3R – 467 2003 AGWMR 04 / 17 / 2004



SAN JUAN DIVISION

March 17, 2004

Certified: 70993400001842167562

Bill Olson New Mexico Oil Conservation Division 2040 S. Pacheco Santa Fe, NM 87505

RE: 2003 Annual Groundwater Investigation and Remediation Reports San Juan Basin, New Mexico

Dear Mr. Olson:

As required in Burlington Resources' approved Groundwater Investigation and Remediation Plan dated August, 1998, enclosed are the 2003 annual reports for Burlington's groundwater impact sites in the San Juan Basin. Separate reports are enclosed for the following locations:

> Cozzens B#1 Hampton #4M Johnson Federal #4 Metering Station Maddox Com 1A Flora Vista Marcotte Pool Unit #1 Sategna #2

If you have questions or additional information is needed, please contact me at (505) 326-9537.

Sincerely,

Mm

Gregg Wurtz Sr. Environmental Representative

Attachments - Groundwater Investigation and Remediation Reports

cc:

Denny Foust - NMOCD Aztec WFS - Mark Harvey (Cozzens B#1, Hampton #4M) EPFS - Scott Pope (Johnson Fed. #4, Standard Oil Com.#1) Facility and Correspondence Files

3401 East 30th Street, 87402-8807, P.O. Box 4289, Farmington, New Mexico 87499-4289, Telephone 505-326-9700, Fax 505-326-9833

BURLINGTON RESOURCES 2003 ANNUAL GROUNDWATER REPORT

Marcotte Pool Unit 1

SITE DETAILS

Location: Unit Letter G, Section 08, Township 31N, Range 10W; San Juan County, New Mexico Land Type: Federal

2003 ACTIVITIES

Hydrocarbon impacted soil was discovered at Burlington Resources (BR) production location Marcotte Pool Unit 1 on 9/16/03. The impacted soil was discovered during excavation work to reset the production equipment. Remediation excavation and land treatment of impacted soils started 9/17/03.

The Marcotte Pool Unit #1 is located in the OCD determined vulnerable area. A second order ephemeral wash boarders the location approximately 30 yds. to the north. A seasonal irrigation ditch is located approximately 100 yds. to the west. The soils at the location area are mainly fine to coarse sands with minor amounts of cobbles and boulders. The ground water gradient is approximately west/southwest parallel to the adjacent stream coarse.

The attached facility maps (Attachment 1) display: 1) regional and general location layout; 2) perimeter of the excavation; 3) surface water features; 4) boring and well locations and 5) proposed source well MW-1 location.

The well has been producing oil and gas since Nov. 1953.

Soil Impacts

Approximately 3000 cubic yards of impacted soil was removed and land farmed on the adjacent Marcotte #2. Permission to landfarm was obtained from OCD and BLM (Attachment 2, BLM Sundry Notice). No soil was land farmed on the Marcotte Pool Unit 1 because of the limited area available on location. The land farmed soil will be tested to confirm soil is below OCD clean up standards and filled back into the excavation.

The vertical extent of contamination and the extent of the excavation was determined by the depth to ground water. Soils were excavated down to ground water at approximately 30 feet below grade. The vertical extent of contamination appears to stop at the ground water table. A black organic decaying gravel layer marks the extent of vertical soil impacts approximately 6 inch in depth above the water table . Soils below this layer were water saturated and no hydrocarbons were detected in the field. The horizontal extent of contamination detector was used for field-testing. Soil samples collected during soil boring were using a split spoon sampler every 2.5 feet . The four soil borings were used to determine the northwest, west and southwest extent of contamination (Attachment 3). Soil samples collected from the sides of the excavation determined the horizontal extent on the north, northeast, and east sides of the location. An x-section of the soil contamination plume approximates the shape of a bell at depth with the top of the bell at the source of contamination , the old earth pit, and the bottom of the bell at the ground

water surface. The contamination spread at depth to form the sides of the bell. The soil contamination spread furthest from the source directly above the water table (i.e., vadose zone). The soil borings, Boring 3 and Boring 4 were completed into downgradient monitoring wells, monitoring wells MW-2 and MW-3. An additional source well (MW-1) and soil borings are proposed and will be used to confirm the north, northeast and southeast limits of contamination. Production equipment and the lack of open space prevented the subsequent drilling to start until backfilling the excavation in 2004. Boring logs and well diagrams are provided for the work completed in 2003 (Attachment 4).

Ground Water Impacts

Observations of the water in the bottom of the open excavation showed minor free phase hydrocarbons during excavation activities. Water and oil was removed from the open excavation using a pump truck over a period of 2 months as the excavation recharged. Prior to backfilling the excavation no free phase hydrocarbons were visible on the water surface in the excavation.

The downgradient extent of the groundwater contamination was defined by the monitoring wells (MW-2 and MW-3) located down gradient of the excavation. These wells where first sampled in October 2003 for a general list of water quality parameters and BTEX and then subsequently for BTEX only. No constituents of concern were detected in the general or BTEX analysis (Attachment 5).

CONCLUSIONS

The analytical results of groundwater sampling in 2003 from the downgradient wells show that levels of benzene, toluene, ethylbenzene, total xylenes and general water quality parameters are below the New Mexico Groundwater Standards in all wells.

RECOMMENDATIONS

- Installation of the source well MW-1 and additional soil boring to the east to confirm soil clean up levels have been reached.
- Burlington Resources proposes to continue quarterly sampling at this site and submit for closure after four quarters of below standard results.

Attachments:Attachment 1 Site Maps
Attachment 2 BLM Sundry
Attachment 3 Soil sample analytical results
Attachment 4 Drilling Log/Wellbore Diagrams
Attachment 5 2003 Ground water sampling and analysis results

Attachment 1

Site maps

S: / grndwatr/GW-Sites/JohnFed#4/99Annual.doc









Attachment 2

BLM Sundry

S: / grndwatr/GW-Sites/JohnFed#4/99Annual.doc

submitted in lieu of Form 3160-5

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

	Sundry Notices and Reports on Wells		
•		5.	Lease Number NMSF078604
1. T y	pe of Well	6.	If Indian, All. or Tribe Name
	GAS	7.	Unit Agreement Name
-	me of Operator		-
B	URLINGTON		
	RESOURCES OIL & GAS COMPANY		
		8.	
	dress & Phone No. of Operator O Box 4289, Farmington, NM 87499 (505) 326-9700	9.	Marcotte #2 API Well No.
F	0 BOX 4209, Falmington, MA 07499 (303, 320 9700	2.	30-045-29466
	cation of Well, Footage, Sec., T, R, M	10.	Field and Pool
15	40'FSL, 935'FEL, Sec.8, T-31-N, R-10-W, NMPM	11	Wildcat Morrison County and State
			San Juan Co, NM
	HECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE,		DATA
ту	pe of Submission Type of Action X Notice of Intent Abandonment	Change of Pla	ins
	Recompletion	New Construct	ion
	Subsequent Report Plugging Back	Non-Routine H Water Shut of	Tracturing
	Final Abandonment Casing Repair Final Abandonment Altering Casing		
	X_ Other -		5
	<pre>It is intended to move impacted soil from the Marcotte Background: The Marcotte #1 and the Marcotte #2 are in the same Me The wells share the same spacing unit and are on fee if Work start date 9/22/03 The duration of the soil being placed on the Marcotte The impacted soils will be generated from a soil reme Marcotte #1. The soils will be transported within two weeks across starting 9/22/03. Landfarm every 2 weeks. The area used for landfarming We will conduct the Landfarming operations in accordance regulations. Soils will be land farmed on location to expedite the soil Upon successful remediation the excavated soils will be at the Marcotte #1 or a suitable environmentally approx</pre>	esaverde spacir land #2 is a maximu diation excavat gravel/soil of will be ½ to f nce with applic natural remedi be returned to	ng unit. Im of 1 year tion activity at the il and gas lease roads acre. table OCD and BLM dation of the impacted the original excavation
•	Approximate amount of soils to be moved to the Marcot	te #2 is 1000-:	
14.	I hereby certify that the foregoing is true and com	rrect.	
	d Tammy Winsold (GW & EH) Title Regular	tory Specialis	st_Date 9/22/03
	space for Federal or State Office use) VED BYTitle	Date	
Title 18	TION OF APPROVAL, if any: U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make tates any false, fictitious or fraudulent statements or representations as to any matt	to any department or a er within its jurisdic	gency of the tion.

Attachment 3

Soil Sample Analytical Results

S: / grndwatr/GW-Sites/JohnFed#4/99Annual.doc



Pinnacle Lab ID number October 23, 2003 310026

MARTIN NEE 26 CR 3500 FLORA VISTA, NM 87415

BURLINGTON RESOURCES P.O. BOX 4289 FARMINGTON, NM 87499

Project NameMARCOTE POOLProject Number(NONE)

Attention: MARTIN NEE/GREGG WURTZ

On 10/02/03 Pinnacle Laboratories Inc., (ADHS Lincense No. AZ0643), received a request to analyze **non-aq** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

H. Mitchell Rubenstein, Ph.D. General Manager, Pinnacle Laboratories, Inc.

MR: jt

Enclosure



3

CLIENT	: MARTIN NEE	PINNACLE ID	: 310026
PROJECT #	: (NONE)	DATE RECEIVED	: 10/02/03
PROJECT NAME	: MARCOTE POOL	REPORT DATE	: 10/23/03
PINNACLE			DATE
ID #	CLIENT DESCRIPTION	MATRIX	COLLECTED
310026 - 01	MARCOTE BH-1, 28.5'-29'	NON-AQ	09/30/03
310026 - 02	MARCOTE BH-2, 33'-35'	NON-AQ	09/30/03
310026 - 03	MARCOTE BH-3, 26'-28'	NON-AQ	09/30/03
310026 - 04	MARCOTE BH-4, 25'-27'	NON-AQ	10/01/03
010020 - 04		NON-AQ	10/01/03

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GAS CHROMATOGRAPHY RESULTS

TEST CLIENT PROJECT # PROJECT NAME	: EPA 8021B MOI : MARTIN NEE : (NONE) : MARCOTE POC		5B GRO	ł	PINNACLE I.D. ANALYST	
SAMPLE			DATE	DATE	DATE	DIL.
ID. # CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR
01 MARCOTE BH-	1, 28.5'-29'	NON-AQ	09/30/03	10/07/03	10/09/03	1
02 MARCOTE BH-	2, 33'-35'	NON-AQ	09/30/03	10/07/03	10/09/03	2
03 MARCOTE BH-	3, 26'-28'	NON-AQ	09/30/03	10/07/03	· 10/08/03	1
PARAMETER	DET. LIMIT	UNITS		MARCOTE BH- 1, 28.5'-29'	MARCOTE BH- 2, 33'-35'	MARCOTE BH- 3, 26'-28'
FUEL HYDROCARBONS 10		MG/KG		< 10	79	< 10
HYDROCARBON RANGE				C6-C10	C6-C10	C6-C10
HYDROCARBONS QUANTI	TATED USING			GASOLINE	GASOLINE	GASOLINE
BENZENE	0.025	MG	/KG	< 0.025	< 0.050	< 0.025
TOLUENE	0.025	MG	/KG	< 0.025	< 0.050	< 0.025
ETHYLBENZENE	0.025	MG	/KG	< 0.025	0.37	< 0.025
TOTAL XYLENES	0.050	MG	/KG	< 0.050	1.7	< 0.050
SURROGATE: BROMOFLUOROBENZENE SURROGATE LIMITS			90	113	86	

CHEMIST NOTES: N/A



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GAS CHROMATOGRAPHY RESULTS

TEST CLIENT PROJECT # PROJECT NAME	: EPA 8021B MOI : MARTIN NEE : (NONE) : MARCOTE POO		5B GRO	Ρ	INNACLE I.D. ANALYST		
SAMPLE			DATE	DATE	DATE	DIL.	
ID. # CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR	
04 MARCOTE BH	-4, 25'-27'	NON-AQ	10/01/03	10/07/03	10/08/03	1	
PARAMETER	DET. LIMIT	UN	IITS	MARCOTE BH- 4, 25'-27'	· · · · ·		
FUEL HYDROCARBONS HYDROCARBON RANGE HYDROCARBONS QUANTI	10 TATED USING	MG)/KG	< 10 C6-C10 GASOLINE	· ·		
BENZENE TOLUENE ETHYLBENZENE TOTAL XYLENES	0.025 0.025 0.025 0.050	MG MG	6/KG 6/KG 6/KG 6/KG	< 0.025 < 0.025 < 0.025 < 0.050			
SURROGATE: BROMOFLUOROBENZENE SURROGATE LIMITS	(%) (65 - 120)			92			

CHEMIST NOTES: V/A

Attachment 4 Drilling Log/Wellbore Diagrams

WELL DEVELOPMENT AND SAMPLING LOG

Sampling Method: Submersible Pump Centrifugal Pump Peristaltic Pump Other

Bottom Valve Bailer x Double Check Valve Bailer 🗆 Stainless-Steel Kemmerer

Criteria: 3 to 5 Casing Volumes of Water Removal X stabilization of Indicator Parameters X Other: or bail dry

Water Volur		
Gallons	Ounces	Gal/oz to be removed
1.61 x 3		4.84
	Gallons	

Time (military)	pH (su)	SC (umhos/cm)	Temp (°C)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
1607	7.47	2400	19.6			an a	1	Silty, brown
	7.46	2250	18.0				2	Silty, brown
	7.39	2260	17.4				3	Silty, brown
	7.36	2240	17.9				4	Silty, brown
1624	7.48	2260	17.6			····	5	Silty, brown
						William and an and a second		
<u></u>			* • • • • • • • • • • • • • • • • • • •					

Final:							Ferrous		
Time	рН	SC	Temp	Eh-ORP	D.O.	Turbidity	Iron	Vol Evac.	Comments/Flow Rate
<u>1624</u>	7.48	2260	17.6					5	Silty, brown

COMMENTS:

INSTRUMENTATION:	pH Meter X		Temperature Meter x
	DO Monitor		Other
Condu	ctivity Meter X	Window	
Water Disposal onsite	Sample ID <u>Marcote 1</u>	1 MW-2	Sample Time <u>1630</u>
BTEX VOCs Alkalinity	TDS Cations	Anions Nitrate Nitri	te Ammonia TKN NMWQCC Metals Total
Phosphorus		•	
MS/MSD	BD	BD Name/Time	ТВ

WELL DEVELOPMENT AND SAMPLING LOG

	marcher	
Project No.: <u>30001.0</u>	Project Name: Burlington Flera-Vista	Client: Burlington Resources
Location:_Marcote Pool Unit 1	Well No: <u>MW-3</u>	Development Sampling
Project ManagerMJN	Date <u>10/6/03</u> Start Time	1458 Weather sunny 80s
Depth to Water <u>30.74</u>	Depth to Product <u>na</u> Product Thickness <u>na</u>	Measuring PointOC
Water Column Height 8.28	Well Dia2"	

Sampling Method: Submersible Pump Centrifugal Pump Peristaltic Pump Other

Bottom Valve Bailer x Double Cl

Double Check Valve Bailer
Stainless-Steel Kemmerer

.

Criteria: 3 to 5 Casing Volumes of Water Removal X stabilization of Indicator Parameters X Other____

Water Volur		
Gallons	Ounces	Gal/oz to be removed
1.32 x 3		3.79
-	Gallons	

Time (military)	pH (su)	SC (umhos/cm)	Temp (°C)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate	
1507	7.16	2230	19.1				0.5	muddy, brown, good flow to well	very
	7.26	2150	18.4				1	muddy, brown, good flow to well	very
	7.31	2130	17.9			•	1.5	muddy, brown, good flow to well	very
	7.17	2270	18.0	-			5	muddy, brown, good flow to well	very
	7.38	2220	17.4				10	muddy, brown, good flow to well	very
	7.48	2240	17.1			· · · · · · · · · · · · · · · · · · ·	15	muddy, brown, good flow to well	very
<u>1603</u>	7.38	2390	17.3				20	muddy, brown, good flow to well	very
<u>1617</u>	7.42	2330	17.3			······································	30	muddy, brown, good flow to well	very

Final:							Ferrous		
Time	pН	SC	Temp	Eh-ORP	D.O.	Turbidity	Iron	Vol Evac.	Comments/Flow Rate
<u>1617</u>	7.42	2330	17.3					30	muddy, brown, very good
									flow to well

COMMENTS:	
INSTRUMENTATION: pH Meter X	Temperature Meter x
DO Monitor	Other
Conductivity Meter X	
Water Disposal onsite Sample ID NA	Sample Timena
BTEX VOCs Alkalinity TDS Cations Anion	s Nitrate Nitrite Ammonia TKN NMWQCC Metals Total Phosphorus
MS/MSDBD	BD Name/Time TB

Borehole 1

Lodestar Services, Inc

PO Box 3681 Farmington, New Mexico 87499 (505) 334-2791

Borehole Location W	NW of former pit
GWL Depth	-29
Logged By MJN	
Drilled By Terra	con
Date/Time Started	9/30/2003 0800 hrs
Date/Time Completed	9/30/2003 1043 hrs

Page 1 of 1

 Project Name
 Burlington Resources Marcote Pool Unit 1

 Project Number
 30003
 Phase

 Project Location
 1 mile south of Dutchman's Hill transfer

station Well Logged By <u>M Nee</u> Personnel On-Site <u>R Thor</u>

 Weil Logged By
 M Nee

 Personnel On-Site
 R Thompson, Tony

 Contractors On-Site
 Terracon

 Client Personnel On-Site
 G Wurtz

Drilling Method Mobile B59 Hollow Stem Auger Air Monitoring Method Photo Vac 2020

1		Contalo		r	Dist				
Depth	Sample	Sample Type &	Sample Description	USCS	Depth	A.1.		-t	Delline Ore divisors
(Feet)	Interval		Classification System: USCS		Lithology		Monitor	-	Drilling Conditions
(reet)	IIIterval	Recovery (inches)	Classification system: 0505	Symbol	Change (feet)	BZ	Inits: NC BH	s s	& Blow Counts
0		(mones)	and the second		(leet)	DL	БЛ		
r `		Split	0-13 ' Sand, Moderate Yellow Brown, Sand			0			
		spoon	is fine to medium grained, poorly sorted,			Ŭ			
		spoon	unconsolidated.					ľ	
	3.5	12	unconsonaatea.						
5	5.5	12							
	6.7	14							
	0.7	14							
	7.9	16							
	1.5	10							
10	9.11	16							
	9.11	10	minor gravel and cobble in sample at 10.5-						
	11-13	16	12.5						
	11-13	10	12.5						
	13.15	18	13-25' Sand, moderate yellow brown, very						
15	13.13	10	fine, minor small <1" silt stringers,						
	15.17	20	moderate sorted, unconsolidated. Minor						
	15.17	20	silt 16.17'						
	17.19	20	Silt 10-17						
	17.19	20							
20	19.21	24							
	19.21	24							
I	01.00	24							
	21.23	24							
	02.05	20							
- 25	23.25	20							
	25.27	16							
	20.21	10	25-28.5 Sand, coarse, minor gravel, well						
	27-29	12	sorted, moisture increasing, saturated at						
	21.29	12	28' 28 5 20 0 Silbu day Jamas Islandu						
- 30	29.31	12	28.5-30.0 Silty clay lense, black						
30	29.31	12	20.21 Owned black activity of with						
			30-31, Gravel, black, saturated, with						
			cobbles			0			Refusal in cobbles/gravel
			TD 211						31'
- 35			TD 31'						
³⁵									
] ┝ │									
40									
L 40									
	1		en miesten bekendet bekendet beren en er benedels alle op en men en ander en e		1				

Comments:

Borehole 2

Lodestar Services, Inc

PO Box 3681 Farmington, New Mexico 87499 (505) 334-2791

Elevation	
Borehole Location W	est of former pit
GWL Depth	-33
Logged By MJN	
Drilled By Terra	con
Date/Time Started	9/30/2003 1116 hrs
Date/Time Completed	9/30/2003 1340 hrs

Page 1 of 1

Project Name Burlington Resources Marcote Pool Unit 1 Project Number 30003 Phase 1 mile south of Dutchman's Hill transfer **Project Location** station Well Logged By M Nee Personnel On-Site R Thompson, Tony Contractors On-Site Terracon G Wurtz Client Personnel On-Site

Drilling Method Mobile B59 Hollow Stem Auger Air Monitoring Method Photo Vac 2020

Depth (*eet) Sample Interval (*eet) Sample Becomp (betwal Recovery Sample Description Classification System: USCS Depth USCS Depth USCS Air Monitoring Units: NUU (*eet) Dulling Conditions & Blow Counts 0 (\$)					Anne as a way the first distribution of a surger second as providing and the second second statements where the			************			
(Feet) Interval Recovery (50) Classification System: USCS Symbol Change (693) Units: NUL BZ BH S				Sample			Depth				
0 (%) (%) (%) 82 PH 8 0 \$ Split spoon 0.23' Sand moderate yellow brown, coarse to fine moderately sorted, unconsolidated, minor cobble/gravel. 0 0 0 0 5 0 0 0 0 0 0 0 10 0 0 0 0 0 0 0 15 0 0 0 0 0 0 0 20 25.27 90 27.29' fine-very fine sand, unconsolidated, well sorted. 0 0 0 0 25 25.27 90 27.29. fine-very fine sand for 1' then into brown stiff clay to 36', some black marbieing 28.5.29 0 0 552 30 29.31 100 30.31, Gravel, black, saturated, with cobbles 0 552 35 33.35 100 36-36.5, coarse sand, saturated, black, well sorted, unconsolidated. 0 552	Depth	S	ample	Type &	Sample Description	USCS	Lithology	Ai	r Monito	ring	Drilling Conditions
0 (%) Constrained 0 RZ BH S 5 Split 0-23' Sand moderate yellow brown, coarse to fine moderately sorted, unconsolidated, minor cobble/gravel. 0<	(Feet)	In	iterval	Recovery	Classification System: USCS	Symbol	Change	ι (Jnits: N	DU	& Blow Counts
0 Split 0-23' Sand moderate yellow brown, coarse to fine moderately sorted, unconsolidated, minor cobble/gravel. 0 5 0 0 10 0 11 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 11 0 12 0 20 27.29' fine-very fine sand, unconsolidated, will sorted. 21 27.29 22 27.29 23 27.29 24 27.29 25 27.29 26 27.29 27 20 27 20 28 27.29 29 95 anableing 28.5-29 30 29.31 30 29.31 31.33 100 36-36.5, coarse sand, saturated, with cobbles 35 0 35.37 100 36-36.5, coarse sand, saturated, black, well sorted.						-					
Split 0-23' Sand moderate yellow brown, coarse spoon 0 5 0 0 5 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 25 90 27-29 fine-very fine sand, unconsolidated, well sorted, 27-29, olay, then very fine sand for 1' then into brown stiff clay to 36', some black 0 100 30-31, Gravel, black, saturated, with cobbles 0 30 100 36-36-5, coarse sand, saturated, black, with cobblack 0	0			(107)						-	
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5 minor cobble/gravel. no no< no<<!--</td--><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>v</td><td></td><td></td><td></td>								v			
5 23.25 90 27.29' fine-very fine sand, unconsolidated, well sorted. 20 23.25 90 27.29' fine-very fine sand, unconsolidated, well sorted. 25 25.27 90 27.29, clay, then very fine sand for 1" then into brown stiff clay to 36', some black marbleing 28.5-29 30 27.29 95 marbleing 28.5-29 30 29.31 100 30.31, Gravel, black, saturated, with cobbles 0 31.33 100 35.37 100 36.36.5, coarse sand, saturated, black, well sorted, unconsolidated. 0				shoon						Į	
10 10 15 15 20 23-25 90 25 25-27 90 25 25-27 90 25 27-29, day, then very fine sand, unconsolidated, well sorted. 27-29 95 and bernown stiff day to 36, some black marbleing 28.5-29 30 29-31 31-33 100 35 33-35 35-37 100 36-36.5, coarse sand, saturated, black, well sorted. 0 582 2750 0 36-36.5, coarse sand, saturated, black, well sorted.					minor cobbie/gravel.						
10 10 15 15 20 23-25 90 25 25-27 90 25 25-27 90 25 27-29, day, then very fine sand, unconsolidated, well sorted. 27-29 95 and bernown stiff day to 36, some black marbleing 28.5-29 30 29-31 31-33 100 35 33-35 35-37 100 36-36.5, coarse sand, saturated, black, well sorted. 0 582 2750 0 36-36.5, coarse sand, saturated, black, well sorted.											
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well sorted, unconsolidated.		1 3.	<u>, , , , , , , , , , , , , , , , , , , </u>		26.26 E popros cond acturated blast					v	
	Ⅰ ⊢ ∮	-									
	Ⅰ⊢ ∣										
					36.5⋅37, clay						
40 TD-37	40				TD-37						
		<u> </u>									

Comments:

Borehole logged on cutting returns from 0-23 feet beneath ground surface.

Borehole 3, MW-3

Lodestar Services, Inc

PO Box 3681 Farmington, New Mexico 87499 (505) 334-2791

Elevation	
Borehole Location W	est of BH-2
GWL Depth	27.1
Logged By MJN	
Drilled By Terra	
Date/Time Started	9/30/2003 1359 hrs
Date/Time Completed	9/30/2003 1730 hrs

 Project Name
 Burlington Resources Marcote Pool Unit 1

 Project Number
 30003
 Phase

 Project Location
 1 mile south of Dutchman's Hill transfer station

 Well Logged By
 M Nee

 Personnel On-Site
 R Thompson, Tony

 Contractors On-Site
 G Wurtz

Page

1

of 1

Drilling Method Mobile B59 Hollow Stem Auger Air Monitoring Method Photo Vac 2020

Depth (Feet)	Sample Interval	1	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)		ir Monito Units: N BH		Drilling Conditions & Blow Counts
		Split spoon	0-34' Sand moderate yellow brown, fine to medium grains, moderately well sorted, unconsolidated.			0			
20	20-22 22-24	95 95				0		0	
25 	24-26 26-28 28-30	95 85 90	Saturated at 27.5			0 0 0		0 1.9 0	
			34-37 Cobbles						34-37 rough drilling,
40			TD-37						cobbles Refusal at 37'

Comments:

Borehole logged on cutting returns from 0-20 and 30-37 feet beneath ground surface. Groundwater at 27.1' beneath ground surface at 1600 hrs.

Borehole 4, MW-2

Project Name

Lodestar Services, Inc

PO Box 3681 Farmington, New Mexico 87499 (505) 334-2791

Т

Elevation Borehole Location North northwest of pit. GWL Depth 26.3 Logged By MJN Drilled By Terracon Date/Time Started 10/1/2003 0820 hrs Date/Time Completed 10/1/2003 1600 hrs

Project Number 30003 Phase 1 mile south of Dutchman's Hill transfer Project Location station Well Logged By M Nee R Thompson, Tony Personnel On-Site Contractors On-Site Terracon **Client Personnel On-Site** G Wurtz Mobile B59 Hollow Stem Auger hod Photo Vac 2020 **Drilling Method**

Page

1

Burlington Resources Marcote Pool Unit 1

of 1

 MJN
 Client Personnel On-Sit

 Terracon
 0/1/2003 0820 hrs

 d
 10/1/2003 1600 hrs

 Ieted
 10/1/2003 1600 hrs

 Sample
 Depth

Depth (Feet)		ample iterval	Sample Type & Recovery (inches)	Sample Description	USCS Symbol	Depth Lithology Change (feet)		ir Monito Units: N BH	Drilling Conditions & Blow Counts
			Split spoon	0-23.5' Sand, moderate yellow brown, fine to coarse grains, moderately sorted, unconsolidated.			0		
20							5		
25	23	3-25	6	23.5-34 gravel/sand/cobble					Poor recovery due to
25	25	-27	8						cobbles cobbles/gravel/sand,
	27	.29	8	Saturated at 26.3					saturated at bottom coarse sand, gravel, and
30 							0		cobbles in spoon. No cuttings beneath 34 feet. Lithology based on material on auger flights after retrevial
35 				34-38.5 Clay, gray					
40				TD-38.5					



borehole logged on cuttings from 0-23 feet. Water level at 26.3' @ 1004

MONITORING WELL INSTALLATION RECORD

10/1//03 0820

10/1/03 1600

Lodestar Services, Inc PO Box 3861 Farmington, New Mexico 87499 (505) 334-2791

Elevation

Well Location **GWL** Depth

Date/Time Started

Date/Time Completed

Installed By

Borehole	# _		3
Well #			3
Page	1	of	1

co 87499	Project Name	Burlington Resources Flora Vista 1
	Project Number	30003.0 Cost Code
	Project Location	1 mi south of Dutchman's Hill transfer station
	On-Site Geologist	M. Nee
West of fromer pit	Personnel On-Site	R. Thompson, Tony
26.30' beneath ground surface	Contractors On-Site	Terracon
Terracon	Client Personnel On-Site	G. Wurtz

Depths in Reference	to Ground Surface				n fan skriuwe se weer weer weer de seere en weer weer weer weer weer weer we	
Item	Material	Depth (feet)	F.		Top of Protective Casing	2.83
Top of Protective Casing	Flush to grade	2.83			Top of Riser	2.83
Bottom of Protective Casing	vault	-2.17			Ground Surface	0.0
Top of Permanent Borehole Casing		na				
Bottom of Permanent Borehole Casing		na				
Top of Concrete	2 bags quickcrete	0.31				
Bottom of Concrete		0.0				
Top of Grout	5 96# bags portland	0.0				
Bottom of Grout	with 5% bentonite chips	-16.33				
Top of Well Riser	2" flush threaded	2.83				
Bottom of Well Riser	schedule 40 pvc	-23.06				
Top of Well Screen	10 slot schedule 40	-23.06		200	Top of Seal	-16.33
Bottom of Well Screen	flush threaded pvc	-38.06				
Top of Peltonite Seal	1 bag 3/8 bentonite	-16.33	∞	$\overline{\alpha}$		
Bottom of Peltonite Seal	chips	-18.67	∞	$ \infty $	Top of Gravel Pack	-18.67
Top of Gravel Pack	8 #50 bags 10-20	-18.67			Top of Screen	-23.06
Bottom of Gravel Pack	silica sand	-37.5	F			
Top of Natural Cave-In		-37.5	E			
Bottom of Natural Cave-In		-38.5				
Top of Groundwater		-30.74			Bottom of Screen	-38.06
Total Depth of Borehole		-38.5			Bottom of Borehole	-38.5

Comments: Water level is 30.74 beneath top of casing

MONITORING WELL INSTALLATION RECORD

Lodestar Services, Inc PO Box 3861 Farmington, New Mexico 87499 (505) 334-2791

El

ElevationWell LocationNorth northwest of former pitGWL Depth27.00' beneath ground surfaceInstalled ByTerraconDate/Time Started9/30//03 0800Date/Time Completed9/30//03 1730

 Borehole #
 4

 Well #
 2

 Page 1
 of 1

	Project Name	Burlington Resources Flora Vista 1
	Project Number	30003.0 Cost Code
	Project Location	1 mi south of Dutchman's Hill transfer station
44	On-Site Geologist	M. Nee
est of former pit	Personnel On-Site	R. Thompson, Tony
1 ground surface	Contractors On-Site	Terracon
	Client Personnel On-Site	G. Wurtz

Depths in Reference	e to Ground Surface				na na serie de la constante de	9999-9999 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1
Item	Material	Depth (feet)	F		Top of Protective Casing	g 2.67
Top of Protective Casing	Flush to grade	2.67			Top of Riser	2.67
Bottom of Protective Casing	vault	-2.33			Ground Surface	0.0
Top of Permanent Borehole Casing		na			-	
Bottom of Permanent Borehole Casing		na				
Top of Concrete	2 bags quickcrete	0.31				
Bottom of Concrete		0.0				
Top of Grout	5 96# bags portland	0.0				
Bottom of Grout	with 5% bentonite chips	-12.75				
Top of Well Riser	2" flush threaded	2.67				
Bottom of Well Riser	schedule 40 pvc	-22.04				
Top of Well Screen	10 slot schedule 40	-22.04	∞	∞	Top of Seal	-14.6
Bottom of Well Screen	flush threaded pvc	-37.04			-	
Top of Peltonite Seal	1 bag 3/8 bentonite	-14.60	000			
Bottom of Peltonite Seal	chips	-17.60	\sim	000	Top of Gravel Pack	-17.6
Top of Gravel Pack	9.5 #50 bags 10-20	-17.60			Top of Screen	-22.04
Bottom of Gravel Pack	silica sand	-34.25		7	-	:
Top of Natural Cave-In		-34.25]		
Bottom of Natural Cave-In		-37.00				
Top of Groundwater		-27.00			Bottom of Screen	-37.04
Total Depth of Borehole		-37.04	1		Bottom of Borehole	-37.04

Comments: Water level is 28.76 beneath top of casing

Geologist Signature

Attachment 5

2003 Ground water sampling and analysis results

S: / grndwatr/GW-Sites/JohnFed#4/99Annual.doc

Table 1 Marcot Pool Unit 1 Groundwater Monitoring Well Sampling

		Sample	В	Т	E	Х	BTEX	DTW (1)	Comments
Well Name	MW #	Date	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ft)	
Standard			10	750	750	620			
Marcote Pool Unit 1	1	Well not ins	talled open	excavation					
	2	10/6/2003	U	U	U	U	U	29.71	muddy brn, very good well flow
		12/16/2004	0.4JJ	U	U	U	0.4J	30.09	Brown muddy
			m.						
	3	10/6/2003	U	0.2J	U	U	0.2J	30.74	Silty, Brown
		12/16/2004	0.5J	U	U	U	0.5J	34.14	Silty Muddy
								<u> </u>	

J= Analyte concentration detected at a value between MDL and PQL

(1) measured from top of casing

B Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493 ETTER port to: Address: Directory npany: Context on the state of the state	s: 24×8500 500×1500 $505 \times 324 \times 791$ 500×4289 500×4289 500×4289 505×326900 505×326000 505×326000 505×326000 505×326000 505×3260000 505×3260000 505×326000000 505×3260000000 505×32600000000 505	(800) 334-5493 Address: \swarrow (R 3500 $F(m)$ $F(m)$ (R 87415 $relephone:$ 505 334 \Rightarrow 791 R $E-mail:$ $relephone:$ 505 334 \Rightarrow 791 R	2773 Downhill Drive Steamboat Springs, CO 80497 (800) 334-3493 Address: 24 CR_35500 Report to: Float Link and the second sec	rs Downhill Drive Steamboat Springs, CO 80487 (port to: me: Martin Lea mpany: Leatesta	300) 334-5493						CU	SIUL
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				Matrix SW (Surface Water) · GW (Ground Water) · WW	(Waste Water) · DW	(Drinkin	g Water) · SL (S	udge) · S	O (Soll)	· OL (Oil)) · Other (Sp
Image: Switch of the second	Water) · SL (Sludge) · SO (Soli) · OL (OII) · Other (String)	V (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Spec	Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soll) · OL (Oil) · Other (Sp	MARKS								
				Matrix SW (Surface Water) · GW (Ground Water) · WW MARKS Ren Burlington And) · SL (SI	udge) · S	0 (S	oll)	oli) · OL (Oli
											1	
								┢───				<u>†</u> −-†-

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L43323: Page 13 of 13

ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

October 30, 2003

Gregg Wurtz Burlington Resources, Inc. 3401 E. 30th St. PO BOX 4289 Farmington, NM 87402-4289

Project ID: ACZ Project ID: L43323

Gregg Wurtz:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 10, 2003. This project has been assigned to ACZ's project number, L43323. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 10.0. The enclosed results relate only to the samples received under L43323. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

This report shall be used or copied only in it's entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 30, 2003. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years. Please notify your Project Manager if you have other needs.

If you have any questions, please contact your Project Manager or Customer Service Representative.

sur

30/Oct/03

Sue Barkey, Project Manager, has reviewed and approved this report in its entirety.





REPAD.01.11.00.01

L43323: Page 1 of 13

ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Burlington Resources, Inc.

Project ID: M P Unit 1 MW-2 Sample ID:

Inorganic Analytical Results

ACZ Sample ID:	L43323-01
Date Sampled:	10/08/03 16:30
Date Received:	10/10/03
Sample Matrix:	Ground Water

Metals Analysis								
Parameter	EPA Method	Result	Qual X	Q Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M200.8 ICP-MS	0.0036		mg/L	0.0001	0.0005	10/24/03 8:49	jb
Barium, dissolved	M200.7 ICP	0.047		mg/L	0.003	0.01	10/31/03 19:57	wfg
Cadmium, dissolved	M200.8 ICP-MS	0.0001	В	mg/L	0.0001	0.0005	10/24/03 8:49	jb
Calcium, dissolved	M200.7 ICP	266		mg/L	0.2	1	10/29/03 14:52	scp
Chromium, dissolved	M200.8 ICP-MS	0.0008		mg/L	0.0001	0.0005	10/24/03 8:49	jb
Copper, dissolved	M200.8 ICP-MS	0.0021	В	mg/L	0.0005	5 0.003	10/24/03 8:49	jb
Iron, dissolved	M200.7 ICP	0.98		mg/L	0.01	0.05	10/31/03 19:57	wfg
Magnesium, dissolved	M200.7 ICP	34.9		mg/L	0.2	1	10/29/03 14:52	scp
Manganese, dissolved	M200.7 ICP	2.390		* mg/L	0.005	0.03	10/31/03 19:57	wfg
Potassium, dissolved	M200.7 ICP	1.6		mg/L	0.3	1	10/31/03 19:57	wfg
Sodium, dissolved	M200.7 ICP	419		mg/L	0.3	1	10/31/03 19:57	wfg
Zinc, dissolved	M200.7 ICP	0.02	В	mg/L	0.01	0.05	10/29/03 14:52	scp
Wet Chemistry								
Parameter	EPA Method	Result	Qual X	Q Units	MDL	POL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration							
Bicarbonate as		302		mg/L	2	10	10/22/03 0:00	mah
CaCO3								
Carbonate as CaCO	3		U	mg/L	2	10	10/22/03 0:00	mah
Hydroxide as CaCO3	3		U	mg/L	2	10	10/22/03 0:00	mah
Total Alkalinity		302		mg/L	2	10	10/22/03 0:00	mah
Cation-Anion Balance	Calculation							
Cation-Anion Balance)	-0.7		%			10/30/03 0:00	calc
Sum of Anions		35.4		meq/L	0.1	0.5	10/30/03 0:00	calc
Sum of Cations		34.9		meq/L	0.1	0.5	10/30/03 0:00	calc
Chloride	M325.2 - Colorimetric	45		mg/L	1	5	10/22/03 20:09	kmc
Conductivity @25C	M120.1 - Meter	2230		umhos/cm	1	10	10/22/03 0:10	mah
Lab Filtration	SM 3030 B						10/21/03 10:21	lms
Lab Filtration & Acidification	SM 3030 B						10/14/03 11:24	scp
pH (lab)	M150.1 - Electrometric	7.9	н	units	0.1	0.1	10/22/03 0:10	mah
Sulfate	M375.3 - Gravimetric	1340		mg/L	50	300	10/28/03 8:22	lms

ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO 80487(800) 334-5493

Burlington Resources, Inc.

Project ID: Sample ID: M P Unit 1 MW-3

Inorganic Analytical Results

ACZ Sample ID:	L43323-02
Date Sampled:	10/08/03 17:00
Date Received:	10/10/03
Sample Matrix:	Ground Water

Metals Analysis								
Parameter	EPA Method	Result	Qual XQ	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M200.8 ICP-MS	0.0012		mg/L	0.0001	0.0005	10/24/03 8:55	jb
Barium, dissolved	M200.7 ICP	0.037		mg/L	0.003	0.01	10/31/03 20:09	wfg
Cadmium, dissolved	M200.8 ICP-MS		U	mg/L	0.0001	0.0005	10/24/03 8:55	jb
Calcium, dissolved	M200.7 ICP	262		mg/L	0.2	1	10/29/03 14:55	scp
Chromium, dissolved	M200.8 ICP-MS	0.0012		mg/L	0.0001	0.0005	10/24/03 8:55	jb
Copper, dissolved	M200.8 ICP-MS	0.0017	В	mg/L	0.0005	0.003	10/24/03 8:55	jb
Iron, dissolved	M200.7 ICP	0.47		mg/L	0.01	0.05	10/31/03 20:09	wfg
Magnesium, dissolved	M200.7 ICP	34.5		mg/L	0.2	1	10/29/03 14:55	scp
Manganese, dissolved	M200.7 ICP	0.063	*	mg/L	0.005	0.03	10/31/03 20:09	wfg
Potassium, dissolved	M200.7 ICP	1.6		mg/L	0.3	- 1	10/31/03 20:09	wfg
Sodium, dissolved	M200.7 ICP	409		mg/L	0.3	1	10/31/03 20:09	wfg
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	10/29/03 14:55	scp
Wet Chemistry								
Parameter	EPA Method	Result	Qual XQ	Units	MDL	POL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration							
Bicarbonate as CaCO3		291		mg/L	2	- 10	10/22/03 0:00	mah
Carbonate as CaCO3	3		U	mg/L	2	10	10/22/03 0:00	mah
Hydroxide as CaCO3	3		U	mg/L	2	10	10/22/03 0:00	mah
Total Alkalinity		291		mg/L	2	10	10/22/03 0:00	mah
Cation-Anion Balance	Calculation							
Cation-Anion Balance	•	-4.2		%			10/30/03 0:00	calc
Sum of Anions		37.0		meq/L	0.1	0.5	10/30/03 0:00	calc
Sum of Cations		34.0		meq/L	0.1	0.5	10/30/03 0:00	calc
Chloride	M325.2 - Colorimetric	48		mg/L	1	5	10/22/03 20:09	kmc
Conductivity @25C	M120.1 - Meter	2340		umhos/cm	1	10	10/22/03 0:26	mah
Lab Filtration	SM 3030 B						10/21/03 10:31	lms
Lab Filtration & Acidification	SM 3030 B						10/14/03 11:25	scp
pH (lab)	M150.1 - Electrometric	7.9	н	units	0.1	0.1	10/22/03 0:26	mah
Sulfate								

* Please refer to Extended Qualifier Report for detail.



Inorganic Reference

Ro		Explanations							
	Batch	A distinct set of samples analyzed at a specific time							
	Found	Value of the QC Type of interest							
	Limit	Upper limit for RPD, in %.							
	Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)							
	MDL	Method Detection Limit. Same as Minimum Reporting L							
	PCN/SCN	number assigned to reagents/standards to trace to the manufacturer's certificate of analysis							
	PQL	Practical Quantitation Limit, typically 5 times the MDL.							
	QC	True Value of the Control Sample or the amount added i							
	Rec	Amount of the true value or spike added recovered, in %	• •	(SS, mg/Kg)					
	RPD	Relative Percent Difference, calculation used for Duplica	ite QC Types						
	Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)							
	Sample	Value of the Sample of interest							
(e)(Sample Ty	pes							
	AS	Analytical Spike (Post Digestion)	LCSWD	Laboratory Control Sample - Water Duplicate					
	ASD	Analytical Spike (Post Digestion) Duplicate	LFB	Laboratory Fortified Blank					
	CCB	Continuing Calibration Blank	LFM	Laboratory Fortified Matrix					
	CCV	Continuing Calivation Verification standard	LFMD	Laboratory Fortified Matrix Duplicate					
	DUP	Sample Duplicate	LRB	Laboratory Reagent Blank					
	ICB	Initial Calibration Blank	MS	Matrix Spike					
	ICV	Initial Calibration Verification standard	MSD	Matrix Spike Duplicate					
	ICSAB	Inter-element Correction Standard - A plus B solutions	PBS	Prep Blank - Soil					
	LCSS	Laboratory Control Sample - Soil	PBW	Prep Blank - Water					
	LCSSD	Laboratory Control Sample - Soil Duplicate	PQV	Practical Quantitation Verification standard					
	LCSW	Laboratory Control Sample - Water	SDL	Serial Dilution					
	Blanks Control Sau Duplicates Spikes/Ford Standard		hod, including t rument and/or r ferences, if any	method.					
A	Z Quellifiers								
	В	Analyte concentration detected at a value between MDL		ata hald tima					
	Н	Analysis exceeded method hold time. pH is a field test to Poor spike recovery accepted because the other spike in							
	R T	High Relative Percent Difference (RPD) accepted because		-					
	U U	Analyte was analyzed for but not detected at the indicate							
	v	High blank data accepted because sample concentration		oher than blank concentration					
	w	Poor recovery for Silver quality control is accepted beca							
	x	Quality control sample is out of control.		· • • • • • • • • • • • • • • • • • • •					
	Z	Poor spike recovery is accepted because sample conce	ntration is four	times greater than spike concentration.					
2010/0000	_			- ·					
66	thani Rotono								
	(1)	EPA 600/4-83-020. Methods for Chemical Analysis of W	ater and Wast	es, March 1983.					
	(2)	EPA 600/R-93-100. Methods for the Determination of In	organic Substa	nces in Environmental Samples, August 1993.					
	(3)	EPA 600/R-94-111. Methods for the Determination of M							
	(5)	EPA SW-846. Test Methods for Evaluating Solid Waste		·					
	(6)	Standard Methods for the Examination of Water and Wa	stewater, 19th	edition, 1995.					
66	mments								
	(1)	QC results calculated from raw data. Results may vary							
	(2)	Soil, Sludge, and Plant matrices for Inorganic analyses a	are reported on	a dry weight basis.					
	(3)	Animal matrices for Inorganic analyses are reported on a	an "as received	" basis.					

REPIN03.11.00.01

ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Extended Qualifier Report

Burlington Resources, Inc.

ACZ Project ID: L43323

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L43323-01	WG164197	Manganese, dissolved	M200.7 ICP	МЗ	The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.
L43323-02	WG164197	Manganese, dissolved	M200.7 ICP	МЗ	The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.

WELL DEVELOPMENT AND SAMPLING LOG

Project No.: <u>30001.0</u> Location:_Marcote Pool Unit 1	Project Name: <u>Burlington Marcote 1</u>	Client: <u>Burlington Resources</u> Development Sampling
Project ManagerMJN	Date 10/6/03 Start Time	<u>1627</u> Weather sunny 80s
Depth to Water <u>29.71</u>	Depth to Product Product Thickness	Measuring Point
Water Column Height 9.38	Well Dia2"	

Sampling Method: Submersible Pump

Bottom Valve Bailer x Double Check Valve Bailer 🖾 Stainless-Steel Kemmerer

Criteria: 3 to 5 Casing Volumes of Water Removal X stabilization of Indicator Parameters X Other_____

Water Volur		
Gallons	Ounces	Gal/oz to be removed
1.50 x 3		4.50
	Gallons	Gallons Ounces

Time (military)	pH (su)	SC (umhos/cm)	Temp (°C)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
1632	7.29	2070	17.2				1	muddy, brown, very good flow to well
	7.45	2080	17.3				2	muddy, brown, very good flow to well
	7.34	2000	16.9				3	muddy, brown, very good flow to well
	7.33	2040	16.8				4	muddy, brown, very good flow to well
	7.34	2170	16.6				5	muddy, brown, very good flow to well
<u>1713</u>	7.36	2180	16.4				10	muddy, brown, very good flow to well
· · · · · · · · · · · · · · · · · · ·								
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								

Final:							Ferrous		
Time	рН	SC	Temp	Eh-ORP	D.O.	Turbidity	Iron	Vol Evac.	Comments/Flow Rate
<u>1713</u>	7.36	2180	16.4					10	muddy, brown, very good flow to well

COMMENTS:	
INSTRUMENTATION: pH Meter X	Temperature Meter x
DO Monitor	Other
Conductivity Meter X	
Water Disposal onsite Sample ID NA	Sample Timena
BTEX VOCs Alkalinity TDS Cations Anions	Nitrate Nitrite Ammonia TKN NMWQCC Metals Total Phosphorus
MS/MSDBD	BD Name/Time TB

WELL DEVELOPMENT AND SAMPLING LOG

Project No.: <u>30003.0</u> Location:_Marcote Pool Unit 1	Project Name: <u>Burlington Marcote 1</u> Well No: <u>MW-3</u>	Client: <u>Burlington Resources</u> Development <u>Sampling</u>
Project ManagerMJN	Date <u>10/6/03</u> Start Time <u>1637</u>	Weather <u>sunny 80s</u>
Depth to Water 30.74	Depth to Product <u>na</u> Product Thickness <u>na</u>	Measuring Point <u>TOC</u>
Water Column Height	Well Dia2"	

Sampling Method: Submersible Pump 🗆 Centrifugal Pump 📋 Peristaltic Pump 🔲 Other 📋

Bottom Valve Bailer x Double Check Valve Bailer 🗆 Stainless-Steel Kemmerer

Criteria: 3 to 5 Casing Volumes of Water Removal X stabilization of Indicator Parameters X Other: or bail dry

ater Volume in Well	
Ounces	Gal/oz to be removed
	3.8
	Ounces

Time (military)	pH (su)	SC (umhos/cm)	Temp (°C)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
1645	7.10	2470	18.0				1	Silty, brown
2000 - 11 - 1. 20 <u>6 - 1</u> 000 - 1000	7.42	2240	17.1				2	Silty, brown
	7.44	2200	16.9				3	Silty, brown
<u>1656</u>	7.40	2230	17.0				4	Silty, brown
						<u> </u>		,

Final:								
Time	pН	SC	Temp	Eh-ORP	D.O.	Turbidity	Vol Evac.	Comments/Flow Rate
1656	7.40	2230	17.0				4	Silty, brown

COMMENTS:					
INSTRUMENTATION: pH Meter X	Temperature Meter x				
DO Monitor	Other				
Conductivity Meter X					
Water Disposal onsite Sample ID Marcote 1	<u>1 MW-3</u> Sample Time_ <u>1700</u>				
BTEX VOCs Alkalinity TDS Cations	Anions Nitrate Nitrite Ammonia TKN NMWQCC Metals Total				
Phosphorus					
MS/MSDBD	BD Name/Time TB				
ACZ Laborate	-	Orga	anic Ar Resu		ical
---	-------------	---	---	-------	--------
Burlington Resources, Inc. Project ID: Sample ID: M P Unit 1 M	1W-2	ACZ Sample ID: Date Sampled: Date Received: Sample Matrix:	L43323-0 10/08/03 10/10/03 Ground V	16:30	
Benzene, Toluene, Ethyl Analysis Method: M8021 Extract Method: Metho	IB GC/PID	Analyst: Extract Date: Analysis Date: Dilution Factor:	km 10/13/03 10/13/03 1		
Compound Compound	CAS	Result QUAL	KQ: Units	MDL	1:(@)]
Benzene	000071-43-2	U ·	ug/L	0.3	1
Ethylbenzene	000100-41-4	U	ug/L	0.2	1
m p Xylene	01330 20 7	U	ug/L	0.4	2
o Xylene	00095-47- 6	υ	ug/L	0.2	1
Toluene	000108-88-3	U	ug/L	0.2	1
Surrogate Recoveries					
Surrogate	C'AS	% Receivery	X0 Units	LCL	UCL
Bromofluorobenzene	000460-00-4	90.8	%	84	114

ACZ Laboratories			Orga	anic Ar Resu		cal
Burlington Resources, Inc. Project ID: Sample ID: M P Unit 1 MW-3			nple ID: ampled: eceived:	L43323-0 10/08/03 10/10/03	-	
Benzene, Toluene, Ethylbenz	osson 9. Verbasso	Sample	e Matrix:	Ground V	Vater	
Analysis Method: M8021B GC/ Extract Method: Method		Extra Analys	Analyst: ct Date: is Date: Factor:	km 10/13/03 10/13/03 1		
Compound Compound	CAS	Result	OUAL	(o) Unite	W(b)L	1:(0)]
Benzene	000071-43-2		U	ug/L	0.3	1
Ethylbenzene	000100-41-4		U	ug/L	0.2	1
m p Xylene	01330 20 7		υ	ug/L	0.4	2
o Xylene	00095-47- 6		U	ug/L	0.2	1
Toluene	000108-88-3	0.2	J	ug/L	0.2	1
Surrogate Recoveries	CAS	% Recovery		a Unifis	I. (e)L	VEL
Bromofluorobenzene	000460-00-4	92.6		%	84	114

	Laboratories, Inc. ive Steamboat Springs, CO 80487 (800) 334-5493	Org	anic Analytical Results
Burlington Re	sources, Inc.	ACZ Sample ID:	L43323-03
Project ID:		Date Sampled:	10/08/03 0:00
Sample ID:	TB100303-02	Date Received:	10/10/03
		Sample Matrix:	Ground Water
Benzeine, T	oluene, Ethylbenzene & Xylene	Analyst:	km
A sa mila sa in ti		Extract Date:	10/13/03 21:32
Analysis	Method: M8021B GC/PID	Analysis Date:	10/13/03 21:32

Compound Componied Result QUAL XQ Units MDL Benzene 000071-43-2 υ ug/L 0.3 1 U Ethylbenzene 000100-41-4 ug/L 0.2 1 01330 20 7 υ 2 m p Xylene ug/L 0.4 00095-47-6 υ o Xylene 0.2 1 ug/L Toluene 000108-88-3 υ ug/L 0.2 1 Surrogate Recoveries LCL 18(01) Suprogette 000460-00-4 Bromofluorobenzene 91 % 84 114

Dilution Factor: 1

Extract Method: Method

ACZ Laboratories, Inc.								HAIN JSTC	
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 33 Report to:	4-5493								
		Addre	جور کر	JAL	CAS		いて	1 57	
Name: GREGG WURTZ Company: BURLINGTON RESOULCES	-							3749	
E-mail:				505					
					۽ ري	- Q		<u> </u>	
Copy of Report to:			u.						
	-	E-mai							
Company:		Telep	hone:				<u>`</u>		
Invoice to:						Ţ.			
Name: SAME AS ABOVE		Addre	SS:						
Company:	4						·····		
E-mail:		Telep						\/F0	<u> </u>
If sample(s) received past holding time (HT), or if insufficie analysis before expiration, shall ACZ proceed with reques				ete				YES NO	
If "NO" then ACZ will contact client for further instruction.	lf neithe	r "YES"	nor "N						
is indicated, ACZ will proceed with the requested analyses	i, even if l								
PROJECT INFORMATION		ANA	ALYSES		ESTED	allac	n list ol	r use que	ole n
	-1	6							
Project/PO #: MISC_GW SAMPLING	4	ners							
Shipping Co.:	_	of Containers		,					
Tracking #: Reporting State for compliance testing:		ပို	X	۱ ۲					
Reporting State for compliance testing.		0 #		•					
SAMPLE IDENTIFICATION DATE: TIME	Matrix	c .	51						
MIN-3 MORCOTE 12-16-03 0847	GW	2	X						
MW-2 MARCOTE 12-16-030915	GW	2	X						
MW-1 FLORA VISTA 12-16-03 1030	GW	2	X				<u> </u>		
MW-2 COZZENS 12-16-031105	GW	2	X						
MW-1 COZZENS 12-16-03/131 TRID BLANK 12-16-03/1200	GW O	2.	X				-		
TRIP BLANK 12-16-03 1200		+'	N				-		
		1							
	_								
Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste)	Nater) · DV	V (Drinkin	g Water)	· SL (Slu	dge) · S	O (Soil)	· OL (OII) · Other (S	Specil
Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste N REMARKS	Water) · DV	V (Drinkin		· SL (Slu	dge) · S	O (Soil)	· OL (OII) · Other (S	Speci
	Water) · DV	V (Drinkin	g Water)	· SL (Slu	dge) · S	O (Soll)	· OL (OII) · Other (S	Specif
	Water) · DV	V (Drinkin		· SL (Slu	dge) · S	O (Soll)	· OL (OII) · Other (s	Speci
REMARKS		V (Drinkin	4			O (Soil)			
REMARKS RELINQUISHED BY: DATE:1	ГІМЕ	V (Drinkin	4	· SL (Slu		O (Soil)) · Other (S	
REMARKS	ГІМЕ	V (Drinkin	4		BY:	O (Soll)			

FRMQA021.06.03.05

•

White - Return with sample.

Yellow - Retain for your records.

	aboratories, Inc teamboat Springs, CO 80487	C. (800) 334-5493		Orga	anic Ar Resu		cal
· · · , - · · · · ·	rces, Inc. MISC. GW SAMPLING M-2 MARCOTE		ACZ San Date Sa Date Re Sample	ampled: ceived:	L44072- 1 12/16/03 12/17/03 Ground V	9:15	
Benzene, Tolu Analysis Meth Extract Meth		Xylene	Extrac	Analyst: ct Date: s Date: Factor:	km 12/18/03 12/18/03 1		
Compound Compound		CAS	Result	OUAL	Ka Uhite	MEL	12(0)]
Benzene		000071-43-2	0.4	J	ug/L	0.3	1
Ethylbenzene		000100-41-4		U	ug/L	0.2	1
m p Xylene		01330 20 7		U	ug/L	0.4	2
o Xylene		00095-47- 6		U	ug/L	0.2	1
Toluene		000108-88-3		υ	ug/L	0.2	1
Surrogate Recoveries		CAS	% Recovery		X@_Unifis_	L(C)L	UCL
Bromofluorobenzene		000460-00-4	78.5		* %	84	114

ACZ Laborator	-	Org	janic An Resul		ical
Burlington Resources, Inc.Project ID:MISC. GW SANSample ID:MW-3 MARCOT		ACZ Sample ID: Date Sampled: Date Received: Sample Matrix:	12 16 03 8 12 17 03	8:47	
Benzene, Toluene, Ethylbe Analysis Method: M8021B Extract Method: Method		Analyst Extract Date: Analysis Date: Dilution Factor:	12/18/03 12/18/03		
Compound Compound	CAS	Result QUAL	X@ Units	[9[3]_	1901
Benzene	000071-43-2	0.5 J	ug/L	0.3	1
Ethylbenzene	000100-41-4	U	ug/L	0.2	1
m p Xylene	01330 20 7	U	ug/L	0.4	2
o Xylene	00095-47- 6	U	ug/L	0.2	1
Toluene	000108-88-3	U	ug/L	0.2	1
Surrogate Recoveries	CAS	% Recovery	X0 Units	il (cil.	UGL
Bromofluorobenzene	000460-00-4	81.7	* %	84	114



Organic Reference

Report Header Explanations

Report Heade	er Explanations							
Batch	A distinct set of samples analyzed at a specific time							
Found	Value of the QC Type of interest							
Limit	Upper limit for RPD, in %.							
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)							
LCL	Lower Control Limit							
MDL	Method Detection Limit. Same as Minimum Reporting							
PCN/SCN	V A number assigned to reagents/standards to trace to t	he manufacturer's	certificate of analysis					
PQL	Practical Quantitation Limit							
QC	True Value of the Control Sample or the amount adde							
Rec	Amount of the true value or spike added recovered, in		SS, mg/Kg)					
RPD	Relative Percent Difference, calculation used for Dupli	cate QC Types						
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg))						
UCL	Upper Control Limit							
Sample	Value of the Sample of interest							
QC Sample T	[ypes							
SURR	Surrogate	LFM	Laboratory Fortified Matrix					
INTS	Internal Standard	LFMD	Laboratory Fortified Matrix Duplicate					
DUP	Sample Duplicate	LRB	Laboratory Reagent Blank					
LCSS	Laboratory Control Sample - Soil	MS/MSD	Matrix Spike/Matrix Spike Duplicate					
LCSW	Laboratory Control Sample - Water	PBS	Prep Blank - Soil					
LFB	Laboratory Fortified Blank	PBW	Prep Blank - Water					
QC Sample T	Type Explanations							
Blanks			on in the prep method procedure.					
Control Sa								
Duplicates								
Spikes/Fo	ortified Matrix Determines sample matrix in	terferences, if any	·					
ACZ Qualifier	ars (Qual)							
В	Analyte detected in daily blank							
н	Analysis exceeded method hold time.							
J	Analyte concentration detected at a value between MI							
R	Poor spike recovery accepted because the other spike							
т	High Relative Percent Difference (RPD) accepted bec		centrations are less than 10x the MDL.					
U	Analyte was analyzed for but not detected at the indic							
V	High blank data accepted because sample concentrat							
W	Poor recovery for Silver quality control is accepted be	cause Silver often	precipitates with Chloride.					
х	Quality contreol sample is out of control.							
Z	Poor spike recovery is accepted because sample con-		imes greater than spike concentration.					
Р	Analyte concentration differs from second detector by							
Е	Analyte concentration is estimated due to result excee	eding calibration ra	ange.					
Μ	Analyte concentration is estimated due to matrix interf	ferences.						
Method Refe	rences							
(1)	EPA 600/4-83-020. Methods for Chemical Analysis of							
(2)	EPA 600/4-90/020. Methods for the Determination of							
(3)	EPA 600/R-92/129. Methods for the Determination of							
(5)	EPA SW-846. Test Methods for Evaluating Solid Was	ste, Third Edition v	with Update III, December, 1996.					
(6)	Standard Methods for the Examination of Water and V	Vastewater, 19th	edition, 1995.					
Comments								
(1)	QC results calculated from raw data. Results may val	ry slightly if the ro	unded values are used in the calculations.					
(2)	Organic analyses are reported on an "as received" ba							
REPIN03.11.0								

REPIN03.11.00.01





Burlington Resources, Inc.

ACZ ID WORKNUM PARAMETER

ACZ Project ID: L43323

QUAL DESCRIPTION

No extended qualifiers associated with this analysis

METHOD

ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Burlington Resources, Inc.	ACZ Proje Date Rece Receiv			L43323 0/2003 tonya
Receipt Verification				
		YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?				\checkmark
2) Are the custody seals on the cooler intact?		- V		
3) Are the custody seals on the sample containers intact?				\checkmark
4) Is there a Chain of Custody or other directive shipping papers present?		: 1		
5) Is the Chain of Custody complete?		· 1		
6) Is the Chain of Custody in agreement with the samples received?		1		
7) Is there enough sample for all requested analyses?		V		
8) Are all samples within holding times for requested analyses?		1		
9) Were all sample containers received intact?		\checkmark		
10) Are the temperature blanks present?		. 1		
11) Are the trip blanks (VOA and/or Cyanide) present?		\checkmark		
12) Are samples requiring no headspace, headspace free?		\checkmark		
13) Do the samples that require a Foreign Soils Permit have one?				V

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
ACZ	6.9	13

Notes

ACZ Laboratories, Inc. 2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Burlington Resources, Inc.

Receipt ACZ Project ID: L43323 Date Received:

Sample

Received By:

10/10/2003 tonya

Sample Container Preservation

SAMPLE	CLIENT ID	R<2	G < 2	Y < 2	YG< 2	B < 2	BG< 2	0<2	T >12	P >12	N/A	RAD
L43323-01	M P Unit 1 MW-2										\checkmark	
L43323-02	M P Unit 1 MW-3										\checkmark	
L43323-03	TB100303-02										1	

WELL DEVELOPMENT AND SAMPLING LOG

Project No.: <u>30003.0</u> Location:_Marcote Pool Unit 1	Project Name: <u>Burlington Marcote 1</u> Well No: MW-2	Client: <u>Burlington Resources</u> Development Sampling
Project Manager <u>MJN</u>	Date <u>12/16/03</u> Start Time <u>0855</u> Depth to Product <u>na</u> Product Thickness_ <u>_na</u>	Weather <u>cloudy 40s</u> Measuring Point <u>TOC</u>
Water Column Height 8.76	Well Dia	
Sampling Method: Submersible	Pump 🗌 Centrifugal Pump 🔲 Peristaltic Pum	p □ Other □

Bottom Valve Bailer x Double Check Valve Bailer Stainless-Steel Kemmerer

Criteria: 3 to 5 Casing Volumes of Water Removal X stabilization of Indicator Parameters X Other: or bail dry

	Water Vol	ume in Well	
Gal/ft x ft of water	Gallons	Ounces	Gal/oz to be removed
8.76 x .16	1.40 x 3		4.2

Time (military)	pH (su)	SC (umhos/cm)	Temp (°F)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
0902	6.96	5930	48.0				.50	Brown Muddy
	7.0	5930	51.7		· · · · · · · · · · · · · · · · · · ·		1.0	Brown Muddy
	7.06	6360	51.6				1.25	Brown Muddy
	7.05	6310	51.5				2.0	Brown Muddy
<u>0912</u>	7.10	6160	51				3.0	Brown Muddy
							4.0	Bailing Dry

<u>091</u>	Fii Tin
<u>12</u>	nal: 1e
7.10	рН
)	
6160	<u>SC</u> 6160
	Т
51	emp
	,
	Eh-(
	ORF
	> [
	D.O
	•
	Tu
	rbidi
	rrous on
	Vol
8.0	Eva
	o.
Bro	Co
own	mm
ı Mu	ents
Iddy	s/Flo
y	ow F
	Rate

COMMENTS	CC	DMI	ME	NT	S:
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INSTRUMENTATION:	pH Meter X		Temperature Meter x	
	DO Monitor		Other	
Conc	luctivity Meter X	<u>.</u>		
Water Disposal onsite	Sample ID_Marcote	1 MW-2	Sample Time <u>0915</u>	
BTEX VOCs Alkalini	ty TDS Cations	Anions Nitrate	Nitrite Ammonia TKN NMWQCC M	letals Total
Phosphorus	-			
MS/MSD	BD	BD Name/	Time TB	

WELL DEVELOPMENT AND SAMPLING LOG

Project No.:3	30003.0		Project Name: Burlington Marcote 1				Clien	t: Burlington Resources
Location:_Marcote Pool Unit 1			Well No: <u>MW-3</u> Development <u>Samp</u>					lopment Sampling
Project Mana	ager	MJN	Date_	12/16/03	_ Start	Time 0830	Weat	her_cloudy 40s
Depth to Wa	ıter <u>3</u>	4.14 Dep	th to Produ	uct <u>na</u> I	Product T	nickness <u>na</u>		suring Point TOC
		t <u>4.52</u> Well						·
Sampling Me	Sampling Method: Submersible Pump Centrifugal Pump Peristaltic Pump Other							
			. —	-	• —		• —	
	B	ottom Valve Bai	ler x	Double Che	ck Valve I	3ailer 🗌 🛛 St	ainless-Ste	el Kemmerer
Criteria: 3 t	to 5 Casi	ng Volumes of V	Notor Por	oval V stabil	lization of	Indicator Da	romotore V	Other: or bail dry
Ontona. Ot	.0 0 0 0001	ng volumes or w	Valor Nom	Uva A Slavi			allicicis A	Other. or ball dry
				Water Volum	ne in Well			
Gal/ft x ft of water			Gallons		•	Dunces	G	al/oz to be removed
4.52 x.16			.72 x 3					2.2
Time	pН	SC	Tomo	ORP	D.O.	Turbidity	Vol Evac.	Commonte/
(military)	µ⊓ (su)	(umhos/cm)	Temp (°F)	(millivolts)	(mg/L)	Turbidity (NTU)	(gal.)	Comments/ Flow rate
0833	(3u) 6.44	6490	48.1	(ITIIIIVOILO)	(119/6/			
0000	0.44	6490	40.1				.25	Brown/Heavy
	6.65	6560	49.6				.5	Silt/Muddy
	6.80	6520	.75				.75	Silt/Muddy
	0.00							
	6.83	6540	51.3				1.0	Silt/Muddy
	6.79	6540	51.3				2.0	Silt/Muddy

Final: Time pH	SC Temp	Eh-ORP D.O.	Turbidity Vol Evac	Comments/Flow Rate Silt/Muddy
<u>0845</u> 6.80	6520 51		2.5	Silt/Muddy

Silt/Muddy

2.5

COMMENTS	3:
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<u>0845</u>

6.80

6520

51.0

INSTRUMENTATION: pl	H Meter X		Temperature Meter x
	DO Monitor		Other
Conduct	tivity Meter X		
Water Disposal <u>onsite</u> Sa	ample ID <u>Marcote 1</u>	MW-3	Sample Time <u>0847</u>
<u>BTEX</u> VOCs Alkalinity Phosphorus	TDS Cations	Anions Nitrate	Nitrite Ammonia TKN NMWQCC Metals Tota
MS/MSD	BD	BD Name/T	Time TB