3R - 57

REPORTS

DATE:

1994-95

Vastar Resources, Inc.

15375 Memorial Drive
Houston, Texas 77079
713 584-6000

July 28, 1995

Mr. Bill Olsen
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Subject: Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico.
January 1995 - Monitoring Well Plugging Report.

Dear Mr. Olsen,

Please find attached a letter report dated July 25, 1995 from Philip Environmental (formerly Burlington Environmental). The letter report details the procedures used to plug and abandon four ground water monitoring wells located at the Wood Federal in San Juan County, New Mexico.

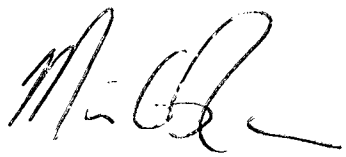
Briefly, on July 13, 1995, the well casings were ripped then filled with a cement and bentonite mixture from the bottom of the well to the top using a tremie pipe. The well casings were cut off or broken off below the surface and filled to the surface with the cement - bentonite mixture.

As per your letter of June 20, 1995, Vastar provided at least one week advance notice to OCD Aztec office and BLM Farmington office of the plugging activities. Neither OCD nor BLM were able to observe the plugging work conducted on the 13th of July.

I believe this report concludes all correspondence regarding the Wood pit closure and groundwater remediation, however, a final letter from your office for our files certifying that all work is complete in accordance with New Mexico standards would be appreciated. A final pit closure sundry will be submitted to BLM with a copy of this letter as an attachment.

Finally, I wish to thank you for all your work and attention to this matter. It has been a pleasure working with you on this project. If you have any questions or require additional information, please call me at 713-584-3192.

Sincerely,



Mario G. Ramon
Principal Environmental Consultant

cc:	Ron Johnston	Vastar - Farmington, NM
	Bill Leiss	BLM - Farmington, NM
	Denny Faust	OCD - Aztec, NM

PHILIP ENVIRONMENTAL

July 25, 1995 Project 14306

Mr. Mario Ramon
Principal Consultant
Safety, Health, and Environmental
Vastar Resources, Inc.
15375 Memorial Drive
Houston, Texas 77079

RE: Abandonment and Plugging of Four Monitoring Wells at the Vastar Wood WN Federal #1 Well Site, near Blanco, New Mexico

Dear Mr. Ramon:

Philip Environmental Services Corporation (Philip) is pleased to present this letter report documenting the abandonment of four monitoring wells located at the Vastar Wood WN Federal #1 Well Site. The abandonment method is described in this report and photographs of the procedures are attached.

Well abandonment procedures followed *New Mexico Environment Department-Ground Water Section, Monitor Well Construction and Abandonment Guidelines*. On July 13, 1995, Philip used the following methods to abandon the wells identified as MW-1, MW-2, MW-3, and MW-4, located at the above-mentioned well site. This work was performed using Philip's CME 75 hollow-stem auger drill rig. After positioning the drill rig over a well, a casing ripping tool was pushed down the entire length of the polyvinyl chloride (PVC) casing. The ripping tool consists of a ripping tooth welded onto a drill rod, which tears the casing as it is pushed to the bottom of the well.

After the casing was ripped, cement mixed with a minimum of 5% bentonite powder was pumped from the bottom to the top of the well using a tremie pipe. The steel protective casings at each well location were removed. At MW-1 and MW-3, the PVC casing was cut off at approximately one foot beneath ground surface. At MW-2 and MW-4, the PVC casing was broken off during the retrieval of the ripping tool. Approximately 2 feet of PVC casing was pulled out and broken off at MW-2. At MW-4, approximately 13 feet of PVC casing was pulled out and broken off. A hole was dug around the PVC casing to approximately 1 foot bgs and the perforated PVC casing filled with grout to the surface. After the grout began setting up, the holes were covered with sand from the site and a temporary post was placed in the ground to mark each well location. Attached to this report are photographs documenting the abandonment of these wells.

PHILIP ENVIRONMENTAL SERVICES CORPORATION
4000 Monroe Road • Farmington, NM 87401
(505) 326-2262 • Fax (505) 326-2388

Philip appreciates this opportunity to provide services to Vastar. If you have any questions regarding this work, please call Sarah Kelly in Farmington, New Mexico, at (505) 326-2262.

Sincerely,

PHILIP ENVIRONMENTAL SERVICES CORPORATION

Sarah Kelly

Sarah Kelly
Hydrogeologist

Attachment 1: Site Photographs

J:\14306\LRPT57

PHOTO 1
MW-3 - RIPPING CASING

PHOTO 2
MW-3 - RIPPED AND GROUTED

PHILIP ENVIRONMENTAL

PHOTO 3
MW-4 - RIPPING TOOL BEING RETRIEVED FROM WELL WITH CASING CAUGHT ON IT.

PHOTO 4
MW-4 - RIPPPED AND GROUTED

PHOTO 5
MW-1 - RIPPING TOOL AT TOP OF CASING

PHOTO 6
MW-1 - TREMIE PIPE GROUTING

PHOTO 7
MW-2 - WITH TOP OF CASING BROKEN OFF ON THE RIPPING TOOL AFTER RETRIEVAL

PHOTO 8
MW-2 - RIPPED, GROUTED, AND BEING COVERED

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

June 20, 1995

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-283

Mr. Mario G. Ramon
Vastar Resources, Inc.
15375 Memorial Drive
Houston, Texas 77079

RE: GROUND WATER SAMPLING REPORT
WOOD WN FEDERAL COM #1

Dear Mr. Ramon:

The New Mexico Oil Conservation Division (OCD) has completed a review of Vastar Resources, Inc. (VRI) May 16, 1995 "WOOD WN. FEDERAL COM #1, SAN JUAN COUNTY, BLANCO, NEW MEXICO, JANUARY 1995 - GROUND WATER SAMPLING RESULTS". This document contains the results of VRI's March 29, 1995 sampling of ground water related to the closure of an unlined pit at VRI's Wood WN Federal Com #1 well site. Also included is VRI's request for final closure of remedial actions at the site and a plan for plugging and abandonment of the monitor wells.

The above referenced final closure request and plugging plan is approved with the following conditions:

1. VRI will submit a plugging and abandonment completion report by July 28, 1995 which will contain information on the actual procedures used during plugging and abandonment of the monitor wells.

2. VRI will notify the OCD at least one week in advance of all scheduled activities such that the OCD has the opportunity to witness the events.

3. VRI will submit all original documents to the OCD Santa Fe Office with copies provided to the OCD Aztec District Office.

Please be advised that OCD approval does not relieve VRI of liability if remaining contaminants are found to pose a future threat to surface water, ground water, human health or the environment. In addition, OCD approval does not relieve VRI of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: OCD Aztec Office
Ilyse Gold, Farmington BLM District Office

Vastar Resources, Inc.

15375 Memorial Drive
Houston, Texas 77079
713 584-6000

May 16, 1995

Mr. Bill Olsen
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Subject: Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico. January 1995 - Ground Water Sampling Results.

Dear Mr. Olsen,

Please find attached the analytical results for the ground water sampling event of March 29, 1995 for Monitoring Wells No. 2 and No. 4 of the subject facility.

As you can see from analytical reports, down gradient Monitor Well No. 2 continues non-detect (fourth successive sampling event) for the contaminants of concern. And, from the table below, Monitor Well No. 4, located in the center of the remediated contaminant plume, has again exhibited a decrease in contaminant levels from the previous monitoring event of January, 1995.

Well No. 4 Analytical Results, *ug*/L (PPB)

	Benzene	Toluene	Ethyl Benzene	Xylenes
9/29/94	91	62	18	720
1/27/95	15	ND	9	117
3/29/95	11	6	6	50

We believe that BTEX compounds in the ground water are continuing to bio-degrade as evidenced by the continuing decline in contaminant levels. We believe that the pit remediation and ground water treatment conducted in March, 1994, has successfully remediated the aromatic hydrocarbons in the ground water to acceptable levels.

Although, 15 and 11 *ug*/L (parts per billion) do not numerically meet the New Mexico ground water standard of 10 parts per billion, we believe that additional monitoring and sampling is not warranted because there essentially is no detectable difference between Benzene concentrations of 11 PPB vs. the standard of 10 PPB; particularly when the analytical procedure has a 78% blank to spike recovery ratio. Also, please note that except for Benzene, all other aromatic constituents have met the New Mexico Water Quality Control Commission standards for BTEX in ground water on at least two successive sampling events.

Consequently, Vastar respectfully requests that NMOCD authorize closure of the Wood Federal ground water monitoring wells. We propose to plug these wells in such manner as to preclude migration of surface run-off or ground water along the length of the well. This shall be accomplished by removing the well casing and pumping expanding cement from the bottom of the well to the top using a tremie pipe. Where well casing cannot be removed, the casing shall be cut-off level at the concrete pad and filled with bentonite pellets from the bottom to the top. The well plugging procedures shall be consistent with the New Mexico Environmental Improvement Division, Monitoring Well Construction and Abandonment Policy, copy attached.

Vastar very much wants to close this project. We fully believe we have successfully remediated the pit and that the ground water treatment has effectively bio-degraded the hydrocarbon contaminants to levels consistent with OCD standards. Your written authorization to proceed with plugging of the Wood Federal ground water monitoring wells would be appreciated. Upon receipt of your written authorization to proceed with plugging of the wells, we will schedule the work, notify your office, notify Mr. Bill Liess of the BLM and submit the required sundry notices of pit closure to the BLM, Farmington Office.

Finally, I wish to thank you for all your work and attention to this matter. If you have any questions or require additional information, please call me at 713-584-3192.

Sincerely,

Mario G. Ramon
Principal Environmental Consultant

cc: Ron Johnston — Vastar - Farmington, NM
Bill Leiss — BLM - Farmington. NM

received 4/10/95

HOUSTON LABORATORY
8880 INTERCHANGE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

SPL, INC.

REPORT APPROVAL SHEET

WORK ORDER NUMBER: 95-03-C29

Approved for release by:

Date: 4/6/95

Brent Barron, Project Manager

Date: 4/7/95

S. Sample, Laboratory Director

Southern Petroleum Laboratories
****SUMMARY REPORT*****

04/06/95

Company: Vastar Resources
Site: Blanco, NM
Project No:
Project: Wood Fed

ANALYTICAL DATA
NOTE: ND - Not Detected

SPL ID MATRIX	CLIENT ID DATE SAMPLED	BENZENE PQL	TOLUENE PQL	ETHYLBENZ. PQL	XYLENE PQL	TPH-IR	TPH-GC	LEAD	MTBE
9503C29-01 WATER	MW 4 03/29/95 11:10:00	11 1µg/L	6 1µg/L	6 1µg/L	50 1µg/L				
9503C29-02 WATER	MW 2 03/29/95 11:05:00	ND 1µg/L	ND 1µg/L	ND 1µg/L	ND 1µg/L				

BTEX - METHOD 8020***

SPL, Inc., - Project Manager

Certificate of Analysis No.·H9-9503C29-01

Vastar Resources
15375 Memorial Drive
Houston, TX 77079
ATTN: M.G. Ramon

DATE: 04/06/95

PROJECT: Wood Fed
SITE: Blanco, NM
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 4

PROJECT NO:
MATRIX: WATER
DATE SAMPLED: 03/29/95 11:10:00
DATE RECEIVED: 03/30/95

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	11	1 P	µg/L
TOLUENE	6	1 P	µg/L
ETHYLBENZENE	6	1 P	µg/L
TOTAL XYLENE	50	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	73		µg/L

Surrogate	% Recovery
1,4-Difluorobenzene	83
4-Bromofluorobenzene	110

METHOD 8020***
Analyzed by: KA
Date: 04/05/95

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. H9-9503C29-02

Vastar Resources
15375 Memorial Drive
Houston, TX 77079
ATTN: M.G. Ramon

DATE: 04/06/95

PROJECT: Wood Fed
SITE: Blanco, NM
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 2

PROJECT NO:
MATRIX: WATER
DATE SAMPLED: 03/29/95 11:05:00
DATE RECEIVED: 03/30/95

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	ND	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L

Surrogate	% Recovery
1,4-Difluorobenzene	80
4-Bromofluorobenzene	97

METHOD 8020***
Analyzed by: KA
Date: 04/04/95

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL DOCUMENTATION

Matrix: Aqueous
Units: µg/L

Batch Id: HP_R950404020200

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	39	78.0	61 - 123
Toluene	ND	150	120	80.0	62 - 122
EthylBenzene	ND	50	41	82.0	56 - 119
O Xylene	ND	100	85	85.0	32 - 160
M & P Xylene	ND	200	170	85.0	32 - 160

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
Benzene	ND	50	45	90.0	44	88.0	2.25	25	39 - 150
Toluene	ND	150	130	86.7	130	86.7	0	26	56 - 134
EthylBenzene	ND	50	47	94.0	46	92.0	2.15	38	61 - 128
O Xylene	ND	100	90	90.0	88	88.0	2.25	20	40 - 130
M & P Xylene	ND	100	100	100	100	100	0	20	43 - 152

Analyst: KA
Sequence Date: 04/04/95
SPL ID of sample spiked: 9503C52-01A
Sample File ID: R___752.TXO
Method Blank File ID:
Blank Spike File ID: R___742.TXO
Matrix Spike File ID: R___745.TXO
Matrix Spike Duplicate File ID: R___746.TXO

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9503C26-02A 9503C26-01A 9503C52-02A 9503C19-03A
9503A53-02A 9503C19-01A 9503C19-08A 9503B62-02A
9503967-11A 9503C56-01A 9503C52-05A 9503C52-04A
9503C52-03A 9503C29-02A 9503C52-01A 9503C13-11A
9503C13-08A 9503C12-11A 9503B98-08A

Idelis Williams, QC Officer

Matrix: Aqueous
Units: µg/L

Batch Id: HP_R950404234700

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	38	76.0	61 - 123
Toluene	ND	50	42	84.0	62 - 122
EthylBenzene	ND	50	43	86.0	56 - 119
O Xylene	ND	50	43	86.0	32 - 160
M & P Xylene	ND	100	93	93.0	32 - 160

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
Benzene	ND	20	17	85.0	17	85.0	0	25	39 - 150
Toluene	ND	20	18	90.0	18	90.0	0	26	56 - 134
EthylBenzene	ND	20	20	100	18	90.0	10.5	38	61 - 128
O Xylene	ND	20	18	90.0	18	90.0	0	20	40 - 130
M & P Xylene	ND	40	38	95.0	37	92.5	2.67	20	43 - 152

Analyst: KA
Sequence Date: 04/04/95
SPL ID of sample spiked: 9503C72-01A
Sample File ID: R___784.TX0
Method Blank File ID:
Blank Spike File ID: R___775.TX0
Matrix Spike File ID: R___778.TX0
Matrix Spike Duplicate File ID: R___779.TX0

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9503C16-02A	9503C16-01A	9504154-01A	9504152-01A
9504151-01A	9504150-01A	*9503C29-01A	9503C72-08A
9504022-01A	9503C72-07A	9503C52-06A	9503C72-06A
9503C72-05A	9503C72-04A	9503C72-03A	9503C72-02A
9503C72-01A	9503C56-04A	9503C56-03A	9503C56-02A

Idelis Williams, QC Officer

CHAIN OF CUSTODY
AND
SAMPLE RECEIPT CHECKLIST

450021

BB

Page 1 of 1

Environmental Laboratory
8880 Interchange Drive
Houston, Texas 77054
713/660-0901

Analysis Request and Chain of Custody Record

Project No.	Client/Project Name	Project Location
Wood fed	Vastar	Blanco, NM

Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
MW 4	1110A 3/29/95	X		VOA	water	HCA	BTEX – Fax results to	
MW 2	1105A 3/29/95	X		VOA	Water	HCA	BTEX – M.G. Ramon	
							713-584-6515	

Samplers: (Signature)	Relinquished by: (Signature)	Date: 3/29/95 Time:	Received by: (Signature)	Date: Time:	Intact
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	Intact
	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	Intact
SAMPLER REMARKS: Mailed fed Ex airbill # 453074225 2			Received for laboratory: (Signature)	Date: 3/30/95 Time: 0758	Laboratory No.
Seal #			Data Results to:		

3 Contact

FedEx
Federal Express

RECIPIENT'S COPY

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL PACKAGE TRACKING NUMBER 4530742252

4530742252

Date 3-29-95

Your Name) Please Print	Your Phone Number (Very Important)	2 To (Recipient's Name) Please Print	Recipient's Phone Number (Very Important)
MARIO KUHON	(505)	SAMPLE RECEIVING	713-660-0401

Department/Floor No.	Company	Department/Floor No.
C/O BURLINGTON ENVIRONMENTAL INC.	SOUTHERN PETROLEUM LAB	

Street Address	Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.)
4000 MONROE	8880 INTERCHANGE

City	State	ZIP Required	City	State	ZIP Required
FARMINGTON	NM	87401	HOUSTON	TX	77054

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)

HF

H IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here
Street Address 4702 TRAVIS
City HOUSTON, State TX. ZIP Required 77002

3 PAYMENT 1 ☐ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card
☐ Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)	Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
11 ☐ OTHER PACKAGING	51 ☒ OTHER PACKAGING
16 ☐ FEDEX LETTER*	56 ☐ FEDEX LETTER*
12 ☐ FEDEX PAK*	52 ☐ FEDEX PAK*
13 ☐ FEDEX BOX	53 ☐ FEDEX BOX
14 ☐ FEDEX TUBE	54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day †)	Government Overnight (Restricted for authorized users only)
30 ☐ ECONOMY*	46 ☐ GOVT LETTER
	41 ☐ GOVT PACKAGE

* Economy Letter Rate not available. Minimum charge: One pound Economy rate.

Freight Service (for packages over 150 lbs.)
70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
80 ☐ TWO-DAY FREIGHT**
† Delivery commitment may be later in some areas.
**Declared Value Limit $500. **Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

Weekday Service
1 ☐ HOLD AT FEDEX LOCATION WEEKDAY (Fill in Section H)
2 ☒ DELIVER WEEKDAY

Saturday Service
31 ☐ HOLD AT FEDEX LOCATION SATURDAY (Fill in Section H)
3 ☐ DELIVER SATURDAY (Extra charge) (Not available to all locations)
9 ☐ SATURDAY PICK-UP (Extra charge)

Special Handling
4 ☐ DANGEROUS GOODS (Extra charge)
6 ☐ DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice, 9, UN 1845, ____ X ____ kg, 904 III
☐ DESCRIPTION
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
Total 1	Total 8	Total

DIM SHIPMENT (Chargeable Weight)
☐ ____ ____ lbs.
L x W x H

Received At
1 ☐ Regular Stop 3 ☐ Drop Box
2 ☒ On-Call Stop 4 ☐ B.S.C. 5 ☐ Station

7 Release Signature:

Emp. No.	Date	Federal Express Use
☐ Cash Received		Base Charges
☐ Return Shipment		
☐ Third Party ☐ Chg. To Del. ☐ Chg. To Hold		Declared Value Charge
Street Address		Other 1
City State Zip		Other 2
Received By: X		Total Charges
Date/Time Received	FedEx Employee Number	

REVISION DATE 4/94
PART #145412 FXEM 2/95
FORMAT #160
160

SPL HOUSTON ENVIRONMENTAL LABORATORY

SAMPLE LOGIN CHECKLIST

DATE: 3/30/95 TIME: _____ CLIENT NO. _____
LOT NO. _____ CONTRACT NO. _____

CLIENT SAMPLE NOS. _____

SPL SAMPLE NOS.: 9503C29

	YES	NO
1. Is a Chain-of-Custody form present?	✓	
2. Is the COC properly completed?	✓	
If no, describe what is incomplete:		
If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)		
3. Is airbill/packing list/bill of lading with shipment?	✓	
If yes, ID#:		
4. Is a USEPA Traffic Report present?		✓
5. Is a USEPA SAS Packing List present?		
6. Are custody seals present on the package?	✓	
If yes, were they intact upon receipt?	✓	
7. Are all samples tagged or labeled?	✓	
Do the sample tags/labels match the COC?	✓	
If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)		
8. Do all shipping documents agree?	✓	
If no, describe what is in nonconformity:		

9. Condition/temperature of shipping container: 3 C intact
10. Condition/temperature of sample bottles: ✓ 3 C intact
11. Sample Disposal?: SPL disposal ✓ Return to client _____

NOTES (reference item number if applicable): _____

ATTEST: R Dibau DATE: 3/30/95
DELIVERED FOR RESOLUTION: REC'D _____ DATE: _____
RESOLVED: _____ DATE: _____

Received 5/9/95

PHILIP ENVIRONMENTAL

May 1, 1995 Project 14306

Mr. Mario Ramon
Principal Consultant
Safety, Health, and Environmental
Vastar Resources, Inc.
15375 Memorial Drive
Houston, Texas 77079

RE: New Mexico Environmental Improvement Division's Well Abandonment Guidelines

Dear Mr. Ramon:

Enclosed is a copy of the New Mexico Environmental Improvement Division's Well Abandonment Guidelines. Philip Environmental Services Corporation (Philip) will follow these guidelines when abandoning any Vastar groundwater monitoring wells in the state of New Mexico.

If you have any questions regarding these guidelines, or Philip's proposal to abandon the four monitoring wells at the Vastar Wood WN Federal #1 Well Site, please call Sarah Kelly in Farmington at (505) 326-2262.

Sincerely,

PHILIP ENVIRONMENTAL SERVICES CORPORATION

Sarah E. Kelly

Sarah E. Kelly
Hydrogeologist

SK:tg

Enclosure -
As stated

J:\14306\ABAND2

PHILIP ENVIRONMENTAL SERVICES CORPORATION
5600 [illegible] • [illegible]
(505) 326-2262 • Fax (505) 326-2388

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
MONITORING WELL CONSTRUCTION AND ABANDONMENT POLICY

I. PURPOSE

Ground water quality monitoring wells should provide water samples which are technically and legally valid. The purpose of this policy is to provide minimum standards necessary to prevent monitoring wells from becoming sources of invalid data and providing conduits for contamination migration.

II. APPLICABILITY

All ground water monitoring wells installed and abandoned by Environmental Improvement Division personnel and all monitoring wells installed and abandoned as a requirement of the Division after this date will, at a minimum, conform to the policy presented below.

III. EFFECTIVE DATE

January 1, 1990

IV. GENERAL

This policy does not address design and installation procedures necessary to assure valid water samples. It is the responsibility of individual EID programs to establish appropriate additional and more strict requirements for design, installation and abandonment in response to specific situations and to conform to specific regulatory requirements (such as those for monitoring hazardous waste contamination). Exceptions to this policy may be granted by the Division Director.

V. POLICY STATEMENT

Completion Wherever practical, monitoring wells must be completed so that at least one foot of casing extends above grade. The top of the casing must be protected by a cap, and the exposed casing must be protected by a locking steel shroud (see diagram, over). Where permeable surface materials are penetrated by the well, a two foot minimum radius, four inch minimum thickness concrete pad shall surround the shroud. Where impermeable material (such as asphalt paving) is penetrated, a watertight bond must be formed between the shroud and the surface material.

Where physical conditions prohibit above-grade completions, completing wells below grade in protective housings is permitted. The top of the casing shall extend to at least four inches below land surface and its aperture covered with a water tight (preferably threaded) cap. A 12 inch minimum depth manhole of 12 inch diameter shall surround the exposed casing. The manhole shall be capped with a watertight locking cap. The manhole shall be surrounded by a two foot minimum radius, four inch thick, concrete pad sufficiently elevated to divert drainage away from the well.

Filter Packs and Seals At a minimum, the upper 10 feet of annular space must be sealed with a bentonite-cement slurry grout seal (two to eight percent bentonite by weight), except where shallow depth to ground water does not permit. Backfill may be uncontaminated native soil.

Filter packs should extend no more than two feet, and never more than five feet, above the well screen. Water table monitor wells must have a one-foot minimum linear dimension annular pelletized bentonite seal in the vadose zone above the filter pack and below the grout seal. In non-water-table and artesian aquifers, additional annular seals comprised of a minimum of two feet of bentonite must be placed with a tremie pipe so as to preclude the commingling of water from different aquifers.

Abandonment Monitoring wells no longer used shall be plugged in such a manner as to preclude migration of surface runoff or ground water along the length of the well. Where possible, this shall be accomplished by removing the well casing and pumping expanding cement from the bottom to the top of the well using a tremie pipe. Where properly sealed casing cannot be removed, the casing shall be cut off at the level of the concrete pad or impermeable surface and be filled with bentonite pellets from the bottom to the top.

Signed: _____ Date: 12/1/89

Richard Mitzelfelt, Director

Vastar Resources, Inc.

15375 Memorial Drive
Houston, Texas 77079
713 584-6000

March 6, 1995

Mr. Bill Olsen
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Subject: Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico. January 1995 - Ground Water Sampling Results.

Dear Mr. Olsen,

Please find attached the analytical results for the ground water sampling event of January, 1995 for Monitoring Wells No. 2 and No. 4 of the subject facility.

As you can see, down gradient Monitor Well No. 2 continues non-detect (third succesive sampling event) for any of the contaminants of concern. And, Well No. 4 located in the center of the remediated contaminant plume, has significantly decreased contaminant levels from the last monitoring event of September, 1994.

Well No. 4 Analytical Results

	Benzene	Toluene	EthylBenzene	Xylenes
9/29/94	91	62	18	720
1/27/95	15	ND	9	117

We believe that BTEX compounds in the ground water are continuing to bio-degrade as a result of the pit remediation and ground water treatment conducted in March of 1994. We are hopeful that the next sampling event scheduled for March of 1995 will yield analytical results of less than detection for the aromatic hydrocarbons.

We propose to conduct sampling of the MW-4 the end of this month for BTEX compounds. If the results are what we expect, less than detect for Benzene, then we propose to plug all the monitor wells. Based on the telephone conversations you

and I have had in the recent past, I understand that the OCD likes to see two consecutive sampling events at less than the New Mexico ground water standard of 10 ug/kg (PPB) before authorizing closure. I request that OCD reconsider this position for the Wood Federal Well because of the continuously decreasing level of Benzene in MW-4 and the fact that the last sampling report indicated 15 PPB, practically meeting the New Mexico Water Quality Control Commission standards for BTEX in the ground water of 10 PPB. All other constituents already meet the state requirements for ground water.

We very much want to bring this project to closure. We believe that we have successfully remediated the pit and that the ground water treatment is effectively bio-degrading the hydrocarbon contaminants. We believe the next sampling event, later this month, will prove closure is warranted. If however, the analytical results are indicative that continued monitoring is neccessary, then we will prepare a monitoring plan for your review and approval.

I will contact your office, the week of March 20th to discuss these plans and to solicit your comments prior to conducting the next sampling event.

Thank you for your attention to this matter. If you have any questions or require additional information, please call me at 713-584-3192.

Sincerely,

Mario G. Ramon
Principal Environmental Consultant
Vastar Resources, Inc.

cc: Ron Johnston — Vastar - Farmington, NM
Bill Leiss — BLM - Farmington. NM

HOUSTON LABORATORY
8880 INTERCHANGE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

SPL, INC.

REPORT APPROVAL SHEET

WORK ORDER NUMBER: 95-01-650

Approved for release by:

Date: 1/30/95

Brent Barron, Project Manager

Date: 1/30/95

S. Sample, Laboratory Director

Southern Petroleum Laboratories
******SUMMARY REPORT*******

01/27/95

Company: Vastar Resources
Site: Houston, TX
Project No:
Project: Vastar Wood Fed #1

ANALYTICAL DATA
NOTE: ND - Not Detected

SPL ID MATRIX	CLIENT ID DATE SAMPLED	BENZENE PQL	TOLUENE PQL	ETHYLBENZ. PQL	XYLENE PQL	TPH-IR	TPH-GC	LEAD	MTBE
9501650-01 WATER	MW-2 01/18/95 10:45:00	ND 1µg/L	ND 1µg/L	ND 1µg/L	ND 1µg/L				
9501650-02 WATER	MW-4 01/18/95 11:00:00	15 1µg/L	ND 1µg/L	9 1µg/L	117 1µg/L				

BTEX - METHOD 5030/8020 ***

SPL, Inc., - Project Manager

Certificate of Analysis No. H9-9501650-01

Vastar Resources
15375 Memorial Drive
Houston, TX 77079
ATTN: Mario Ramon

DATE: 01/26/95

PROJECT: Vastar Wood Fed #1
SITE: Houston, TX
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW-2

PROJECT NO:
MATRIX: WATER
DATE SAMPLED: 01/18/95 10:45:00
DATE RECEIVED: 01/19/95

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	ND	1 P	µg/L
TOTAL BTEX	ND		µg/L

Surrogate	% Recovery
1,4-Difluorobenzene	102
4-Bromofluorobenzene	100

METHOD 5030/8020 ***
Analyzed by: SLB
Date: 01/23/95

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. H9-9501650-02

Vastar Resources
15375 Memorial Drive
Houston, TX 77079
ATTN: Mario Ramon

DATE: 01/26/95

PROJECT: Vastar Wood Fed #1
SITE: Houston, TX
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW-4

PROJECT NO:
MATRIX: WATER
DATE SAMPLED: 01/18/95 11:00:00
DATE RECEIVED: 01/19/95

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	15	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	9	1 P	µg/L
TOTAL XYLENE	117	1 P	µg/L
TOTAL BTEX	141		µg/L

Surrogate	% Recovery
1,4-Difluorobenzene	98
4-Bromofluorobenzene	106

METHOD 5030/8020 ***
Analyzed by: LT
Date: 01/25/95

(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, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL DOCUMENTATION

Matrix: Aqueous Batch Id: HP_R950122225000
Units: µg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	47	94.0	61 - 123
Toluene	ND	50	50	100	62 - 122
EthylBenzene	ND	50	49	98.0	56 - 119
O Xylene	ND	50	52	104	32 - 160
M & P Xylene	ND	100	110	110	32 - 160

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
Benzene	ND	20	23	115	23	115	0	25	39 - 150
Toluene	ND	20	22	110	22	110	0	26	56 - 134
EthylBenzene	ND	20	23	115	23	115	0	38	61 - 128
O Xylene	1	20	24	115	23	110	4.44	20	40 - 130
M & P Xylene	1	40	48	118	47	115	2.58	20	43 - 152

Analyst: SLB
Sequence Date: 01/23/95
SPL ID of sample spiked: 9501725-01A
Sample File ID: R___417.TXO
Method Blank File ID:
Blank Spike File ID: R___428.TXO
Matrix Spike File ID: R___415.TXO
Matrix Spike Duplicate File ID: R___416.TXO

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9501673-01B	9501650-01A	9501583-02A	9501583-01A
9501675-07A	9501675-13A	9501675-12A	9501675-11A
9501675-10A	9501675-09A	9501751-15A	9501751-14A
9501751-13A	9501730-11A	9501730-10A	9501730-09A
9501730-08A	9501724-01A	9501732-01A	9501725-01A

Idelis Williams, QC Officer

Matrix: Aqueous
Units: ug/L

Batch Id: HP_R950125100300

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	48	96.0	61 - 123
Toluene	ND	50	48	96.0	62 - 122
EthylBenzene	ND	50	50	100	56 - 119
O Xylene	ND	50	50	100	32 - 160
M & P Xylene	ND	100	111	111	32 - 160

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
Benzene	2	20	22	100	26	120	18.2	25	39 - 150
Toluene	ND	20	22	110	21	105	4.65	26	56 - 134
EthylBenzene	ND	20	21	105	21	105	0	38	61 - 128
O Xylene	ND	20	23	115	23	115	0	29	40 - 130
M & P Xylene	ND	40	47	118	45	112	5.22	20	43 - 152

Analyst: LT
Sequence Date: 01/25/95
SPL ID of sample spiked: 9501723-01A
Sample File ID: R___509.TX0
Method Blank File ID:
Blank Spike File ID: R___501.TX0
Matrix Spike File ID: R___504.TX0
Matrix Spike Duplicate File ID: R___505.TX0

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9501662-03A 9501697-05A 9501650-02A 9501696-02A
9501707-11A 9501707-13A 9501707-17A 9501707-15A
9501707-12A 9501707-10A 9501707-09A 9501674-02A
9501751-06B 9501723-01A 9501736-02A

Idelis Williams, QC Officer

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

9501650 BB

BURLINGTON ENVIRONMENTAL
A Philip Environmental Company

Chain-of Custody Record

4000 Monroe Road
Farmington, NM 87401

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

COC Serial No. C 1073

Project Name	[illegible] Fed #1
Project Number	**Phase . Task** .
Samplers	M. Ramon
Laboratory Name	SPL
Laboratory Location	HOUSTON, TX

Type of Analysis and Bottle: BTEX (8020)

Sample Number (and depth)	Date	Time	Matrix	Total Number of Bottles	BTEX (8020)												Comments
MW-2	1/18	10:45 A		3	X												Fax results
MW-4	1/18	11:[illegible] A		3	X												to M. Ramon
																	713 584 6515
																	Std Turnaround

Relinquished by: / **Received By:**

Signature	Date	Time	Signature	Date	Time
[signature]	1/18/95	12:01pm	[signature]	1/18/95	12:01pm
[signature]	1/18/95	15:05	[signature]	1/19	1030 3 Cimag

Samples Iced: ☒ Yes ☐ No

Carrier: FED EX

Airbill No. 33[illegible]

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) ____

Shipping and Lab Notes:

Please send report + invoice to [illegible]tar [illegible] 15375 Memorial Drive, Houston, Tx 77079 attn: Mario Ramon [illegible] 584 [illegible]

BE-179 4/94

FedEx
Federal Express

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
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QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL PACKAGE TRACKING NUMBER 3382913715

3382913715

RECIPIENT'S COPY

1 Date 1-18-95

From (Your Name) Please Print: ALEX HAINS
Your Phone Number (Very Important): 403-220-2202
Company: [illegible] ENVIRONMENTAL
Department/Floor No.:
Street Address: [illegible]
City: [illegible] State: NM ZIP Required: 8 7 4 0 1

2 To (Recipient's Name) Please Print: Sample Receiving
Recipient's Phone Number (Very Important): (713) 660-0901
Company: Southern Petroleum Lab
Department/Floor No.:
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 8880 Interchange
City: Houston State: TX ZIP Required: 77054

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)

H IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here
Street Address: 4702 Travis
City: Houston State: TX ZIP Required: 77002

3 PAYMENT 1 ☐ Bill Sender 2 ☒ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card 5 ☐ Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)	Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
11 ☐ OTHER PACKAGING	51 ☒ OTHER PACKAGING
16 ☐ FEDEX LETTER*	56 ☐ FEDEX LETTER*
12 ☐ FEDEX PAK*	52 ☐ FEDEX PAK*
13 ☐ FEDEX BOX	53 ☐ FEDEX BOX
14 ☐ FEDEX TUBE	54 ☐ FEDEX TUBE
Economy Two-Day (Delivery by second business day †)	**Government Overnight** (Restricted to authorized users only)
30 ☐ ECONOMY*	46 ☐ GOVT LETTER
	41 ☐ GOVT PACKAGE

* Economy Letter Rate not available. Minimum charge: One pound Economy rate.

Freight Service (for packages over 150 lbs.)
70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
80 ☐ TWO-DAY FREIGHT**
† Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

Weekday Service
1 ☒ HOLD AT FEDEX LOCATION WEEKDAY (Fill in Section H)
2 ☐ DELIVER WEEKDAY

Saturday Service
31 ☐ HOLD AT FEDEX LOCATION SATURDAY (Fill in Section H)
3 ☐ DELIVER SATURDAY (Extra charge) (Not available to all locations)
9 ☐ SATURDAY PICK-UP (Extra charge)

Special Handling
4 ☐ DANGEROUS GOODS (Extra charge)
6 ☐ DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice, 9, UN 1845, _____ X _____ kg, 904 III
☐ DESCRIPTION
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	5	
Total 1	Total 5	Total

DIM SHIPMENT (Chargeable Weight)
☐ _____ lbs.
L X W X H

Received At
1 ☐ Regular Stop 3 ☐ Drop Box
2 ☐ On-Call Stop 4 ☐ B.S.C. 5 ☐ Station

7 Release Signature: X

Emp. No. Date
☐ Cash Received
☐ Return Shipment
☐ Third Party ☐ Chg. To Del. ☐ Chg. To Hold
Street Address
City State Zip
Received By: X
Date/Time Received FedEx Employee Number

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 4/94
PART #145412 FXEM 9/94
FORMAT #160
160

SPL HOUSTON ENVIRONMENTAL LABORATORY

SAMPLE LOGIN CHECKLIST

DATE: 1/19 TIME: _____ CLIENT NO. _____
LOT NO. _____ CONTRACT NO. _____

CLIENT SAMPLE NOS. _____

SPL SAMPLE NOS.: 95016(50

	YES	NO
1. Is a Chain-of-Custody form present?	✓	
2. Is the COC properly completed?	✓	
If no, describe what is incomplete:		
If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)		
3. Is airbill/packing list/bill of lading with shipment?	✓	
If yes, ID#: BY FED EX		
4. Is a USEPA Traffic Report present?		
5. Is a USEPA SAS Packing List present?		✓
6. Are custody seals present on the package?	✓	
If yes, were they intact upon receipt?	✓	
7. Are all samples tagged or labeled?	✓	
Do the sample tags/labels match the COC?	✓	
If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)		
8. Do all shipping documents agree?	✓	
If no, describe what is in nonconformity:		

9. Condition/temperature of shipping container: 3C INTACT
10. Condition/temperature of sample bottles: ✓ 3C INTACT
11. Sample Disposal?: SPL disposal ✓ Return to client _____

NOTES (reference item number if applicable): _____

ATTEST: RDisbell DATE: 1/19
DELIVERED FOR RESOLUTION: REC'D _____ DATE: _____
RESOLVED: _____ DATE: _____

Vastar Resources, Inc.

15375 Memorial Drive
Houston, Texas 77079
713 584-6000

November 15, 1994

Mr. Bill Olsen
New Mexico Oil Conservation Division
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Subject: Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico.

Dear Mr. Olsen,

Please find attached a copy of the recently completed ground water sampling report for the subject facility. This report provides a summary of the analytical results for the sampling conducted on September 29, 1994. All analytical reports and field data are included.

We believe that BTEX compounds in the ground water are being bio-degraded as a result of the pit remediation and ground water treatment completed last March. By comparing the excavated soil from the 22-foot depth interval to the ground water sampled in September, a significant reduction of BTEX compounds have been realized. We recognize that this is a soil vs. ground water comparison but it is representative of a significant reduction in overall contamination.

It is important to note that total BTEX in the ground water is 891 ug/kg. This compares very favorably to the Commission's total maximum allowable of 2130 ug/kg for all BTEX compounds. Although the Benzene level is nine times higher than the Commission's standard (91 ug/kg vs. 10 ug/kg respectfully) the Toluene and Ethyl benzene levels are more than ten times less than the standard and total Xylenes are just slightly over the allowable. Vastar believes that these concentrations of BTEX compounds are indicative that we have accomplished the intended goal of pit remediation and meeting the New Mexico Water Quality Control Commission standards for BTEX in the ground water.

Also included in the attached report is a summary (Table 4) of the metals analysis you requested for MW-4.

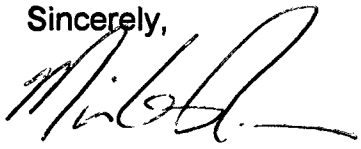
Vastar would like to bring this project to closure. We believe that we have successfully remediated the pit. We believe that the ground water treatment is effectively bio-degrading the hydrocarbon contaminants and that the ground water is

very close to or well below the individual pollutant standards specified in Part 3-103 of the New Mexico Water Quality Regulations. We request that the New Mexico Oil Conservation Division review the enclosed report and accept it as the final report.

If NMOCD concurs that this project should be finalized, please advise me and I will prepare and submit appropriate Sundry notices to the Bureau of Land Management and copy your office.

Thank you for your attention to this matter. If you have any questions or require additional information, please call me at 713-584-3192.

Sincerely,



Mario G. Ramon
Principal Environmental Consultant
Vastar Resources, Inc.

cc: Ron Johnston Vastar - Farmington, NM
Bill Leiss BLM - Farmington. NM

BURLINGTON
ENVIRONMENTAL

November 10, 1994
Project 13067

Mr. Mario G. Ramon
Principal Consultant
Safety, Health, and Environmental
Vastar Resources, Inc.
15375 Memorial Drive
Houston, Texas 77079

Dear Mr. Ramon:

Subject: Groundwater Sampling Results for the Wood WN Federal #1 Well Site, Near Blanco, New Mexico

Enclosed are the laboratory analytical reports documenting the results of the groundwater sampling conducted on September 29, 1994. Four wells, MW-1, MW-2, MW-3, and MW-4, were sampled on that date. Samples were preserved on ice for transport to the laboratory. All samples collected were sent to Southern Petroleum Laboratories, Inc. in Houston, Texas under strict chain-of-custody procedures. Well-purging data were recorded on "Well Development and Purging Data" forms. Information on the water samples collected was recorded on "Water Sampling Data" forms.

Groundwater samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8020. None of these parameters were detected in the samples from MW-1, MW-2, or MW-3. The results of the analysis for MW-4, along with results from a previous sampling event and the New Mexico Water Quality Control Commission (NMWQCC) standards, are summarized in Table 1. Table 1 compares the BTEX analysis results of the March 22, 1994, pit excavation soil sampling with the September 29, 1994, MW-4 water sample results.

All four wells were also sampled and analyzed for total petroleum hydrocarbons (TPH) in the gasoline and diesel ranges by EPA Method 8015, Modified. As required by the New Mexico Oil Conservation Division, MW-4 was sampled for NMWQCC Metals by EPA methods. These analyses, as well as chain-of-custody and quality assurance/quality control information, are included with the laboratory analytical reports in Appendix A.

Groundwater samples for polynuclear aromatic hydrocarbon (PAH) analysis were collected from all four wells. The sample collected from MW-4 for PAH analysis was analyzed by EPA Method 610 on September 30, 1994. None of the PAH compounds were detected in the MW-4 sample, therefore the samples from MW-1, MW-2, and MW-3 were not analyzed for PAH. The groundwater from MW-4 was also analyzed for major ions that included calcium, chloride, carbonate, bicarbonate, potassium, magnesium, and sodium. Nitrate, sulfate, pH, and total dissolved solids were also analyzed in the sample from MW-4. A summary of these analyses is presented in Table 5. These analyses, as well as chain-of-custody and quality assurance/quality control information, are included with the laboratory analytical reports in Appendix A.

Burlington Environmental Inc.
4000 Monroe Road • Farmington, NM 87401
Phone 505/326-2262 • FAX 505/326-2388

If you have any questions regarding these results, please call Martin Nee or Allen Hains in our Farmington office at (505) 326-2262.

Sincerely,

BURLINGTON ENVIRONMENTAL INC.

Sarah Kelly

Sarah Kelly
Geologist

Martin J. Nee
Project Manager

SK/lcc/210wl

Table 1

Groundwater Sampling Results for September 29, 1994, and Pit Excavation Soil Sampling Results from March 22, 1994, Benzene, Toluene, Ethylbenzene, and Total Xylenes

	Benzene µg/kg	Toluene µg/kg	Ethylbenzene µg/kg	Total Xylenes µg/kg
Pit Excavation Soil at 22',	105	9,500	3,090	53,100
MW-4	91	62	18	720
WQCC	10	750	750	620

µg/L = micrograms per liter
µg/kg = micrograms per kilogram
WQCC = New Mexico Water Quality Control Commission Standard for Groundwater

Table 2
Groundwater Sampling Results for September 29, 1994
Benzene, Toluene, Ethylbenzene, and Total Xylenes

	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L
MW-1	ND (1)	ND (1)	ND (1)	ND (1)
MW-2	ND (1)	ND (1)	ND (1)	ND (1)
MW-3	ND (1)	ND (1)	ND (1)	ND (1)
MW-4	91 (10)	62 (10)	18 (10)	720 (10)

ND = Not Detected
µg/L = micrograms per liter
Detection limits are given in parentheses.

Table 3
Groundwater Sampling Results for September 29, 1994
Gasoline and Diesel Range Total Petroleum Hydrocarbons

	Gasoline mg/L	Diesel mg/L
MW-1	ND (0.1)	0.22 (0.1)
MW-2	ND (0.1)	0.19 (0.1)
MW-3	ND (0.1)	ND (0.1)
MW-4	5.2 (1.0)	3.9 (2.0)

mg/L = milligrams per liter
ND = Not Detected
Detection limits are given in parentheses

Table 4
Groundwater Sampling Results for September 29, 1994
WQCC Metals, MW-4

	Silver mg/L	Arsenic mg/L	Barium mg/L	Cadmium mg/L	Chromium mg/L	Mercury mg/L	Lead mg/L	Selenium mg/L
MW-4	ND (0.06)	0.2 (0.1)	5.81 (0.06)	ND (0.08)	0.4 (0.2)	ND (0.0004)	ND (1.0)	ND (0.008)
WQCC	0.05	0.1	1.0	0.01	0.05	0.002	0.05	0.05

mg/L = milligrams per liter
ND = Not Detected
WQCC = New Mexico Water Quality Control Commission Standard for Groundwater
Detection limits are given in parentheses.

Table 5
General Chemistry Analysis, MW-4

	MW-4	WQCC
Calcium	542 (0.07)	NS
Chloride	11 (1.0)	250
Carbonate	ND (1.0)	NS
Bicarbonate	198 (1.0)	NS
Potassium	0.8 (0.4)	NS
Magnesium	48 (0.1)	NS
Sodium	255 (0.2)	NS
Nitrate	ND (0.05)	10
Sulfate	1,700 (100)	600
pH pH units	7.78 (NA)	6 - 9
TDS	2,700 (4.0)	1,000
Specific Conductance µmhos/cm	3,000 (1.0)	NS

TDS = Total Dissolved Solids
Units are mg/L unless otherwise indicated
NS = No Standard
NA = Not applicable
WQCC = New Mexico Water Quality Control Commission Standard for Groundwater
Detection limits are given in parentheses.

HOUSTON LABORATORY
8880 INTERCHANGE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

SPL, INC.

REPORT APPROVAL SHEET

WORK ORDER NUMBER: 94-09-B38

Approved for release by:

Date: 10/19/94

Brent Barron, Project Manager

Date: 10/19/94

S. Sample, Laboratory Director

Certificate of Analysis No. 9409B38-01

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 1-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 12:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	ND	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	95		
4-Bromofluorobenzene	28 «		
METHOD 8020***			
Analyzed by: JZL			
Date: 10/10/94			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	34 «		
Modified 8015 - Gasoline			
Analyzed by: JZL			
Date: 10/10/94			
Total Petroleum Hydrocarbons-Diesel	0.22	0.1 P	mg/L
Surrogate	**% Recovery**		

ND - Not detected. (P) - Practical Quantitation Limit
« - Recovery beyond control limits.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-01

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 1-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 12:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
n-Pentacosane	CI		
Mod. 8015 - Diesel			
Analyzed by: APM			
Date: 10/09/94 20:33:00			
Liquid-liquid extraction	10/05/94		
METHOD 3520 ***			
Analyzed by: DR			
Date: 10/05/94			

CI - Coeluting interference.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-02

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 2-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 13:30:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	ND	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	96		
4-Bromofluorobenzene	30 «		
METHOD 8020***			
Analyzed by: JZL			
Date: 10/10/94			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	36 «		
Modified 8015 - Gasoline			
Analyzed by: JZL			
Date: 10/10/94			
Total Petroleum Hydrocarbons-Diesel	0.19	0.1 P	mg/L
Surrogate	**% Recovery**		

ND - Not detected. (P) - Practical Quantitation Limit
« - Recovery beyond control limits.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-02

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 2-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 13:30:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
n-Pentacosane	CI		
Mod. 8015 - Diesel			
Analyzed by: APM			
Date: 10/09/94 20:33:00			
Liquid-liquid extraction	10/05/94		
METHOD 3520 ***			
Analyzed by: DR			
Date: 10/05/94			

CI - Coeluting interference.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-03

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/17/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 3-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 13:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	ND	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	95		
4-Bromofluorobenzene	28 «		
METHOD 8020***			
Analyzed by: JZL			
Date: 10/10/94			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	33 «		
Modified 8015 - Gasoline			
Analyzed by: JZL			
Date: 10/10/94			
Total Petroleum Hydrocarbons-Diesel	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	52		
Mod. 8015 - Diesel			
Analyzed by: APM			
Date: 10/09/94 20:33:00			

ND - Not detected. (P) - Practical Quantitation Limit
« - Recovery beyond control limits.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-03

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/17/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 3-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 13:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction METHOD 3520 *** Analyzed by: DR Date: 10/05/94	10/05/94		

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-04

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 4-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 14:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	91	10 P	µg/L
TOLUENE	62	10 P	µg/L
ETHYLBENZENE	18	10 P	µg/L
TOTAL XYLENE	720	10 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	891		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	99		
4-Bromofluorobenzene	84		
METHOD 8020***			
Analyzed by: JZL			
Date: 10/11/94			
Petroleum Hydrocarbons - Gasoline	5.2	1.0 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	120		
4-Bromofluorobenzene	124		
Modified 8015 - Gasoline			
Analyzed by: JZL			
Date: 10/11/94			
Total Petroleum Hydrocarbons-Diesel	3.9	2 P	mg/L
Surrogate	**% Recovery**		

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-04

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 4-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 14:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
n-Pentacosane Mod. 8015 - Diesel Analyzed by: APM Date: 10/09/94 20:33:00	CI		
Calcium, Dissolved METHOD 6010 *** Analyzed by: DQ Date: 10/13/94	542	0.07	mg/L
Chloride METHOD 325.3 * Analyzed by: ET Date: 10/07/94	11	1	mg/L
Carbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: ST Date: 09/30/94	ND	1	mg/L
Specific Conductance METHOD 120.1 * Analyzed by: CA Date: 09/30/94	3000	1	umhos/cm
Bicarbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: ST Date: 09/30/94	198	1	mg/L

CI - Coeluting interference. ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-04

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 4-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 14:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Potassium, Dissolved METHOD 6010 Analyzed by: JM Date: 10/07/94	0.8	0.4	mg/L
Magnesium, Dissolved METHOD 6010 Analyzed by: DQ Date: 10/13/94	48.0	0.1	mg/L
Sodium, Dissolved METHOD 6010 Analyzed by: DQ Date: 10/13/94	255	0.2	mg/L
Nitrate nitrogen(as N) METHOD 353.3 Analyzed by: ET Date: 10/05/94	ND	0.05	mg/L
pH METHOD 150.1 * Analyzed by: CA Date: 09/30/94	7.78		pH units
Sulfate METHOD 375.4 * Analyzed by: ST Date: 10/13/94	1700	100	mg/L

ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-04

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 4-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 14:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Dissolved Solids METHOD 160.1 * Analyzed by: CA Date: 10/03/94	2700	4	mg/L
Liquid-liquid extraction METHOD 3520 *** Analyzed by: DR Date: 10/05/94	10/05/94		
Silver, Total METHOD 6010 *** Analyzed by: DQ Date: 10/05/94	ND	0.06	mg/L
Arsenic, Total METHOD 7060 *** Analyzed by: WFL Date: 10/06/94	0.2	0.1	mg/L
Barium, Total METHOD 6010 *** Analyzed by: DQ Date: 10/05/94	5.81	0.06	mg/L

ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-04

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 4-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 14:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total METHOD 6010 *** Analyzed by: DQ Date: 10/05/94	ND	0.08	mg/L
Chromium, Total METHOD 6010 *** Analyzed by: DQ Date: 10/05/94	0.4	0.2	mg/L
Mercury, Total METHOD 7470 *** Analyzed by: JM Date: 10/04/94	ND	0.0004	mg/L
Acid Digestion-Aqueous, ICP METHOD 3010 *** Analyzed by: PB Date: 10/03/94	10/03/94		
Acid Digestion-Aqueous, GF METHOD 3020 *** Analyzed by: PB Date: 10/03/94	10/03/94		

ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-04

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 4-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 14:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Lead, Total METHOD 6010 *** Analyzed by: DQ Date: 10/05/94	ND	1	mg/L
Selenium, Total METHOD 7740 *** Analyzed by: WFL Date: 10/07/94	ND	0.008	mg/L

ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-04

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

10/19/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Burlington Environmental
SAMPLE ID: MW 4-1

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94 14:00:00
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	MDL*	UNITS
Naphthalene	ND	0.20	µg/L
Acenaphthylene	ND	0.10	µg/L
Acenaphthene	ND	0.40	µg/L
Fluorene	ND	0.80	µg/L
Phenanthrene	ND	1.2	µg/L
Anthracene	ND	1.0	µg/L
Fluoranthene	ND	0.80	µg/L
Pyrene	ND	0.60	µg/L
Benzo (a) anthracene	ND	4.0	µg/L
Chrysene	ND	1.6	µg/L
Benzo (b) fluoranthene	ND	4.0	µg/L
Benzo (k) fluoranthene	ND	4.0	µg/L
Benzo (a) pyrene	ND	5.6	µg/L
Dibenzo (a,h) anthracene	ND	4.0	µg/L
Benzo (g,h,i) perylene	ND	4.0	µg/L
Indeno (1,2,3-cd) pyrene	ND	4.0	µg/L

SURROGATES	% RECOVERY
2-Fluorobiphenyl	129

ANALYZED BY: APM DATE/TIME: 10/02/94 11:28:00
EXTRACTED BY: BV DATE/TIME: 09/30/94
METHOD: EPA 610 - Polynuclear Aromatic Hydrocarbons
NOTES: * - Method Detection Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Certificate of Analysis No. 9409B38-05

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401
ATTN: Allen Haines

DATE: 10/17/94

PROJECT: Vaster-Wood-Fed
SITE:
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank

PROJECT NO: 13067
MATRIX: WATER
DATE SAMPLED: 09/29/94
DATE RECEIVED: 09/30/94

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	ND	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	32 «		
METHOD 8020***			
Analyzed by: JZL			
Date: 10/09/94			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	95		
4-Bromofluorobenzene	41 «		
Modified 8015 - Gasoline			
Analyzed by: JZL			
Date: 10/09/94			

ND - Not detected. (P) - Practical Quantitation Limit
« - Recovery beyond control limits.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL DOCUMENTATION

Matrix: Aqueous Batch Id: HP_R941009142200
Units: µg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	42	84.0	54 - 126
Toluene	ND	50	42	84.0	61 - 125
EthylBenzene	ND	50	32	64.0	57 - 129
O Xylene	ND	50	37	74.0	32 - 160
M & P Xylene	ND	100	81	81.0	32 - 160

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
Benzene	ND	20	22	110	21	105	4.65	19	61 - 131
Toluene	ND	20	21	105	20	100	4.88	18	57 - 127
EthylBenzene	ND	20	14	70.0	13	65.0	7.41	18	55 - 131
O Xylene	ND	20	16	80.0	14	70.0	13.3	20	40 - 130
M & P Xylene	ND	40	30	75.0	28	70.0	6.90	16	43 - 152

Analyst: JZL
Sequence Date: 10/09/94
SPL ID of sample spiked: 9410010-02A
Sample File ID: R___990.TXO
Method Blank File ID:
Blank Spike File ID: R___980.TXO
Matrix Spike File ID: R___982.TXO
Matrix Spike Duplicate File ID: R___983.TXO

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID): 9410010-04A 9410010-05A 9410010-03A 9410010-02A
9409B38-03A 9409B38-02A 9409B38-01A 9410078-04A
9410078-03A 9410078-01A 9409B38-05A 9410078-05A

Idelis Williams, QC Officer

Matrix: Aqueous Batch Id: HP_R941010190200
Units: µg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	50	100	54 - 126
Toluene	ND	50	49	98.0	61 - 125
EthylBenzene	ND	50	39	78.0	57 - 129
O Xylene	ND	50	44	88.0	32 - 160
M & P Xylene	ND	100	98	98.0	32 - 160

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
Benzene	ND	20	21	105	23	115	9.09	19	61 - 131
Toluene	ND	20	19	95.0	21	105	10.0	18	57 - 127
EthylBenzene	ND	20	14	70.0	15	75.0	6.90	18	55 - 131
O Xylene	ND	20	17	85.0	16	80.0	6.06	20	40 - 130
M & P Xylene	ND	40	33	82.5	34	85.0	2.99	16	43 - 152

Analyst: JZL
Sequence Date: 10/10/94
SPL ID of sample spiked: 9410223-01A
Sample File ID: R___059.TX0
Method Blank File ID:
Blank Spike File ID: R___044.TX0
Matrix Spike File ID: R___047.TX0
Matrix Spike Duplicate File ID: R___048.TX0

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9410135-01A 9410135-03A 9410135-04A 9410135-02A
9410135-05A 9410148-06A 9410148-07A 9410148-02A
9410148-01A 9410174-02A 9410078-02A 9409B38-04A
9410174-01A 9410223-01A 9409B84-02A 9409B26-02A
9410223-03A

Idelis Williams, QC Officer

Modified 8015 - Gasoline

Matrix: Aqueous
Units: mg/L

Batch Id: HP_R941009135400

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Petroleum Hydrocarbons	ND	5.0	4.5	90.0	56 - 139

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
Petroleum Hydrocarbons	ND	2.5	1.8	72.0	1.8	72.0	0	18	40 - 158

Analyst: JZL
Sequence Date: 10/09/94
SPL ID of sample spiked: 9410002-03A
Sample File ID: RR__993.TX0
Method Blank File ID:
Blank Spike File ID: RR__984.TX0
Matrix Spike File ID: RR__987.TX0
Matrix Spike Duplicate File ID: RR__988.TX0

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9410002-07A 9410010-04A 9410010-05A 9410002-06A
9410002-05A 9410002-04A 9410002-03A 9410002-02A
9410010-03A 9410010-02A 9409B38-03A 9409B38-02A
9409B38-01A 9410078-04A 9410078-03A 9410078-01A
9409B38-05A 9410078-05A

Idelis Williams, QC Officer

Modified 8015 - Gasoline

Matrix: Aqueous **Batch Id:** HP_R941012205100

Units: mg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Petroleum Hydrocarbons	ND	5.0	5.2	104	56 - 139

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
Petroleum Hydrocarbons	ND	2.5	1.8	72.0	1.8	72.0	0	18	40 - 158

Analyst: JZL
Sequence Date: 10/10/94
SPL ID of sample spiked: 9410148-01A
Sample File ID: RR__069.TXO
Method Blank File ID:
Blank Spike File ID: RR__051.TXO
Matrix Spike File ID: RR__052.TXO
Matrix Spike Duplicate File ID: RR__053.TXO

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9409966-06A 9410231-09A 9410213-08A 9410210-08A
9410210-07A 9410210-05A 9410210-04A 9410210-03A
9410210-02A 9410227-03A 9410078-02A 9409B38-04A
9410026-05A

Idelis Williams, QC Officer

Matrix:	Aqueous	**Reported on:**	10/17/94 16:11:41
Sample ID:	941005CXB1	**Analyzed on:**	10/09/94 20:33:00
Batch ID:	HP_T941009203300	**Analyst:**	APM

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Petroleum Hydrocarbons-Diesel (Water)
Mod. 8015 - Diesel

COMPOUND	Sample Value mg/L	Spike Added mg/L	MS % Recovery #	MSD % Recovery #	Relative % Difference #
PETROLEUM HYDROCARBONS-DIE	ND	4.6	99	93	6

NOTES

column to be used to flag recovery and RPD values with an asterisk
* values outside of QC Limits.

Idelis Williams, QC Officer

Matrix:	Aqueous	**Reported on:**	10/17/94 16:12:45
Sample ID:	940930CXB1	**Analyzed on:**	10/02/94 11:28:00
Batch ID:	VARH941002112800	**Analyst:**	APM

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Method 610 [40 CFR]
Polynuclear Aromatics

COMPOUND	Sample Value µg/L	Spike Added µg/L	MS % Recovery #	MSD % Recovery #	Relative % Difference #
Naphthalene	ND	25.00	93	76	20
Acenaphthylene	ND	25.00	97	77	23
Acenaphthene	ND	25.00	100	80	22
Fluorene	ND	25.00	101	82	20
Phenanthrene	ND	25.0	102	80	24
Anthracene	ND	25.0	97	78	23
Fluoranthene	ND	25.00	103	81	24
Pyrene	ND	25.00	103	83	22
Chrysene	ND	25.0	100	77	26
Benzo (a) anthracene	ND	25.0	98	77	25
Benzo (b) fluoranthene	ND	25.0	103	89	15
Benzo (k) fluoranthene	ND	25.0	115	90	24
Benzo (a) pyrene	ND	25.0	94	74	24
Dibenzo (a,h) anthracene	ND	25.0	104	92	12
Benzo (g,h,i) perylene	ND	25.0	100	82	20
Indeno (1,2,3-cd) pyrene	ND	25.0	91	73	22

NOTES

column to be used to flag recovery and RPD values with an asterisk
* values outside of QC Limits.

Idelis Williams, QC Officer

HOUSTON ENVIRONMENTAL

ICPQAQC.RC REV.4/94

ICP SPECTROSCOPY
QUALITY ASSURANCE AND CONTROL REPORT

Date of Analysis: 10-13-94 Time: 09:16 AM. Analyst: RR Units: mg/L.

Inst. ☑ Thermo-Jarrell Ash 61E ☐ Perkin Elmer Plasma 40 File #: A101374 Method: ☐ 200.7 ☑ 6010 Digest: N/A TCLP: ☐ Water ☐ Soil ☐ Other ☐ Oil Matrix: ☐ Soil ☑ Water ☐ Leachate

SPL Sample #'s In Batch:

9409B38 - 4B			
9409B12 - 2A			

SPL QA/QC Sample ID: #1 9409B12 - 2A * #2 _____ #3 _____

(* Dilution X10 FOR SPIKE ONLY)

Blank and Check Standard				QA/QC	Matrix Spike and Spike Duplicate Data					
Elem.	Method Blank	LCS Theoret.	LCS Rec. (±20%)	Sample Conc.	Spike Added	Spike Conc.	Spk. Dup. Conc.	Spike % Rec.	Spk. Dup. % Rec.	MS-MSD % RPD
CA	N/A	N/A	N/A	11.94	10.0	23.76	22.99	118.2	110.5	7
MG	↓	↓	↓	7.175	↓	16.84	16.23	96.7	90.6	7
NA	↓	↓	↓	36.79	↓	45.63	44.57	88.4	77.8	13

*Flags ☐ MS or MSD Out of QA Limits (±25%)
☐ Spike RPD Out of QA Limits (±20%)
☐ See Case Narrative
☐ Within Soil LCS Limits
Analyst _____

Supervisor Approval _____ Date 10/14/94

QA/QC Approval _____ Date 10/14/94
Idelis Williams, QC Officer

Wet Chemistry QA/QC Validation Report

Test Name CHLORIDE

Test Code: CLD Date: 10-7-94 Time 7:00 PM Analyst ET

Samples in Batch: E409 Matrix: LIQUID Units: MG/L Method: 325.3

(Sample #'s Listed Below)

E409A70-1A;3A→9A				
E409B38-4B				

Standards	Actual Concentration	Theoretical Concentration	% Recovery	QC Limits (**) (Mandatory) Upper Limit	Lower Limit
Blank	ND	<0.1	ND	NA	NA
Check Std. 1	101.97	100.00	101.97	102.90	96.90
Check Std. 2					
Check Std. 3					
LCS					

Spike Sample ID	Sample Result <2>	Spike Added <3>	Matrix Spike Results <1>	Matrix Spike % Recovery <4>	Matrix Spike Duplicate Results <1>	Matrix Spike Duplicate % Recovery <5>	MS/MSD Relative Percent Difference	QC Limits (**) (Advisory) RPD Max.	Recovery Range
E409A70-1A	8.99	50.00	59.98	101.98	60.98	103.98	1.94	NA	121.80 / 71.60

Spike Recovery Calculation

$$\% \text{ Rec.} = \frac{\langle 1 \rangle - \langle 2 \rangle}{\langle 3 \rangle} \times 100$$

* = Values Outside of QC Range

(**) = Source: SPL Houston Historical

Relative Percent Difference Calculation

$$\% \text{ RPD} = \frac{\langle 4 \rangle - \langle 5 \rangle}{\langle 4 \rangle + \langle 5 \rangle \times 0.5} \times 100$$

Reviewed By: [signature] Date: 10/10/94

Approved By: [signature] Date: 10/10/94

[signature] Date: 10-10-94

Idelis Williams, QC Officer

WETDUPQA.RC Rev. 4/94

Wet Chemistry QA/QC Validation Report

SAM Test Code: C03 Date: 9/30/94 Analyst: CA/ST

Method 4500D-CO2 Time: 2:00pm Matrix ☒ Liquid ☐ Soil ☐ Other

# of Samples in Batch: 1 Test Name: Carbonate Reporting Units: mg/L

SPL Sample #'s in Batch:

9409B38-4B		

Standards	Actual Concentration	Theoretical Concentration	Percent Recovery	QC Limits (**) (Mandatory) Upper Limit	Lower Limit
Blank					
Check Standard 1	24	24.2	99.2	27.4	21.5
Check Standard 2					
Check Standard 3					
LCS (Outside Source)					

DUPLICATES

QA/QC Duplicate SPL Sample ID	Sample Result <1>	Sample Result <2>	Relative Percent Difference	QC LIMITS (**) (Advisory) Relative Percent Difference Max.
9409B38-4B	ND	ND	0	2.17

Relative Percent Difference (RPD) Calculation:

$$RPD = \frac{|<1> - <2>|}{(<1> + <2>) \times 0.5} \times 100$$

(**) = Source: SPL Houston Historical Data

* = Indicates Value Outside QA/QC Range

Reviewed By: _____ Date: 10-3-94

Approved By: _____ Date: 10/3/94

QA/QC Approval: _____ Date: 10/3/94

Idelis Williams, QC Officer

WETDUPQA.RC Rev. 4/94

Wet Chemistry QA/QC Validation Report

SAM Test Code: COND Date: 9/30/94 Analyst: CA/SI

Method 120.1 Time: 3:00pm Matrix ☒ Liquid ☐ Soil ☐ Other

# of Samples in Batch: 1 Test Name: Conductivity Reporting Units: µmhos/cm

SPL Sample #'s in Batch:

9409B38 -4B		

Standards	Actual Concentration	Theoretical Concentration	Percent Recovery	QC Limits (**) (Mandatory) Upper Limit	QC Limits (**) (Mandatory) Lower Limit
Blank	0.60	<1	ND	NA	NA
Check Standard 1	102	101.5	100.5		
Check Standard 2	988	988	100.0	100.12	99.86
Check Standard 3	1047.0	1047.3	99.9	100.57	99.63
LCS (Outside Source)					

DUPLICATES

QA/QC Duplicate SPL Sample ID	Sample Result <1>	Sample Result <2>	Relative Percent Difference	QC LIMITS (**) (Advisory) Relative Percent Difference Max.
9409B38 -4B	3.00	3.00	0	1.90

Relative Percent Difference (RPD) Calculation:

$$RPD = \frac{|<1> - <2>|}{(<1> + <2>) \times 0.5} \times 100$$

(**) = Source: SPL Houston Historical Data

* = Indicates Value Outside QA/QC Range

Approved By: _____ Date: 10/3/94

Reviewed By: _____ Date: 10-3-94

QA/QC Approval: _____ Date: 10/3/94

Idelis Williams, QC Officer

WETDUPQA.RC Rev. 4/94

Wet Chemistry QA/QC Validation Report

SAM Test Code: HCO3 Date: 9/30/94 Analyst: CA/ST

Method 4500D-CO2 Time: 2:00pm Matrix ☒ Liquid ☐ Soil ☐ Other

# of Samples in Batch: 1 Test Name: Bicarbonate Reporting Units: mg/L

SPL Sample #'s in Batch:

9409B38-4B		

Standards	Actual Concentration	Theoretical Concentration	Percent Recovery	QC Limits (**) (Mandatory) Upper Limit	QC Limits (**) (Mandatory) Lower Limit
Blank					
Check Standard 1	24	24.2	99.2	27.4	21.5
Check Standard 2					
Check Standard 3					
LCS (Outside Source)					

DUPLICATES

QA/QC Duplicate SPL Sample ID	Sample Result <1>	Sample Result <2>	Relative Percent Difference	QC LIMITS (**) (Advisory) Relative Percent Difference Max.
9409B38-4B	198	198	0	2.90

Relative Percent Difference (RPD) Calculation:

$$RPD = \left| \frac{<1> - <2>}{(<1> + <2>) \times 0.5} \right| \times 100$$

(**) = Source: SPL Houston Historical Data

* = Indicates Value Outside QA/QC Range

Approved By: _____ Date: 10/3/94

Reviewed By: _____ Date: 10-3-94

QA/QC Approval: _____ Date: 10/3/94

Idelis Williams, QC Officer

HOUSTON ENVIRONMENTAL
ICP SPECTROSCOPY
QUALITY ASSURANCE AND CONTROL REPORT

ICPQAQC.RC REV.4/94

Date of Analysis: 10/7/94 Time: 10:29 Analyst: JM Units: mg/L

Inst. ☐ Thermo-Jarrell Ash 61E ☑ Perkin Elmer Plasma 40 File #: ICC7A Method: ☐ 200.7 ☐ 6010 Digest: N/A TCLP: ☐ Water ☐ Soil ☐ Other ☐ Oil Matrix: ☐ Soil ☑ Water ☐ Leachate

SPL Sample #'s In Batch:

9409B38-4B	9409B12-2A		

SPL QA/QC Sample ID: #1 9409B12-2A #2 _____ #3 _____

Blank and Check Standard				QA/QC	Matrix Spike and Spike Duplicate Data					
Elem.	Method Blank	LCS Theoret.	LCS Rec. (±20%)	Sample Conc.	Spike Added	Spike Conc.	Spk. Dup. Conc.	Spike % Rec.	Spk. Dup. % Rec.	MS-MSD % RPD
Al	N/A	N/A	N/A	0.891	2.0*	2.795	3.022	105.2	106.6	1

*Flags ☐ MS or MSD Out of QA Limits (±25%)
☐ Spike RPD Out of QA Limits (±20%)
☐ See Case Narrative
☐ Within Soil LCS Limits _____

Supervisor Approval _____ Date 10-7-94

QA/QC Approval _____ Date 10-7-94
Idelis Williams, QC Officer

Analyst Jaime Marroquin

* Boron Spiked.

Wet Chemistry QA/QC Validation Report

Test Name NITRATE

Test Code: NO_3 Date: 10-5-94 Time 8:30am Analyst ET

Samples in Batch: 8 Matrix: LIQUID Units: mg/L Method: 352.1

(Sample #'s Listed Below)

409838-4B				
410076-1F → 3F				
410136-1F → 3F & 7F				

Standards	Actual Concentration	Theoretical Concentration	% Recovery	QC Limits (**) (Mandatory) Upper Limit	Lower Limit
Blank	ND	ND	NA		
Check Std. 1	0.482	0.50	96.4	114.94	79.84
Check Std. 2	0.48	0.50	96		
Check Std. 3	0.52	0.50	104		
LCS	2.14	2.0	107	2.27	1.71

Spike Sample ID	Sample Result <2>	Spike Added <3>	Matrix Spike Results <1>	Matrix Spike % Recovery <4>	Matrix Spike Duplicate Results <1>	Matrix Spike Duplicate % Recovery <5>	MS/MSD Relative Percent Difference	QC Limits (**) (Advisory) RPD Max.	Recovery Range
~~410136~~									
410076-1F	0.56	0.40	0.98	105	0.93	92.5	12.5	Ins Data	121.7-77.3

Spike Recovery Calculation

$$\% \text{ Rec.} = \frac{\langle 1 \rangle - \langle 2 \rangle}{\langle 3 \rangle} \times 100$$

* = Values Outside of QC Range

(**) = Source: SPL Houston Historical

Relative Percent Difference Calculation

$$\% \text{ RPD} = \frac{\langle 4 \rangle - \langle 5 \rangle}{\langle 4 \rangle + \langle 5 \rangle \times 0.5} \times 100$$

Reviewed By: Date: 10/14/94

Approved By: Date: 10/14/94

Idelis Williams, QC Officer Date: 10-14-94

WETDUPQA.RC Rev. 4/94

Wet Chemistry QA/QC Validation Report

SAM Test Code: pH Date: 9/30/94 Analyst: CA/ST

Method 150.1 Time: 3:00pm Matrix ☑ Liquid ☐ Soil ☐ Other

# of Samples in Batch: 4 Test Name: pH Reporting Units: pH units

SPL Sample #'s in Batch:

9409B38-4B		
9409B70-1B→2B		
9409B58-1C		

Standards	Actual Concentration	Theoretical Concentration	Percent Recovery	QC Limits (**) (Mandatory) Upper Limit	QC Limits (**) (Mandatory) Lower Limit
Blank	Temp 23C	Slope 100%			
Check Standard 1	4.05	4.00	101.3	4.29	3.87
Check Standard 2	7.04	7.00	100.6	7.07	6.95
Check Standard 3	10.07	10.00	100.7	10.12	9.94
LCS (Outside Source)	Calibration	4.00, 7.00 & 10.00 pH		buffers	

DUPLICATES

QA/QC Duplicate SPL Sample ID	Sample Result <1>	Sample Result <2>	Relative Percent Difference	QC LIMITS (**) (Advisory) Relative Percent Difference Max.
9409B38-4B	7.77	7.79	0.26	1.20
9409B70-2B	7.57	7.53	0.53	↓

Relative Percent Difference (RPD) Calculation:

$$RPD = \frac{|<1> - <2>|}{(<1> + <2>) \times 0.5} \times 100$$

(**) = Source: SPL Houston Historical Data

* = Indicates Value Outside QA/QC Range

Approved By: _____ Date: 10/3/94

Reviewed By: _____ Date: 10/3/94

QA/QC Approval: _____ Date: 10/3/94

Idelis Williams, QC Officer

Wet Chemistry QA/QC Validation Report

Test Name: Sulfate

Test Code: SO4 Date: 10/13/94 Time: 1:00pm Analyst: ST

Samples in Batch: 22 Matrix: Liquid Units: mg/L Method: 375.3

(Sample #'s Listed Below)

9409560-5A,6A		9410147-10→20		
9409B338-4B		9410184-1F→5F		
9410076-1F→3F, 4B→6B		9410185-9F		
9410134-6D				
9410136-1F→3F, 7F				

Standards	Actual Concentration	Theoretical Concentration	% Recovery	QC Limits (**) (Mandatory) Upper Limit	Lower Limit
Blank	ND	ND	NA		
Check Std. 1	10.15	10.00	101.5	116.20	88.70
Check Std. 2	19.66	20.00	98.3	↓	↓
Check Std. 3	19.94	20.00	99.7	22.6	16.9
LCS					

Spike Sample ID	Sample Result <2>	Spike Added <3>	Matrix Spike Results <1>	Matrix Spike % Recovery <4>	Matrix Spike Duplicate Results <1>	Matrix Spike Duplicate % Recovery <5>	MS/MSD Relative Percent Difference	QC Limits (**) (Advisory) RPD Max.	Recovery Range
9410136-1F	~~52.94~~ 10.59	10.00	19.73	91.4	20.07	94.8	3.65	±DS	121.2/81.6
9410147-10	10.22	10.00	19.59	93.7	19.82	96.0	2.42	DATA	↓
9410076-2F	10.88	10.00	19.66	87.8	20.21	93.3	6.07	↓	
9410076-3F	8.79	10.00	17.65	88.6	18.28	94.9	6.87		↓

Spike Recovery Calculation

$$\% \text{ Rec.} = \frac{\langle 1 \rangle - \langle 2 \rangle}{\langle 3 \rangle} \times 100$$

* = Values Outside of QC Range

(**) = Source: SPL Houston Historical

Relative Percent Difference Calculation

$$\% \text{ RPD} = \frac{\langle 4 \rangle - \langle 5 \rangle}{\langle 4 \rangle + \langle 5 \rangle \times 0.5} \times 100$$

Reviewed By: _____ Date: 10-17-94

Approved By: _____ Date: 10/17/94

_____ Date: 10-17-94

Idelis Williams, QC Officer

WETDUPQA.RC Rev. 4/94

Wet Chemistry QA/QC Validation Report

SAM Test Code: TDS Date: 10/3/94 Analyst: CA

Method 160.1 Time: 2:30 pm Matrix ☒ Liquid ☐ Soil ☐ Other

# of Samples in Batch: 20 Test Name: Total Dissolved Solids Reporting Units: mg/L

SPL Sample #'s in Batch:

9409B70-1B, 2B	9410020-16D, 16D, 19D, 20D	
9409B72-1B, 2B	9409 B38-4B	
9409 B75-1C, 2C	9409 B12-2A	
9409 A70-1B, 3B→9B		

Standards	Actual Concentration	Theoretical Concentration	Percent Recovery	QC Limits (**) (Mandatory) Upper Limit	QC Limits (**) (Mandatory) Lower Limit
Blank	ND	1	NA		
Check Standard 1	383	373.3	102.60	320.5	426.1
Check Standard 2					
Check Standard 3					
LCS (Outside Source)					

DUPLICATES

QA/QC Duplicate SPL Sample ID	Sample Result <1>	Sample Result <2>	Relative Percent Difference	QC LIMITS (**) (Advisory) Relative Percent Difference Max.
9409 B12-2A	1596	1588	0.50	7.60
9410020-20E	ND	ND	0	↓

Relative Percent Difference (RPD) Calculation:

$$RPD = \frac{|<1> - <2>|}{(<1> + <2>) \times 0.5} \times 100$$

(**) = Source: SPL Houston Historical Data

* = Indicates Value Outside QA/QC Range

Approved By: [signature] Date: 10/4/94

Reviewed By: [signature] Date: 10/4/94

QA/QC Approval: [signature] Date: 10/4/94

Idelis Williams, QC Officer

HOUSTON ENVIRONMENTAL
ICP SPECTROSCOPY
QUALITY ASSURANCE AND CONTROL REPORT

ICPQAQC.RC REV.4/94

Date of Analysis: 10-5-94 Time: 09:13 AM. Analyst: DR. Units: mg/L

Inst. ☑ Thermo-Jarrell Ash 61E ☐ Perkin Elmer Plasma 40 File #: A100594 Digest: P3010

Method: ☐ 200.7 ☑ 6010 TCLP: ☐ Water ☐ Soil ☐ Other ☐ Oil

Matrix: ☐ Soil ☑ Water ☐ Leachate

SPL Sample #'s In Batch:

9409B60 - 1c - 19c	9409B75 - 1d	2d	9410004 - 7c
9409B62 - 20c - 23c	9410020 - 6B	16B 19B 20c	
9409B70 - 1A, 2A	9409B38 - 4E	9410043 - 2c	
9409B72 - 1A, 2A	9410023 - 8H	9410044 - 2c, 4B	

SPL QA/QC Sample ID: #1 9409B70 - 1A #2 9410020 - 20c #3

	Blank and Check Standard			QA/QC	Matrix Spike and Spike Duplicate Data					
Elem.	Method Blank	LCS Theoret.	LCS Rec. (±20%)	Sample Conc.	Spike Added	Spike Conc.	Spk. Dup. Conc.	Spike % Rec.	Spk. Dup. % Rec.	MS-MSD % RPD
PB *1 BA	NP	2.0	105.4	0.3826	2.0	2.427	2.453	102.2	103.5	1
Cd	↓	↓	98.8	NP	1.0	1.041	1.060	104.7	106.0	1
CL	↓	↓	100.6	↓	↓	1.013	1.026	101.3	102.6	1
PB	↓	↓	100.0	↓	↓	1.047	1.066	104.7	106.6	2
FE	↓	↓	102.7	1.102	↓	2.170	2.187	106.8	108.5	2
~~MN~~ PB								~~TO~~ PB	~~101.0~~ PB	~~+~~ PB
AG	NP	2.0	96.1	NP	1.0	0.9875	1.005	98.8	100.5	2
PB *2 BA	NP	2.0	104.7	NP	2.0	2.008	2.020	100.4	101.0	1
Cd	↓	↓	99.6	↓	1.0	1.034	1.039	103.4	103.9	0
CL	↓	↓	101.1	↓	↓	1.039	1.049	103.9	104.9	1
PB	↓	↓	100.6	↓	↓	1.058	1.086	105.8	108.6	3
FE	↓	↓	102.2	↓	↓	1.049	1.056	104.9	105.6	1
MN	↓	↓	103.4	↓	↓	1.046	1.058	104.6	105.8	1
AG	NP	2.0	96.4	NP	1.0	0.9663	0.9844	96.6	98.4	2

*Flags ☐ MS or MSD Out of QA Limits (±25%)
☐ Spike RPD Out of QA Limits (±20%)
☐ See Case Narrative
☐ Within Soil LCS Limits

Analyst

Supervisor Approval Date 10/6/94

QA/QC Approval Date 10/6/94
Idelis Williams, QC Officer

SPL QUALITY CONTROL SUMMARY

Rev. 4/94

Atomic Absorption Analysis

Element: AS Date: 10/6/94 Analyst: WFC Units: mg/L

Test Code: P3020 Time: 09:50 Matrix: Soil ☐ Water ☑

Method: GFAA File #: 1006A Leachate: ☐ Water ☐ Soil

Instrument: 3030Z ☐ Oil ☐ Other

Sample #'s in Batch

09B62-20c				
09B38-4E				
10004-7c				
10023-8H				
10043-2c				

Blank and Check Standard					Matrix Spike and Spike Duplicate Data					
Sample ID	Method Blank	LCS Conc. Theoretical	LCS % Recovery	Sample Conc.	Spike Added	Spike Conc.	Spike Dup. Conc.	Spike % Rec.	Spike Dup. % Rec	% RPD
* 09B44-1c	ND	50.0	107.8%	19.7	50.0	74.7	76.3	110.0%	113.2%	3

* FLAGS *

* = Values Outside QC Range

☐ MS or MSD out of QA/QC Limits (% Rec. 75-125)

☐ RPD out of QA/QC Limits (20 %)

☐ Soil LCS % Rec. Range _____

*☑ Sample used for QA/QC only

☐ See Case Narrative

Analyst Wally Fawal Date 10/6/94

Approved By R Chulal Date 10/6/94

L Williams Date 10/6/94

Idelis Williams, QC Officer

SPL QUALITY CONTROL SUMMARY

Atomic Absorption Analysis

Rev. 4/94

Element: Hg | Date: 10/4/94 | Analyst JM | Units mg/L

Test Code: HgQC | Time: 14:47 | Matrix: Soil ☐ Water ☑

Method: 7470 | File #: 1004A | Leachate: ☐ Water ☐ Soil

Instrument: B3030 | ☐ Oil ☐ Other

Sample #'s in Batch

9409B60-1C-19C	9409B62-2C-23C	9409B38-4E	9410004-7C	(JM) ~~9410~~ 9410023-8H

Blank and Check Standard					Matrix Spike and Spike Duplicate Data					
Sample ID	Method Blank	LCS Conc. Theoretical	LCS % Recovery	Sample Conc.	Spike Added	Spike Conc.	Spike Dup. Conc.	Spike % Rec.	Spike Dup. % Rec	% RPD
9409B60-1C	#1 ND	2.00	#1 103.0	ND	2.00	2.02	2.06	101.0	103.0	2
9409B62-20C	#2 ND	↓	#2 112.5	↓	↓	2.20	1.87	110.0	93.7	16

* FLAGS * * = Values Outside QC Range

- ☐ MS or MSD out of QA/QC Limits (% Rec. 75-125)
- ☐ RPD out of QA/QC Limits (20 %)
- ☐ Soil LCS % Rec. Range _____
- ☐ Sample used for QA/QC only
- ☐ See Case Narrative

Analyst Joann Marroquin Date 10/4/94

Approved By [signature] Date 10-5-94

[signature] Date 10-5-94

Idelis Williams, QC Officer

Rev. 4/94

SPL QUALITY CONTROL SUMMARY

Atomic Absorption Analysis

Element: SE
Test Code: P3020
Method: GFAA
Instrument: 30302

Date: 10/7/94
Time: 12:15
File #: 10070

Analyst: WFC
Units: mg/L

Matrix: Soil ☐ Water ☑

Leachate: ☐ Water ☐ Soil ☐ Oil ☐ Other

Sample #'s in Batch

09B385-4E				
10004-7C				
10023-8H				
10043-2C				
10083-4A				

Blank and Check Standard					Matrix Spike and Spike Duplicate Data					
Sample ID	Method Blank	LCS Conc. Theoretical	LCS % Recovery	Sample Conc.	Spike Added	Spike Conc.	Spike Dup. Conc.	Spike % Rec.	Spike Dup. % Rec	% RPD
*07B44-1C	ND	50.0	112.4%	ND	50.0	43.7	42.7	87.4%	85.4%	2

* FLAGS *

* = Values Outside QC Range

☐ MS or MSD out of QA/QC Limits (% Rec. 75-125)
☐ RPD out of QA/QC Limits (20 %)
☐ Soil LCS % Rec. Range ____________
*☐ Sample used for QA/QC only
☐ See Case Narrative

Analyst: Walley F. Stewal Date: 10/7/94

Approved By: R Chulil Date: 10/7/94

[signature] Date: 10/7/94
Idelis Williams, QC Officer

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

9401038

BURLINGTON ENVIRONMENTAL
A Philip Environmental Company

Chain-of Custody Record

4000 Monroe Road
Farmington, NM 87401

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

9/29/94 SK

BB

COC Serial No. C 1937

Project Name Vastar - Wood Fed
Project Number 13067 Phase . Task 0077.77
Samplers S. Kelly
Laboratory Name SPL, Houston TX
Location 8880 Interchange Dr.

Sample Number (and depth)	Date	Time	Matrix	Total Number of Bottles	Type of Analysis and Bottle: BTEX-40ml VOA	TPH-8015 Gas, VOA	TPH, 8015 diesel, 1L Glass	cation/anion, 1L Plastic	PAH 610, 1L Glass	RCRA metals	Comments
MW4-1	9/29/94	1400	H2O	1	✓						
MW4-1	9/29/94	1400	H2O	1		✓					
MW4-1		1400	H2O	1			✓				
MW4-1		1400	H2O	1			✓				
MW4-1		1400	H2O	1				✓			
MW4-1		1400	H2O	1					✓		PAH, 50% Rush
MW4-1		1400	H2O	1						✓	
Trip Blank		1145	H2O	2	✓						
Trip Blank		1145	H2O	1		✓					
MW2-1		1330	H2O				✓				
MW1-1		1200	H2O				✓				

Relinquished by:

Signature	Date	Time
Sarah Kelly	9/29/94	1630
		2C

Received By:

Signature	Date	Time
FedEx	9/30/94	1000

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) _____
- ☐ _____

8809273922

Carrier:

Airbill No.

Shipping and Lab Notes:

E-179 4/94

BURLINGTON ENVIRONMENTAL
A Philip Environmental Company

Chain-of Custody Record

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

COC Serial No. C 1939

Project Name Vastar-Wood Fed
Project Number 13067 Phase . Task 0077.77
Samplers S. Kelly
Laboratory Name SPL
Location Houston, TX

Sample Number (and depth)	Date	Time	Matrix	Total Number of Bottles	TPH 8015, 625, VOA	BTEX 8020, VOA	Comments
MW3-1	9/29/94	1300	H2O	2		✓	
MW3-1		1300	H2O	2	✓		
MW1-1		1200	H2O	2		✓	
MW1-1		1200	H2O	2	✓		
MW2-1		1330	H2O	2		✓	
MW2-1		1330	H2O	2	✓		

Relinquished by:

Signature	Date	Time
Sarah Kelly	9/29/94	1630

Received By:

Signature	Date	Time

Samples Iced: ☒ Yes ☐ No

Carrier:

Airbill 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) _____

Shipping and Lab Notes:

FEDERAL EXPRESS

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON-U.S. LOCATIONS.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER

8809273922

8809273922

RECIPIENT'S COPY

1 Date 9-3-94

From (Your Name) Please Print: JAPAN KELLY

Your Phone Number (Very Important): (505) 326-2267

Company: [illegible] INTERNATIONAL

Department/Floor No:

Street Address: 4001 [illegible]

City: FARMINGTON State: NM ZIP Required: 8 7 4 0 1

2 To Recipient's Name) Please Print: JANICE REICHEUNG

Recipient's Phone Number (Very Important): (713) 420-[illegible]

Company: SOUTHERN PETROLEUM LAB

Department/Floor:

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.):

City: State: ZIP Required:

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)
13067

H IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here
Street Address: 4702 TRAVIS
City: HOUSTON State: TX ZIP Required: 77002

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No 3 [ ] Bill 3rd Party FedEx Acct. No 4 [ ] Bill Credit Card
5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning)
- 11 [ ] OTHER PACKAGING
- 16 [ ] FEDEX LETTER*
- 12 [ ] FEDEX PAK*
- 13 [ ] FEDEX BOX
- 14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon/No Saturday delivery)
- 51 [X] OTHER PACKAGING
- 56 [ ] FEDEX LETTER*
- 52 [ ] FEDEX PAK*
- 53 [ ] FEDEX BOX
- 54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day.†)
- 30 [ ] ECONOMY**

Government Overnight (Restricted to authorized locations)
- 46 [ ] GOVT LETTER
- 41 [ ] GOVT PACKAGE

*Economy Letter Rate not available. Minimum charge: One pound Economy rate

Freight Service (for packages over 150 lbs.)
- 70 [ ] OVERNIGHT FREIGHT** (Call/email reservation required)
- 80 [ ] TWO-DAY FREIGHT**

†Delivery commitment may be later in some areas
**Declared Value Limit $500. Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

Weekday Service
- 1 [X] HOLD AT FEDEX LOCATION WEEKDAY (Fill in Section H)
- 2 [ ] DELIVER WEEKDAY

Saturday Service
- 3 [ ] HOLD AT FEDEX LOCATION SATURDAY (Fill in Section H)
- 3 [ ] DELIVER SATURDAY (Extra charge) (Not available to all locations)
- 9 [ ] SATURDAY PICK-UP (Extra charge)

Special Handling
- 4 [ ] DANGEROUS GOODS (Extra charge)
- 6 [ ] DRY ICE (Dangerous Goods Shipper's Declaration not required)

Class 9 UN 1845 X kg 104 III

- 12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6 PACKAGES | WEIGHT In Pounds Only | YOUR DECLARED VALUE (See right)

Total | total | total
1 | 12

DIM SHIPMENT (Chargeable Weight)
[ ] lbs
L x W x H

Recipient's At
1 [ ] Regular Stop 3 [ ] Drop Box
2 [ ] On-Call Stop 4 [ ] B.S.C.
5 [ ] Station

7 Release Signature.

Emp. No. | Date

- [ ] Cash Received
- [ ] Return Shipment
- [ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold

Street Address

City State Zip

Received By: X

Date/Time Received FedEx Employee Number

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 12/92
PART #137204 FXEM 1
FORMAT #158
158

SPL HOUSTON ENVIRONMENTAL LABORATORY

SAMPLE LOGIN CHECKLIST

DATE: 9/30 TIME: _____ CLIENT NO. _____
LOT NO. _____ CONTRACT NO. _____

CLIENT SAMPLE NOS. _____

SPL SAMPLE NOS.: 9409B38

		YES	NO
1.	Is a Chain-of-Custody form present?	✓	
2.	Is the COC properly completed?	✓	
	If no, describe what is incomplete:		
	If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)		
3.	Is airbill/packing list/bill of lading with shipment? If yes, ID#: FEDEX: 8807273922	✓	
4.	Is a USEPA Traffic Report present?		✓
5.	Is a USEPA SAS Packing List present?		✓
6.	Are custody seals present on the package?	✓	
	If yes, were they intact upon receipt?	✓	
7.	Are all samples tagged or labeled?	✓	
	Do the sample tags/labels match the COC?	✓	
	If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)		
8.	Do all shipping documents agree?	✓	
	If no, describe what is in nonconformity:		

9. Condition/temperature of shipping container: 2°C WET ICE
10. Condition/temperature of sample bottles: 2°C WET ICE
11. Sample Disposal?: SPL disposal ✓ Return to client _____

NOTES (reference item number if applicable): _____

ATTEST: R Dixon DATE: 9/30
DELIVERED FOR RESOLUTION: REC'D _____ DATE: _____
RESOLVED: _____ DATE: _____

Vastar Resources, Inc.

15375 Memorial Drive
Houston, Texas 77079
713 584-6000

June 2, 1994

Mr. Bill Olsen
New Mexico Oil Conservation Division
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Subject: Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico.

Dear Mr. Olsen,

Please find attached a copy of the pit closure report for the subject facility.

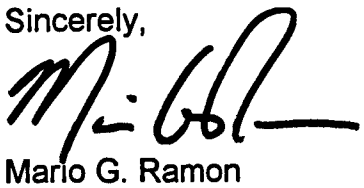
This report details the pit closure activities that were conducted during March 21, 22, and 23, 1994. All analytical reports and field samples data are included. A total of 764 cubic yards of soil was excavated and removed from the pit area. All soils removed from the pit area were delivered to Envirotech Soil Remediation Facility, Landfarm No. 2, located in Hilltop, New Mexico for bio-remediation. The excavated pit area was backfilled with soils obtained from an undeveloped area of landfarm 2 from the Hilltop facility.

At completion of the pit excavation and remediation work and as per the approved closure plan, an additional monitoring well was installed in the anticipated center of the suspect contaminant plume. Well details and location were provided to your office by Mr. Mike Lane, formerly of Envirotech, in a letter dated March, 21, 1994. The additional well was developed and sampled for limited BTEX parameters. The analytical report (enclosed) for well BTEX levels will serve as base line for additional testing scheduled for September, 1994 and final analysis in March, 1995. In addition to the BTEX concentrations, Vastar will analyze for the parameters outlined in your letter dated March 9, 1994, during the sampling event of September, 1994. If concentrations of the additional analytes are within NMWQC standards, no additional sampling for these parameters will be conducted and a final groundwater remediation report will be submitted to your office.

Also enclosed is a copy of a letter submitted to BLM, including Sundry Notice, of pit remediation.

Thank you for your attention to this matter. If you have any questions or require additional information, please call me at 713-584-3192.

Sincerely,



Mario G. Ramon
Principal Environmental Consultant
Vastar Resources, Inc.

cc: Ron Johnston — Vastar - Farmington, NM
Bill Leiss — BLM - Farmington. NM

\sctrc\mgr\ltr\woodfed

Vastar Resources, Inc.

15375 Memorial Drive
Houston, Texas 77079
713 584-6000

June 2, 1994

Mr. Bill Leiss
Bureau of Land Management
1235 La Plata Highway
Farmington, New Mexico 87401

Subject: Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico.

Dear Mr. Leiss,

Please find attached a copy of the pit closure report for the subject facility.

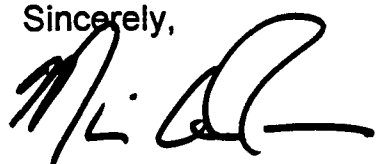
This report details the pit closure activities that were conducted during March 21, 22, and 23, 1994. All analytical reports and field samples data are included. A total of 764 cubic yards of soil was excavated and removed from the pit area. All soils removed from the pit area were delivered to Envirotech Soil Remediation Facility, Landfarm No. 2, located in Hilltop, New Mexico for bio-remediation. The excavated pit area was backfilled with soils obtained from an undeveloped area of landfarm 2 from the Hilltop facility.

At completion of the pit excavation and remediation work and as per the approved NMOCD closure plan, an additional monitoring well was installed in the anticipated center of the suspect contaminant plume. Well details and location were provided to OCD by Mr. Mike Lane, formerly of Envirotech. As per your letter received on March 15, 1994, groundwater remediation will continue until NMOCD approves the cleanup. A copy of the final closure report for the groundwater remediation effort will be submitted to your office upon completion.

Enclosed is a completed and signed Sundry for pit (soil) remediation.

Thank you for your attention to this matter. If you have any questions or require additional information, please call me at 713-584-3192.

Sincerely,



Mario G. Ramon
Principal Environmental Consultant
Vastar Resources, Inc.

cc: Ron Johnston Vastar - Farmington, NM
Bill Olsen NMOCD - Santa Fe, NM

\sctrc\mgr\ltr\woodfed

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

PIT REMEDIATION AND CLOSURE REPORT

Operator: ARCO/VASTAR Telephone: 599-4325 713-584-3192

Address: 1816 E MOJAVE, FARMINGTON, NM

Facility Or: WOOD WN Federal Com #1
Well Name

Location: Unit or Qtr/Qtr Sec B Sec 21 T 29N R 10W County #1 SAN JUAN

Pit Type: Separator X Dehydrator ___ Other ___

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

Pit Location: (Attach diagram)
Pit dimensions: length 25', width 25', depth 5'
Reference: wellhead X, other ___
Footage from reference: 180'
Direction from reference: 10 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: March 21, 1994 **Dated Completed:** March 23, 199

Remediation Method: (Check all appropriate sections) Excavation X Approx. cubic yards ~~648~~ 764 Rm

Landfarmed ___ Insitu Bioremediation ___

Other _____

Remediation Location: (ie. landfarmed onsite, name and location of offsite facility) Onsite ___ Offsite Envirotech Soil Remediation Facility Landfarm #2, San Juan Co, NM

General Description Of Remedial Action: Pit Excavated to groundwater. Minor Soil Contamination in Sidewalls at 20'-25' below Surface. Nutrients added to enhance bioremediation of any Remaining Contamination.

Ground Water Encountered: No ___ Yes X Depth 25'

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

Sample location See Attached Site diagram and Laboratory Resu

Sample depth _____

Sample date _____ Sample time _____

Sample Results

Benzene(ppm) _____

Total BTEX(ppm) _____

Field headspace(ppm) _____

TPH _____

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 5/9/94

SIGNATURE Robert M Young

PRINTED NAME AND TITLE Robert M Young Environmental Biologist

Form 3160-5
(June 1990)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No 1004-0135
Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.
Use "APPLICATION FOR PERMIT—" for such proposals

SUBMIT IN TRIPLICATE

5. Lease Designation and Serial No.: NMSF078266

6. If Indian, Allottee or Tribe Name:

7. If Unit or CA, Agreement Designation: SW448

1. Type of Well: ☐ Oil Well ☒ Gas Well ☐ Other

8. Well Name and No.: Wood WN Federal #1

2. Name of Operator: Vastar Resources Inc.

9. API Well No.: 30-045-20267

3. Address and Telephone No.: 1816 East Mojave Farmington, New Mexico Tel: 505-599-4300

10. Field and Pool, or Exploratory Area: Basin Dakota

4. Location of Well (Footage, Sec., T., R., M., or Survey Description): 1100' FNL & FEL (NWNE) Sec 21, T29N, R10W, NMPM

11. County or Parish, State: San Juan, New Mexico

12. CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION	
☐ Notice of Intent	☐ Abandonment	☐ Change of Plans
☒ Subsequent Report	☐ Recompletion	☐ New Construction
☐ Final Abandonment Notice	☐ Plugging Back	☐ Non-Routine Fracturing
	☐ Casing Repair	☐ Water Shut-Off
	☐ Altering Casing	☐ Conversion to Injection
	☒ Other Pit closure	☐ Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Pit closure verification - see attached documentation.

14. I hereby certify that the foregoing is true and correct

Signed [signature] Title Prin. Envir Consultant Date 6/2/94

(This space for Federal or State office use)

Approved by _____ Title _____ Date _____
Conditions of approval, if any:

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

PIT CLOSURE REPORT

WOOD WN FEDERAL COM #1
SAN JUAN COUNTY
BLANCO, NEW MEXICO

PREPARED FOR:
ARCO OIL & GAS COMPANY (VASTAR)

FOR SUBMITTAL TO:
NEW MEXICO OIL CONSERVSATION DIVISION
BUREAU OF LAND MANAGEMENT

COMMISSIONED BY:
ARCO OIL & GAS COMPANY (VASTAR)

May 1994

Project No: 93183

PIT CLOSURE REPORT

WOOD WN FEDERAL COM #1
(B) SECTION 21, T29N, R10W, NMPM
SAN JUAN COUNTY, BLANCO, NEW MEXICO

PREPARED FOR:
ARCO OIL & GAS COMPANY (VASTAR)

FOR SUBMITTAL TO:
NEW MEXICO OIL CONSERVATION DIVISION
BUREAU OF LAND MANAGEMENT: FARMINGTON DISTRICT

COMMISSIONED BY:
ARCO OIL & GAS COMPANY (VASTAR)

PROJECT No: 93183

MAY 1994

ENVIROTECH, INC.
Environmental Scientists & Engineers
5796 U.S. Highway 64-3014
Farmington, New Mexico

TABLE OF CONTENTS

PIT CLOSURE REPORT
WOOD WN FEDERAL COM #1
(B) SECTION 21, T29N, R10W, NMPM
SAN JUAN COUNTY, BLANCO, NEW MEXICO

PROJECT No. 93183

APPENDIX

May 1994 **PROJECT NO: 93183**

PIT CLOSURE REPORT
WOOD WN FEDERAL COM #1
(B) SECTION 21, T29N, R10W, NMPM
SAN JUAN COUNTY, BLANCO, NEW MEXICO

INTRODUCTION

Vastar Resources Incorporated, formerly ARCO Oil & Gas Company, retained Envirotech, Inc. to perform a separator pit reclamation, for closure, for the Wood WN Federal Com No: 1 well location (refer to Sheet 1). The well is currently operated by Vastar. This closure is in accordance with "Pit Closure Plan, Wood WN Federal Com #1, (B) Section 21, T29N, R10W, NMPM, San Juan County, Blanco, New Mexico", which was submitted to both New Mexico Oil Conservation Division (NMOCD) and the Bureau of Land Management: Farmington District (BLM) in January 1994. This Pit Closure Plan was for the reclamation of hydrocarbon contamination of soil and groundwater identified in the area of a previously unlined separator pit. This Pit Closure Plan was approved by NMOCD on March 9, 1994 in a letter from Mr. William Olson of NMOCD to Mr. Mario Ramon of Vastar.

SUMMARY OF PREVIOUS FINDINGS

In September 1993, A limited site assessment was performed by Envirotech to define the extent of contamination associated with the separator pit. The findings of the assessment were documented in a report prepared by Envirotech and titled "Limited Site Assessment: Wood WN Federal COM #1, (B) Section 21, T29N, R10W, NMPM, San Juan County, New Mexico". The following conclusions were drawn from the September 1993 site assessment:

1) Hydrocarbon contamination of soil and groundwater above current regulatory action levels was present in the area of the unlined earthen separator pit. This hydrocarbon contamination appeared to have originated from the normal exploration and production operations of the separator equipment on the location.

2) The contamination appeared to be limited to the well location, involving a surface area of approximately 5000 square feet.

3) In the area of the pit, soil contamination extended from the pit bottom to groundwater (approximately 27.5 feet below the ground surface). Beyond the pit area, only the vadoze zone soils immediately above the groundwater were contaminated.

4) No free product was observed. Significant dissolved phase contamination of groundwater appeared to be limited to the immediate area below the pit.

5) Groundwater sloped toward the south-southwest at approximately 0.010 feet/foot.

6) Subsurface soils were typical alluvium, predominately sands with interbedded silt and clay horizons.

7) The vertical and lateral extent of contamination appeared to be relatively limited as noted previously. Therefore, impacted groundwater did not appear to pose an eminent threat or risk to human health or the environment.

PIT CLOSURE SUMMARY

Based on these conclusions, in conjunction with discussions with the NMOCD and BLM, ARCO retained Envirotech to remediate the hydrocarbon contamination by: excavation of soil hydrocarbon contamination in the immediate area of the separator pit (source area), off-site landfarm treatment of the soils, and nutrient augmentation of the groundwater to enhance the indigenous hydrocarbon degrading microbial environment.

On March 21 and 22, 1994, Envirotech excavated 764 cubic yards of hydrocarbon contaminated soils from the immediate area of the pit. Lateral excavation was continued until either field screening by OVM was below an action level of 100 ppm or until the amount of overburden removal was impractical for only minor quantities of contaminated soil. Vertical excavation in the pit area was continued until groundwater was encountered.

The 764 cubic yards of contaminated soil that was removed from the site was transported to Envirotech's Soil Remediation Facility - Landfarm #2, located at Hilltop, New Mexico. This facility is permitted and regulated by the NMOCD for landfarming treatment of exploration and production non-hazardous wastes. Soil was transported in covered 20 cubic yard tractor-trailer transports to Landfarm #2, where it was placed in accordance with NMOCD regulations.

To verify the remediation effort, the excavation was field assessed to determine remaining quantities of hydrocarbon contamination. Field assessment included soil sampling and field screening of volatile organic vapors by the Field Headspace Method and testing of Total Petroleum Hydrocarbons (TPH) by EPA Method 418.1. Refer to Table 1 for results of the sidewall soil samples. Sample locations are outlined in the Site Plan (Attached: SHEET 2). No groundwater samples were collected.

TABLE 1
Field Soil Sample Results
ARCO Wood WN Federal Com #1
March, 1994

SAMPLE ID	HEADSPACE (PPM)	BTEX (PPM)	TPH - 418.1 (PPM)	TPH - 8015 (PPM)
N @ 18-20'	667	-	17	-
E @ 12'-15'	56	-	-	-
S @ 20'-22'	830	0.1/65.8	510	697
W @ 15'-20'	1.5	-	<10	-
Fill Material	<0.1	-	7.6	-

NOTES: "HEADSPACE" is Headspace Field Method [Unlined Surface Impoundment Closure Guidelines, New Mexico Oil Conservation Division (NMOCD), February 1993 subpart III-B-1], using an organic vapor meter (OVM) with a photoionization detector (PID). Readings are in meter units which are calibrated to be equivalent to parts-per-million (PPM).

"BTEX" is US EPA Method 8020 for benzene, toluene, ethylbenzene, and total xylene. Laboratory results are in μg/Kg, which has been correlated to equivalent parts-per-million for Table 1. Results are expressed as benzene/total BTEX.

"TPH-418.1" is US EPA Method 418.1 (Total Recoverable Petroleum Hydrocarbons) modified for soil. Results are in mg/Kg which is equivalent to parts-per-million (PPM).

"TPH-8015" is US EPA Method 8015 modified for Total Recoverable Petroleum Hydrocarbons. Results are in mg/Kg which is equivalent to parts-per-million (PPM).

According to "Unlined Surface Impoundment Closure Guidelines", New Mexico Oil Conservation Division (NMOCD), February 1993 subpart II, the NMOCD ranking score classifies this site as a minimum of 20 points. With a ranking score in excess of 20 points, the NMOCD recommended remediation levels for the site is: organic vapors (100 ppm), benzene (10 mg/Kg), total BTEX (50mg/Kg), and TPH (100 mg/Kg).

After the excavation was complete and the field assessment was performed, both the sidewalls and the groundwater exposed in the bottom of the excavation was treated with a spray application of nutrients to enhance biodegradation of remaining hydrocarbon contamination. The spray application process consisted of 9 gallons of a microbial nutrient mixture [ie. Nitrogen (16%), Phosphorus (16%), and Potassium (16%)] sprayed on the excavation sidewalls. Based on the estimated age of the hydrocarbon release and Envirotech's experience with similar sites in the area, it is believed that an indigenous population of hydrocarbon degrading microbes are present in the vadose zone. Addition of the suggested nutrients is anticipated to accelerate the degradation of any residual hydrocarbon contamination of the soils and groundwater.

Following treatment, the excavation was backfilled with clean granular soil imported from Landfarm #2. This soil was taken from an undeveloped area within Landfarm #2 which has been undisturbed, with the exception of clean fill extraction.

After the excavation was backfilled, monitor well #4 was emplaced in the anticipated center of the groundwater plume, directly down-gradient from the excavation. Monitor well construction details are attached as Sheet 4. Monitor well #4 was developed immediately following construction, and was then sampled on March 25, 1994. Laboratory analytical results for BTEX indicate benzene concentrations to be 11.4 μg/L, with no other analytes exceeding New Mexico Water Quality Control Commission (NMWQCC) standards. Laboratory results of the groundwater sample are attached.

Maximum allowable concentrations of groundwater contaminants are outlined by the NMWQCC regulations (Aug 18, 1991), Part 3-103. Refer to Table 2 for the current WQCC regulatory limits.

TABLE 2
HYDROCARBON GROUNDWATER CONTAMINATION STANDARDS
STATE OF NEW MEXICO

Parameter	Maximum Allowable Limits groundwater (µg/l)
Benzene	10
Toluene	750
Ethylbenzene	750
Total Xylene	620
MTBE	100

Notes: µg/l - equivalent to parts per billion.

FUTURE ACTIVITIES:

Based on NMOCD regulatory guidelines, field findings, on-site activities, and analytical results, no further action with remaining soil contamination should be required. It is anticipated that the added nutrients will enhance biodegradation sufficiently to reduce contamination to below NMOCD action levels.

Based on correspondence dated February 17, 1994 from Mr. Mario Ramon of Vastar to Mr. Bill Olson of NMOCD (Attached as SHEET 4), sampling of the on-site monitor wells will occur on a semi-annual basis for one year. Sampling will occur according to the following schedule:

9/94 -Sample all monitor wells for major anions / cations, NMWQCC heavy metals, polynuclear aromatics, and BTEX.

3/95 -Sample all monitor wells for BTEX and any parameters that are indicated from the 9/94 sampling to be above NMWQCC groundwater standards.

All sample results will be submitted to Vastar, for submittal to NMOCD, following receipt of the 3/95 sampling event. It is our understanding that the site will be permanently closed if there is a significant drop in the concentrations of groundwater contaminants by the 3/95 sampling event.

LIMITATIONS AND CLOSURE

This pit closure report is to document on-site activities in accordance with the NMOCD approved "Pit Closure Plan, Wood WN Federal Com #1, (B) Section 21, T29N, R10W, NMPM, San Juan County, Blanco, New Mexico", which was developed using the findings of a prior site assessment, information provided by Arco Oil & Gas/ Vastar Resources Incorporated, and the NMOCD and BLM pit closure guidelines.

All soil and groundwater contamination is believed to have originated from the normal E & P operation of the separator equipment on the location. No hazardous wastes are believed to be present or involved with the subject contamination as defined per RCRA (40 CFR 261).

This pit closure plan has been developed for the exclusive use of Vastar Resources Incorporated as it pertains to the Wood WN Federal Com No:1 well site located in (B) Section 21, Township 29N, Range 10W, NMPM, San Juan County, New Mexico.

Respectfully Submitted,
ENVIROTECH, INC.

Robert M. Young
Environmental Biologist

Reviewed By:

Morris D. Young
President

EMPLACEMENT OF MONITOR WELL #4
VASTAR RESOURCES INC.- WOOD WN FED #1

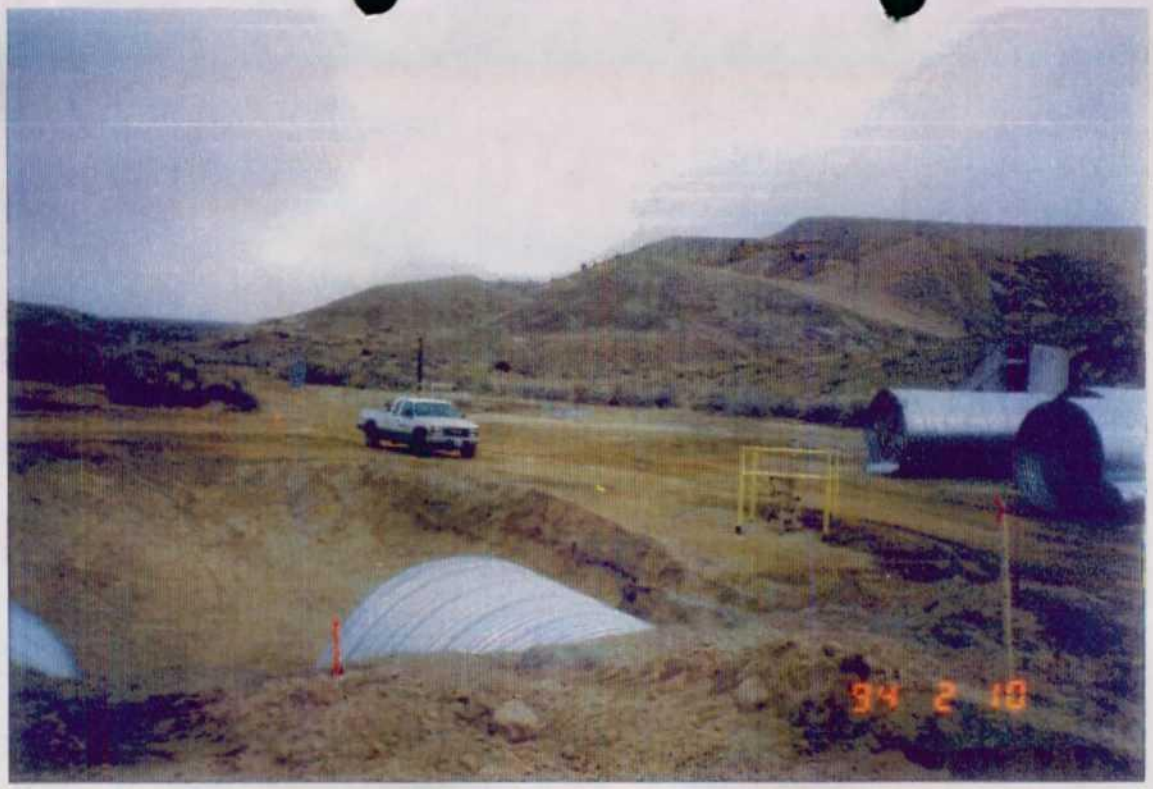
LANDFARM #2, ENVIROTECH SOIL REMEDIATION FACILITY
VASTAR RESOURCES INC.- WOOD WN FED #1

NUTRIENT SPRAY APPLICATION
VASTAR RESOURCES INC.- WOOD WN FED #1

BACKFILLED EXCAVATION
VASTAR RESOURCES INC.- WOOD WN FED #1

BOTTOM OF FINAL EXCAVATION
VASTAR RESOURCES INC.- WOOD WN FED #1

CONTAMINATED SOIL REMOVAL
VASTAR RESOURCES INC.- WOOD WN FED #1



SITE PRIOR TO EXCAVATION
VASTAR RESPOURCES INC.-WOOD WN FED #1

PIT EXCAVATION
VASTAR RESOURCES INC.- WOOD WN FED #1

REFERENCE: USGS 7.5 min QUAD BLOOMFIELD (36107-F8-TF-024)

VASTAR RESOURCES INC.

WOOD WM FEDERAL COM No. 1
LEASE No.: SF-078266
(B) SEC 27, T29N, R10W, NMPM

ENVIROTECH INC.

ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

VICINITY MAP

CLOSURE ASSESSMENT

PROJECT NO: 93183

SHEET 4

DRAWN BY: M. LANE

SCALE

20 0 50 ft

[75.00']: GROUNDWATER DEPTH MEASURED ON 9/26/93, ELEVATIONS RELATIVE TO WELLHEAD FLANGE (100.00').

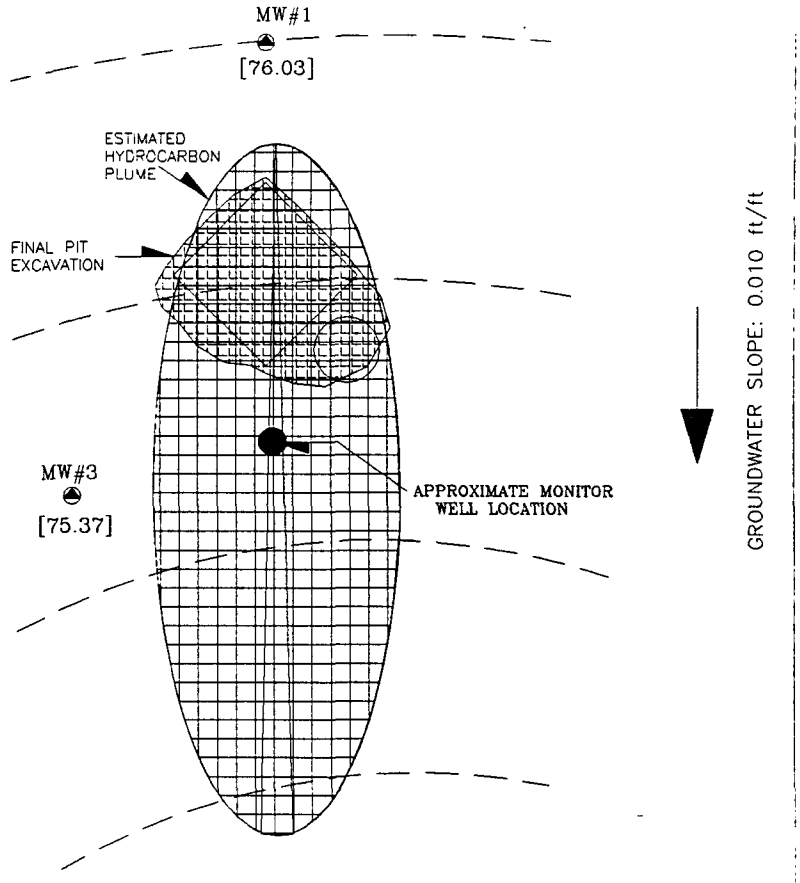
T#0 APPROXIMATE TEST BORING LOCATION (SEPT 93)

MW#0 MONITOR WELL

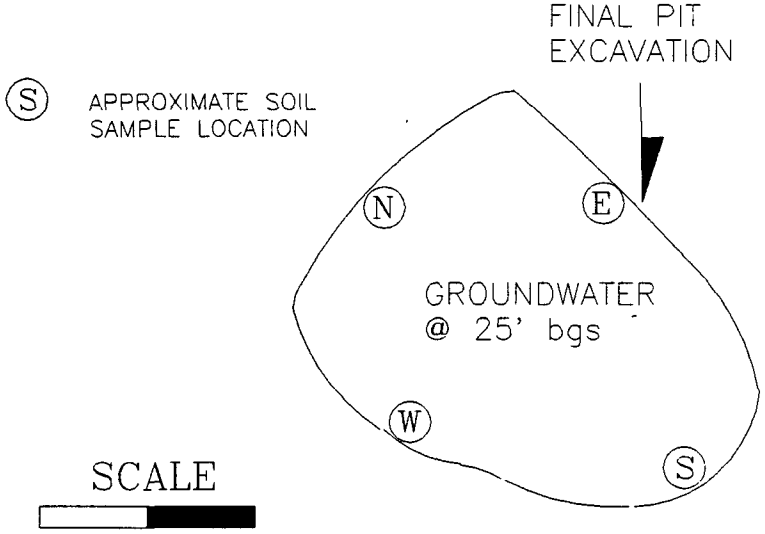
ESTIMATED HYDROCARBON PLUME

APPROXIMATE SOURCE REMOVAL EXCAVATION

ALL DISTANCE AND ELEVATIONS HAVE BEEN DETERMINED BY SIGHTING, PACING, AND CONSTRUCTION SURVEY. MEASUREMENTS ARE ACCURATE TO THE DEGREE IMPLIED BY THE INTENT AND METHOD USED.



SOIL SAMPLE DETAIL



WELL HEAD

SAMPLE RESULTS

SAMPLE	FIELD HEADSPACE (ppm)	TPH 418.1 (ppm)	TPH 8015 (ppm)
FILL	ND	7.6	–
N @ 18–20'	667	17	–
E @ 12–15'	56	–	–
S @ 20–22'	830	510	697
W @ 15–20'	1.5	7.8	–

ARCO OIL & GAS COMPANY

WOOD WM FEDERAL COM No. 1
LEASE No.: SF-078266
(B) SEC 21, T29N,R10W,NMPM

CLOSURE ASSESSMENT PROJECT NO: 93183

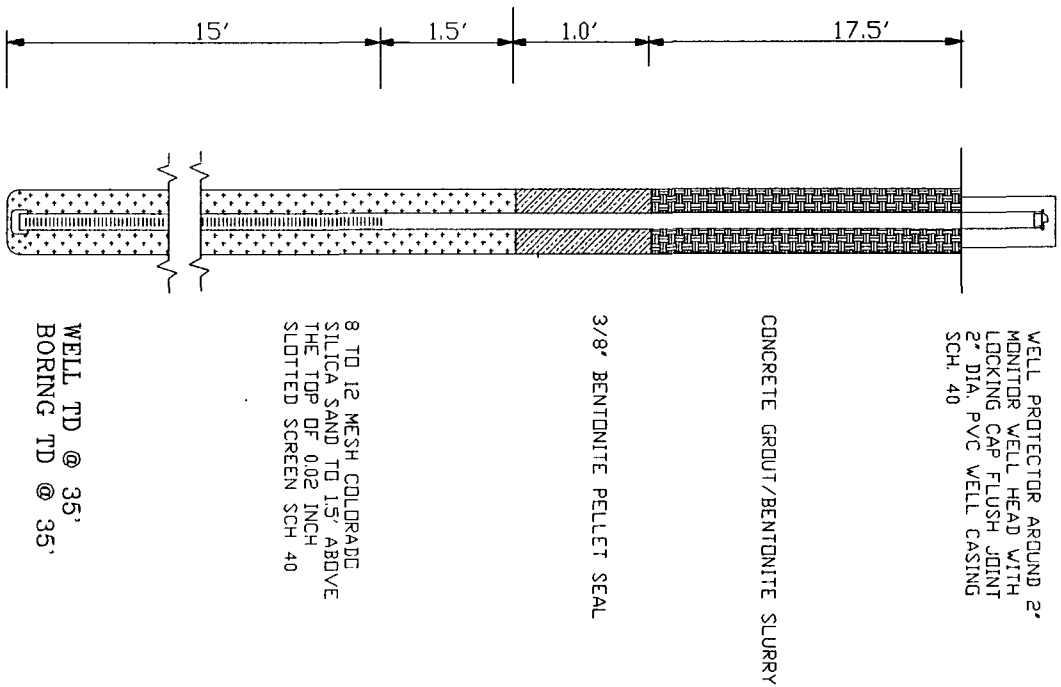
ENVIROTECH INC.

ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

PIT CLOSURE SUMMARY

SHEET: 2
DRWN BY: MK LANE
FILE: 93183EXC.SKD

MONITOR WELL "4"



VASTAR RESOURCES INC.
WOOD WN FEDERAL COM #1
(B) S21, T29N, R10W, NMPM
SAN JUAN COUNTY, NEW MEXICO
PROJECT: 93183

ENVIROTECH INC.

ENVIRONMENTAL SCIENTISTS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

MONITOR WELL #4

PROJ MGR: R. YOUNG
DRW BY: R. YOUNG
DATE: 5-12-94
SHEET: # 4

ARCO Oil and Gas Company
Eastern District
15375 Memorial Drive
Houston, Texas 77079
Telephone 713 584 6000

Post-it™ brand fax transmittal memo 7671 | # of pages ▶

To Rob Young	From Maria Lamon
Co.	Co.
Dept.	Phone #
Fax # 505 632 1865	Fax #

February 17, 1994

Mr. Bill Olsen
New Mexico Oil Conservation Division
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Dear Mr. Olsen:

Subject: Proposed Pit Closure, Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico

Pursuant to a telephone conversation with Mr. Roger Anderson of your office on February 8, 1994, this is to submit a closure plan for your review and approval for the Wood Wn Federal Com No. 1 separator pit located in San Juan County near Blanco, New Mexico.

As I explained to Mr. Anderson, Arco Oil and Gas Company is somewhat in a hurry to complete the pit remediation and ground water treatment project due to the New Mexico Highway Department's encroachment on to the well pad location. The highway department has in fact placed ten or twelve foot diameter culverts within several feet of our ground water monitoring wells and our producing well head.

Mr. Anderson recommended that we permanently close the monitoring wells that maybe impacted by the highway department's heavy equipment traffic, surface runoff control ditches and drainage culverts. We instructed our consulting firm to visit the site and determine if these monitoring wells require immediate closure. Our consultant felt that immediate closure is not required but would be prudent. Therefore, we did not close the wells but instead collected samples from one of the monitoring wells (MW-2, the one at most risk). Sampling results confirmed that the well is still a clean well. Because we remain concerned for this well's integrity, we propose to sample this well first thing when we begin the pit closure. Since the closure will take a few days to complete, we will have time to analyze for select parameters. At that time, when equipment is available, MW-2 will be closed according to NMOCD and BLM requirements as specified in the enclosed pit closure plan.

The enclosed plan also details ARCO's plan to address the impacted ground water. Succinctly, ARCO proposes to supplement the soil and ground water with nutrients to enhance natural bio-degradation of the remaining ground water contaminants. To ensure bio-degradation is progressing as desired, ARCO will install a monitoring well in the center of the pit remediation site and collect samples semi-annually for one year for select

parameter analysis. At the end of the year and if substantial decreases in the contaminant levels are observed, all of the monitoring wells will be closed and a report of the findings will be submitted to your office.

A copy of this pit closure plan has also been submitted to the Bureau of Land Management, Farmington Office, for their approval of the remediation of the contaminated surface and subsurface soils.

Arco Oil and Gas Company requests your expedient review and approval of this plan. As previously stated, ARCO would like to proceed as quickly as possible on this project due to the highway department's construction activities in and about the well head and facility equipment. The same request for expedient review and approval has been made of the Bureau of Land Management, Farmington Office.

We have taken pictures of the highway department's encroachment onto our well pad and operating equipment. We have discussed this with the highway department personnel and hope to obtain some relief. I will keep in touch with your office on the progress and hope to be in Santa Fe in the near future to discuss this with you personally. I will call you to set an appointment in the next few days.

Finally, as I indicated to Mr. Anderson, I will provide your office at least five days advance notice of commencement of work. I hope that the enclosed plan meets with your satisfaction and approval. If you have any questions or require additional information please call me at 713-584-3192.

Sincerely,

Mario G. Ramon
Principal Environmental Consultant
Arco Oil and Gas Company

Enclosure

cc: Ron Johnston - Farmington, NM

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ENVIROTECH LABS
5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	ARCO	Project #:	93183
Sample ID:	S @ 22'	Date Analyzed:	3-22-94
Project Location:	Wood WM Fed #1	Date Reported:	4-04-94
Laboratory Number:	GAC0414	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**510**	**10**

ND = Not Detectable at stated detection limits.

QA/QC:

QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
510	490	4

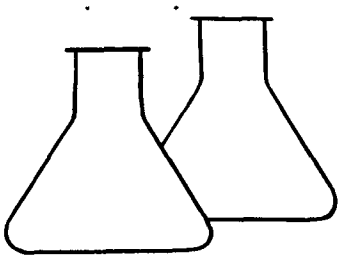
*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Closure Excavation

Michael K. Lane
Analyst

Review



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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	ARCO	Project #:	93183
Sample ID:	N @ 20'	Date Analyzed:	3-22-94
Project Location:	Wood WM Fed #1	Date Reported:	4-04-94
Laboratory Number:	GAC0415	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**17**	**10**

ND = Not Detectable at stated detection limits.

QA/QC:

QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
510	490	4

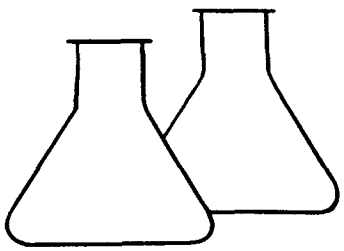
*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Closure Excavation

Michael K. Lane
Analyst

Review



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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	ARCO	Project #:	93183
Sample ID:	W @ 15'	Date Analyzed:	3-22-94
Project Location:	Wood WM Fed #1	Date Reported:	4-04-94
Laboratory Number:	GAC0416	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**ND**	**10**

ND = Not Detectable at stated detection limits.

QA/QC:

QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
510	490	4

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Closure Excavation

Michael K. Lane
Analyst

Review

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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	ARCO	Project #:	93183
Sample ID:	Composite	Date Analyzed:	3-22-94
Project Location:	Wood WM Fed #1	Date Reported:	4-04-94
Laboratory Number:	GAC0417	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**ND**	**10**

ND = Not Detectable at stated detection limits.

QA/QC:

QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
510	490	4

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Closure Excavation

Michael K. Lane
Analyst

Review

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	ARCO	Project #:	93183
Sample ID:	So. Exc. @ 22'	Date Reported:	03-24-94
Laboratory Number:	7092	Date Sampled:	03-22-94
Sample Matrix:	Soil	Date Received:	03-23-94
Preservative:	Cool	Date Extracted:	03-23-94
Condition:	Cool & Intact	Date Analyzed:	03-23-94
		Analysis Requested:	BTEX

Parameter	Concentration (ug/Kg)	Det. Limit (ug/Kg)
Benzene	105	19.8
Toluene	9,500	39.7
Ethylbenzene	3,090	39.7
p,m-Xylene	43,000	49.6
o-Xylene	10,100	39.7

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	100 %
Bromofluorobenzene	98 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986.

ND - Parameter not detected at the stated detection limit.

Comments: Wood WN Fed. Com 1

Analyst

Review

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

MODIFIED EPA METHOD 8015
NONHALOGENATED VOLATILE ORGANICS

Client:	ARCO	Project #:	93183
Sample ID:	So. Exc. @ 22'	Date Reported:	03-24-94
Laboratory Number:	7092	Date Sampled:	03-22-94
Sample Matrix:	Soil	Date Received:	03-23-94
Preservative:	Cool	Date Analyzed:	03-23-94
Condition:	Cool and Intact	Analysis Requested:	TPH

Parameter	Concentration (mg/Kg)	Det. Limit (mg/Kg)
Gasoline Range (C5 - C10)	346	0.1
Diesel Range (C10 - C28)	351	0.1
C28 - C36 Range	ND	0.1
Total Petroleum Hydrocarbons	697	0.1

Method: Method 8015, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments: Wood WN Fed. Com 1

Analyst

Review

ENVIROTECH LABS
5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	03-24-94
Laboratory Number:	0323PM.BLK	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	03-23-94
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.2
Toluene	ND	0.4
Ethylbenzene	ND	0.4
p,m-Xylene	ND	0.5
o-Xylene	ND	0.4

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	98 %
Bromofluorobenzene	101 %

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

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PHONE: (505) 632-0615 • FAX: (505) 632-1865

MODIFIED EPA METHOD 8015
NONHALOGENATED VOLATILE ORGANICS
TOTAL PETROLEUM HYDROCARBONS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	03-24-94
Laboratory Number:	0323TPH.BLK	Date Sampled:	NA
Sample Matrix:	Hexane	Date Received:	NA
Preservative:	NA	Date Analyzed:	03-23-94
Condition:	NA	Analysis Requested:	TPH

Parameter	Concentration (mg/L)	Det. Limit (mg/L)
Gasoline Range C5 - C10	ND	0.1
Diesel Range C10 - C28	ND	0.1
C28 - C36 Range	ND	0.1
Total Petroleum Hydrocarbons	ND	0.1

Method: Method 8015, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS
5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE EPA METHOD 8020
MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	03-24-94
Laboratory Number:	7088-S-BTEX	Date Sampled:	03-22-94
Sample Matrix:	Water	Date Received:	03-22-94
Analysis Requested:	BTEX	Date Analyzed:	03-23-94
Condition:	NA		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	ND	20.0	18.8	0.2	94	39-150
Toluene	ND	20.0	19.4	0.4	96	46-148
Ethylbenzene	0.5	20.0	20.1	0.4	98	32-160
p,m-Xylene	10.9	20.0	30.0	0.5	97	46-148
o-Xylene	2.4	20.0	21.5	0.4	96	46-148

Method: Method 5030A, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

ENVIROTECH LABS

5796 US HIGHWAY 64-3014 • FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615 • FAX: (505) 632-1865

** QUALITY ASSURANCE REPORT MATRIX DUPLICATE
MODIFIED EPA METHOD 8015 NONHALOGENATED VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	NA	Date Reported:	03-24-94
Laboratory Number:	7092-D-TPH	Date Sampled:	03-22-94
Sample Matrix:	Soil	Date Received:	03-23-94
Preservative:	Cool	Date Analyzed:	03-23-94
Condition:	Cool and Intact	Analysis Requested:	TPH

Parameter	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	Percent Difference
Gasoline Range (C5 - C10)	346	336	3.1
Diesel Range (C10 - C28)	351	352	0.5
C28 - C36 Range	ND	ND	0.0
Total Petroleum Hydrocarbons	697	688	1.3

QA ACCEPTANCE CRITERIA: Administrative control limit set at maximum of 30% difference.

Method: Method 8015, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

ND - Parameter not detected at the stated detection limit.

Comments:

Analyst

Review

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location	ANALYSIS/PARAMETERS
ARCO 93183	Wood WN Fed. Com 1	
Sampler: (Signature)	Chain of Custody Tape No.	
Michael K. Lane		

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	TPH 8015	BTEX 8020					Remarks
So. Eq. @ 22'	3/22/94	1430	7092	Soil	1	✓	✓					

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Michael K. Lane	3/23/94	720	Denise L. Aplanalp	3-23-94	720
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.
5796 U.S. Highway 64-3014
Farmington, New Mexico 87401
(505) 632-0615

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EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Arco	Project #:	93183
Sample ID:	MW #4	Date Reported:	03-28-94
Laboratory Number:	7101	Date Sampled:	03-25-94
Sample Matrix:	Water	Date Received:	03-25-94
Preservative:	HgCl & Cool	Date Analyzed:	03-28-94
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	11.4	0.2
Toluene	128	0.5
Ethylbenzene	10.2	0.2
p,m-Xylene	90	0.3
o-Xylene	22.0	0.2

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	99 %
Bromofluorobenzene	103 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: Wood Fed #1

Tony Tristano
Analyst

Review

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EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Arco	Project #:	93183
Sample ID:	Travel Blank	Date Reported:	03-28-94
Laboratory Number:	7102	Date Sampled:	03-25-94
Sample Matrix:	Water	Date Received:	03-25-94
Preservative:	HgCl & Cool	Date Analyzed:	03-28-94
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.2
Toluene	0.5	0.5
Ethylbenzene	ND	0.2
p,m-Xylene	0.4	0.3
o-Xylene	ND	0.2

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	93 %
Bromofluorobenzene	97 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: Wood Fed #1

Tony Tinsley
Analyst

Review

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EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Laboratory Blank	Date Reported:	03-28-94
Laboratory Number:	0328am.blk	Date Sampled:	NA
Sample Matrix:	Water	Date Received:	NA
Preservative:	NA	Date Analyzed:	03-28-94
Condition:	NA	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	ND	0.2
Toluene	ND	0.5
Ethylbenzene	ND	0.2
p,m-Xylene	ND	0.3
o-Xylene	ND	0.2

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	93 %
Bromofluorobenzene	91 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Tony Linstano
Analyst

Review

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** QUALITY ASSURANCE EPA METHOD 8020
MATRIX SPIKE - AROMATIC VOLATILE ORGANICS

Client:	NA	Project #:	NA
Sample ID:	Sample Spike	Date Reported:	03-28-94
Laboratory Number:	7101-S-BTEX	Date Sampled:	03-25-94
Sample Matrix:	Water	Date Received:	03-25-94
Analysis Requested:	BTEX	Date Analyzed:	03-28-94
Condition:	NA		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	11.4	20.0	34.2	0.2	109	39-150
Toluene	128	20.0	152	0.5	102	46-148
Ethylbenzene	10.2	20.0	32.9	0.2	109	32-160
p,m-Xylene	90	20.0	111	0.3	101	46-148
o-Xylene	22.0	20.0	45.1	0.2	107	46-148

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments:

Tony Tristano
Analyst

Review

3453

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location	ANALYSIS/PARAMETERS
ARCO 193183	WOOD FED #1	
Sampler: (Signature)	Chain of Custody Tape No.	
MICHAEL K. LANE		

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX						Remarks
MW#4	3/25/94	1030	7101	WATER	2	✓						
TRIP BLANK	3/23/94	730	7102	"	1	✓						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	3/25/94	1045	[signature]	3-25-94	1045
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.
5796 U.S. Highway 64-3014
Farmington, New Mexico 87401
(505) 632-0615

ENVIROTECH INC.

UNDERGROUND TANK TESTING • SITE ASSESSMENT • SITE REMEDIATION

5796 U.S. HIGHWAY 64 - 3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

March 21, 1994

Mr. Bill Olson
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504

SENT VIA FAX: (505) 827-5741

RE: Addition Monitor Well
Wood WN Fed. Com #1
Pit Closure

Dear Mr. Olson:

Per your request, attached is the proposed location for an additional monitor well as part of the pit closure at the subject well location. The monitor well will be completed in a similar manner as the previous three wells used for the pit assessment. A copy of the well details is also attached.

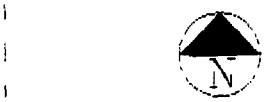
Envirotech is presently in the process of executing the excavation and closure of the pit. The additional monitor well will be installed upon completion of the pit excavation. Please contact Myke Lane at (505) 632-0615 or (505) 599-6774 if you have any further questions.

Respectfully submitted,
ENVIROTECH INC.

Michael K. Lane, P.E.
Geological Engineer

ATTACHMENTS: Site Plan (Monitor Well Location)
Monitor Well Details

Verbal OK with condition of 5 feet of well screen above water table
3/21/94
1610 hrs.
Bill Olson



SCALE

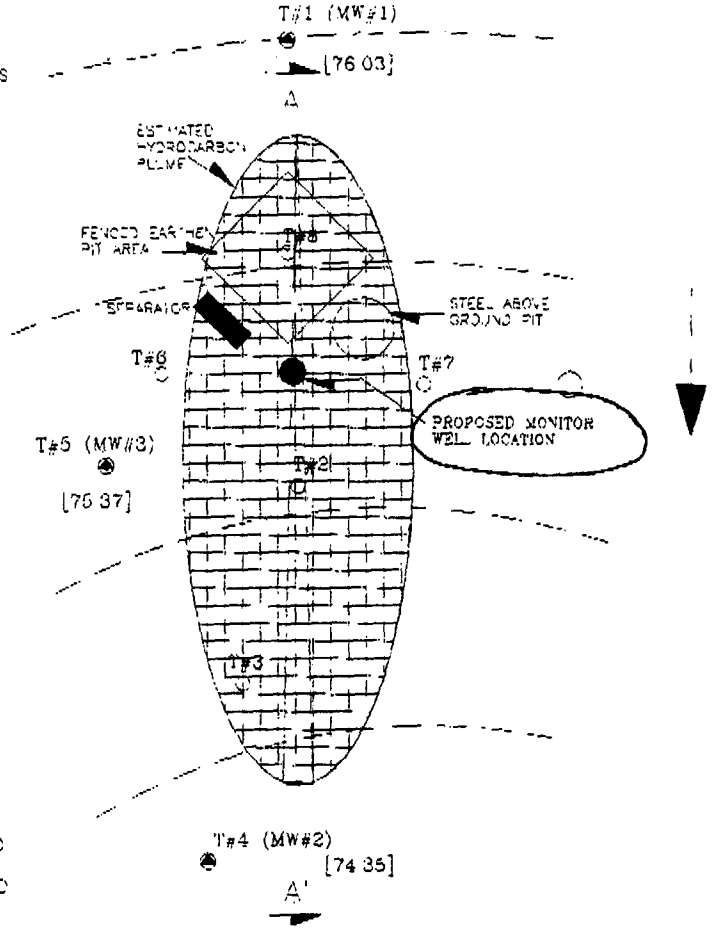
20 0 50 ft

[76.00']: GROUNDWATER DEPTH MEASURED ON 9/26/93, ELEVATIONS RELATIVE TO WELLHEAD FLANGE (100.00').

T#0 APPROXIMATE TEST BORING LOCATION

MW#0 MONITOR WELL

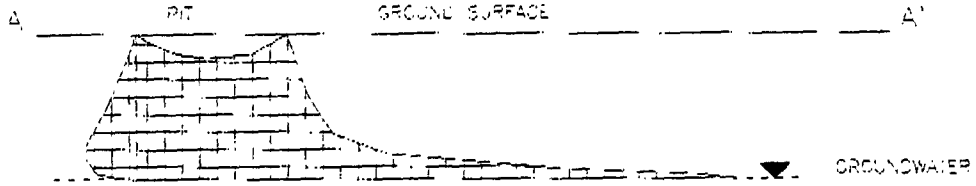
ESTIMATED HYDROCARBON PLUME



ALL DISTANCE AND ELEVATIONS HAVE BEEN DETERMINED BY SIGHTING, PACING, AND CONSTRUCTION SURVEY. MEASUREMENTS ARE ACCURATE TO THE DEGREE IMPLIED BY THE INTENT AND METHOD USED.

WELL HEAD

EAST PROFILE



ARCO OIL & GAS COMPANY

WOOD WM FEDERAL COM No. 1
LEASE No.: SF-078266
(B) SEC 21 T28N,R10W,NMPM

SITE ASSESSMENT

PROJECT NO: 93183

ENVIROTECH INC.

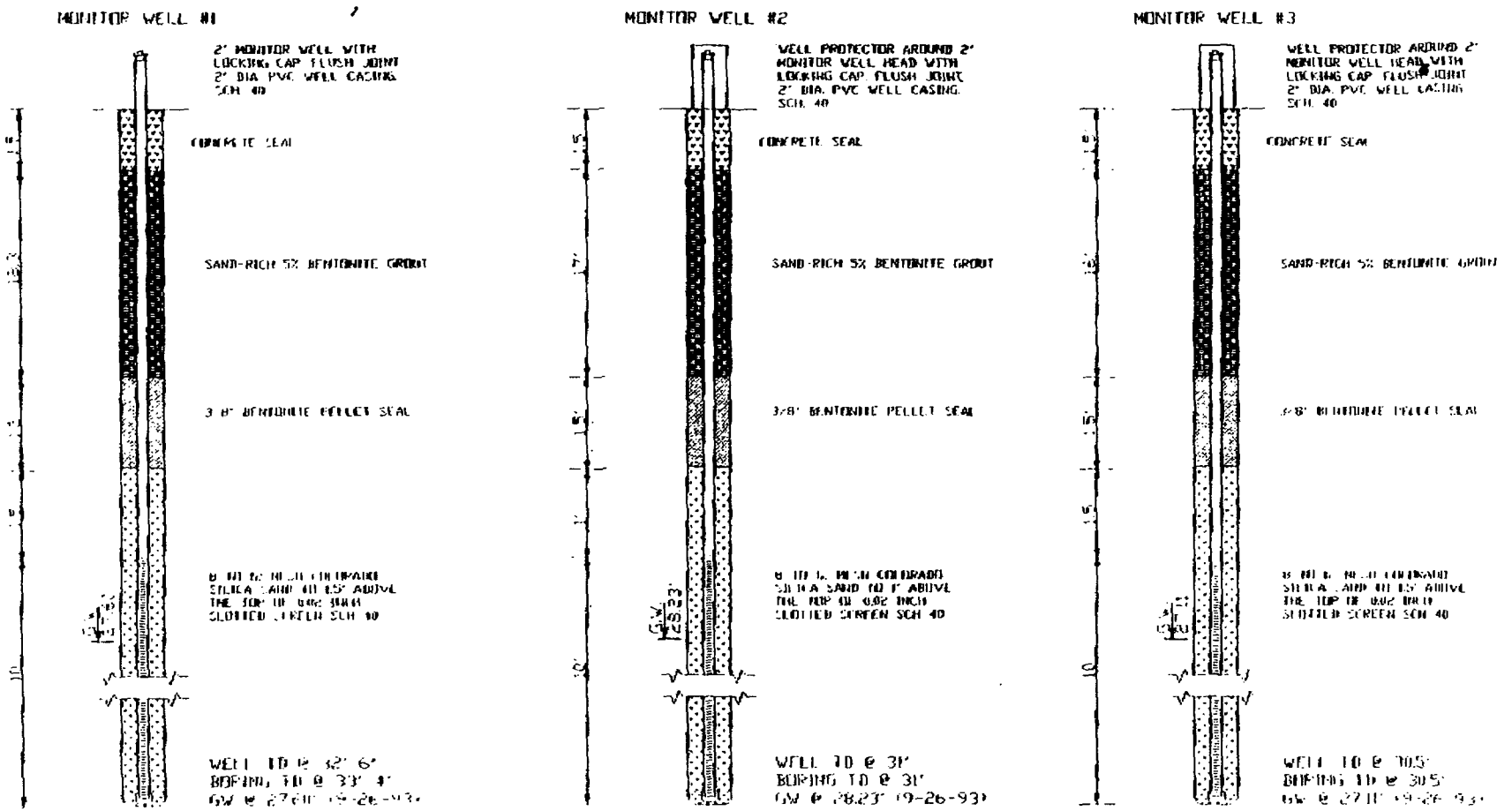
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

SITE PLAN

SHEET A2

DRWN BY MS LAW

FILE [illegible]



MONITOR WELL DETAIL
GETTY OIL & GAS COMPANY
WELLS WM FEDERAL COM NO. 1
(R) SEC 21, T29N, R10W, NMPM

ENVIROTECH INC.
ENVIRONMENTAL SCIENTISTS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

ENGINEER: M. LAND
DRAFTER: F. DIMAIO
DATE: 9-28-93
MONITOR WELLS: #1, #2, #3
SHEET: # 11

ARCO Oil and Gas Company
Eastern District
15375 Memorial Drive
Houston, Texas 77079
Telephone 713 584 6000

February 17, 1994

Mr. Bill Olsen
New Mexico Oil Conservation Division
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Dear Mr. Olsen:

Subject: Proposed Pit Closure, Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico

Pursuant to a telephone conversation with Mr. Roger Anderson of your office on February 8, 1994, this is to submit a closure plan for your review and approval for the Wood Wn Federal Com No. 1 separator pit located in San Juan County near Blanco, New Mexico.

As I explained to Mr. Anderson, Arco Oil and Gas Company is somewhat in a hurry to complete the pit remediation and ground water treatment project due to the New Mexico Highway Department's encroachment on to the well pad location. The highway department has in fact placed ten or twelve foot diameter culverts within several feet of our ground water monitoring wells and our producing well head.

Mr. Anderson recommended that we permanently close the monitoring wells that maybe impacted by the highway department's heavy equipment traffic, surface runoff control ditches and drainage culverts. We instructed our consulting firm to visit the site and determine if these monitoring wells require immediate closure. Our consultant felt that immediate closure is not required but would be prudent. Therefore, we did not close the wells but instead collected samples from one of the monitoring wells (MW-2, the one at most risk). Sampling results confirmed that the well is still a clean well. Because we remain concerned for this well's integrity, we propose to sample this well first thing when we begin the pit closure. Since the closure will take a few days to complete, we will have time to analyze for select parameters. At that time, when equipment is available, MW-2 will be closed according to NMOCD and BLM requirements as specified in the enclosed pit closure plan.

The enclosed plan also details ARCO's plan to address the impacted ground water. Succinctly, ARCO proposes to supplement the soil and ground water with nutrients to enhance natural bio-degradation of the remaining ground water contaminants. To ensure bio-degradation is progressing as desired, ARCO will install a monitoring well in the center of the pit remediation site and collect samples semi-annually for one year for select

parameter analysis. At the end of the year and if substantial decreases in the contaminant levels are observed, all of the monitoring wells will be closed and a report of the findings will be submitted to your office.

A copy of this pit closure plan has also been submitted to the Bureau of Land Management, Farmington Office, for their approval of the remediation of the contaminated surface and subsurface soils.

Arco Oil and Gas Company requests your expedient review and approval of this plan. As previously stated, ARCO would like to proceed as quickly as possible on this project due to the highway department's construction activities in and about the well head and facility equipment. The same request for expedient review and approval has been made of the Bureau of Land Management, Farmington Office.

We have taken pictures of the highway department's encroachment onto our well pad and operating equipment. We have discussed this with the highway department personnel and hope to obtain some relief. I will keep in touch with your office on the progress and hope to be in Santa Fe in the near future to discuss this with you personally. I will call you to set an appointment in the next few days.

Finally, as I indicated to Mr. Anderson, I will provide your office at least five days advance notice of commencement of work. I hope that the enclosed plan meets with your satisfaction and approval. If you have any questions or require additional information please call me at 713-584-3192.

Sincerely,

Mario G. Ramon
Principal Environmental Consultant
Arco Oil and Gas Company

Enclosure

cc: Ron Johnston - Farmington, NM

\setrc\mgr\ltr\woodfed

ARCO Oil and Gas Company
Eastern District
15375 Memorial Drive
Houston, Texas 77079
Telephone 713 584 6000

February 17, 1994

Ms. Ilyse Gold
Bureau of Land Management
1235 La Plata Highway
Farmington, New Mexico 87401

Subject: Proposed Pit Closure, Wood WN. Federal Com # 1, San Juan County, Blanco, New Mexico

Dear Ms. Gold,

The purpose of this letter is to submit a closure plan for your review and approval for the Wood Wn Federal Com No. 1 separator pit located in San Juan County near Blanco, New Mexico.

Arco Oil and Gas Company requests your review and approval of the pit remediation and ground water treatment project at the subject well location. We request immediate due to the New Mexico Highway Department's encroachment on to our well pad location. The State Highway Department has in fact placed ten or twelve foot diameter culverts within several feet of our ground water monitoring wells and our producing well head.

We have contacted Mr. Roger Anderson of the New Mexico Oil Conservation Division regarding this matter and have also submitted a copy of the plan to NMOCD for their immediate approval.

The enclosed plan details ARCO's plan to remove the contaminated soils for off-site land treatment. We also plan to address the impacted ground water by supplementing the soil and ground water with nutrients to enhance natural bio-degradation of the ground water contaminants. To ensure bio-degradation is progressing as desired, ARCO will install a monitoring well in the center of the pit remediation site and collect samples semi-annually for one year for select parameter analysis. At the end of the year and if substantial decreases in the contaminant levels are observed, all of the monitoring wells will be closed and a report of the findings will be submitted to your office. Also, because one of the wells (MW-2) is at risk of being damaged by the highway department's encroachment we plan to permanently remove the well as soon as possible. (Please attached letter to OCD.)

Arco Oil and Gas Company requests your expedient review and approval of this plan. As previously stated, ARCO would like to proceed as quickly as possible on this project due to the highway department's construction activities in and about the well head and facility equipment.

Finally, either I or Mr. Rick Renick of our Farmington Office will provide your office at least five days advance notice of commencement of work. I hope that the enclosed plan meets with your satisfaction and approval. If you have any questions or require additional information please call me at 713-584-3192

Sincerely,

Mario G. Ramon
Principal Environmental Consultant
Arco Oil and Gas Company

cc: Ron Johnston - Farmington, NM.

\sotro\mgr\ltr\woodfed

State of New Mexico
ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT
Santa Fe, New Mexico 87505

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☐ Telephone ☑ Personal | Time 1100 | Date 10/4/93

Originating Party	Other Parties
Lee Hinman - Arco	Bill Olson) Enviro. Bureau Roger Anderson)

Subject

Wood Federal Com #1

Discussion

Presented Site Assessment performed as part of property transfer

SA documented GW contamination

OCD requires remediation of GW and the source (pit)

Up to Arco as to how to do it

Conclusions or Agreements

Arco will determine a remedial action and submit to OCD for approval

Distribution

Signed Bill Olson