3R - 68

REPORTS

DATE:

7/30/1999

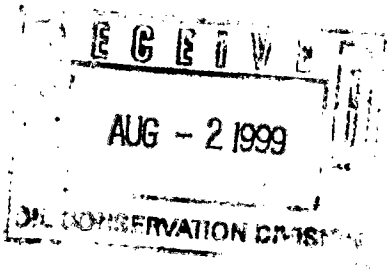
BURLINGTON RESOURCES

SAN JUAN DIVISION

July 30, 1999

Certified Mail: Z 186 732 847

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



RE: Fogelson #4-1
Unit Letter P, Section 4, Township 29N, Range 11W
Notification of Groundwater above Chloride Standard

Dear Mr. Olson:

This letter is Burlington Resources' (BR) notification of groundwater that exceeded the chloride standard at the subject location. All BTEX constituents were below the standards, but the chlorides were over 250 MG/L. BR is also proposing a plan of action to address the groundwater concerns at the Fogelson #4-1.

BR excavated an earthen pit on the location to 41 feet below ground surface. At that point, soil samples from the walls and bottom of the excavation were collected and tested clean. The excavation was backfilled with clean fill. Due to El Paso having groundwater impacts at the location, BR installed a temporary groundwater monitoring well in the center of BR's former earthen pit on May 17, 1999. After developing the well and allowing it to stabilize for ten days, the well was purged and sampled on May 27, 1999. The sample tested below the groundwater standards for the BTEX constituents, but chlorides were 430 MG/L. Total dissolved solids (TDS) were 14,000 MG/L.

Included with this letter is the original Pit Remediation and Closure Report for the BR earthen pit along with the analytical results of the soil testing. Also attached are the groundwater lab analysis, the drilling log, the monitoring well installation record, and a location diagram from El Paso's 1997 Annual Groundwater Report.

Plan of Action: Since the TDS of the groundwater from the temporary source monitoring well were over 10,000 MG/L, BR proposes to install a temporary groundwater monitoring well upgradient of operations at the site. Due to the work conducted by El Paso at this location, the direction of groundwater flow has been determined to be in the westerly direction. The proposed upgradient monitoring well will be located at the edge of the southeast part of location. If the groundwater from the proposed upgradient monitoring well tests over 10,000 MG/L, the groundwater would not be considered "protected" and BR proposes no additional remediation/investigation work at the site. The 2-inch PVC casing would be removed to the extent practical from the two temporary wells and the wellbores would be filled to surface with a bentonite/cement grout.

If the upgradient water tests below 10,000 MG/L, BR would complete the existing temporary source well as permanent and initiate quarterly sampling of the source well.

3535 East 30th St., 87402-8801, P.O. Box 4289, Farmington, New Mexico 87499-4289, Telephone 505-326-9700, Fax 505-326-9833

Please provide written correspondence approving our proposed plan of action. If you have questions or additional information is needed, please contact me at (505) 326-9841.

Sincerely,

Ed Hasely
Sr. Staff Environmental Representative

Attachments: Pit Remediation and Closure Report
Drilling Log/Wellbore Diagram
Analytical Results
Location Diagram

cc: Denny Foust - NMOCD Aztec
Sandra Miller - El Paso
Johnny Ellis
Bruce Gantner
Facility File
Correspondence

Pit Remediation and Closure Report

District I
P.O. Box 1980, Hobbs, NM
District II
P.O. Drawer DD, Artesia, NM 88211
District III
1000 Rio Brazos Rd, Aztec, NM 87410

State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

SUBMIT 1 COPY TO APPROPRIATE DISTRICT OFFICE AND 1 COPY TO SANTA FE OFFICE

(Revised 3/9/94)

PIT REMEDIATION AND CLOSURE REPORT

Operator: Burlington Resources **Telephone:** (505) 326-9700

Address: 3535 E. 30th Farmington NM 87402

Facility Or: Well Name Fogelson 4-1 Com

Location: Unit or Qtr/Qtr Sec P Sec 4 T 29N R 11W County San Juan

Pit Type: Separator ___ Dehydrator ___ Other Unknown

Land Type: BLM X, State ___, Fee ___, Other ___

Pit Location: (Attach diagram)
Pit dimensions: length 17, width 20, depth 1
Reference: wellhead X, other ___
Footage from reference: 66'
Direction from reference: 55 Degrees ___ East North X of X West South ___

Depth To Ground Water: (Vertical distance from contaminants to seasonal high water elevation of ground water)	Less than 50 feet (20 points) 50 feet to 99 feet (10 points) Greater than 100 feet (0 Points)	20
Wellhead Protection Area: (Less than 200 feet from a private domestic water source, or; less than 1000 feet from all other water sources)	Yes (20 points) No (0 points)	0
Distance To Surface Water: (Horizontal distance to perennial lakes, ponds, rivers, streams, creeks, irrigation canals and ditches)	Less than 200 feet (20 points) 200 feet to 1000 feet (10 points) Greater than 1000 feet (0 points)	0
	RANKING SCORE (TOTAL POINTS):	20

Date Remediation Started: 11/4/98 **Date Completed:** _____

Remediation Method: (Check all appropriate sections) Excavation X Approx. cubic yards 4574

Landfarmed X Insitu Bioremediation ___

Other _____

Remediation Location: (ie. landfarmed onsite, name and location of offsite facility) Onsite X Offsite _____

General Description Of Remedial Action: Soils were excavated to an approximate depth of 41 ft. and landfarmed on location. Soil samples were collected from the walls and bottom and tested clean. The excavation was backfilled w/ clean soils. Due to El Paso's groundwater impact on location, a temporary monitoring well was installed in the former pit.

Ground Water Encountered: No X Yes ___ Depth _____ during excavation

Final Pit: Closure Sampling: (if multiple samples, attach sample results and diagram of sample locations and depths)

Sample location Bottom of excavation.

Sample depth 41 ft

Sample date 11/24/98 Sample time _____

Sample Results

Benzene(ppm) ND

Total BTEX(ppm) 0.196

Field headspace(ppm) 20.1

TPH 17.5

Ground Water Sample: Yes ___ No X (If yes, attach sample results)

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

DATE 7/30/99

SIGNATURE E Hasely PRINTED NAME AND TITLE Ed Hasely Sr. Staff Environmental Rep.

PHILIP SERVICES CORP

PRODUCTION PIT REMEDIATION FORM

WELL NAME: Fogelson 4-1 Com #14 WELL NO.: _____ DP NO.: _____

OPERATOR NAME: Burlington Resources P/L DISTRICT: _____

COORDINATES: LETTER: P SECTION: 4 TOWNSHIP: 29 RANGE: 11

PIT TYPE: DEHYDRATOR: X LOCATION DRIP: _____ LINE DRIP: _____ OTHER: _____

FOREMAN NO.: Johnny Ellis AREA: _____

INITIAL REMEDIATION ACTIVITIES

DATE: 11-4-98 TIME: _____

GROUND WATER ENCOUNTERED? ☐Y / ☒N

INSIDE NMOCD ZONE

FINAL EXCAVATION DIMENSIONS: LENGTH: 76' WIDTH: 63' DEPTH: 41'

APPROX. CUBIC YARDS: 7,270 FINAL PID READING: 20.1 ppm
Composite reading

REMEDIATION METHOD: ONSITE LANDFARM ___

OFFSITE LANDFARM ___ LOCATION: _____

OTHER stockpile

LANDFARM DIMENSIONS: LENGTH: _____ WIDTH: _____

OUTSIDE NMOCD ZONE

FINAL SAMPLE DEPTH: 41' FINAL PID READING: 20.1

EXCAVATION SAMPLING INFORMATION

IF PID READINGS ARE LESS THAN 100 PPM, SAMPLE TAKEN DURING EXCAVATION)

SAMPLE DATE: _____ SAMPLE NOS _____ _____

SAMPLE ANALYSIS: TPH METHOD 8015 MODIFIED

IF PID READINGS ARE GREATER THAN 100 PPM, NO SAMPLE WILL BE TAKEN DURING EXCAVATION. THE EXCAVATION WILL BE SAMPLED PRIOR TO BACKFILLING (SEE ADDITIONAL SAMPLING SECTION).

REMARKS: Contaminated Soil 4,574 yds
Clean Soil 3,067 yds

SIGNATURE: Robert Thompson DATE: 11/4/98

ADDITIONAL REMEDIATIC ACTIVITIES

SOIL TILLING

DATE: _____ PID READING: _____ SIGNATURE: _____

REMARKS: _____

DATE: _____ PID READING: _____ SIGNATURE: _____

REMARKS: _____

DATE: _____ PID READING: _____ SIGNATURE: _____

REMARKS: _____

DATE: _____ PID READING: _____ SIGNATURE: _____

REMARKS: _____

ADDITIONAL SAMPLING INFORMATION

EXCAVATION SAMPLING(IF REQUIRED)

IF NO SAMPLE WAS TAKEN DURING EXCAVATION, THE EXCAVATION WILL BE SAMPLED BEFORE BACKFILLING).

SAMPLE DATE: _____ SAMPLE NOS_____ _____

SIGNATURE:_____

IF PID READINGS ARE LESS THAN 100 PPM , SAMPLE ANALYSIS: TPH METHOD 8015 MODIFIED

IF PID READINGS ARE GREATER THAN 100 PPM, SAMPLE ANALYSES: BTEX METHOD 8020 AND TPH METHOD 8015 MODIFIED

SOIL REMEDIATION VERIFICATION SAMPLE

SAMPLE DATE: _____ SAMPLE NOS_____ _____

SIGNATURE:_____

SAMPLE ANALYSIS: TPH METHOD 8015 MODIFIED

BACKFILLING INFORMATION

DATE: _____ TIME:_____

BACKFILL SOURCE: ONSITE LANDFARM: _____

OFFSITE SOURCE:_____ APPROX. VOLUME:_____

REMARKS:_____

_____

_____

SIGNATURE: **DATE:**

807 S. CARLTON AVE.
FARMINGTON, NEW MEXICO 87401
PHONE (505) 326-2588
FAX (505) 326-2875

Certificate of Analysis No. 9811133-01a

Philip Environmental Services
4000 Monroe Road
Farmington, NM 87401
Attn: Robert Thompson

		Date:	12/16/98
Project:	BR Pits	Project No:	20440
Site:	Farmington	Matrix:	Soil
Sampled By:	R. Thompson	Date Sampled:	11/24/98
Sample ID:	112498140 - WALLS	Date Received:	11/30/98

Analytical Data

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Benzene	ND	1.0 (P)	µg/Kg
Toluene	ND	1.0 (P)	µg/Kg
Ethylbenzene	ND	1.0 (P)	µg/Kg
Total Xylene	1.4	1.0 (P)	µg/Kg
Total Volatile Aromatic Hydrocarbons	1.4		µg/Kg

Surrogate	% Recovery
1,4,Difluorobenzene	103
4-Bromofluorobenzene	113

Method 8020A***
Analyzed by: AA
Date: 12/02/98

ND-Not Detected MI-Matrix Interference (P)-Practical Quantitation Limit

Notes:
*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th Ed
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

Billy G. Rich, Lab Director

807 S. CARLTON AVE.
FARMINGTON, NEW MEXICO 87401
PHONE (505) 326-2588
FAX (505) 326-2875

Certificate of Analysis No. 9811133-02b

Philip Environmental Services
4000 Monroe Road
Farmington, NM 87401
Attn: Robert Thompson

		Date:	12/16/98
Project:	BR Pits	Project No:	20440
Site:	Farmington	Matrix:	Soil
Sampled By:	R. Thompson	Date Sampled:	11/24/98
Sample ID:	112498145 - BOTTOM	Date Received:	11/30/98

Analytical Data

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	7.5	0.5 (P)	mg/kg
Surrogate	**% Recovery**		
1,4,Difluorobenzene	80		
4-Bromofluorobenzene	353MI		
Method 8015B*** for Gasoline			
Analyzed by: AA			
Date: 12/03/98			
Total Petroleum Hydrocarbons-Diesel	10	10 (P)	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	44		
Method 8015B*** for Diesel			
Analyzed by: RR			
Date: 12/03/98			

MI-Matrix Interference (P)-Practical Quantitation Limit D-Diluted, limits not applicable

Notes:
*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th Ed
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

Comments: Sample contains petroleum hydrocarbons from C10 - c24 that do not resemble a diesel pattern. (C10 - C24) RR

Billy G. Rich, Lab Director

807 S. CARLTON AVE.
FARMINGTON, NEW MEXICO 87401
PHONE (505) 326-2588
FAX (505) 326-2875

Certificate of Analysis No. 9811133-02a

Philip Environmental Services
4000 Monroe Road
Farmington, NM 87401
Attn: Robert Thompson

		Date:	12/16/98
Project:	BR Pits	Project No:	20440
Site:	Farmington	Matrix:	Soil
Sampled By:	R. Thompson	Date Sampled:	11/24/98
Sample ID:	112498145 - BOTTOM	Date Received:	11/30/98

Analytical Data

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Benzene	ND	5.0 (P)	µg/Kg
Toluene	26	5.0 (P)	µg/Kg
Ethylbenzene	ND	5.0 (P)	µg/Kg
Total Xylene	170	5.0 (P)	µg/Kg
Total Volatile Aromatic Hydrocarbons	196		µg/Kg

Surrogate	% Recovery
1,4,Difluorobenzene	100
4-Bromofluorobenzene	160MI

Method 8020A***
Analyzed by: AA
Date: 12/03/98

ND-Not Detected MI-Matrix Interference (P)-Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th Ed
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

Comments: Sample contains petroleum hydrocarbons from C10 - c24 that do not resemble a diesel pattern. (C10 - C24) RR

Billy G. Rich, Lab Director

807 S. CARLTON AVE.
FARMINGTON, NEW MEXICO 87401
PHONE (505) 326-2588
FAX (505) 326-2875

Certificate of Analysis No. 9811133-01b

Philip Environmental Services
4000 Monroe Road
Farmington, NM 87401
Attn: Robert Thompson

		Date:	12/16/98
Project:	BR Pits	Project No:	20440
Site:	Farmington	Matrix:	Soil
Sampled By:	R. Thompson	Date Sampled:	11/24/98
Sample ID:	112498140 - WALLS	Date Received:	11/30/98

Analytical Data

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.11	0.1 (P)	mg/kg
Surrogate	**% Recovery**		
1,4,Difluorobenzene	103		
4-Bromofluorobenzene	127		
Method 8015B*** for Gasoline			
Analyzed by: AA			
Date: 12/02/98			
Total Petroleum Hydrocarbons-Diesel	ND	10 (P)	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	42		
Method 8015B*** for Diesel			
Analyzed by: RR			
Date: 12/02/98			

MI-Matrix Interference (P)-Practical Quantitation Limit ND-Not Detected

Notes:
*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th Ed
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

Billy G. Rich, Lab Director

Chain of Custody Record

WO# 9811173-

PHILIP ENVIRONMENTAL

4000 Monroe Road
Farmington, NM 87401

(505) 326-2262 Phone
(505) 326-2388 FAX

COC Serial No. C 2287

Project Name [illegible]

Project Number [illegible] Phase . Task [illegible]

Samplers Paul [illegible]

Laboratory Name = PL

Location Farmington

Sample Number (and depth)	Date	Time	Matrix	Total Number of Bottles	Type of Analysis and Bottle: BTEX 8020 (A)	TPH 8015 Modified DRO-GRO (B)	Comments
112[illegible]-WALLS	[illegible]	[illegible]	Soil	1	X	X	
112[illegible]-BOTTOM	[illegible]	[illegible]	Soil	1	X	X	

-01

-02

Relinquished by:

Signature	Date	Time
[signature]	[illegible]	[illegible]
[signature]	11-30-98	10:15

Received By:

Signature	Date	Time
[signature]	11-30-98	10:00
[signature]	11-30-98	10:17 AM

Samples Iced: ☐ Yes ☐ No

Preservatives (ONLY for Water Samples)

- ☐ Cyanide ..... Sodium hyroxide (NaOH)
- ☐ Volatile Organic Analysis ..... Hydrochloric acid (HCl)
- ☐ Metals ..... Nitric acid (HNO_3)
- ☐ TPH (418.1) ..... Sulfuric acid (H_2SO_4)
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

Carrier:

Airbill No.

Shipping and Lab Notes:

PE-176 4/95

807 S. CARLTON AVE.
FARMINGTON, NEW MEXICO 87401
PHONE (505) 326-2588
FAX (505) 326-2875

Certificate of Analysis No. 9811030-01a

Philip Environmental Services
4000 Monroe Road
Farmington, NM 87401

Attn: Scott Pope		Date:	11/17/98
Project:	Fogelson 4-1 Com #14	Project No:	20440
Site:	1733ppm	Matrix:	Soil
Sampled By:	Paul Archuleta	Date Sampled:	11/04/98
Sample ID:	11498315 23'	Date Received:	11/05/98

Analytical Data

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Benzene	1600	500 (P)	µg/Kg
Toluene	19000	500 (P)	µg/Kg
Ethylbenzene	12000	500 (P)	µg/Kg
Total Xylene	92000	500 (P)	µg/Kg
Total Volatile Aromatic Hydrocarbons	124600		µg/Kg

Surrogate	% Recovery
1,4,Difluorobenzene	100
4-Bromofluorobenzene	273 MI

Method 8020A***
Analyzed by: FAB
Date: 11/06/98

ND-Not Detected MI-Matrix Interference (P)-Practical Quantitation Limit

Notes:
*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th Ed
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

Billy G. Rich, Lab Director

807 S. CARLTON AVE.
FARMINGTON, NEW MEXICO 87401
PHONE (505) 326-2588
FAX (505) 326-2875

Certificate of Analysis No. 9811030-01b

Philip Environmental Services
4000 Monroe Road
Farmington, NM 87401

Attn: Scott Pope		Date:	11/17/98
Project:	Fogelson 4-1 Com #14	Project No:	20440
Site:	1733ppm	Matrix:	Soil
Sampled By:	Paul Archuleta	Date Sampled:	11/04/98
Sample ID:	11498315 23'	Date Received:	11/05/98

Analytical Data

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	1900	50 (P)	mg/kg
Surrogate	**% Recovery**		
1,4,Difluorobenzene	127		
4-Bromofluorobenzene	1070 MI		
Method 8015B*** for Gasoline			
Analyzed by: FAB			
Date: 11/06/98			
Total Petroleum Hydrocarbons-Diesel	520	250 (P)	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	0		
Method 8015B*** for Diesel			
Analyzed by: RR			
Date: 11/10/98			

MI-Matrix Interference (P)-Practical Quantitation Limit D-Diluted, limits not applicable

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th Ed
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

Comments: Sample contains petroleum hydrocarbons from C10 - C24 that do no resemble a diesel pattern. (C10 - C24) RR

Billy G. Rich, Lab Director

PHILIP

Chain of Custody Record

4000 Monroe Road
Farmington, NM 87401
(505) 326-2262 Phone
(505) 326-2388 FAX

COC Serial No. C 2286

Project Name: Fogelson 4-1 Com #14
Project Number: 20410 Phase . Task: 3000 . 77
Samplers: Paul R Archuleta
Laboratory Name: SPL
Laboratory Location: Farmington

Sample Number (and depth)	Date	Time	Matrix	Total Number of Bottles	Type of Analysis and Bottle: TPH	BTEX	Comments
114918315 23'	11/4/98	0315	soil	1	X	X	1733 PPM

Relinquished by:

Signature	Date	Time
Paul R Archuleta	11-4-98	17:24
	11-5-98	11:45 AM

Received By:

Signature	Date	Time

Samples Iced: ☒ Yes ☐ No

Preservatives (ONLY for Water Samples)

- ☐ Cyanide ..... Sodium hyroxide (NaOH)
- ☐ Volatile Organic Analysis ..... Hydrochloric acid (HCl)
- ☐ Metals ..... Nitric acid (HNO_3)
- ☐ TPH (418.1) ..... Sulfuric acid (H_2SO_4)
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

Carrier:

Airbill No.

Shipping and Lab Notes:

PHILIP ENVIRONMENTAL

SITE SKETCH

Serial No. SS- _____ Title _____

Project Name BR PITS Project No. 20440

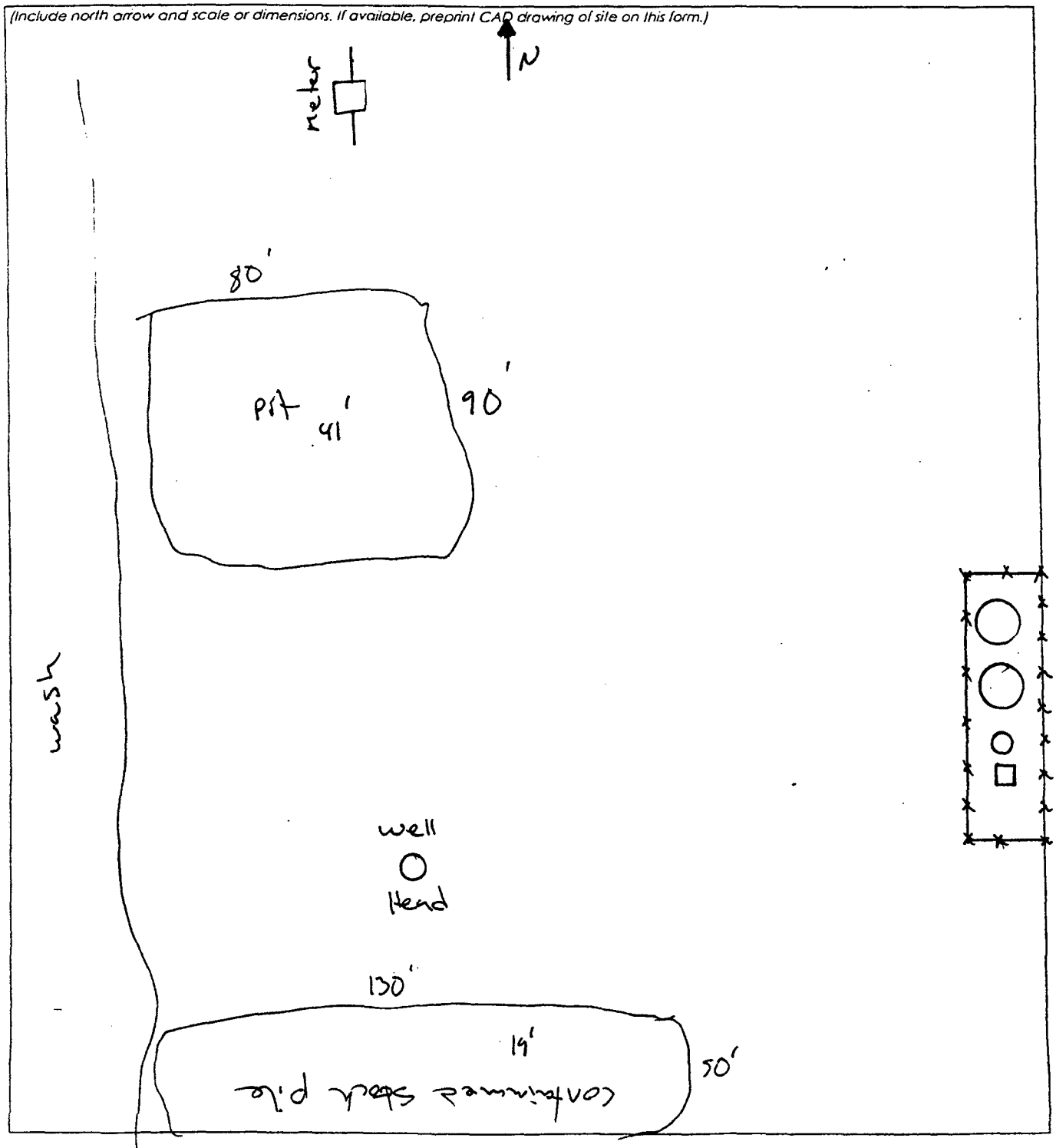
Project Manager Robert Thompson Phase.Task No. 3000.77

Client Company Burlington Resources

Site Name Fogelson 4-1 Com #14

Site Address Bloomfield N.M.

(Include north arrow and scale or dimensions. If available, preprint CAD drawing of site on this form.)



Sketched by (signature) _____ Date _____

AGRA Earth & Environmental
ENGINEERING GLOBAL SOLUTIONS

AGRA Earth & Environmental, Inc.
2060 Afton Place
Farmington, NM 87401
Tel: (505) 327-7928
Fax: (505) 326-5721

November 10, 1998
AEE Project No. 8529-000188

Philip Environmental Services Corp.
4000 Monroe Road
Farmington, New Mexico 87401

Attention: **Mr. Robert Thompson**

Regarding: **Environmental Cleanup Excavation**
Burlington Resources Oil and Gas Company
Fogelson 4-1 Com # 14-08-0001 Well Site
SF 043260C, 1190 Feet FSL and 1190 Feet FEL
Section 4, Township 29 North, Range 11 West, N.M.P.M.
San Juan County, New Mexico

Ladies and Gentlemen:

In accordance with the request of Mr. Robert Thompson of Philip Environmental, AGRA Earth and Environmental, Inc. (AEE) personnel visited the referenced site on Thursday, November 5, 1998, to observe the existing excavation and provide excavation guidelines for continuing the excavation below the 20 foot depth, which was excavated at the time of our site visit. It is understood that the excavation will continue to a depth near 40 feet, where groundwater is expected to be encountered.

The soils observed consisted of a fairly loose silty sand which exhibited signs of sloughing in the open excavation. It is recommended that in all areas, where personnel or equipment will be working in the excavation, the sides of the excavation be laid-back at an angle not to exceed 2:1 (horizontal to vertical). Spoils should be kept away from the edge of the excavation a distance at least equal to the depth of the excavation. The edges of the excavation should be checked regularly for tension cracks or other signs of possible slope failure. Any areas showing signs of slope failure should be repaired prior to personnel or equipment entering the excavation.

We appreciate the opportunity to be of service on this project. If you should have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
AGRA Earth & Environmental, Inc.

KIM M. PRESTON
NEW MEXICO
11871
REGISTERED PROFESSIONAL ENGINEER

Kim M. Preston, P.E. 11/10/98
Four Corners Area Manager

Copies: Addressee (3)

Drilling Log/Wellbore Diagram

RECORD OF SUBSURFACE EXPLORATION

Borehole # 1
Well # MW-B1
Page 1 of 2

Philip Environmental Services Corp.
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name
Project Number 21057 Phase 1000.99
Project Location Fogelson 4-1 Com

Elevation
Borehole Location
GWL Depth
Logged By P. Cheney
Drilled By K. Padilla
Date/Time Started 5/17/99 0930
Date/Time Completed 5/17/99 1230

Well Logged By P. Cheney
Personnel On-Site K. Padilla, D. Padilla, P. Cheney
Contractors On-Site
Client Personnel On-Site Ed. Hasely

Drilling Method 4 1/4" HSA
Air Monitoring Method PID

Depth (Feet)	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
0			Pit has been excavated to 11' (Ed Hasely, pers. com 5/17). Will collect first sample at 35' to 37'. Fill material is brown, medium to coarse grained sand.						
35	35 - 37	6"	very pale brown, medium grained sandstone No odor		35'	0.0	0.0		Bc=50 (6") S/HS = 0.0
40									

Comments: Auger refusal at 38', All samples appeared clean to 38'. Set 10' of screen From 38' to 28'. Sand pack to 35', open bore hole to ground surface. Approx 6"-10" of water in well

Geologist Signature Paul Cheney

RECORD OF SUBSURFACE EXPLORATION

Borehole # 1
Well # MW-B1
Page 2 of 2

Philip Environmental Services Corp.
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name
Project Number 21057 Phase 1000.99
Project Location Fogelson 4-1 Com

Elevation
Borehole Location
GWL Depth
Logged By P. Cheney
Drilled By K. Padilla
Date/Time Started 5/17/99 0930
Date/Time Completed 5/17/99 1250

Well Logged By P. Cheney
Personnel On-Site K. Padilla, D. Padilla, P. Cheney
Contractors On-Site
Client Personnel On-Site Ed Hensely

Drilling Method 4 1/4" HSA
Air Monitoring Method PID

Depth (Feet)	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
40	40	10"	very pale brown, medium to coarse grained sandstone, NO odor. cemented			0.0	0.0	0.0	BC= 50 (6") 50 (4") S/HS= 0.0
	42								
45	45	10"	color change at 45.5 feet. no light gray, medium grained sandstone, cemented			0.0	0.0	0.0	BC= 50/6" 50/4" S/HS= 0.0
	47								
	48	10"							
10			Auger refusal at approx 48'. Take Sample at 48'. Light grey, medium grained sandstone, cemented			0.0	0.0	0.0	BC= 50/6" 50/4"
15			Set 10' of 2" screen at approx 48'. Sand pack to 35' open borehole 35' to 0'						
20									
25									
30									
35									
40									

Comments:

Geologist Signature

MONITORING WELL INSTALLATION RECORD

Phillip Environmental Services Corp.
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Borehole # 1
Well # MW-B1
Page 1 of 1

Project Name
Project Number 21057 Phase 1000.99
Project Location Fogelson 4-1 Com

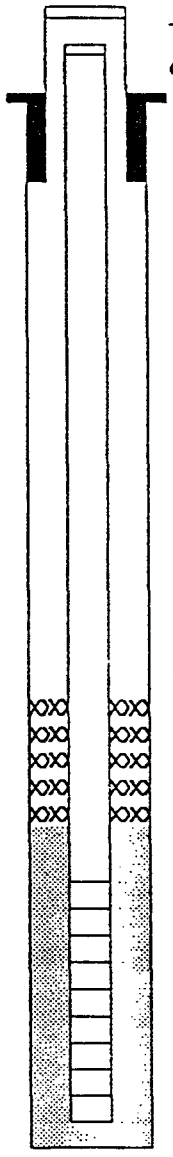
Elevation
Well Location Fogelson 4-1 Com
GWL Depth
Installed By K. Padilla

Date/Time Started 5/17/99 0530
Date/Time Completed 5/17/99 1230

On-Site Geologist P. Cheney
Personnel On-Site K. Padilla, D. Padilla, P. Cheney
Contractors On-Site
Client Personnel On-Site Ed Hasely

Depths in Reference to Ground Surface

Item	Material	Depth
Top of Protective Casing		
Bottom of Protective Casing		
Top of Permanent Borehole Casing		
Bottom of Permanent Borehole Casing		
Top of Concrete		
Bottom of Concrete		
Top of Grout		
Bottom of Grout		
Top of Well Riser		
Bottom of Well Riser		
Top of Well Screen		
Bottom of Well Screen		
Top of Peltonite Seal		
Bottom of Peltonite Seal		
Top of Gravel Pack		
Bottom of Gravel Pack		
Top of Natural Cave-In		
Bottom of Natural Cave-In		
Top of Groundwater		
Total Depth of Borehole		



Top of Protective Casing
Top of Riser
Ground Surface

Top of Seal N.A
Top of Gravel Pack 35'
Top of Screen 38'

Bottom of Screen 48'
Bottom of Borehole 48'

Comments: Temporary well installation, set screen 48'-38', sand pack to 35'
Open borehole from 35' to ground surface

Geologist Signature Paul Cheney

Analytical Results - Groundwater

PINNACLE
LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

Pinnacle Lab ID number **905106**
June 14, 1999

PHILIP ENVIRONMENTAL
4000 MONROE ROAD
FARMINGTON, NM 87401

Project Name BURLINGTON DRILLING
Project Number 21057

Attention: PAUL CHENEY

On 5/28/99 Pinnacle Laboratories, Inc. Inc., (ADHS License No. AZ0592), received a request to analyze **aqueous** 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.

EPA method 8021 was performed by Pinnacle Laboratories, Inc., Albuquerque, NM.

All other parameters were performed by Severn Trent (FL) Inc., Pensacola, FL.

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

Kimberly D. McNeill
Project Manager

H. Mitchell Rubenstein, Ph. D.
General Manager

MR: mt

Enclosure

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

CLIENT	: PHILIP ENVIRONMENTAL	PINNACLE ID	: 905106
PROJECT #	: 21057	DATE RECEIVED	: 5/28/99
PROJECT NAME	: BURLINGTON DRILLING	REPORT DATE	: 6/14/99

PIN ID. #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	BR-TAYLOR MW1	AQUEOUS	5/27/99
02	BR-FOGELSON MW1	AQUEOUS	5/27/99

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : PHILIP ENVIRONMENTAL
PROJECT # : 21057
PROJECT NAME : BURLINGTON DRILLING

PINNACLE I.D.: 905106

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	BR-TAYLOR MW1	AQUEOUS	5/27/99	NA	5/28/99	1
02	BR-FOGELSON MW1	AQUEOUS	5/27/99	NA	5/28/99	10

PARAMETER	DET. LIMIT	UNITS	BR-TAYLOR MW1	BR-FOGELSON MW1
BENZENE	0.5	**UG/L**	**64**	**5.0**
TOLUENE	0.5	UG/L	< 0.5	< 5.0
ETHYLBENZENE	0.5	**UG/L**	**23**	**210**
TOTAL XYLENES	0.5	**UG/L**	**98**	**420**
SURROGATE:				
TRIFLUOROTOLUENE (%)			85	95
SURROGATE LIMITS	(69 - 117)			

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

TEST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 905106
BLANK I. D.	: 052899	DATE EXTRACTED	: NA
CLIENT	: PHILIP ENVIRONMENTAL	DATE ANALYZED	: 5/28/99
PROJECT #	: 21057	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: BURLINGTON DRILLING		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
TRIFLUOROTOLEUEN (%)		100
SURROGATE LIMITS:	(69 - 117)	

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

TEST	: EPA 8021 MODIFIED		
MSMSD #	: 905111-01	PINNACLE I.D.	: 905106
CLIENT	: PHILIP ENVIRONMENTAL	DATE EXTRACTED	: NA
PROJECT #	: 21057	DATE ANALYZED	: 5/28/99
PROJECT NAME	: BURLINGTON DRILLING	SAMPLE MATRIX	: AQUEOUS
		UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
BENZENE	<0.5	10.0	10.1	101	10.5	105	4	(80 - 120)	20
TOLUENE	<0.5	10.0	10.5	105	10.5	105	0	(80 - 120)	20
ETHYLBENZENE	<0.5	10.0	10.8	108	10.8	108	0	(80 - 120)	20
TOTAL XYLENES	<0.5	30.0	32.2	107	32.0	107	1	(80 - 120)	20

CHEMIST NOTES:
N/A

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Committed To *Your* Success

Severn Trent Laboratories
11 East Olive Road
Pensacola FL 32514

Tel: (850) 474-1001
Fax: (850) 478-2671

SIGNATURE PAGE

Reviewed by: _____
STL Project Manager

Client:	PINNACLE LABORATORIES ALBUQUERQUE, NEW MEXICO
Project Name:	PHIL
Project Number:	905106
Project Location:	BURLINGTON DRILLING
Accession Number:	905635
Project Manager:	KIMBERLY D. MCNEILL
Sampled By:	N/S

SEVERN TRENT LABORATORIES, INC. – PENSACOLA, FLORIDA
STATE CERTIFICATIONS

Alabama Department of Environmental Management, Laboratory ID No. 40150 (Drinking Water by Reciprocity with FL)

Arizona Department of Health Services, Lab ID No. AZ0589 (Hazardous Waste & Wastewater)

Arkansas Department of Pollution Control and Ecology, (No Laboratory ID No. assigned by state) (Environmental)

State of California, Department of Health Services, Laboratory ID No. 2338 (Hazardous Waste and Wastewater)

State of Connecticut, Department of Health Services, Connecticut Lab Approval No. PH-0697 (Drinking Water, Hazardous Waste and Wastewater)

Delaware Health & Social Services, Division of Public Health, Laboratory ID No. FL094 (Drinking Water by Reciprocity with FL)

Florida DOH Laboratory ID No. 81142 (Drinking Water), Laboratory ID No. E81010 (Hazardous Waste and Wastewater)

Florida, Radioactive Materials License No. G0733-1

Foreign Soil Permit, Permit No. S-37599

Kansas Department of Health & Environment, Laboratory ID No. E10253 (Wastewater and Hazardous Waste)

Commonwealth of Kentucky, Natural Resources and Environmental Protection Cabinet, Laboratory ID No. 90043 (Drinking Water)

State of Louisiana, DHH, Office of Public Health Division of Laboratories, Laboratory ID No. 98-25 (Drinking Water)

State of Maryland, DH&MH Laboratory ID No. 233 (Drinking Water by Reciprocity with Florida)

Commonwealth of Massachusetts, DEP, Laboratory ID No. M-FL094 (Hazardous Waste and Wastewater)

State of Michigan, Bureau of E&OccH, Laboratory ID No.9912 (Drinking Water by Reciprocity with Florida)

New Hampshire DES, Laboratory ID No. 250598-A (Wastewater)

State of New Jersey, Department of Environmental Protection & Energy, Laboratory ID No. 49006 (Wastewate and Hazardous Waster)

New York State, Department of Health, Laboratory ID No. 11503 (Wastewater and Solids/Hazardous Waste)

North Carolina Department of Environment, Health, & Natural Resources, Laboratory ID No. 314 (Hazardous Waste and Wastewater)

North Dakota DH&Consol Labs, Laboratory ID No. R-108 (Hazardous Waste and Wastewater by Reciprocity with Florida)

State of Oklahoma, Oklahoma Department of Environmental Quality, Laboratory ID No. 9810 (Hazardous Waste and Wastewater)

Commonwealth of Pennsylvania, Department of Environmental Resources, Laboratory ID No. 68-467 (Drinking Water)

South Carolina DH&EC, Laboratory ID No. 96026 (Wastewater by Reciprocity with FL and Solids/Hazardous Waste by Reciprocity with CA)

Tennessee Department of Health & Environment, Laboratory ID No. 02907 (Drinking Water)

Tennessee Division of Underground Storage Tanks Approved Laboratory

Virginia Department of General Services, Laboratory ID No. 00008 (Drinking Water by Reciprocity with FL)

State of Washington, Department of Ecology, Laboratory ID No. C282 (Hazardous Waste and Wastewater)

West Virginia Division of Environmental Protection, Office of Water Resources, Laboratory ID No. 136 (Hazardous Waste and Wastewater by Reciprocity with FL)

American Industrial Hygiene Association (AIHA) Accredited Laboratory, Laboratory ID No. 9133

SEVERN TRENT LABORATORIES 11 East Olive Road Pensacola, Florida 32514 (850) 474-1001

Analysis Report

Analysis: Group of Single Wetchem

Accession:	905635
Client:	PINNACLE LABORATORIES
Project Number:	905106
Project Name:	PHIL
Project Location:	BURLINGTON DRILLING
Department:	WET CHEM

SEVERN TRENT LABORATORIES 11 East Olive Road Pensacola, Florida 32514 (850) 474-1001

"FINAL REPORT FORMAT - SINGLE"

Accession: 905635
Client: PINNACLE LABORATORIES
Project Number: 905106
Project Name: PHIL
Project Location: BURLINGTON DRILLING
Test: Group of Single Wetchem
Matrix: WATER
QC Level: I

Lab ID: 001
Client Sample Id: 905106-01
Sample Date/Time: 27-MAY-99 1015
Received Date: 29-MAY-99

Parameters:	Units:	Results:	Rpt Lmts:	Q:	Batch:	Analyst:
CHLORIDE (4500-CL E)	MG/L	45	2		CKW22C	WH
NITRITE-NITRATE, NITROGEN (353.2)	MG/L	2.0	0.1		N3W36A	WH
SULFATE (375.4/4500E/9038)	MG/L	1000	200	+	SEW052	BE
TOTAL DISSOLVED SOLIDS (160.1)	MG/L	1800	5		TDW027	ED

Comments:

SEVERN TRENT LABORATORIES 11 East Olive Road Pensacola, Florida 32514 (850) 474-1001

"FINAL REPORT FORMAT - SINGLE"

Accession: 905635
Client: PINNACLE LABORATORIES
Project Number: 905106
Project Name: PHIL
Project Location: BURLINGTON DRILLING
Test: Group of Single Wetchem
Matrix: WATER
QC Level: I

Lab ID: 002
Client Sample Id: 905106-02
Sample Date/Time: 27-MAY-99 1215
Received Date: 29-MAY-99

Parameters:	Units:	Results:	Rpt Lmts:	Q:	Batch:	Analyst:
CHLORIDE (4500-CL E)	MG/L	430	10	+	CKW22C	WH
NITRITE-NITRATE, NITROGEN (353.2)	MG/L	ND	0.1		N3W36A	WH
SULFATE (375.4/4500E/9038)	MG/L	9300	2000	+	SEW052	BE
TOTAL DISSOLVED SOLIDS (160.1)	MG/L	14000	5		TDW027	ED

Comments:

"Method Report Summary"

Accession Number: 905635
Client: PINNACLE LABORATORIES
Project Number: 905106
Project Name: PHIL
Project Location: BURLINGTON DRILLING
Test: Group of Single Wetchem

Client Sample Id:	Parameter:	Unit:	Result:
905106-01	CHLORIDE (4500-CL E)	MG/L	45
	NITRITE-NITRATE, NITROGEN (353.2)	MG/L	2.0
	SULFATE (375.4/4500E/9038)	MG/L	1000
	TOTAL DISSOLVED SOLIDS (160.1)	MG/L	1800
905106-02	CHLORIDE (4500-CL E)	MG/L	430
	SULFATE (375.4/4500E/9038)	MG/L	9300
	TOTAL DISSOLVED SOLIDS (160.1)	MG/L	14000

SEVERN TRENT LABORATORIES 11 East Olive Road Pensacola, Florida 32514 (850) 474-1001

Analysis Report

Analysis: RCRA METALS - AXIAL

Accession:	905635
Client:	PINNACLE LABORATORIES
Project Number:	905106
Project Name:	PHIL
Project Location:	BURLINGTON DRILLING
Department:	METALS

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"FINAL REPORT FORMAT - SINGLE"

Accession: 905635
Client: PINNACLE LABORATORIES
Project Number: 905106
Project Name: PHIL
Project Location: BURLINGTON DRILLING
Test: RCRA METALS - AXIAL
Matrix: WATER
QC Level: I

Lab Id: 001 Sample Date/Time: 27-MAY-99 1015
Client Sample Id: 905106-01 Received Date: 29-MAY-99

Parameters:	Units:	Results:	Rpt Lmts:	Q:	Batch:	Analyst:
SILVER (6010B)	MG/L	ND	0.005		AYW154	GSP
ARSENIC (6010B)	MG/L	ND	0.005		RYW154	GSP
BARIUM (6010B)	MG/L	0.38	0.01		BYW154	GSP
CADMIUM (6010B)	MG/L	ND	0.005		CYW154	GSP
CHROMIUM (6010B)	MG/L	0.008	0.005		HYW154	GSP
MERCURY (7470A)	MG/L	ND	0.0002		M7W047	JL
LEAD (6010B)	MG/L	0.042	0.005		PYW154	GSP
SELENIUM (6010B)	MG/L	ND	0.01		SYW154	GSP

Comments:

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"FINAL REPORT FORMAT - SINGLE"

Accession: 905635
Client: PINNACLE LABORATORIES
Project Number: 905106
Project Name: PHIL
Project Location: BURLINGTON DRILLING
Test: RCRA METALS - AXIAL
Matrix: WATER
QC Level: I

Lab Id: 002 Sample Date/Time: 27-MAY-99 1215
Client Sample Id: 905106-02 Received Date: 29-MAY-99

Parameters:	Units:	Results:	Rpt Lmts:	Q:	Batch:	Analyst:
SILVER (6010B)	MG/L	ND	0.005		AYW154	GSP
ARSENIC (6010B)	MG/L	0.006	0.005		RYW154	GSP
BARIUM (6010B)	MG/L	0.14	0.01		BYW154	GSP
CADMIUM (6010B)	MG/L	ND	0.005		CYW154	GSP
CHROMIUM (6010B)	MG/L	0.019	0.005		HYW154	GSP
MERCURY (7470A)	MG/L	ND	0.0002		M7W047	JL
LEAD (6010B)	MG/L	0.007	0.005		PYW154	GSP
SELENIUM (6010B)	MG/L	ND	0.01		SYW154	GSP

Comments:

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"Method Report Summary"

Accession Number: 905635
Client: PINNACLE LABORATORIES
Project Number: 905106
Project Name: PHIL
Project Location: BURLINGTON DRILLING
Test: RCRA METALS - AXIAL

Client Sample Id:	Parameter:	Unit:	Result:
905106-01	BARIUM (6010B)	MG/L	0.38
	CHROMIUM (6010B)	MG/L	0.008
	LEAD (6010B)	MG/L	0.042
905106-02	ARSENIC (6010B)	MG/L	0.006
	BARIUM (6010B)	MG/L	0.14
	CHROMIUM (6010B)	MG/L	0.019
	LEAD (6010B)	MG/L	0.007

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Data Qualifiers for Final Report

STL-Pensacola Inorganic/Organic and AFCEE Projects (under QAPP)

J4	(For positive results)	Temperature limits exceeded (≤2°C or ≥ 6°C)
J5	(TICs)	The reported value is quantitated as a TIC; therefore, it is estimated
J6	(For positive results)	LCS or Surrogate %R is > upper control limit (UCL) or < lower control limit (LCL)
J7	(For positive results)	The reported value is > the laboratory MDL and < lowest calibration standards; therefore, the quantitation is an estimation.
J (AFCEE description)	The analyte was positively identified, the quantitation is an estimation	
R1	(For nondetects)	Temperature limits exceeded (≤2°C or ≥ 6°C)
R2	Improper preservation, no preservative present in sample upon receipt	
R3	Improper preservation, incorrect preservative present in sample upon receipt	
R4	Holding time exceeded	
R5	Collection requirements not met, improper container used for sample	
R6	LCS or surrogate %R is < LCL and analyte is not detected or surrogate %R is < 10% for detects/nondetects	
R7	Internal standard area outside –50% to +100% of initial calibration midpoint standard.	
R8	Second source calibration verification exceeds acceptance criteria.	
R9	Improper preservation, sample not filtered in the field.	
R (AFCEE description)	The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria	
F	< laboratory or AFCEE RL and > laboratory MDL	
F (AFCEE description)	The analyte was positively identified but the associated numerical value is below the AFCEE or lab RL	
U2	≤ Laboratory MDL (value for result will be the MDL, never below the MDL)	
U (AFCEE description)	The analyte was analyzed for but not detected. The associated numerical value is at or below the MDL	
B (AFCEE description)	The analyte was found in the associated blank, as well as in the sample	
@	Adjusted reporting limit due to sample matrix (dilution prior to digestion and/or analysis)	
+	Elevated reporting limit due to dilution into calibration range	
*	Elevated reporting limit due to matrix interference (dilution prior to digestion and/or analysis)	
#	Elevated reporting limit due to insufficient sample size	
D	Diluted out	
M	A matrix effect was present (sample was analyzed twice to confirm or chromatogram had interfering peaks)	
S	Incorrect sample amount was submitted to the laboratory for analysis	
T	Second-column confirmation exceeded the SW-846 criteria of 40% RPD for this compound.	

ND = Not Detected at or above the STL-Pensacola reporting limit (RL)
IDL = Laboratory Instrument Detection Limit
RL = Reporting Limit (AFCEE RLs are listed in the AFCEE QAPP)
N/S = Not Submitted N/A = Not Applicable
MDL = Laboratory Method Detection Limit

Any time a sample arrives at the laboratory improperly preserved (at improper pH or temperature) or after holding time has expired or prepared or analyzed after holding time, client must be notified in writing (i.e. case narrative)

Florida Projects Inorganic/Organic
Refer to back side of this page

ICR Projects Inorganic/Organic

A1	Acceptable	R6	Rejected

Examples: ICR Flags
R6 = Laboratory extracted the sample but the refrigerator malfunctioned so the extract became warm and client was notified
R6 = Sample arrived in laboratory in good condition; however, the laboratory did not analyze it within EPA's established holding time limit.

CLP and CLP-like Projects: Refer to referenced CLP Statement of Work (SOW) for explanation of data qualifiers

SEVERN TRENT LABORATORIES 11 East Olive Road Pensacola, Florida 32514 (850) 474-1001

Quality Control Report

Analysis: Group of Single Wetchem

Accession:	905635
Client:	PINNACLE LABORATORIES
Project Number:	905106
Project Name:	PHIL
Project Location:	BURLINGTON DRILLING
Department:	WET CHEM

SEVERN TRENT LABORATORIES 11 East Olive Road Pensacola, Florida 32514 (850) 474-1001

"WetChem Quality Control Report"

Parameter:	CHLORIDE	NO2NO3	SULFATE	TDS
Batch Id:	CKW22C	N3W36A	SEW052	TDW027
Blank Result:	<2	<0.1	<5	<5
Anal. Method:	CL4500E	353.2	375.4	160.1
Prep. Method:	N/A	N/A	N/A	N/A
Analysis Date:	02-JUN-99	07-JUN-99	02-JUN-99	03-JUN-99
Prep. Date:	01-JUN-99	01-JUN-99	02-JUN-99	02-JUN-99
Sample Duplication				
Sample Dup:	905608-10	905611-1	905608-9	905635-1
Rept Limit:	<2	<0.1	<5	<5
Sample Result:	48.4	<0.1	19	1794
Dup Result:	48.4	<0.1	19	1856
Sample RPD:	0	N/C	0 G	3
Max RPD:	20	0.1	5	17
Dry Weight%	N/A	N/A	N/A	N/A
Matrix Spike				
Sample Spiked:	905608-10	905611-1	905608-9	N/A
Rept Limit:	<2	<0.1	<5	N/A
Sample Result:	48.4	<0.1	19	
Spiked Result:	73.4	0.97	38	
Spike Added:	25.0	1.00	20	
% Recovery:	100	97	95	
% Rec Limits:	79-132	71-123	61-138	
Dry Weight%	N/A	N/A	N/A	
ICV				
ICV Result:	50.2	1.94	20	
True Result:	50.0	2.00	20	
% Recovery:	100	97	100	
% Rec Limits:	90-110	90-110	90-110	
LCS				
LCS Result:				296
True Result:				293
% Recovery:				101
% Rec Limits:				73-125

SEVERN TRENT LABORATORIES 11 East Olive Road Pensacola, Florida 32514 (850) 474-1001

"Quality Control Comments"

Batch Id:	Comments:
TDW027	906013-1,2,3,4,5,6,7,8,9,10 were added to batch on 03-Jun-99
TDW027	906043-1,2,3 were added to batch on 04-Jun-99

----- Common Footnotes WetChem -----

N/A = NOT APPLICABLE.
N/S = NOT SUBMITTED.
N/C = SAMPLE AND DUPLICATE RESULTS ARE AT OR BELOW STL REPORTING LIMIT; THEREFORE, THE RPD IS "NOT CALCULABLE" AND NO CONTROL LIMITS APPLY.
N/D = NOT DETECTED AT OR ABOVE THE STL-PENSACOLA REPORTING LIMIT (RL).
R = REACTIVE
T = TOTAL
G = SAMPLE AND/OR DUPLICATE RESULT IS BELOW 5 X STL REPORTING LIMIT AND THE ABSOLUTE DIFFERENCE BETWEEN THE SAMPLE AND DUPLICATE RESULT IS AT OR BELOW STL REPORTING LIMIT; THEREFORE, THE RESULTS ARE "IN CONTROL".
Q = THE ANALYTICAL (POST-DISTILLATION) SPIKE IS REPORTED DUE TO PERCENT RECOVERY BEING OUTSIDE ACCEPTANCE LIMITS ON THE MATRIX (PRE-DISTILLATION) SPIKE.
# = ELEVATED REPORTING LIMIT DUE TO INSUFFICIENT SAMPLE.
+ = ELEVATED REPORTING LIMIT DUE TO DILUTION INTO CALIBRATION RANGE.
* = ELEVATED REPORTING LIMIT DUE TO MATRIX INTERFERENCE (DILUTION PRIOR DIGESTION AND/OR ANALYSIS).
@ = ADJUSTED REPORTING LIMIT DUE TO SAMPLE MATRIX (DILUTION PRIOR TO DIGESTION AND/OR ANALYSIS).
P = ANALYTICAL (POST DIGESTION) SPIKE.
I = DUPLICATE INJECTION.
& = AUTOMATED
F = SAMPLE SPIKED > 4 X SPIKE CONCENTRATION.
N/C+ = NOT CALCULABLE
H = SAMPLE AND/OR DUPLICATE RESULT IS BELOW 5 X STL REPORTING LIMIT AND THE ABSOLUTE DIFFERENCE BETWEEN THE RESULTS EXCEEDS THE STL REPORTING LIMIT; THEREFORE, THE RESULTS ARE "OUT OF CONTROL".
A = SAMPLE AND DUPLICATE RESULTS ARE "OUT OF CONTROL".
Z = THE SAMPLE RESULT FOR THE SPIKE IS BELOW THE REPORTING LIMIT. HOWEVER, THIS RESULT IS REPORTED FOR ACCURATE QC CALCULATIONS.
NH= SAMPLE AND / OR DUPLICATE RESULT IS BELOW 5 X STL REPORTING LIMIT AND THE ABSOLUTE DIFFERENCE BETWEEN THE RESULTS EXCEEDS THE STL REPORTING LIMIT; THEREFORE, THE RESULTS ARE "OUT OF CONTROL". SAMPLE IS NON-HOMOGENEOUS.
(*) = REPORTING LIMITS RAISED DUE TO CLP METHOD NOT REQUIRING A CONCENTRATION STEP FOR CN.
(CA) = SEE CORRECTIVE ACTIONS FORM.
**= MATRIX INTERFERENCE
SW-846, 3rd Edition, latest EPA-approved edition.
EPA 600/4-79-020, Revised March 1983.
STANDARD METHODS, For the Examination of Water and Wastewater, latest EPA-approved edition.
NIOSH Manual of Analytical Methods, 4th Edition.
ANNUAL BOOK OF ASTM STANDARDS, VOLUMES 11.01 and 11.02, latest EPA-approved edition.
METHODS FOR THE DETERMINATION OF INORGANIC SUBSTANCES IN ENVIRONMENTAL SAMPLES, EPA600/R-93/100, AUGUST 1993
METHODS FOR SOIL ANALYSIS, PART 2, CHEMICAL AND MICROBILOGICAL PROPERTIES, 2ND EDITION.
STL-PN USES THE MOST CURRENT PROMULGATED METHODS FROM THE REFERENCES LISTED ABOVE.

1. COLIFORM. COLIFORM PRECISION IS MEASURED BY THE ABSOLUTE DIFFERENCE BETWEEN THE LOGARITHM OF COLONIES PER 100 MLS OF SAMPLE ON DUPLICATE PLATES.
2. PH. PH PRECISION IS MEASURED BY THE ABSOLUTE DIFFERENCE BETWEEN THE SAMPLE AND DUPLICATE ANALYSIS.
3. FLASHPOINT. FLASHPOINT PRECISION IS MEASURED BY THE ABSOLUTE DIFFERENCE BETWEEN THE SAMPLE AND DUPLICATE ANALYSIS.

RPD = RELATIVE PERCENT DIFFERENCE (OR DEVIATION).
RPD LMTS = REPORTING LIMITS BASED ON METHOD DETECTION LIMIT STUDIES.
COE = EPA/COE, EPA/CE-81-1, 1981, AMMONIA, TKN, NO3-NO2, T-PO4 AND PHENOL PREPARATION METHODS.
SAMPLES AND QC SAMPLES ARE NOT ADJUSTED FOR DRY WEIGHT UNLESS REQUESTED BY THE CLIENT.

DPH = DOLLY P. HWANG RB = REBECCA BROWN WH = WENDY HAGGARD
ED = ESTHER DANTIN CR = CYNTHIA ROBERTS AB = AMY BRADLEY
BE = BETTY EVERTON PLD = PAULA L. DOUGHTY
RH = RICKY HAGENDORFER LT = LISA TORRES

SEVERN TRENT LABORATORIES 11 East Olive Road Pensacola, Florida 32514 (850) 474-1001

Quality Control Report

Analysis: RCRA METALS - AXIAL

Accession:	905635
Client:	PINNACLE LABORATORIES
Project Number:	905106
Project Name:	PHIL
Project Location:	BURLINGTON DRILLING
Department:	METALS

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"Metals Quality Control Report"

Parameter:	SILVER	ARSENIC	BARIUM	CADMIUM	CHROMIUM	MERCURY
Batch Id:	AYW154	RYW154	BYW154	CYW154	HYW154	M7W047
Blank Result:	<0.005	<0.005	<0.01	<0.005	<0.005	<0.0002
Anal. Method:	6010B	6010B	6010B	6010B	6010B	7470A
Prep. Method:	3010A	3010A	3010A	3010A	3010A	7470A
Analysis Date:	08-JUN-99	08-JUN-99	08-JUN-99	08-JUN-99	08-JUN-99	09-JUN-99
Prep. Date:	07-JUN-99	07-JUN-99	07-JUN-99	07-JUN-99	07-JUN-99	09-JUN-99
Sample Duplication						
Sample Dup:	905635-2	905635-2	905635-2	905635-2	905635-2	905588-1
Rept Limit:	<0.005	<0.005	<0.01	<0.005	<0.005	<0.0002
Sample Result:	0.55	1.0	1.1	0.48	0.99	0.0050
Dup Result:	0.54	1.0	1.1	0.48	0.99	0.0048
Sample RPD:	2	0	0	0	0	4
Max RPD:	20	20	20	20	20	20
Dry Weight%	N/A	N/A	N/A	N/A	N/A	N/A
Matrix Spike						
Sample Spiked:	905635-2	905635-2	905635-2	905635-2	905635-2	905588-1
Rept Limit:	<0.005	<0.005	<0.01	<0.005	<0.005	<0.0002
Sample Result:	<0.005	0.006	0.14	<0.005	0.019	<0.0002
Spiked Result:	0.55	1.0	1.1	0.48	0.99	0.0050
Spike Added:	0.5	1.0	1.0	0.5	1.0	0.0050
% Recovery:	110	99	96	96	97	100
% Rec Limits:	75-125	75-125	75-125	75-125	75-125	75-125
Dry Weight%	N/A	N/A	N/A	N/A	N/A	N/A
ICV						
ICV Result:	0.49	1.0	1.0	0.50	1.0	0.0039
True Result:	0.5	1.0	1.0	0.5	1.0	0.0040
% Recovery:	98	100	100	100	100	98
% Rec Limits:	90-110	90-110	90-110	90-110	90-110	90-110
LCS						
LCS Result:	0.52	1.0	1.0	0.52	1.0	0.0051
True Result:	0.5	1.0	1.0	0.5	1.0	0.0050
% Recovery:	104	100	100	104	100	102
% Rec Limits:	80-120	80-120	80-120	80-120	80-120	85-115

"Metals Quality Control Report"

Parameter:	LEAD	SELENIUM
Batch Id:	PYW154	SYW154
Blank Result:	<0.005	<0.01
Anal. Method:	6010B	6010B
Prep. Method:	3010A	3010A
Analysis Date:	08-JUN-99	08-JUN-99
Prep. Date:	07-JUN-99	07-JUN-99
Sample Duplication		
Sample Dup:	905635-2	905635-2
Rept Limit:	<0.005	<0.01
Sample Result:	0.96	1.0
Dup Result:	0.97	1.0
Sample RPD:	1	0
Max RPD:	20	20
Dry Weight%	N/A	N/A
Matrix Spike		
Sample Spiked:	905635-2	905635-2
Rept Limit:	<0.005	<0.01
Sample Result:	0.007	<0.01
Spiked Result:	0.96	1.0
Spike Added:	1.0	1.0
% Recovery:	95	100
% Rec Limits:	75-125	75-125
Dry Weight%	N/A	N/A
ICV		
ICV Result:	0.98	0.99
True Result:	1.0	1.0
% Recovery:	98	99
% Rec Limits:	90-110	90-110
LCS		
LCS Result:	1.0	0.99
True Result:	1.0	1.0
% Recovery:	100	99
% Rec Limits:	80-120	80-120

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--- Data Qualifiers for Metals QC Report ----

N/A = NOT APPLICABLE.
N/S = NOT SUBMITTED.
N/C = SAMPLE AND DUPLICATE RESULTS ARE AT OR BELOW THE REPORTING LIMIT; THEREFORE, THE RPD IS "NOT CALCULABLE" AND NO CONTROL LIMITS APPLY.
N/D = NOT DETECTED AT OR ABOVE THE STL-PENSACOLA REPORTING LIMIT (RL).
DISS. OR D = DISSOLVED
T & D = TOTAL AND DISSOLVED
R = REACTIVE
T = TOTAL
G = SAMPLE AND/OR DUPLICATE RESULT IS BELOW 5 X THE REPORTING LIMIT AND THE ABSOLUTE DIFFERENCE BETWEEN THE SAMPLE AND DUPLICATE RESULT IS AT OR BELOW STL REPORTING LIMIT; THEREFORE, THE RESULTS ARE "IN CONTROL".
Q = THE ANALYTICAL (POST-DIGESTION) SPIKE IS REPORTED DUE TO PERCENT RECOVERY BEING OUTSIDE ACCEPTANCE LIMITS ON THE MATRIX (PRE-DIGESTION) SPIKE.
# = ELEVATED REPORTING LIMIT DUE TO INSUFFICIENT SAMPLE.
+ = ELEVATED REPORTING LIMIT DUE TO DILUTION INTO CALIBRATION RANGE.
* = ELEVATED REPORTING LIMIT DUE TO MATRIX INTERFERENCE. (DILUTION PRIOR TO ANALYSIS)
@ = ADJUSTED REPORTING LIMIT DUE TO SAMPLE MATRIX. (DILUTION PRIOR TO DIGESTION)
P = ANALYTICAL (POST DIGESTION) SPIKE.
I = DUPLICATE INJECTION.
& = AUTOMATED
F = SAMPLE SPIKED > 4 X SPIKE CONCENTRATION.
N/C+ = NOT CALCULABLE
N/C* = NOT CALCULABLE; SAMPLE SPIKED > 4 X SPIKE CONCENTRATION.
H = SAMPLE AND/OR DUPLICATE RESULT IS BELOW 5 X STL REPORTING LIMIT AND THE ABSOLUTE DIFFERENCE BETWEEN THE RESULTS EXCEEDS THE STL REPORTING LIMIT; THEREFORE, THE RESULTS ARE "OUT OF CONTROL".
A = SAMPLE AND DUPLICATE RESULTS ARE "OUT OF CONTROL".
Z = THE SAMPLE RESULT FOR THE SPIKE IS BELOW THE STL REPORTING LIMIT. HOWEVER, THIS RESULT IS REPORTED FOR ACCURATE QC CALCULATIONS.
NH= THE RELATIVE PERCENT DIFFERENCE (RPD) EXCEEDS THE STL CONTROL LIMIT AND IS "OUT OF CONTROL; DUE TO A NON-HOMOGENEOUS SAMPLE MATRIX.
J = (FLORIDA DEP 'J' FLAG) - MATRIX SPIKE AND POST SPIKE RECOVERY IS OUT OF THE ACCEPTABLE RANGE. SEE OUT OF CONTROL EVENTS FORM.
U = (FLORIDA DEP 'U' FLAG) - THE COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.
S = METHOD OF STANDARD ADDITIONS (MSA) WAS PERFORMED ON THIS SAMPLE.
M = A MATRIX EFFECT WAS PRESENT (SAMPLE WAS ANALYZED TWICE TO CONFIRM).
SCN = SEE CASE NARRATIVE.

FROM QUALITY CONTROL REPORT:
RPD= RELATIVE PERCENT DEVIATION.
REPT LIMIT= REPORTING LIMIT BASED ON METHOD DETECTION LIMIT STUDIES.

NOTE: ALL RESULTS REPORTED UNDER 'SAMPLE DUPLICATION' ARE THE MS/MSD.

NOTE: THE UNITS REPORTED ON THE QUALITY CONTROL REPORT ARE REPORTED ON AN AS RUN BASIS. (NOT ADJUSTED FOR DRY WEIGHT).

SW-846, 3rd Edition.
EPA 600/4-79-020, Revised March 1983.
NIOSH Manual of Analytical Methods, 4th Edition.
Standard Methods For the Examination of Water and Wastewater, 18th Edition, 1992.
Methods For the Determination of Metals in Environmental Samples - Supplement I, EPA 600/R-94-111, May 1994.

GSP = GARY ST PERE LT = LISA TORRES KN = KAREN NALL
CH = CHRIS HIGH JL = JANET LECLEAR MPE = MARTY EDWARDS

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Data Qualifiers for Final Report

STL-Pensacola Inorganic/Organic and AFCEE Projects (under QAPP)

J4	(For positive results)	Temperature limits exceeded (≤2°C or ≥ 6°C)
J5	(TICs)	The reported value is quantitated as a TIC; therefore, it is estimated
J6	(For positive results)	LCS or Surrogate %R is > upper control limit (UCL) or < lower control limit (LCL)
J7	(For positive results)	The reported value is > the laboratory MDL and < lowest calibration standards; therefore, the quantitation is an estimation.
J (AFCEE description)	The analyte was positively identified, the quantitation is an estimation	
R1	(For nondetects)	Temperature limits exceeded (≤2°C or ≥ 6°C)
R2	Improper preservation, no preservative present in sample upon receipt	
R3	Improper preservation, incorrect preservative present in sample upon receipt	
R4	Holding time exceeded	
R5	Collection requirements not met, improper container used for sample	
R6	LCS or surrogate %R is < LCL and analyte is not detected or surrogate %R is < 10% for detects/nondetects	
R7	Internal standard area outside –50% to +100% of initial calibration midpoint standard.	
R8	Second source calibration verification exceeds acceptance criteria.	
R9	Improper preservation, sample not filtered in the field.	
R (AFCEE description)	The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria	
F	< laboratory or AFCEE RL and > laboratory MDL	
F (AFCEE description)	The analyte was positively identified but the associated numerical value is below the AFCEE or lab RL	
U2	≤ Laboratory MDL (value for result will be the MDL, never below the MDL)	
U (AFCEE description)	The analyte was analyzed for but not detected. The associated numerical value is at or below the MDL	
B (AFCEE description)	The analyte was found in the associated blank, as well as in the sample	
@	Adjusted reporting limit due to sample matrix (dilution prior to digestion and/or analysis)	
+	Elevated reporting limit due to dilution into calibration range	
*	Elevated reporting limit due to matrix interference (dilution prior to digestion and/or analysis)	
#	Elevated reporting limit due to insufficient sample size	
D	Diluted out	
M	A matrix effect was present (sample was analyzed twice to confirm or chromatogram had interfering peaks)	
S	Incorrect sample amount was submitted to the laboratory for analysis	
T	Second-column confirmation exceeded the SW-846 criteria of 40% RPD for this compound.	

ND = Not Detected at or above the STL-Pensacola reporting limit (RL) N/S = Not Submitted N/A = Not Applicable
IDL = Laboratory Instrument Detection Limit MDL = Laboratory Method Detection Limit
RL = Reporting Limit (AFCEE RLs are listed in the AFCEE QAPP)

Any time a sample arrives at the laboratory improperly preserved (at improper pH or temperature) or after holding time has expired or prepared or analyzed after holding time, client must be notified in writing (i.e. case narrative)

Florida Projects Inorganic/Organic
Refer to back side of this page

ICR Projects Inorganic/Organic

A1	Acceptable	R6	Rejected

Examples: ICR Flags
R6 = Laboratory extracted the sample but the refrigerator malfunctioned so the extract became warm and client was notified
R6 = Sample arrived in laboratory in good condition; however, the laboratory did not analyze it within EPA's established holding time limit.

CLP and CLP-like Projects: Refer to referenced CLP Statement of Work (SOW) for explanation of data qualifiers