New Mexico State University

Soil Test Interpretations

Guide A-122

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A soil test can be an important management tool in developing an efficient soil fertility program, as well as monitoring a field for potential soil and water management problems. A soil test provides basic information on the nutrient supplying capacity of the soil. However, a test is not reliable if the soil sample is taken incorrectly or is improperly handled after collection. If you need help taking a soil sample properly, see your county Extension agent for publications on the proper soil sampling methods, and for a soil sampling kit.

Because analytical techniques vary among laboratories, the number values reported may vary from lab to lab. Numbers used by each have specific meanings for the laboratory. The interpretations discussed here are for the Soil, Plant and Water Testing Lab at New Mexico State University.

Fertilizer and soil management recommendations shown on the soil test report are based on the soil test and information provided on the information sheet which accompanies the soil sample to the lab. Items on the information sheet include cropping history, previous yields, fertilizer used, depth of soil and water table, water quality, and irrigation practices. Additional comments made on the information sheet can include general appearance of the crop, yield practices, or problems that may have a bearing on the crop. Fertilization requirements can vary with overall crop management program. Complete and accurate information is essential to get a fertilizer recommendation that will ensure the maximum yield for the least cost.

Individual Soil Tests

The following classifications are used for the standard soil test conducted by NMSU Soil, Plant and Water Testing Lab. Analyses for other factors are available upon request and require additional fees. Except for pH, the classifications are categorized as very low, low, moderate, high, and very high. For fertility factors (N, P, K, micronutrients) very low and low classifications indicate a high probability for obtaining a fertilizer response; moderate classifications indicate a fertilizer response may or may not occur; high and very high classifications indicate a fertilizer response is not likely to occur.

pH. Most crops will grow satisfactorily on soils with a pH ranging from 6.2 to 8.3. Crops susceptible to iron and zinc deficiencies may be affected at pH levels above 7.5.

Soils with a pH of 8.3 or higher usually have a high sodium content. Applications of sulfuric acid usually lower the pH for only a short period due to the high buffering capacity of the soils.

pH	Classification
> 8.5	strongly alkaline
7.9-8.5	moderately alkaline
7.3-7.9	slightly alkaline

6.7–7.3	neutral
6.2–6.7	slightly acid
5.6–6.2	moderately acid
3.0–5.6	strongly acid

Salts, Electrical Conductivity (E.C. x 10^3)

conductivity is less than 2, few salinity problems are evident. Problems may be evident with highly sensitive crops when the E.C. x 10^3 is from 2 to 4, although problems are usually minor. When the E.C. x 10^3 is from 4 to 8, problems usually are evident. When the E.C. x 10^3 is greater than 8, crops with moderate salt tolerance will usually show signs of reduced growth, foliage burn or chlorosis. Leaching can decrease the salinity hazard if soil permeability is adequate. Tables 1 and 2 list the salt tolerances of some crops and ornamental plants.

E.C. x 10^3	Classification
< 2	very low
2–4	low
4–8	moderate
8–16	high
> 16	very high

Table 1. Relative salt tolerance of selected crops, in order of decreasing tolerance within each group.

Good salt tolerance	Moderate salt tolerance	Poor salt tolerance
Field Crops		
barley (grain) sugar beet rape cotton	rye (grain) wheat (grain) oats (grain) alfalfa sorghum (grain) corn (grain) foxtail millet sunflower	vetch
Forage Crops		

alkali sacaton saltgrass bermudagrass Canada wild rye western wheatgrass	white sweetclover yellow sweetclover perennial ryegrass mountain bromegrass barley (hay) birdsfoot trefoil	white Dutch clover meadow foxtail alsike clover red clover ladino clover
	strawberry clover dallisgrass sudangrass hubam clover alfalfa tall fescue rye (hay) wheat (hay) oats (hay)	

----------Truck Crops ----------

garden beet kale asparagus	tomato broccoli cabbage cauliflower lettuce potatoes (White Rose) sweetcorn carrot peas onion squash canteloupe cucumber	radish spinach celery green beans

----------Fruit and Nut Crops ----------

pistachio palm	grape	pear apple prune plum apricot peach strawberry pecan

Appendix A-2
Discharge Quality

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	Rotary Table Discharge 0707207-1										
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sodium	3600	156.59									
Potassium	110	2.81									
Calcium	320	15.97									
Magnesium	87	7.16									
Total Cations		182.53									
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sulfate	4100	85.36									
Chloride	2800	78.98									
Bicarbonate (CaCO3)	1600	31.97									
Carbonate (CaCO3)	ND	*									
Phosphate (P)	ND	*									
Nitrite (N)	ND	*									
Nitrate (N)	0.1	0.01									
Fluoride	2.8	0.15									
Bromide	6	0.07									
Total Anions		196.55									
Elect. Cond. (µMhos/cm)	16000										
CATION/ANION RATIO		0.93									
% Difference		4									
TOTAL DISSOLVED SOLIDS RATIOS											
TDS (measured)	14000										
TDS (calculated)	11986										
Ratio meas TDS:calc TDS		1.2									
Ratio Meas. TDS:EC		0.88									
Ratio Calc. TDS:EC		0.75									
Ratio of anion sum:EC		1.2									
Ratio of cation sum:EC		1.1									

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

GENERALLY ACCEPTED RANGES

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS -- 1.0-1.2. Ratio Calculated TDS:EC – 0.55-0.7. Ratio Measured TDS:EC--0.55-0.7. Ratio of anion sum:EC -- 0.9-1.1.

Ratio of cation sum:EC -- 0.9-1.1

HALL ENVIRONMENTAL ANALYSIS LABORATORY

COVER LETTER

Thursday, July 19, 2007

Andrew Parker
R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104

TEL: (505) 266-5004
FAX (505) 266-0745

RE: Rio West EXP-06

Order No.: 0707207

Dear Andrew Parker:

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 7/16/2007 for the analyses presented in the following report.

This report is an addendum to the report dated July 19, 2007. Sample ID Name for sample #1 has been corrected in this report.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

Hall Environmental Analysis Laboratory, Inc.

Date: *19-Jul-07*

CLIENT:	R.T. Hicks Consultants, LTD	**Client Sample ID:**	Rotary Table Discharge
Lab Order:	0707207	**Collection Date:**	7/15/2007 7:00:00 AM
Project:	Rio West EXP-06	**Date Received:**	7/16/2007
Lab ID:	0707207-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: KS
Fluoride	2.8	1.0		mg/L	10	7/16/2007 2:47:56 PM
Chloride	2800	10		mg/L	100	7/17/2007 10:59:00 AM
Nitrogen, Nitrite (As N)	ND	1.0		mg/L	10	7/16/2007 2:47:56 PM
Bromide	5.9	0.10		mg/L	1	7/16/2007 1:55:42 PM
Nitrogen, Nitrate (As N)	0.12	0.10		mg/L	1	7/16/2007 1:55:42 PM
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	7/16/2007 1:55:42 PM
Sulfate	4100	50		mg/L	100	7/17/2007 10:59:00 AM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: TES
Arsenic	0.12	0.020		mg/L	1	7/17/2007 3:16:09 PM
Barium	0.063	0.020		mg/L	1	7/17/2007 3:16:09 PM
Calcium	320	5.0		mg/L	5	7/17/2007 3:23:36 PM
Iron	ND	0.020		mg/L	1	7/17/2007 3:16:09 PM
Magnesium	87	1.0		mg/L	1	7/17/2007 3:16:09 PM
Manganese	0.10	0.0020		mg/L	1	7/17/2007 3:16:09 PM
Potassium	110	5.0		mg/L	5	7/17/2007 3:23:36 PM
Sodium	3600	50		mg/L	50	7/17/2007 3:27:41 PM
Zinc	0.063	0.050		mg/L	1	7/17/2007 3:16:09 PM
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: TES
Barium	0.062	0.020		mg/L	1	7/18/2007 5:08:07 PM
Calcium	330	50		mg/L	50	7/18/2007 4:06:32 PM
Iron	15	2.5		mg/L	50	7/18/2007 4:06:32 PM
Magnesium	94	50		mg/L	50	7/18/2007 4:06:32 PM
Manganese	0.22	0.0020		mg/L	1	7/18/2007 5:08:07 PM
Potassium	110	50		mg/L	50	7/18/2007 4:06:32 PM
Sodium	3600	100		mg/L	100	7/18/2007 4:09:35 PM
Zinc	0.079	0.050		mg/L	1	7/18/2007 5:08:07 PM
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: SMP
Benzene	ND	1.0		µg/L	1	7/17/2007 2:06:43 PM
Toluene	ND	1.0		µg/L	1	7/17/2007 2:06:43 PM
Ethylbenzene	ND	1.0		µg/L	1	7/17/2007 2:06:43 PM
Naphthalene	ND	2.0		µg/L	1	7/17/2007 2:06:43 PM
Xylenes, Total	ND	3.0		µg/L	1	7/17/2007 2:06:43 PM
Surr: 1,2-Dichloroethane-d4	99.4	69.9-130		%REC	1	7/17/2007 2:06:43 PM
Surr: 4-Bromofluorobenzene	102	71.2-123		%REC	1	7/17/2007 2:06:43 PM
Surr: Dibromofluoromethane	92.5	73.9-134		%REC	1	7/17/2007 2:06:43 PM
Surr: Toluene-d8	103	81.9-122		%REC	1	7/17/2007 2:06:43 PM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

Date: *19-Jul-07*

CLIENT:	R.T. Hicks Consultants, LTD	**Client Sample ID:**	Rotary Table Discharge
Lab Order:	0707207	**Collection Date:**	7/15/2007 7:00:00 AM
Project:	Rio West EXP-06	**Date Received:**	7/16/2007
Lab ID:	0707207-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 310.1: ALKALINITY						Analyst: LMM
Alkalinity, Total (As CaCO3)	1600	20		mg/L CaCO3	1	7/18/2007
Carbonate	ND	2.0		mg/L CaCO3	1	7/18/2007
Bicarbonate	1600	20		mg/L CaCO3	1	7/18/2007
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: LMM
Specific Conductance	16000	0.010		µmhos/cm	1	7/17/2007
EPA METHOD 160.1: TDS						Analyst: TAF
Total Dissolved Solids	14000	200		mg/L	1	7/17/2007

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *19-Jul-07*

CLIENT:	R.T. Hicks Consultants, LTD	Client Sample ID:	Road Discharge
Lab Order:	0707207	Collection Date:	7/15/2007 12:15:00 PM
Project:	Rio West EXP-06	Date Received:	7/16/2007
Lab ID:	0707207-02	Matrix:	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: KS
Fluoride	2.3	1.0		mg/L	10	7/16/2007 3:22:45 PM
Chloride	2700	10		mg/L	100	7/17/2007 11:16:24 AM
Nitrogen, Nitrite (As N)	ND	1.0		mg/L	10	7/16/2007 3:22:45 PM
Bromide	5.7	0.10		mg/L	1	7/16/2007 3:05:20 PM
Nitrogen, Nitrate (As N)	0.31	0.10		mg/L	1	7/16/2007 3:05:20 PM
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	7/16/2007 3:05:20 PM
Sulfate	4200	50		mg/L	100	7/17/2007 11:16:24 AM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: TES
Barium	0.17	0.10		mg/L	5	7/17/2007 3:54:19 PM
Calcium	180	5.0		mg/L	5	7/17/2007 3:54:19 PM
Iron	0.23	0.10		mg/L	5	7/17/2007 3:54:19 PM
Magnesium	76	5.0		mg/L	5	7/17/2007 3:54:19 PM
Manganese	ND	0.010		mg/L	5	7/17/2007 3:54:19 PM
Potassium	76	5.0		mg/L	5	7/17/2007 3:54:19 PM
Sodium	4200	100		mg/L	100	7/17/2007 3:34:25 PM
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: TES
Barium	0.27	0.020		mg/L	1	7/19/2007 12:50:37 PM
Calcium	280	10		mg/L	10	7/19/2007 1:02:43 PM
Iron	33	2.5		mg/L	50	7/19/2007 12:59:46 PM
Magnesium	88	1.0		mg/L	1	7/19/2007 12:50:37 PM
Manganese	0.25	0.0020		mg/L	1	7/19/2007 12:50:37 PM
Potassium	88	1.0		mg/L	1	7/19/2007 12:50:37 PM
Sodium	4000	50		mg/L	50	7/19/2007 12:59:46 PM
EPA METHOD 8260: VOLATILES SHORT LIST						Analyst: SMP
Benzene	ND	1.0		µg/L	1	7/17/2007 1:33:16 PM
Toluene	ND	1.0		µg/L	1	7/17/2007 1:33:16 PM
Ethylbenzene	ND	1.0		µg/L	1	7/17/2007 1:33:16 PM
Naphthalene	ND	2.0		µg/L	1	7/17/2007 1:33:16 PM
Xylenes, Total	ND	3.0		µg/L	1	7/17/2007 1:33:16 PM
Surr: 1,2-Dichloroethane-d4	87.7	69.9-130		%REC	1	7/17/2007 1:33:16 PM
Surr: 4-Bromofluorobenzene	103	71.2-123		%REC	1	7/17/2007 1:33:16 PM
Surr: Dibromofluoromethane	93.2	73.9-134		%REC	1	7/17/2007 1:33:16 PM
Surr: Toluene-d8	108	81.9-122		%REC	1	7/17/2007 1:33:16 PM
EPA METHOD 310.1: ALKALINITY						Analyst: LMM
Alkalinity, Total (As CaCO3)	1600	20		mg/L CaCO3	1	7/18/2007
Carbonate	ND	2.0		mg/L CaCO3	1	7/18/2007

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

Date: *19-Jul-07*

CLIENT:	R.T. Hicks Consultants, LTD	**Client Sample ID:**	Road Discharge
Lab Order:	0707207	**Collection Date:**	7/15/2007 12:15:00 PM
Project:	Rio West EXP-06	**Date Received:**	7/16/2007
Lab ID:	0707207-02	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 310.1: ALKALINITY						Analyst: LMM
Bicarbonate	1600	20		mg/L CaCO3	1	7/18/2007
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: LMM
Specific Conductance	16000	0.010		µmhos/cm	1	7/17/2007
EPA METHOD 160.1: TDS						Analyst: TAF
Total Dissolved Solids	13000	200		mg/L	1	7/17/2007

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

QA/QC SUMMARY REPORT

Client: R.T. Hicks Consultants, LTD
Project: Rio West EXP-06 **Work Order:** 0707207

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: E300									
Sample ID: MB		*MBLK*			Batch ID:	R24411	Analysis Date:	7/16/2007 11:19:02 AM	
Fluoride	ND	mg/L	0.10						
Chloride	ND	mg/L	0.10						
Nitrogen, Nitrite (As N)	ND	mg/L	0.10						
Bromide	ND	mg/L	0.10						
Nitrogen, Nitrate (As N)	ND	mg/L	0.10						
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50						
Sulfate	ND	mg/L	0.50						
Sample ID: MB		*MBLK*			Batch ID:	R24423	Analysis Date:	7/17/2007 9:31:56 AM	
Fluoride	ND	mg/L	0.10						
Chloride	ND	mg/L	0.10						
Nitrogen, Nitrite (As N)	ND	mg/L	0.10						
Bromide	ND	mg/L	0.10						
Nitrogen, Nitrate (As N)	ND	mg/L	0.10						
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50						
Sulfate	ND	mg/L	0.50						
Sample ID: LCS ST300-07026		*LCS*			Batch ID:	R24411	Analysis Date:	7/16/2007 11:38:27 AM	
Fluoride	0.4956	mg/L	0.10	99.1	90	110			
Chloride	4.747	mg/L	0.10	94.9	90	110			
Nitrogen, Nitrite (As N)	0.9750	mg/L	0.10	97.5	90	110			
Bromide	2.481	mg/L	0.10	99.2	90	110			
Nitrogen, Nitrate (As N)	2.416	mg/L	0.10	96.6	90	110			
Phosphorus, Orthophosphate (As P)	4.576	mg/L	0.50	91.5	90	110			
Sulfate	9.820	mg/L	0.50	98.2	90	110			
Sample ID: LCS ST300-07026		*LCS*			Batch ID:	R24423	Analysis Date:	7/17/2007 9:49:20 AM	
Fluoride	0.5180	mg/L	0.10	104	90	110			
Chloride	4.876	mg/L	0.10	97.5	90	110			
Nitrogen, Nitrite (As N)	0.9960	mg/L	0.10	99.6	90	110			
Bromide	2.552	mg/L	0.10	102	90	110			
Nitrogen, Nitrate (As N)	2.463	mg/L	0.10	98.5	90	110			
Phosphorus, Orthophosphate (As P)	4.779	mg/L	0.50	95.6	90	110			
Sulfate	9.999	mg/L	0.50	100	90	110			
Method: E310.1									
Sample ID: 0707207-01BMSD		*MSD*			Batch ID:	R24430	Analysis Date:	7/18/2007	
Alkalinity, Total (As CaCO3)	1660	mg/L CaC	20	91.2	80	120	0.121	20	
Sample ID: MB		*MBLK*			Batch ID:	R24430	Analysis Date:	7/18/2007	
Alkalinity, Total (As CaCO3)	ND	mg/L CaC	20						
Carbonate	ND	mg/L CaC	2.0						
Bicarbonate	ND	mg/L CaC	20						
Sample ID: LCS		*LCS*			Batch ID:	R24430	Analysis Date:	7/18/2007	
Alkalinity, Total (As CaCO3)	84.00	mg/L CaC	20	105	80	120			
Sample ID: 0707207-01BMS		*MS*			Batch ID:	R24430	Analysis Date:	7/18/2007	
Alkalinity, Total (As CaCO3)	1658	mg/L CaC	20	88.8	80	120			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: R.T. Hicks Consultants, LTD
Project: Rio West EXP-06 **Work Order:** 0707207

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SW6010A									
Sample ID: MB		*MBLK*			Batch ID:	R24421	Analysis Date:	7/17/2007 2:58:11 PM	
Arsenic	ND	mg/L	0.020						
Barium	ND	mg/L	0.020						
Calcium	ND	mg/L	1.0						
Iron	ND	mg/L	0.020						
Magnesium	ND	mg/L	1.0						
Manganese	ND	mg/L	0.0020						
Potassium	ND	mg/L	1.0						
Sodium	ND	mg/L	1.0						
Zinc	ND	mg/L	0.050						
Sample ID: LCS		*LCS*			Batch ID:	R24421	Analysis Date:	7/17/2007 3:01:06 PM	
Arsenic	0.4711	mg/L	0.020	94.2	80	120			
Barium	0.4671	mg/L	0.020	93.4	80	120			
Calcium	48.38	mg/L	1.0	95.8	80	120			
Iron	0.4648	mg/L	0.020	91.8	80	120			
Magnesium	48.44	mg/L	1.0	95.8	80	120			
Manganese	0.4608	mg/L	0.0020	92.2	80	120			
Potassium	52.05	mg/L	1.0	94.6	80	120			
Sodium	52.08	mg/L	1.0	103	80	120			
Zinc	0.4723	mg/L	0.050	94.5	80	120			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: R.T. Hicks Consultants, LTD
Project: Rio West EXP-06 **Work Order:** 0707207

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SW6010A									
Sample ID: MB-13397		*MBLK*			Batch ID:	13397	Analysis Date:	7/18/2007 1:23:54 PM	
Barium	ND	mg/L	0.020						
Calcium	ND	mg/L	1.0						
Iron	ND	mg/L	0.050						
Magnesium	ND	mg/L	1.0						
Manganese	ND	mg/L	0.0020						
Potassium	ND	mg/L	1.0						
Sodium	ND	mg/L	1.0						
Zinc	ND	mg/L	0.050						
Sample ID: MB-13407		*MBLK*			Batch ID:	13407	Analysis Date:	7/19/2007 1:09:03 PM	
Barium	ND	mg/L	0.020						
Calcium	ND	mg/L	1.0						
Iron	ND	mg/L	0.050						
Magnesium	ND	mg/L	1.0						
Manganese	ND	mg/L	0.0020						
Potassium	ND	mg/L	1.0						
Sodium	ND	mg/L	1.0						
Sample ID: LCS-13397		*LCS*			Batch ID:	13397	Analysis Date:	7/18/2007 1:26:19 PM	
Barium	0.5183	mg/L	0.020	104	80	120			
Calcium	49.59	mg/L	1.0	99.2	80	120			
Iron	0.4870	mg/L	0.050	97.4	80	120			
Magnesium	48.79	mg/L	1.0	97.6	80	120			
Manganese	0.5179	mg/L	0.0020	104	80	120			
Potassium	51.25	mg/L	1.0	102	80	120			
Sodium	52.84	mg/L	1.0	106	80	120			
Zinc	0.5091	mg/L	0.050	102	80	120			
Sample ID: LCS-13407		*LCS*			Batch ID:	13407	Analysis Date:	7/19/2007 1:11:59 PM	
Barium	0.5166	mg/L	0.020	103	80	120			
Calcium	48.71	mg/L	1.0	97.4	80	120			
Iron	0.6808	mg/L	0.050	136	80	120			S
Magnesium	48.27	mg/L	1.0	96.5	80	120			
Manganese	0.5111	mg/L	0.0020	102	80	120			
Potassium	50.89	mg/L	1.0	102	80	120			
Sodium	51.12	mg/L	1.0	102	80	120			
Method: E160.1									
Sample ID: MB-13404		*MBLK*			Batch ID:	13404	Analysis Date:	7/17/2007	
Total Dissolved Solids	ND	mg/L	20						
Sample ID: LCS-13404		*LCS*			Batch ID:	13404	Analysis Date:	7/17/2007	
Total Dissolved Solids	1032	mg/L	20	102	80	120			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: R.T. Hicks Consultants, LTD
Project: Rio West EXP-06 **Work Order:** 0707207

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SW8260B									
Sample ID: 5ml rb		*MBLK*			Batch ID:	R24425	Analysis Date:	7/17/2007 8:32:36 AM	
Benzene	ND	µg/L	1.0						
Toluene	ND	µg/L	1.0						
Ethylbenzene	ND	µg/L	1.0						
Naphthalene	ND	µg/L	2.0						
Xylenes, Total	ND	µg/L	3.0						
Sample ID: 100ng lcs		*LCS*			Batch ID:	R24425	Analysis Date:	7/17/2007 9:39:17 AM	
Benzene	20.61	µg/L	1.0	103	82.4	128			
Toluene	18.80	µg/L	1.0	94.0	77.2	115			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

CHAIN-OF-CUSTODY RECORD

QA/QC Package: Std ☐ Level 4 ☐
Other:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: RT Hicks
Address: on-file
Phone #: 266-5004
Fax #: 266-0745

Project Name: Rio West EXP-06
Project #:
Project Manager: Andrew Parker
Sampler: Andrew Parker
Sample Temperature: 4

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No. 0702207	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)	Ion Balance	Filtered Metals + Mn, Fe, Ba	~~Total Dissolved~~ Metals + Mn, Fe, Ba	~~TRC/DRO~~ 8260-BTEX + MTBE	Air Bubbles or Headspace (Y or N) only
7/15	07:00	AQ	Rotary Table Discharge	705 mL	X	X		-1													X	X	X	X	
7/15	12:15	AQ	Road Discharge	705 mL	X	X		-2													X	X	X	X	

Date	Time	Relinquished By: (Signature)	Received By: (Signature)
7/16	09:50	[signature]	[signature] 7/16/07 09:50
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:
RUSH - ASAP