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MEETING NOTES

TO: Distribution **DATE:** August 5, 1994

FROM: P. Holland **PROJECT:** OU4 Phase II RFI/RI

MEMO #: PHII:080594.01

ATTENDANCE:

R. Ogg, EG&G
S. Paris, EG&G
J. Haasbeek, ERM
L. Pivonka, Geraghty & Miller
K. Pacheco, Tierra Environmental
P. Breen
R. Henry
P. Holland

DISTRIBUTION:

R. Ogg, EG&G
K. Ruger, EG&G
S. Paris, EG&G
R. Popish, EG&G (2-Admin Record)
J. Haasbeek, ERM
L. Pivonka, G&M
J. Bender, Ground Exploration
K. Pacheco, Tierra Env
P. Breen
B. Cropper
G. DeWeese
J. Evans
B. Glenn
R. Henry
N. Hilmar
P. Holland
T. Kuykendall
J.P. O'Brien
A. Putinsky
C. Rosé
R. Schmeirmund
R. Stegen
R. Wilkinson
Central Files

SUBJECT: OU4 Phase II RFI/RI Program Working Meeting #1

The meeting was organized by EG&G to discuss on-going efforts for modifying the Field Sampling Plan (FSP) included as Section 5.0 in the Draft Final Phase II RFI/RI Work Plan, and to outline responsibilities of the various contractors contributing to the OU4 Phase II RFI/RI Program. The meeting agenda is included in the minutes as Attachment 1. Summary of discussions are organized by the topics listed in the attached agenda.

1) OU4 Contractor Integration

R. Ogg opened the discussions by stating that Parsons/ES would maintain responsibility for the majority of the Phase II RFI/RI program. Specifically, Parsons/ES would be responsible for managing all field data generated by Parsons/ES or other participating

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contractors, analyzing/interpreting field data, and preparing the OU4 Phase II RFI/RI Report. Parsons/ES would not perform the geophysical survey program, sample sediments at Bowman's pond, nor monitor/sample the ITS, as may be specified in the Final Phase II RFI/RI Work Plan. Parsons/ES site management responsibilities during the execution of the field program would also be reduced.

Tierra Environmental will direct the field activities on behalf of EG&G. Tierra will be responsible for maintaining the field schedule and for the overall implementation of the field activities. Tierra will also perform the geophysical surveys specified in the Final Phase II RFI/RI Work Plan.

R. Ogg stated that he was in the process of modifying an existing contract between EG&G and ERM/Geraghty & Miller (ERM/G&M) to provide direct technical consultation support to EG&G during the OU4 Phase II RFI/RI. P. Holland questioned the use of a new contractual relationship when G&M was already scoped and budgeted under the Parsons/ES contract to provide technical support services. R. Ogg replied that Parsons/ES had failed to execute a formal contract with G&M thus far, so he planned to modify the Parsons/ES contract to remove the hours budgeted for G&M and use the associated dollars to fund the direct contract with ERM/G&M. P. Holland also asked how Parsons/ES should interpret future input from ERM/G&M. R. Ogg stated that ERM/G&M input should be interpreted as EG&G direction.

2) Comments on July 13, 1994 Meeting Minutes

S. Paris took exception to several aspects of the July 13, 1994 Meeting Minutes prepared by P. Holland of Parsons/ES concerning modifications to the OU4 Phase II RFI/RI field program. Specifically, EG&G requested Parsons/ES: revise the distribution list; state that an objective of the July 13, 1994 meeting was to modify the OU4 Phase II RFI/RI FSP to provide data directly supporting the future CMS/FS; document that a geoprobe was successfully employed at OU10 recently; clarify that EM would be eliminated from the geophysical program only if it failed to yield accurate results; note that Attachment 2 of the Meeting Minutes was not distributed at the meeting, was prepared subsequent to the meeting, and reflected items not specifically discussed at the meeting; modify statement attributed to L. Pivonka with respect to the completeness and accuracy of the existing data referenced and results portrayed in the Draft Final Phase II RFI/RI Work Plan. P. Holland agreed to revise the July 13, 1994 accordingly, and re-issue.

R. Ogg stated that EG&G had received final comments from US EPA on the Draft Final Phase II RFI/RI Work Plan on August 2, 1994. He added that the Parsons/ES OU4

Phase II RFI/RI contract would be modified to reflect a Final Phase II RFI/RI Work Plan delivery date of August 29, 1994 (12:00 pm).

3) Specific Conductivity Survey

S. Paris presented the results (Atch 2) of regression analyses performed between Rocky Flats Plant (RFP) historical nitrate concentrations and concentrations of (1) total dissolved solids (TDS); and (2) uranium isotopes. S. Paris cited a relatively strong (approx 60%) correlation between nitrate and TDS. P. Breen provided a log-log plot of RFP TDS verses nitrate (Atch 3) noting that the correlation deteriorates at nitrate concentrations less than 100 mg/L.

L. Pivonka emphasized the importance of examining the correlation between Phase II RFI/RI constituents of interest and TDS and/or nitrate given the planned course of action under the revised FSP. P. Holland stated that Parsons/ES (R. Schmeirmund) will be overlaying contour maps for specific constituents over the TDS and nitrate plume maps to qualitatively assess the general correlation. All agreed that technical literature supported a correlation between TDS and nitrate, as well as between TDS and/or nitrate and other constituents of interest.

S. Paris agreed to direct Golder to perform the conductivity/field nitrate survey for September, 1994 to gain a "snapshot" of the data and identify any problems/issues associated with data acquisition (e.g., unavailability of water, logistical problems, etc.) prior to initiation of the Phase II RFI/RI field program.

4) Phase II RFI/RI Geophysics Program

The revised FSP program called for electromagnetic, shear and compression waves seismic refraction, GPR, and borehole geophysical surveys. P. Breen explained the purpose for the OU4 Phase II RFI/RI geophysics program was to provide information supportive of the optimal placement of Phase II RFI/RI monitoring wells, to characterize the hydrologic systems prevalent at OU4, and to evaluate the effectiveness of the Interceptor Trench System (ITS) in a non-intrusive, cost effective manner.

P. Breen added that the seismic surveys were specifically designed to provide information on existing preferential pathways and irregularities in the bedrock surfaces within OU4 and the surrounding buffer zone. R. Ogg questioned if that information wasn't already available from the Phase I RFI/RI. R. Henry stated that the Phase I RFI/RI effort focused only within the boundaries of the SEPs and provided little information on the

buffer zone. J. Haasbeek suggested additional seismic surveys be specified in and around Pond 207-C to investigate potential DNAPLs. P. Breen agreed to add seismic lines around 207-C to the revised FSP.

R. Ogg asked if there was a high degree of confidence that the seismic surveys would provide the information sought. P. Breen stated he was confident in the success of the seismic surveys provided that skilled field personnel are used.

L. Pivonka emphasized the importance of understanding the hydraulics of the OU4 area and noted that the alignment of the proposed geophysics lines in the Draft Final Phase II RFI/RI Work Plan should be adjusted to be either parallel or perpendicular to the groundwater flow direction. P. Breen responded that the location of the lines were proximate and subject to adjustments based on the development of real-time field data/judgement.

L. Pivonka also noted that future remedial designs/actions should use the natural hydraulics of the site to its advantage, specifically the natural "welling" of groundwater that occurs around N. Walnut Creek. R. Henry agreed and emphasized that the seismic surveys were a "tool" to better define the hydraulics of the OU4 area. P. Breen noted that the ITS' future value was directly related to its effectiveness in capturing all groundwater flowing from the SEPs northeasterly to N. Walnut Creek. The seismic surveys would be key in identifying where the ITS isn't keyed to bedrock.

J. Haasbeek questioned why fluoride tracers were not specified in the Draft Final Phase II RFI/RI Work Plan to better answer the question of groundwater underflowing the ITS. P. Breen understood that tracer studies were dropped from the Draft Final Phase II RFI/RI Work Plan based on a perception that the studies were problematic and yielded data of questionable value. P. Breen added that well designed tracer tests could provide valuable information concerning the ITS hydraulic effectiveness, in addition to insights on the overall groundwater flow direction and velocity associated with the OU4 area. He agreed to include tracer tests in the revised FSP after investigating problems associated their past use at RFP.

P. Breen asked if the ITS effectiveness evaluation should include an evaluation of its mechanical effectiveness. R. Ogg directed that the ITS evaluation be focused primarily on its hydraulic effectiveness, reserving the right to address mechanical effectiveness via a contract modification at a later date.

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5) Field Sampling Plan Revision

P. Breen distributed the revised Section 5.0 table of contents and first four pages of revised FSP text (Atch 4) for review. P. Breen briefly outlined the thrust of the revised FSP. The meeting was adjourned due to time and a follow-on meeting scheduled for Tuesday, August 9, 1994 at 8:00 am in the Parsons/ES offices.

Peter J. Holland, P.E.
Project Manager, Phase II RFI/RI

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OU 4 PHASE II RFI/RI PROGRAM

AUGUST 5, 1994

AGENDA

1:00 - 1:30	OU 4 Phase II RFI/RI Contractor Integration - EG&G, Parsons/ES, ERM, G&M, Tierra Environmental. (R. Ogg) Attendees: Paris, Holland, Haasbeek, Pivonka, Pacheco
1:30 - 2:00	Comments on Parsons/ES Modifications to Phase II Field Program Meeting Minutes (July 13, 1994) - (S. Paris) Attendees: Paris, Holland, Breen, Haasbeek, Pivonka, Pacheco
2:00 - 2:15	Specific Conductivity Survey (S. Paris) Attendees: Paris, Holland, Breen, Haasbeek, Pivonka, Pacheco
2:15 - 2:30	Phase II Geophysical Program (S. Paris) Attendees: Paris, Holland, Breen, Haasbeek, Pivonka, Pacheco
2:30 - 3:00	Field Sampling Plan Revision Status (P. Breen) Attendees: Paris, Holland, Breen, Henry, Haasbeek, Pivonka, Pacheco
3:00 - 5:00	Field Sampling Plan Revision (Group) Attendees: Paris, Holland, Breen, Henry, Haasbeek, Pivonka, Pacheco

Atch 1
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Nitrate	TDS
26	380
21	430
17	550
15	560
21	560
16	580
39	670
82	950
16	1000
39	1000
80	1000
45	1100
52	1100
95	1100
37	1300
65	1300
110	1300
20	1400
110	1400
39	1500
29	1600
73	1600
84	1700
180	1800
250	2100
200	2200
200	2200
260	2900
150	3400
130	3900
450	3900
470	4000
600	4300
620	4400
390	4600
590	4600
480	4700
570	5000
850	7200
1400	11000
1700	11000
1300	12000
1900	17000
2000	17000
2100	17000
2500	18000
3400	30000
37	32000

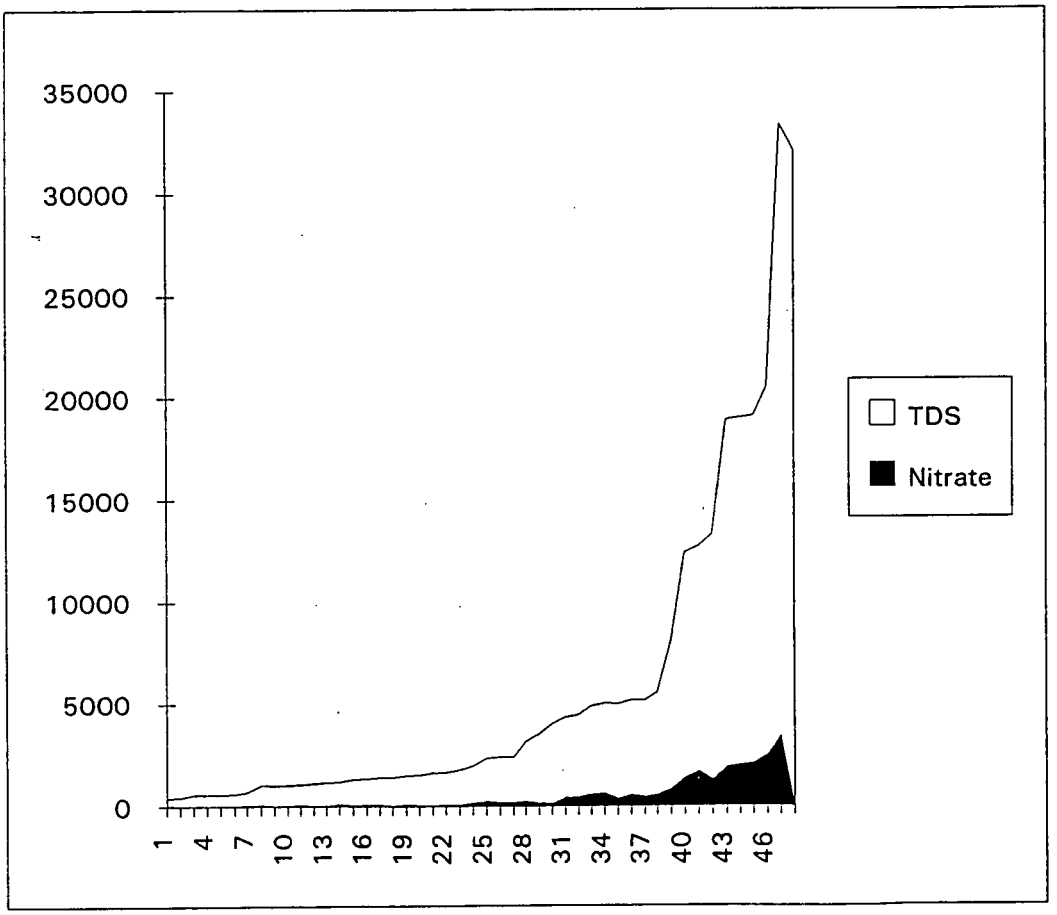
Regression Statistics

Multiple R	0.779251826
R Square	0.607233408
Adjusted R Square	0.598695004
Standard Error	4608.743849
Observations	48

Analysis of Variance

	df	*Sum of Squares*	*Mean Square*
Regression	1	1510581253	1510581253
Residual	46	977063914	21240519.87
Total	47	2487645167	

	Coefficients	*Standard Error*	*t Statistic*
Intercept	1551.468276	794.4471689	1.952890433
x1	7.368996678	0.873813775	8.433143186



ATCH 2
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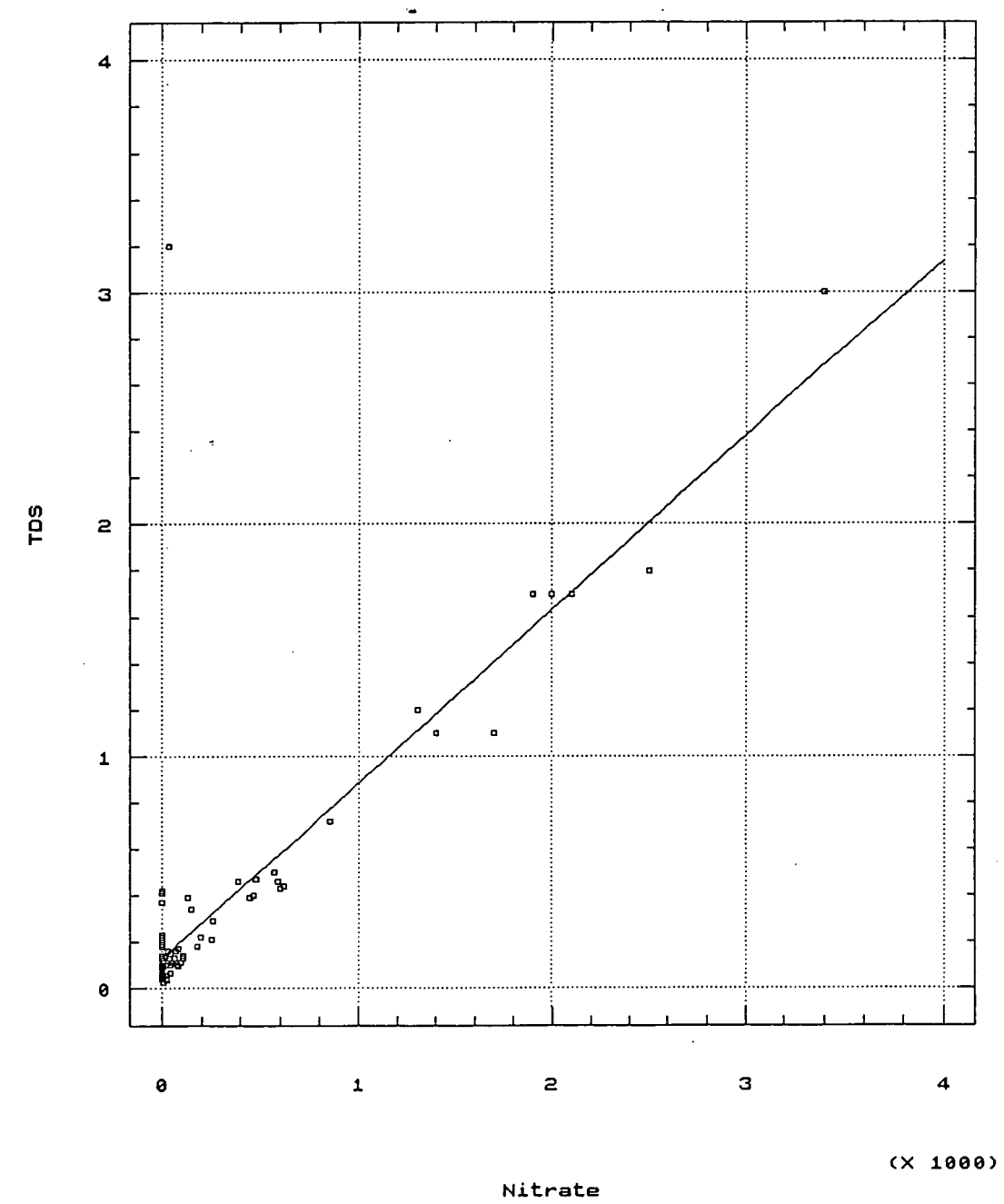
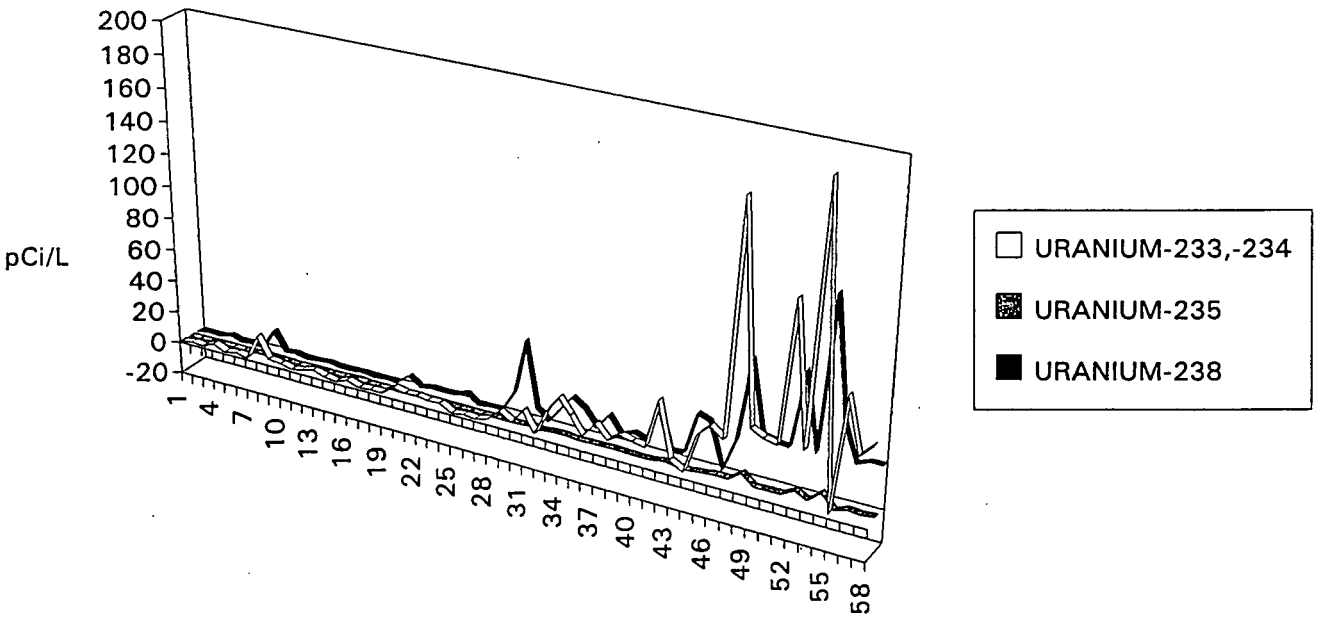
Regression of TDS on Nitrate





Uranium isotope concentrations with increasing Nitrate

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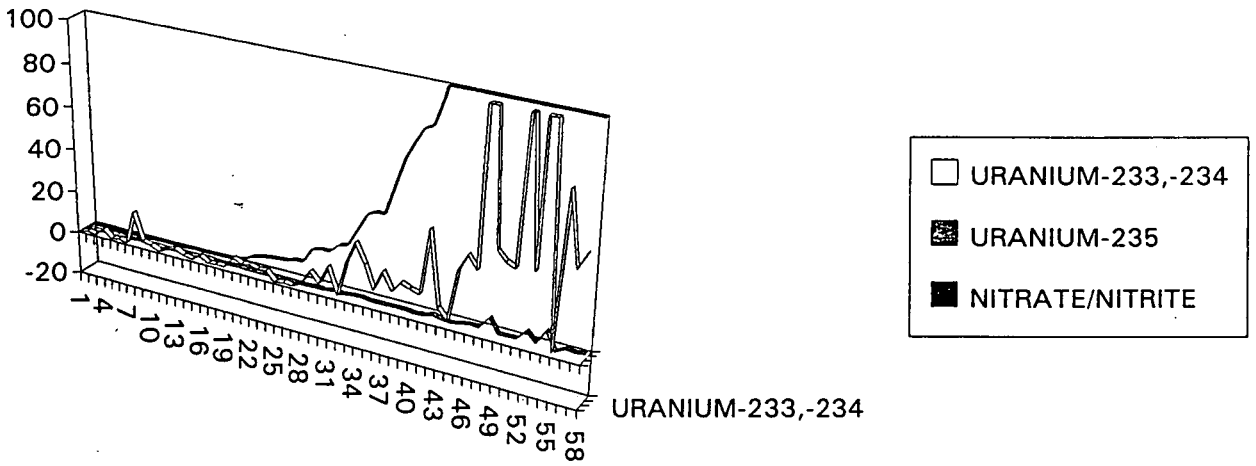
100
80
60
40
20
0
-20
1
4
7
10
13
16
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22
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28
31
34
37
40
43
46
49
52
55
58
URANIUM-233,-234
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URANIUM-235
NITRATE/NITRITE

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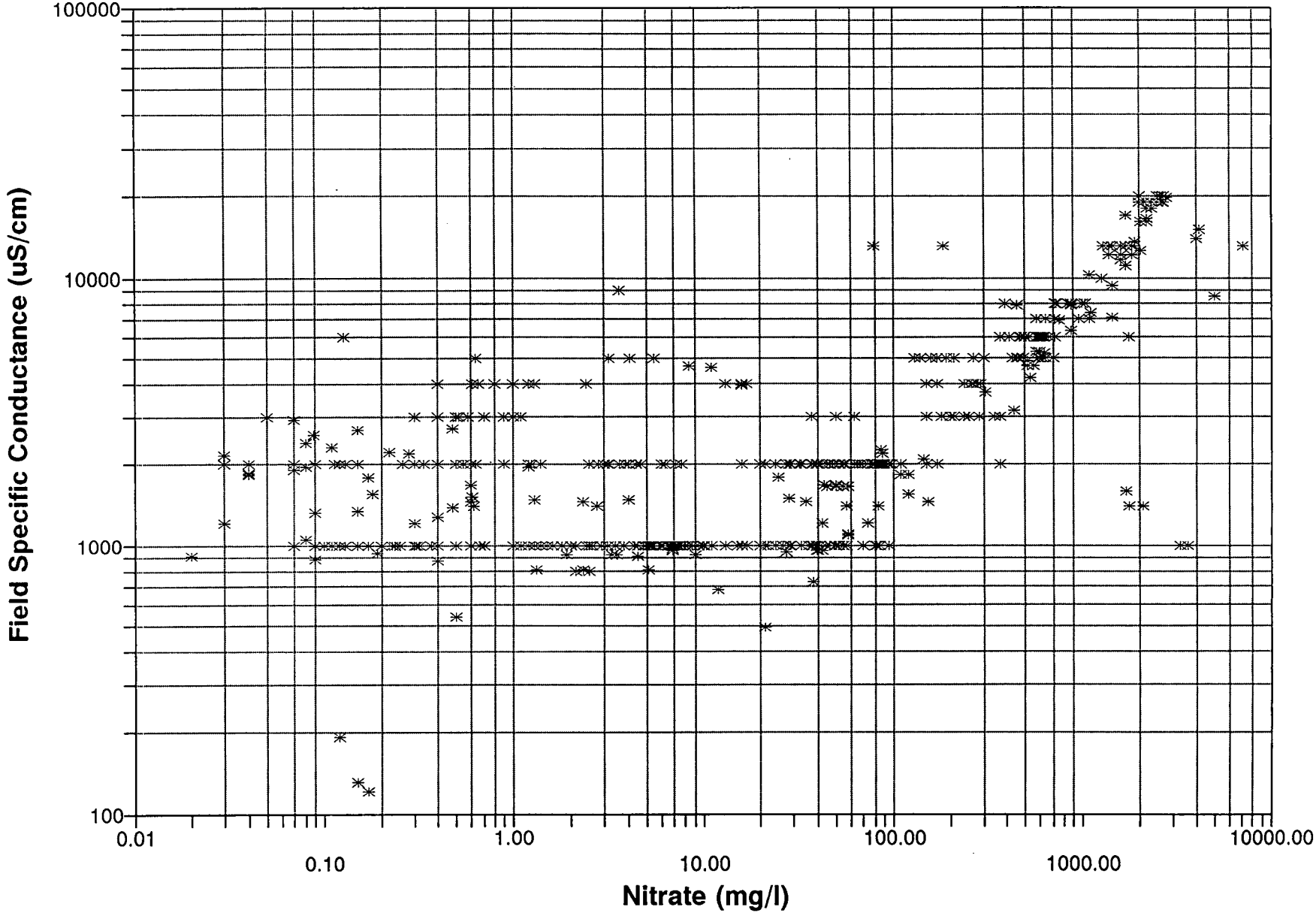
Nitrate vs. Specific Conductance



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SECTION 5.0

FIELD SAMPLING PLAN

This section presents the Field Sampling Plan (FSP) for the OU4 Phase II RFI/RI. The FSP is designed around an iterative, observational approach for the acquisition of data of sufficient quality to satisfy the RFI/RI objectives as described in Section 5.1. The FSP is designed to be flexible and allows for the acquisition and "real-time" analysis of data to guide subsequent field activities. Existing data, the on-going RCRA ground water monitoring program, rapid field-screening assessment techniques, and placement and sampling of permanent monitoring wells will be integrated to achieve the Phase II RFI/RI objectives. Upon completion of selected tasks, technical memoranda will be prepared reporting the results and recommending subsequent actions.

The objectives for the Phase II RFI/RI and technical approach for implementing the FSP are described in Section 5.1. Other sections in this FSP include a description and rationale of the investigative activities to be conducted (Section 5.2), the sampling methodology (Section 5.3), specific requirements of the analytical program (Section 5.4), QA/QC procedures (Section 5.5), air monitoring procedures (Section 5.6), and the disposition of investigation-derived wastes (Section 5.7).

5.1 OU4 Phase II RFI/RI Overview

This section provides a brief description of the objectives and technical approach for the Phase II RFI/RI.

5.1.1 Phase II RFI/RI Objectives

The general objectives of the Phase RFI/RI field investigation, per the IAG, are to determine the nature and extent of contamination and to evaluate the impact of OU4 on surface water, ground water, air, the environment, and biota.

The specific objectives of the Phase II RFI/RI field investigation are as follows:

- Characterize the surface water, upper HSU and lower HSU hydrologic systems and the hydraulic and chemical interactions between these systems;
- Characterize contamination in the OU4 surface water and ground water systems;
- Delineate the extent of ground water contamination;
- Delineate the contribution of upgradient sources to ground water contamination at OU4;
- Evaluate contaminant fate and transport characteristics in OU4 media;

- Evaluate the ITS effectiveness;
- Evaluate the Bowman's Pond (Building 774) water system; and
- Evaluate compliance with ARARs and conduct a baseline risk assessment.

The Phase II RFI/RI is also intended to provide data to support future Corrective Measure Studies/Feasibility Studies (CMS/FS) at OU4. The CMS/FS will evaluate remedial action alternatives and potential ground water treatment technologies.

5.1.2 Technical Approach and Rationale

Data from previous investigations performed at OU4, including the OU4 Phase I RFI/RI, and sitewide information pertinent to OU4 were previously presented in Section 3.0 of this work plan. The value of the previous data in meeting the Phase II RFI/RI objectives varies, and the extent of ground water contamination at OU4 has only been preliminarily characterized. This FSP is designed around a flexible, observational approach to integrate existing data and the on-going RCRA ground water monitoring program with data collected using rapid field-screening assessment and geophysical techniques to delineate the vertical and horizontal extent of contamination and to guide the placement of permanent monitoring wells.

The technical approach as described in this FSP consists of the incremental acquisition and "real-time" evaluation of data to guide subsequent field activities. The proposed approach will provide "scientific method" to evaluate the nature and extent of contamination and to guide the optimal placement of permanent monitoring wells. Upon completion of selected tasks, technical memoranda will be prepared reporting the results and recommending subsequent actions. The following tasks will be completed in increments as the FSP is implemented.

- Collect water level and *in-situ* specific conductance measurements in selected wells, piezometers, and surface water locations to assess whether *in-situ* specific conductance can be used to map the extent of the inorganic contaminant plume, to provide a preliminary "snapshot" in time of the extent of the inorganic plume, and to assess whether ground water is discharging to North Walnut Creek.
- Compile and review additional soil characterization data adjacent to OU4 to evaluate whether additional soil samples are required for completion of Phase I RFI/RI (source and soils) objectives.
- Acquire geophysical data (refraction seismic, ground penetrating radar, electromagnetic) to map the top of bedrock (both unweathered and weathered), to map the water table, and to map high conductivity inorganic contaminant plumes. Preferential ground water flow paths are to be identified.
- Prepare Technical Memorandum No.5 (TM5) to document the results and conclusions from the above-described tasks. Additional data needs will be identified and recommendations for further work, such as installing well points and permanent

monitoring wells and collecting additional soil samples, will be presented. The locations and procedures for installing well points using a drive-point system also will be presented, as appropriate.

- *In-situ* specific conductance and nitrate will be measured in all monitoring wells and piezometers and at locations along North Walnut Creek to determine the extent of the inorganic contaminant plume. Water level elevations will be measured in all wells and piezometers.

- Install well points in selected areas to evaluate the depth to bedrock and to collect ground water samples using a drive point sampling device. The ground water samples will be analyzed in the field for specific conductance and nitrate. The purpose of this task is to determine the extent of inorganic ground water contamination and to guide the placement of permanent monitoring wells.

- Prepare Technical Memorandum No.6 (TM6) to document the results of additional field measurements of water level elevation and water quality, and to document the results gathered during installation of well points. Results of additional geophysical work (if conducted) will be presented. A detailed plan with recommendations for the installation of permanent monitoring wells and subsequent work will be presented in TM6.

- Install permanent monitoring wells at the locations presented in this work plan, as modified by TM6.

- Analyze ground water, surface water, seep, sediment, soil and bedrock samples for the parameters identified in the FSP, as modified by TM6, to determine chemical characteristics, contaminant presence, fate, and mobility characteristics, and physical characteristics of OU4 media.

- Conduct and analyze aquifer tests (slug, pumping and tracer tests) to determine aquifer .parameters for evaluating contaminant fate and transport.

Additional items to be addressed/considered:

- o All ground water data will be reviewed - maps generated for NO3, TDS, VOCs looked at.

- o Revisit locations of wells/rationale - appropriate for addressing CMS/FS issues?

- o Tracer tests put back into program - designs/results of past tests at RFP to be reviewed, design of tests for OU4 will be in TM5.

- o Multiport sampling wells considered for deep bedrock wells - look at locations, determine appropriateness of monitoring shallow and deeper zones from one well. Propose in TM5 if implementation desired.

- o Locations of pumping tests to be reviewed, changed to be more appropriate for CMS/FS issues.

- o Review analytical program, clarify rationale for suites of analyses and which wells to be analyzed for what.

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