AP - 30

STAGE 1 & 2 REPORTS

DATE:

Dec. 5, 2002

December 5, 2002
AMEC Project No. 2-517-00312M

AP-30

PHASE II
MONITORING WELL INSTALLATION
AND GROUNDWATER SAMPLING

BYRD RANCH PROJECT
LEA COUNTY, NEW MEXICO

Submitted To:

Amerada Hess Corporation
P. O. Box 840
Seminole, Texas 79360

Submitted By:

AMEC Earth and Environmental, Inc.
301 N. Colorado Ave., Suite 350
Midland, Texas 79701

December 5, 2002
AMEC Job No. 2-517-00312M

Amerada Hess Corporation
P.O. Box 840
Seminole, Texas 79360

Attention: Mr. Sam Small

RE: PHASE II MONITORING WELL INSTALLATION AND SAMPLING
BYRD RANCH
LEA COUNTY, NEW MEXICO

Enclosed is the AMEC Earth and Environmental, (AMEC) report for the above referenced site. This report presents the results of the Phase II field exploratory drilling and groundwater sampling conducted at the site during October, 2002.

We appreciate the opportunity to provide environmental services to Amerada Hess Corporation for this project. If you have any questions regarding this report, please give us a call at (915) 686-1978.

Respectfully submitted,

AMEC Earth & Environmental, Inc.

Mark A. Ehrlich
Project Manager

Reviewed by:

Bob Wilcox, PG
Operations Manager

Attachment

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1.0 EXECUTIVE SUMMARY

This report presents the results of a Phase II groundwater investigation performed at the request of Amerada Hess Corporation on the Byrd Ranch located approximately three miles southwest of the township of Monument in Lea County, New Mexico. The purpose of this study was to further evaluate the horizontal extent of petroleum hydrocarbon concentrations in groundwater in the vicinity of the Byrd residence. During the first phase of the project in 2001, a previous contractor drilled eight (8) soil borings and installed eight (8) monitor wells at the site. Samples obtained from the monitor wells indicated groundwater had been impacted by chlorides, total petroleum hydrocarbons (TPH) and benzene. On October 21 and 22, 2002, AMEC Earth and Environmental (AMEC) drilled one (1) additional soil boring, installed one (1) additional monitor well (MW-9), measured fluid levels, and sampled groundwater in six (6) monitor wells at the site.

During the installation of MW-9, two (2) soil samples were obtained from the boring and one (1) water sample was obtained on October 22, 2002, from this well 24 hours after development. Five (5) additional water samples were collected, one each from the following monitor wells: MW-1, MW-2, MW-4, MW-6 and MW-8.

Headspace readings from a photoionization detector (PID) indicated a maximum of 4.2 parts per million (ppm) from a soil sample obtained from MW-9 at a depth of 35 - 36 feet below ground surface (bgs). Measured depth to groundwater in MW-9 was at 33.07 feet below the top of casing (toc). The groundwater flow direction was determined to be toward the south with a measured gradient of 0.0021 feet/foot (ft/ft).

Soil samples obtained at 25 - 26 feet and 35 - 36 feet bgs from the MW-9 boring were analyzed for BTEX and Total Petroluem Hydrocarbons (TPH) including Diesel Range (DRO) and Gasoline Range (GRO) hydrocarbons and Chlorides. Both samples were below detectable limits for BTEX and TPH concentrations. Chloride concentrations were 162 mg/kg and 2,310 mg/kg, respectively.

Representative groundwater samples obtained from the monitor wells on October 22, 2002, indicated benzene concentrations were <0.001ppm in MW-1, 0.019 ppm in MW-2, 0.019 ppm in MW-4, 0.011 ppm in MW-6, <0.001 ppm in MW-8 and <0.001 ppm in MW-9. Chloride concentrations obtained from these monitor wells were 14,400 mg/L in MW-1, 6,000 mg/L in MW-2, 12,400 mg/L in MW-4, 11,900 mg/L in MW-6, 7,110 mg/L in MW-8 and 6,360 mg/L in MW-9.

2.0 PURPOSE AND SCOPE

This report presents the results of a Phase II site investigation conducted by AMEC on the Byrd Ranch (the site) in Lea County, near Monument, New Mexico. The location of the project site is in Section 12, T20S, R36E as shown on Figure 1. This study was performed to further evaluate the horizontal extent of petroleum hydrocarbon and chloride concentrations identified in

groundwater at the site during an earlier (Phase I) investigation and sampling of a domestic well at the Byrd Ranch. An areal photograph of the site is shown in Figure 2.

The former Phase I investigation completed in 2001 consisted of drilling a total of eight (8) exploratory borings and completing them as monitor wells. The objective of the Phase II investigation was to install and sample one (1) monitor well (MW-9). During the Phase II investigation groundwater table elevations were also measured in monitor wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6. MW-7, MW-8 and MW-9 and water samples were obtained from monitor wells MW-1, MW-2, MW-4, MW-6, MW-8 and MW-9. Groundwater was not sampled in MW-3 because of the presence of phase-separated hydrocarbons. At the request of the client groundwater was not sampled in MW-5 and MW-7.

3.0 SITE CONDITIONS

The Byrd property is occupied by the Byrd residence, several storage buildings, an animal stable and one inactive domestic water well. Cattle graze the land in and around the site. Several pipelines carrying natural gas, propane, produced salt water and crude oil are near or have right-of-ways through the site (Figure 3). Several oil and gas facilities are located on the property. Photographs obtained during the project are shown in Appendix D.

4.0 SUBSURFACE INVESTIGATION

The new soil boring/monitor well (MW-9) was drilled using air rotary methods to a depth of 40 feet bgs with a 5-inch outside diameter (OD) bit. The locations of all monitor wells at the site are shown on Figures 2 and 3.

4.1 Investigation Procedures

The drilling contractor, Straub Drilling from Stanton, Texas, provided the air rotary drilling rig for the project. A shelby tube sampler was used to collect the initial five foot sample and a split-spoon sampler was utilized to obtain soil samples every five feet thereafter. The sampler was decontaminated using Alconox and distilled water between each sample interval to prevent cross contamination.

A Photovac Model 2020 photoionization detector (PID), calibrated to a 100 ppm isobutylene standard, was used to qualitatively detect the presence of VOCs which may be related to potential petroleum hydrocarbon contamination. Soil samples were collected and tested using field headspace methods during the drilling program. To conduct field headspace tests, soil samples were obtained every five feet and were collected in glass jars (filled approximately one half full) then sealed with aluminum foil. After allowing the sample to warm readings were obtained by puncturing the foil seal with the PID probe and measuring the concentration of headspace gases. Results of field screening tests performed on selected soil samples are shown on the log presented in Appendix B and are summarized in Table 1.

Drilling and sampling were completed in accordance with AMEC's standard Quality Assurance/Quality Control (QA/QC) procedures. These procedures have been designed to ensure that samples are representative and sampling results are both accurate and precise. Copies of the field notes are presented in Appendix A. A copy of AMEC's site specific Health and Safety Plan for the project is on file at AMEC's Midland, Texas office.

4.2 Groundwater Monitor Well

Monitor well MW-9 was drilled to a depth of 40 feet bgs and constructed with schedule 40, 2-inch diameter, flush-joint, threaded PVC riser pipe and 20 feet of factory slotted 0.01-inch screen. The annular space was filled with 20/40 silica sand to 2 feet above the screen, followed by a bentonite pellet plug (minimum 2 feet thick) above the sand pack. The remainder of the annular space was backfilled with a bentonite slurry to within two feet of the ground surface. The well was completed at the surface with a square, metal locked vault cemented into the base. The screened interval intersected the top of the water table and provided for seasonal fluctuations of water levels. The monitor well completion diagram and New Mexico State Engineer Well Record are presented in Appendix B.

After well development and prior to subsequent water quality sampling, water depths were measured to the nearest one-hundredth (0.01) foot bgs. The reference point elevations were previously provided by a licensed survey company. AMEC personnel surveyed the top of casing elevation of monitor well MW-9 at the request of Amerada Hess and referenced it to other known monitor well toc elevations. A summary of groundwater measurements and elevations are shown in Table 2.

4.3 Soil and Groundwater Sampling Procedures

Soil samples were obtained every five feet during the drilling operation with a shelby type (first five feet) and split-spoon samplers. Field headspace readings were obtained every five feet; headspace readings varied between 0.0 and 4.2 ppm. Two of the soil samples, from 25 - 26 feet bgs and 35 - 36 feet bgs, were submitted for laboratory analysis. Headspace readings are summarized in Table 1.

MW-9 was developed prior to sampling. Each of the other wells were purged until water temperature, pH, and conductivity had stabilized. The water sample in MW-9 was obtained at least 24 hours after development.

Water samples obtained from each well were tested for the following at the request of Amerada Hess: Monitor well MW-1 was tested for BTEX, Chlorides, PAH, Major Cations and Anions; MW-2 was tested for BTEX and Chlorides; MW-4 was tested for BTEX and Chlorides; MW-6 was tested for BTEX, Chlorides, Major Cations and Anions, PAH and Metals; MW-8 was tested for BTEX and Chlorides and MW-9 was tested for BTEX and Chlorides. The samples were submitted to Trace Analysis of Lubbock, Texas for chemical analysis by EPA methods shown in the laboratory reports

in Appendix C. Each groundwater sample was collected, containerized, and preserved according to AMEC QA/QC procedures and standard laboratory protocol.

Copies of the chain-of-custody records and analytical reports for groundwater samples are also provided in Appendix C.

5.0 SUBSURFACE CONDITIONS

Surface soils at the site consist of Quaternary alluvium and caliche which occur in the Monument Draw area. Soils encountered in the upper 25 feet in the MW-9 borehole consisted of very pale orange to light brown, very fine-grained silty sand containing white caliche or caliche nodules. At approximately 20 feet bgs, a small sand layer was encountered, light brown in color. No hydrocarbon odor was noticed during the drilling of MW-9.

The depth to groundwater measured from the top of the casing in the monitor wells ranged from 33.06 feet bgs in MW-2 to 34.55 feet bgs in MW-5. Using groundwater elevations derived from measurements provided by Topographic Surveys, Inc. and AMEC field personnel, the groundwater flow direction is south with a gradient of 0.0021 ft/ft. A groundwater elevation contour map is presented as Figure 4.

6.0 GROUNDWATER LABORATORY ANALYSES AND RESULTS

The groundwater samples indicated benzene concentrations were 0.019 ppm in MW-2, 0.011 ppm in MW-6, and 0.019 ppm in MW-4. Monitor wells MW-1, MW-8 and MW-9 indicated benzene levels were non-detectable. Monitor well MW-3 was not sampled because 2.1 feet of free phase hydrocarbons were measured above the water table. Monitor well MW-5 and MW-7 were not sampled at the request of the client. Toluene, ethylbenzene, and total xylenes concentrations were not detected in any well sampled. Table 3 summarizes the laboratory testing results for hydrocarbons detected in groundwater. A benzene contaminant concentration map summarizing the benzene concentrations from this investigation is presented as Figure 5.

Chloride concentrations ranged from 6,360 mg/L in MW-9 to 14,400 mg/L in MW-1. The chloride concentrations are shown in Table 3 and on Figure 6.

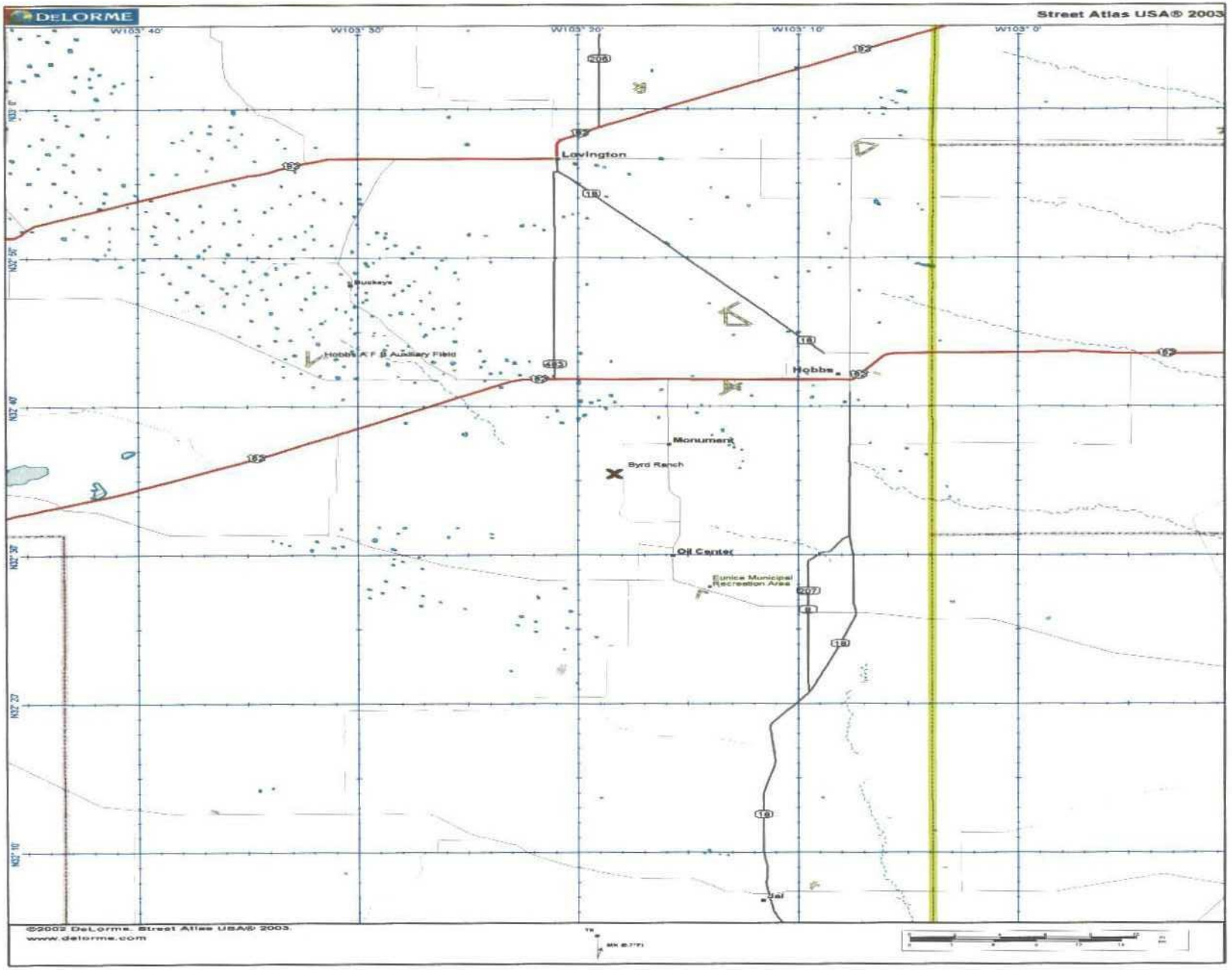
Groundwater samples from monitor well MW-1 and MW-6 were analyzed for major anions and cations (EPA Methods 7470A, 300.0, 200.7, and 310.1), PAH (EPA Method 8270C) and total metals (EPA method 6010B) and the results are presented in Appendix C.

Laboratory results from the soil sample obtained at 25-26 feet bgs contained TPH GRO concentrations of < 1 mg/kg and TPH DRO concentrations of < 50.0 mg/kg. The soil sample obtained from 35 - 36 feet (PID field reading 4.2 ppm) contained TPH GRO concentrations of <1 mg/kg and TPH DRO concentrations of < 50.0 mg/kg. No Total Petroleum Hydrocarbons were detected in soils from the MW-9 soil boring.

7.0 GENERATED WASTE

Groundwater development and purge water from each well was placed in separate 55-gallon drums which were labeled and sealed. A total of six (6) drums containing purged water and one (1) drum of soil cuttings were generated.

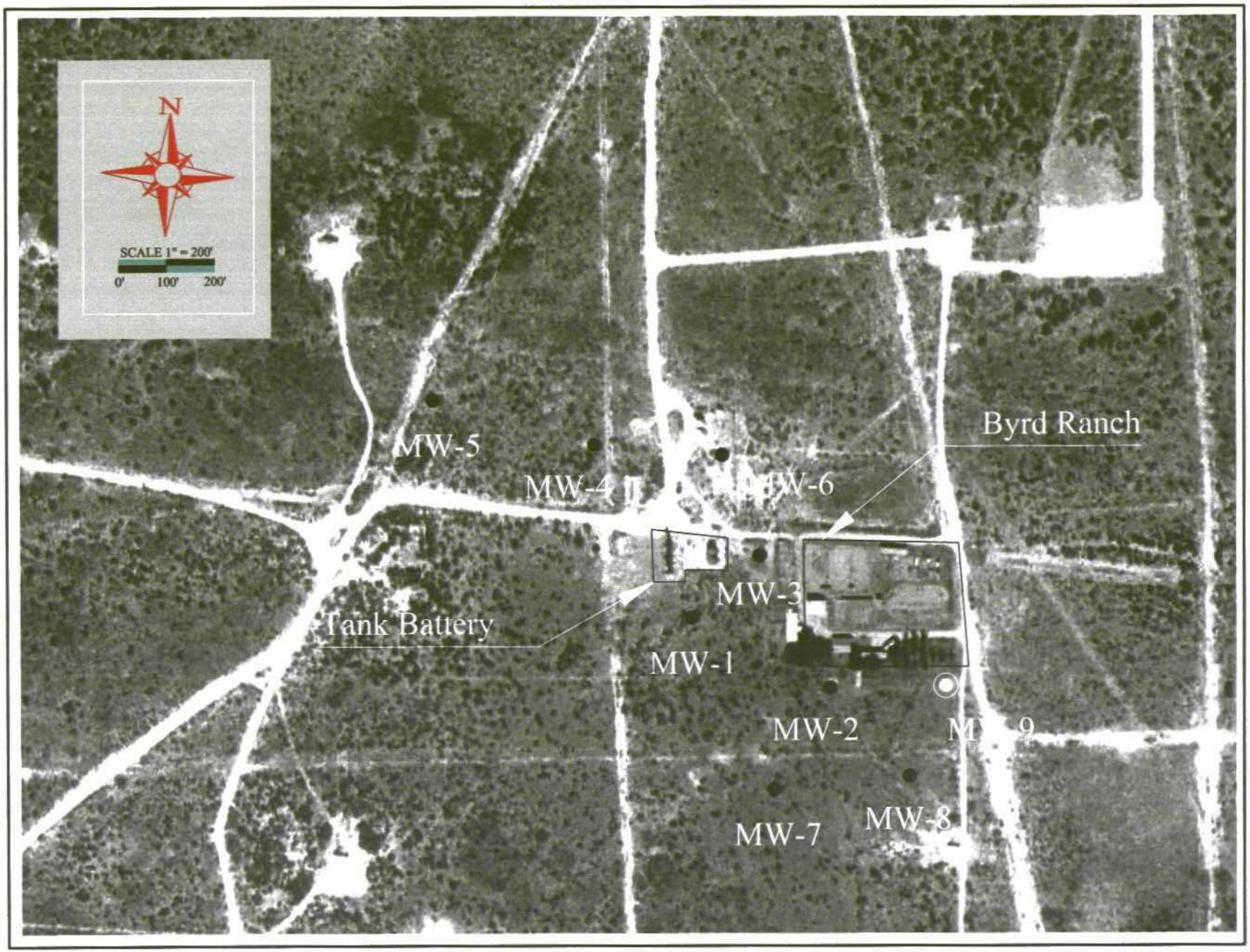
The drums were disposed at an OCD-approved disposal facility operated by Gandy-Marley Corporation in Chaves County, New Mexico. The waste disposal records are included in Appendix E.



LEGEND

x Site Location

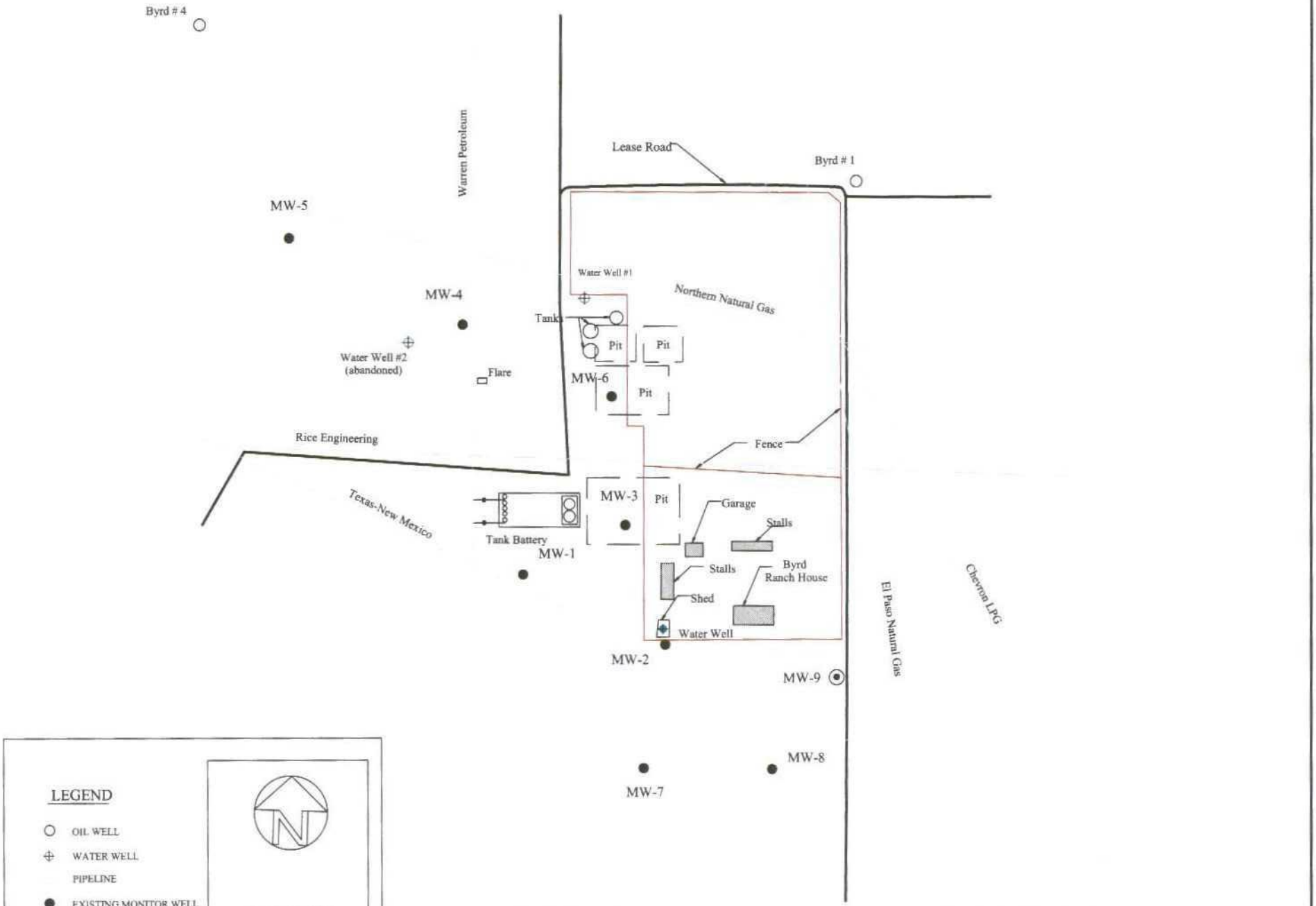
Amerada Hess Corp. Byrd Ranch Project Section 12, T-20-S, R-36-E Lea County, New Mexico	amec Earth and Environmental 301 N. Colorado, Ste. 350 Midland, Texas 79701	Vicinity Map	Figure No. 1
		Date Drawn: November 5, 2002	Drawn By: MAE
			Reviewed By: RW



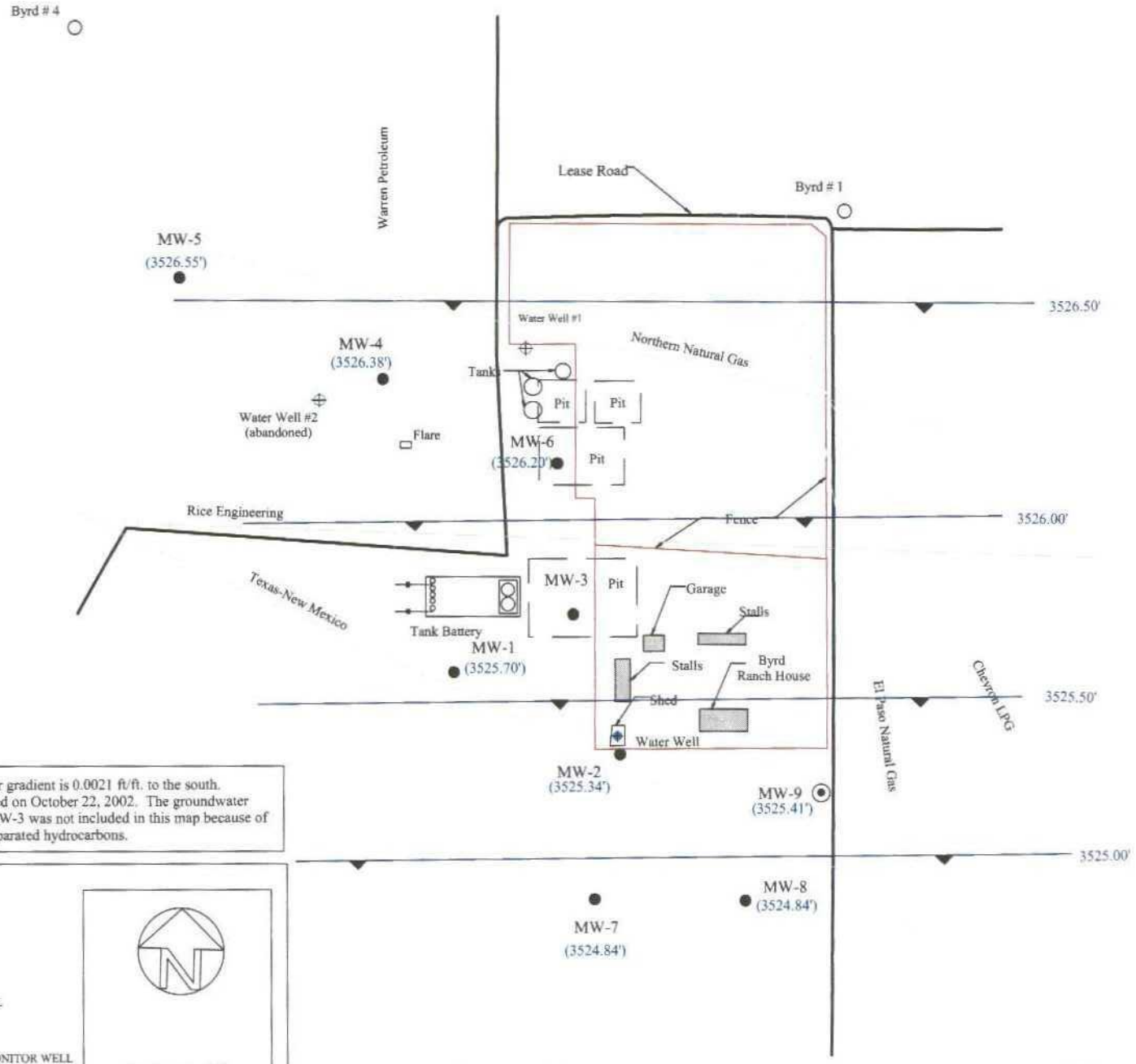
LEGEND

- EXISTING MONITOR WELL
- NEW MONITOR WELL

Amerada Hess Corp. Byrd Ranch Project Section 12, T-20-S, R-36-E Lea County, New Mexico	amec Earth and Environmental 301 N. Colorado Ave., Ste. 350 Midland, Texas 79701	Aerial Vicinity Map			Figure No. 2
		Date Drawn: November 16, 2002	Drawn By: MAE	Reviewed By: REW	



Amerada Hess Corp. Byrd Ranch Project Section 12, T-20-S, R-36-E Lea County, New Mexico	amec Earth and Environmental 301 N. Colorado, Ste. 350 Midland, Texas 79701	Site Plan	Figure No. 3
		Date Drawn: November 4, 2002	Drawn By: MAE
			Reviewed By: RW



Site specific groundwater gradient is 0.0021 ft/ft. to the south. Fluid levels were obtained on October 22, 2002. The groundwater elevation measured in MW-3 was not included in this map because of the presence of phase-separated hydrocarbons.

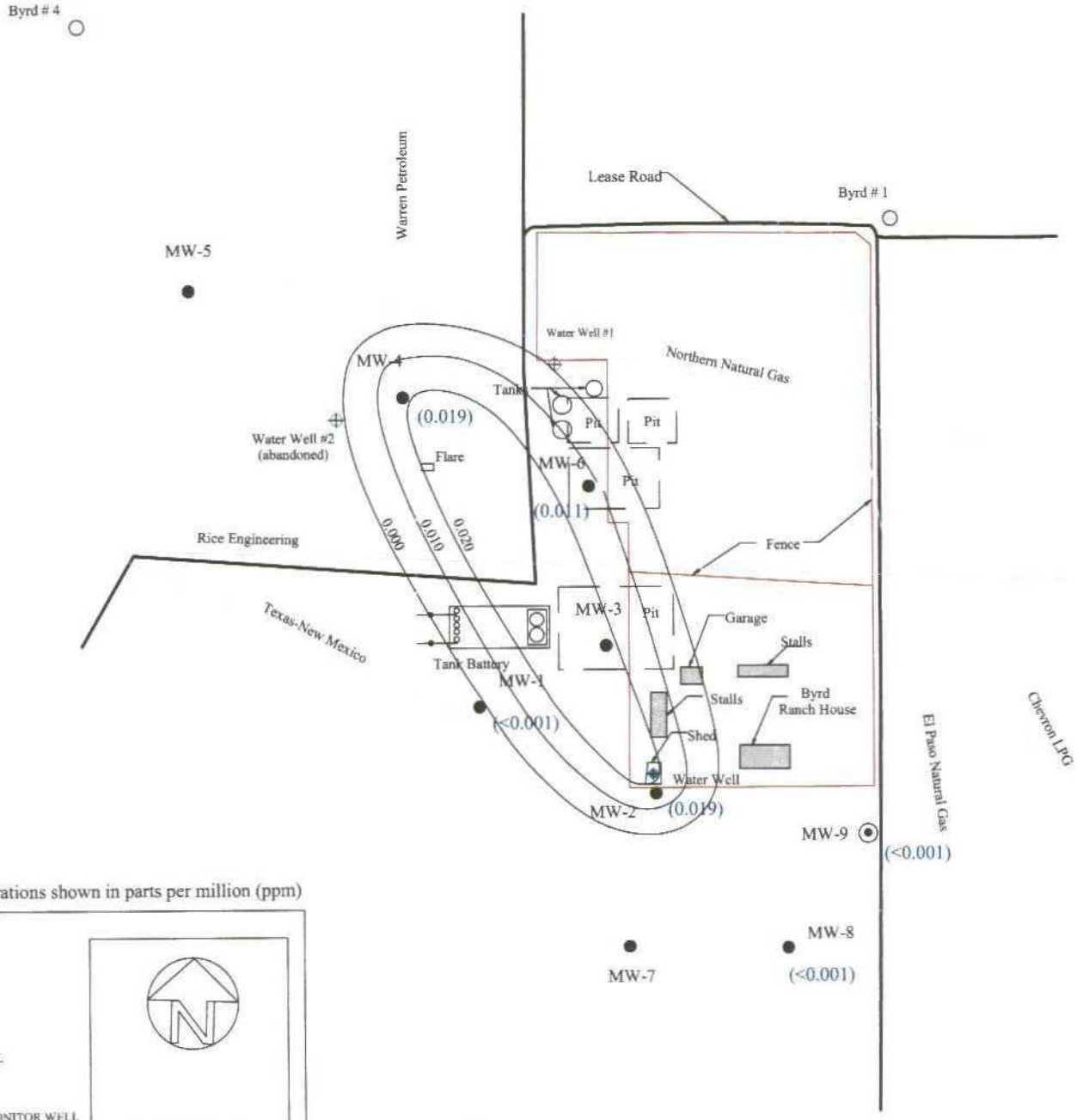
LEGEND

- OIL WELL
- WATER WELL
- PIPELINE
- EXISTING MONITOR WELL
- NEW MONITOR WELL

SCALE: 1" = 200'

0' 100' 200'

Amerada Hess Corp. Byrd Ranch Project Section 12, T-20-S, R-36-E Lea County, New Mexico	amec Earth and Environmental 301 N. Colorado, Ste. 350 Midland, Texas 79701	Groundwater Elevation Contour Map	Figure No. 4
		Date Drawn: November 4, 2002	Drawn By: MAE
			Reviewed By: RW



Benzene concentrations shown in parts per million (ppm)

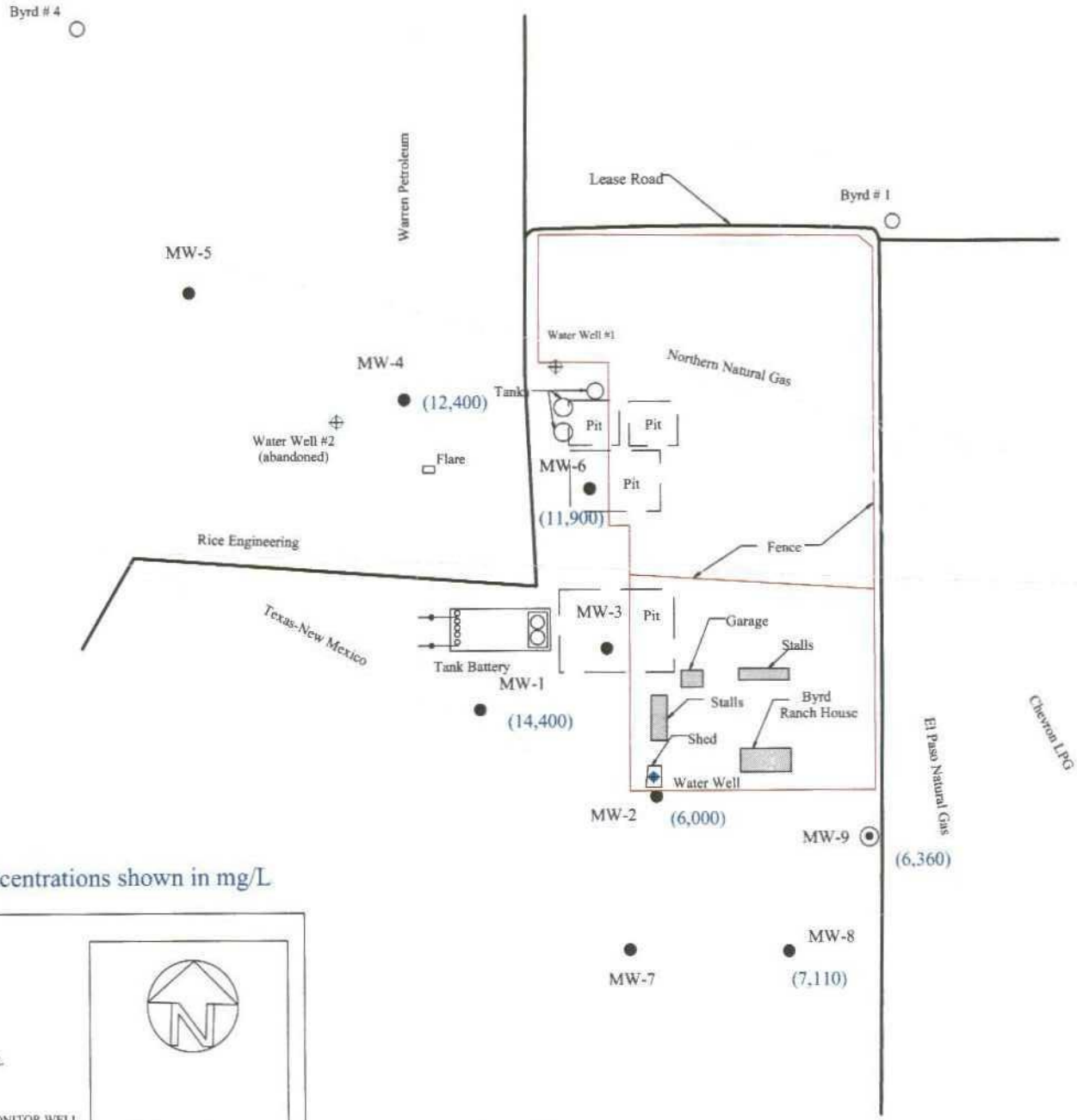
LEGEND

- OIL WELL
- WATER WELL
- PIPELINE
- EXISTING MONITOR WELL
- NEW MONITOR WELL

SCALE: 1" = 200'

0' 100' 200'

Amerada Hess Corp. Byrd Ranch Project Section 12, T-20-S, R-36-E Lea County, New Mexico	amec Earth and Environmental 301 N. Colorado, Ste. 350 Midland, Texas 79701	Benzene Concentration Contours in Groundwater	Figure No. 5
		Date Drawn: November 4, 2002	Drawn By: MAE
			Reviewed By: RW



Chloride concentrations shown in mg/L

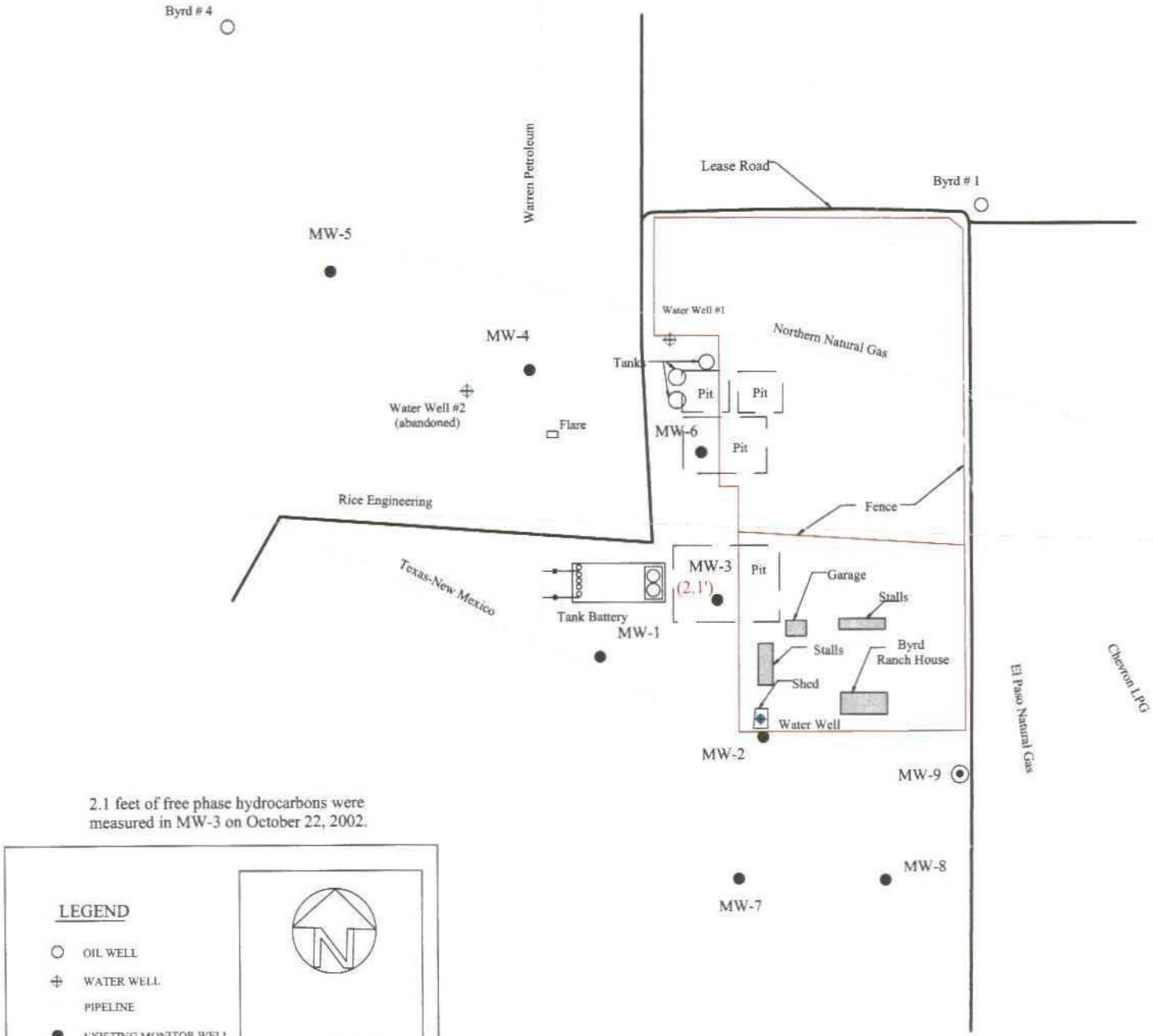
LEGEND

- OIL WELL
- WATER WELL
- PIPELINE
- EXISTING MONITOR WELL
- NEW MONITOR WELL

SCALE: 1" = 200'

0' 100' 200'

Amerada Hess Corp. Byrd Ranch Project Section 12, T-20-S, R-36-E Lea County, New Mexico	amec Earth and Environmental 301 N. Colorado, Ste. 350 Midland, Texas 79701	Chloride Concentration Map	Figure No. 6
		Date Drawn: November 4, 2002	Drawn By: MAE
			Reviewed By: RW



2.1 feet of free phase hydrocarbons were measured in MW-3 on October 22, 2002.

LEGEND

- OIL WELL
- WATER WELL
- PIPELINE
- EXISTING MONITOR WELL
- NEW MONITOR WELL

SCALE: 1" = 200'

0' 100' 200'

Amerada Hess Corp. Byrd Ranch Project Section 12, T-20-S, R-36-E Lea County, New Mexico	amec Earth and Environmental 301 N. Colorado, Ste. 350 Midland, Texas 79701	Free Phase Hydrocarbon Map	Figure No. 7
		Date Drawn: November 4, 2002	Drawn By: MAE
			Reviewed By: RW

TABLE 1
SUMMARY OF FIELD SCREENING

	Sample Depth (feet)						
Boring No.	5-7	10-11	15-16	20-21	25-26	30-31	35-36
	Headspace Readings (ppm)						
MW-9	0.0	0.0	0.0	0.0	0.0	0.0	4.2

Note: A Photovac Model 2020 Photoionization Detector (PID) calibrated to a 100 ppm isobutylene was used to perform the headspace testing.

TABLE 2
SUMMARY OF GROUNDWATER ELEVATIONS

Monitor Well	Top of Casing Elevation (feet)	Depth to Water (feet below TOC)	Groundwater Elevation (feet)	Total Depth from Top of Casing (feet)	Phase Separated Hydrocarbons (feet)
MW-1	3559.30	33.60	3525.70	42.50	ND
MW-2	3558.40	33.06	3525.34	41.50	ND
MW-3	3558.20	34.35	3523.85	41.85	2.10
MW-4	3560.70	34.32	3526.38	42.48	ND
MW-5	3561.10	34.55	3526.55	41.75	ND
MW-6	3560.30	34.10	3526.20	42.70	ND
MW-7	3558.00	33.16	3524.84	42.90	ND
MW-8	3557.94	33.10	3524.84	42.56	ND
MW-9	3558.48	33.07	3525.41	44.30	ND

Note: Groundwater levels were measured in MW-1 through MW-9 on October 22, 2002.
Elevations are referenced to mean sea level.

TABLE 3
SUMMARY OF ANALYTICAL TESTING RESULTS - GROUNDWATER [5]

Well ID.	Sample Date	B[1] (ppm)	T[2] (ppm)	E[3] (ppm)	X[4] (ppm)	Chloride (mg/L)
MW-1	10/22/02	<0.001	<0.001	<0.001	<0.001	14,400
MW-2	10/22/02	0.019	<0.005	<0.005	<0.005	6,000
MW-4	10/22/02	0.019	<0.001	<0.001	<0.001	12,400
MW-6	10/22/02	0.011	<0.001	<0.001	<0.001	11,900
MW-8	10/22/02	<0.001	<0.001	<0.001	<0.001	7,110
MW-9	10/22/02	<0.001	<0.001	<0.001	<0.001	6,360

Notes:

(1) Benzene
(2) Toluene
(3) Ethylbenzene
(4) Total Xylenes
(5) Samples were analyzed by EPA Methods 8021 and 8015B. Reports of test results provided by the analytical laboratory are presented in Appendix C

APPENDIX A

FIELD NOTES

Pure Resources

10/10/02 Left Midland 1030

251/100712m Amerada Hess, Byrd

8/21/02

- Left Midland ~ 845
- Called Sam Small to notify him we were running behind

tailgate meeting

Drilling rig safety

- Rig should be properly secured & inspected prior to drilling
- 1st 10' should go slowly (shelby tube) in case of unknown lines.
- Powerline caution
- Lifting carefully should be observed
- First aid kit in Amec truck
- - Fire / explosion
- Fire extinguisher is in Amec truck
- Rain will constitue shut down until it passes.
- Careful of footing & slips, trips & falls
- Emergency phone numbers on dash of Amec truck including Lea Regional Hospital & Amerada Hess phone number
- Sign log

Calibrated PID w/ gas.

10/21/02

On location @ 9:40 am
time w/ Straub Drilling.

- Had short safety meeting
prior to drilling (10am) am

- Began drilling 10:00 Well #9

1120 - 1st ST sample 5-7'. Took
additional sample to field ID

all sampling instruments decommed
between samples w/ Alconox

Slight moisture encountered @
~22' so with Sam's blessings
went w/ on addl 5' of
screen @ from 40'-20'

Sample Interval	Sample Recovery	Sample Type	Soil Description/Classification	PID
5'-7'	6"	SM	SM silty sand, fine to v. fine gr, 40% caliche sand, very pale orange (10YR 8/2)	0.0
10'-11'	8"	SM	Silty sand fine to v. fine gr. very pale orange (10YR 8/2)	0.0
15'-16'	6"	SM	Fine - v. fine gr. caliche indurated, very pale orange 10YR 8/2	0.0
20'-21'	8"	SP	Fine gr. SAND, light brown (5YR 5/6)	0.0
25'-26'	8"	SM	Silty Sand, fine to v. fine 1" SSt & S nodules, pale to dark orange. Slight moisture 10YR 6/2	0.0

Sample Interval	Sample Recovery	sample type	Soil Description / Classification	PID
30'-31'	12"	SM	Br-pale, moist, fine - v. fine gr. 5% LS nodules, moist (10YR 8/2)	0.0
35'-36'	12"	SM	Light brown clay silt v. fine grained 20% LS nodules	4.2
40'-41'	none	—	unable to gather sample due to hardness of the red bed or water content from groundwater	

010 +24 ~~grout~~ & Sched. 40

~~22~~' Sand - 20/40 (40'-18')

~~20/40~~ Bentonite pellet seal from ~~18~~ 18'-

Kept samples 25'-26' &
35'-36'. Also gathered one
drum sample

Filled 1½' grout in top
& made slab 2'x2' concrete
Put in Square vault w/
PVC csg to surface of vault

Long / Lat N32° 35.430'
W 103° 18.341'
3559' Ele

10/21 Hess Monument 2517003I2M

mileage 94182 - 94400 218 8-6.00

10.0 hrs.

Installed MW#9

Soil Samples 5-7; 10-11, 15-16, 20-21
25-26; 30-31, 35-36

T.D. @ 40' hit water ≈ 30'-35'

Installed Screen 20' to 40'

2" MW.

1 drum of ~~Soil~~ Cuttings

All samples 0.0 on PID

left 6 drums @ MW 1, 2, 3, 4, 6
9, 8,

2517003I2M

10/22 Monument Hess

miles 94400 - 635 235 7am - 7pm

MW#	PSH	H2O (DTW)	T.D. ↓ TOC casing	Bail until!
9	N.D.	33.07	44.30 (2")	10.45
8	N.D.	33.10	42.56 (2")	9.21
2 odor!	N.D.	33.06	41.50 (2")	8.32
1	N.D.	33.60	42.50 (2")	8.7
3	32.25	34.35	41.85 (2")	
6	N.D.	34.10	42.70 (2")	8.4
4	N.D.	34.32	42.48 (2")	7.95
5	N.D.	34.55	41.75 (2")	
7 odor	N.D.	33.16	42.90 (2")	

Sample MW# 1, 2, 3, 4, 6, 8 & 9

MW#8 3:40 & 42

MW#9 4:00 & 02

MW#2 4:30 & 32

MW#1 4:15 & 16 - 20 & 21

MW#6 4:50 - 4:55

MW#4 5:10 - 5:15

Amerada Hess
Byrd Ranch
Job # 2-517-60312 M
Oct. 26, 2002

SURVEY ELEVATIONS

MW-9

PAD 100'* - SET AS DATUM

CASING 103.13'

MW-8

PAD 100.08'

CASING 102.59'

MW-2

PAD 100.45'

CASING 103.20'

DISTANCES

TO MW-9

FROM:

FENCE CORNER = 61'

OIL FIELD ROAD = 19.5'

MW-8 - 193.9'

MW-2 TO MW-8 311.5'

MW-2 TO CORNER OF FENCE 308.3'

MW-9 TO MW-2 ~290'

APPENDIX B

MONITOR WELL COMPLETION DIAGRAM

STATE ENGINEER WELL RECORD

amec

Earth and Environmental
301 N. Colorado, Ste. 350
Midland, Texas 79701

WELL CONSTRUCTION DIAGRAM

DATE INSTALLED: October 21, 2002 WELL NUMBER: MW-9

PROJECT NUMBER: 251700312M DRILLING COMPANY: Straub METHOD: Air rotary

TOP OF CASING ELEVATION: 3558.48' LOGGED BY: M. Ehrlich

REMARKS:

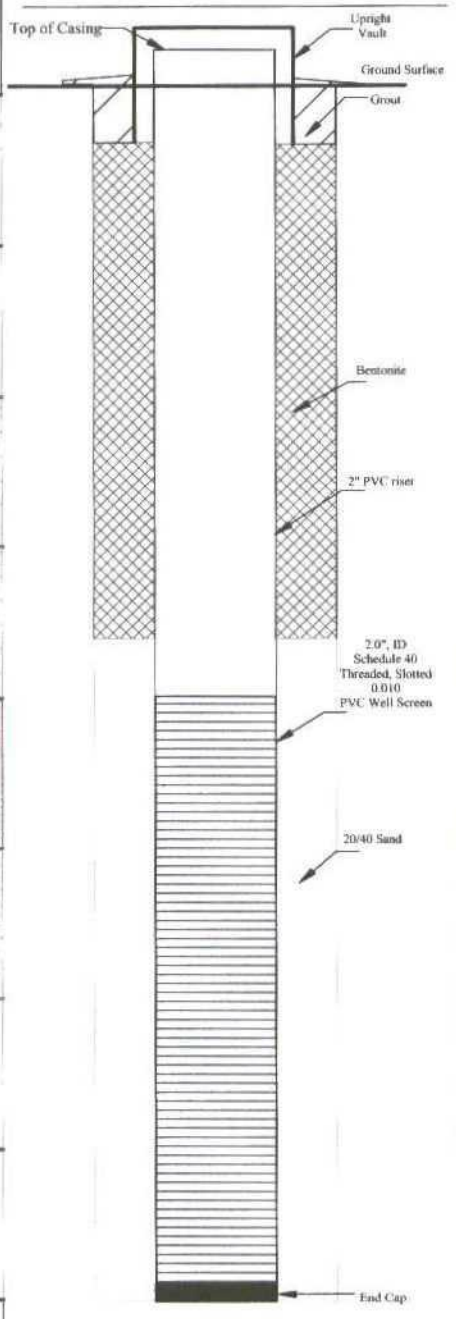
Project Name/Location:

Amerada Hess Corporation
W. P. Byrd Lease
SECTION 12, T-28-S, R-36-E
LEA COUNTY, NEW MEXICO

Depth	Sample Interval (FT)	Sample Recovery (FT)	Sample Type	Soil Classification	FIELD SCREENING INSTRUMENT: PID/OVM UNITS: ppm	Sample Description and Conditions
5'	5-7'	6"	ST	SM	0.0	SILTY SAND: Fine to v. fine grained, 40% caliche nodules; very pale orange (10YR 8/2)
10'	10-11'	8"	SS	SM	0.0	SILTY SAND: Fine to v. fine grained, very pale orange (10YR 8/2)
15'	15-16'	6"	SS	SM	0.0	SILTY SAND: Fine to v. fine grained, caliche indurated; very pale orange (10YR 8/2)
20'	20-21'	8"	SS	SP	0.0	SAND: Fine grained, light brown (5YR 5/6)
25'	25-26'	8"	SS	SM	0.0	SILTY SAND: Fine to v. fine grained, 1" limestone nodules; pale to dark orange; moist; (10YR 8/2)
30'	30-31'	12"	SS	SM	0.0	SILTY SAND: fine to v. fine grained, pale brown; 5% limestone nodules; moist (10YR 8/2)
35'	*35-36'	12"	SS	SM	4.2	SILTY SAND: Very fine grained, 2% limestone nodules; light brown; moist; (10YR 8/2)
40'						

Lithology

Monitor Well Construction Detail



NOTES:

ST - Shelby Tube Sample
SS - Split Spoon Sample
* - Sample submitted to laboratory
Groundwater @ ~ 29.94'
Bottom of Boring @ 40.0'
Bottom of Monitor Well @ 40.0'

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Amerada Hess Owner's Well No. MW-9
Street or Post Office Address
City and State

Well was drilled under Permit No. and is located in the:

a. ¼ ¼ ¼ ¼ of Section 12 Township T20S Range R-36-E N.M.P.M.

b. Tract No. of Map No. of the

c. Lot No. of Block No. of the Subdivision, recorded in County.

d. X= feet, Y= feet, N.M. Coordinate System Zone in the Grant.

(B) Drilling Contractor Raymond L. Straub License No. WD-1478

Address P. O. Box 192 Stanton, TX 79782

Drilling Began 10-21-02 Completed 10-21-02 Type tools Air Rotary Size of hole 5.0 in.

Elevation of land surface or at well is ft. Total depth of well 40 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 29 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
29	40	11	Lt. Tan Silty Sand	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
2	Sch 40	FJpvc	20	40	20	Slotted .010	40	20
2	Sch 40	FJpvc	20	+3'.6"	23.5	Riser	20	+3'.6"

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
40	18	5"	3 20/40 sand		Top Loaded
18	0	5"	2.5 bentonite		Top Loaded

Section 5. PLUGGING RECORD

Plugging Contractor
Address
Plugging Method
Date Well Plugged
Plugging approved by:
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad FWL FSL

File No. Use Location No.

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	2	2	Brown Silty Sand
2	5	3	Sandy Caliche
5	15	10	Lt. Tan Silty Sand
15	18	3	Calcified Sand
18	23	5	Brown Sand w/Silt
23	40	17	Lt. Tan Silty Sand

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of th described hole.

Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate distric

APPENDIX C

LABORATORY REPORTS

Summary Report

Mark Ehrlich
AMEC
301 N. Colorado St Suite 350
Midland, Tx. 79701

Report Date: November 4, 2002

Order ID Number: A02102413

Project Number: 251700312M
Project Name: Amerada Hess
Project Location: Byrd Ranch

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
211562	MW-9 @ 25'-26'	Soil	10/22/02	11:00	10/24/02
211563	MW-9 @ 35'-36'	Soil	10/22/02	11:20	10/24/02

0 This report consists of a total of 1 page(s) and is intended only as a summary of results for the sample(s) listed above.

	BTEX					TPH DRO	TPH GRO
Sample - Field Code	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	M,P,O-Xylene (ppm)	Total BTEX (ppm)	DRO (ppm)	GRO (ppm)
211562 - MW-9 @ 25'-26'	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1
211563 - MW-9 @ 35'-36'	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1

Sample: 211562 - MW-9 @ 25'-26'

Param	Flag	Result	Units
Chloride		162	mg/Kg

Sample: 211563 - MW-9 @ 35'-36'

Param	Flag	Result	Units
Chloride		2310	mg/Kg

This is only a summary. Please, refer to the complete report package for quality control data.

Summary Report

Mark Ehrlich
AMEC
301 N. Colorado St Suite 350
Midland, Tx. 79701

Report Date: November 13, 2002

Order ID Number: A02102416

Project Number: 251700312M
Project Name: Amerada Hess
Project Location: Byrd Ranch

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
211580	MW-8	Water	10/22/02	:	10/24/02
211581	MW-9	Water	10/22/02	:	10/24/02
211582	MW-1	Water	10/22/02	:	10/24/02
211583	MW-2	Water	10/22/02	:	10/24/02
211584	MW-6	Water	10/22/02	:	10/24/02
211585	MW-4	Water	10/22/02	:	10/24/02

0 This report consists of a total of 3 page(s) and is intended only as a summary of results for the sample(s) listed above.

	BTEX				
Sample - Field Code	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	M,P,O-Xylene (ppm)	Total BTEX (ppm)
211580 - MW-8	<0.001	<0.001	<0.001	<0.001	<0.001
211581 - MW-9	<0.001	<0.001	<0.001	<0.001	<0.001
211582 - MW-1	<0.001	<0.001	<0.001	<0.001	<0.001
211583 - MW-2	0.019	<0.005	<0.005	<0.005	0.019
211584 - MW-6	0.011	<0.001	<0.001	<0.001	0.011
211585 - MW-4	0.019	<0.001	<0.001	<0.001	0.019

Sample: 211580 - MW-8

Param	Flag	Result	Units
Chloride		7110	mg/L

Sample: 211581 - MW-9

Param	Flag	Result	Units
Chloride		14400	mg/L

This is only a summary. Please, refer to the complete report package for quality control data.

Sample: 211582 - MW-1

Param	Flag	Result	Units
Hydroxide Alkalinity		<1.0	mg/L as CaCo3
Carbonate Alkalinity		<1.0	mg/L as CaCo3
Bicarbonate Alkalinity		766	mg/L as CaCo3
Total Alkalinity		766	mg/L as CaCo3
Total Mercury		<0.0002	mg/L
Chloride	[1]	6360	mg/L
Fluoride		<10.0	mg/L
Nitrate-N		<10.0	mg/L
Sulfate		1270	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Dissolved Calcium		968	mg/L
Dissolved Magnesium		475	mg/L
Dissolved Potassium		49.4	mg/L
Dissolved Sodium		6380	mg/L
Total Arsenic		<0.050	mg/L
Total Barium		0.296	mg/L
Total Cadmium		<0.005	mg/L
Total Chromium		<0.010	mg/L
Total Lead		<0.010	mg/L
Total Selenium		<0.050	mg/L
Total Silver		<0.0125	mg/L

Sample: 211583 - MW-2

Param	Flag	Result	Units
Chloride		6000	mg/L

Sample: 211584 - MW-6

Param	Flag	Result	Units
Hydroxide Alkalinity		<1.0	mg/L as CaCo3

Continued on next page ...

[1]This sample was reran on IC102502.sch. The ICV%IA = 96; CCV%IA = 95; and LCS%EA = 96 and RPD = 1; MS%EA = 97 and RPD = 0.

Sample 211584 continued ...

Param	Flag	Result	Units
Carbonate Alkalinity		<1.0	mg/L as CaCo3
Bicarbonate Alkalinity		416	mg/L as CaCo3
Total Alkalinity		416	mg/L as CaCo3
Total Mercury		<0.0002	mg/L
Chloride	[2]	11900	mg/L
Fluoride		<10.0	mg/L
Nitrate-N		<10.0	mg/L
Sulfate		1370	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Dissolved Calcium		904	mg/L
Dissolved Magnesium		471	mg/L
Dissolved Potassium		49.9	mg/L
Dissolved Sodium		5350	mg/L
Total Arsenic		<0.050	mg/L
Total Barium		0.388	mg/L
Total Cadmium		<0.005	mg/L
Total Chromium		<0.010	mg/L
Total Lead		<0.010	mg/L
Total Selenium		<0.050	mg/L
Total Silver		<0.0125	mg/L

Sample: 211585 - MW-4

Param	Flag	Result	Units
Chloride		12400	mg/L

[2]This sample was reran on IC102502.sch. The ICV%IA = 96; CCV%IA = 95; and LCS%EA = 96 and RPD = 1; MS%EA = 97 and RPD = 0.

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
155 McCutcheon, Suite H El Paso, Texas 79932 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

Analytical and Quality Control Report

Mark Ehrlich
AMEC
301 N. Colorado St Suite 350
Midland, Tx. 79701

Report Date: November 4, 2002

Order ID Number: A02102413

Project Number: 251700312M
Project Name: Amerada Hess
Project Location: Byrd Ranch

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
211562	MW-9 @ 25'-26'	Soil	10/22/02	11:00	10/24/02
211563	MW-9 @ 35'-36'	Soil	10/22/02	11:20	10/24/02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety including the chain of custody (COC), without written approval of TraceAnalysis, Inc.

Note: Samples will be disposed of 30 days from the report date unless the lab is contacted before the 30 days has past.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 211562 - MW-9 @ 25'-26'

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC24459 | Date Analyzed: 10/25/02
Analyst: CG | Preparation Method: N/A | Prep Batch: PB22814 | Date Prepared: 10/25/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.780	mg/Kg	10	1	78	70 - 130
4-BFB		0.753	mg/Kg	10	1	75	70 - 130

Sample: 211562 - MW-9 @ 25'-26'

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC24512 | Date Analyzed: 10/28/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB22843 | Date Prepared: 10/28/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		162	mg/Kg	10	1

Sample: 211562 - MW-9 @ 25'-26'

Analysis: TPH DRO | Analytical Method: Mod. 8015B | QC Batch: QC24621 | Date Analyzed: 11/1/02
Analyst: BP | Preparation Method: 3550 B | Prep Batch: PB22943 | Date Prepared: 10/31/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		137	mg/Kg	1	150	91	70 - 130

Sample: 211562 - MW-9 @ 25'-26'

Analysis: TPH GRO | Analytical Method: 8015B | QC Batch: QC24460 | Date Analyzed: 10/25/02
Analyst: CG | Preparation Method: 5035 | Prep Batch: PB22814 | Date Prepared: 10/25/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.738	mg/Kg	10	0.10	74	70 - 130
4-BFB		0.791	mg/Kg	10	0.10	79	70 - 130

Sample: 211563 - MW-9 @ 35'-36'

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC24459	Date Analyzed:	10/25/02
Analyst:	CG	Preparation Method:	N/A	Prep Batch:	PB22814	Date Prepared:	10/25/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.717	mg/Kg	10	1	72	70 - 130
4-BFB	[1]	0.684	mg/Kg	10	1	68	70 - 130

Sample: 211563 - MW-9 @ 35'-36'

Analysis:	Ion Chromatography (IC)	Analytical Method:	E 300.0	QC Batch:	QC24512	Date Analyzed:	10/28/02
Analyst:	JSW	Preparation Method:	N/A	Prep Batch:	PB22843	Date Prepared:	10/28/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		2310	mg/Kg	100	1

Sample: 211563 - MW-9 @ 35'-36'

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	QC Batch:	QC24621	Date Analyzed:	11/1/02
Analyst:	BP	Preparation Method:	3550 B	Prep Batch:	PB22943	Date Prepared:	10/31/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		118	mg/Kg	1	150	78	70 - 130

Sample: 211563 - MW-9 @ 35'-36'

Analysis:	TPH GRO	Analytical Method:	8015B	QC Batch:	QC24460	Date Analyzed:	10/25/02
Analyst:	CG	Preparation Method:	5035	Prep Batch:	PB22814	Date Prepared:	10/25/02

[1]Surrogate within acceptabe limits according to GC-2 soil control chart.

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.72	mg/Kg	10	0.10	72	70 - 130
4-BFB		0.72	mg/Kg	10	0.10	72	70 - 130

Quality Control Report
Method Blank

Method Blank

QCBatch: QC24459

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.010	mg/Kg	0.001
Toluene		<0.010	mg/Kg	0.001
Ethylbenzene		<0.010	mg/Kg	0.001
M,P,O-Xylene		<0.010	mg/Kg	0.001
Total BTEX		<0.010	mg/Kg	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.965	mg/Kg	10	1	96	70 - 130
4-BFB		0.898	mg/Kg	10	1	90	70 - 130

Method Blank

QCBatch: QC24460

Param	Flag	Results	Units	Reporting Limit
GRO		<1	mg/Kg	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.979	mg/Kg	10	0.10	98	70 - 130
4-BFB		0.936	mg/Kg	10	0.10	94	70 - 130

Method Blank

QCBatch: QC24512

Param	Flag	Results	Units	Reporting Limit
Chloride		<1.0	mg/Kg	1

Method Blank

QCBatch: QC24621

Param	Flag	Results	Units	Reporting Limit
DRO		<50.0	mg/Kg	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		134	mg/Kg	1	150	91	70 - 130

Quality Control Report
Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes

QCBatch: QC24459

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.986	0.953	mg/Kg	10	1	<0.010	98	3	70 - 130	20
Benzene	0.981	1	mg/Kg	10	1	<0.010	98	1	70 - 130	20
Toluene	0.99	1.01	mg/Kg	10	1	<0.010	99	2	70 - 130	20
Ethylbenzene	1	1.02	mg/Kg	10	1	<0.010	100	1	70 - 130	20
M,P,O-Xylene	2.99	3.04	mg/Kg	10	3	<0.010	99	1	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.967	0.949	mg/Kg	10	1	96	94	70 - 130
4-BFB	0.95	0.93	mg/Kg	10	1	95	93	70 - 130

Laboratory Control Spikes

QCBatch: QC24460

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
GRO	10.4	10.7	mg/Kg	1	1	<1	104	2	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	1.03	1.03	mg/Kg	10	0.10	103	103	70 - 130
4-BFB	.98	1.02	mg/Kg	10	0.10	98	102	70 - 130

Laboratory Control Spikes

QCBatch: QC24512

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	[2] 28.02	[3] 28.04	mg/Kg	1	12.50	<1.0	224	0	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC24621

[2]The blank soil should be subtracted from the blank spike samples. %EA = 90 and RPD = 0.
[3]The blank soil should be subtracted from the blank spike samples. %EA = 90 and RPD = 0.

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
DRO	250	239	mg/Kg	1	250	<50.0	100	4	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
n-Triacontane	141	139	mg/Kg	1	150	94	92	70 - 130

Quality Control Report
Matrix Spikes and Duplicate Spikes

Matrix Spikes

QCBatch: QC24459

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Benzene	0.811	0.838	mg/Kg	10	1	<0.010	81	3	70 - 130	20
Toluene	0.83	0.863	mg/Kg	10	1	<0.010	83	3	70 - 130	20
Ethylbenzene	0.858	0.886	mg/Kg	10	1	<0.010	85	3	70 - 130	20
M,P,O-Xylene	2.55	2.64	mg/Kg	10	3	<0.010	85	3	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dilution	Spike Amount	MS % Rec	MSD % Rec	Recovery Limits
TFT	0.821	0.866	mg/Kg	10	1	82	86	70 - 130
4-BFB	0.826	0.857	mg/Kg	10	1	82	85	70 - 130

Matrix Spikes

QCBatch: QC24460

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
GRO	[4] 7.74	[5] 10.3	mg/Kg	1	1	<1	77	28	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dilution	Spike Amount	MS % Rec	MSD % Rec	Recovery Limits
TFT	0.878	1.01	mg/Kg	10	0.10	88	101	70 - 130
4-BFB	0.836	0.903	mg/Kg	10	0.10	84	90	70 - 130

Matrix Spikes

QCBatch: QC24512

[4]MS recovery within acceptable range. RPD between MS, MSD outside normal limits. LCS, LCSD show the method to be in control.
[5]MSD recovery within acceptable range. RPD between MS, MSD outside normal limits. LCS, LCSD show the method to be in control.

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	3430	3450	mg/Kg	1	1250	2310	89	1	35 - 144	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes

QCBatch: QC24621

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
DRO	220	197	mg/Kg	1	250	<50.0	88	11	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dilution	Spike Amount	MS % Rec	MSD % Rec	Recovery Limits
n-Triacontane	126	114	mg/Kg	1	150	84	76	70 - 130

Quality Control Report
Continuing Calibration Verification Standards

CCV (1)

QCBatch: QC24459

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.102	102	85 - 115	10/25/02
Benzene		mg/L	0.10	0.098	98	85 - 115	10/25/02
Toluene		mg/L	0.10	0.0989	99	85 - 115	10/25/02
Ethylbenzene		mg/L	0.10	0.100	100	85 - 115	10/25/02
M,P,O-Xylene		mg/L	0.30	0.300	100	85 - 115	10/25/02

CCV (2)

QCBatch: QC24459

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.1	100	85 - 115	10/25/02
Benzene		mg/L	0.10	0.097	97	85 - 115	10/25/02
Toluene		mg/L	0.10	0.098	98	85 - 115	10/25/02
Ethylbenzene		mg/L	0.10	0.099	99	85 - 115	10/25/02
M,P,O-Xylene		mg/L	0.30	0.296	98	85 - 115	10/25/02

ICV (1)

QCBatch: QC24459

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.0954	95	85 - 115	10/25/02
Benzene		mg/L	0.10	0.0987	99	85 - 115	10/25/02
Toluene		mg/L	0.10	0.0998	100	85 - 115	10/25/02
Ethylbenzene		mg/L	0.10	0.102	102	85 - 115	10/25/02
M,P,O-Xylene		mg/L	0.30	0.303	101	85 - 115	10/25/02

CCV (1) QCBatch: QC24460

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/Kg	1	1	100	85 - 115	10/25/02

ICV (1) QCBatch: QC24460

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/Kg	1	1.06	106	85 - 115	10/25/02

CCV (1) QCBatch: QC24512

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.31	90	90 - 110	10/28/02

ICV (1) QCBatch: QC24512

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.64	93	90 - 110	10/28/02

CCV (1) QCBatch: QC24621

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	252	100	75 - 125	11/1/02

ICV (1)

QCBatch: QC24621

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	261	104	75 - 125	11/1/02

TRACEANALYSIS, INC.

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Analytical and Quality Control Report

Mark Ehrlich
AMEC
301 N. Colorado St Suite 350
Midland, Tx. 79701

Report Date: November 13, 2002

Order ID Number: A02102416

Project Number: 251700312M
Project Name: Amerada Hess
Project Location: Byrd Ranch

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
211580	MW-8	Water	10/22/02	:	10/24/02
211581	MW-9	Water	10/22/02	:	10/24/02
211582	MW-1	Water	10/22/02	:	10/24/02
211583	MW-2	Water	10/22/02	:	10/24/02
211584	MW-6	Water	10/22/02	:	10/24/02
211585	MW-4	Water	10/22/02	:	10/24/02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.

Note: Samples will be disposed of 30 days from the report date unless the lab is contacted before the 30 days has past.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 211580 - MW-8

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC24425 | Date Analyzed: 10/23/02
Analyst: CG | Preparation Method: S 5030B | Prep Batch: PB22777 | Date Prepared: 10/23/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.101	mg/L	1	0.10	101	70 - 130
4-BFB		0.0998	mg/L	1	0.10	100	70 - 130

Sample: 211580 - MW-8

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC24486 | Date Analyzed: 10/25/02
Analyst: JSW | Preparation Method: | Prep Batch: PB22827 | Date Prepared: 10/25/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		7110	mg/L	500	1

Sample: 211581 - MW-9

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC24425 | Date Analyzed: 10/23/02
Analyst: CG | Preparation Method: S 5030B | Prep Batch: PB22777 | Date Prepared: 10/23/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.102	mg/L	1	0.10	102	70 - 130
4-BFB		0.0986	mg/L	1	0.10	99	70 - 130

Sample: 211581 - MW-9

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC24486 | Date Analyzed: 10/25/02
Analyst: JSW | Preparation Method: | Prep Batch: PB22827 | Date Prepared: 10/25/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		14400	mg/L	500	1

Sample: 211582 - MW-1

Analysis: Alkalinity | Analytical Method: E 310.1 | QC Batch: QC24656 | Date Analyzed: 11/4/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB22977 | Date Prepared: 11/4/02

Param	Flag	Result	Units	Dilution	RDL
Hydroxide Alkalinity		<1.0	mg/L as CaCo3	1	1
Carbonate Alkalinity		<1.0	mg/L as CaCo3	1	1
Bicarbonate Alkalinity		766	mg/L as CaCo3	1	1
Total Alkalinity		766	mg/L as CaCo3	1	1

Sample: 211582 - MW-1

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC24434 | Date Analyzed: 10/24/02
Analyst: CG | Preparation Method: S 5030B | Prep Batch: PB22785 | Date Prepared: 10/24/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.097	mg/L	1	0.10	97	70 - 130
4-BFB		0.099	mg/L	1	0.10	99	70 - 130

Sample: 211582 - MW-1

Analysis: Hg, Total | Analytical Method: S 7470A | QC Batch: QC24547 | Date Analyzed: 10/29/02
Analyst: BC | Preparation Method: N/A | Prep Batch: PB22880 | Date Prepared: 10/29/02

Param	Flag	Result	Units	Dilution	RDL
Total Mercury		<0.0002	mg/L	1	0.0002

Sample: 211582 - MW-1

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC24485 | Date Analyzed: 10/24/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB22826 | Date Prepared: 10/24/02

Param	Flag	Result	Units	Dilution	RDL
Chloride	[1]	6360	mg/L	1000	1
Fluoride		<10.0	mg/L	50	0.20

Continued ...

[1]This sample was reran on IC102502.sch. The ICV%IA = 96; CCV%IA = 95; and LCS%EA = 96 and RPD = 1; MS%EA = 97 and RPD = 0.

... *Continued* Sample: 211582 Analysis: Ion Chromatography (IC)

Param	Flag	Result	Units	Dilution	RDL
Nitrate-N		<10.0	mg/L	50	0.20
Sulfate		1270	mg/L	50	1

Sample: 211582 - MW-1

Analysis: PAH Analytical Method: S 8270C QC Batch: QC24857 Date Analyzed: 11/11/02
Analyst: RC Preparation Method: E 3510C Prep Batch: PB23131 Date Prepared: 10/28/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		56.27	mg/L	1	80	70	35 - 114
2-Fluorobiphenyl		63.1	mg/L	1	80	78	43 - 116
Terphenyl-d14		41.65	mg/L	1	80	52	33 - 141

Sample: 211582 - MW-1

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC24683 Date Analyzed: 11/4/02
Analyst: BC Preparation Method: S 3005A Prep Batch: PB22897 Date Prepared: 10/30/02

Param	Flag	Result	Units	Dilution	RDL
Dissolved Calcium		968	mg/L	1	0.50
Dissolved Magnesium		475	mg/L	1	0.50
Dissolved Potassium		49.4	mg/L	1	0.50
Dissolved Sodium		6380	mg/L	1	0.50

Sample: 211582 - MW-1

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC24505 Date Analyzed: 10/28/02
Analyst: RR Preparation Method: S 3010A Prep Batch: PB22835 Date Prepared: 10/28/02

Param	Flag	Result	Units	Dilution	RDL
Total Arsenic		<0.050	mg/L	1	0.05
Total Barium		0.296	mg/L	1	0.10
Total Cadmium		<0.005	mg/L	1	0.005
Total Chromium		<0.010	mg/L	1	0.01
Total Lead		<0.010	mg/L	1	0.01
Total Selenium		<0.050	mg/L	1	0.05
Total Silver		<0.0125	mg/L	1	0.01

Sample: 211583 - MW-2

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC24434	Date Analyzed:	10/24/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB22785	Date Prepared:	10/24/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.019	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		0.019	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.095	mg/L	5	0.10	95	70 - 130
4-BFB		0.092	mg/L	5	0.10	92	70 - 130

Sample: 211583 - MW-2

Analysis:	Ion Chromatography (IC)	Analytical Method:	E 300.0	QC Batch:	QC24486	Date Analyzed:	10/25/02
Analyst:	JSW	Preparation Method:		Prep Batch:	PB22827	Date Prepared:	10/25/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		6000	mg/L	500	1

Sample: 211584 - MW-6

Analysis:	Alkalinity	Analytical Method:	E 310.1	QC Batch:	QC24656	Date Analyzed:	11/4/02
Analyst:	JSW	Preparation Method:	N/A	Prep Batch:	PB22977	Date Prepared:	11/4/02

Param	Flag	Result	Units	Dilution	RDL
Hydroxide Alkalinity		<1.0	mg/L as CaCo3	1	1
Carbonate Alkalinity		<1.0	mg/L as CaCo3	1	1
Bicarbonate Alkalinity		416	mg/L as CaCo3	1	1
Total Alkalinity		416	mg/L as CaCo3	1	1

Sample: 211584 - MW-6

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC24434	Date Analyzed:	10/24/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB22785	Date Prepared:	10/24/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.011	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		0.011	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.098	mg/L	1	0.10	98	70 - 130
4-BFB		0.096	mg/L	1	0.10	96	70 - 130

Sample: 211584 - MW-6

Analysis: Hg, Total | Analytical Method: S 7470A | QC Batch: QC24547 | Date Analyzed: 10/29/02
Analyst: BC | Preparation Method: N/A | Prep Batch: PB22880 | Date Prepared: 10/29/02

Param	Flag	Result	Units	Dilution	RDL
Total Mercury		<0.0002	mg/L	1	0.0002

Sample: 211584 - MW-6

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC24485 | Date Analyzed: 10/24/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB22826 | Date Prepared: 10/24/02

Param	Flag	Result	Units	Dilution	RDL
Chloride	[2]	11900	mg/L	1000	1
Fluoride		<10.0	mg/L	50	0.20
Nitrate-N		<10.0	mg/L	50	0.20
Sulfate		1370	mg/L	50	1

Sample: 211584 - MW-6

Analysis: PAH | Analytical Method: S 8270C | QC Batch: QC24857 | Date Analyzed: 11/11/02
Analyst: RC | Preparation Method: E 3510C | Prep Batch: PB23131 | Date Prepared: 10/28/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002

Continued ...

[2]This sample was reran on IC102502.sch. The ICV%IA = 96; CCV%IA = 95; and LCS%EA = 96 and RPD = 1; MS%EA = 97 and RPD = 0.

... *Continued* Sample: 211584 Analysis: PAH

Param	Flag	Result	Units	Dilution	RDL
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		67.19	mg/L	1	80	83	35 - 114
2-Fluorobiphenyl		73.02	mg/L	1	80	91	43 - 116
Terphenyl-d14		37.07	mg/L	1	80	46	33 - 141

Sample: 211584 - MW-6

Analysis: Salts | Analytical Method: E 200.7 | QC Batch: QC24683 | Date Analyzed: 11/4/02
Analyst: BC | Preparation Method: S 3005A | Prep Batch: PB22897 | Date Prepared: 10/30/02

Param	Flag	Result	Units	Dilution	RDL
Dissolved Calcium		904	mg/L	1	0.50
Dissolved Magnesium		471	mg/L	1	0.50
Dissolved Potassium		49.9	mg/L	1	0.50
Dissolved Sodium		5350	mg/L	1	0.50

Sample: 211584 - MW-6

Analysis: Total Metals | Analytical Method: S 6010B | QC Batch: QC24505 | Date Analyzed: 10/28/02
Analyst: RR | Preparation Method: S 3010A | Prep Batch: PB22835 | Date Prepared: 10/28/02

Param	Flag	Result	Units	Dilution	RDL
Total Arsenic		<0.050	mg/L	1	0.05
Total Barium		0.388	mg/L	1	0.10
Total Cadmium		<0.005	mg/L	1	0.005
Total Chromium		<0.010	mg/L	1	0.01
Total Lead		<0.010	mg/L	1	0.01
Total Selenium		<0.050	mg/L	1	0.05
Total Silver		<0.0125	mg/L	1	0.01

Sample: 211585 - MW-4

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC24434 | Date Analyzed: 10/24/02
Analyst: CG | Preparation Method: S 5030B | Prep Batch: PB22785 | Date Prepared: 10/24/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.019	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		0.019	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.101	mg/L	1	0.10	101	70 - 130
4-BFB		0.099	mg/L	1	0.10	99	70 - 130

Sample: 211585 - MW-4

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC24486 Date Analyzed: 10/25/02
Analyst: JSW Preparation Method: Prep Batch: PB22827 Date Prepared: 10/25/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		12400	mg/L	1000	1

Quality Control Report
Method Blank

Method Blank

QCBatch: QC24425

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.100	mg/L	1	0.10	100	70 - 130
4-BFB		0.0982	mg/L	1	0.10	98	70 - 130

Method Blank

QCBatch: QC24434

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.099	mg/L	1	0.10	99	70 - 130
4-BFB		0.092	mg/L	1	0.10	92	70 - 130

Method Blank

QCBatch: QC24485

Param	Flag	Results	Units	Reporting Limit
Fluoride		<0.2	mg/L	0.20
Nitrate-N		<0.2	mg/L	0.20
Sulfate		<1.0	mg/L	1

Method Blank

QCBatch: QC24486

Param	Flag	Results	Units	Reporting Limit
Chloride		<1.0	mg/L	1

Method Blank

QCBatch: QC24505

Param	Flag	Results	Units	Reporting Limit
Total Arsenic		<0.050	mg/L	0.05
Total Barium		<0.100	mg/L	0.10
Total Cadmium		<0.005	mg/L	0.005
Total Chromium		<0.010	mg/L	0.01
Total Lead		<0.010	mg/L	0.01
Total Selenium		<0.050	mg/L	0.05
Total Silver		<0.0125	mg/L	0.01

Method Blank

QCBatch: QC24547

Param	Flag	Results	Units	Reporting Limit
Total Mercury		<0.0002	mg/L	0.0002

Method Blank

QCBatch: QC24656

Param	Flag	Results	Units	Reporting Limit
Hydroxide Alkalinity		<1.0	mg/L as CaCo3	1
Carbonate Alkalinity		<1.0	mg/L as CaCo3	1
Bicarbonate Alkalinity		<4.0	mg/L as CaCo3	1
Total Alkalinity		<4.0	mg/L as CaCo3	1

Method Blank

QCBatch: QC24683

Param	Flag	Results	Units	Reporting Limit
Dissolved Calcium		<0.5	mg/L	0.50
Dissolved Magnesium		<0.5	mg/L	0.50
Dissolved Potassium		1.18	mg/L	0.50
Dissolved Sodium		<0.5	mg/L	0.50

Method Blank

QCBatch: QC24857

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Param	Flag	Results	Units	Reporting Limit
Naphthalene		<0.0002	mg/L	0.0002
Acenaphthylene		<0.0002	mg/L	0.0002
Acenaphthene		<0.0002	mg/L	0.0002
Fluorene		<0.0002	mg/L	0.0002
Phenanthrene		<0.0002	mg/L	0.0002
Anthracene		<0.0002	mg/L	0.0002
Fluoranthene		<0.0002	mg/L	0.0002
Pyrene		<0.0002	mg/L	0.0002
Benzo(a)anthracene		<0.0002	mg/L	0.0002
Chrysene		<0.0002	mg/L	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	0.0002
Benzo(a)pyrene		<0.0002	mg/L	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		72.18	mg/L	1	80	90	35 - 114
2-Fluorobiphenyl		65.92	mg/L	1	80	82	43 - 116
Terphenyl-d14		86.5	mg/L	1	80	108	33 - 141

Quality Control Report
Duplicate Samples

Duplicate

QCBatch: QC24656

Param	Flag	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity		<1.0	<1.0	mg/L as CaCo3	1	0	9.2
Carbonate Alkalinity		<1.0	<1.0	mg/L as CaCo3	1	0	9.2
Bicarbonate Alkalinity		206	202	mg/L as CaCo3	1	1	9.2
Total Alkalinity		206	202	mg/L as CaCo3	1	1	9.2

Quality Control Report
Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes

QCBatch: QC24425

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.103	0.107	mg/L	1	0.10	<0.001	103	4	70 - 130	20

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Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Benzene	0.102	0.103	mg/L	1	0.10	<0.001	102	1	70 - 130	20
Toluene	0.103	0.105	mg/L	1	0.10	<0.001	103	2	70 - 130	20
Ethylbenzene	0.105	0.106	mg/L	1	0.10	<0.001	105	1	70 - 130	20
M,P,O-Xylene	0.312	0.318	mg/L	1	0.30	<0.001	104	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.098	0.100	mg/L	1	0.10	98	100	70 - 130
4-BFB	0.0993	0.103	mg/L	1	0.10	99	103	70 - 130

Laboratory Control Spikes

QCBatch: QC24434

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.1	0.101	mg/L	1	0.10	<0.001	100	0	70 - 130	20
Benzene	0.099	0.1	mg/L	1	0.10	<0.001	99	1	70 - 130	20
Toluene	0.099	0.101	mg/L	1	0.10	<0.001	99	2	70 - 130	20
Ethylbenzene	0.1	0.102	mg/L	1	0.10	<0.001	100	1	70 - 130	20
M,P,O-Xylene	0.297	0.304	mg/L	1	0.30	<0.001	99	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.095	0.097	mg/L	1	0.10	95	97	70 - 130
4-BFB	0.096	0.098	mg/L	1	0.10	96	98	70 - 130

Laboratory Control Spikes

QCBatch: QC24485

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Fluoride	2.39	2.44	mg/L	1	2.50	<0.2	95	2	90 - 110	20
Nitrate-N	2.36	2.38	mg/L	1	2.50	<0.2	94	0	90 - 110	20
Sulfate	11.29	11.45	mg/L	1	12.50	<1.0	90	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC24486

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	12.01	11.86	mg/L	1	12.50	<1.0	96	1	90 - 110	20
Sulfate	12.47	12.48	mg/L	1	12.50	<1.0	99	0	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC24505

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Arsenic	0.511	0.510	mg/L	1	0.50	<0.050	102	0	75 - 125	20
Total Barium	1.04	1.04	mg/L	1	1	<0.100	104	0	75 - 125	20
Total Cadmium	0.269	0.270	mg/L	1	0.25	<0.005	108	0	75 - 125	20
Total Chromium	0.104	0.105	mg/L	1	0.10	<0.010	104	1	75 - 125	20
Total Lead	0.533	0.537	mg/L	1	0.50	<0.010	107	1	75 - 125	20
Total Selenium	0.477	0.471	mg/L	1	0.50	<0.050	95	1	75 - 125	20
Total Silver	0.125	0.125	mg/L	1	0.12	<0.0125	100	0	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC24547

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Mercury	0.00114	0.00114	mg/L	1	0.001	<0.0002	114	0	87 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC24683

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Dissolved Calcium	85.3	86.1	mg/L	1	100	<0.5	85	0	75 - 125	20
Dissolved Magnesium	83.6	86.0	mg/L	1	100	<0.5	83	2	75 - 125	20
Dissolved Potassium	93.6	89.5	mg/L	1	100	1.18	93	4	75 - 125	20
Dissolved Sodium	96.9	98.6	mg/L	1	100	<0.5	96	1	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC24857

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Naphthalene	71.45	82.2	mg/L	1	80	<0.0002	89	2	16 - 96	20
Acenaphthylene	80.57	84.0	mg/L	1	80	<0.0002	100	4	20 - 110	20
Acenaphthene	78.39	82.5	mg/L	1	80	<0.0002	97	5	18 - 108	20
Fluorene	82.69	79.2	mg/L	1	80	<0.0002	103	4	22 - 102	20
Phenanthrene	78.2	81.8	mg/L	1	80	<0.0002	97	4	25 - 103	20
Anthracene	83.65	83.7	mg/L	1	80	<0.0002	104	0	22 - 110	20
Fluoranthene	93.29	71.0	mg/L	1	80	<0.0002	116	27	21 - 110	20
Pyrene	93.27	87.8	mg/L	1	80	<0.0002	116	6	22 - 100	20
Benzo(a)anthracene	84.82	88.3	mg/L	1	80	<0.0002	106	4	30 - 99	20
Chrysene	72.96	78.7	mg/L	1	80	<0.0002	91	8	27 - 108	20
Benzo(b)fluoranthene	79.03	79.3	mg/L	1	80	<0.0002	98	0	19 - 102	20
Benzo(k)fluoranthene	73.85	80.8	mg/L	1	80	<0.0002	92	9	35 - 103	20

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Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Benzo(a)pyrene	76.85	82.0	mg/L	1	80	<0.0002	96	6	24 - 105	20
Indeno(1,2,3-cd)pyrene	79.98	81.6	mg/L	1	80	<0.0002	99	2	22 - 108	20
Dibenzo(a,h)anthracene	59.91	60.9	mg/L	1	80	<0.0002	74	2	23 - 77	20
Benzo(g,h,i)perylene	79.9	81.8	mg/L	1	80	<0.0002	99	2	19 - 119	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
Nitrobenzene-d5	71.4	75.4	mg/L	1	80	89	94	35 - 114
2-Fluorobiphenyl	74.6	84.7	mg/L	1	80	93	106	43 - 116
Terphenyl-d14	93.0	87.0	mg/L	1	80	116	109	33 - 141

Quality Control Report
Matrix Spikes and Duplicate Spikes

Matrix Spikes

QCBatch: QC24485

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Fluoride	117	121	mg/L	1	125	<10.0	93	3	82 - 101	20
Nitrate-N	123	121	mg/L	1	125	<10.0	98	1	87 - 100	20
Sulfate	1890	1900	mg/L	1	625	1370	83	1	59 - 121	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes

QCBatch: QC24486

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	24560	24550	mg/L	1	12500	12400	97	0	48 - 127	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes

QCBatch: QC24505

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Arsenic	0.434	0.426	mg/L	1	0.50	<0.050	87	2	75 - 125	20
Total Barium	1.36	1.36	mg/L	1	1	0.296	136	0	75 - 125	20
Total Cadmium	0.211	0.209	mg/L	1	0.25	<0.005	84	1	75 - 125	20
Total Chromium	0.0937	0.0922	mg/L	1	0.10	<0.010	94	2	75 - 125	20
Total Lead	0.563	0.562	mg/L	1	0.50	<0.010	113	0	75 - 125	20

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Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Selenium	[3] 0.325	0.342	mg/L	1	0.50	<0.050	65	5	75 - 125	20
Total Silver	0.147	0.150	mg/L	1	0.12	<0.0125	118	2	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes

QCBatch: QC24547

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Mercury	[4] 0.00036	[5] 0.00035	mg/L	1	0.001	<0.0002	36	2	40 - 177	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes

QCBatch: QC24683

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Dissolved Calcium	[6] 977	1050	mg/L	1	100	968	9	2	75 - 125	20
Dissolved Magnesium	[7] 432	[8] 497	mg/L	1	100	475	-43	6	75 - 125	20
Dissolved Potassium	[9] 248	[10] 195	mg/L	1	100	49.4	198	20	75 - 125	20
Dissolved Sodium	[11] 7660	[12] 7940	mg/L	1	100	6380	1280	19	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Quality Control Report
Continuing Calibration Verification Standards

CCV (1)

QCBatch: QC24425

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.099	99	85 - 115	10/23/02
Benzene		mg/L	0.10	0.0994	99	85 - 115	10/23/02
Toluene		mg/L	0.10	0.100	100	85 - 115	10/23/02
Ethylbenzene		mg/L	0.10	0.102	102	85 - 115	10/23/02
M,P,O-Xylene		mg/L	0.30	0.302	101	85 - 115	10/23/02

[3]Matrix spike recovery invalid due to matrix effects. LCS demonstrates process under control.
[4]MS RECOVERY INVALID DUE TO MATRIX EFFECT
[5]MS RECOVERY INVALID DUE TO MATRIX EFFECT
[6]MS RECOVERY INVALID DUE TO MATRIX EFFECT/ DILUTION FACTOR.
[7]MS RECOVERY INVALID DUE TO MATRIX EFFECT/ DILUTION FACTOR.
[8]MS RECOVERY INVALID DUE TO MATRIX EFFECT/ DILUTION FACTOR.
[9]MS RECOVERY INVALID DUE TO MATRIX EFFECT/ DILUTION FACTOR.
[10]MS RECOVERY INVALID DUE TO MATRIX EFFECT/ DILUTION FACTOR.
[11]MS RECOVERY INVALID DUE TO MATRIX EFFECT/ DILUTION FACTOR.
[12]MS RECOVERY INVALID DUE TO MATRIX EFFECT/ DILUTION FACTOR.

CCV (2) QCBatch: QC24425

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.103	103	85 - 115	10/23/02
Benzene		mg/L	0.10	0.1	100	85 - 115	10/23/02
Toluene		mg/L	0.10	0.1	100	85 - 115	10/23/02
Ethylbenzene		mg/L	0.10	0.102	102	85 - 115	10/23/02
M,P,O-Xylene		mg/L	0.30	0.301	100	85 - 115	10/23/02

ICV (1) QCBatch: QC24425

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.106	106	85 - 115	10/23/02
Benzene		mg/L	0.10	0.102	102	85 - 115	10/23/02
Toluene		mg/L	0.10	0.103	103	85 - 115	10/23/02
Ethylbenzene		mg/L	0.10	0.104	104	85 - 115	10/23/02
M,P,O-Xylene		mg/L	0.30	0.310	103	85 - 115	10/23/02

CCV (1) QCBatch: QC24434

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.103	103	85 - 115	10/24/02
Benzene		mg/L	0.10	0.101	101	85 - 115	10/24/02
Toluene		mg/L	0.10	0.101	101	85 - 115	10/24/02
Ethylbenzene		mg/L	0.10	0.102	102	85 - 115	10/24/02
M,P,O-Xylene		mg/L	0.30	0.304	101	85 - 115	10/24/02

ICV (1) QCBatch: QC24434

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.098	98	85 - 115	10/24/02
Benzene		mg/L	0.10	0.1	100	85 - 115	10/24/02
Toluene		mg/L	0.10	0.1	100	85 - 115	10/24/02
Ethylbenzene		mg/L	0.10	0.101	101	85 - 115	10/24/02
M,P,O-Xylene		mg/L	0.30	0.301	100	85 - 115	10/24/02

CCV (1) QCBatch: QC24485

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Fluoride		mg/L	2.50	2.47	98	90 - 110	10/24/02
Nitrate-N		mg/L	2.50	2.36	94	90 - 110	10/24/02
Sulfate		mg/L	12.50	11.45	91	90 - 110	10/24/02

ICV (1) QCBatch: QC24485

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Fluoride		mg/L	2.50	2.48	99	90 - 110	10/24/02
Nitrate-N		mg/L	2.50	2.36	94	90 - 110	10/24/02
Sulfate		mg/L	12.50	11.44	91	90 - 110	10/24/02

CCV (1) QCBatch: QC24486

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.82	94	90 - 110	10/25/02
Sulfate		mg/L	12.50	12.46	99	90 - 110	10/25/02

ICV (1) QCBatch: QC24486

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.94	95	90 - 110	10/25/02
Sulfate		mg/L	12.50	12.47	99	90 - 110	10/25/02

CCV (1) QCBatch: QC24505

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Arsenic		mg/L	1	0.976	98	90 - 110	10/28/02
Total Barium		mg/L	2	1.99	100	90 - 110	10/28/02
Total Cadmium		mg/L	0.50	0.504	101	90 - 110	10/28/02
Total Chromium		mg/L	0.20	0.201	100	90 - 110	10/28/02
Total Lead		mg/L	1	0.986	99	90 - 110	10/28/02
Total Selenium		mg/L	1	0.952	95	90 - 110	10/28/02
Total Silver		mg/L	0.25	0.239	96	90 - 110	10/28/02

ICV (1) QCBatch: QC24505

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Arsenic		mg/L	1	0.999	100	90 - 110	10/28/02
Total Barium		mg/L	2	1.99	100	90 - 110	10/28/02
Total Cadmium		mg/L	0.50	0.502	100	90 - 110	10/28/02
Total Chromium		mg/L	0.20	0.200	100	90 - 110	10/28/02
Total Lead		mg/L	1	0.987	99	90 - 110	10/28/02
Total Selenium		mg/L	1	0.974	97	90 - 110	10/28/02
Total Silver		mg/L	0.25	0.245	98	90 - 110	10/28/02

CCV (1) QCBatch: QC24547

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Mercury		mg/L	0.001	0.00095	95	80 - 120	10/29/02

ICV (1) QCBatch: QC24547

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Mercury		mg/L	0.001	0.00097	97	80 - 120	10/29/02

CCV (1) QCBatch: QC24656

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0	<1.0	0	90 - 110	11/4/02
Carbonate Alkalinity		mg/L as CaCo3	0	232	0	90 - 110	11/4/02
Bicarbonate Alkalinity		mg/L as CaCo3	0	2	0	90 - 110	11/4/02
Total Alkalinity		mg/L as CaCo3	250	234	93	90 - 110	11/4/02

ICV (1) QCBatch: QC24656

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0	<1.0	0	90 - 110	11/4/02
Carbonate Alkalinity		mg/L as CaCo3	0	224	0	90 - 110	11/4/02
Bicarbonate Alkalinity		mg/L as CaCo3	0	18	0	90 - 110	11/4/02
Total Alkalinity		mg/L as CaCo3	250	242	96	90 - 110	11/4/02

CCV (1) QCBatch: QC24683

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25	24.1	96	90 - 110	11/4/02
Dissolved Magnesium		mg/L	25	23.5	94	90 - 110	11/4/02
Dissolved Potassium		mg/L	25	24.8	99	90 - 110	11/4/02
Dissolved Sodium		mg/L	25	25.8	103	90 - 110	11/4/02

ICV (1) QCBatch: QC24683

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25	25.8	103	95 - 105	11/4/02
Dissolved Magnesium		mg/L	25	24.5	98	95 - 105	11/4/02
Dissolved Potassium		mg/L	25	25.0	100	95 - 105	11/4/02
Dissolved Sodium		mg/L	25	26.0	104	95 - 105	11/4/02

CCV (1) QCBatch: QC24857

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/L	60	62.54	104	80 - 120	11/11/02
Acenaphthylene		mg/L	60	57.13	95	80 - 120	11/11/02
Acenaphthene		mg/L	60	61.48	102	80 - 120	11/11/02
Fluorene		mg/L	60	63.25	105	80 - 120	11/11/02
Phenanthrene		mg/L	60	68.12	113	80 - 120	11/11/02
Anthracene		mg/L	60	48.26	80	80 - 120	11/11/02
Fluoranthene		mg/L	60	49.52	82	80 - 120	11/11/02
Pyrene		mg/L	60	56.28	93	80 - 120	11/11/02
Benzo(a)anthracene		mg/L	60	70.68	117	80 - 120	11/11/02
Chrysene		mg/L	60	56.63	94	80 - 120	11/11/02
Benzo(b)fluoranthene		mg/L	60	66.63	111	80 - 120	11/11/02
Benzo(k)fluoranthene		mg/L	60	64.56	107	80 - 120	11/11/02
Benzo(a)pyrene		mg/L	60	61.57	102	80 - 120	11/11/02
Indeno(1,2,3-cd)pyrene		mg/L	60	57.86	96	80 - 120	11/11/02
Dibenzo(a,h)anthracene		mg/L	60	58.32	97	80 - 120	11/11/02
Benzo(g,h,i)perylene		mg/L	60	57.26	95	80 - 120	11/11/02
Nitrobenzene-d5		mg/L	60	51.63	86	80 - 120	11/11/02
2-Fluorobiphenyl		mg/L	60	53.43	89	80 - 120	11/11/02
Terphenyl-d14		mg/L	60	53.36	88	80 - 120	11/11/02

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1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # A0210241 16

Company Name: AMEC
Phone #: (915) 686-1978
Address: (Street, City, Zip) 301 N. Colorado St.
Fax #: (915) 618-0134
Contact Person: Mark Ehrlich
Invoice to: (If different from above)
Project #: ~~2580~~ 25170031 2M
Project Name: Amerada Hess
Project Location: Byrd Property
Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME
211580	MW # 8	2	2oz	✓				✓				✓		10/22	15:40
	↓	1													15:42
581	MW# 9	2	2oz					✓							16:00
	↓	1													16:02
682	MW#1	2	2oz					✓							16:15
		1													16:16
		1													16:20
		1													16:21
583	MW#2	2	2oz					✓							16:30
	↓	1													16:32
584	MW#6	2	2oz	✓				✓				✓		↓	16:50

ANALYSIS REQUEST
(Circle or Specify Method No.)

MTBE 8021B/602	BTEX 8021B/~~602~~	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/~~200.7~~	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Chlorides	Major Cations & anion				Turn Around Time if different from standard	Hold
	✓														✓	✓					
	✓														✓						
	✓														✓						
		✓	✓												✓	✓					
	✓																				
															✓						
	✓														✓						
	✓																				

Relinquished by: Date: 10/23/02 Time: 13:00
Received by: Helen Shelton Date: 10/23/02 Time: 1300
Relinquished by: Helen Shelton Date: 10/23/02 Time: 1830
Received by: Date: Time:
Relinquished by: Date: Time:
Received at Laboratory by: Vicki Quinn Date: 10-24-02 Time: 1020

LAB USE ONLY
Intact Y / N
Headspace Y / N
Temp 1° °
Log-in Review

REMARKS:
11/13F18
☐ Check if Special Reporting Limits Are Needed
Carrier # Greyhound 822 163 566 855-1

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C. 16 samples-HS

ORIGINAL COPY

6701 Aberdeen Avenue, Ste. 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

TraceAnalysis, Inc.

155 McCutcheon, Suite H
El Paso, Texas 79932
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # A0210 2413

Company Name: Amec Earth + Environmental — Phone #: 915 686 1578

Address: (Street, City, Zip) 301 ~~303~~ N Colorado Ste 350 — Fax #: 915 618 0137

Contact Person: Mark Ehrlich

Invoice to: (If different from above)

Project #: 25170 0312 M — Project Name: Amerada Hess

Project Location: Byrd Ranch — Sampler Signature: M. Ehrlich

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Cl	8015 M TPH GRO DRO	Turn Around Time if different from standard	Hold
21562	MW-9 @ 25'-26'	1	4 oz		X									10/21/02	1100		✓														✓	✓		
63	MW-9 @ 35'-36'	1	"		X									10/21/02	1420		✓														✓	✓		
64	Drum Sample MW-9	1	"		X									10/21/02	1415		~~✓~~				Don't Run Per Mark										~~✓~~	~~✓~~	10-24-02	

Relinquished by: [signature] Date: 10/23/02 Time: 13:00 — Received by: Helen Shelton Date: 10/23/02 Time: 1300

Relinquished by: Helen Shelton Date: 10/23/02 Time: 1830 — Received by: Date: Time:

Relinquished by: Date: Time: — Received at Laboratory by: Vicki [signature] Date: 102402 Time: 10:00

LAB USE ONLY
Intact (Y) / N
Headspace Y / N
Temp 1°
Log-in Review M

REMARKS: PdF 11/5/02

☐ Check If Special Reporting Limits Are Needed

Carrier # Greyhound GLI 163-566-855-1

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C. 3 samples-HS

ORIGINAL COPY

6701 Aberdeen Avenue, Ste. 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

TraceAnalysis, Inc.

155 McCutcheon, Suite H
El Paso, Texas 79932
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # A0210241 6

Company Name: AMEC
Phone #: (915) 686-1978
Address: (Street, City, Zip) 301 N. Colorado St. Suite 350
Fax #: (915) 618-0137
Contact Person: Mark Ehrlich
Invoice to: (If different from above)
Project #: 251700312M
Project Name: Amerada Hess
Project Location: Byrd Property
Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME
21588	MW#6	1		✓								✓		10/22	16:51
	↓	1													16:53
	↓	1													16:55
85	MW#4	2	2oz					✓							17:10
	↓	1													17:12

ANALYSIS REQUEST

(Circle or Specify Method No.)

MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	✓ Chlorides	✓ Major Cation + anion			Turn Around Time if different from standard	Hold
			✓	✓											✓	✓				
	✓														✓					

Relinquished by: Date: 10/23/02 Time: 13:00
Received by: Helen Shelton Date: 10/23/02 Time: 1300

Relinquished by: Helen Shelton Date: 10/23/02 Time: 1830
Received by: Date: Time:

Relinquished by: Date: Time:
Received at Laboratory by: Vicki Lewis Date: 10-24-02 Time: 10:00a

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C. 6 samples-HS

ORIGINAL COPY

LAB USE ONLY

Intact (Y) / N
Headspace Y / N
Temp 1° °
Log-in Review

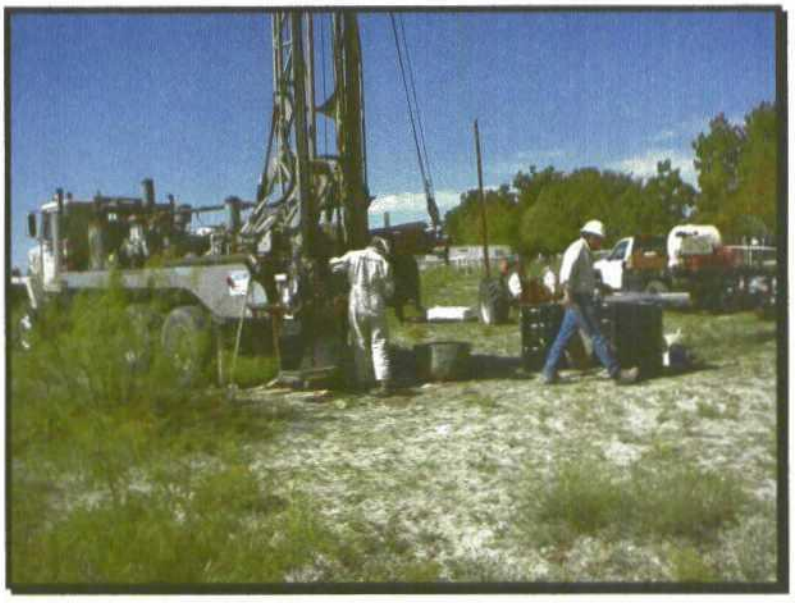
REMARKS: F 11/1/02

☐ Check If Special Reporting Limits Are Needed

Carrier # GLI 163-5466-855-1

Amerada Hess Corporation
Byrd Ranch
Lea County, New Mexico

October 21, 2002; Site of Monitor Well MW-9



October 21, 2002; Drilling operations, MW-9

amec

APPENDIX E

WASTE DISPOSAL RECORDS

GANDY-MARLEY, INC.

P. O. Box 1658
Roswell, NM 88202
Office (505) 347-0434
Fax (505) 347-0435

№ 3726

LEASE OPERATOR/SHIPPER/COMPANY Amerada Hess

LEASE NAME Byrd Lease

TRANSPORTER COMPANY R Marley TIME 3:30 AM/PM

DATE 11/22/2 VEHICLE NO. 7 DRIVER NO.

CHARGE TO AMEC Earth & Environmental Inc

TYPE OF MATERIAL

OCD

[ ] Other Material [ ] Contaminated soil [ ] C-117 No. _____

[ ] BS&W content _____

Description 1- Drum Soil Cuttings

6 Drums H2O 9 BS - Stilwell

VOLUME OF MATERIAL [ ]: ~~YARDS~~ 1 Drm : CELL# 14 : [ ] _____

AS A CONDITION TO GANDY-MARLEY, INC.'S ACCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, OPERATOR/SHIPPER REPRESENTS AND WARRANTS THAT THE WASTE MATERIAL SHIPPED HEREWITH IS MATERIAL EXEMPT FROM THE RESOURCE, CONSERVATION AND RECOVERY ACT OF 1976, AS AMENDED FROM TIME TO TIME, 40 U.S.C. §6901, et seq., THE NM HEALTH AND SAF. CODES, §361.001, et seq., AND REGULATIONS RELATED THERETO, BY VIRTUE OF THE EXEMPTION AFFORDED CONTAMINATED SOILS AND OTHER WASTE ASSOCIATED WITH THE EXPLORATION, DEVELOPMENT OR PRODUCTION OF CRUDE OIL OR NATURAL GAS OR GEOTHERMAL ENERGY.

ALSO AS A CONDITION TO GANDY-MARLEY, INC.'S ACCCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, TRANSPORTER REPRESENTS AND WARRANTS THAT ONLY THE MATERIAL DELIVERED BY OPERATOR/SHIPPER TO TRANSPORTER IS NOW DELIVERED BY TRANSPORTER TO GANDY-MARLEY, INC.'S FACILITY FOR DISPOSAL.

THIS WILL CERTIFY that the above Transporter loaded the material represented by this Transporter Statement at the above described location, and that it was tendered by the above described shipper. This will certify that no additional materials were added to this load, and that the material was delivered without incident.

DRIVER _____

FACILITY REPRESENTATIVE _____

White - GMI Canary - Shipper Pink - GMI Gold - Transporter

Superior Printing Service, Inc.

Gandy Marley, Inc.
P.O. Box 1658 Roswell, NM 88202
Phone 505-347-0434 Fax 505-347-0435

Amerada Hess Corp.
Box 840
Seminole, TX 79360

12/4/02

Detailed Report of material for Invoices 4605 thru 4605

EXEMPT OCD

Origin Byrd lease

Date:	Ticket No	Discription:	Transporter	Cell	Units	Unit Type:
11/22/02	6726	OCD EXEMPT SOILS	Bill Marley	750	1	BBLS
11/22/02	6726	OCD EXEMPT LIQUICS	Bill Marley		6	BBLS
		Byrd lease Total BBLS			7	BBLS
		EXEMPT OCD Total BBLS.			7	BBLS
		EXEMPT OCD Total Units.			7	Units

Amerada Hess Corp. Total Units. 7 Units