cyanide

Matrix Spike analysis not required for this compound.

3.3.6.4. Flame AA Metals

Matrix Spike results met QC criteria for this method.

3.3.6.5. Automated Cold Vapor AA (Mercury)

Matrix Spike analysis not required for this compound.

3.3.7. Standard Addition Results

Method of Standard Addition analyses were not required for samples in this batch.

3.3.8. ICP Serial Dilution

ICP serial dilution results met acceptance criteria for all metals

3.3.9. Sample Result Verification

All sample results met acceptance criteria.

3.4. OTHER ANALYSES

The laboratory followed analytical methods derived from the USEPA Methods for Chemical Analysis of Water and Wastes and Standard Methods for the Examination of Water and Wastewater 16 ed.

3.4.1. Calibration

All calibration verification checks were within the required controlled limits of 90-110%. Calibration verification was performed using independent standards.

3.4.1.1. Alkalinity

Continuing Calibration Verification checks were performed every 10 samples or less using an alkalinity standard solution. CCV results varied by no more than 10% from the true value. No sample results were qualified.

3.4.1.2. Fluoride, Nitrite, and Nitrate-Nitrite

Fluoride instruments were calibrated using a six-point instrument calibration curve. Nitrite and Nitrate-Nitrite instrumentation was calibrated using a nine-point calibration curve. Calibration curves exhibited correlation coefficients $\geq$ 0.995. Continuing calibration checks were run every 20 samples and the results were within 15% of true value.

3.4.1.3. Total Dissolved Solids and Total Suspended Solids

The use of S class weights was not documented. Calibration was verified within a 24-hour time period.

3.4.2. Blanks

All preparation blank results were below the required detection limits with the exception of Alkalinity for sample 94LAL040-MB1 which was at the reporting limit, but below the contractual detection limit.

3.4.3. Laboratory Control Sample

All Laboratory Control standard results met acceptance criteria.

3.4.4. Matrix Spike/Matrix Spike Duplicate Sample Analysis

All Matrix Spike/Matrix Spike Duplicate recoveries met the performance criteria of the OU-9 QAPP. All results met the %Recovery guidance limits.

3.4.5. Sample Result Verification

Nitrate/Nitrite and Nitrite as N concentration were calculated automatically from absorbance measurements. No data was available to verify calculations from raw absorbance values. Calculations were checked to verify correct use of dilution factors. No data was qualified.

4. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

4.1. FIELD DUPLICATES

No field duplicates were analyzed in this batch.

4.2. FIELD BLANKS (equipment blanks, etc.)

One Ambient Blank and three Trip Blanks were collected with this batch. These blank samples were analyzed only for 502.2 volatiles.

Volatiles 502.2

No target compounds were detected in the Ambient Blank except for methylene chloride, which was verified by confirmation analyses. This compound is a common laboratory contaminant and appears at low (<0.5 ug/l) levels in the gas chromatograms of the method blanks and samples, and at a higher (2 ug/l) level in the gas chromatogram of the sample analyzed immediately before the ambient blank. Additionally, methylene chloride has been reported in the trip blanks of batch #9408L011. This data suggests that the presence of the compound is due to sample contamination. The ambient blank results have been qualified as not detected (U) based on professional judgement.

5. OVERALL ASSESSMENT OF DATA

TCL VOCs, water - Method 502.2

Weston Analytical Laboratories requested variances from the OU-9 QAPP criteria for 502.2 analyses. The variances were reviewed by Terran Corporation and EG&G Mound personnel. Approved variances from the QAPP are referenced in the following sample analysis discussion

All ground water samples were analyzed for Purgeable Aromatic Compounds and Purgeable Halocarbons by gas chromatography (Method 502.2). The OU-9 QAPP required the addition of two compounds to the Purgeable Aromatic analyte list, which were correctly analyzed. The QAPP also required the addition of four compounds to the Purgeable Halocarbon list, which were also correctly analyzed. However, laboratory reports for samples collected in January and February, 1994 mislabeled trichlorotrifluoroethane as trichlorotrifluoromethane. The labeling was corrected for the samples included in this batch.

The laboratory reported that the compound 2-chloroethylvinylether is very unstable, as indicated by a disclaimer on the manufacturer's certificate of analysis. This compound was calibrated only to a 4-point curve, not a 5- or 7-point curve as used for all other compounds. Preservation of ground water samples by the addition of HCL may have eliminated the presence of 2-chloroethylvinylether (see laboratory narrative). These conditions reduce the ability of the laboratory to quantitate low levels of this compound. 2-chloroethylvinylether was not detected above quantitation levels in any samples.

Each analysis was conducted on two separate GC columns coupled with a Hall electrolytic conductivity detector and a photoionization detector. Positive compound identifications were verified by reanalysis on separate GC columns.

Samples were quantitated from a curve in accordance with Method 502.2, an approved variance from the OU-9 QAPP guidelines. Initial calibration criteria required that a correlation coefficient of $\geq$0.992 be achieved for a 5-point calibration curve. This criteria was met for all compounds except vinyl acetate on the primary analysis column, and 2-chloroethylvinylether on the confirmation column. Initial and Continuing Calibration Verification criteria required that a 80-120% recovery be achieved. Five compounds failed the DCV or CCV criteria on the primary and confirmation columns.

No VOCs were detected in the ground water samples. Methylene chloride was detected and confirmed in the method blank, but was qualified as non-detect based on professional judgement. No VOCs were reported in the method blanks prepared for the analysis of the samples.

Four of thirty-eight surrogate recoveries and seven of forty-eight blank spike recoveries failed the QAPP criteria. The water sample results affected by these quality control analyses were qualified as estimated (J) for compounds with low recoveries. All results are considered useable.

Two of thirty-two matrix spike recoveries were outside of the QAPP control limits. No samples were qualified due to matrix spike recoveries.

Acrylonitrile and Acetonitrile - Method 8030

The water samples were analyzed for acrylonitrile and acetonitrile by Gas Chromatography (Method 8030). Each analysis was conducted on a single GC column coupled with a Photoionization Detector. No confirmation analyses were required because no target compounds were detected. No 8030 analytes were reported above quantitation limits in the ground water samples, field blanks, or method blanks. All quality control analyses met acceptance criteria. No data from this batch were qualified.

Semivolatiles

No TCL semivolatiles were detected in the water samples. Two common analytical contaminants, di-n-butylphthalate and bis(2-ethylhexyl)phthalate, were detected in the method blank. Sample results were qualified as non-detects (U_B).

Unknown and Tentatively Identified Compounds were reported in the water sample and blanks. Sample MND24-0938-0002 contained eight unidentified alkanes. Other non-TCL compounds appeared to be cyclohexane variants and may be laboratory contaminants.

All surrogate recoveries met QC requirements except one. A low recovery of Phenol-$_{d5}$ was attributed by the laboratory to deuterium exchange prior to sample extraction. The recovery of total deuterated phenols does meet QC limits. No sample results were qualified.

One of eleven blank spike recoveries and three of twenty-two matrix spike recoveries did not meet the control limits. Matrix Spike and Matrix Spike Duplicate samples were spiked and analyzed beyond holding times. MS/MSD recoveries were qualified as estimated (J_H).

Pesticides/PCBs

Alpha-chlordane and gamma-chlordane were detected at the quantitation level (0.010 ug/l) in sample MND24-0938-0002. No other target compounds were detected in any other environmental samples.

Several surrogate recoveries were outside of control limits, resulting in the qualification of three of four environmental sample results as estimated (J_K). The sample containing chlordane compounds did not require qualification.

Laboratory Control Sample recoveries met QC requirements. Sample data were not qualified.

Matrix spike/matrix spike duplicate sample results met the required QC criteria.

Method blank sample chromatograms revealed numerous extraneous peaks of varying height, but no target compounds were quantitated above reporting limits.

Sample results for this batch are considered estimated but useable.

TAL Inorganics and Cyanide - CLP SOW

Four water samples were analyzed for TAL metals using the OU-9 QAPP Modification B to the CLP SOW. The OU-9 QAPP criteria required that target analyte concentrations in Initial and Continuing Calibration Blanks be less than the Instrument Detection Limits. The laboratory requested a variance from this criteria since the IDL represents a region of uncertain data acquisition. The variance was approved and the criteria was modified to permit analyte concentrations in ICBs and CCBs up to 4 ug/l for antimony and 2 ug/l for beryllium and thallium. For all the remaining analytes, the ICB and CCB criteria became the Level of Quantitation, defined as ten times the standard deviation of a low concentration sample. This variance did not reduce the quality of the analytical results.

Aluminum, arsenic, calcium, iron, lead, magnesium, manganese, sodium, vanadium, and zinc were reported above the CRQL in one or both of the samples.

All Quality Control results met the required criteria, except that 17 metals were out of range on the Matrix Spike analyses. Affected sample results were given a J qualifier to indicate that the results are considered to be estimated values.

Other Analytes

The analytes included Alkalinity, Total Cyanide, Fluoride, Nitrate-Nitrite, Nitrate (as nitrogen), Total Dissolved Solids, and Total Suspended Solids.

The laboratory requested a variance from the OU-9 QAPP to allow the analysis of nitrite by EPA Method 353.2 (Colorimetric Cadmium Reduction) instead of Method 354.1 (Spectrophotometric). This variance was approved and did not affect the quality of the data.

Alkalinity samples were analyzed one day past their hold times. The results were qualified as estimated (J_H) but usable.

Appendix F

APPENDIX F

DETECTED ANALYTE STATISTICS FOR BOTH SAMPLING EVENTS

Table E.1. Qualified Concentrations of Detected Analytes

Detected Analyte	Number of Detections	Mean	Standard Deviation	3xSD
FIRST SAMPLING EVENT				
Volatile Organic Compounds				
cis-1,2-dichloroethene	1	1.40	0.00	0.00
Semivolatile Organic Compounds				
acenapthylene	1	0.30	0.00	0.00
anthracene	0	-	-	-
benzo(a)anthracene	1	1.00	0.00	0.00
benzo(b)fluoranthene	1	2.00	0.00	0.00
benzo(k)fluoranthene	1	1.00	0.00	0.00
benzo(g,h,i)perylene	1	1.00	0.00	0.00
benzo(a)pyrene	1	1.00	0.00	0.00
bis(2-ethylhexyl)phthalate	2	0.800	0.100	0.300
carbazole	1	0.500	0.000	0.000
chrysene	1	2.00	0.00	0.00
dibenz(a,h)anthracene	1	0.400	0.000	0.000
fluoranthene	1	4.00	0.00	0.00
indeno(1,2,3-cd)pyrene	1	1.00	0.00	0.00
4-methylphenol	1	0.300	0.000	0.000
phenanthrene	1	2.00	0.00	0.00
phenol	1	0.500	0.000	0.000
pyrene	1	2.00	0.00	0.00
Pesticides/PCBs				
delta-BHC	1	0.019	0.000	0.000
alpha-chlordane	2	0.241	0.210	0.629
gamma-chlordane	2	0.272	0.249	0.746
4,4-DDE	1	0.0380	0.0000	0.0000
4,4-DDT	1	0.0280	0.0010	0.0030
heptachlor epoxide	2	0.0710	-	-
heptachlor	1	0.0560	0.0000	0.0000
gamma - BHC (Lindane)	1	0.0370	0.0000	0.0000
methyoxychlor	0	-	-	-
Target Analyte List Metals				
Aluminum, Total	28	440	1485	4456
Antimony, Total	4	0.928	0.161	0.484
Arsenic, Total	8	18.45	25.67	77.02
Barium, Total	32	110.2	96.9	290.7
Beryllium, Total	5	0.420	0.145	0.434
Bismuth, Total	2	28.55	1.05	3.15
Cadmium, Total	3	5.60	5.82	17.46
Calcium, Total	32	79581	30196	90588

Table E.1. Qualified Concentrations of Detected Analytes

Detected Analyte	Number of Detections	Mean	Standard Deviation	3xSD
Target Analyte List Metals (cont.)				
Chromium, Total	9	16.4	31.9	95.6
Cobalt, Total	17	2.78	4.57	13.72
Copper, Total	28	9.92	11.01	33.03
Cyanide	1	6.00	0.00	0.00
Iron, Total	32	7682	24949	74847
Lead, Total	15	40.3	72.7	218.2
Lithium, Total	27	32.4	36.3	108.9
Magnesium, Total	32	30481	15496	46487
Manganese, Total	30	83.8	125	375
Mercury, Total	1	0.130	0.000	0.000
Molybdenum, Total	18	12.1	16.6	49.9
Nickel, Total	12	6.49	6.62	19.87
Potassium, Total	32	1970	1444	4332
Selenium, Total	5	3.30	1.46	4.37
Silver, Total	2	3.80	1.50	4.50
Sodium, Total	32	28712	39833	119500
Tin, Total	16	22.1	25.8	77.4
Vanadium, Total	22	7.57	4.11	12.32
Zinc, Total	32	1156	4123	12370
Radionuclides				
Americium-241	25	0.0773	0.0265	0.0795
Potassium-40	0	-	-	-
Plutonium-238	2	0.0929	0.0832	0.2495
Plutonium-239/240	21	0.0793	0.0361	0.1082
Radium-226	16	0.464	0.193	0.580
Strontium-90	12	1.908	2.689	8.066
Thorium-228	27	0.722	0.353	1.058
Thorium-230	25	1.249	1.999	5.998
Thorium-232	3	0.905	0.778	2.334
Tritium	11	849	667	2002
Uranium-234	25	0.737	1.379	4.136
Uranium-235/236	2	0.1824	0.0876	0.2628
Uranium-238	19	0.689	1.226	3.678
Anions				
Alkalinity	32	269	116	348
Fluoride	27	0.410	0.360	1.080
Nitrate/Nitrite	25	1.35	2.94	8.82
Nitrite as N	4	0.01650	0.00585	0.01756
Total Dissolved Solids	32	414	169	507
Total Suspended Solids	12	148	244	731

Table E.1. Qualified Concentrations of Detected Analytes

Detected Analyte	Number of Detections	Mean	Standard Deviation	3xSD
SECOND SAMPLING EVENT				
Volatile Organic Compounds				
cis-1,2-dichloroethene	1	0.900	0.000	0.000
Semivolatile Organic Compounds				
acenapthylene	0	-	-	-
anthracene	1	0.500	0.000	0.000
benzo(a)anthracene	1	2.00	0.00	0.00
benzo(b)fluoranthene	1	3.00	0.00	0.00
benzo(k)fluoranthene	1	3.00	0.00	0.00
benzo(g,h,i)perylene	1	2.00	0.00	0.00
benzo(a)pyrene	1	2.00	0.00	0.00
bis(2-ethylhexyl)phthalate	1	0.5	0	0
carbazole	0	-	-	-
chrysene	2	1.80	1.20	3.60
dibenz(a,h)anthracene	2	3.30	2.70	8.10
fluoranthene	2	4.00	2.00	6.00
indeno(1,2,3-cd)pyrene	2	2.50	0.50	1.50
4-methylphenol	0	-	-	-
phenanthrene	3	3.00	1.63	4.90
phenol	2	3.00	2.00	6.00
pyrene	2	2.51	2.50	7.49
Pesticides/PCBs				
delta-BHC	4	0.0270	0.0172	0.0517
alpha-chlordane	7	0.0494	0.0473	0.1420
gamma-chlordane	7	0.0609	0.0461	0.1383
4-4-DDE	5	0.0676	0.0530	0.1590
4-4-DDT	3	0.0620	0.0368	0.1104
heptachlor epoxide	2	0.0480	0.0380	0.1140
heptachlor	2	0.223	0.137	0.411
gamma - BHC (Lindane)	1	0.360	0.000	0.000
methoxychlor	1	0.360	0.000	0.000
Target Analyte List Metals				
Aluminum, Total	30	1090	3975	11924
Antimony, Total	0	-	-	-
Arsenic, Total	13	5.55	5.23	15.68
Barium, Total	30	107.0	89.9	269.7
Beryllium, Total	5	0.486	0.406	1.218
Bismuth, Total	0	-	-	-
Cadmium, Total	7	2.19	2.24	6.71
Calcium, Total	30	79322	32328	96983

Table E.1. Qualified Concentrations of Detected Analytes

Detected Analyte	Number of Detections	Mean	Standard Deviation	3xSD
Target Analyte List Metals (cont.)				
Chromium, Total	5	11.48	8.27	24.81
Cobalt, Total	5	5.84	5.75	17.26
Copper, Total	30	13.3	15.0	45.0
Cyanide	0	-	-	-
Iron, Total	30	2846	7300	21901
Lead, Total	16	28.2	75.7	227.1
Lithium, Total	22	39.9	36.4	109.2
Magnesium, Total	30	31778	16010	48030
Manganese, Total	29	82.3	123.5	370.5
Mercury, Total	2	0.210	0.060	0.180
Molybdenum, Total	20	8.63	15.99	47.96
Nickel, Total	8	8.01	9.52	28.56
Potassium, Total	30	2521	1872	5615
Selenium, Total	6	2.483	0.847	2.542
Silver, Total	4	1.098	0.647	1.941
Sodium, Total	30	23439	20334	61002
Tin, Total	4	10.35	4.27	12.81
Vanadium, Total	28	11.17	4.59	13.78
Zinc, Total	30	351	821	2463
Radionuclides				
Americium-241	12	0.2633	0.0988	0.2963
Potassium-40	3	226.6	23.1	69.4
Plutonium-238	2	0.245	0.115	0.345
Plutonium-239/240	8	0.216	0.130	0.390
Radium-226	13	0.526	0.164	0.493
Strontium-90	1	0.641	0.000	0.000
Thorium-228	17	0.499	0.201	0.602
Thorium-230	16	0.438	0.262	0.785
Thorium-232	5	0.372	0.133	0.400
Tritium	14	922	633	1900
Uranium-234	25	0.442	0.353	1.059
Uranium-235/236	6	0.2483	0.0537	0.1610
Uranium-238	19	0.409	0.326	0.978
Anions				
Alkalinity	30	253	106	319
Fluoride	25	0.411	0.351	1.054
Nitrate/Nitrite	25	1.62	3.68	11.05
Nitrite as N	25	1.62	3.68	11.05
Total Dissolved Solids	30	458	194	583
Total Suspended Solids	15	80.1	233.7	701.1

PLATE 1: ANALYTES DETECTED DURING RESIDENTIAL, MUNICIPAL, AND INDUSTRIAL WELL INVESTIGATION

Analyte	RESIDENTIAL WELLS																	PRODUCTION WELLS						CISTERNS							
	0941	0942	0943	0944	0945	0946*	0947	0948	0949	0950	0952	0953	0954	0955	0956	0958	0960	0967	0961	0962	0963	0964	0965	0966	0931*	0932	0933	0935	0936	0938	0951	0959
Volatile Organic Compounds																																
cis-1,2-Dichloroethene																				• / •												
Semivolatile Organic Compounds																																
Acenaphthylene																													•			
Anthracene																													/ •			
Benzo(a)anthracene																													◦ / ◦			
Benzo(b)fluoranthene																													◦ / ◦			
Benzo(k)fluoranthene																													◦ / ◦			
Benzo(g,h,i)perylene																													• / •			
Benzo(a)pyrene																													◦ / ◦			
bis(2-Ethylhexyl)phthalate														• / •								•										
Carbazole																													•			
Chrysene																													◦ / ◦			
Dibenz(a,h)anthracene																													◦ / ◦			
Fluoranthene																													• / •			
Indeno(1,2,3-cd)pyrene																													◦ / ◦			
4-Methylphenol																													•			
Phenanthrene																													• / •			
Phenol			/ •																										•			
Pyrene																													• / •			
Pesticides / PCBs																																
alpha - Chlordane																												• / •	/ •	• / •		
delta - BHC																														•		
gamma - Chlordane																												• / •	/ •	• / •		
4,4'-DDE																													• / •			
4,4'-DDT																													• / •			
Heptachlor epoxide																											• / •	• / •				
Heptachlor																														•		
Lindane (gamma - BHC)																											•					
Methoxychlor																													/ •			
Target Analyte List Metals																																
Aluminum, Total	• / •	• / •	• / •	◦ / ◦	• / •	◦	◦ / •	• / •	/ •	• / •	• / •	◦ / ◦	• / •	• / •	• / •	/ •	/ •	• / •	• / ◦	• / •	• / •	◦ / •	• / •	• / •	◦	◦ / ◦	• / •	• / ◦	◦ / ◦	• / •	• / ◦	◦ / •
Antimony, Total						•	•					•															•					
Arsenic, Total	• / •			• / •						/ •	• / •	◦ / •			/ •		•			/ •	• / •		• / •	/ •		/ •		• / •		/ •	
Barium, Total	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Beryllium, Total				• / •									•	/ •												/ •	•		/ •	•	• / •	
Bismuth, Total																			•											•		
Cadmium, Total				/ •		•						◦ / ◦														/ •	/ •	/ •	• / ◦		/ •	
Calcium, Total	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Chromium, Total				• / •		•		/ •				◦ / •		•			•	•				•				/ •			• / •	•		
Cobalt, Total	•	•		• / •	•	•	• / •		•	•	•	• / •		•	•		•	•		•	•					/ •			• / •			
Copper, Total	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	/ •	/ •	• / •	• / •	/ •	• / •	•	• / •	• / •	• / •	• / •	/ •	• / •	• / •
Cyanide, Total				•																												
Iron, Total	◦ / ◦	• / •	◦ / ◦	◦ / ◦	◦ / ◦	◦	◦ / •	• / •	• / ◦	◦ / •	• / •	◦ / ◦	• / •	◦ / ◦	• / •	• / •	• / •	• / •	• / ◦	• / •	◦ / ◦	• / •	◦ / ◦	◦ / ◦	•	• / ◦	• / •	• / •	◦ / ◦	◦ / ◦	• / •	• / •
Lead, Total	/ •	•	• / •	◦ / ◦	• / •	◦	•			/ •	◦	◦ / ◦	/ •	• / •			• / •		• / •				/ •			/ •	• / •	/ •	◦ / ◦	•	/ •	• / •
Lithium, Total	• / •	• / •	• / •	• / •	• / •	•	• / •	•	• / •	• / •	• / •	/ •	• / •	• / •	• / •	• / •	• / •		•	•	• / •		•	•	• / •	• / •	/ •	• / •	• / •	•	
Magnesium, Total	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Manganese, Total	• / •	• / •	◦ / •	◦ / ◦	• / •	◦	◦ / ◦	• / •	• / •	•	• / •	◦ / ◦	/ •	◦ / •	◦ / ◦	• / •	/ •	• / •	• / •	◦ / ◦	◦ / ◦	◦ / ◦	◦ / ◦	◦ / ◦	•	• / ◦	• / •	• / •	◦ / ◦	• / •	• / ◦	• / •
Mercury, Total																										/ •			• / •			
Molybdenum, Total	• / •	/ •	• / •	•		•	◦ / ◦	/ •	• / •	/ •	• / •	•	• / •	• / •	•	• / •	• / •	• / •	/ •	• / •	• / •	/ •	• / •	• / •						/ •		
Nickel, Total		/ •	/ •	• / •		•	• / •	• / •				•		• / •					•			•				• / •			• / •	•	•	
Potassium, Total	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Selenium, Total		•		•						/ •			•		/ •				• / •							/ •			/ •		• / •	
Silver, Total				• / •								• / •																	/ •			/ •
Sodium, Total	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Tin, Total				• / •	•	•		•	•	•		•		•		•	•		•	•	•			/ •	•	/ •			• / •			•
Vanadium, Total	• / •	• / •	/ •	• / •	• / •	•	/ •	• / •	• / •	• / •	• / •	• / •	/ •	/ •	• / •	• / •	• / •	• / •	/ •	• / •	• / •	/ •	• / •	• / •	•	• / •	/ •	•	• / •	/ •	/ •	
Zinc, Total	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	◦ / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Radionuclides																																
Americium-241	•	•	•	•	•	•	•	•	• / •	•	• / •	/ •	•	•	•	• / •	• / •	• / •	/ •	•	•	•	•	/ •	•	• / •	•	• / •			/ •	• / •
Potassium-40																				/ •	/ •		/ •									
Plutonium-238																							/ •	•					• / •			
Plutonium-239/240	•			/ •	•		•		•	•	•	•	•	• / •	•	/ •	•	•	•	•	• / •	•	/ •	• / •	•	•	/ •	/ •	•	•	•	
Radium-226	• / •	•	•	•	• / •		•		•	•		•			• / •	• / •		/ •	• / •	• / •	• / •	/ •	• / •	• / •		/ •			/ •	•		
Strontium-90				•			•	/ •	•		•					•	•								•	•	•				•	•
Thorium-228	• / •	• / •	• / •	• / •	•		•	•	/ •	•	• / •	• / •	•	•	• / •		/ •	• / •	• / •	•	•	•	• / •	•	•	• / •	• / •	•	• / •	• / •	•	• / •
Thorium-230	• / •	/ •	/ —	• / •	• / •	•	• / —	/ •	• / •	• / —	• / •	• / —	• / •		• / —	• / •	• / •	• / •		• / •	• / •	• / •	• / •	• / •	•	• / —	/ —	• / —	• / —	•	•	• / •
Thorium-232	•	/ •		• / •	/ •								/ •			/ •													•			
Tritium		• / •		•		•			• / •	•	/ •	/ •		/ •	• / •	• / •		/ •	• / •	• / •	• / •	/ •	/ •						•	/ •		
Uranium-234	• / •	• / •	/ •	• / •	•	•	• / •	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	•	• / •	• / •	• / •	• / •	/ •	• / •	• / •	• / •		• / •	• / •		•	• / •	/ •	/ •
Uranium-235/236				•								• / •			/ •						• / •											/ •	/ •
Uranium-238	• / •			• / •		•	• / •	• / •	• / •	• / •	• / •	/ •		• / •			• / •	• / •	• / •	• / •	/ •	• / •	• / •	• / •		/ •		•	•		• / •	/ •
Anions																																
Alkalinity	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •
Fluoride	• / •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •		•				• / •	• / •	
Nitrate/Nitrite	•	• / •	• / •	/ •	/ •	•		• / •	•	• / •			• / •	• / •	• / •	• / •	• / •	• / •	/ •	/ •	• / •	• / •	• / •	• / •	•	• / •	• / •	• / •	• / •	• / •	◦ / ◦	• / •
Nitrite, as N	•		/ •	• / •										•							/ •						•			/ •		/ •
Total Dissolved Solids	• / •	◦ / ◦	• / •	◦ / ◦	• / ◦	•	◦ / ◦	• / •	• / •	◦ / ◦	◦ / ◦	• / •	• / •	◦ / ◦	◦ / ◦	• / •	• / •	• / ◦	◦ / ◦	• / ◦	◦ / ◦	• / •	• / ◦	◦ / ◦	•	• / •	• / •	• / •	• / •	◦ / ◦	• / ◦	• / •
Total Suspended Solids	• / •	/ •	• / •	• / •	/ •		•	•	/ •	•	•	• / •	•	•					/ •	/ •	• / •		•	/ •	•	/ •	/ •		• / •			/ •

Analyte	SEDIMENTS		
	0935	0937	0951
Semivolatile Organic Compounds			
Acenaphthene			• / •
Acenaphthylene	/ •	• / •	• / •
Anthracene	/ •	• / •	• / •
Benzo(a)anthracene	/ •	• / •	• / •
Benzo(b)fluoranthene	• / •	• / •	• / •
Benzo(k)fluoranthene	/ •	• / •	• / •
Benzo(g,h,i)perylene	/ •	• / •	• / •
Benzo(a)pyrene	/ •	• / •	• / •
Benzoic Acid	•		
bis(2-Ethylhexyl)phthalate	• / •	• / •	•
Carbazole	/ •		•
Chrysene	• / •	• / •	• / •
Di-n-butylphthalate	•	• / •	• / •
Dibenz(a,h)anthracene	/ •	• / •	• / •
Dibenzofuran			• / •
Fluoranthene	• / •	• / •	• / •
Fluorene	/ •	• / •	• / •
Indeno(1,2,3-cd)pyrene	/ •	• / •	• / •
2-Methylnaphthalene			•
Naphthalene			• / •
Phenanthrene	• / •	• / •	• / •
Pyrene	• / •	• / •	• / •
Pesticides / PCBs			
alpha - Chlordane	• / •	• / •	
beta - BHC	/ •		
gamma - Chlordane	• / •		
4,4'-DDD			• / •
4,4'-DDE			• / •
4,4'-DDT			•
Endosulfan II		•	•
Endrin ketone			/ •
Heptachlor epoxide	• / •	/ •	
Heptachlor	• / •		
Lindane (gamma - BHC)	•		
Methoxychlor		/ •	/ •
Target Analyte List Metals			
Aluminum, Total	• / •	• / •	• / •
Antimony, Total		•	•
Arsenic, Total	• / •	/ •	• / •
Barium, Total	• / •	• / •	• / •
Beryllium, Total	• / •	• / •	• / •
Cadmium, Total	• / •	• / •	• / •
Calcium, Total	• / •	• / •	• / •
Chromium, Total	• / •	• / •	• / •
Cobalt, Total	• / •	• / •	• / •
Copper, Total	• / •	• / •	• / •
Iron, Total	• / •	• / •	• / •
Lead, Total	• / •	• / •	• / •
Lithium, Total	• / •	• / •	• / •
Magnesium, Total	• / •	• / •	• / •
Manganese, Total	• / •	• / •	• / •
Mercury, Total	• / •	• / •	• / •
Molybdenum, Total			•
Nickel, Total	• / •	• / •	• / •
Potassium, Total	• / •	• / •	• / •
Selenium, Total	•	• / •	• / •
Silver, Total	/ •	• / •	/ •
Sodium, Total	• / •	• / •	• / •
Thallium, Total		•	
Tin, Total	• / •	• / •	• / •
Vanadium, Total	• / •	• / •	• / •
Zinc, Total	• / •	• / •	• / •
Radionuclides			
Americium-241		•	
Cesium-137	• / •	• / •	•
Potassium-40	•	•	• / •
Plutonium-238	•	• / •	
Plutonium-239/240	• / •	•	• / •
Radium-226	• / •	• / •	• / •
Thorium-228	• / •	• / •	• / •
Thorium-230	• / —	• / —	• / —
Thorium-232	• / •	• / •	• / •
Tritium			/ •
Uranium-234	• / •	• / •	• / •
Uranium-235/236	•	• / •	•
Uranium-238	• / •	• / •	• / •
Anions			
Fluoride		• / •	
Nitrate/Nitrite	• / •	• / •	• / •

• - indicates an analyte detection during the first sampling event.
/ • - indicates an analyte detection during the second sampling event.
◦ - indicates analyte detections above maximum contaminant levels.
* - Not sampled during the second sampling event.
— - value rejected by validator.

Residential, Municipal, and Industrial Well Investigation, Operable Unit 9, Technical Report
U.S. Department of Energy, Environmental Restoration Program, EG&G Mound Applied Technologies, Miamisburg, Ohio, July 1995.